

Fintech, Bigtech, and Financial Inclusion



Loretta J. Mester
President and Chief Executive Officer
Federal Reserve Bank of Cleveland

Fourth Annual Fintech Conference
Federal Reserve Bank of Philadelphia
Philadelphia, PA
(via videoconference)

November 9, 2020

Introduction

I thank the Federal Reserve Bank of Philadelphia and the other organizers for inviting me to speak at the fourth annual Fintech Conference. I spent most of my career at the Philadelphia Fed, so it is always a pleasure to participate in one of its events. Since the beginning of this conference series, the discussions have consistently been very topical, and the agenda for the next two days does not disappoint on that score. The conference will cover many of the hot issues confronting practitioners, academics, and policymakers as financial system innovation proceeds at a rapid pace. Today I will discuss the implications of digitalization for financial inclusion and some steps that need to be taken to ensure that digitalization helps to foster inclusion rather than promote exclusion. The views I will present today are my own and not necessarily those of the Federal Reserve System or my colleagues on the Federal Open Market Committee.

Financial Inclusion Has Benefits

It is probably best to start off with a definition of financial inclusion, and the World Bank provides us with a workable one: financial inclusion refers to individuals and businesses having access to useful and affordable financial products and services that meet their needs and that are delivered in a responsible and sustainable way.¹ Much of the literature measures financial inclusion as households' and businesses' use of formal financial services from banks or other traditional providers, so-called mainstream financial services. With the entry of fintech providers, that definition is expanding because fintech financial services are moving into the mainstream.

The World Bank's Global Findex database provides data on how people in 140 economies access accounts, make payments, save, borrow, and manage risks. It includes data on formal and informal financial services and the use of financial technology to conduct financial transactions.² The data indicate

¹ The World Bank, Financial Inclusion, <https://www.worldbank.org/en/topic/financialinclusion/overview>.

² World Bank (2017).

that across the globe financial inclusion has risen. The share of adults with an account at a financial institution or through a mobile money service rose from 62 percent in 2014 to 69 percent in 2017. Nonetheless, there is still a large portion of the population that does not have access to or use financial services. As of 2017, an estimated 1.7 billion adults around the world are unbanked or underserved. Women lag behind men; the poor lag behind the wealthy; and developing economies lag behind developed economies in the shares having formal accounts.

In the U.S., the level of financial inclusion is high: 93 percent of adults have an account at a bank or other type of financial institution or use a mobile money service. But disparities exist: there is a 13 percentage point gap between those in the richest 60 percent of households and those in the poorest 40 percent. Federal Reserve data indicate that, compared to whites, Blacks and Hispanics in the U.S. are less likely to have a bank account and more likely to rely on alternative financial services such as money orders and check cashing services.³ And compared to small firms with white ownership, those with Black ownership were half as likely to have obtained financing from a bank in the past five years, relying more on online lenders, which, according to the survey respondents, provide less satisfactory service.⁴

To address these types of gaps, many countries have set financial inclusion as a formal target.⁵ This is reasonable because numerous studies have documented the contribution of a well-functioning financial system and higher levels of financial inclusion to longer-run macroeconomic goals of output and

³ According to a 2020 supplement to the Board of Governors' Survey of Economic Well-Being, 14 percent of Black adults and 10 percent of Hispanic adults do not have a bank account, compared to 3 percent of white households. (See Board of Governors of the Federal Reserve System (May 2020), Table 11, p. 28.) Unbanked is defined as not having a checking, savings, or money market account. Underbanked is defined as having a checking, savings, or money market account but having used one of these alternative financial services: money order, check cashing service, pawn shop loan, auto title loan, payday loan, paycheck advance, or tax refund advance.

⁴ According to the Fed's most recent Small Business Credit Survey of firms with 1-499 employees, 46 percent of firms with white ownership, 32 percent of firms with Hispanic ownership, and 23 percent of firms with Black ownership had obtained financing from a bank in the past five years; 19 percent of firms with white ownership, 22 percent of firms with Hispanic ownership, and 27 percent of firms with Black ownership had obtained financing from an online lender in the past five years. (See Federal Reserve System (2020), p. 9.)

