

SECTOR IN-DEPTH

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Fintech - Global: Bank of the Future

Innovative incumbents will thrive; laggards will be disrupted

The widening application of digital innovations in financial services is placing a premium on efficiency and opening up competition that will continue to drive disruption across banking business segments, including payments, lending, capital markets and wealth management. How incumbent institutions and new entrants harness these innovations will define the bank of the future. In the coming years, we expect the disruption and evolution of business models, financial infrastructure, product pricing models and profit margins to open a split in global banking leadership. Incumbent banks that aggressively pursue agile digital strategies will defend their core franchises, broaden their customer bases and improve efficiency, supporting their creditworthiness. Laggards will face increased customer attrition, reduced pricing power and uncompetitive cost structures.

- » **Agile incumbent banks that consistently assert digital leadership will thrive and prosper.** These banks will pursue transformative digital strategies that drive: relentless investment in data analytics; the upgrade of core systems and cyber defenses; ongoing innovation in product design, distribution and strategic marketing; and deliberate choices to cede ground to competitors in select markets where necessary. We expect successful incumbents to achieve these ends both on their own and via acquisitions and partnerships with fintechs, ranging from niche new entrants to big tech firms.
- » **Laggard banks that lack the vision or resources to develop competitive digital strategies will be disrupted.** These firms will find themselves unable to deliver the quality of service or price competitiveness necessary to maintain their market share and revenue streams. They will lose ground as more nimble peers poach clients, as new fintech entrants gain a foothold in low-efficiency banking service niches, and as big tech firms and digital challenger banks expand their suite of banking alternatives across markets. As the business activity and profit margins of laggard banks shrink, they may increase risk taking, consolidate business lines or, ultimately, be subsumed in larger or stronger firms.

The fintech effect will be far-reaching and global, but the type and degree of change will vary considerably by region, sub-sector and institution. To help frame discrete credit implications for incumbents and new entrants across both established and emerging markets, our forward-looking analysis concentrates on four active arenas in which the future shape of the financial services industry will be determined – **customer expectations, competitive dynamics, infrastructure and regulation** – each described immediately below and highlighted with case studies in this report.

Four key arenas in which technology-driven change will be felt

The implications of new technology for financial firms' business models and operating environment will vary considerably by region, sub-sector and institution, but they will be broad and transformative in all cases. Legacy financial technology platforms remain, to differing degrees, ridden with complexity and inefficiencies stemming from years of underinvestment, the incompatibility of acquired platforms, and the demands of increasingly rapid development cycles. This has created opportunities for new, more agile entrants – from small startups to big tech firms – to capture a portion of banks' profit by offering more customer-focused, responsive and efficient channels. The pace of this transformation will pick up in coming years as open data initiatives, service aggregators, distributed ledger technology (DLT), cloud computing, big data analytics and artificial intelligence boost fintech penetration into traditional financial services profit centers.

We focus on the following four key arenas in which the shape of the bank of the future will be determined:



Customer expectations will increase and shift rapidly, both reflecting and driving fintech advances. Both demographics and innovation in other service sectors will drive consumer demand to transact electronically across a broad and growing ecosystem of online products and services. Customers will gravitate to providers that best meet their needs for convenience, personalization and affordability, with privacy and data security a growing competitive differentiator. This makes financial institutions vulnerable to big technology firms that already have a business model to meet customers' digital demands, as well as to nimble new entrants in niche markets. Banks that have the resources and strategic vision to develop or acquire innovative products and processes and integrate new technology into their business models will be most successful in maintaining their historical grip on the customer relationship.



Competition will widen and stiffen as technological advances and new entrants drive changes in how financial services are developed, delivered and consumed. Fintechs will advance and expand their suite of financial services from current competitive positions in payments/cash management, through services like Alipay ([Alibaba Group Holding Limited](#), A1 stable) and WeChat ([Tencent Holding Limited](#), A1 stable) in Asia; lending, particularly to consumers via digital challenger banks like N26 (unrated) in Europe; capital markets, thanks to low-cost electronic trading systems and liquidity provision; and wealth management, where robo-advisory will continue to gain momentum. DLT will continue to evolve and could open competitive fronts in areas such as clearing, settling and custodial services, global remittances, trade finance and securities issuance. In the face of these threats, successful incumbent banks will be those that, either on their own or in collaboration with others, pursue aggressive digital transformation to become more efficient and responsive to evolving customer demands. Services that require the liquidity and scale of a bank's balance sheet, such as deposit-taking and large commercial lending, will remain a keystone of future bank business models. Disintermediation of the customer relationship would be a threat to this business model if it ends up reducing banks' pricing power by transforming them into providers of a "back-office" balance sheet for customer-facing apps/businesses.



Infrastructure and cost management are the foundation for financial innovation. Digitization offers efficiency enhancement opportunities for incumbent banks through the optimization of branch networks as part of integrated distribution platforms to reach and retain customers; the data collection, analysis and reporting process; and the transformation of legacy IT systems – but it also requires a high initial investment and ongoing maintenance costs. Beyond shifting to lower cost delivery channels via online, mobile and high-tech branches, and automating internal processes, successful incumbent firms will monetize the massive amounts of data they have accumulated in order to compete with big tech companies expanding their own product suite. In addition to leveraging data to service their client base more effectively, these agile incumbent banks will tap this increasingly valuable resource to drive additional revenue through targeted cross-selling, helping to manage the cost of IT upgrades.



Regulatory requirements are a moat protecting incumbents, but recent initiatives signal increasing openness to innovation and competition. To date, fintechs have had success in areas where regulatory compliance is manageable, such as payments, data aggregation, lending and robo-advice. The traditional, more regulated banking model – reliant on cheap, sticky deposits – retains a significant advantage for incumbents over non-bank platforms. Competitors may introduce a new disruptive marketplace business model that avoids regulatory barriers by relying on bank partnership to satisfy regulation. However, there will likely be an increase in regulatory initiatives such as *sandboxes*¹ and *open banking initiatives*² showing regulators' willingness to encourage innovation and competition without losing sight of the risks of new technology to consumer protection, individual firm soundness as well as broader financial stability.

