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The Promise and Perils of Open Finance

Law Working Paper N° 632/2022
May 2022

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Abstract

We are at the dawn of a new age of Open Finance. Open Finance seeks to harness the potential of new platform technology to enhance customer data access, sharing, portability, and interoperability—thereby leveling the informational playing field and fostering greater competition between incumbent financial institutions and a new breed of fintech disruptors. According to its proponents, this competition will yield a radical restructuring of the financial services industry: offering more and better choices for consumers looking to make fast payments, borrow money, invest their savings, manage household budgets, and compare financial products and services. The promise of Open Finance is very real. Yet its proponents have largely ignored the economics driving the development of the key players at the heart of this new infrastructure: data aggregators. Data aggregators are the connective tissue of Open Finance—the pipes through which the majority of this valuable data flows. Like other types of infrastructure, these pipes are characterized by economies of scale and network effects that erect substantial barriers to entry, undercut competition, and propel the market toward monopoly. In the United States, these dynamics are compounded by the highly fragmented structure of both the conventional financial services industry and the emerging fintech ecosystem. The result is an embryonic market structure in which a small handful of data aggregators have a massive head start, and where one in particular—Plaid—arguably already enjoys a dominant market position. This Article describes the promise and perils of Open Finance and explains how policymakers can tap into its potential while simultaneously preventing the abuse of monopoly power and avoiding the creation of a new strain of too-big-to-fail institutions.

Keywords: open finance, open banking, platforms, financial regulation, competition, antitrust, consumer protection, application programming interfaces, machine learning, artificial intelligence

JEL Classifications: D4, D53, G18, G20, G23, G28, K20, K21, K22, L1, L12, L17

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The Promise & Perils of Open Finance

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Data aggregators are the connective tissue of Open Finance—the pipes through which the majority of this valuable data flows. Like other types of infrastructure, these pipes are characterized by economies of scale and network effects that erect substantial barriers to entry, undercut competition, and propel the market toward monopoly. In the United States, these dynamics are compounded by the highly fragmented structure of both the conventional financial services industry and the emerging fintech ecosystem. The result is an embryonic market structure in which a small handful of data aggregators have a massive head start, and where one in particular—Plaid—arguably already enjoys a dominant market position. This Article describes the promise and perils of Open Finance and explains how policymakers can tap into its potential while simultaneously preventing the abuse of monopoly power and avoiding the creation of a new strain of too-big-to-fail institutions.

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INTRODUCTION

In the world of finance, the most precious commodity is *information*. The great banking dynasties of the Renaissance and Industrial Revolution—the Houses of Fugger and Medici, Rothschild and Morgan—all famously used their privileged access to information to amass enormous fortunes and wield political power on the global stage.[1] From their earliest beginnings, the London and New York Stock Exchanges were organized for the explicit purpose of preventing the dissemination of information about prevailing stock prices to anyone other than exchange members.[2] And today, hedge fund managers relentlessly chase down and jealously guard any and all information that they think can give them even the slightest edge over other investors.[3] These and myriad other examples reflect the golden rule

[1] *See* GREG STEINMETZ, *THE RICHEST MAN WHO EVER LIVED: THE LIFE AND TIMES OF JACOB FUGGER* (2015); PAUL STRATHERN, *THE MEDICI: POWER, MONEY AND AMBITION IN THE ITALIAN RENAISSANCE* (2016); NIALL FERGUSON, *THE HOUSE OF ROTHSCHILD: MONEY'S PROPHETS 1798-1848* (1998), and RON CHERNOW, *THE HOUSE OF MORGAN* (1990).

[2] *See* Paul Mahoney, *The Exchange as Regulator*, 83 VIRGINIA L. REV. 1453, 1490-1491 (1997) (describing London Stock Exchange rules restricting the dissemination of trading information); Harold Mulherin, Jeffry Netter, & James Overdahl, *Prices as Property: The Organization of Financial Exchanges from a Property Law Perspective*, 43 J. LAW & ECON. 591, 606-617 (1991) (describing New York Stock Exchange rules restricting the dissemination of trading information).

[3] In this respect, hedge fund managers are the prototypical "professionally informed traders"; see Ron Gilson & Reinier Kraakman, *The Mechanisms of Market Efficiency*, 70:4 VIRGINIA L. REV. 549, 569 and 594 (1984)

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of conventional finance: the party that can obtain and control the flow of information ultimately gets the gold.

The golden rule of conventional finance has long been reflected in the relationship between banks, brokerage firms, insurance companies, and their customers. The process of opening a new bank or brokerage account, applying for a loan, or taking out an insurance policy inevitably demands that customers hand over an enormous amount of personal information. Once this relationship is established, these financial institutions are then often in a position to collect additional information about what these customers buy, how they manage their money, and whether they pay their debts. In theory, these institutions can use this information to provide customers with better financial products and services. Yet in practice, this information ends up locked away in a legal, technological, and economic vault to which only incumbent financial institutions have the key.[4]

For centuries, exclusive access to these informational vaults has given incumbents a distinct advantage over both their own customers and potential competitors. But the world is changing before our very eyes. Today, rapid advances in information technology hold out the tantalizing prospect of unlocking these vaults. This technology includes application programming interfaces—or APIs—that enable incumbent banks, brokerage firms, and insurance companies to request and share customer information with other financial institutions.[5] These APIs are the technological backbone of an emerging financial market infrastructure designed to enhance data access, sharing, portability, and interoperability.[6] In the view of many observers, the emergence of this new infrastructure signals the dawn of a new age: the age of *Open Finance*.

The promise of Open Finance stems from its potential to dramatically reduce the legal and technological barriers that have historically made it difficult for customers to access their information, prevented them from easily sharing it with third parties, and thus deterred them from switching between the products and services offered by different financial institutions.[7] By reducing these barriers, Open Finance seeks to level the informational playing field, thereby promoting greater competition not only among incumbent financial institutions, but also between these incumbents and a new breed of "fintech" disruptors. These disruptors include online lending platforms such as SoFi and Lending Circle, stock trading and investment apps such as Robinhood, Betterment, and Acorns, and payment platforms such as PayPal, Venmo, Circle, and Wise.[8] In the eyes of its proponents, this competition will drive a radical restructuring of the financial services industry—offering more and better choices for

(explaining that professionally informed traders are investors that have made the human capital and other investments necessary to identify which pieces of information are relevant to the pricing of a given security, along with the likely impact of this information on its market price).

[4] These metaphorical vaults are described in greater detail in Part II.

[5] The mechanics, role, and types of APIs are described in greater detail in Part I.A.

[6] These core principles of Open Finance are described in greater detail in Part I.A.

[7] The promise of Open Finance is described in greater detail in Part II.

[8] The business of models of these fintech disruptors are described in Parts I.B and II.

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consumers looking to make fast payments, borrow money, invest their savings, manage household budgets, and compare financial products and services.

The promise of Open Finance is very real. Yet the shift toward Open Finance will inevitably force financial institutions and policymakers to confront a host of thorny technical challenges. Paramount amongst these challenges is ensuring that consumers give informed consent to the collection, transfer, and use of their personal information.[9] Once this consent has been obtained, it is also imperative that consumers are adequately protected against the risk of data breaches, identity theft, and cyber-fraud.[10] By the same token, for all the potential benefits of using new technology to promote greater competition, there exists the corresponding threat that expanding access to large volumes of potentially sensitive personal and transactional information will open the door to algorithmic discrimination and the exploitation of consumer behavioral biases.[11] Without question, successfully addressing these—already well understood[12]—challenges will be key to building trust in this new financial ecosystem.

Yet both proponents and critics of Open Finance have thus far ignored a far more fundamental peril. This peril is rooted in the economics underpinning the development of this new financial market infrastructure. The United States is home to over 10,000 banks and other insured deposit-taking institutions.[13] It is also home to thousands of brokerage firms, insurance companies, and other incumbent financial institutions, along with a large, diverse, and rapidly expanding ecosystem of fintech disruptors. This high level of industry fragmentation is the source of massive coordination problems that make it difficult for financial institutions to develop the standardized APIs necessary to unleash the promise of Open Finance. In the absence of both a common industry standard or government intervention, responsibility for

[9] *See e.g. See* Cesare Fracassi & William Magnusson, *Data Autonomy*, 74:2 VANDERBILT L. REV. 327, 373 (2020) and Kathryn Petralia, Thomas Philippon, Tara Rice & Nicolas Veron, *Banking Disrupted? Financial Intermediation in an Era of Transformational Technology*, 22 GENEVA REPORTS ON THE WORLD ECONOMY, 50 (2019).

[10] *See e.g.* Xavier Vives, *Digital Disruption in Banking*, ANN. REV. FIN. ECON. [forthcoming], 28; Petralia et al., *supra* note __, 51.

[11] As described in Parts II and III, this threat stems primarily from the use of artificial intelligence, machine learning, and advances analytics to gain commercial insights from this information. For a discussion of these threats outside the specific context of Open Finance, see e.g. Margot Kaminski & Jennifer Urban, *The Right to Contest AI*, 121:7 COLUMBIA L. REV. 1957 (2021); Daniel Schwarcz & Anya Prince, *Proxy Discrimination in the Age of Artificial Intelligence and Big Data*, 105 IOWA L. REV. 1257 (2020); Talia Gillis & Jann Spiess, *Big Data and Discrimination*, 86 U. CHICAGO L. REV. 459 (2019), and Solon Barocas & Andrew Selbst, *Big Data's Disparate Impact*, 104 CAL. L. REV. 671, 677–80 (2016). *See also* Committee for the Study of Digital Platforms, Market Structure and Antitrust Subcommittee, Final Report, 19-20 and 35-37 (July 1, 2019) [hereinafter, Report on Digital Platforms], https://www.judiciary.senate.gov/imo/media/doc/market-structure-report%20-15-may-2019.pdf.

[12] For previous scholarship and other work describing these and other technical challenges, see Nizah Geslevich Packin, *Show Me the (Data About the) Money!*, 2020:4 UTAH L. REV. 1277, 1317-1318, 1325, 1328-1329, and 1331 (2020); FINRA, *Know Before You Share: Be Mindful of Data Aggregation Risks*, Investor Alert (March 29, 2018), https://www.finra.org/investors/alerts/be-mindful-data-aggregation-risks, and Fracassi & Magnusson, *supra* note __, 358 and 373.

[13] The highly fragmented structure of the U.S. financial services industry is described in greater detail in Part III.A(i).

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developing these APIs has instead fallen to a small cadre of technology firms known as *data aggregators*.

Data aggregators are the connective tissue of Open Finance—the technological pipes through which the vast majority of customer information flows on its journey from one financial institution to another. The success of Open Finance—at least in the United States—therefore depends on the economics of data aggregation, and on the incentives of data aggregators to invest in the development of this new infrastructure. These economics are characterized by three mutually reinforcing dynamics.[14] First, as producers of information goods, data aggregators benefit from pronounced economies of scale and scope in connection with the collection and analysis of customer information. Second, at its core, data aggregation is a platform business: connecting incumbent financial institutions, fintech disruptors, and their customers. Like Amazon, Google, and Facebook, data aggregation thus bears all the hallmarks of a "two-sided market" in which strong network effects on each side of the market serve to attract users on the other side. Lastly, the market for software developers exhibits similar network effects, with the most talented developers wanting to write to the APIs of the most successful data aggregators.

Together, these dynamics yield a clear and troubling prediction. In theory, we should expect these economies of scale, scope, and network effects to erect significant barriers to entry, undercut competition, and propel the embryonic data aggregation market toward monopoly. And in practice, that is exactly what we observe in the marketplace.[15] Today, a small handful of data aggregators serves the entire U.S. financial services industry. Even more importantly, one of these data aggregators—Plaid—has rapidly built a dominant market position: providing API connectivity to more than 9,000 banks and other deposit-taking institutions, and over 4,000 fintech disruptors, in the U.S. alone. This observation leads to a stark and counterintuitive conclusion. In the short term, the new age of Open Finance may very well promote greater competition, spur new innovation, and enhance consumer choice. Yet in the longer term, the economics of data aggregation are likely to yield a highly concentrated industry structure, with one or more data aggregators wielding enormous power over the flow of customer information.

The emergence of this concentrated industry structure will inevitably open the door to abuse of market power. This abuse could theoretically include both monopoly pricing and the imposition of restrictions on platform access by data aggregators. Given their privileged access to customer information, data aggregators may also be tempted to expand vertically into the markets for the financial products and services currently supplied by the own clients. The prospect that data aggregators will abuse this power may deter both incumbent financial institutions and fintech disruptors from fully investing in the development and implementation of Open Finance. Perhaps more importantly, this new market structure would effectively recreate the informational vaults that Open Finance is designed to unlock, with data aggregators supplanting banks and other incumbent financial institutions at the apex of the

[14] The economics of data aggregation are described in greater detail in Part III.A.

[15] The evolving structure of the U.S. data aggregation market is described in greater detail in Part III.B.

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financial system. Paradoxically, the end result may therefore be a new and more muscular reincarnation of the golden rule of conventional finance.

The challenge for policymakers becomes how to fulfill the inherent promise of Open Finance while simultaneously minimizing the perils associated with market concentration, the abuse of monopoly power, and the creation of a new breed of too-big-to-fail institutions. Meeting this challenge demands that policymakers strike a delicate balance. On the one hand, policymakers should adopt policies designed to capitalize on any efficiency benefits available at the edge of *today's* technological frontier. On the other hand, policymakers must ensure that the markets in which this technology finds its applications remain fundamentally contestable, so that the forces of competition continue to drive innovation and push the boundaries of this frontier *tomorrow and beyond*.

To meet this challenge, this Article lays out a blueprint for a new regulatory framework governing the data aggregation market.[16] This blueprint is based on four pillars. The first pillar is a licensing regime for data aggregators that enables policymakers to collect information about this rapidly evolving market, ensure that licensed data aggregators obtain informed consent from customers, and protect customers against the risks of data breaches, identity theft, and cyber-fraud. The second pillar—building on Section 1033 of the Dodd-Frank Act[17]—is a more active role for the federal government in promoting the development of standardized APIs and other infrastructure designed to support customer data access, sharing, portability, and interoperability. The third is the imposition of a universal access requirement designed to ensure that data aggregators cannot unreasonably deny incumbent financial institutions, fintech disruptors, or their customers access to their platforms. And lastly, this blueprint calls for the structural separation of data aggregation from finance: preventing data aggregators from directly or indirectly offering financial products and services.

In advancing this new regulatory framework, we acknowledge that the age of Open Finance is not one that will be universally welcomed. Some observers will view it as further accelerating the harvesting and commoditization of our personal information.[18] Others will question whether it is really possible for consumers to give fully informed consent, or to protect them from the risks of data breaches, algorithmic discrimination, or exploitation. While this Article brackets these questions, we do not seek to minimize their importance. Instead, our message is aimed at the those who see Open Finance as the key to unlocking the informational vaults at the heart of our current financial system. Our message is simple: *be careful what you wish for*. While Open Finance holds out significant promise, the economics of data aggregation, as highlighted by the concentrated structure of the data aggregation market, pose even more significant perils. These perils demand new thinking, together with a new regulatory framework for the data aggregation market.

[16] This proposed regulatory framework is described in greater detail in Part IV.

[17] Section 1033 of the Dodd-Frank Act is described in greater detail in Part I.D.

[18] *See e.g.* Omri Ben-Shahar, *Data Pollution*, 11 J. LEGAL ANALYSIS 104 (2019) (coining the term "data maximization" to describe the constantly expanding accumulation and analysis of consumer information).

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This Article proceeds as follows. Part I introduces the core principles of Open Finance, describes the role of data aggregators and other key players in the emerging Open Finance ecosystem, and surveys the state of regulation in the United States and around the world. Part II explores the promise of Open Finance as a technological platform for leveling the informational playing field, promoting greater competition, enhancing consumer welfare, and fostering a more resilient financial system. Part III then explains how the economics of data aggregation are driving the emergence of a highly concentrated market structure that, over the long term, threatens to derail this promise. Part IV concludes by advancing a blueprint for how policymakers can promote the development of a diverse and vibrant Open Finance ecosystem, while also limiting the distortions created by market concentration, preventing the abuse of monopoly power, and avoiding the creation of a new breed of too-big-to-fail institutions.

I. THE NEW AGE OF OPEN FINANCE

Technological advances are rapidly changing our relationship with information. Innovations such as the internet, social media platforms, digital marketplaces, and smartphones have placed an enormous amount of information at our fingertips. Yet they have also paved the way for the commoditization of our personal information, fundamentally changed the dynamics of market competition, and given rise to sophisticated new ways of exploiting consumers.[19] These rapid changes have spurred a growing movement—flying under the banner of "Open Data"—calling on policymakers to better define and strengthen the legal rights of consumers over their personal information.[20] Open Finance represents a strand of this broader movement dedicated to promoting data access, sharing, portability, and interoperability within the financial services industry.[21] This Part describes the core principles of Open Finance, identifies the key players in this emerging ecosystem, and surveys the current legal landscape in the United States and around the world.

A. The Core Principles of Open Finance

Whenever we open a new bank or brokerage account, apply for a loan, or take out an insurance policy, we hand over an enormous amount of personal information: including, in

[19] For a more detailed description of these trends and their dangers, *see e.g.* ARIEL EZRACHI & MAURICE STUCKE, *VIRTUAL COMPETITION: THE PROMISE AND PERILS OF THE ALGORITHM-DRIVEN ECONOMY* (2016); Lina Khan, *Amazon's Antitrust Paradox*, 126 YALE L.J. 710 (2017); Rory Van Loo, *Digital Market Perfection*, 117 MICH. L. REV. 815 (2019), and Report on Digital Platforms, *supra* note __.

[20] The term "Open Data" is used in a wide variety of domains: from government, to healthcare, to academic research. While proponents of Open Data across these domains generally seek to foster open *access* to information, in the context of digital markets this access is often viewed as a necessary but insufficient condition for the advancement of policy objectives such as protecting consumers and promoting more vigorous competition.