⁵ Sahay, et al. (2015).

productivity growth.⁶ On the macro level, healthy financial markets and institutions allow for more efficient allocation of capital and better monitoring and broader diversification of risk, which can enable higher levels of overall growth. At the micro level, access to savings and credit via financial intermediaries connects households and businesses to economic opportunities that would not be available otherwise. A sound financial system can spur entrepreneurship and support the competitive forces that drive productivity in the economy.

In addition to these benefits, the distributional impacts of finance are worth considering. A body of work has shown that finance can expand economic opportunities for those at the bottom of the income and wealth distributions and does not merely benefit those at the top.⁷ For example, access to credit allows access to education, which can have profound effects on an individual's economic well-being, and it also allows households to build wealth through homeownership, which remains the most significant asset on many U.S. families' balance sheets.

Digitalization Is Transforming Financial Services

Digitalization of financial services is transforming the industry and expanding the range of financial service providers to include not only fintech lending and payments firms but also so-called bigtech firms, including technology, social media, search platform, and e-commerce companies. Consumer demand is one factor driving the rise in these services. EMarketer estimates that in 2019, 1.9 billion people worldwide purchased goods online.⁸ In 2020, despite the global pandemic, retail e-commerce sales are estimated to rise to over \$3.9 trillion and yearly sales growth has been in the 15 to 25 percent range over the past three years.⁹ As the costs of computing have declined and the demand for new services that offer

⁶ Levine (2009).

⁷ Levine (2009) and Demirgüç-Kunt and Levine (2009).

⁸ See United Nations (2020) and Lipsman (2019).

⁹ See Lipsman (2019) and Cramer-Flood (2020).

speed and convenience at a lower price has risen, new firms have entered the financial services space. According to the U.S. Treasury, from 2010 to the third quarter of 2017, more than 3,330 new technology-based firms serving the financial services industry have been founded. The global market capitalization of fintech firms grew to \$22 billion in 2017, 13 times what it was in 2010. Lending by these firms accounts for over 36 percent of personal loans in the U.S., up from under 1 percent in 2010. New tools and techniques, including machine learning and artificial intelligence, are now routinely being applied in finance.

Digitalization Has the Potential to Increase Financial Inclusion

Like past financial innovations, digitalization holds the promise of increasing the efficiency, productivity, and inclusiveness of the financial sector, thereby increasing the economic welfare of households and businesses. For example, a wide body of research indicates that tools that increase a household's savings behavior can have a substantial impact on household welfare.¹⁰ Digital tools that give households and small businesses across the income spectrum the ability to track and understand their spending and savings patterns can improve their ability to manage their finances, allow them to avoid more costly sources of credit, and increase their savings rate. There is evidence, reflected in several countries' experiences, that access to savings accounts not only increases savings but also results in households shifting more of their spending to education and to healthier food.¹¹ Digitalization also provides customers with tools to search for and compare financial services across various vendors to determine which is more likely to meet their specific needs.

On the credit side, digital lending platforms hold the potential for more objective credit decisions, helping to guard against personal prejudices influencing those decisions. Bigtech companies have access to large amounts of data, for example, from e-commerce platforms or search engines. Models to assess credit risk

¹⁰ Karlan, et al. (2016).

¹¹ Karlan, et al. (2016).

based on these alternative data hold the potential to increase credit access for households and small firms that do not necessarily have a long credit history, audited financial statements, or collateral, which are traditionally used to underwrite and monitor credit risk. And there is some research to back this up. A study co-authored by Julapa Jagtiani, one of the organizers of this conference, found that consumer loans made by LendingClub, a large fintech lending platform, reached areas with fewer bank branches and lower-income borrowers.¹² Research published by the Bank for International Settlements found that the internal credit scoring model built by and applied to small merchant customers of Mercado Libre, a large e-commerce platform in Latin America now offering financial services, has outperformed (at least in the short run) models based on credit bureau ratings and traditional borrower characteristics.¹³ And Mercado Libre was able to provide credit to merchants who would have been assessed as high risk by the credit bureau.