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High, rapidly changing customer expectations are digitally driven and spur continual innovation

The digital transformation of business and consumer behavior is driving demand for more bespoke products and services and seamless interactions and transactions. Consumers have become accustomed to a broad array of digital products and services, and they expect financial institutions to follow suit.

Historically, banks have been an integral part of their customers' productive life, forming ongoing connections that are marked by important financial and personal milestones like opening a savings account, getting a loan to finance a house or a car, getting married and starting a college savings plan or seeking wealth-management and retirement advice.

Now new, non-bank entrants are building a similar wealth of client data that challenges traditional banks' insight into their own customers' needs. Technology companies, social media networks and e-commerce platforms alike are building a reservoir of consumer data and gaining customers' trust, notwithstanding recurring issues around data privacy and security.

Accordingly, the bank of the future will need to follow the lead of new entrants, and cater to high and rapidly evolving customer expectations by identifying or developing the key enabling technologies, leveraging increasingly mature and dependable digital distribution channels, and applying these tools across multiple businesses and product segments.

Along with these challenges, however, is an opportunity for incumbent banks with the strategic vision and resources to integrate new technology into their operations or forge cooperative relationships with other incumbents or new fintech partners. Agile incumbent firms, focused on harnessing these transformative changes, will thrive from new tech capabilities and stay at the forefront of financial services. At the same time, they will need to contend with the cybersecurity and data privacy risks that digitization and financial technology partnerships entail.

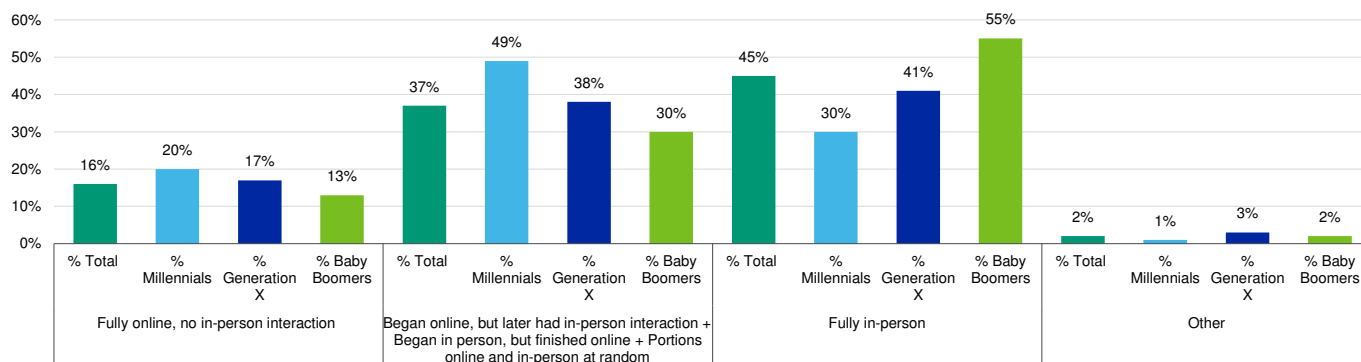
Fintech is a mobile threat on the consumer front

Future financial service providers will need to attract and satisfy a generation of tech-savvy customers that value rewards, speed of service and select options for person-to-person, but not necessarily in-person, interactions. This is evident in recent trends in US mortgage applications, for which 53% of US borrowers used online platforms to obtain their mortgage loans in 2017 (Exhibit 1). Banks that fall short of these demography-driven demands risk losing their grip on historically sticky banking relationships. Firms with the resources and strategic leadership to fully integrate and leverage new technology will stay at the forefront of financial services, though not without significant work and change.

Exhibit 1

More than half of US borrowers use online platforms during the mortgage application process

How borrowers applied for their last mortgage loan



Note: Millennials = born between 1980 and 1999; Gen X = born between 1965 and 1979; and Baby Boomers = born between 1946 and 1964.

Source: Ellie Mae Inc.'s 2018 Borrower Insights Survey

Nimble fintech upstarts are competitors without borders, posing a challenge to banks across markets and regions. Their efficient, streamlined operations can provide banking and other financial services through mobile devices and online channels. Retail and consumer banking businesses are particularly vulnerable to the mobile threat of fintech, which arms new entrants to cause, and benefit from, market disruptions and increased price competition.

But the battle is not yet decided, and the stakes vary across developed and emerging markets. In most developed markets, entrenched incumbent banks have built up and retain strong retail banking franchises providing deposit, payment and consumer lending services. A large fraction of overall consumer retail spending is already settled electronically for these incumbents, with credit and debit cards generating fee income for the card-issuing banks, payment networks and merchant acquirers. Nonetheless, the digital threat from nimble new entrants will force established banks to streamline operations and offer more competitive products to retain customers.

Payment processing has been a more active battleground in emerging markets, as the rapid rise of third-party mobile payment providers in China shows. Some of the success of Chinese firms like Alipay and WeChat (see case study below), which now process trillions of dollars of payments per year, reflects the particulars of the Chinese market, including the rapid spread of smartphones coupled with urbanization, low credit card penetration and usage, banks' traditional focus on serving larger corporates and government enterprises, and technology companies' aspiration to monetize on their vast customer base or community.

In other emerging markets, too, the increasing availability of smartphones and limited card penetration are likely to hasten the adoption of mobile banking and payments to the benefit of new entrants.

In some developed markets as well, consumers are eager to embrace mobile banking for a wider range of banking products. For example, in Korea, two digital banks, K-Bank (unrated) and KakaoBank of Korea Corp (unrated), were launched in 2017 and have reported significant early stage growth powered by their ease of use and the prevalence of smartphones in Korea. Kakao Bank's market share for unsecured personal loans rose to 2.4% as of December 2017, within five months of opening operations. Although their current product offerings are limited to deposits and unsecured retail loans, the banks also plan to offer insurance, mortgages, credit cards and overseas wire transfers. Survey data indicates that the take-up of such products could be strong: for example, 18% of respondents aged 30 or lower to a 2017 Korea Housing Finance Corporation survey said they are likely to use digital banks for mortgage loans.