[21] *See* Basel Committee on Banking Supervision (BCBS), *Report on Open Banking and Application Programming Interfaces* (November 2019) (emphasizing the importance of *data sharing* in the context of Open Banking—a subspecies of Open Finance—and its central role in promoting *competition*).

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many cases, our name, date of birth, marital status, home address, employer, salary, and social security number. Thereafter, our bank, broker, or insurance company is in an advantageous position to collect even more personal information about our spending habits, investment decisions, net worth, and whether or not we pay our debts.

Importantly, the business models, information systems, and regulation of these financial institutions have historically reflected the desire to maintain tight control over this information. Your bank has powerful economic incentives not to share private customer information with its competitors.[22] It probably also spends millions of dollars a year attempting to protect this information against the risks of fraud, information systems failures, and cyber-attacks.[23] And in the background, your bank faces the threat of potentially severe legal sanctions for breaches of customer confidentiality.[24] In theory, this private information can be used to offer you better financial products and services. Yet in practice, the result has long been a closed system in which your personal and transactional information resides within legal, technological, and economic vaults to which only incumbent financial institutions enjoy access. As we shall see, exclusive access to these informational vaults is ultimately what gives these incumbents an entrenched advantage over both their own customers and any potential competitors.[25]

Open Finance stands this closed system on its head. At the heart of Open Finance are three intertwined principles. The first is *data access*. The starting point for meaningful data access is the ability of customers to view the entire range of personal and transactional information that a financial institution has collected and produced about them.[26] This can be achieved by expressly giving customers property rights over this information, or by placing an affirmative obligation on financial institutions to provide this information to customers upon request.[27] The logical extension of data access is then *data sharing*: giving customers the power

[22] *See e.g.* Ben Bernanke, *Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression*, 73:3 AM. ECON. REV. 257 (1983) (describing the business model of banks as based on private information about borrower and loan quality).

[23] *See e.g.* Ron Shevlin, "How Much Do Banks Spend on Technology?" FORBES (April 1, 2019) (reporting average annual IT costs for mid-size U.S. banks—banks with between $500 million and $50 billion in assets—of 0.22% of assets. The report also notes that the IT costs of larger banks such as JPMorgan Chase, Bank of America, Citigroup, and Wells Fargo was over 0.40% of assets—in each case reflecting several billion dollars in IT costs per year).

[24] *See e.g.* Laura Noonan, "Capital One fined $80m for Data Breach", FIN. TIMES (August 6, 2020), https://www.ft.com/content/a730c6a0-c362-4664-a1ae-5faf84912f20.

[25] This closed system, and how Open Finance might open it up to greater competition, is described in greater detail in Part II.

[26] Of course, the principle of data access raises thorny but important questions about the type of information that should rightly be viewed as belonging to a customer versus that which should be viewed as belonging to a financial institution; see William McGeveran, *The Duty of Data Security*, 103 MINN. L. REV. 1135, 1148–52, 1164–68 (2019) and Joseph DeMarco & Brian Fox, *Data Rights and Data Wrongs: Civil Litigation and the New Privacy Norms*, 128 YALE L.J. 1016, 1024–26 (2019).

[27] *See* Fracassi & Magnusson, *supra* note __, 349-353. Fracassi and Magnusson view customer ownership and the imposition of affirmative data access and data sharing obligations on financial institutions as necessary complements. However, while we agree that this combination would represent a particularly strong set of rights

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to instruct financial institutions to provide their personal information to specified third parties—including, most importantly, other financial institutions.[28] Together, data access and data sharing are the first fundamental building block of Open Finance.

Intuitively, of course, we might not expect strong data access and data sharing rights to automatically yield meaningful benefits for consumers. Perhaps most importantly, if financial institutions can comply with their legal obligations by providing information in expensive and hard to use formats—e.g. hardcopy documents comprised of unstructured text—then the practical benefits of data access and data sharing may be very limited. This highlights the rationale for the second core principle of Open Finance: *data portability*. The International Standards Organization (ISO) defines data portability as the "ability to easily transfer data from one system to another without being required to re-enter data."[29] There are essentially two types of data portability.[30] The first—*export* portability—enables customers to download a virtual snapshot of their personal and transactional data from the information systems of one financial institution that can then be uploaded to the information systems of other institutions.[31] The key feature of export portability is therefore the demands it places on consumers to manually download and upload their personal information each and every time they want to share it with a third party. The second type of data portability—*platform* portability—relies on an automated electronic interface to facilitate the transfer of customer data from one financial institution to another.[32] Unlike export portability, platform portability thus theoretically enables the large-scale and continuous transfer of real-time customer information between financial institutions. Just as importantly, platform portability enables customers to control how their information is used, and by whom, without forcing them to personally coordinate the transfer process.

The automation, scalability, and other efficiency benefits of platform portability are reflected in the third core principle of Open Finance: *data interoperability*.[33] The ISO defines data interoperability as the "ability of two or more systems or applications to exchange information and to mutually use the information that has been exchanged."[34] In a nutshell, data interoperability envisions the development of standardized protocols that enable otherwise independent or siloed information systems to send automated requests for specified information to one another, and then to automatically receive the requested information in a

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and obligations, it is not strictly speaking necessary for the purposes of ensuring effective data access or data sharing.

[28] *Id.*

[29] *See* ISO/IEC 19941:2017 Information Technology–Cloud Computing–Interoperability and Portability, section 3.2.1, https://www.iso.org/obp/ui/#iso:std:iso-iec:19941:ed-1:v1:en.

[30] *See* Gabriel Nicholas, *Taking It With You: Platform Barriers to Entry and The Limits of Data Portability*, 27 MICH. TECH. L. REV. 263, 269 (2021).

[31] *Id.*

[32] *Id.*

[33] *See* Oscar Borgogno & Giuseppe Colangelo, *Data Sharing and Interoperability: Fostering Innovation and Competition Through APIs*, 35:5 COMPUTER LAW AND SECURITY REV. 105314 (2019) and Fracassi & Magnusson, *supra* note __, 353-358 (both describing data interoperability as a key component of Open Finance).

[34] ISO, *supra* note __, section 3.1.1.

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specified format.[35] In theory, this standardization enables financial institutions that follow these protocols to simply "plug-and-play" into an existing network: giving these institutions access to the customer data of other network participants without granting them direct access to their underlying information systems.[36]

The technological workhorses of data interoperability are software protocols known as application programming interfaces (APIs). At its most basic level, an API represents a structured data sharing agreement between two or more network participants: a set of common data standards, messaging formats, rules, and procedures that enable the information systems of these network participants to communicate with one another.[37] In effect, APIs are the language, grammar, and syntax that enable information systems to describe the kind of data that can be requested and retrieved, how to request and retrieve it, and the format in which this data will be provided to the recipient. By specifying these inputs and outputs *ex ante* and enshrining them in executable computer code, APIs facilitate the rapid and automated transfer of an enormous amount of customer information across a potentially very large network of financial institutions.

There are three types of APIs—each reflecting a different level of interoperability. The first APIs used in the financial services industry were *closed* APIs designed to eliminate internal data silos and enhance information sharing within large, complex financial institutions.[38] More recently, many financial institutions have also invested in the development of *partner* APIs, pursuant to which a limited number of strategic partners seek to leverage enhanced data sharing in order to improve data analytics, offer complementary services, or develop new products.[39] Lastly, *open* APIs are based on publicly available data standards that technically enable any software developer to follow the relevant protocols and access the customer information held by network participants.[40] Whereas closed and partner APIs both retain elements of the existing closed system, open APIs thus represent the purest embodiment of the core principles of Open Finance.

Together, these core principles reflect the desire to promote what Professors Cesare Fracassi and William Magnusson have labelled "data autonomy": the ability of consumers to

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[35] *See* Markos Zachariadis & Pinar Ozcan, "The API Economy and Digital Transformation in Financial Services: The Case of Open Banking", SWIFT INSTITUTE WORKING PAPER NO. 20016-001, 6 (June 15, 2017) (defining data interoperability).

[36] Although, as described below, participation in this network will also hinge on whether the relevant application programming interfaces are *closed*, *partnered*, or *open*.

[37] *See* DANIEL JACOBSON, GREG BRAIL & DAN WOODS, *APIS: A STRATEGY GUIDE* (2012) (describing APIs as "a way for two computer applications to talk to each other over a network using a common language that they both understand").

[38] These data silos often reflect the fact that these large, complex institutions pursued growth strategies based on mergers and acquisitions, leaving them with a highly fragmented patchwork of legacy information systems; see Raj Chawla, "Legacy Systems Are Banks' Achilles' Heel", AM. BANKER (June 4, 2021).

[39] *See* BCBS, *supra* note __, 19 (defining a partner API as "an API created with one or two strategic partners who will create applications, add-ons, or integrations with the API").

[40] *Id.* (defining an open API as "an interface that provides a means of accessing data based on a public standard").

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exercise control over their own personal information.[41] As explained by Fracassi and Magnusson, the concept of data autonomy envisions giving consumers "a set of rights over their data that wrests control over data back from the large institutions that, until now, have maintained a vice grip over it."[42] The economic benefits of Open Finance—especially in terms of levelling the informational playing field, promoting greater competition, improving the price and quality of financial products and services, and building a more resilient financial system—are described in Part II.

B. The Open Finance Ecosystem

Perhaps not surprisingly, the age of Open Finance envisions a new financial ecosystem—one that is already emerging in many parts of the world. While its size and composition vary across jurisdictions, this ecosystem is characterized by the interaction of four groups of key players. The first group is *consumers*. Consumers occupy a unique position in this ecosystem as both the producers of the raw material—data—that is used to design and market financial products and services, and as the end consumers of these same products and services. This data can include personal information about the identity of consumers: e.g. where they live and work, their family status, and economic circumstances. Importantly, it can also include transactional information revealing where and when consumers shop, how much they spend, and whether they pay their credit card and other bills on time and in full. This digital "gold" and "platinum" can be extremely valuable in the hands of financial institutions, digital marketplaces, and other merchants, who can use it to design better products and services, develop more targeted marketing strategies, and potentially exploit any behavioral biases revealed by consumer preferences and spending habits.[43]

The second group of key players are *incumbent financial institutions*: This expansive category includes established banks, brokerage firms, asset managers, insurance companies, and other financial intermediaries. There is no precise or universally accepted definition of what makes a business enterprise an "incumbent." Broadly speaking, however, incumbent financial institutions will have been in business long enough to develop large and established customer bases, and potentially a dominant market position. The age and size of incumbent financial institutions may also create institutional path dependency: forcing them to rely on outdated legacy information systems and, thus, relatively slow to adopt new technologies. Accordingly, while incumbents may enjoy a comparative advantage in terms of the sheer volume of consumer data in their possession, they will often find themselves at a comparative disadvantage in terms of the use of cutting edge technology that would enable them to make the most of this data. Viewed in this light, perhaps the most intuitively tractable definition of

[41] In addition to data access, portability, and interoperability, the concept of data autonomy as articulated by Fracassi and Magnusson also encompasses customer ownership of their personal data and strong cybersecurity; Fracassi & Magnusson, *supra* note __.

[42] *Id.* at 333.

[43] *See* Adam Levitin, *Pandora's Digital Box: The Promise and Perils of Digital Wallets*, 166:2 U. PENN. L. REV. 305, 333 (2018) (describing consumer data as "digital gold" and transactional data as "digital platinum").

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an incumbent financial institution is one that, whether intentionally or not, has created the type of informational vault that Open Finance seeks to unlock.

Standing opposite incumbent financial institutions in the Open Finance ecosystem is a third group of key players: *fintech disruptors*. Once again, there is no single, widely accepted definition of "fintech." As explained by economist Thomas Philippon: "FinTech covers digital innovations and technology-enabled business model innovations in the financial sector. Such innovations can disrupt existing industry structures and blur industry boundaries, facilitate strategic disintermediation, revolutionize how existing firms create and deliver products and services, provide new gateways for entrepreneurship, [and] democratize access to financial services."[44] This broad definition captures digital lending platforms such as SoFi and Funding Circle, stock trading and investment apps such as Robinhood and Acorns, and payment platforms such as Venmo, Stripe, and Wise.

The distinguishing feature of these fintech disruptors is that their business models are based on the use of advanced information technology—e.g. data mining and analytics, machine learning, and artificial intelligence—to provide highly automated financial products and services.[45] Crucially, however, while these new entrants typically enjoy a comparative technological advantage,[46] they have historically lacked access to the raw inputs that would enable them to capitalize on it: the detailed customer and transactional data in the hands of incumbent financial institutions.[47] The informational position, technological capacity, and economic interests of fintech disruptors thus stand in sharp juxtaposition with those of the incumbent financial institutions they ultimately hope to disrupt.

The last, and by far the least studied, group of key players are *data aggregators*.[48] Data aggregators are technological platforms that connect all the other players within the Open Finance ecosystem (*see* Figure 1). These platforms develop and manage partner or open APIs designed to access the customer data held by incumbent financial institutions and to share it with fintech disruptors. There are two basic types of data aggregators. The first type serves as a centralized *repository* of customer data, and as the technological *conduit*—the pipes—through which this data is shared between financial institutions. The second type combines these roles with the provision of advanced *data analytics* that enable their clients—both incumbent

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[44] Thomas Philippon, "The Fintech Opportunity", NAT'L BUREAU ECON. RESEARCH WORKING PAPER NO. 22476 (August 2016), 2.

[45] *See* Xavier Vives, *Digital Disruption in Banking*, ANN. REV. FIN. ECON. [forthcoming], 2 (November 2019) ("the FinTech sector… can be understood as the use of innovative information and automation technology in financial services.") and Petralia et al., *supra* note __, 24 (identifying data analytics and automation as key features of fintech business models).

[46] *See* Petralia et al., *supra* note __, 38.

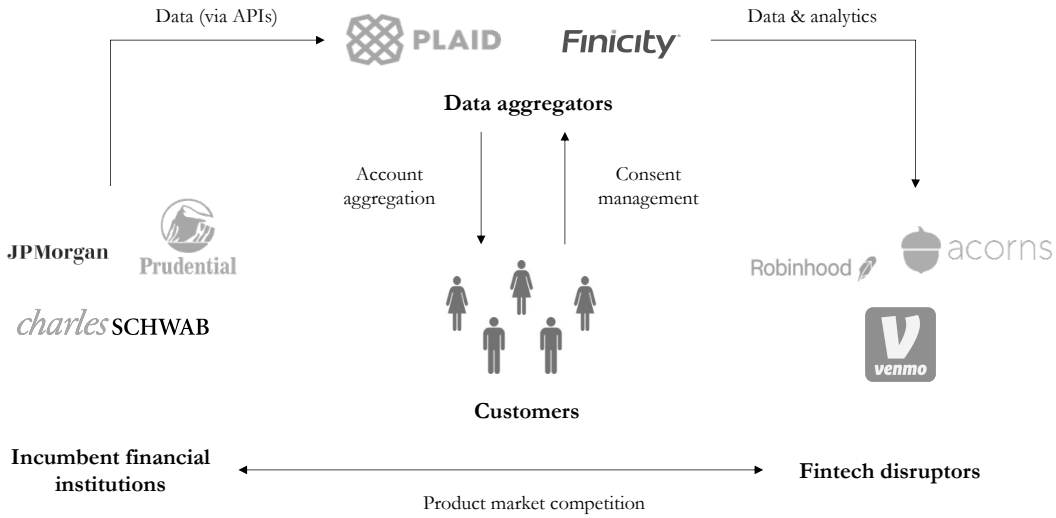
[47] *See* Zhiguo He, Jing Huang & Jidong Zhou, "Open Banking: Credit Market Competition When Borrowers Own the Data", BECKER FRIEDMAN INSTITUTE WORKING PAPER NO. 2020-168, 2 (November 2020) and Vives, *supra* note __, 8 (both noting that while fintech disruptors typically have less information, they often have superior tools for analyzing it).

[48] To date, the most sustained and informative treatment of the role of data aggregators in the United States is by Professor Nizan Geslevich Packin; see Nizah Geslevich Packin, *Show Me the (Data About the) Money!*, 2020:4 UTAH LAW REV. 1277 (2020).

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financial institutions and fintech disruptors—to extract insights from this data that can theoretically help them better design and market their products and services. In many cases, data aggregators also interact directly with consumers: enabling them to aggregate their personal data across financial institutions, and to control who has access to this information and what they can do with it.

Figure 1: The Open Finance Ecosystem



For incumbents, partnering with data aggregators enables them to leverage cutting edge technology, while simultaneously saving them the time and expense of striking individual data sharing agreements with hundreds, if not thousands, of fintech disruptors.[49] For nascent disruptors, data aggregators represent a cost-effective way of outsourcing the development and management of APIs, the extraction, aggregation, and analysis of customer data, and the creation of robust front-end user experiences.[50] This enables fintech entrepreneurs to focus their time, energy, and other resources on the development of their core products and services. Importantly, by bringing together these two groups of players, data aggregators thus serve as the central hubs of these rapidly expanding informational networks—the connective tissue of the emerging Open Finance ecosystem.

C. Open Finance Around the World

The relationships between the key players in the Open Finance ecosystem are inevitably shaped by the extent to which the law supports the core principles of data access, sharing, portability, and interoperability. Perhaps most importantly, the incentives of

[49] *See* Amias Gerety & Nate Soffio, "Impacts of BaaS Intermediation on Embedded Finance", QED QUARTERLY NEWSLETTER, 4 (March 30, 2021), https://www.qedinvestors.com/blog/impacts-of-baas-intermediation-on-embedded-finance.

[50] *See* Petralia et al., *supra* note __, 43.

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incumbent financial institutions to participate in this ecosystem, and on what terms, are a function of both their legal obligations to provide access to and share customer data, and how the law allocates the potentially significant costs of building the technological, operational, and other infrastructure necessary to ensure data portability and interoperability.