Innovations in payments services also hold the potential to increase inclusion. Across the globe there is a move toward faster, cashless payment systems, which can lower costs and provide more secure transactions than cash. Early evidence from several countries shows that the move to digital payments has had a positive impact on the well-being of individuals by strengthening their ties to other financial services.¹⁴ There is also evidence that the use of digital systems by governments to make transfer payments to individuals can significantly reduce the cost of distribution and the amount of fraud.¹⁵

The Federal Reserve's FedNowSM service, which is currently being built, will be an around-the-clock service whereby payments can be originated, cleared, and settled within seconds.¹⁶ The service is

¹² Jagtiani and Lemieux (2018).

¹³ See Bank for International Settlements (2019) and Frost, et al. (2019).

¹⁴ Karlan, et al. (2016).

¹⁵ Karlan, et al. (2016).

¹⁶ More information on FedNow is available on the Fed's website at <https://www.frbservices.org/financial-services/fednow/index.html>.

expected to provide clear public benefits in the form of safety, efficiency, and accessibility of instant payments. By lowering the cost of making payments in a secure way, FedNow can help promote financial inclusion by drawing more people into the financial system. This service, coupled with a directory service with accurate information on where to route payments for final distribution to households and businesses, could also make distribution of government benefits more efficient and solve some of the challenges the government faced when distributing pandemic relief payments earlier this year.

Steps Need to Be Taken So That Digitalization Lives Up to Its Potential

While digitalization holds a lot of promise to bring more households and businesses into the financial system, there is no guarantee this will happen. Indeed, digitalization could create more exclusion and increase disparities rather than close the gaps. But steps can be taken to help ensure that digitalization lives up to its potential. Let me discuss five of these.

Close the digital divide

First, the digital divide in the U.S. needs to close so that more people can take advantage of digital financial services. Among communities with a population of 100,000 or more, the city of Cleveland has among the lowest home broadband access in the nation.¹⁷ Only about 69 percent of households have broadband subscriptions compared to over 84 percent in the city of Philadelphia and over 86 percent for the nation as a whole. In the meantime, mobile phone technology, which has wide distribution, could significantly improve financial system access for unbanked adults.¹⁸

¹⁷ The data are available in Table GCT2801, U.S. Census American Community Survey (2019). In the city of Cleveland, 69.3 percent of households have a broadband internet subscription. Only Lakewood Township, Ocean County, N.J. has lower internet connectivity, at 58.9 percent. The number for the U.S. is 86.4 percent and the number for the city of Philadelphia is 84.2 percent.

¹⁸ World Bank data indicate that two-thirds of unbanked adults globally have a mobile phone. See Demirgüç-Kunt, et al. (2018), p. 91.

Improve financial literacy

Second, steps must also be taken to improve the reach and the effectiveness of financial literacy programs. Digitalization increases the number of financial services providers and the types of services being offered. But to take advantage of these, people need to be able to assess their value. One study of 188 financial literacy programs indicated that they had not, on average, increased financial knowledge or resulted in better financial choices. But the research also suggested that programs that included simple rules-of-thumb were more effective.¹⁹ Businesses also have to understand the costs and benefits of credit coming from a fintech firm versus a traditional banking relationship, which may prove to be more stable in an economic downturn. Increasing the ability of the consumers of financial services to evaluate new services will help ensure that these products add value.

Build trust

Third, in order to increase inclusion, steps must be taken to build trust between potential customers and the financial services industry. One Federal Reserve analysis indicated that one reason people do not have a transaction account is the lack of trust in financial institutions.²⁰ Effective consumer protection regulations encompassing all providers of financial services would give potential customers more confidence to use the services. Trust also depends on providers of financial services adequately protecting their customers' accounts against cybersecurity breaches, fraud, and data leakage. With the changes in technology and rapid expansion of available data, the methods for protecting the data will need to adapt. The traditional way of keeping data private, by taking away names or otherwise anonymizing it, no longer works in a world rich with multiple data sources that can be cross-referenced to de-anonymize the data and reveal identities.²¹ New methods have to be evaluated. An example is the technique used to achieve differential privacy by carefully adding some statistical noise to the data to maintain individual

¹⁹ Karlan, et al. (2016).

²⁰ Hogarth, et al. (2004), as cited in Raskin (2011).