Meeting customer expectations: fintechs like Alipay and WeChat Pay have apps for that...

Recent advances in third-party payment applications and technology have rapidly reshaped consumer habits and expectations in China, putting it at the forefront of electronic payments globally. The convenience, ease of use and growing capabilities of digital payment apps pose a competitive threat to incumbents that has spurred established Chinese banks such as Industrial and Commercial Bank of China Limited (A1 stable, baa2), China Construction Bank Corporation (A1 stable, baa2), Agricultural Bank of China Limited (A2/A2 positive, baa3), Bank of China Limited (A1 stable, baa2) and Bank of Communications Co. Ltd. (A3 stable, ba1) to improve their online banking offerings.

Two companies that have helped catalyze the charge of Chinese consumers into widespread use of third-party electronic payment services are Ant Financial Services Group (an affiliate of [Alibaba Group Holding Limited](#), A1 stable) and [Tencent Holdings Limited](#) (A1 stable), which operate the Alipay and WeChat Pay (also known as Weixin Pay in mainland China) payment services, respectively. These two companies have leveraged their or their affiliates' large user bases and technological capabilities to rapidly grow electronic payment ecosystems that now dominate third-party payment services in China.

Both Alipay and WeChat Pay have grown beyond their e-commerce and social network roots, building significant market shares in third-party electronic payments in China. Both are aggressively seeking to onboard brick-and-mortar merchants, allowing consumers to pay for daily physical purchases through their payment platforms. In addition, both allow users to order and pay for services, such as taxi rides, plane and train tickets, movie tickets and public utilities with a few simple taps within the payment apps, conveniences not matched by traditional banks' mobile banking offerings.

To date, consumers' increasing use of the Alipay and WeChat Pay payment services has not materially impacted banks' fee income, because most Alipay and WeChat Pay mobile wallet accounts are ultimately linked to bank deposit or credit card accounts, in line with government regulation. If consumers select debit or credit card as their payment option when using Alipay or WeChat Pay, banks can still generate income from consumer purchases. However, banks do not earn fees and cannot track wallet-to-wallet transactions that occur entirely within a third-party digital payment platform.

Beyond mobile payments, Alipay and WeChat Pay also allow users to invest in money market funds and purchase travel, accident, car, health and other insurance policies with a few clicks on their phones. Most wealth management products and insurance policies are from third parties. The money market funds offer returns well above bank deposit rates, and customers can typically make same-day funds transfers from their mobile wallets up to a certain limit. Alipay and WeChat Pay's large user bases and efficiency – with no need for branch networks or a large customer-facing staff – give them a substantial competitive edge over traditional banks.

Yu'E Bao, which is a money market fund managed by Ant Financial's subsidiary Tian Hong Fund and featured on Alipay, had net asset value of RMB 1.58 trillion (\$243 billion) as of year-end 2017. Growth in Yu'E Bao's assets under management has moderated in recent quarters as the maximum amount each investor can maintain in the fund and the maximum daily amount investors can transfer into the fund have been lowered. The fund places the bulk of its assets under management as wholesale deposits with commercial banks. Given the fund's large size, commercial banks pay higher rates on Yu'E Bao's wholesale deposits than they would on retail personal deposits.

In addition to payment services and money market funds, Ant Financial provides lending to individuals and SMEs. Such borrowers have traditionally been underserved by the banking sector in China, because banks have historically focused on corporate lending and mortgages. Ant Financial analyzes merchants and buyers' behaviour patterns to inform its lending decisions. [Recently](#), the People's Bank of China licensed Baihang Credit Bureau Co., Ltd. through 31 January 2021 as a consumer credit information business. Baihang, a non-state-owned credit bureau with nine founding shareholders including subsidiaries of Ant Financial and Tencent, will complement the government's existing consumer credit database of banking transactions.

Competition will stiffen and change focus along with shifts in technology and consumer demand

Innovation and digitization have allowed new entrants to quickly and cost-effectively achieve scale, establishing a long-term competitive threat to the current banking ecosystem. New technology also arms incumbents to enhance their product offerings, but nimble fintech firms have an edge in adjusting rapidly to changing competitive dynamics and harnessing the entrepreneurial drive to concentrate resources quickly and cost-effectively in new and promising niches. Banks will also face competition from large technology firms intent on capturing an ever-increasing share of customers' online activity, spending and data.

Established incumbents generally have far greater financial resources than startups, which will help them fend off new entrants, and big technology firms have to date wanted to avoid banking regulation, providing some protection from encroachments on banks' traditional product suite. Nonetheless, incumbents will need to strike a strategic balance between investing heavily in IT and staying light enough on their feet competitively and financially to respond to digital disrupters. Additionally, publicly traded incumbents have to manage shareholder expectations and will be cautious when rebalancing expenditures toward technology investments to ensure that it is not to the detriment of per share metrics.

There are four key competitive fronts for fintech in the banking sector – **payments/cash management, lending, capital markets and wealth management** – each of which we explore below. Those firms that offer more flexible, efficient and cost-effective alternative products and services by leveraging technology will stand to benefit and maintain or gain market share. Services for which the liquidity and scale of a bank's balance sheet provide an advantage, such as lending and prime brokerage, will remain a keystone of future bank business models. Conversely, "capital-light" and off-balance sheet services, such as payments and wealth management, are more exposed to disruption by new entrants. In response, incumbent providers will invest heavily in platforms, on their own or in collaboration with others, as well as build partnerships with fintechs.

The payments and cash management landscape is fertile with new entrants looking to gain customer wallet share

An array of new tech-enabled entrants is transforming the global electronic payments network. Some entrants are making direct attacks on parts of the payment ecosystem, and others aim to embed themselves in the existing landscape. In the long term, they threaten to outflank an entrenched group of card networks, card-issuing banks and merchant acquirers that stand between the merchant and the consumer.