At present, the laws supporting Open Finance vary widely across jurisdictions.[51] At one end of the spectrum, the United Kingdom has recently introduced a comprehensive new legal framework targeting the retail banking industry.[52] Unveiled in 2017, this "Open Banking" framework imposes an affirmative obligation on the nine largest "high street" banks—representing over 90% of domestic retail banking business[53]—to provide third parties with free and continuous access to specific customer information.[54] This information includes transaction-level data for both personal and business current accounts.[55] It also includes information about the prices, charges, features, benefits, and other terms and conditions associated with these accounts, along with those of commercial credit cards and small business loans.[56] At the request of the customer, this information must be shared with third parties in a secure and standardized format.[57] To ensure the protection of customer data, third parties seeking access to this data must first register with the Financial Conduct Authority (FCA) and comply with basic data privacy and security requirements.[58]

In addition to introducing legal rules mandating data access and portability, the United Kingdom's Open Banking framework also establishes a new governance structure designed to promote data interoperability. At the heart of this structure is a special purpose body, the Open Banking Implementation Entity (OBIE), funded by the nine participating banks and overseen by the FCA, the Competition and Markets Authority, and HM Treasury.[59] The mandate of OBIE is to develop, publish, and update an open API—known as the *Open Banking Standard*[60]—with the objective "to drive competition, innovation, and transparency in UK retail banking."[61] OBIE is also responsible for developing industry guidelines governing data

[51] *See* BCBS, *supra* note __ for an overview of different approaches to the implementation of Open Finance around the world.

[52] This framework was implemented under the *Payment Services Regulations*, 2017, No. 752 and UK Competition and Markets Authority, *Retail Banking Market Investigation Order* (2017), https://www.gov.uk/government/publications/retail-banking-market-investigation-order-2017.

[53] *See* UK Competition and Markets Authority, *Retail Banking Market Investigation: Final Report*, 224, 237, and 254 (August 9, 2016), https://assets.publishing.service.gov.uk/media/57ac9667e5274a0f6c00007a/retail-banking-market-investigation-full-final-report.pdf.

[54] *See Retail Banking Market Investigation Order 2017*, Art. 12.

[55] *Id.*, Art. 14.

[56] *Id.*, Art. 12.

[57] *Id.*, Art. 10.

[58] *See* Open Banking Implementation Entity (OBIE), "Enrolling onto the OBIE Directory: How to Guide" (2020), https://www.openbanking.org.uk/wp-content/uploads/Enrolling-Onto-Open-Banking-Guide.pdf.

[59] *Retail Banking Market Investigation Order 2017*, Art. 10.

[60] *See* OBIE, *The Open Banking Standard* (2021), https://standards.openbanking.org.uk/.

[61] *See* OBIE, "About OBIE" (2021), https://www.openbanking.org.uk/about-us/.

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security and fraud protection, and for managing the process for resolving disputes between participating banks, third parties, and API developers.[62] Accordingly, despite the framework's relatively limited scope, the United Kingdom's commitment to enhancing data access, portability and, in particular, interoperability via the development of open APIs has, in the eyes of many observers, marked it out as the early gold standard amongst Open Finance initiatives.[63]

Another jurisdiction that has made significant strides toward implementing the core principles of Open Finance is Australia. In August 2019, the Australian government enacted legislation introducing a "Consumer Data Right" (CDR) giving individual and small business customers the right to instruct businesses to share their personal information regarding the consumption of goods and services with third parties.[64] While the objective is ultimately to expand the application of the CDR across sectors, the first stage of its implementation, beginning in January 2020, targeted the retail banking industry—and specifically the country's four largest banks.[65] The CDR will eventually enable customers to share a broad range of information, including customer, product, account, and transaction data for savings and current accounts, credit cards, mortgages, and other loans.[66] Like the United Kingdom, the Australian government has also established a new Data Standards Body responsible for establishing technical standards governing consumer data sharing.[67]

The implementation of Open Finance in the European Union has thus far followed a different, and somewhat more modest, trajectory. Pursuant to the recently revised *Payment Services Directive* (PSD2), banks must provide objective, real-time, and non-discriminatory access to customer account data to a wide range of third parties.[68] However, beyond this basic

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[62] *See* OBIE, "Open Banking: Guidelines for Open Data Participants", 16 (July 2018), https://www.openbanking.org.uk/wp-content/uploads/2021/04/Guidelines-for-Open-Data-Participants.pdf.

[63] Borgogno & Colangelo, *supra* note __, 8-9 ("the British Open Banking remedy stands out as the only well-structured mechanism closely monitored by a government body… with the goal of delivering a sound implementation of account data access.").

[64] *See Treasury Laws Amendment (Consumer Data Right) Bill 2019* (Cth), https://parlinfo.aph.gov.au/parlInfo/download/legislation/bills/r6370_aspassed/toc_pdf/19126b01.pdf;fileType=application%2Fpdf.

[65] *See* Australia Competition and Consumer Rights Commission, *Competition and Consumer (Consumer Data Right) Rules 2019* (September 2, 2019), https://www.accc.gov.au/system/files/Proposed%20CDR%20rules%20-%20August%202019.pdf and *Consumer Data Right Rules–Data Sharing Obligations, Phasing Summary Table*, (September 2, 2019), https://www.accc.gov.au/system/files/Proposed%20CDR%20rules%20-%20Phasing%20table%20-%202%20September%202019%20rules%20update.pdf.

[66] *Competition and Consumer (Data Right) Rules 2019*, Schedule 3, section 6.5.

[67] *See* "Consumer Data Standards: Standards", https://consumerdatastandards.gov.au/standards/ (describing the role of the Data Standards Body in devising technical standards).

[68] *See* European Council Directive, 2015/2366, 2015 O.J. (L 337/35), Arts. 64-68. PSD2 identifies two types of third parties that are permitted to access consumer account information: so-called "Account Information Service Providers" (AISPs), which enjoy read-only access to customer account information and (2) "Payment Initiation Service Providers" (PISPs), which have the ability to initiate payments directly from customer accounts. For a more detailed description of the PSD2 data access rules, see Giuseppe Colangelo & Oscar Borgogno, *Data, Innovation and Transatlantic Competition in Finance: The Case of the Access to Account Rule*, 31 EUR. BUS. L. REV. 573 (2020).

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data access rule, PSD2 does relatively little to advance the core principles of data sharing, portability, or interoperability. As a preliminary matter, the access rule itself only applies to a relatively narrow range of payment accounts.[69] Unlike Australia, for example, the rule does not cover savings accounts, credit cards, mortgages, or small business loans. More importantly, PSD2 does not specify the format in which this data must be provided to third parties.[70] Nor does it envision any concrete steps to promote the development of open APIs or other technical standards designed to enhance data interoperability.[71] Especially when combined with PSD2's relatively onerous data security requirements, it is thus not surprising that many third parties have initially reported struggling to gain timely and cost-effective access to account information.[72]

Beyond the United Kingdom, Australia, and the European Union, a number of other jurisdictions are starting to build momentum in the realm of Open Finance. Brazil, Mexico, and Japan have all recently taken steps to introduce Open Banking frameworks.[73] The central banks in Hong Kong and Singapore have developed open APIs designed to foster collaboration between incumbent banks, fintech disruptors, and data aggregators.[74] And in Canada, an Advisory Committee on Open Banking established by the federal government recently delivered its final report laying out a detailed blueprint for implementing what it labels "consumer-driven finance."[75] Collectively, these developments raise an important and awkward question: *where is the United States?*

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[69] Specifically, PSD2's data access rule only applies to "payment accounts," which the Directive defines broadly as "account[s] held in the name of one or more payment service users which [are] used for the execution of payment transactions."; *Id.*, Art. 4(12).

[70] *Id.*, 366.

[71] *Id.*, 366-367.

[72] *See* "The Sobering September Preview: Banks' PSD2 APIs Far From Ready", TINK (June 14, 2019), https://tink.com/blog/open-banking/psd2-updated-sandbox/.

[73] *See* Banco Central Do Brasil, "Open Banking", https://www.bcb.gov.br/en/financialstability/open_banking (describing Brasil's Open Banking framework); Greenberg Taurig, LLP, "New Open Banking Regulation in Mexico" (June 16, 2020), https://www.gtlaw.com/en/insights/2020/6/open-banking-en-mexico-nueva-regulacion (describing Mexico's "Fintech Law"), and Sean Creehan & Paul Tierno, "The Slow Introduction of Open Banking and APIs in Japan", PACIFIC EXCHANGES PODCAST (May 2, 2019), https://www.frbsf.org/banking/asia-program/pacific-exchanges-podcast/open-banking-apis-japan/ (describing the incremental implementation of Open Banking in Japan).

[74] *See* Hong Kong Monetary Authority, *Open Banking Programming Interface (API) for the Banking Sector*, https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech/open-application-programming-interface-api-for-the-banking-sector/ and Monetary Authority of Singapore, *Application Programming Interfaces (APIs)*, https://www.mas.gov.sg/development/fintech/technologies---apis.

[75] *See* Government of Canada, Press Release, "Government Welcomes Final Report from Advisory Committee on Open Banking" (August 4, 2021), https://www.canada.ca/en/department-finance/news/2021/08/government-welcomes-final-report-from-advisory-committee-on-open-banking.html.

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D. Open Finance in the United States

The United States has thus far taken what has been described as a "market-driven" approach to Open Finance.[76] Indeed, the only significant federal legislation in this area is an obscure provision of the *Dodd-Frank Wall Street Reform and Consumer Protection Act*, the omnibus statute passed by Congress in the wake of the global financial crisis.[77] Section 1033 of the Dodd-Frank Act requires providers of financial products and services to make available to a consumer, upon request, any information in their possession or control "relating to any transaction, series of transactions, or to the account including costs, charges and usage data."[78] Section 1033 requires that this information be provided "in an electronic form usable by customers"[79] and mandates the Consumer Financial Protection Bureau (CFPB) to prescribe standards "to promote the development and use of standardized formats for information, including through the use of machine readable files, to be made available to consumers."[80]

The financial products and services covered by Section 1033 include deposit-taking, payments, check cashing, loans, real estate services, consumer reporting services, and financial data processing.[81] The CFPB is also empowered to expand the scope of covered products and services in certain circumstances, including where a product or service is being used "as a subterfuge or with a purpose to evade any Federal consumer financial law."[82] However, while Section 1033 technically applies to a relatively wide range of financial products and services, its scope and operation are uniquely limited in one very important respect. Specifically, Section 1033 only creates an express data access right in favor of *customers themselves*—it says absolutely nothing about whether financial institutions must also share this data with *third parties*. As a result, while Section 1033 takes constructive steps toward the introduction of one-off export potability, it is silent on the core principles of platform portability and interoperability.

Following the enactment of the Dodd-Frank Act in July 2010, the CFPB did not take any public action to implement Section 1033 until October 2017.[83] This initial foray involved the release of non-binding principles governing the use of customer information by data

[76] *See* BCBS, *supra* note __.

[77] *See* Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010) [hereinafter Dodd-Frank Act].

[78] Dodd-Frank Act, §1033(a). This broad data access requirement is then subject to several exclusions for confidential commercial information, information subject to confidentiality laws, and other similar matters; *Id.*, §1033(b).

[79] *Id.*, §1033(a).

[80] *Id.*, §1033(d).

[81] *Id.*, §1002(5) and (15)(A) (together defining a "consumer financial product or service").

[82] *Id.*, §1002(15)(A)(xi).

[83] In fact, a search of the CFPB website reveals no references to Section 1033 whatsoever before the publication of a request for information issued in November 2016; see CFPB, *Request for Information Regarding Consumer Access to Financial Records* (November 22, 2016), https://files.consumerfinance.gov/f/documents/112016_cfpb_Request_for_Information_Regarding_Consumer_Access_to_Financial_Records.pdf.

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aggregators.[84] These principles, which the CFPB expressly acknowledges "are not intended to alter, interpret, or otherwise provide guidance on" existing legal protections, essentially just restate the core rights and obligations under Section 1033: including the obligation on covered financial institutions to provide customers with timely access to their personal information in a secure and usable format.[85] The CFPB principles also encourage financial institutions to obtain informed consent, ensure the security and accuracy of customer data, and put in place mechanisms for resolving any customer disputes.[86] Importantly, however, the principles do not address the more fundamental uncertainty at the heart of Section 1033 regarding the ability of customers to instruct financial institutions to share their information with third parties.[87]

The CFPB principles were followed by the publication of an Advanced Notice of Proposed Rulemaking (ANPR) in November 2020.[88] The ANPR lays out the background, objectives, and core provisions of Section 1033, describes the evolving Open Finance ecosystem in the United States, and identifies a number of questions on which the CFPB sought comment from industry stakeholders, policy groups, and the general public.[89] Amongst other matters, these questions related to the costs and benefits of consumer data access, the optimal scope of data access rights, the impact of greater data access on competition, data privacy and security, and the role of the CFPB and industry stakeholders in the design and implementation of data standards.[90] The range of questions canvassed in the ANPR is both thorough and important. At the same time, over a decade after the enactment of the Dodd-Frank Act, the fact that the CFPB has only recently started to seriously engage with these questions demonstrates just how far the United States has fallen behind many other jurisdictions.

In the absence of a well-developed legal framework, the burden of developing common data sharing standards has largely fallen to the financial services industry itself. Prominent industry initiatives include the Financial Data Exchange (FDX), a non-profit consortium of incumbent financial institutions, fintech disruptors, and data aggregators created with the objective of developing "a common, interoperable, royalty-free standard for secure and convenient consumer and business access to their financial data."[91] NACHA, the organization that governs the ACH Payment Network, has similarly created a standard setting

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[84] *See* CFPB, *Consumer Protection Principles: Consumer-Authorized Financial Data Sharing and Aggregation* (October 18, 2017), https://files.consumerfinance.gov/f/documents/cfpb_consumer-protection-principles_data-aggregation.pdf.

[85] *Id.*, Principles 1 and 2.

[86] *Id.*, Principles 3, 5, 7, and 8.

[87] Packin, *supra* note __, 1288.

[88] *See* CFPB, *Advance Notice of Proposed Rulemaking, Consumer Access to Financial Records*, 85 FED. REG. 71,003 (November 6, 2020).

[89] *Id.*, 4-16.

[90] *Id.*, 24-33.

[91] *See* FDX, "About FDX", https://financialdataexchange.org/FDX/About/FAQ-US/FDX/About/FDX_US_FAQ.aspx?hkey=901b169a-cf60-48e3-88dd-a438f54c6c43#WhatisFDX.

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group called Afinis that has published several open APIs for use in the payments industry.[92] Yet it would be remarkably shortsighted to view these initiatives simply as a burden—a digital cross that the industry has been forced to bear. Indeed, as we shall see, the absence of government intervention has created an enormous opportunity for at least one key group of industry stakeholders to shape this emerging financial market infrastructure.

II. THE PROMISE OF OPEN FINANCE

In the eyes of its proponents, the new age of Open Finance holds out the promise of a revolution. By leveling the informational playing field between incumbent financial institutions and fintech disruptors, they believe Open Finance will inject much needed competition into the financial services industry. This competition will then encourage the development and adoption of new technologies—driving lower costs, better quality products and services, and the emergence of a more resilient financial system. This Part describes the still largely theoretical promise of Open Finance. Part III then explains why the concentrated structure of the Open Finance ecosystem in the United States makes it increasingly unlikely that this promise will be fulfilled.

A. A Level Informational Playing Field

The promise of Open Finance stems first and foremost from the benefits of unlocking the tens of thousands of informational vaults at the heart of our current financial system. As we have seen, the key feature of this closed system is that incumbent banks, brokers, asset managers, insurance companies, and other financial institutions each enjoy a high degree of control over the personal information disclosed to them by their customers, along with the valuable payment and other transactional data generated over the course of their customer relationships. To protect the economic value of this private information, the business models, information systems, and legal frameworks of these financial institutions have for centuries been designed to keep it out of the public domain: away from the prying eyes of competitors, regulators, and even from customers themselves.

These vaults tilt the informational playing field in favor of incumbent financial institutions. Incumbent banks, for example, can use this private information to screen and monitor the creditworthiness of their existing borrowers. This gives incumbent banks an edge over potential competitors, who would theoretically need to collect and analyze this customer information from scratch.[93] Compounding matters, where competitors are not able to obtain or otherwise replicate all of this private information, incumbent banks will retain a comparative

[92] *See* NACHA, "Available APIs", https://www.nacha.org/content/available-apis.

[93] There is a large literature in financial economics exploring the existence and impact of information asymmetries between incumbent banks, customers, and competitors; *see e.g.* Robert Marquez, *Competition, Adverse Selection, and Information Dispersion in the Banking Industry*, 15:3 REV. FIN. STUD. 901 (2002); Mitchell Pedersen & Raghuram Rajan, *The Benefits of Lending Relationships: Evidence From Small Business Data*, 49:1 J. FIN. 3 (1994) Raghuram Rajan, *Insiders and Outsiders: The Choice Between Informed and Arm's-Length Debt*, 47 J. FIN. 1367 (1992), and Bernanke, *supra* note __.

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advantage in understanding the business and credit profile of their customers—enabling them to more accurately price and better structure the terms of individual loans.[94] This can lead to a "winner's curse," where competitors are only able to attract customers away from incumbents when they have *underpriced* the relevant business, credit, and other risks.[95] Anticipating this prospect, competitors may rationally decide not to vigorously compete for an incumbent's customers, thus further solidifying the advantages of incumbency.

Incumbent financial institutions can also use aggregated customer information to gain valuable insights into consumer saving, spending, and borrowing habits. These insights can then be used to design better financial products and services, create more effective and targeted advertising campaigns, and more accurately measure and price potential risks.[96] Crucially, the larger the number of customers, and the more granular the information that incumbents have about them, the more insights this information is likely to yield. Once again, this gives older, larger incumbents a distinct informational advantage. Yet even if these incumbents do not want to leverage customer information in this way, the simple ability to exclude others from doing so serves to further entrench the competitive *status quo*.

