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Fintech and the banking bandwagon

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ABSTRACT

We examine annual report filings of U.S. listed banks to assess their attitude toward the financial technology (fintech) sector. Banks did not mention the impact of fintech on their business until the 2016 filing season, when 14 banks, or 3% of the total number of filers, did so. In 2017, this number skyrocketed to 66 banks, or 14% of filers. These filings prove to be a rich source of data about banks' perceptions of fintech. Further, compared to survey data, the information has the advantage of being management-certified and not anonymous. We analyze what banks say about fintech in their annual filings and find that they are largely concerned about fintech's impact on deposits, lending, and payments business, and about the proposed bank charter for fintechs. Banks are much less worried about cryptocurrencies, blockchain, and competition from "Big Tech." There is also evidence of banks being influenced by what their peers are saying, and even copying peers' disclosures verbatim.

[1] We are grateful to Yuliya Snihur and Maxim Zagonov for suggestions, and to Jasper Ginn for help with data. All errors are ours.

1. INTRODUCTION

In the post-dotcom-boom era, it is rare that a business sector, let alone one as large and long-established as banking, exhibits a fivefold year-on-year increase in anything. Yet, this is just what happened over the 2016-2017 period with U.S. banks, whose official notifications to their investors about the impact of fintech on their business grew 371%. What does this remarkable fact mean, and what do we learn from it?

In this article, we focus on the text of banks' disclosures about fintech in their Form 10-K annual reports. In one year, the amount of textual data increased dramatically, yielding a number of intriguing insights into an important industry's official reaction to digital disruption.

First, banks that mention fintech overwhelmingly view it as a threat rather than as an opportunity (though many more do not mention fintech at all, at least for now). Further, even among those that refer to fintech, many do not state the exact nature of the threat. For those banks that do, deposits, lending, and payments are deemed to be the most vulnerable lines of business. Only six banks discuss their strategy with respect to fintech competition, with four stressing potential partnerships with fintech firms. We also report that banks that refer to fintech are somewhat more likely than those that don't to be already engaged with the fintech sector in a meaningful manner, and to be involved in industry consolidation.

The sudden increase in the use of the term fintech in banks' 10-K forms makes one wonder what has prompted it. One reason could be the fact that the Office of the Comptroller of the Currency (OCC) has raised the possibility of a special bank charter for fintech companies, which appears to have alarmed 11 banks. We also present evidence that some banks simply copy their peers in how they refer to fintech, and point out a geographical pattern in the way references to fintech have spread across banks. Finally, we find that when compared to their concerns about competition from fintech companies, banks seem to be less worried about the competition from Big Tech.

2. OVERVIEW OF THE DATA

Table 1: Determinants of banks' fintech mentions

PANEL A: DESCRIPTIVE STATISTICS

	MEAN	MEDIAN	SD	MIN.	MAX.
log(assets)	7.979	7.632	1.593	4.785	14.728
ROA	0.008	0.009	0.004	-0.030	0.030
ROE	0.074	0.080	0.079	-1.251	0.310
CEO age	59.670	60.000	6.690	36.000	86.000
CEO compensation	1,877,281	807,713	2,902,329	26,804	27,236,892
Long-term compensation	0.284	0.226	0.278	0.000	1.000

There is a substantial finance literature on the informativeness of textual disclosures by companies in general, and in the risk factor disclosures of their 10-K filings in particular [Campbell et al. (2014)]. To conduct our analyses, we look for the text "fintech" or "financial technology" in 10-K forms filed in the 12 months ending 31 December, 2017 with the Securities and Exchange Commission (SEC) by publicly traded U.S. bank holding companies (which we define as corporations whose Standard Industrial Codes, or SICs, range from 6021 to 6036 according to the SEC's EDGAR portal). We retain only disclosures addressing the impact of fintech on the bank's business,[2] and henceforth refer to these cases as "bank fintech mentions". Our 2017 sample consists of 66 banks with such mentions (these are listed in Appendix A), up from 14 in 2016 and zero in the preceding years.

> "The number of bank annual reports mentioning fintech competition grew from 0 in 2015 to 14 in 2016 and to 66 in 2017."

[2] This excludes one bank that mentions fintech in an executive's biography and another that mentions a loan portfolio acquired through a fintech company.