Current and looming new entrants include:

- » **New payments companies** like Affirm (unrated) and Square (unrated) in the US, and large Chinese payment services such as Alipay, operated by Ant Financial, an affiliate of Alibaba Group Holding Limited, and WeChat Pay, operated by Tencent Holdings Limited
- » **Big consumer technology companies**, such as [Alphabet Inc.](#)'s (Aa2 stable) Google, [Amazon.com Inc.](#) (Baa1 stable), [Apple Inc.](#) (Aa1 stable), Facebook Inc. (unrated) and PayPal (unrated)
- » **Gateway service providers** such as Stripe (unrated), Braintree (owned by PayPal) and Dwolla (unrated) that enable payments to be accepted electronically; and
- » **Emerging payment startups building blockchain payment platforms.**

In the US, niche markets are open to capture by early or fast movers, as PayPal, Square and Stripe have demonstrated, but the scale, acceptance, reliability and ease of use of the current ecosystem makes the displacement of current market leaders unlikely. However, the fees that incumbents charge for electronic payments are at risk. The incursion of new entrants will likely undercut the card fees banks charge to merchants as well as attract customers through added convenience and benefits. In response, incumbents have been innovating and building partnerships among themselves and with fintechs, increasing consumer rewards and slowly lowering fees charged to merchants, particularly larger ones.

In other parts of the world where financial inclusion has historically been low, new forms of peer-to-peer payment are gaining a quick foothold with customers, growing new communities of financial consumers. For example, in 2007 Kenya's dominant mobile networks operator Safaricom (unrated) launched M-PESA – a mobile phone-based money transfer and microfinancing service – to leverage the [country's high mobile penetration](#) and large cash-based economy and draw in the financially excluded. Safaricom's large mobile user

base allowed M-PESA to grow an extensive countrywide agent network that bypassed rural banking constraints to tap into unbanked consumers. Financial inclusion in Kenya grew to 75.3% in 2016, a 50% increase over the last 10 years, and M-PESA accounts for 80% of Kenya's mobile transactions as of September 2017.

Cryptocurrencies are also encroaching on some types of payments

Another threat to payment providers is cryptocurrencies, which provide an alternative payment system that eliminates the need for centralized institutions to approve transactions. Wide adoption would lessen the need for intermediaries to approve, clear and settle payments. However, thus far the use of cryptocurrencies in mainstream payments has been very limited because of their [price volatility](#), their bespoke nature, and a [regulatory clampdown](#) in [many jurisdictions](#), and we do not expect a near-term reversal of this trend.

Nevertheless, one area of global payments that could benefit from mass adoption of cryptocurrencies is the global remittances industry. In 2016, the total value of global remittances, although a small portion of global payments, reached \$575 billion³, 70% of which consisted of transfers by international migrants in developed countries home to developing countries (Exhibit 2). The global remittances business is mainly led by money transfer operators, to which correspondent banks have been limiting their exposure because of the risk of money laundering and financial crime. In 2017, the average cost worldwide for sending a \$200 international transfer was 7.2%, with costs generally higher in developing countries.

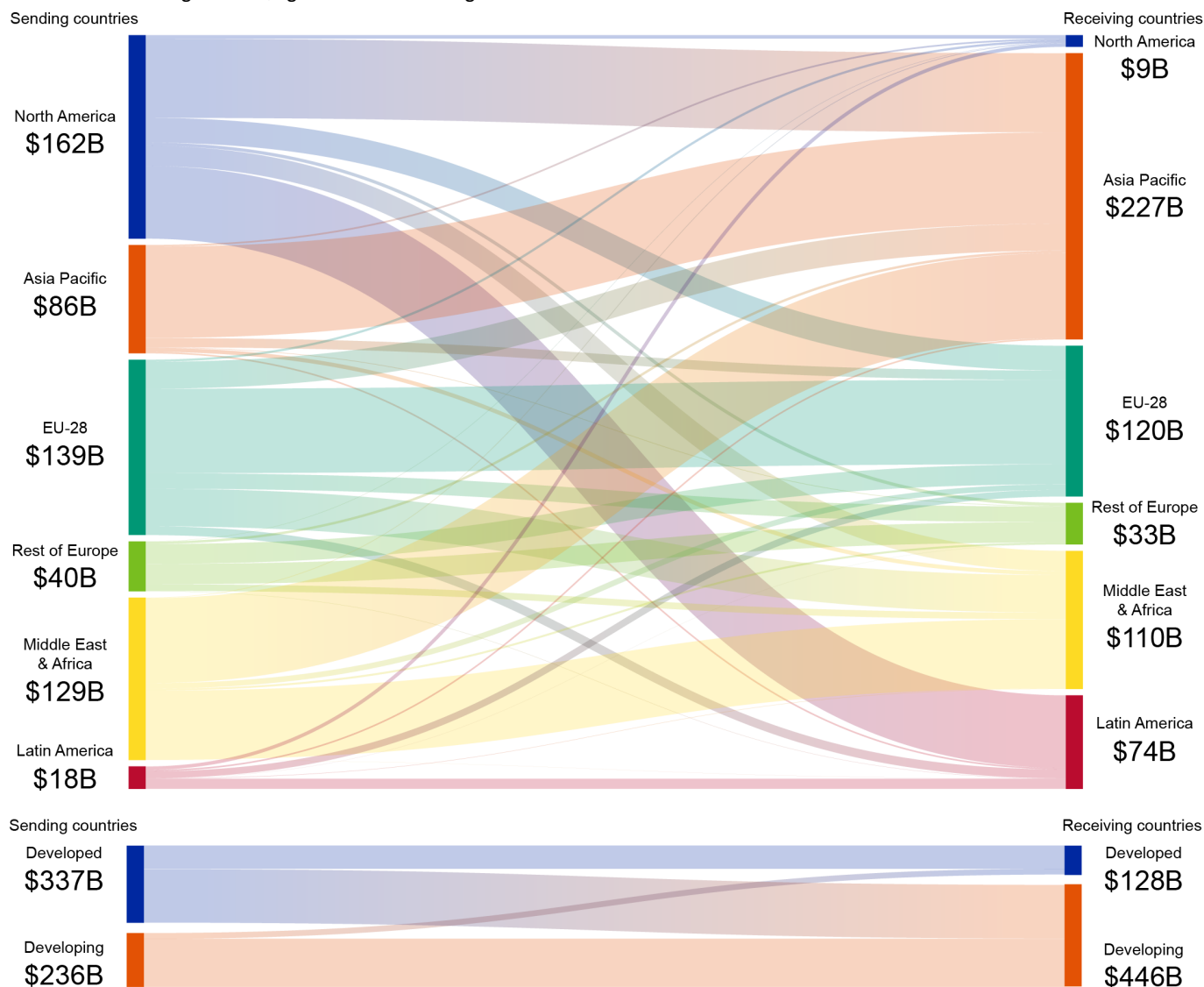
Given banks' general aversion to the remittances business, fintech companies may be able to gain market share, particularly in regions where fees are highest. In April 2018, [Walmart Inc.](#) (Aa2 stable) and [MoneyGram International, Inc.](#) (B1 stable) [announced](#) the launch of Walmart2World, a new money transfer service. Walmart's entry into the global money transfer market will exacerbate pricing pressures in the industry.