Given these advantages, it should come as no surprise that incumbent financial institutions have historically gone to great lengths to defend these informational bastions against a succession of barbarians at the gate. Most recently, in response to the growing threat posed by fintech disruptors, incumbents such as JPMorgan, PNC Bank, and Capital One have been accused of throwing up an array of legal and technological obstacles: including restricting third party access to online customer account information,[97] blocking incoming internet traffic from servers used by fintech disruptors,[98] and forcing disruptors to enter into burdensome data sharing agreements.[99] These defensive tactics reflect the enormous economic value of the private information currently locked away in incumbents' vaults. They also highlight that, in the absence of an affirmative legal obligation, incumbents typically possess powerful incentives not to share this information with anyone—let alone their nascent competitors.

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[94] *See* Steven Sharpe, *Asymmetric Information, Bank Lending, and Implicit Contracts: A Stylized Model of Customer Relationships*, 45:4 J. FIN. 1069 (1990) (describing the informational advantage of incumbent banks and the resulting prospect of the winner's curse).

[95] *Id.*

[96] *See* Dirk Zetzsche, Douglas Arner & Ross Buckley, *Decentralized Finance*, 6:2 J. FIN. REG. 172, 197 (2020); Levitin, *supra* note __, 333.

[97] *See* Jennifer Surane, "Capital One Restricts Third-Party Data Access, Upsets Customers," *BLOOMBERG* (June 27, 2018), https://www.bloomberg.com/news/articles/2018-06- 27/capital-one-restricts-third-party-data-access-upsets-customers; Robin Sidel, "Big Banks Lock Horns with Personal-Finance Web Portals", *WALL ST. J.* (Nov. 4, 2015), https://www.wsj.com/articles/big-banks-lock-horns-with-personal-finance-web-portals-1446683450, and Yuka Hayashi, "Venmo Glitch Opens Window on War Between Banks, Fintech Firms", *WALL ST. J.* (Dec. 14, 2019), https://www.wsj.com/articles/venmo-glitch-opens-window- on-war-between-banks-fintech-firms-11576319402.

[98] *See* Penny Crosman, "The Truth Behind the Hubbub over Screen Scraping", *AM. BANKER* (Nov. 12, 2015), https://www.americanbanker.com/news/the-truth-behind-the-hubbub-over-screen-scraping.

[99] *See* Penny Crosman, "U.S. Bank Embraces Open Banking with Data-Sharing Agreements", *AM. BANKER* (Sept. 24, 2019), https://www.americanbanker.com/news/us-bank-embraces-open-banking-with-data-sharing-agreements.

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Viewed in this light, legal frameworks supporting the core principles of Open Finance can be understood as a direct response to this pervasive incentive problem. As Fracassi and Magnuson explain: "Given these dynamics, regulatory pressure to improve and increase data sharing within the financial industry is both desirable and necessary. Without it, it is likely that efforts to create open, transparent financial markets will be slow and halting."[100] Put differently, data access and data sharing rules are designed to *compel* incumbent financial institutions to open their vaults, thereby neutralizing their comparative advantage and leveling the informational playing field. In turn, leveling this playing field represents a necessary, if insufficient, first step toward the objective of promoting greater competition within the financial services industry.

B. More Vibrant Competition

The financial services industry has a competition problem.[101] Despite the seemingly relentless pace of technological innovation, empirical evidence suggests that the efficiency of the industry has almost completely stagnated over the last century. Economist Thomas Philippon, for example, has measured the efficiency of the financial services industry in the United States by comparing the *quantity* of assets held by financial institutions against the spreads, charges, and other fee *income* generated on these assets.[102] Remarkably, Philippon finds that this intermediation ratio has remained relatively constant over the past 130 years at between 1.5 and 2 percent.[103] The financial services industries in the United Kingdom, Germany, and France have been afflicted by a similar torpor.[104]

These findings suggest that the financial services industries in some of the world's most dynamic economies managed not to generate any efficiency gains over the course of a century that saw the invention of the computer, dramatic advances in data storage and processing power, and the emergence and widespread adoption of the internet.[105] Most importantly, these findings suggests that—contrary to what we would expect to observe in a

[100] Fracassi & Magnusson, *supra* note __, 353.

[101] For research exploring the potential existence, nature, and extent of this problem, see e.g. Patrick Bolton, Tano Santos & Jose Scheinkman, *Cream Skimming in Financial Markets*, 71:2 J. FIN. 709 (2016); Nicola Gennaioli, Andrei Shleifer & Robert Vishny, *Money Doctors*, 70:1 J. FIN. 91 (2015); Robin Greenwood and David Scharfstein, *The Growth of Modern Finance*, 27:2 J. ECON. PERSP. 3 (2013).

[102] *See* Thomas Philippon, *Has the U.S. Finance Industry Become Less Efficient? On the Theory and Measurement of Financial Intermediation*, 105:4 AM. ECON. REV. 1408 (2015) and Thomas Philippon, "The Fintech Opportunity", NAT'L BUR. ECON. RES. WORKING PAPER 22476 (August 2016), http://www.nber.org/papers/w22476.

[103] *Id.*

[104] *See* Guillaume Bazot, *Financial Consumption and the Cost of Finance: Measuring Financial Efficiency in Europe* (1950-2007), 16:1 J. EUR. ECON. ASS. 123 (2018).

[105] Consistent with these findings, there is empirical and anecdotal evidence pointing to a lack of competition within specific segments of the financial services industry: including banking, payments, and even the burgeoning fintech market; *see e.g.* Carin van der Cruijsen & Maaike Diepstraten, *Banking Products: You Can Take Them with You, So Why Don't You?*, 52 J. FIN. SERV. RES. 123 (2017); Lawrence Ausubel, *The Failure of Competition in the Credit Card Market*, 81 AM. ECON. REV. 50 (1991); Victor Stango, *Pricing with Consumer Switching Costs: Evidence from the Credit Card Market*, 50 J. IND. ECON. 475, 489 (2002), and Rory Van Loo, *Making Innovation More Competitive: The Case of Fintech*, 65 UCLA L. REV. 232 (2018).

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competitive market—many technological advances have not driven down the cost of financial products and services for consumers. As Philippon explains: "Financial services remain expensive and financial innovations have not delivered significant benefits to consumers. The point is not that finance does not innovate. It does. But these innovations have not improved the overall efficiency of the system."[106]

There are several possible reasons for this apparent market failure—competitive frictions in the machinery of modern finance. We have already encountered the first source of friction: pervasive *asymmetries of information* between incumbent financial institutions, customers, and aspiring new entrants. A second source of friction is *high switching costs*. Switching costs are incurred by customers in the process of moving their bank accounts, loans, investments, or other financial products and services from one financial institution to another. These costs include the time and effort necessary to search for cheaper, better quality, or more individually tailored products and services. They also include the hassle of filling out application forms and coordinating the process of transferring a customer's personal and historical transactional information to a new institution.

Lastly, many segments of the financial services industry are characterized by pronounced *economies of scale* and *network effects*.[107] Economies of scale exist when the average unit cost of producing a product or service decreases as the volume of production increases.[108] This bestows an advantage on larger financial institutions, who can supply products and services to the market at a lower cost than their smaller competitors. Network effects, meanwhile, exist when the addition of new customers increases the value of an institution or network of institutions from the perspective of existing customers.[109] Classic examples of goods that exhibit these network effects include the telephone, email, and social media networks and, in the realm of finance, stock exchanges, credit card networks, and payment systems.[110] In effect, the attractiveness of these network goods to any given user is a function

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[106] Philippon (2016), *supra* note __, 9.

[107] For recent empirical research examining economies of scale in banking, see David Wheelock & Paul Wilson, *The Evolution of Scale Economies in U.S. Banking*, 33:1 J. OF APP. ECONOMETRICS 16 (2018); Joseph Hughes & Loretta Mester, "The Future of Large, Internationally Active Banks: Does Scale Define the Winners?" in Douglas Evanoff (ED.), THE FUTURE OF LARGE, INTERNATIONALLY ACTIVE BANKS (2016); Anne Kovner, James Vickery & Lily Zhou, *Do Big Banks Have Lower Operating Costs?*, 3:1 J. ECON. PERSPECTIVES 1 (2015); Elena Becalli, Mario Anolli & Giuliana Borello, *Are European Banks Too Big? Evidence on Economies of Scale*, 58 J. OF BANKING & FIN. 232 (2015); David Wheelock & Paul Wilson, *Do Large Banks Have Lower Costs? New Estimates of Returns to Scale for U.S. Banks*, 44 J. OF MONEY, CREDIT & BANKING 171 (2015). For empirical research examining economies of scale in payment systems, see Christine Beijnen & Wilco Bolt, *Size Matters: Economies of Scale in European Payments Processing*, 33 J. OF BANKING & FIN. 203 (2009); Wilco Bolt & David Humphrey, *Payment Network Scale Economies, SEPA, and Cash Replacement*, 6 REV. OF NETWORK ECON. 453 (2007).

[108] *See* ROBERT FRANK, BEN BERNANKE, KATE ANTONOVICS & ORI HEFFETZ, PRINCIPLES OF ECONOMICS, 32-33 (2019).

[109] *See* Paul Klemperer, "Network Goods (Theory)", in 5 THE NEW PALGRAVE DICTIONARY OF ECONOMICS 915, 915 (Steven N. Durlauf & Lawrence E. Blume eds., 2nd ed. 2008).

[110] *See e.g.* Robert Ahdieh, *Making Markets: Network Effects and the Role of Law in the Creation of Strong Securities Markets*, 76 SO CAL. L. REV. 277 (2002) and Carmine Di Noia, *Competition and Integration Among Stock Exchanges in Europe: Network Effects, Implicit Mergers and Remote Access*, 7:1 EUR. FIN, MAN. 39 (both examining network effects within stock markets); Sujit Chakravorti & Roberto Roson, *Platform Competition in Two-Sided Markets: The Case of Payment Networks*, 5:1 REV. OF NETWORK ECON. 118 (2006); *James McAndrews, Network Issues*

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of the number of other users. Importantly, this makes customers less likely to switch to new institutions or networks that do not already enjoy a critical mass of existing customers. Like economies of scale, network effects thus give larger financial institutions a comparative advantage over their smaller rivals.[111]

These frictions generate a range of competitive distortions. Asymmetries of information between financial institutions erect formidable barriers to the entry of new, more innovative, and potentially more efficient competitors.[112] These barriers are compounded by economies of scale: while new entrants need large volumes of customer information to effectively compete with incumbents, they also need to effectively compete in order to attract new customers, and thereby acquire this information. Even where new entrants are somehow able to gain a foothold in the market, high switching costs and network effects mean that they may still face pronounced "lock-in" effects—undercutting the incentives of customers to identify and switch to new financial institutions even when they offer superior products and services.[113] These lock-in effects will be particularly powerful where incumbents market and sell a wide range of products and services: thus offering customers the convenience of a one-stop financial supermarket, but also creating opportunities for tied selling.[114] By insulating the market from the forces of vigorous competition, these distortions can enable incumbents to build and protect a dominant market position.[115] Incumbents can then exploit this position by charging higher prices, reducing the quality of financial products and services, and designing these products and services in ways that exploit the behavioral biases of consumers.[116]

These distortions illuminate the fundamental logic underpinning the core principles of Open Finance. As we have already seen, data access and data sharing rules represent an important first step. Specifically, by dismantling the legal, technological, and economic vaults at the heart of the existing closed system, these rules would reduce asymmetries of information between incumbents, fintech disruptors, and their customers.[117] In theory, this would enable more and better use of valuable customer information. Yet where implemented on their own,

and Payment Systems, FED. RES. BANK OF PHILADELPHIA BUS. REV. 15 (November/December 1997), and Alistair Milne, *What Is In It For Us? Network Effects and Bank Payment Innovation*, 30:6 J. BANKING & FIN. 1613 (2006) (each exploring network effects in credit card networks and other payment systems).

[111] *See* Michael Katz & Carl Shapiro*, Systems Competition and Network Effects*, 8 J. ECON. PERSP. 93 (1994).

[112] *See* ARIEL EZRACHI & MAURICE STUCKE, VIRTUAL COMPETITION: THE PROMISE AND PERILS OF THE ALGORITHM-DRIVEN ECONOMY (2016); Nathan Newman, *Search, Antitrust, and the Economics of the Control of User Data*, 31 YALE J. REG. 401 (2014); Fracassi & Magnuson, *supra* note __, 377.

[113] For a more detailed discussion of lock-in effects, see Joseph Farrell & Paul Klemperer, "Coordination and Lock-In: Competition with Switching Costs and Network Effects", in MARK ARMSTRONG & ROBERT PORTER EDS., HANDBOOK OF INDUSTRIAL ORGANIZATION (2007). *See* also Borgogno & Colangelo (2020), *supra* note __, 1.

[114] Tied selling takes place when a firm makes the purchase of a product or service by a consumer conditional on the purchase of another product or service. As a result, tied selling can be used to induce customers to obtain multiple products and services from a single supplier. In the United States, tied selling is illegal pursuant to §2 of the *Sherman Antitrust Act*.

[115] *See* Report on Digital Platforms, *supra* note __, 34-55.

[116] *Id.*, 12 ("There are many well-known problems that follow from lack of competition, including higher prices, less innovation, and lower quality in all its forms") and Borgogno & Colangelo (2020), *supra* note __.

[117] *See* Fracassi & Magnusson, *supra* note __, 377.

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data access and data sharing rules are unlikely to overcome the distortions created by high switching costs, economies of scale, or network effects. Ultimately, granting customers legal rights to access and share their information will be of little use where the cost of exercising these rights remains high. By the same token, customers may find that these rights yield few practical benefits—especially in terms of greater choice—where the universe of aspiring competitors is restricted to those financial institutions that can singlehandedly bear the costs of building the technological infrastructure necessary to support data sharing.

This is where data portability and interoperability rules come into play. Effective network portability rules complement data access and data sharing rules by ensuring that customers can easily transfer their personal and transactional information from one financial institution to another, often with the click of a button. In turn, effective network portability requires a high level of interoperability between the information systems of each of the financial institutions—both incumbents and fintech disruptors—within a given network. Ideally, this interoperability should facilitate the seamless real-time transfer of large volumes of customer information within the widest possible network of financial institutions.[118] Where they can be developed, this makes open APIs the most desirable technological platform on which to build an interoperable network.

Viewed from this perspective, legal frameworks supporting data portability and interoperability hold out two potential benefits. First, by mandating network portability, these frameworks can lower switching costs for customers, thus eliminating the hassle of one-off export portability and, even worse, the prospect of having to manually enter detailed customer information on new application forms.[119] Second, by forcing incumbents to invest in the development of the technological infrastructure necessary to comply with data portability and interoperability rules, these frameworks can help ensure that the costs of building interoperable networks are not borne entirely by aspiring new entrants. They can also help economize on these costs by providing a coordination mechanism and governance structure for the development of open APIs, data privacy and security rules, and dispute resolution processes. Together, well-designed data portability and interoperability rules can thus reduce barriers to entry by making it possible for fintech disruptors and other new entrants to exploit the opportunities presented by data access and data sharing rules. In this way, the core principles of Open Finance can enable a broader cross-section of financial institutions to capitalize on economies of scale, while simultaneously reducing the competitive distortions generated by high switching costs, network effects, and the associated lock-in effects.

Ultimately, if data access and data sharing rules seek to level the informational playing field, data portability and interoperability rules seek to ensure that there is a large, diverse, and competitive universe of players. In this more competitive financial ecosystem, both incumbents and fintech disruptors would be forced to compete on the basis of quality, cost, and other features in order to attract and retain customers.[120] Greater competition would also drive financial institutions to harness new technologies in order to deliver higher quality, less

[118] *See* Report on Digital Platforms, *supra* note __, 96.

[119] *See* Vives, *supra* note __, 35.

[120] *See* Vives, *supra* note __, 2; Report on Digital Platforms, *supra* note __, 96.

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expensive, and more individually tailored products and services. In theory, the net result would be a more dynamic and efficient financial services industry, and one that offered more and better choices for consumers.[121]

C. Better Financial Products and Services

Promoting more vibrant competition is all well and good, but the *real* question is whether this competition yields meaningful and lasting benefits for consumers. This is a difficult question to answer with any real certainty. Indeed, while the expectation is that competition will drive the development of new, better, and cheaper financial products and services, the nature of market competition means that we cannot confidentially predict what those future products and services will look like and, thus, what benefits and costs they will ultimately yield. Nevertheless, proponents of Open Finance point to a number of plausible and potentially significant benefits that they argue provide a compelling justification for forging ahead into this brave new world.

These benefits can be broken up into two categories. The first category includes benefits stemming from the more effective use of technology *by financial institutions* to gather, sort, and analyze the treasure trove of customer information that would be available within this new financial ecosystem. The existence of this extremely large and deep dataset would encourage financial institutions to invest in technologies—like APIs—designed to automate the processes governing the collection, organization, analysis, and use of this information.[122] Greater automation would then provide the technological backbone for the development of a faster, more transparent, and more seamless customer experience.[123] The existence of this dataset would also encourage financial institutions to use advanced data analytics such as machine learning and artificial intelligence to analyze this information with a view to extracting valuable insights into customer preferences, risk tolerance, and saving, spending, and borrowing habits.[124] These insights could then be used to design better financial products and services, and to market these products and services directly to the consumers who stand the most to benefit from them.[125]

The combination of advanced data analytics and large, deep datasets could also be used to improve the process of identifying, pricing, and managing various risks. For example,

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[121] *Id.*

[122] A dataset is "large" if it contains information for a significant *number of customers*; a dataset is "deep" if it contains a significant *amount of information about each of these customers*.

[123] *See* Vives, *supra* note __, 9; Petralia et al., *supra* note __, 41, and BCBS, *supra* note __, 7.