²¹ Kearns and Roth (2020) discuss how then-Massachusetts governor William Weld's medical record was identified by combining the anonymized medical records released by the state with voter registration data.

privacy while maintaining statistical accuracy.²² The U.S. Census Bureau plans to apply differential privacy techniques to the statistics released as part of the 2020 census.²³

Test the algorithms before deployment

Fourth, it must be recognized that just because it is an algorithm does not mean it is immune from producing discriminatory underwriting and pricing decisions. Algorithms should be tested for bias before they are deployed. Credit and pricing models produced by algorithms through machine learning are necessarily complex because they are designed to reveal relationships in the data that are not revealed by standard modeling. But their opacity and complexity – their black-box quality – make it more difficult to identify these relationships and more difficult to uncover statistical discrimination or disparate impact and to enforce fair lending laws.²⁴

Well-meaning algorithms can have unintended effects. Algorithms are trained on past data that may have reflected biased decisions or may not be representative of the entire population. With more pieces of data available, there is more risk that data correlated with race or gender could be used in discriminatory ways. This means machine learning algorithms could exacerbate disparities by reinforcing past decisions. Kearns and Roth point out the need for what they call ethical algorithms, which are built to balance the accuracy of the model, for, say, assessing credit risk, with other desirable goals.²⁵ For example, the developer could build the algorithm so that it has low error rates in identifying creditworthy borrowers and the error rate for one racial group is not disproportionately higher than that for another.

At present, much of the auditing of algorithms occurs in an ad hoc way after the algorithm has been put

²² Differential privacy is achieved when no one, regardless of additional data, is able to determine better than random guessing whether any individual's data were used to construct a data release. See Kearns and Roth (2020).

²³ See U.S. Census (2020).

²⁴ Morse and Pence (2020) examine the ways in which technology may augment or deter discrimination in household finance. See also Abuhamad (2019).

²⁵ Kearns and Roth (2019, 2020).

into place and has had the opportunity to have a disparate impact.²⁶ A well-known example is the Apple Card: gender discrimination was alleged by some customers about the algorithms used by Goldman Sachs, the issuer of the card, after the card was deployed.²⁷ Who should do the testing is an open question. A report from the Brookings Institution's Artificial Intelligence and Emerging Technologies Initiative recommends that the developer test the algorithm for disparate impact. Companies that use such algorithms could engage independent third parties to evaluate them, with appropriate restrictions to guard the firms' intellectual property. Regulators may also have to play a larger role in testing algorithms.

Since adequate data sets are needed for testing, the rules pertaining to data collections should be reviewed. The Equal Credit Opportunity Act restricts creditors from discriminating in credit transactions against credit applicants on any prohibited basis, including race and gender. The collection of data on applicants' personal characteristics for home purchase and refinance loan transactions is required and the data must be publicly disclosed. The Dodd-Frank Act also requires small business lenders to collect and report race and gender data to federal regulators. But for other nonmortgage loans, creditors' collection of these data is prohibited except for the creditors' own use to conduct a limited self-test of their compliance with the law.²⁸ The original prohibition was based on the notion that the data might be used in discriminatory ways. But experience with the collection of mortgage data suggests that this has not been the case and that the data have made it easier to monitor compliance and enforce the law. Extending mandatory data collection of personal characteristics for nonmortgage credit applicants may allow for better testing for compliance. But it would also entail costs for creditors that could partially be passed on to borrowers. With more entities offering credit, it is time to undertake a new review of the costs and benefits of data collection for different types of nonmortgage credit.²⁹

²⁶ Kleinberg (2018).

²⁷ MacCarthy (2019).

²⁸ Data collected for such a self-test are not available to government agencies or credit applicants for use in examinations or litigation. See Taylor (2011).

²⁹ The Equal Credit Opportunity Act does not address data collection. In 1995 and again in 1998, the Board of Governors of the Federal Reserve System put out for public comment proposed amendments to Regulation B, which

Rethink the regulatory framework

Fifth, a rethinking of the regulatory framework is needed to ensure that the financial innovations led by digitalization are a net positive. Such innovations do not reduce the need for risk management, financial regulation and supervision, and good governance, although the form each takes is likely to be different than what has been effective in the past. Existing regulatory and supervisory structures will need to adapt to keep up with the new ways that financial services are being delivered and the new players delivering them. Under the principle, “If it walks like a duck and quacks like a duck, it’s a duck,” a regulatory approach that shifts the focus from the type of institution offering the service to the type of activity would likely be more effective in fostering the stability of the financial system and limiting regulatory arbitrage. The extension of some regulations to new service providers is already occurring; for example, bigtech firms’ payments services are subject to know your customer rules.