There are sizable savings to be gained through peer-to-peer alternatives that leverage cryptocurrency technology. Assuming half of all remittances transition to a cheaper channel offered by a start-up, at an average of 2% in transaction fees (a conservative estimate of average cost of a cryptocurrency transaction, absent extreme volatility periods), the annual savings would be around \$15 billion. Blockchain⁴ technology is still untested at large transaction volumes, where authorizations need to be processed in fractions of a second. But if the technology proves to be a practical solution for payments, incumbents are likely to adopt it. Indeed, a global consortium of banks has partnered with blockchain start-up Ripple to develop enterprise blockchain solutions for international payments. Ripple has created a payment protocol and exchange network with a much faster consensus method than the Bitcoin blockchain, and introduced its own cryptocurrency, the "XRP".

Exhibit 2

Helping send money home is a large potential 'remit' for blockchain-enabled fintechs

Left side shows sending countries, right side shows receiving countries



Note: Country classification between developed and developing economies is based on United Nations classifications

Source: The World Bank, Moody's Investors Service

As non-bank lending gathers new steam online, the underlying driver of success will still be funding strength

Online peer-to-peer, or marketplace, lenders have leveraged the ease and appeal of mobile apps to gain market share from banks in some pockets of the unsecured loan, credit card debt consolidation, student loan and small business loan markets, but this is not new: banks have faced disintermediation from disrupting innovation before, notably with the advent of the securitization market in the 1990s. Incumbent banks ultimately weathered that market disruption through stronger funding, and banks in advanced economies have long fended off competition from other sources such as the corporate bond and collateralized loan obligation (CLO) markets.

Competition from marketplace lenders will continue, but history is likely to repeat itself in advanced economies. Indeed, in the US, new online lenders such as Prosper Marketplace Inc. (unrated) and Lending Club Corporation (unrated) have had [weaker-than-expected asset quality performance](#) despite a benign credit market, which we attribute to untested underwriting models. In the [US mortgage lending market](#), banks typically lag behind more entrepreneurial non-bank mortgage companies, in part because of banks' greater concerns about regulatory and compliance issues in the face of the often greater rigor of bank oversight.

Even in emerging markets, the scale and stability of new entrants' business models is likely to be limited by funding and liquidity constraints. Much like traditional monoline non-bank finance companies, online lenders rely heavily on expensive, confidence-sensitive wholesale funding.

Except for small business loans, today's marketplace lenders have been unsuccessful in the corporate loan market. Yet, online lending has registered some notable successes, particularly in developing markets that have lacked established financial infrastructure and where consumers have been underserved by traditional banks. A case in point is China, where [outstanding internet-based person-to-person loans](#) were RMB1.2 trillion (\$181.8 billion) at November 2017, more than 13 times the amount three years earlier and far outstripping the growth of traditional microcredit companies. New regulations in China aim to foster stronger underwriting standards and risk controls in the internet-based "microlending" sector. This will [improve the credit quality of asset-backed securities](#) backed by such loans.

Large technology companies have partnered with a number of financial institutions to help their customers finance mobile phone upgrades, purchase the latest tablet or help a school lease new laptops. For the most part, these loans have been off-balance sheet for the technology manufacturers with the risk assumed by the financing banks.

Amazon, however, has experimented with direct lending through a lending program extended to select third-party small businesses operating on its website, not unlike many other large brick-and-mortar retailers. The program is funded by a \$600 million bank credit facility secured by certain seller receivables. Data on inventory turnover, sales and customer reviews can offer a risk assessment for Amazon to determine which sellers to extend financing to. The program has its limitations, particularly the scale of debt, and receivables, Amazon is willing to manage and onboard onto its balance sheet. While we expect these programs to continue, capital and liquidity constraints will spur off-balance funding via bank partnerships.

Historically, a key advantage of traditional banks has been their funding structure and access to cheap, stable retail deposits, a benefit that has helped incumbents weather previous bouts of disintermediation when credit markets tightened. The "stickiness" and low cost of retail deposits allows traditional banks to generate a healthy margin through maturity transformation, deploying deposits into earning assets. A well-diversified deposit base is also stable under most conditions, principally because in most countries deposit insurance provides government backing for depositors up to a specified amount.

Digital challenger banks that are able to attract, and retain, a low-cost, stable deposit base will have an advantage compared with marketplace lenders (see N26 case study below). Incumbent banks that are able to keep pace with changing consumer preferences will continue to attract a healthy base of depositors, but those that do not will see a key competitive advantage erode or disappear. However, disintermediation by new entrants, particularly in the payments system and traditional deposit accounts, may stimulate a move to a new model in which banks are the "back-office" providers of capital to consumers by way of new entrants who interact directly with customers. This model would allow new entrants to avoid government requirements that participating deposit-taking institutions be subject to a full suite of banking regulations, including capital and liquidity requirements.



Competitive Dynamics: as challenger banks mobilise in Europe, N26 makes quick inroads with digitally native customers

In Europe a number of mobile-based 'challenger banks' are entering the market and peeling millennials (those aged 35 and younger) away from established brick-and-mortar banks. In the UK, Monzo and Revolut are gaining a foothold. On the continent, Orange Bank recently launched in France.