[124] *See* Vives, *supra* note __, 14; Petralia et al., *supra* note __, 41; Fracassi & Magnusson, *supra* note __, 332, and Report on Digital Platforms, *supra* note __, 26.

[125] Fracassi & Magnusson, *supra* note __, 332, 339 and 340 (arguing that big data, artificial intelligence, and mobile computing have the potential to dramatically improve individuals' access to beneficial banking services); Report on Digital Platforms, *supra* note __, 26 ("this targeting can also raise the quality of services provided by platforms. When they can identify individual tastes at fine levels and personalize their services to this taste, they often improve people's lives."), and Dirk Zetzsche, Ross, Buckley, Douglas Arner & Jon Barberis, "From FinTech to TechFin: The Regulatory Challenges of Data-Driven Finance", UNIVERSITY OF HONG KONG FACULTY OF LAW RESEARCH PAPER NO. 2017/007 (2017), 19, http://ssrn.com/abstract=2959925.

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by combining customer-specific information with insights from machine learning, artificial intelligence, and alternative data sources such as social media, lenders may be able to make better predictions about the creditworthiness of prospective borrowers.[126] Supporting this intuition, economists at the Bank for International Settlements have found that credit scoring models based on machine learning techniques and the use of alternative data sources improves default prediction compared with traditional credit scoring models.[127] Similarly, a recent study by the not-for-profit FinRegLab found that credit scoring models that use detailed customer payment data are better than traditional tools for distinguishing between more and less risky borrowers.[128] Where the application of these new technologies yields better predictions, this would enable financial institutions to more accurately price loans to reflect the risks posed by individual borrowers, and then to more effectively manage these risks.[129] In theory, these technologies could also help reduce the impact of implicit biases in lending decisions, thus potentially expanding the availability of credit to previously underserved borrowers and communities.[130]

The second category includes benefits stemming from the more effective use of information and technology *by consumers*. Open Finance can help improve consumer decision-making in a variety of ways. First, by breaking open the informational vaults of incumbent financial institutions, effective data access, data sharing, and interoperability rules would facilitate the aggregation of customer information across different institutions and platforms.[131] Using applications offered by institutions such as Mint, Yodlee, and Quicken, customers could then use this aggregated information to create a single, comprehensive snapshot of their personal finances.[132] These snapshots can provide customers with useful insights into their spending habits and overall debt levels.[133] They can also promote better household budgeting and long-term financial planning.[134] Crucially, these snapshots reduce the costs of keeping track of a customer's personal finances, thus replicating the convenience of using a single institution for all their financial products and services.[135] This, in turn, further

[126] *See* Petralia et al., *supra* note __, 41.

[127] *See* Leonardo Gambacorta, Yiping Huang, Han Qiu, & Jingyi Wang, "How Do Machine Learning and Non-Traditional Data Affect Credit Scoring? New Evidence from a Chinese Fintech Firm", BANK FOR INT'L SETTLEMENTS WORKING PAPER NO. 834 (December 19, 2019).

[128] *See* FinRegLab, "The Use of Cash-Flow Data in Underwriting Credit", (July 2019), https://finreglab.org/cash-flow-data-in-underwriting-credit-empirical-research-findings.

[129] *See* Petralia et al., *supra* note __, 40-41.

[130] *See* Vives, *supra* note __, 9.

[131] Like many elements of Open Finance, this is already technically possible in many cases. Specifically, where either (1) all the financial institutions used by a given customer use partner or open APIs to share data or (2) the customer has manually downloaded the data and then uploaded it to a data aggregator or financial planning app, the net result will often be the same.

[132] *See* Bank for Int'l Settlements, *supra* note __, 16.

[133] *Id.*

[134] *Id.*

[135] *See* Aluma Zernick, *The (Unfulfilled) Fintech Potential*, 1 NOTRE DAME J. EMERGING TECH. 352, 375 (2020).

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reduces potential switching costs, helps overcome consumer inertia, and promotes greater competition.

Second, Open Finance can support the emergence of technology designed to help consumers search for and compare financial products and services. Consumers face significant time and other resource constraints. These constraints are compounded by the high costs of identifying financial products and services that satisfy their specific needs.[136] Indeed, even the relatively simple task of comparing different bank accounts demands that consumers compare prevailing interest rates, charges, overdraft fees, online account access, and other product features.[137] Consumers then need to determine which constellation of features is right for them and their own unique circumstances.[138] To help reduce these costs, recent years have witnessed the emergence of online price comparison platforms like Nerdwallet, Credit Karma, and WalletHub. These platforms use sophisticated algorithms to help consumers identify the financial products and services that best suit their needs, and to compare the price and other salient features of different options.

Crucially, the more information these price comparison platforms possess about individual consumers, broader trends in consumer behavior and demand, and the universe of available products and services, the more likely it is that their algorithms will identify the best options for each consumer. In this way, Open Finance can help improve the quality of the recommendations that these platforms make: thus promoting consumer confidence, improving consumer decision-making, and encouraging consumers to actively shop around for the best products and services.[139] The existence of more confident, better informed, and highly motivated consumers would then reorient the incentives of financial institutions—and especially new entrants seeking to capitalize on the amplifying power of these platforms—toward supplying products and services that catered to this more sophisticated, discerning, and elastic demand.[140]

Third, by combining advanced data analytics with more and higher-quality information, Open Finance can help overcome engrained biases in consumer decision-making. In their book, *Dollars and Sense: How We Misthink Money and How to Spend Smarter*, behavioral scientist Dan Ariely and lawyer Jeff Kreisler describe how overconfidence, emotions, and implicit biases can lead to bad financial decisions.[141] Importantly, Ariely and Kreisler see a role for financial technology—apps—in improving the quality of these decisions and, ultimately, enhancing consumer welfare. Specifically, in the same way that fitness and wellness apps help us better understand the impact of our choices on our physical and mental health, financial

[136] *See* Borgogno & Colangelo (2020), *supra* note __, 1 and 6 and Zernick, *supra* note __, 358.

[137] *See* Melissa Lambarena, "How to Choose A Bank Account: Seek High Fees, Low Rates", NERDWALLET (Jan. 17, 2020), https://www.nerdwallet.com/article/banking/how-to-choose-a-bank-account.

[138] The comparison process for even basic loan products can be even more challenging; see John Campbell, *Restoring Rational Choice: The Challenge of Consumer Financial Regulation*, 106 AM. ECON. REV. 1, 17-20 (2016).

[139] *See* Borgogno & Colangelo (2020), *supra* note __, 1.

[140] *Id.*

[141] *See* Dan Ariely & Jeff Kreisler, *DOLLARS AND SENSE: HOW WE MISTHINK MONEY AND HOW TO SPEND SMARTER* (2017).

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apps can better frame how decisions about what to do with our money impact our overall financial health.[142] Thus, for example, apps can use past payment data and algorithms to predict a consumer's upcoming expenses, monitor their spending habits, and then alert them to purchases that may result in short-term cash flow problems.[143]

In some cases, these apps could even replace consumer decision-making altogether: identifying the optimal payment method for a given purchase in light of prevailing interest rates, available rewards, or other features; calculating how much to transfer from a consumer's current account to their savings or investment account each month, or blocking late night impulse purchases from online retailers.[144] Like price comparison platforms, the quality of these apps is ultimately a function of the amount and quality of available data. By unlocking the informational vaults of incumbent financial institutions and building the technological infrastructure necessary to share this data in real-time, Open Finance can thus improve the quality of the products and services on which consumers increasingly rely to make important financial decisions.

D. A More Resilient Financial System

The last, and perhaps least heralded, source of promise stems from the potential impact of Open Finance on the structure and resilience of the financial system. In the existing closed system, consumers, assets, and activities gravitate toward a relatively small number of large incumbents. The seven largest banks in the United States have roughly the same stock of financial assets as all other U.S. banks c*ombined*.[145] Similarly, the vast majority of retail payments flow through a tightly-knit network of large banks.[146] And just a handful of large players dominate the U.S. investment management industry: each managing *trillions* of dollars on behalf of their clients.[147] This concentration both reflects and reinforces high switching costs and pronounced lock-in effects, thereby undermining vibrant competition and limiting consumer choice. It also contributes to the emergence of financial behemoths that may ultimately be viewed by policymakers as "too-big-to-fail."

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[142] *Id.*

[143] *See* Borgogno & Colangelo (2020), *supra* note __, 6 and Zernick, *supra* note __, 364-365.

[144] *Id.*

[145] These seven banks—JPMorgan Chase, Bank of America, Wells Fargo, Citibank, U.S. Bank National Association, Truist, and PNC Bank—collectively have approximately $10.5 trillion in assets; see "The 15 Largest Banks in the United States", BANKRATE.COM (June 10, 2021), https://www.bankrate.com/banking/biggest-banks-in-america/. This is compared against total assets of all commercial banks in the United States of approximately $22.2 trillion; see Board of Governors of the Federal Reserve System, Release H.8: Assets and Liabilities of Commercial Banks in the United States (September 1, 2021), https://fred.stlouisfed.org/series/TLAACBW027SBOG.

[146] *See* Kimmo Soramäki, Morten Bech, Jeffrey Arnold, Robert Glass & Walter Beyeler, *The Topology of Interbank Payment Flows*, Fed. Res. Bank of N.Y. Staff Report No. 243 (March 2006) (reporting that just 66 banks—less than 1 percent of all chartered deposit-taking institutions—accounted for roughly 75 percent of the total volume of inter-bank payments).

[147] *See* ADV Ratings, "America's Top 50 Asset Managers by AUM", https://www.advratings.com/top-us-asset-managers.

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As described by the Financial Stability Board, the global oversight body for systemic risk, the too-big-to-fail problem arises when the threatened failure of a financial institution—"given its size, interconnectedness, complexity, cross-border activity or lack of substitutability"—forces policymakers to rescue it using public funds "to avoid financial instability and economic damage."[148] In theory, the core principles of Open Finance can help ameliorate the too-big-to-fail problem in at least two ways. First, by reducing switching costs and barriers to entry, greater data access, sharing, portability, and interoperability can promote the *unbundling* of financial products and services.[149] Where customers no longer face the inertia of high switching costs, we would expect them be more likely to shop around for the highest quality, lowest price, and most suitable financial products and services. In many cases, this will mean that each consumer obtains these products and services from several different financial institutions. Simultaneously, armed with more information and faced with fewer barriers to entry, we would expect fintech disruptors—many specializing in specific financial products and services—to emerge to meet this new consumer demand. From a systemic perspective, the existence of more and more specialized financial institutions would then reduce our structural reliance on a small number of large incumbents.[150] The result would be a less concentrated, more diverse financial ecosystem that may be better able to weather severe shocks without the need for government support.

The second way that Open Finance can help ameliorate the too-big-to-fail problem and improve the resilience of the financial system is by reducing the economic fallout when financial institutions do actually fail. As we have seen, banks and other lenders generate valuable private information about the creditworthiness of their borrowers, the value of any assets that these borrowers pledge as security against their loans and, ultimately, the quality of the loans themselves. Where these financial institutions fail, there is a risk that this private information may be lost, thereby making it more difficult for borrowers to obtain new loans on the same terms. During periods of widespread financial instability, there is also the risk that this loss of private information could contribute to a more generalized contraction in the availability of credit. Research conducted by economist and former Federal Reserve Board Chairman Ben Bernanke, for example, has found that the loss of private information as a result of local bank failures contributed to the depth and severity of the Great Depression.[151] Inevitably, of course, at least some of this private information—especially so-called "soft"

[148] *See* Financial Stability Board, "Evaluation of Too-Big-to-Fail Reforms: Summary Terms of Reference" 1 (May 23, 2019), https://www.fsb.org/wp-content/uploads/P230519.pdf.

[149] *See* Markos Zachariadis & Pinar Ozcan, "The API Economy and Digital Transformation in Financial Services: The Case of Open Banking", SWIFT Institute Working Paper No. 20016-01, 5 (June 15, 2017) and Mark Carney, "Building the Infrastructure to Realise FinTech's Promise", speech at the International FinTech Conference (April 2017), https://www.bis.org/review/r170424d.pdf.

[150] As explained by the Bank for International Settlements: "These could be services provided along different segments of the financial service delivery chain that have traditionally been provided by banks, or new non-financial services that create additional value to the delivery chain."; Bank for Int'l Settlements, *supra* note __, 7.

[151] *See* Bernanke, *supra* note __.

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information[152]—may be difficult to capture in electronic form. Nevertheless, insofar as Open Finance would make it easier for borrowers to share this information with prospective new lenders, it would also reduce the costs of institutional failure, guard against potentially crippling credit contractions, and thus relieve some of the pressure on policymakers to undertake costly and distortive bailouts.

In the eyes of its proponents, the promise of Open Finance stems from the prospect that a level informational playing field will unleash the forces of competition—driving technological innovation, the development of new and better financial products and services, and the creation of a more resilient financial system. The trillion dollar question thus becomes: *could their eyes be deceiving them?*

III. THE PERILS OF OPEN FINANCE

Even the most vocal advocates of Open Finance acknowledge the existence of legal, technological, and other challenges that need to be addressed before it can fulfill its inherent promise. As a threshold matter, any shift toward Open Finance must be accompanied by mechanisms designed to ensure that consumers give informed consent to the collection, transfer, and use of their personal information.[153] It would also demand strong data privacy, data security, and fraud protections,[154] along with legal frameworks that clearly allocate liability between incumbent financial institutions, fintech disruptors, and data aggregators for any data breaches, identify theft, and cyber-fraud.[155] And for all the potential benefits of artificial intelligence, machine learning, and other advanced data analytics, the use of these tools pose the risk of algorithmic discrimination and the possibility that financial institutions might apply the insights they gain in order to exploit consumer behavioral biases.[156] Successfully addressing these challenges will be key to building trust in this new financial ecosystem.

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[152] *See* Jose Maria Liberti & Mitchell Petersen, *Information: Hard and Soft*, 8:1 REV. CORP. FIN. STUD. 1 (March 2019).

[153] *See e.g.* Fracassi & Magnusson, *supra* note __, 373; Petralia et al., *supra* note __, 50.

[154] *See e.g.* FINRA, *Know Before You Share: Be Mindful of Data Aggregation Risks*, Investor Alert (March 29, 2018), https://www.finra.org/investors/alerts/be-mindful-data-aggregation-risks; Fracassi & Magnusson, *supra* note __, 358; Bank for Int'l Settlements, *supra* note __, 14-15; Remolina, *supra* note __, 35; Packin, s*upra* note __, 1317-1318, 1325, and 1328-1329; Report on Digital Platforms, *supra* note __, 44; Borgogno & Colangelo (2020), *supra* note __, 10.

[155] *See e.g.* Petralia et al., *supra* note __, 51; Vives, *supra* note __, 28.

[156] *See e.g.* Zetzsche et al. (2017), *supra* note __, 21; Report on Digital Platforms, *supra* note __, 19-20 and 35-37; Packin, *supra* note __, 1331. *See also* Solon Barocas & Andrew Selbst, *Big Data's Disparate Impact*, 104 CAL. L. REV. 671, 677–80 (2016).

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Yet proponents of Open Finance have all but ignored a far more fundamental challenge. This challenge stems from the economics underlying the new infrastructure at the heart of Open Finance: data aggregators. This infrastructure is characterized by pronounced economies of scale, scope, and network effects that combine to erect significant barriers to entry, undercut competition, and propel the market toward monopoly.[157] These dynamics are compounded by the highly fragmented structure of both the conventional banking industry and the emerging fintech ecosystem. This Part describes the economics of data aggregation, the emerging structure of the data aggregation market in the United States, and why the promise of Open Finance—in terms of more vibrant competition, better financial products and services, and a more resilient financial system—may ultimately be outweighed by the perils of market concentration, the abuse of monopoly power, and the distortions created by a new breed of too-big-to-fail institutions.

A. The Economics of Data Aggregation

The core principles of Open Finance seek to dismantle the informational vaults at the heart of modern finance. However, while these principles are designed to level the competitive playing field, the economics of data aggregation generate a powerful countervailing force: driving industry concentration and consolidating market power, and threatening to undermine vibrant competition. These economics are a function of the highly fragmented structure of the U.S. financial services industry, economies of scale and scope in data collection and analysis, the position of data aggregators at the center of a two-sided market, and network effects in the market for API developers.

(i) Financial Services Industry Fragmentation

The United States is home to an extremely fragmented financial services industry. The conventional banking industry offers an illustrative example. The United States is currently home to over 4,900 federal and state chartered banks, over 5,000 credit unions, and over 270 thrifts.[158] These institutions range from global banking giants such as JPMorgan, Bank of America, Citigroup, and Wells Fargo, to the thousands of regional and local banks that have for centuries dotted the American landscape. Notably, this fragmentation is particularly stark when compared with other jurisdictions that have highly developed financial systems, many

[157] That proponents of Open Finance have ignored this challenge is even more remarkable given how many of the them have expressed concern that "Big Tech" may eventually come to occupy a dominant position in the data aggregation market; see e.g. Vives, *supra* note __, 12-13 and 18; Zetzsche et al. (2020), *supra* note __; Zetzsche et al. (2017), *supra* note __; Borgogno & Colangelo (2021), *supra* note __; Zacharidis & Ozcan (2017), *supra* note __; Remolina, *supra* note __ (all warning of the threat that Google, Amazon, Facebook, or other "Big Tech" firms will enter the financial services industry).

[158] *See* Federal Deposit Insurance Corporation, "Data & Insights" (2021), https://www.fdic.gov/ (reporting 4,951 federal and state chartered banks); National Credit Union Administration, Credit Union and Corporate Call Report Data: Quarterly Data (Q2: 2021), https://www.ncua.gov/analysis/credit-union-corporate-call-report-data/quarterly-data; (reporting 5,029 credit unions); Office of the Comptroller of the Currency, Financial Institutions List (August 2021), https://www.occ.treas.gov/topics/charters-and-licensing/financial-institution-lists/index-financial-institution-lists.html (reporting 271 thrifts).