Table 1: Determinants of banks' fintech mentions

PANEL B: RESULTS OF PROBIT REGRESSIONS

	LOG(ASSETS)		ROA		ROE		CEO AGE		CEO COMPENSATION		LONG-TERM COMPENSATION	
	coef.	p-value	coef.	p-value	coef.	p-value	coef.	p-value	coef.	p-value	coef.	p-value
MODEL 1	0.2651	0.0000			-0.6100	0.5195	0.0075	0.5279				
MODEL 2	0.3567	0.0000			-0.7188	0.4386	0.0062	0.6056	0.0000	0.3561	-0.1575	0.7062
MODEL 3	0.2665	0.0000	-10.0393	0.5629			0.0074	0.5344				
MODEL 4	0.3642	0.0001	-14.7381	0.4072			0.0060	0.6156	0.0000	0.3407	-0.1731	0.6799

To provide a better understanding for what bank characteristics are linked with the likelihood of a fintech mention, we conducted probit regressions, as reported in Table 1 (Panel A summarizes the explanatory variables, and Panel B shows the estimation results). The dependent variable is 1 for each of the banks that mention fintech in 2017, and 0 for other filing banks. Our explanatory variables are bank size (the logarithm of bank assets) and profitability (ROA and ROE), as well as CEO characteristics (age, total compensation, and the proportion of long-term compensation) in 2016. The table shows that only bank size is a significant predictor of whether a bank will mention the fintech threat: larger banks are more likely to do so.

With respect to the content of the banks' filings, of the 66 fintech-mentioning banks, 20 use only the term "fintech,"[3] 30 use only the term "financial technology," and 16 banks use both terms. All but two of the banks include these mentions in Item 1 (Business) or Item 1A (Risk factors) of the filing.[4]

Among the 66 filings, 58 mention fintech as a competitive threat, six mention it as both a threat and an opportunity, and two only as an opportunity.[5]

Of the 64 banks that see fintech as a threat (including the six that also see it as an opportunity), 23 do not provide further information, simply mentioning fintech as part of a list of competitor types,[6] or separating it from other competitors in a statement such as "in addition, financial technology, or fintech, startups are emerging in key areas of banking."

Such statements are often boilerplate. For example, seven banks opine that fintech "made it possible for nonbanks to offer products and services traditionally provided by banks" and three state that "technology and other changes, including the emergence of "fintech companies" are allowing parties to complete financial transactions through alternative methods that historically have involved banks." However, there is also variation and richness in the fintech mentions that allows us to examine banks' attitudes toward fintech, and we turn to this issue next.

[3] This includes "fintech" (3 banks), "fintech" (4 banks), and even "fin-tech" (1 bank).
[4] The two exceptions include it in Exhibit 13, containing additional sections of the bank's annual report to investors, such as the letter to shareholders.
[5] It is notable that both of the banks that mention fintech as an opportunity recently became involved in the fintech space – Citizens Financial through a partnership with Bottomline Technologies, and Live Oak through its fintech venture capital arm.
[6] For the record, of the 23 banks, 14 mention fintech in a list (ranging from 3 to 18 competitor types, with a mean and median of 7); in 8 of the cases, fintech is the last item on the list.

3. HOW BANKS DEFINE FINTECH AND WHAT WORRIES THEM ABOUT IT

As Bunea et al. (2016, footnote 3) discuss, the earliest known definition of fintech, attributed to Bettinger (1972), who then worked at Manufacturers Hanover Bank, remains pertinent despite the very different context of the time: "an acronym which stands for financial technology, combining bank expertise with modern management science techniques and the computer." However, while Bettinger was preoccupied with better analytics, thirty-five years on, banks' definitions of fintech are particularly concerned with product delivery, describing fintech in their 10-K filings as: "a broad category referring to technological innovation in the design and delivery of financial services and products" (Mainsource Financial Group); "[the use of] new technology and innovation with available resources in order to compete in the marketplace of traditional financial institutions and intermediaries in the delivery of financial services" (Orrstown Financial Services); or "companies that provide innovative web-based solutions to traditional retail banking services and products" (Valley National Bancorp).