One recent entrant of note is N26, a pan-European mobile-first direct bank based in Berlin. N26 was founded in early 2013, and by October 2014 its beta product was a finalist in the London TechCrunch Disrupt start-up competition. The challenger bank has since attracted \$215 million in venture capital funding from international investors and, after its official launch in January 2015, it quickly grew its user base to 100,000 within 12 months, 300,000 by March 2017, and more than 850,000 by March 2018⁵. N26 now operates in 17 European countries⁶, has 380 plus employees, and is planning to enter the UK market in the first half of 2018 and the US in mid-2018.

The N26 app (for iOS, Android and desktops) is a hub not only for its own offering, but also the products of other fintech companies the bank cooperates with. N26's sole proprietary product is a suite of current accounts, complemented with a free debit Mastercard. The offering allows customers to make worldwide payments without incurring additional foreign currency exchange rate charges, and international remittances in 19 currencies, which are handled by TransferWise, a London-based peer-to-peer money transfer service.

N26's savings account is now available only in Germany and Austria, in conjunction with WeltSparen, a German fintech operating under the Raisin brand internationally. The account allows N26 customers to deposit savings of up to €100,000 (the maximum insured by national deposit guarantee schemes in the EU) with several other banks in the European Union. German customers can also obtain unsecured loans of up to €25,000 through auxmoney, a peer-to-peer market place lender, while in France, N26 cooperates with crowd-lending platform Younited Credit to supply consumer loans of up to €40,000. In addition, ETF-based investment products are available in the German market via robo-advisor vaamo, as are insurance products through Clark, an online insurance broker. Finally, N26 offers Apple Pay integration in France, Italy, Spain and Finland.

Opening an account at N26 is completely paperless and takes less than 10 minutes, using video identification services from IDnow and SafeNed⁷. The user interface is sleek and coherent across both N26 and third-party products, providing push notifications for each transaction in real time, analysis of users' spending patterns, and allowing the debit card to be blocked or unblocked at the push of a button. There are also social features such as MoneyBeam, whereby cash can be transferred to other N26 users via email or SMS.

Powering N26's ability to easily integrate such an array of third-party solutions into its app is an IT stack built bottom-up with a mobile-first strategy in mind, rather than bolted onto disparate legacy systems. Initially, N26 had to rely on a banking partner, Wirecard Bank AG, for back end current account services, but since receiving a full European banking license from the European Central Bank and German regulator BaFin in 2016, all current account processing has been brought in-house, advancing operational efficiency.

Whether N26 would be able to continue to scale up at a rapid rate was until recently an open question, given the limited financial resources the challenger bank had for traditional marketing activities. However, with a \$160 million funding round completed in March 2018⁸, the threat N26 poses in attracting millennials has become even more clear: the under-35 demographic now comprises about 60% of its user base. N26 hopes to lure 5%-10% of this age group away from established banks in each of its 17 markets, lifting its total customer base to five million by the end of 2020.

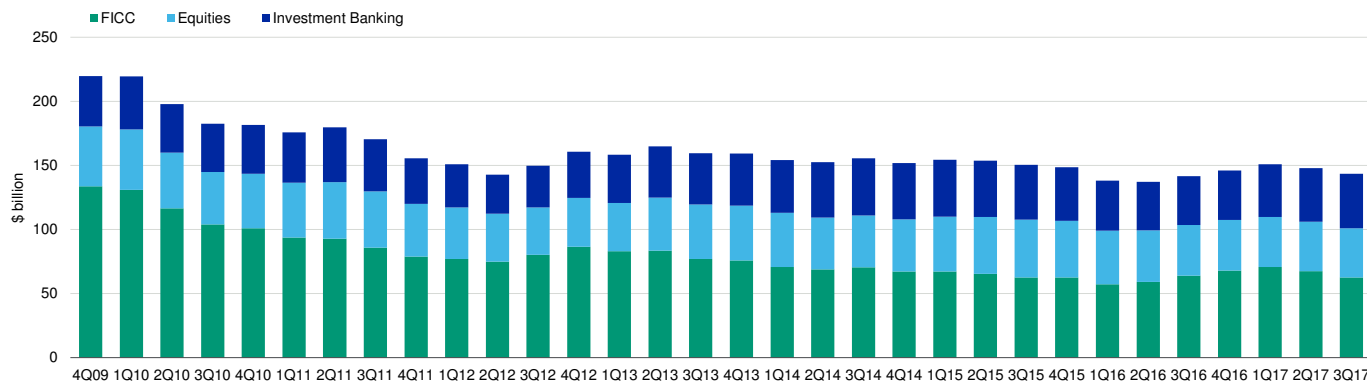
Note: Unless otherwise indicated, the entities discussed in this case study are unrated.

Capital markets

Banks' capital markets operations have undergone drastic change since the financial crisis. Trading operations, in particular, are in the midst of a technological arms race, with fintech forcing the pace. Banks' trading businesses have contracted under stricter regulation, and the growth in electronic trading through alternative trading systems has also hampered trading profitability. Banks have not shied away from the trend toward electronic platforms, making significant investments in core technology platforms and recruiting technology specialists, a trend that will persist. At the same time, technological innovation often results in price transparency and direct, low-cost access to electronic trading markets. The result is favorable for customers, through tighter bid-ask spreads, but lowers trading income for banks. In this environment, lightly regulated algorithmic traders and technology-enabled market-makers have an edge that will only continue to raise the pressure on traditional bank trading activities. However, incumbent banks with large capital markets operations will continue to have a significant advantage over new entrants in areas that require large balance sheets or access to a network of customers. The pressure on bank trading revenue is both structural – through price commoditization, increased regulation and a greater use of central counterparty clearinghouses – and cyclical, through a low interest rate environment and mostly suppressed volatility to date across asset classes (Exhibit 3).