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of which have already adopted, or are in the process of adopting, the key principles of Open Finance. Figure 2 highlights this fragmentation by comparing the number of banks and other insured depository institutions in each of the United States, United Kingdom, European Union, Canada, and Australia against both their total population and economic output.

Figure 2: U.S. Banking Industry Fragmentation in Comparative Perspective

Jurisdiction	Insured deposit-taking institutions (IDIs)	IDIs per million pop.	GDP per IDI (USD)
United States	10,251	31.8	$2.0 billion
European Union	5,581	12.5	$2.7 billion
United Kingdom	345	5.1	$7.8 billion
Canada	88	2.3	$18.6 billion
Australia	53	2.1	$25.1 billion

Sources: FDIC, NCUA, ECB, PRA, OSFI, APRA, World Bank

On the other side of the emerging Open Finance ecosystem, the rapidly expanding fintech industry is also characterized by a high level of fragmentation. While reliable and comprehensive data is not available, global consultancy firm Deloitte estimated in 2017 that there were over 2,000 fintech disruptors targeting banking and capital markets, over 1,500 in the insurance industry, and over 400 in the investment management industry.[159] There is also evidence that the pace of new entry has only increased since 2017, with the United States being one of the most popular jurisdictions for fintech start-ups.[160] And like the conventional banking industry, the fintech industry is home to firms of vastly different sizes: ranging from household names like PayPal, Stripe, Robinhood, and SoFi, to small start-ups seeking their first round of seed financing.

The fragmentation of the U.S. financial services industry is one of the key drivers of the burgeoning data aggregation market. Developing the technological architecture necessary to *connect to* and, importantly, *compete in* an Open Finance ecosystem can be extremely costly. At the front end, this architecture includes developing a customer interface and user authentication protocols. At the back end, it includes developing APIs, data management and analytics tools, and security protocols. These technology costs are compounded by the costs of designing bespoke APIs that are interoperable with those of other ecosystem participants, and by the costs of negotiating sophisticated legal agreements with each participant governing

[159] *See* "Fintech by the Numbers", DELOITTE CENTER FOR FINANCIAL SERVICES 4 (2018), https://www2.deloitte.com/ru/en/pages/financial-services/articles/fintech-by-the-numbers.html.

[160] *See e.g.* "The State of Fintech: A Recap of 2020 and a Glimpse into 2021", FINEXTRA ((February 8, 2021), https://www.finextra.com/blogposting/19849/the-state-of-fintech-a-recap-of-2020-and-a-glimpse-into-2021 (reporting that the United States was the "main catalyst" for growth in fintech investment).

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data sharing and the allocation of liability for data breaches.[161] Importantly, while a small handful of large banks and other financial institutions may be in a position to absorb and amortize these costs, they will often be prohibitive for many smaller banks and fintech disruptors—thus creating a potentially significant barrier to entry.[162] As one senior industry insider has observed: "only the largest banks have had the resources—and the time—to devote to the extensive and technical application programming interface (API) integration, testing and compliance, and the legal and contractual reviews necessary to meet [financial institutions'] standards for data sharing."[163] Viewed from this perspective, data aggregators—which can amortize these costs across hundreds, if not thousands, of customers—represent a turnkey solution for the vast majority of banks, fintech disruptors, and other financial institutions that simply do not have the financial, technological, human, or other resources needed to directly connect to an Open Finance ecosystem.

Data aggregators also play an important role in reducing the coordination costs associated with the development of standardized data access, sharing, portability, and interoperability rules. In the absence of government intervention of the variety seen in the United Kingdom with the creation of OBIE and the *Open Banking Standard*, responsibility for the design and implementation of these rules in the United States has fallen to the financial services industry itself. However, while a number of industry players have developed and promoted the use of their own standards, the adoption of these standards has thus far remained relatively modest.[164] Stepping into this breach, the APIs, customer interfaces, authentication and security protocols, and data sharing agreements developed and used by data aggregators—and thus, indirectly, by their customers—have come to represent an important source of *de facto* industry standardization.

Ultimately, the fragmentation of the U.S. financial services industry helps explain the important economic role that data aggregators play within the emerging Open Finance ecosystem. Yet we would not expect economic importance to translate into market power where the marketplace was served by a large number of competing firms. To understand why and how data aggregators might wield this power, we must therefore explore the economies of scale, scope, and network effects that are driving increasing concentration within the data aggregation market, along with the potential impact of this concentration on competition.

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[161] *See* Magnuson & Fracassi, *supra* note __, 355. *See also* Penny Crosman, *Wells Fargo Strikes Data-Sharing Agreement with Plaid*, AM. BANKER (September 19, 2019), https://www.americanbanker.com/payments/news/wells-fargo-strikes-data-sharing-agreement-with-plaid.

[162] *See* Magnuson & Fracassi, *supra* note __, 354 ("The cost for a small fintech startup to gain access to this system—where there are thousands of different banks that must be taken into account, each with its own website, authentication procedures, and account design—is high"); Packin, *supra* note __, 1300 ("While APIs are becoming more common, their development can be pricey, which means smaller banks with fewer resources might not utilize them.); Bank for Int'l Settlements, *supra* note __, 6 and 9 (citing "the time and cost to build and maintain APIs (particularly when done on a bilateral basis with multiple organisations)… and the economic cost for smaller banks to develop and adopt APIs" as challenges.).

[163] *See* "TCH Gives Banks an Open Banking Template", PYMENTS.COM (November 15, 2019), https://www.pymnts.com/data/2019/tch-gives-banks-an-open-banking-template/ (quoting TCH executive vice president of product development and strategy, Dave Fortney).

[164] *See infra* Part I.D for a description of some these industry initiatives.

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(ii) Economies of Scale and Scope in Data Aggregation

The data aggregation market is characterized by pronounced economies of scale. Data aggregators produce *information goods*: facilitating the exchange of valuable consumer data between incumbent financial institutions and fintech disruptors. While producing these information goods typically involves high fixed costs to develop the technological platform needed to safely and securely store and transfer this data, once the platform exists the provision of these goods often involves little or no variable cost.[165] For example, while the costs of developing and launching a new mobile app like Instagram or TikTok may be relatively high, the costs of making these apps available to each additional new user are effectively zero. As a result, the *average* unit cost of supplying an information good like data aggregation decreases as the number of customers increases.[166] Put bluntly: scale matters in the data aggregation market.

Importantly, data aggregators do not simply facilitate the transfer of data between market participants. Many also apply machine learning, artificial intelligence, and other advanced analytics to generate valuable insights from this data about consumer behavior, preferences, and creditworthiness. Data aggregators can then use these insights to improve the design and marketing of their own products and services, or sell them to both incumbent financial institutions and fintech disruptors. Crucially, this strategy enables data aggregators to leverage the economies of scale in information itself. As explained by Fiona Scott Morton and her colleagues on the Committee for the Study of Digital Platforms:

> "In digital markets specifically, scale offers an additional advantage. Firms can apply machine learning to extensive data sets to improve their products and expand their activities into new areas. Because machine learning yields better insights when it is trained on larger datasets, firms with access to large amounts of data can raise the quality of their services in ways that smaller firms cannot. This creates a form of dynamic economies of scale, allowing large firms with large amounts of data to raise product quality at lower costs than small firms."[167]

The result is a self-reinforcing feedback loop in which larger data aggregators enjoy access to more information, more information enables these aggregators to better design and market their products and services, and better products and services attract more fintech disruptors, more incumbents, and ultimately their customers—thereby further compounding the advantages of scale.

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[165] *See* Report on Digital Platforms, *supra* note __, 13.

[166] The average unit cost in this context is calculated by dividing the total costs by the number of users. Because information goods involve high fixed costs and little or no variable costs, the total costs are largely static, meaning that any increase in users will be reflected in a decrease in average unit cost.

[167] *See* Report on Digital Platforms, *supra* note __, 14. *See also* Maurice Stucke & Allen Grunes, *BIG DATA AND COMPETITION POLICY* 170 (2016); Robert Wilson, *Informational Economies of Scale*, 6 BELL J. ECON. 184 (1975).

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The advantages of scale in data aggregation are amplified by significant economies of scope. In many cases, the insights generated by applying advanced data analytics to extremely large and multidimensional datasets can be used to expand into new markets.[168] This is especially true of markets for products and services that complement the core informational goods already produced by data aggregators.[169] Importantly, this includes the markets for many of the products and services currently provided by their own clientele: the incumbent financial institutions and fintech disruptors that use data aggregators to connect to an Open Finance ecosystem. For example, a data aggregator's ability to consolidate and track a customer's cashflows across multiple financial institutions could give it a comparative advantage in offering products designed to help that consumer make realistic household budgets, monitor their monthly spending habits, or provide short-term credit products that tide them over until payday. It could also help them more effectively target these products and services to specific consumers. These comparative advantages further reinforce the positive feedback effects of scale by giving data aggregators access to more consumers, more information, and more profit opportunities as their platforms grow in size.

Together, we would expect these economies of scale and scope to drive data aggregators to invest heavily in the development of their technological platform, ultimately with the objective of attracting both incumbent financial institutions and fintech disruptors and rapidly expanding their market footprint. The winners in this race to scale would then enjoy lower costs, more information, and be able to offer higher quality products and services—thus erecting significant barriers to entry and potentially forestalling the emergence of new challengers.[170]

(iii) Data Aggregation as a Two-sided Market

The economies and scale and scope in data aggregation are compounded by pronounced network effects. Network effects are a common feature of so-called "two-sided" markets.[171] As explained by economists Jean Tirole and Jean-Charles Rochet: "many if not most markets with network externalities are characterized by the presence of two distinct sides whose ultimate benefit stems from interacting through a common platform."[172] Tirole and Rochet offer the example of a manufacturer of video game consoles.[173] Manufacturers like

[168] *See* Report on Digital Platforms, *supra* note __, 14.

[169] A complement is a product or service that, when used in combination with another product or service, increases the value of this second product or service from the user's perspective.

[170] *See* Report on Digital Platforms, *supra* note __, 14.

[171] *See* Mark Rysman, *The Economics of Two-Sided Markets*, 23 J. ECON. PERSP. 125 (2009); Mark Armstrong, *Competition in Two-Sided Markets*, 37 RAND J. ECON. 668 (2006); Bernard Caillaud & Bruno Jullien, *Chicken & Egg: Competition Among Intermediation Service Providers*, 34 RAND J. ECON. 309 (2003); David Evans & Richard Schmalensee, *The Antitrust Analysis of Multi-Sided Platform Businesses*, NAT'L BUREAU OF ECON. RESEARCH, WORKING PAPER NO. 18783 (2013), https://www.nber.org/papers/w18783.

[172] Jean Tirole & Jean-Charles Rochet, *Platform Competition in Two-sided Markets*, 1:4 J. EURO. ECON. ASS. 990, 990 (2003).

[173] *Id.*, 1015-1016.

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Nintendo and Sony need software developers to make games that customers want to play. Simultaneously, however, software developers understandably want to make games that can be played on the most popular consoles. The result is a chicken and egg problem in which buyers are drawn to platforms with a wide range of sellers, and sellers are drawn to platforms with a large number of prospective buyers. Accordingly, for a two-sided market to be successful, the platform must attract a critical mass of participants on *both* sides of the market.

The data aggregation market bears all the hallmarks of Tirole and Rochet's two-sided market. On one side of the market, consumers want Open Finance platforms that allow them to quickly and seamlessly transfer their personal information between the largest number of financial institutions, thereby lowering switching costs and enhancing consumer choice. On the other side of the market, both incumbent financial institutions and fintech disruptors want access to platforms that have the largest number of consumers: both because they hope to attract these consumers away from their existing providers of financial products and services, and because more consumers means more data, which means more and better opportunities to apply advanced data analytics to gain valuable insights into the behavior, preferences, creditworthiness, and other attributes of these consumers.

Like economies of scale and scope, network effects drive two-sided markets toward concentration. Once the number of buyers and sellers reaches a critical mass, platforms start to generate their own gravity: with new participants attracted not only by the quality of the platform itself, but also by the fact that it is widely used by other participants. In effect, participants extract a benefit stemming from the existence of a large number of other participants on the *same* side of the market because this, ultimately, is what attracts participants to the *other* side of the market. Prospective new participants then face a choice between using the platform or foregoing these benefits. Importantly, the platform can also influence this choice via cross-subsidization: offering free access to participants—typically consumers—on one side of the market, while monetizing access to participants—typically businesses—on the other side.[174] The result is enormous pressure on participants to use successful and popular platforms, thereby rewarding the winners of the race to scale, generating lock-in effects, and yet again erecting potentially significant barriers to entry. For this reason, competition in two-sided markets is typically not *within* the market, but rather *for* the market itself.[175]

(iv) API Developer Network Effects

In many ways, data aggregation is actually a *three*-sided market. In addition to financial institutions and their customers, the use of open APIs demands that data aggregators attract a critical mass of API software developers. As described in Part I, open APIs theoretically enable *any* software developer to follow the protocols published by a data aggregator and thereby access—or "write to"—the relevant Open Finance platform. In some cases, these developers are directly employed by incumbent financial institutions or fintech disruptors. In other cases, they are independent contractors retained by these institutions to write the code

[174] *Id.*, 1017-1018.

[175] *See* Report on Digital Platforms, *supra* note __, 6.

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necessary to access these platforms. Importantly, these software developers have a choice about how to invest their time and talents: including whether to specialize in writing to the API protocols published by specific data aggregators. Like the software developers in Tirole and Rochet's video game example, these API developers would prefer to write to the APIs of data aggregators that already enjoy a large and entrenched base of financial institutions and consumers.[176] As an Open Finance platform becomes more popular, we would therefore expect to see the emergence of a community of software developers dedicated to writing to the APIs of this platform.

The strategy of outsourcing the development of open APIs to third party software developers is a relatively common one in the technology industry. This strategy—known as *voluntary forfeiture*—is designed to overcome the potentially severe hold-up problems that developers would theoretically face when specializing in the proprietary APIs of popular platforms.[177] As we have already seen, the network effects generated by popular platforms create high switching costs and pronounced lock-in effects. For software developers, these effects are compounded by the costs of specialization: while developers reap the benefits of specializing in the proprietary APIs of popular platforms, this specialization also leaves them uniquely vulnerable to having these benefits expropriated by these very same platforms. For example, once a sufficiently large community of developers specializes in the APIs of a given platform, the burgeoning supply of developers may give the platform—as the only source of demand—the power to drive down development prices to a level that fails to fully compensate developers for their specialized expertise. Anticipating this problem, developers may rationally decide not to make these investments in specialization in the first place, thus undermining the success of the platform.

Voluntary forfeiture can be understood as a response to this hold-up problem and the corresponding threat of underinvestment. By forfeiting a degree of control over API development, the platform constrains its own future ability to restrict access to the platform or otherwise exploit developers: thus addressing the fundamental power imbalance and incentivizing developers to invest in specialization.[178] Crucially, surrendering this control to developers demands that the platform then identify and exploit other revenue generating

[176] *See* Amias Gerety & Nate Soffio, "On Market Power—Who Reads, Who Writes, Who's SOL", QED INVESTORS QUARTERLY NEWSLETTER (March 16, 2021), https://www.qedinvestors.com/blog/on-market-power-who-reads-who-writes-whos-sol ("Consumer fintech or e-commerce startups naturally write to the APIs of Plaid, Stripe, Twilio and Intercom as they build their MVPs. In each case, the little startup is a company that writes to others' APIs, and the larger companies have their APIs written to.").

[177] *See* Jonathan Barnett, *The Host's Dilemma: Strategic Forfeiture in Platform Markets for Informational Goods*, 124 HARVARD L. REV. 1861 (2011). In a nutshell, hold-up problems encompass situations where parties fail to cooperate *ex ante* because of the expectation of *ex post* asymmetries in bargaining power. Hold-up problems can be particularly acute in the presence of incomplete contracting, or where the cooperation contemplates the sequential fulfillment of the parties' obligations; see Oliver Williamson, *Transactions-Cost Economics: The Governance of Contractual Relations*, 22(2) J. LAW & ECONOMICS 233 (1979).

[178] *Id.*, 1866 ("By giving away access to core technologies, a platform holder commits against expropriating (and thereby induces) user investments that support platform value.")

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opportunities.[179] In effect, for a platform to be both successful *and profitable*, free access for developers needs to be combined with the sale of complementary products and services to the platform's other participants. In the context of data aggregation, the most obvious opportunities stem from transaction fees and the provision of advanced data analytics to both incumbent financial institutions and fintech disruptors. In theory, data aggregators may also seek to monetize their informational advantage and technological superiority by directly entering the financial services industry.

The existence of API developer network effects reinforces the tendency toward concentration within the data aggregation market. Software developers want to write to the APIs of the most popular data aggregators. Incumbent financial institutions and fintech disruptors similarly want to do business with the data aggregators that benefit from the largest and most specialized community of developers writing to their APIs. And consumers want financial institutions that offer data-driven products and services, and that can quickly, easily, and securely transfer their personal and transactional information to a wide range of other financial institutions. These self-reinforcing feedback effects draw developers, financial institutions, and consumers to the largest and most successful data aggregators, thereby enabling them to tighten their grip over the emerging Open Finance ecosystem.

The economics of data aggregation—driven by financial industry fragmentation, economies of scale and scope, and network effects—enable us to make two tentative predictions about the future trajectory of the Open Finance ecosystem. First, the data aggregation market is likely to be highly concentrated, with a small number of data aggregators supplying the entire market. Second, this concentrated market structure is likely to present opportunities for data aggregators to exercise market power. As described in Part III.B, the first prediction is increasingly borne out in the context of the U.S. data aggregation market. This enables us to speculate in Part III.C about how data aggregators might eventually seek to wield their growing market power.