While the wording of the definitions can vary, it is quite clear that by fintech, these days banks mean potential digital disruption of the banking sector, as well as the companies contributing to this disruption. Further, the 66 banks in our sample believe that the potential impact of fintech is sufficiently important for them to start informing their investors about it. So, what is it that worries banks about fintech?

Primarily, banks are concerned about competition from fintech for their core businesses: deposits (13 banks) and especially lending (20 banks). The prominence of the latter concern is unsurprising, given the proliferation of marketplace lenders. Payments, like deposits, concern 13 banks. Money transfers are in fourth place (8 banks). Other concerns are much less common: only three banks are worried about fintech competition for money management, investment advising, or leasing, and two about mortgage lending. Account management, product access, and working capital lending are singled out by one bank each. Interestingly, only one bank mentions bitcoin, while three banks mention blockchain technology. One bank states that fintech poses a competitive threat in all areas of the bank's operations.

In addition to the above threats to the banks' product offerings, several banks discuss broader threats to the banks' operations. Thus, four banks state that trying to keep up with fintech exposes them to greater cyber-security risk, five say that it can make it harder to attract and retain customers, and one bank warns about fintech making it harder to attract and retain employees.

4. WHAT BANKS PLAN TO DO ABOUT THE FINTECH THREAT

It is reasonable to assume that prior to signing off on an annual report where fintech is newly added as a competitive factor, the bank's leadership will have discussed its strategy for dealing with it. However, most banks do not choose to share this strategy with their investors. The exceptions are below:

- **Associated Banc:** "Strategic planning remains important as we adopt innovative products, services, and processes in response to the evolving demands for financial services and the entrance of new competitors, such as out-of-market banks and financial technology firms."[7]
- **BNY Mellon:** "We are collaborating with clients and leading financial technology startups, or fintechs, to develop and integrate new solutions and services, and attracting top information technology talent through our Innovation Centers worldwide."
- **Citizens Financial:** "We are also focused on fintech partnerships that help deliver differentiated digital experiences for our customers."
- **Hamilton Bancorp:** "Hamilton is evaluating fintech companies with the possibility of developing relationships for efficiency in processing and/or as a source of loans and other business."
- **Huntington Bancshares:** "We are monitoring activity in marketplace lending along with businesses engaged in money transfer, investment advice, and money management tools. Our strategy involves assessing the marketplace, determining our near term plan, while developing a longer term approach to effectively service our existing customers and attract new customers. This includes evaluating which products we develop in-house, as well as evaluating partnership options, where applicable."

[7] While one could expect such a strategy formulation to be bank-specific, United Bancshares' text, appearing 22 days after Associated Banc's, is identical to it.

- Pacific Mercantile Bancorp: "Thus we have reduced and expect to continue to reduce the size of our branches and are redeploying the cost savings to expand our business development team and more actively promote our online banking."

In 2016, only two banks (Hamilton and Huntington) discussed their fintech-facing strategies, hence the year-on-year increase should be welcomed by bank shareholders. However, the disclosure by Huntington, the first-ever bank to mention fintech, remains the most extensive. One could make the argument that after (justifiably) informing investors about the potential implications of fintech on their businesses, banks should reassure them about having a plan to deal with these implications. Such text could have the additional benefit of signaling to fintech companies which banks are particularly receptive to a partnership.

5. ARE BANKS' FINTECH REFERENCES JUST WORDS?

In Bunea et al. (2016), we addressed the possibility that the threats and opportunities of digital disruption in banking may be discussed without using the term "fintech." To examine whether this is so, that study formed a control sample of banks that are of similar size to the 14 fintech-mentioning pioneers, but did not employ the term in their 2016 filings.[8] The 2016 study documented that disclosures by fintech-mentioning firms do a better job of informing banks' investors about the nature and possible consequences of digital disruption. Further, the 2016 study found fintech-mentioning banks to be more active in the fintech field than control banks.

Another year of data lends further support to the notion that banks' mentions of fintech are not (just) words. First, given corporations' reluctance to change text in their annual filings and presumed internal processes that need to be involved in such changes [Cohen et al. (2017)], the very fact that 52 banks did so in 2017, is quite striking.

Second, we once again examine fintech-related actions of our 2016 sample and control banks. As of end-2017, eight of the banks that mentioned fintech in 2016 have significant involvement in the field (through fintech acquisitions, strategic partnerships, or accelerators), as compared to their four control banks.