But the entry of fintech and bigtech providers of financial services also raises new issues. Data produced by bigtech firms are what make it attractive for these firms to enter into financial services in the first place. But their ability to control the data also makes it harder for other firms to enter the market, thus limiting competition. There are different approaches to regulating data usage in order to limit the market power of bigtech firm entrants and facilitate market contestability without stifling entry.³⁰ Two examples are the European Union’s General Data Protection Regulation and the open banking regulations, which are in place in many countries. Both approaches allow certain data to be shared directly with third parties but place restrictions on the type of data and the kinds of authorizations that need to be garnered in order to allow for data sharing.

implements the ECOA, to eliminate the data ban and allow for voluntary collection of personal characteristics of applicants for nonmortgage credit. The final rules did not drop the ban. See Braunstein (2008), Government Accountability Office (2008), Taylor (2011), and Abuhamad (2019).

³⁰ See Frost, et al. (2009) for further discussion.

The ability of bigtech firms to produce and to capture the benefits of big data depends on network effects. Benefits to users grow when there are more users of the services, and as the number of users increases, more data are produced that can be garnered for use by the bigtech firm for the development of new services, pricing, and marketing. For example, a firm that may have begun as an e-commerce firm may find it beneficial to offer payment services as an adjunct to generate more e-commerce business, but the transactions data can then be used to offer more services.³¹ Once a bigtech firm is well established, it becomes more difficult for other firms to enter. This adds concerns about market power to data privacy concerns. Issues of pricing, cross-subsidization, product tying, and other anti-competitive practices that lead to less innovation, not more, deserve increased attention from financial services regulators.

With the entry of bigtech and fintech firms into financial services, the public policy approach will need to change to include a more holistic blending of financial regulation, antitrust policy, and data privacy regulation. There will need to be cooperation across these types of regulators within each country, and this may entail creating structures that allow for more formal or systematic coordination across different types of regulators. The growth of digitalization also calls for a modernization of the antitrust laws and policy, which is occurring in several countries.³² The global nature of the bigtech firms entering financial services means that effective international coordination among regulators and supervisors through the Financial Stability Board and other international entities will be critical to ensuring that the benefits can be captured and the risks managed.³³

Finally, it is important that regulators and those responsible for enforcing fair lending and consumer protections increase their expertise regarding the technologies being used in the marketplace. This is

³¹ Bank for International Settlements (2019) provides a nice description of network externalities in bigtech's entry into financial services.

³² Bank for International Settlements (2019) discusses some of the implications of bigtech for traditional competition policy.

³³ The Financial Stability Board designated fintech as a key area of focus in its 2020 work program. See Financial Stability Board (2019).

beginning to happen as financial system regulators and supervisors are starting to use big data and data analytics to improve their own assessments of banking and financial stability risks and to understand trends in the industry more generally. Several countries have set up innovation hubs and regulatory sandboxes to encourage innovation in financial services. The Fed has been researching new technologies and innovations in financial services for some time. The System Payments Researchers, co-chaired by Fumiko Hayashi of the Kansas City Fed and Bob Hunt of the Philadelphia Fed, are producing research on fintechs and digital currencies. The Board of Governors has set up a technology lab where researchers across the System are building and testing a range of distributed ledger platforms to understand their potential benefits and tradeoffs.³⁴ The Boston Fed is working with the Massachusetts Institute of Technology to experiment with digital currency technologies, and the New York Fed has established an innovation center, in partnership with the Bank for International Settlements, to identify and develop in-depth insights into critical trends and financial technology of relevance to central banks.³⁵

Conclusion

In summary, fintech, bigtech, algorithms, machine learning, and digitalization are rapidly transforming the financial services industry. These innovations hold the promise of increasing financial inclusion for the benefit of individuals, businesses, and the overall macroeconomy. But as with past innovations, they also present challenges that will need to be addressed to ensure that the promised benefits are attained and risks are well managed.

³⁴ Brainard (2020).

³⁵ Bank for International Settlements (2020).

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