B. The Structure of the U.S. Data Aggregation Market

The economics of data aggregation are reflected in the embryonic structure of the U.S. data aggregation market. This market is dominated by a small handful of data aggregators including Plaid, MX, Yodlee, Yapily, and TrueLayer.[180] These data aggregators are building the technological infrastructure that connects the emerging Open Finance ecosystem: with their

[179] *Id.*, 1861 ("To generate revenues that cover development and maintenance costs, the platform holder must regulate access to other goods and services within the total consumption bundle.")

[180] Finicity, another leading U.S. data aggregator, was acquired by Mastercard in November 2020 for $1 billion; Press Release, "Mastercard Extends Open Banking Efforts with Close of Finicity Acquisition", FINICITY (November 19, 2020), https://www.businesswire.com/news/home/20201119005883/en/.

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APIs serving as the rails on which the information of tens of millions of consumers travels on its journey between the thousands of banks, fintech disruptors, and other financial institutions across the sprawling U.S. financial system.[181] Accordingly, while you have probably never heard of any of these firms, if you use financial apps such as PayPal, Venmo, Robinhood, Acorns, or Quicken Loans, you have used their Open Finance platforms.

By far and away the largest data aggregator is Plaid. Since its launch in 2013, Plaid has quietly grown to become one of the world's largest, most important, and most valuable fintech companies. Plaid's success stems not only from the quality of its technology but also, and crucially, the number of established relationships it enjoys with both incumbent financial institutions and fintech disruptors. On the banking side, it has been estimated that Plaid's clients currently include over 11,500 financial institutions across North America and Europe,[182] and Plaid itself has stated that its U.S. clients include over 5,000 federal and state chartered banks and over 4,000 credit unions.[183] If these figures are correct, that is virtually the entire U.S. banking industry.[184] On the fintech side, Plaid's platform currently supports over 4,000 financial apps—including household names such as PayPal, Venmo, Sofi, Acorns, Marcus, Coinbase, and Lending Club.[185] By way of comparison, Plaid's principal U.S. competitors—MX, Yapily, and Yodlee—report having established client relationships with 1,800, 1,500, 1,400 financial institutions, respectively.[186] These figures suggest that Plaid is very clearly winning the race to scale within the U.S. data aggregation market.

One of the keys to Plaid's success has been the order in which it has attempted to attract the different sides of the data aggregation market. Plaid's initial targets were the software developers working with fintech disruptors. At the time Plaid was launched, only a small handful of incumbent banks and other financial institutions had developed, or were in the process of developing, their own closed APIs.[187] More importantly, fintech developers theoretically needed to write to the unique APIs of each individual bank. From the perspective of these developers, Plaid's single, standardized API was understandably viewed as an attractive alternative to the prospect of being forced to write to the APIs of what might ultimately be hundreds if not thousands of individual financial institutions. In effect, by outsourcing the development of a standardized API to Plaid, these developers could dedicate

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[181] *See* Credit Suisse, "Payments, Processors, and Fintech", Equity Research Report 109 (January 28, 2021) [on file with author].

[182] *Id.*, 111.

[183] *See* Ginger Baker & Niko Karvounis, "Plaid's Strategy to Facilitate an API-based Ecosystem", PLAID (November 19, 2020), https://plaid.com/blog/plaids-strategy-to-facilitate-an-api-based-ecosystem/.

[184] These figures can be compared with Figure 2, which reports the existence of a total of 10, 251 banks, credit unions, and other insured depository institutions in the United States.

[185] Credit Suisse, *supra* note __, 111.

[186] *See* Michael Deleon, "A Buyer's Guide to Data Aggregation", TEARSHEET.CO (February 19, 2019), https://tearsheet.co/data/a-buyers-guide-for-data-aggregation/ (reporting a client base for MX of 1,800 financial institutions); Yapily, "Our API Coverage", https://www.yapily.com/coverage/ (reporting a client base of 1,546 financial institutions), and Envestnet|Yodlee, "Financial Data Platform", https://www.yodlee.com/financial-data (reporting a client base of "over 1,400 companies globally").

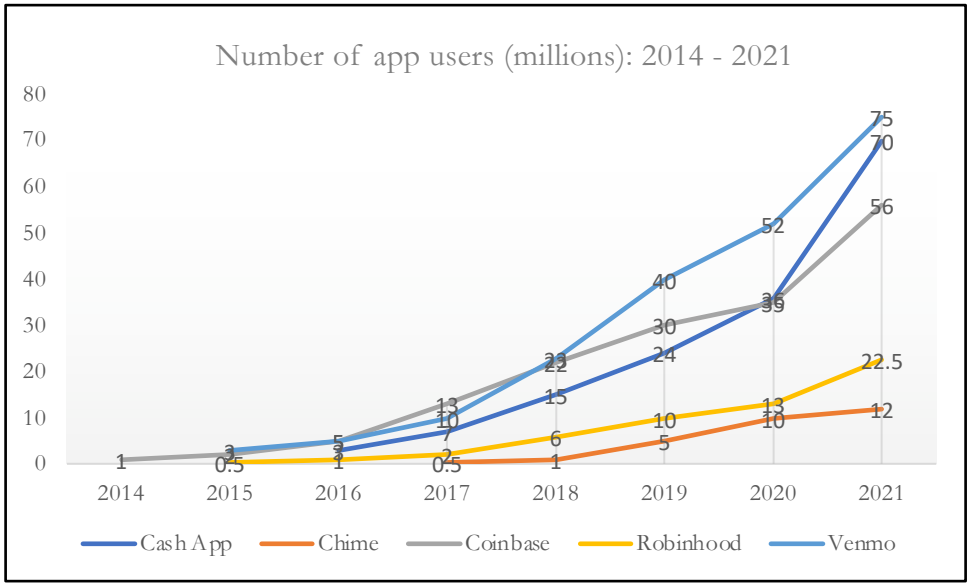
[187] *See* Plaid, *supra* note __.

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more time and energy to the development of their core products and services. As Plaid itself has explained: "[t]he real shift here is this is standardized, almost open-finance-in-a-box. It's built around an API core and we can implement it at scale."[188]

By definition, there is no such thing as a platform that is only able to attract one side of the market. Perhaps not surprisingly, incumbent financial institutions were initially more reluctant than fintech disruptors to enter into information sharing agreements with Plaid that enabled it to access and share customer information. While this reluctance may have in part reflected incumbents 's desire to protect their turf, it also reflected outstanding legal questions around the ownership of customer data and potential liability.[189] Nevertheless, as the popularity of the products and services developed by fintech disruptors has grown (*see* Figure 3), so too has the pressure on incumbents to ensure that their customers can seamlessly connect their bank accounts to these third party products and services. In fact, analysts at global investment back Credit Suisse have estimated that the average U.S. bank account is now connected to more than 15 financial apps and other services.[190]

Figure 3: The Rise of Fintech Apps



Source: Cash App, Chime, Coinbase, Robinhood, Venmo (2021).

[188] *See* Penny Crosman, "Plaid Launches Exchange to Help Banks Share Data with Fintechs", AM. BANKER (May 19, 2020), https://www.americanbanker.com/news/plaid-launches-exchange-to-help-banks-share-data-with-fintechs (quoting Plaid global head of policy John Pitts).

[189] For an overview of these questions and issues, see Tomio Geron, "Plaid Built a $13 Billion Business Behind the Scenes. Now It's Opening Up", PROTOCOL (June 29, 2021), https://www.protocol.com/fintech/plaid-1033-dodd-frank-open. *See also* Packin, *supra* note __, 1318.

[190] *See* Credit Suisse, *supra* note __, 112.

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Ultimately, this demand-side pressure, combined with the shift towards digital financial services as a result of the COVID-19 pandemic,[191] has enabled data aggregators to gain greater traction on this side of the market.[192] And predictably, since Plaid offers connectivity to the largest population of fintech disruptors, it has quickly become the data aggregator of choice amongst incumbent banks and financial institutions including JPMorgan, Goldman Sachs, Capital One, and Wells Fargo.

Having successfully attracted a critical mass of both incumbent financial institutions and fintech disruptors, Plaid has recently turned its attention to their over 200 million customers. In May 2020, Plaid announced the launch of Plaid Exchange.[193] Plaid Exchange gives incumbent financial institutions the ability to offer their customers a greater degree of transparency and control over their personal information. Customers can log into Plaid Exchange and view a dashboard showing how their information—including their name, account numbers, account types, and outstanding balances—is being used and by whom. Customers can then select which information, if any, they want to share with specific third party financial institutions or apps. Plaid then stores and secures this information using end-to-end encryption and shares it only in accordance with each customer's instructions. In effect, Plaid Exchange enables customers to turn Open Finance on or off with the click of a button.

At present, Plaid generates revenue from a variety of sources. Depending of the types of products they use, Plaid charges incumbent financial institutions and fintech disruptors a variety of fees. These fees include one-time charges for connecting a new customer account to Plaid's API, along with ongoing charges for each payment, transaction, or exchange of information processed via Plaid's platform. Over the longer term, Plaid's plan is to supplement these existing revenue sources with "value-added services" based on advanced data analytics: including the development of automated platforms for processing online loan and mortgage applications.[194]

Evidence of Plaid's growing power within the U.S. data aggregation market was recently revealed as part of a Department of Justice (DOJ) lawsuit brought against Plaid and Visa Inc., the global payment processing giant.[195] In January 2020, Visa announced that it had entered into an agreement to purchase Plaid for $5.3 billion.[196] The DOJ challenged the acquisition on antitrust grounds: claiming that Visa's rationale for the deal was its desire to eliminate a nascent competitive threat.[197] As documented in the DOJ complaint, senior Visa

[191] *See* Geron, *supra* note __.

[192] *See* Baker & Karvounis, *supra* note __; Geron, *supra* note __, and Packin, *supra* note __.

[193] *See* Niko Karvounis & Jesse Dhillon, "Introducing Plaid Exchange", PLAID BLOG (May 20, 2020), https://blog.plaid.com/introducing-plaid-exchange/.

[194] *See* Credit Suisse, *supra* note __, 112.

[195] *See* U.S. Department of Justice, Complaint, *United States* v. *Visa Inc. and Plaid Inc.*, U.S. District Court, Northern District of California (November 5, 2020) ["DOJ Complaint"].

[196] *See* Press Release, "Visa to Acquire Plaid", VISA (January 13, 2020), https://usa.visa.com/about-visa/newsroom/press-releases.releaseId.16856.html.

[197] DOJ Complaint, *supra* note __, 20.

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executives viewed Plaid as "the best of breed",[198] having "created a leading position of strength in the business of connecting financial institutions in the United States",[199] and establishing itself as "the preferred connector company by developers."[200] Visa's CEO similarly described Plaid as "by far the best player in the space"[201] with "a huge lead in the connector business."[202] The DOJ ultimately agreed with Visa's assessment, concluding that "Plaid's extensive existing connections with banks and consumers gives Plaid a substantial competitive advantage that cannot be easily replicated by other firms."[203] The DOJ complaint prompted Visa to abandon the proposed acquisition.[204] Yet this has hardly proven disastrous for Plaid, which has subsequently seen its implied market value increase to over $13 billion after closing a $425 million Series D financing round in early 2021.[205] This valuation reflects the expectation that it may soon be Plaid—and not Visa—that is everywhere you want to be.

C. Potential Competitive Distortions

The combination of financial industry fragmentation, economies of scale and scope, and network effects are propelling the U.S. data aggregation market toward a tipping point. Beyond this point, the eventual winner in the race to scale will find itself in a dominant market position, able to wield enormous market power. The question therefore becomes how a dominant data aggregator might seek to wield this power, and what the potential impact would be on competition within the Open Finance ecosystem.

The first and most obvious way that a dominant data aggregator could exercise market power is through the *pricing* of its products and services. The existence of pronounced lock-in effects in successful platform markets leaves market participants—in our case incumbent financial institutions and fintech disruptors—with a limited range of options in the event that the platform raises its prices. The first option is for market participants to simply walk away: thereby forgoing the benefits of platform participation, and potentially putting themselves at a competitive disadvantage vis-à-vis other market participants that elect to remain on the platform. The second option is for market participants to invest in building their own rival Open Finance infrastructure. Yet we might expect this option to be available to only the largest market participants and, even then, involve significant financial, operational, and reputational risks. This leaves the third—and in many cases only realistic—option: paying the new, higher

198 *Id.*, 12.

199 *Id.*

200 *Id.*

201 *Id.*, 13.

202 *Id.*

203 *Id.,* 11.

204 *See* Brent Kendall, AnnaMaria Andriotis & Peter Rudegeair, "VISA Abandons Planned Acquisition of Plaid After DOJ Challenge", WALL ST. J. (January 12, 2021), https://www.wsj.com/articles/visa-abandons-planned-acquisition-of-plaid-after-doj-challenge-11610486569.

205 *See* Alex Wilhelm, "Plaid Raises $425M Series D from Altimeter as it Charts a Post-Visa Course", TECHCRUNCH (April 7, 2021), https://techcrunch.com/2021/04/07/plaid-raises-425m-series-d-from-altimeter-as-it-charts-a-post-visa-future/.

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price right up to the point at which the dominant data aggregator has extracted all the economic value from the relationship. As observed by Tirole and Rochet, the bottom line in successful platform markets is that "[c]aptive buyers tilt the price structure to the benefit of sellers."[206]

The second way that a dominant data aggregator can wield market power is by selectively *restricting access* to its platform. The threat of access restrictions is particularly problematic in the data aggregation market given how embedded the technological infrastructure of data aggregators is in the core financial products and services offered by both incumbent financial institutions and fintech disruptors. For example, fintech disruptors like NerdWallet and other price comparison websites rely on data aggregators to ensure rapid and continuous access to customer account data held by incumbent banks.[207] Similarly, a growing number of banks rely on services like Plaid Exchange to offer their customers more transparency and control over the access, sharing, and use of their personal information. The result is a classic "bottleneck" problem: leaving the financial institutions that rely on this technological infrastructure exposed to the risk that a dominant data aggregator will unilaterally withdrawal access to it. This threat will then inevitably reside in the background of any negotiations over the price of data aggregator's products and services. Importantly, it can also be used as a weapon where data aggregators compete in the same markets as their financial institution clients.

This takes us to a third potential power play: the threat that a dominant data aggregator might seek to expand into the markets served by its clients. At present, data aggregators are part of a long *vertical* supply chain, providing a bundle of information goods to incumbent financial institutions and fintech disruptors. In theory, however, there is nothing preventing a data aggregator from simultaneously becoming a *horizonal* competitor: e.g. directly entering the markets for banking, brokerage services, asset management, or insurance, or developing price comparison, household budgeting, or other financial apps.[208] Indeed, data aggregators would likely enjoy a comparative advantage in these markets given their unparalleled access to information and growing expertise in applying advanced data analytics to generate insights into consumer behavior and preferences, design financial products and services, and market these products to consumers. This makes reliance on a dominant data aggregator all the more problematic: introducing the threat that they will eventually disintermediate their own clients. Importantly, we might expect this threat to be particularly acute where the bundle of goods that data aggregators provide includes a consumer-facing component—like Plaid Exchange—that gives them the opportunity to build brand recognition and relationships directly with their clients' customers.

Lastly, once a dominant data aggregator decides to enter the same markets as its clients, this will theoretically open the door to a whole new range of anticompetitive conduct. As a

[206] Tirole & Rochet, *supra* note __, 30.

[207] Borgogno & Colangelo (2020), *supra* note __, 7.

[208] As Xavier Vives has observed, once a platform has established its position, "they can use their comparative advantage to monopolize the segments where they operate and then expand their monopoly power to other layers of business."; Vives, *supra* note __, 22.

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preliminary matter, a data aggregator could selectively raise prices or restrict access to its platform in order to put pressure on clients that rely on this platform to provide competing products or services. In this way, a dominant data aggregator could exploit its monopoly over the supply of an important intermediate input—customer data—to put its rivals at a competitive disadvantage in the markets for the financial products and services in which they compete head-to-head. Conversely, by entering the price comparison market, a data aggregator could adopt what is known as a "pay for display" strategy: making its recommendations not on the basis of the price, quality, or suitability of its clients' products and services, but rather on the volume of business, amount of revenue, or profits that these clients generate for the data aggregator itself.[209] A captive price comparison website could also be used to steer customers toward a data aggregator's own financial products and services.[210] And perhaps most troubling, a dominant data aggregator could use its privileged access to large multidimensional datasets and expertise in advanced data analytics to identify and dissect consumer behavioral biases, and then to design products and services that exploited these biases.[211]

This analysis paints a clear, if somewhat troubling, picture. In the short run, an Open Finance ecosystem connected by data aggregators may very well deliver on the promise of a level informational playing field: spurring more vibrant competition, the development of better financial products and services, and the emergence of a more resilient financial system. In the long run, however, the economics of data aggregation point toward a highly concentrated industry structure, with a small handful of data aggregators wielding enormous market power. The prospect that these data aggregators will abuse this power may ultimately deter both incumbent financial institutions and fintech disruptors from fully investing in the creation of an Open Finance ecosystem. Perhaps more importantly, this new market structure would effectively recreate the informational vaults that Open Finance was designed to dismantle: with data aggregators supplanting incumbent banks and other financial institutions at the apex of the financial system. The net result is likely to be less competition, a reduction in consumer welfare, and the creation of a new breed of too-big-to-fail institutions.

IV. POLICY IMPLICATIONS

The data aggregation market is still in its infancy. It might therefore seem prudent to adopt a "wait and see" approach toward its regulation. Yet the pronounced economies of scale, scope, and network effects that characterize this market represent highly durable sources of market power: making it unlikely that new competitors will emerge and disrupt this increasingly concentrated market structure. The challenge for policymakers thus becomes how to fulfill the inherent promise of Open Finance while simultaneously minimizing the perils of market concentration, preventing the abuse of monopoly power, and the avoiding the creation of a new breed of too-big-to-fail institutions.

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[209] *See* Zetzsche et al., *supra* note __, 24.

[210] *See* Report on Digital Platforms, *supra* note __, 51.