Third, we examine acquisitions within our sample of bank holding companies. Of the 19 banks that were acquired by other companies in the sample, four banks (or 21%) are fintech mentioners. Of the acquiring banks, six banks (or 32%) are fintech mentioners. While the numbers above are not statistically significant, they do raise the possibility that fintech-aware banks are likely to play a leading role in the consolidation of the banking industry.

6. THE OCC FINTECH CHARTER PROPOSAL

The decision by the OCC to consider giving fintech firms a bank charter appears to have prompted multiple banks to address the fintech threat in their filings. A total of 11 banks discuss the OCC announcement (only one of these banks mentioned fintech in 2016). One of the first official reactions, on 2/26/17, was Iberiabank's (it was subsequently reproduced verbatim by First Financial Corp on 3/9/17 and by Mainsource Financial Group on 3/10/17): "The federal charter would largely allow fintech companies to operate nationwide under a single set of national standards, without needing to seek state-by-state licenses or joining with brick-and-mortar banks, and may therefore allow fintech companies to more easily compete with us for financial products and services in the communities we serve."

The above was echoed by both Central Pacific and CVB Financial on 3/1/17: "Recent developments include: […] the pronouncement by the Office of the Comptroller of the Currency of a limited-purpose "fintech" national bank charter which would enable a fintech company to originate loans and access the payment system directly, without relying on third-party banks. Such a development could further increase competition in the financial services sector, including with the Company and the bank."

However, the pace of OCC announcement mentions did not pick up, and in fact the last ten fintech-mentioning banks (those filing after 3/10/17) did not mention the fintech charter at all. Subsequent years' filings will likely shed more light on just how impactful the banks deem the proposed charter to be.

[8] Eight of these banks mention competition from "non-banks" (or "nonbanks"). Note, however, that this term is quite ambiguous, as the following elaboration by Bryn Mawr Bank makes clear: "The Corporation's competitors include other community banks, larger banking institutions, trust companies and **a wide range of other financial institutions such as credit unions, registered investment advisors, financial planning firms, leasing companies, government-sponsored enterprises, on-line banking enterprises, mutual fund companies, insurance companies and other non-bank businesses**" (emphasis ours).

7. THE GEOGRAPHICAL DISTRIBUTION OF FINTECH MENTIONS

The 66 banks in our sample represent 27 different states. There is some prima facie evidence of geographic clustering: although fewer than one in seven banks nationwide mentioned fintech, both banks in Utah have done so, as well as two of Georgia's three banks, half of Virginia's six banks, and seven of Indiana's 15.

Figure 1 shows the spread of fintech mentions in the Continental U.S. Banks that first mentioned fintech in 2016 are marked with gray circles, banks that first mentioned fintech in 2017 are identified with black circles, and the remaining banks with black dots. Eyeballing the data does make it appear as though there are swathes of the country where bank holding companies do not mention fintech, as well as areas where bank mentions are concentrated.