Exhibit 3

Aggregate capital markets and investment banking revenue (\$ billion, trailing twelve months)



Note: Includes aggregate of BAC, C, GS, JPM, MS, BCS, CS, DB and UBS; see endnote⁹ for bank names. Excludes DVA for US GIBs.

Source: Company filings and Moody's estimates

Banks are upgrading their IT and reorganizing to reduce complexity and keep up with newer quantitative model-driven trading firms; and they are competing for order flows, often in the most liquid markets, by providing liquidity across a range of regulated exchanges and dark venues that have lower capital requirements than incumbents and often have no true clients. These firms – including Virtu Financial Inc. (unrated), parent of [VFH Parent LLC](#) (Ba3 stable), [Jane Street Group, LLC](#) (Ba3 stable), [Hudson River Trading LLC](#) (Ba2 stable) and Jump Trading (unrated) – pursue high-frequency trading (HFT) and non-HFT strategies, algorithmic trading and ETF market-making.

Blockchain could eventually boost capital markets efficiency and transparency

Tangible gains from distributed ledger technology (DLT) are likely a long way off for the capital markets. Given that the greatest benefits of DLT are realized in contexts that include a number of parties, moving the technology from proof of concept to an ingrained part of long-standing processes and markets will require a significant commitment from a number of participants.

But even though DLT is still in the early stages of development, it has the potential to improve efficiency throughout the life-cycle of various securities, including 1) issuance, ownership and trading; 2) post-trade clearing and settlement; and 3) custody and securities servicing. A shared synchronized DLT could eliminate the need to reconcile various independent platforms and improve process workflows, with a clear view of asset and process ownership throughout the chain, as well as leverage smart contract technology to eliminate some manual processes.

Wealth management

Demographics and increasing user adoption of technology-based products will dictate the success of wealth management franchises, which is largely driven by the number of advisors a company can recruit and the number of clients these advisors can bring in. The key questions are whether a new generation of clients will migrate their inherited assets from a human financial advisor to a robo-advisor (see box), whether high net-worth clients will trust a bot with large sums of their invested assets, and which aspects of the client-advisor relationship can be replicated via software, particularly in distressed markets when a customer wants a higher touch service. Wealth managers will therefore offer tiered services, providing automated advisory platforms tailored to clients with lower investable assets and more customized human-based advisory service to those with higher asset balances.

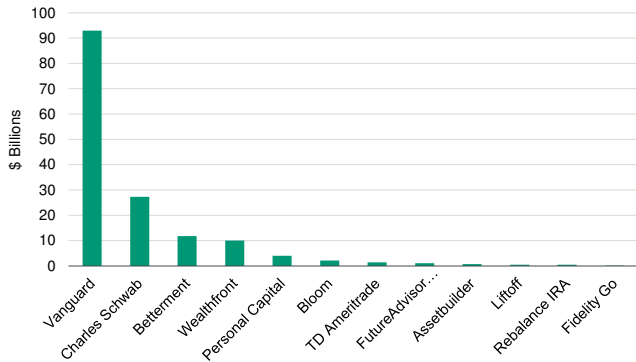
Robo-advisors defined: digital platforms that provide automated algorithm-driven financial planning with little to no human supervision. The algorithms are derived from generally accepted investment theories focused on minimizing risk and maximizing return and recommend portfolio composition based on client responses to a predetermined set of criteria. The investment vehicles used by robo-advisors are often mutual funds and stock and bond exchange-traded funds (ETFs) because of their low cost and attractive liquidity. They are also capable of handling more sophisticated tasks such as tax-loss harvesting, investment selection and retirement planning.

The traditional advisory industry relies on face-to-face client-advisor interactions to develop an investment strategy with a mix of qualitative and quantitative goals, including timeline, return and risk requirements. This process is naturally open to human bias, and error, and we believe customers will, with time, warm to the idea of entrusting larger shares of their portfolios to dispassionate robo-advisors. Machine learning is increasingly accurate in gauging a client's risk-return profile, and some advisory firms have also employed facial recognition software to analyse clients' emotional responses to hypothetical scenarios and help derive an optimal portfolio.

Digitally savvy investors with an open mind to new technology-based products are attracted to robo-advisors that offer an alternative to heavy-touch human financial advice, particularly when the fees are considerably lower. Traditional financial advisors have been lowering fees, but cannot match the cost and price efficiency of scalable, robo-advisory solutions. The typical robo-advisor fee on client assets is between 15 and 90 basis points, with a large concentration in the 30-basis-point range of customer assets. Heavy-touch human financial advice can cost a customer anywhere from 100 to 150 basis points in annual fees. In addition, a large number of robo-platforms, such as the Intelligent Portfolios of [The Charles Schwab Corporation](#) (A2 stable), have a minimum account balance requirement as low as five thousand dollars.

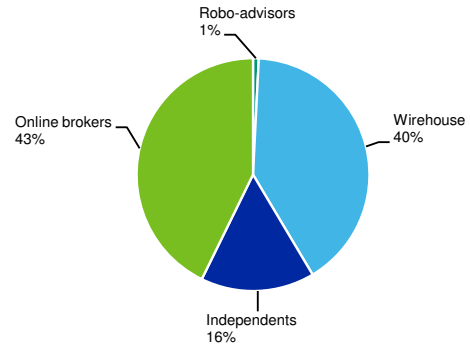
Indeed, assets under management at robo-advisors have doubled in less than a year, driven by demand from millennial investors. Nonetheless, assets held at robo-advisors are below \$200 billion in the US, less than 1% of the broader market (Exhibits 4 and 5).

Exhibit 4
Robo-advisor assets are growing and are offered by multiple wealth management services providers...



Source: Companies' SEC filings (forms ADV) and Moody's Investors Service

Exhibit 5
...but still represent a small slice of the US market



Note: reporting dates range from December 2016 to December 2017
 Companies' SEC filings (forms ADV and annual reports) and Moody's Investors Service estimates

Lower balance accounts will continue to be early adopters of robo-advisory and other technology because of the competitive pricing of products offering DIY investing. High-net-worth individuals and institutional investors who hold more negotiating power will continue to seek personalized services while forcing incumbents to lower their fees. As wealth gets passed on to a tech-savvy generation, demand for easy-to-use robo products will continue to increase.