[211] *Id.*

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Importantly, traditional antitrust law is not well-positioned to address this challenge: both because of its narrow approach toward abuses of platform power[212] and its potentially limited application in the context of the financial services industry.[213] And even if antitrust law was entirely fit for purpose, effective regulation can often serve as a complement to robust enforcement: enabling policymakers to take action before markets have tipped into an uncompetitive equilibrium.[214] To meet this challenge, this Part therefore lays out a blueprint for a new regulatory framework governing the data aggregation market. This blueprint is based on four pillars. The first two pillars—a licensing regime for data aggregators and a more active role for federal regulators in advancing the key principles of Open Finance—are designed to promote the development of a sustainable Open Finance ecosystem. The second two pillars—a universal access requirement and the structural separation of data aggregation from finance—are designed to avoid the perils that threaten to undermine this ecosystem's potentially transformative benefits.

A. A Licensing Regime for Data Aggregators

The cornerstone of this new regulatory framework is a licensing regime for data aggregators.[215] This regime would require data aggregators to obtain a license before providing API connectivity, advanced data analytics, or other services to regulated financial institutions. Once data aggregators had obtained a license, they would then be subject to three obligations. First, they would be required to obtain informed consent from customers prior to accessing, sharing, or using their personal or transactional information.[216] The specific ways in which this information could be used, and by whom, would also need to be clearly disclosed. Second, data aggregators would be required to meet specified minimum technical standards governing data storage, privacy, security, and fraud protection.[217] Ideally, this would be combined with a legal framework allocating liability for customer data breaches amongst data aggregators, incumbent financial institutions, and fintech disruptors. Lastly, data aggregators would be subject to ongoing reporting obligations designed to give policymakers a more accurate and complete picture of the type of customer information they collect, who they share it with, and how it is used to generate advanced data analytics and other services.

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[212] *See* Khan, *supra* note __ and Report on Digital Platforms, *supra* note __, 60-77 (both describing the narrow approach of current antitrust law toward abuses of platform power).

[213] *See Verizon Communications Inc.* v. *Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398 (2004) and *Credit Suisse Securities (USA) LLC* v. *Billing*, 551 U.S. 264 (2007). For a more detailed description of how these decisions have served to limit the application of antitrust law within the domain of regulated financial services, see Samuel Weinstein, *Financial Regulation in the (Receding) Shadow of Antitrust*, 91 TEMP. L. REV. 447 (2019).

[214] Report on Digital Platforms, *supra* note __, 78-79.

[215] This licensing regime would essentially take a page from Open Banking regimes in other jurisdictions; see Bank for Int'l Settlements, *supra* note __, 13. *See also* Zetzsche et al., *supra* note __, 32-33 (recommending a licensing requirement for firms undertaking data gathering and analytics) and Packin, *supra* note __, 1316-1338 (anticipating many of the basic obligations that this licensing regime would impose on data aggregators).

[216] Including consent for any proposed sharing with, or use by, four parties; Bank for Int'l Settlements, *supra* note __, 12.

[217] *Id.*

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The creation of this new licensing regime would demand that policymakers address an important threshold question: who should be responsible for the licensing and oversight of data aggregators? In a recent report prepared for the Senate Judiciary Committee, a group of prominent economists, lawyers, computer scientists, and entrepreneurs recommended the creation of a new Digital Authority.[218] This Digital Authority would be responsible for protecting consumers and promoting competition across *all* digital markets: encompassing not only financial services, but also social media, online advertising, internet retailing, and other digital marketplaces.[219] A second, more modest, proposal would be to hand responsibility for the licensing and oversight of data aggregators to the CFPB. The CFPB already has a statutory mandate to protect consumers and promote competition in the markets for financial products and services.[220] The CFPB is also already responsible for coordinating the process of implementing Section 1033 of the Dodd-Frank Act.[221] In this respect, the licensing and oversight of data aggregators would arguably represent a natural extension of the bureau's existing mandate.

The creation of a licensing regime for data aggregators would yield several benefits. For data aggregators, this regime would provide them with legal certainty around their rights to access customer information, liability for data breaches, and other outstanding questions.[222] For policymakers, a licensing regime would bring data aggregators squarely within the perimeter of financial regulation: giving them access to more information about industry structure and practices, and enabling them to set, monitor, and enforce compliance with minimum technical standards. Together, enhanced legal certainty and minimum technical standards would help to build public trust in the emerging Open Finance ecosystem. Perhaps more importantly, a single federal licensing regime would serve as a coordination mechanism: enabling policymakers to promote industry-wide investment in the standardized APIs and other technological infrastructure necessary to enhance customer data access, sharing, portability, and interoperability.[223]

B. Enhanced Data Sharing, Portability, and Interoperability

To date, the United States has adopted a market-driven approach towards implementing the core principles of Open Finance.[224] This *laissez faire* approach, combined with the highly fragmented structure of the financial services industry, has given data aggregators enormous influence over the direction and pace of both technological development and network expansion. The second pillar of the proposed regulatory framework would be to use the new licensing regime as a springboard for policymakers—whether it be

[218] *See* Report on Digital Platforms, *supra* note __, 83-85.

[219] *Id.*

[220] *See* Dodd-Frank Act, §1021(b).

[221] *See infra* Part I.D.

[222] *See* Bank for Int'l Settlements, *supra* note __, 5.

[223] *See* Report on Digital Platforms, *supra* note __, 78.

[224] *See infra* discussion in Part I.D.

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the CFPB or a new Digital Authority—to take a more assertive role in the ongoing development and evolution of the Open Finance ecosystem.

This new policy role could take many different forms, depending on the prevailing level of industry cooperation.[225] At one end of the spectrum, policymakers could use their convening power to provide an informal forum for data aggregators, incumbent financial institutions, and fintech disruptors to coordinate their sometimes disparate projects, promote technological standardization, and resolve common technical challenges. At the other end of the spectrum, policymakers could adopt specific regulatory rules designed to enhance data access, sharing, portability, and interoperability. As a starting point, policymakers should amend Section 1033 to explicitly permit licensed financial institutions to share customer information with licensed data aggregators. Taking a page out of the United Kingdom's Open Banking initiative, they could then mandate the development of a single, standardized, and open API framework for use across the entire financial services industry. Policymakers could also require data aggregators and financial institutions to maintain online platforms that enabled customers to manage their consents, access their personal and transactional information, and quickly and costlessly share it with third parties.

Importantly, the rationale for this second pillar would not be to give policymakers the power to dictate the direction of technological investment and innovation. Instead, it would be designed to advance three decidedly more targeted objectives. The first objective would be to lower industry coordination costs, thereby preventing overinvestment and technological fragmentation that might otherwise serve to undercut the core principles of Open Finance. Second, in addition to promoting technological standardization, this role would enable policymakers to set, monitor, and enforce common minimum standards governing, for example, the process for obtaining and updating customer consent, the rights of customers to timely and complete access to information, and the obligations of financial institutions when transferring this information to third parties. Third, this role would help ensure that any future technological or market developments were consistent with the core principles of Open Finance, and not simply designed to advance the business interests of key players. In this respect, this role can be understood as a counterweight to the growing power of data aggregators within the Open Finance ecosystem.

C. Universal Platform Access

The first two pillars of this new regulatory framework are designed to unlock the inherent promise of Open Finance and promote the development of a more sustainable Open Finance ecosystem. Yet on their own, neither of these pillars prevent data aggregators from abusing their growing market power. As we have seen, a dominant data aggregator could theoretically wield this power by charging monopoly prices, restricting platform access, or using their informational advantage to directly compete with their own clients. Indeed, even the credible threat that a data aggregator might resort to these anticompetitive strategies serves

[225] Of course, this more assertive role could also involve the *simultaneous* use of different forms of regulatory intervention: e.g. combining informal governance with specific regulatory rules.

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to shift the balance of power in their favor—potentially undercutting competition, stifling innovation, and discouraging investment by other key players. Ultimately, preventing these potential abuses and their damaging knock-on effects requires two more powerful remedies.

The first remedy is a *universal access requirement*. This universal access requirement is designed to ensure that firms offering financial products and services enjoy non-discriminatory access to Open Finance platforms. This requirement would consist of an affirmative obligation on all licensed data aggregators to adhere to an open API standard that enabled any and all regulated financial institutions to follow the published protocols, connect to the platform, and access and share customer information.[226] At the same time, data aggregators would be required to publish a pricing schedule detailing any basic platform access charges, and to apply this schedule universally to all clients. Crucially, this requirement would guarantee non-discriminatory platform access for two distinct types of firms. The first includes the incumbent financial institutions and fintech disruptors that rely on data aggregators for API connectivity. The second includes *other* licensed data aggregators that aspire to enter and compete within the data aggregation market itself.

There is ample historical precedent for the use of universal access requirements in the context of network industries. The Interstate Commerce Act of 1887 requires all railroad companies to "afford all reasonable, proper, and equal facilities for the interchange of traffic",[227] and to "construct, maintain, and operate" switches connecting railroad lines.[228] In 1982, the DOJ similarly required AT&T to provide its competitors—the so-called "Baby Bells"—with open access to its long-distance telephone network.[229] And since 1996, the Federal Energy Regulatory Commission has required electricity transmission facilities to provide electricity generators with non-discriminatory access to the transmission lines and other network infrastructure necessary to transport electricity from producers to consumers.[230] Notably, while the technical details of these access requirements vary from industry to industry, they are all designed to balance the benefits of scale, scope, and network effects with the costs stemming from the potential abuse of monopoly power.

In the context of the U.S. data aggregation market, a universal access requirement would yield several potentially significant benefits. First, by compelling data aggregators to commit to an open API standard, this requirement would foreclose the prospect that a dominant data aggregator—having attracted a critical mass of clients on both sides of the market—might seek to pull up the technological drawbridge, switch to a partner or closed API standard, and thereby capture the monopoly rents generated by its privileged market position.

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[226] Notably, this element of the universal access requirement could also be achieved by mandating the development and adoption of a public API framework for use across the entire financial services industry.

[227] *See* Interstate Commerce Act, Public Law 49-41, 49 U.S.C. §§ 3-22 (Feb. 4, 1887).

[228] *See* Hepburn Act, Pub. L. 59-337, 34 Stat. 584, para. 9(1) (Jun. 29, 1906) (amending the Interstate Commerce Act).

[229] *See United States* v. *AT&T*, 552 F. Supp. 131 (D.D.C. 1982).

[230] *See* Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities, Order No. 888, 61 FED. REG. 21,540 (May 10, 1996) (requiring transmission line owners to file "open access tariffs").

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Second, the publication of a transparent and universal fee schedule for basic platform access would prevent data aggregators from using differential pricing as a means of either restricting platform access or channeling benefits to select clients. Along the same vein, it would prevent data aggregators from using the threat of targeted access restrictions to extract higher prices or other concessions.

Lastly, by ensuring non-discriminatory access to other data aggregators, a universal access requirement would prevent the emergence of multiple closed platforms—so-called "walled gardens"—characterized by relatively low levels of technological interoperability. Like the informational vaults at the heart of conventional finance, these walled gardens are the source of significant switching costs, thereby undercutting the economies of scale, scope, and network effects driving the development of the Open Finance ecosystem. Importantly, preventing the emergence of walled gardens would also play a critical role in ensuring that the data aggregation market remained vulnerable to new entry: with the threat of competition theoretically forcing incumbent data aggregators to make ongoing investments in platform development and maintenance, and imposing an external constraint on potential abuses of monopoly power.[231] Viewed from this perspective, a universal access requirement would help fill the regulatory gaps created by the absence of effective antitrust enforcement at the intersection of platform markets and the financial services industry.

D. The Separation of Data Aggregation from Finance

The second remedy—and final pillar of the new regulatory framework—is the structural separation of data aggregation from finance. Historically, one of the cornerstones of financial regulation in the United States has been the separation of banking from commerce.[232] This separation reflects the concern that allowing banks to combine the business of banking with the same commercial activities as their customers would give them an unfair competitive advantage. Specifically, banks would be tempted to use their privileged access to a vital commercial resource—namely, *capital*—to tilt the competitive landscape in favor of the enterprises in which they had an ownership stake. In theory, this could be achieved either by supplying capital to these affiliated enterprises at subsidized prices, or by offering uncompetitive prices to other enterprises in the same industry.

This historical rationale for the structural separation of banking and commerce perhaps rings hollow in today's world in which commercial enterprises can theoretically obtain capital from a wide range of financial markets and institutions—and where no single financial

[231] Dan Awrey & Joshua Macey, "Open Access, Interoperability, and the DTCC's Unexpected Path to Monopoly", Working Paper (July 14, 2021), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3885194.

[232] This separation is embodied in 12 U.S.C. § 24 (Seventh), which restricts the ability of banks to engage in activities outside the "business of banking"; see MICHAEL BARR, HOWELL JACKSON & MARGARET TAHYAR, FINANCIAL REGULATION: LAW AND POLICY 190 (2d ed. 2018). Famously, this strict separation has been gradually relaxed over time; see e.g. Saule Omarova, *The Quiet Metamorphosis: How Derivatives Changed the 'Business of Banking'*, 63 U. MIAMI L. REV. 1041 (2009).

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institution enjoys a dominant market position.[233] Yet a fundamentally similar concern now arguably exists within the data aggregation market, where the dominant position of a small handful of data aggregators gives them increasing control over another vital commercial resource: *customer information*. The resulting "data concentration"[234] introduces the prospect that a dominant data aggregator might eventually seek to leverage this advantageous position by directly entering the markets for banking, brokerage, asset management, insurance, or other regulated financial services alongside its own customers. This prospect raises the obvious concern that the data aggregator would then tilt the competitive playing field in its favor: providing subsidized access to customer information and advanced data analytics to its affiliated financial services businesses.

Notably, this same fundamental concern is reflected in the growing chorus of policymakers, academics, and industry observers warning about the growing market power of Amazon, Google, Meta, and other "BigTech" firms.[235] These firms share a business model with data aggregators.[236] Specifically, BigTech firms use their position at the center of two-sided platform markets to collect, analyze, and monetize their privileged access to customer information. As argued by Professor Lina Khan, currently the chairwoman of the Federal Trade Commission, this business model enables these platforms to engage in a variety of strategies designed to exploit the information they collect from their customers *as consumers* for the purpose undercutting these same customers *as competitors*.[237] This includes so-called "platform envelopment" strategies, whereby a dominant platform operating in one market seeks to expand into a second platform market, ultimately with a view to offering bundled products and services.[238] Where the products and services produced in these markets are highly complementary—as they are in the case of data aggregation and finance—the net effect will be to both expand and further entrench a platform's dominant market position.

In the context of the U.S. data aggregation market, a universal platform access requirement would go some distance toward limiting the potential use of these strategies. However, while the publication of a universal fee schedule for platform access would prevent some more explicit forms of discriminatory pricing, this remedy is not well suited to deterring

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[233] Indeed, concerns over the combination of banking and commerce were originally raised in the context of the Bank of England's monopoly over joint-stock banking in the decades immediately following its creation in 1694. This is not to suggest that there are not other, potentially more compelling, rationales for the structural separation of banking and commerce.

[234] For a more detailed discussion of the definition and risks of data concentration, see Daniel Rubinfeld & Michal Gal, *Access Barriers to Big Data*, 59 ARIZONA L. REV. 339 (2017) and Josef Drexl, "Designing Competitive Markets for Industrial Data", Max Planck Institute for Innovation and Competition Research Paper No. 16-13 (2016).

[235] *See e.g.* Khan, *supra* note __; Report on Digital Platforms, *supra* note __, and Zetzsche et al., *supra* note __.

[236] Indeed, some BigTech observers even refer to firms like Google and Facebook as "aggregators"; see e.g. Ben Thompson, Tech's Two Philosophies, STRATECHERY (May 9, 2018), https://stratechery.com/2018/techs-two- philosophies.

[237] *See* Khan, *supra* note __.

[238] *See* Thomas Eisenmann, Geoffrey Parker & Marshall Van Alstyne, *Platform Envelopment*, 32:12 STRATEGIC MANAGEMENT J. 1270 (2011) and Vives, s*upra* note __, 19-22.

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more subtle, less detectable, forms of platform cross-subsidization or other anticompetitive conduct. Accordingly, in order to completely foreclose the possibility that a dominant data aggregator might seek to expand and entrench its market power by directly entering the markets served by its own customers, data aggregators should be prohibited from owning, controlling, being owned or controlled by, otherwise being affiliated with, or having a material economic interest in any firm directly operating within the regulated financial services industry.

The structural separation of data aggregation from finance represents a powerful, and inevitably controversial, remedy. Yet the potential efficiency benefits that might be lost of virtue of this separation would seem to pale in comparison to the perils of market concentration, the potential abuse of monopoly power, and the creation of a new breed of too-big-to-fail institutions. Over the long term, these perils pose a far greater threat to market competition than those used to justify the historical separation of banking from commerce. Ultimately, promoting greater competition, innovation, and consumer choice *today* should not come at the expense of these objectives *tomorrow and beyond*. Furthermore, imposing this separation at this relatively early stage is likely to be a far more effective regulatory strategy than waiting to see if these perils ultimately materialize—at which point path dependence, the limits of traditional antitrust law, and the transformation of market power into political influence will inevitably make it more difficult for policymakers to pursue meaningful structural reform.

CONCLUSION

By unlocking the informational vaults at the heart of conventional finance, Open Finance seeks to use new technology to promote more vibrant competition, contribute to the development of better financial products and services, and support the creation of a more resilient financial system. At the same time, the embryonic structure of the Open Finance ecosystem suggests that this technology may soon be concentrated in the hands of a small handful of key players: erecting significant barriers to entry, undercutting competition, and propelling the market toward monopoly. This Article has illuminated the promise and perils of Open Finance. It has also laid out a blueprint for how policymakers can fulfill its inherent promise while simultaneously avoiding the perils of market concentration, the potential abuse of monopoly power, and the emergence of a new breed of too-big-to-fail institutions.

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