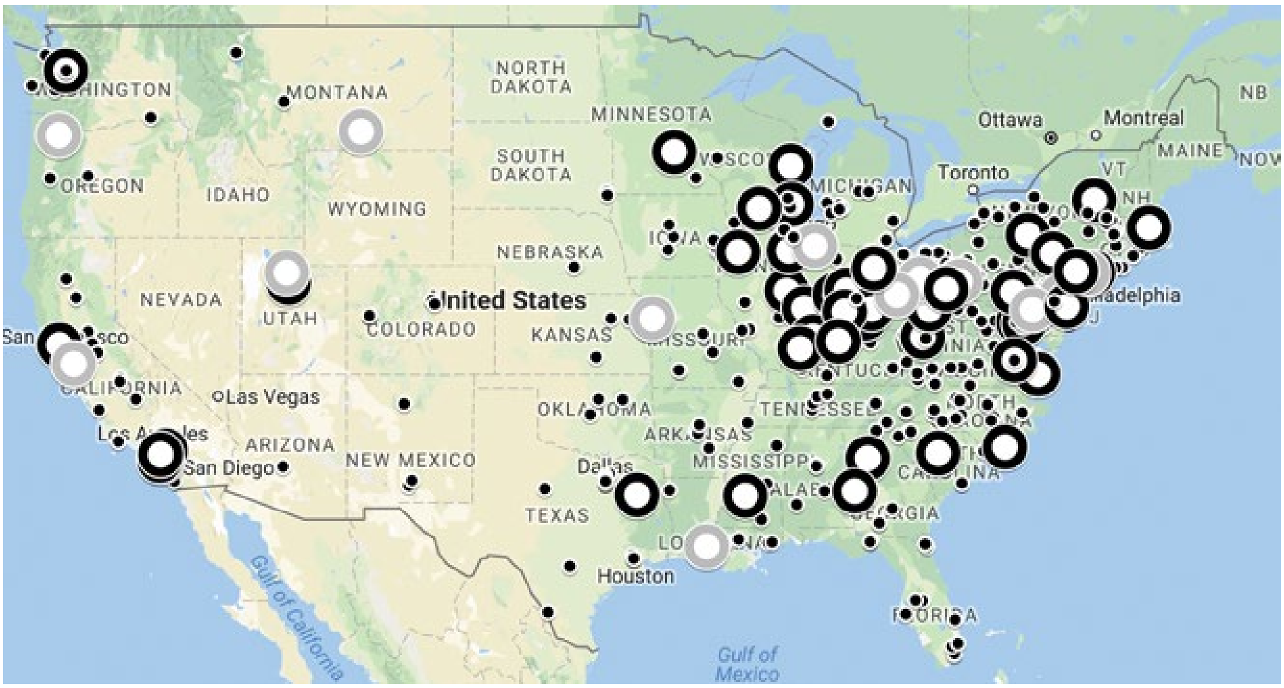
To investigate the geographic clustering hypothesis more formally, we can proceed as follows. The 14 banks that mentioned fintech in 2016 represent 11 states. Of these states' 166 other banks, 25 or 15.1% mentioned fintech in 2017. By contrast, of the 285 banks located elsewhere in the U.S., only 27, or 9.5%, mentioned fintech in 2017. According to a one-tailed Z-test for difference in proportions, this difference is statistically significant at the 95% confidence level (p-value = 0.038). In fact, given the sequence of events (a fintech mention in 2016 followed by more mentions in the same states the following year), this suggests that the increase in fintech-mentioning took place in part through geographical proximity.

8. WHY SUCH AN INCREASE IN FINTECH MENTIONS?

This is a worthwhile question, given that banks' fintech mentions came out of nowhere in 2016, and exhibited a staggering 371% increase in the following year. What explains so many banks jumping on the fintech mentioning bandwagon?

First, it is undeniable that fintech is increasingly part of a reality banks face in their strategic thinking. Given the prominence of fintech over at least the last few years,

Figure 1: The spread of fintech mentions in the Continental U.S.



Banks that first mentioned fintech in 2016 are marked with gray circles, those that first mentioned it in 2017 are marked with black circles, and non-mentioning banks are marked with black dots. An animated version of this figure showing the evolution of fintech mentions over time is available at **www.fintxt.com/s/fintech2.gif** however, this reality alone is unlikely to come anywhere close to explaining a nearly-fivefold increase in banks' fintech mentions over the course of just one year. Even aggressively assuming that the importance of fintech doubled in a single year, we would expect to see only 14 new fintech mentioners, not 52.

Second, the OCC's announcement about granting fintech companies a bank charter was mentioned by 11 banks, so it is reasonable to assume that their fintech mentions were prompted by this announcement.

Third, like any corporation, banks can be expected to read their peers' filings. Indeed, the verbatim reproduction of newly added fintech-related text across filers that we have documented shows this to be the case. While it is implausible that every bank's decision-makers would read the filings of all other banks in the nation, banks may be more likely to read the filings of other banks in their home state. One reason for this is that same-state banks are more likely to be rivals and hence to pay close attention to each other; another reason is that same-state banks face the same regulation at the state level. Indeed, our earlier analysis shows that a bank is 15.1%/9.5%=1.59 times more likely to mention fintech in its filing if another bank in its state did so in the previous year. Taking this calculation at face value, this factor accounts for (15.1%-9.5%)*166=9 new fintech mentions. However, multiple banks could have (and indeed, have, according to cross-state text copying) been inspired by filings of out-of-state peers, which would increase the number further.[9]

Fourth, while we do not wish to flatter ourselves, it is conceivable that some banks' decision-makers may have been prompted to mention fintech either by coming across our 2016 article,[10] or by hearing about it on the Financial Times' influential Banking Weekly podcast.[11] It is unclear what figure, if any, to assign to this possibility.

Lastly, there must be other factors responsible for the rapid spread of fintech mentions, which future data and research may reveal.

9. WHAT ABOUT COMPETITION FROM BIG TECH?

While the potential of financial technology firms to disrupt banking is widely discussed in the academic and business circles, there have also been warnings about the effects of competition from information technology giants such as Amazon, Apple, Facebook, and Google [Arnold (2018), KPMG (2017), McKinsey (2017), World Economic Forum (2017)]. But, do the banks themselves voice such concerns in their annual filings?

While we did not find any mentions of "Big Tech" as such, we have identified several mentions of competition from "technology companies" (not preceded by the adjective "financial"); we have put this term in bold in the quotes below. In fact, Bank of America first mentioned competition from technology firms in March 2006 – a full decade before a bank annual report mentioned competition from fintech: "In addition, technological advances and the growth of e-commerce have made it possible for non-depository institutions to offer products and services that traditionally were banking products, and for financial institutions to compete with **technology companies** in providing electronic and Internet-based financial solutions."

The above text has stayed unchanged until the present day (with the small but noteworthy exception that "Internet" ceased to be capitalized in 2010). Years later, U.S. Bancorp introduced very similar text: "In addition, technology has lowered barriers to entry and made it possible for non-banks to offer products and services that traditionally were banking products, and for financial institutions to compete with **technology companies** in providing electronic and internet-based financial solutions."

On the 25th of February 2016, U.S. Bancorp explicitly listed technology companies among its competitors: "The Company competes with other commercial banks, savings and loan associations, mutual savings banks, finance companies, mortgage banking companies, credit unions, investment companies, credit card

9 A more cynical take on contagion in the banking sector is expressed by Elon Musk, who among other things co-founded perhaps the most influential fintech startup of all, PayPal: "All the bankers did was copy what everyone else did. If everyone else ran off a bloody cliff, they'd run off a cliff with them. If there was a giant pile of gold sitting in the middle of the room and nobody was picking it up, they wouldn't pick it up, either" [Vance (2015)]. This point of view would explain not only why fintech mentions spread so fast, but also why there weren't any for so long.

10 For the record, of the 14 non-fintech-mentioning banks in the Bunea et al. (2016) control sample, four mentioned fintech in 2017.

11 Financial Times Podcast, 2017, "European banks on Brexit, Lloyds cyberattack and US banks on fintech," January, 24, http://on.ft.com/2HjqOpY

companies and a variety of other financial services, advisory and **technology companies**."

On the same day, BB&T filed the following text: "BB&T also experiences competition from nonbank companies inside and outside of its market area and, in some cases, from companies other than those traditionally considered financial sector participants. In particular, **technology companies** have begun to focus on the financial sector and offer software and products primarily over the Internet, with an increasing focus on mobile device delivery. [...] Technology companies are generally positioned and structured to quickly adapt to technological advances and directly focus resources on implementing those advances."

In addition, two days later, the following text first appeared in UMB Financial's filing, and was replicated in Lakeland Bancorp's on the 15th of March: "Competition with financial services technology companies, or **technology companies** partnering with financial services companies, may be particularly intense, due to, among other things, differing regulatory environments."

Lastly, JP Morgan and CVB Financial, which elsewhere in their 10-K mention fintech competition, also address technology companies more generally, stated, respectively: "Competitors of the Firm include other banks and financial institutions, trading, advisory and investment management firms, finance companies and **technology companies** and other firms that are engaged in providing similar products and services. [...] New technologies have required and could require the Firm to spend more to modify or adapt its products to attract and retain customers or to match products and services offered by its competitors, including **technology companies**" (JP Morgan) and "competition and innovation with respect to financial products and services by banks, financial institutions and non-traditional providers including retail businesses and **technology companies**" (CVB Financial).

We have also looked for explicit mentions of competition from U.S.-based Big Tech companies: Amazon, Apple, Facebook, Google (as well as its parent company, Alphabet), and Microsoft. We have only found mentions of Apple, and only in connection with its Apple Pay service[12]: "For example, consumers can now [...] use electronic payment methods such as **Apple** Pay" (Citizens Holding Company). "Merchants may also continue to pursue alternative payment platforms, such as **Apple** Pay, to lower their processing costs. Any such new payment system may reduce our interchange income" (Banner Corporation, Charter Financial, and Colony Bankcorp).

"Big Tech is little mentioned in banks' filings, even though some analysts argue that it poses a greater threat than fintech."

What should we make of the above mentions of competition from technology firms? The alarm raised by analysts over Big Tech's potential to disrupt banking goes well beyond Apple Pay and it is doubtful that any traditional bank is immune from this disruption. McKinsey (2017), for example, stated that "Amazon, Facebook and Apple have all made platform-expanding moves into banking. Banks should consider the possibilities and prepare". According to KPMG (2017), "Recent quarters have seen [...] an increasing number of large fintechs like Square and Klarna applying for banking charters. Yet while these growing players have made headlines, technology and ecommerce giants like Amazon, Google, Facebook and Apple may pose greater threats to the traditional banking model."

At the moment, however, concerns over such developments in banks' annual reports are muted, and far less widespread than banks' concerns over fintech. Since banks' mentions of competition from fintech started appearing in their annual reports years after bankers began discussing the topic in public, mentions of competition from technology giants may end up following a similar trajectory. However, given the speed and the scope of digital disruption in the industry, it is hard to argue that such a delay is in the interest of banks' stakeholders.

[12] Several other banks' reports mention Apple Pay as a service they provide to their clients, rather than as a competitive threat.

CONCLUSION

In the conclusion of our 2016 investigation, we listed six questions for the future about banks mentioning the fintech threat:

1. Is it that they are especially vulnerable in the face of this threat after all, and will this be reflected in subsequent poor performance?
2. Are they unusually prescient, and as such will exhibit greater adaptability and resilience, accompanied by strong financial results?
3. Will the performance of the fintech sector justify the concerns of our cohort of officially apprehensive banks?
4. Will disclosures about fintech competition continue to spread through banks' annual reports?
5. If so, to which banks?
6. Will most banks copy or adapt others' formulations, or will disclosures become increasingly informative?

While the jury is still out on the first three questions, we are now in a position to give qualified answers to the last three. Indeed, disclosures about fintech are spreading fast, and may continue to do so. In part, this spread is toward banks that are themselves involved in fintech, or are geographically close to banks that have mentioned fintech in their disclosures previously. As the spread of fintech disclosures continues, there is much copy-pasting from peers, but also an encouraging trend toward more informative disclosure.

This year's harvest of fintech-related disclosures promises to yield even richer insights. The passage of time will also shed light on a fundamental question underlying our research: does a bank's attitude toward fintech predict its success? We look forward to continuing with this fascinating line of inquiry.

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Appendix A: Fintech-mentioning banks

This list presents the 66 banks that mentioned fintech in 2017, by ticker symbol (in bold): **3CSBB** CSB Bancorp Inc, **AF** Astoria Financial Corp, **AROW** Arrow Financial Corp, **ASB** Associated Banc Corp, **BK** Bank of New York Mellon Corp, **BKMU** Bank Mutual Corp, **BMRC** Bank of Marin Bancorp, **BNCL** Beneficial Bancorp Inc, **BUSE** First Busey Corp, **CBSH** Commerce Bancshares Inc, **CFG** Citizens Financial Group Inc, **CHCO** City Holding Co, **CHMG** Chemung Financial Corp, **COF** Capital One Financial Corp, **CPF** Central Pacific Financial Corp, **CVBF** CVB Financial Corp, **ETFC** E Trade Financial Corp, **FBIZ** First Business Financial Services Inc, **FCFP** First Community Financial Partners Inc, **FFBC** First Financial Bancorp, **FFWM** First Foundation Inc, **FIBK** First Interstate Bancsystem Inc, **FITB** Fifth Third Bancorp, **FNB** FNB Corp, **FNCB** FNCB Bancorp Inc, **FRME** First Merchants Corp, **GABC** German American Bancorp Inc, **HBAN** Huntington Bancshares Inc, **HBK** Hamilton Bancorp Inc, **HBNC** Horizon Bancorp, **HMST** HomeStreet Inc, **IBKC** Iberiabank Corp, **INBK** First Internet Bancorp, **JPM** JP Morgan Chase & Co, **LCNB** LCNB Corp, **LOB** Live Oak Bancshares Inc, **MRLN** Marlin Business Services Corp, **MSFG** Mainsource Financial Group, **NFBK** Northfield Bancorp Inc, **ONB** Old National Bancorp, **OPOF** Old Point Financial Corp, **ORRF** Orrstown Financial Services Inc, **PACW** Pacwest Bancorp, **PEBO** Peoples Bancorp Inc, **PMBC** Pacific Mercantile Bancorp, **PNC** PNC Financial Services Group Inc, **PUB** Peoples Utah Bancorp, **QCRH** QCR Holdings Inc, **RBCAA** Republic Bancorp Inc, **SBSI** Southside Bancshares Inc, **SIVB** SVB Financial Group, **SNBC** Sun Bancorp Inc, **SNV** Synovus Financial Corp, **SSB** South State Corp, **STI** Suntrust Banks Inc, **STT** State Street Corp, **TCF** TCF Financial Corp, **THFF** First Financial Corp, **TRMK** Trustmark Corp, **UBOH** United Bancshares Inc, **UBSH** Union Bankshares Corp, **UMBF** UMB Financial Corp, **UMPQ** Umpqua Holdings Corp, **VLY** Valley National Bancorp, **WSBC** Wesbanco Inc, **ZION** Zions Bancorporation

Appendix B: Fintech mentions by state

This list shows the distribution of fintech mentioning banks by state. Each state's name is followed by the number of fintech mentioning banks, the total number of banks from that state, and tickers of fintech-mentioning banks (in blue for banks that first mentioned fintech in 2016): **Alabama** 0/6; **Alaska** 0/1; **Arizona** 0/1; **Arkansas** 0/4; **California** **6**/32: BMRC, CVBF, FFWM, PACW, PMBC, SIVB; **Colorado** 0/3; **Connecticut** 0/10; **Delaware** 0/2; **Florida** 0/13; **Georgia** **2**/3: SNV, STI; **Hawaii** **1**/4: CPF; **Idaho** 0/0; **Illinois** **3**/18: BUSE, FCFP, QCRH; **Indiana** **7**/15: FRME, GABC, HBNC, INBK, MSFG, ONB, THFF; **Iowa** 0/6; **Kansas** 0/3; **Kentucky** **1**/11: RBCAA; **Louisiana** **1**/7: IBKC; **Maine** 0/4; **Maryland** **1**/12: HBK; **Massachusetts** **1**/19: STT; **Michigan** 0/12; **Minnesota** **1**/3: TCF; **Mississippi** **1**/7: TRMK; **Missouri** **2**/8: CBSH, UMBF; **Montana** **1**/3: FIBK; **Nebraska** 0/1; **Nevada** 0/0; **New Hampshire** 0/0; **New Jersey** **4**/24: MRLN, NFBK, SNBC, VLY; **New Mexico** 0/2; **New York** **6**/29: AF, AROW, BK, CHMG, ETFC, JPM; **North Carolina** **1**/18: LOB; **North Dakota** 0/0; **Ohio** **7**/27: 3CSBB, FFBC, FITB, HBAN, LCNB, PEBO, UBOH; **Oklahoma** 0/3; **Oregon** **1**/3: UMPQ; **Pennsylvania** **5**/42: BNCL, FNB, FNCB, ORRF, PNC; **Rhode Island** **1**/3: CFG; **South Carolina** **1**/9: SSB; **South Dakota** 0/2; **Tennessee** 0/9; **Texas** **1**/16: SBSI; **Utah** **2**/2: PUB, ZION; **Vermont** 0/3; **Virginia** **3**/6: COF, OPOF, UBSH; **Washington** **1**/13: HMST; **West Virginia** **2**/6: CHCO, WSBC; **Wisconsin** **3**/10: ASB, BKMU, FBIZ; **Wyoming** 0/0.

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