Infrastructure and cost management are the foundation for financial innovation

New technology can help incumbent banks increase efficiency through the reduction of large branch networks and call centers, the upgrade of legacy IT systems, and automation of internal processes. But to reap these prospective gains and transform their businesses, incumbent banks will need to make a high initial investment and incur significant ongoing maintenance costs. Successful incumbent firms will manage the cost of IT upgrades by leveraging improved data quality and processes to service their client bases more effectively and drive additional revenue.

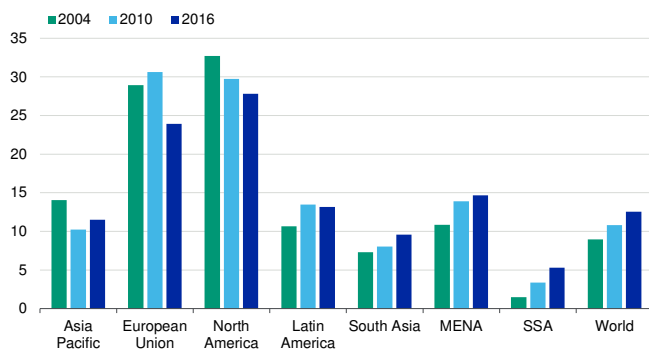
The bank of the future will have a smaller physical footprint as digital solutions help prune branches

Reduced demand for traditional branch services is a logical extension of the increasingly mobile financial ecosystem, but the pace of branch closures will vary by region and reflect the income level and digital literacy of local consumers (Exhibit 6 and 7). In North America and Europe, customer demand for branches will continue to decline over the next decade, giving banks an opportunity to drive down costs by reducing physical footprints and offering more efficient alternative platforms. In some countries where consumers have historically had limited access to financial services, on the other hand, there will be a balance between a measured 'catch-up' in brick-and-mortar branch numbers and the 'leapfrogging' of traditional branches to attract new customers via digital offerings. Branches will increase, but likely stay materially lower than peak levels in systems that developed earlier.

Brazil is an example of where the balance has tipped toward digital platforms following a period of brick-and-mortar expansion. The largest banks in Brazil – [Banco do Brasil S.A.](#) (Ba2/(P)Ba2 stable, ba2), [Itau Unibanco S.A.](#) (Ba2/(P)Ba2 stable, ba2), [Banco Bradesco S.A.](#) (Ba2/(P)Ba2 stable, ba2) and [Banco Santander \(Brasil\) S.A.](#) (Ba1/(P)Ba1 stable, ba2/ba1) – have accelerated digitization, including through platforms that offer a variety of open banking services. All four banks have mobile-based payment platforms that allow users to open a digital deposit account. Under this strategy, the number of traditional bank branches in Brazil has sharply declined by around one third between 2013 and 2016, and now more than 75% of banking transactions are handled on the internet and through mobile apps.

Exhibit 6

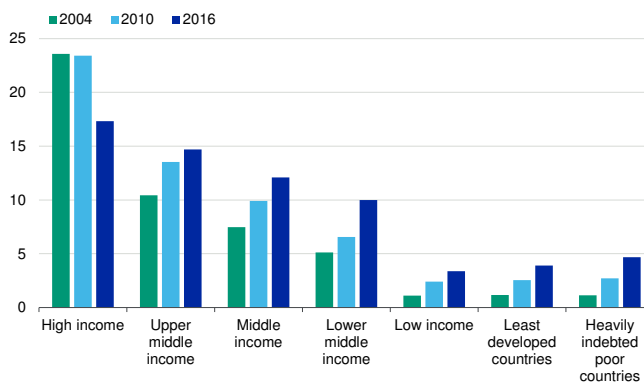
Domestic branches per 100 thousand adults, by region



Note: SSA = sub-Saharan Africa
Source: The World Bank, Moody's Investors Service

Exhibit 7

Domestic branches per 100 thousand adults, by earnings



Source: The World Bank, Moody's Investors Service

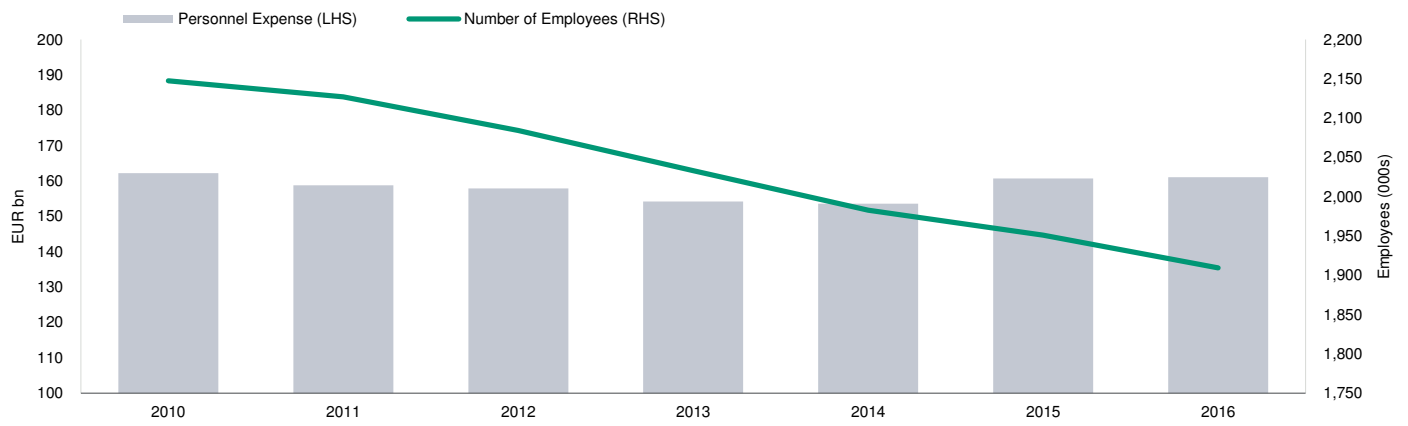
In low-income economies, the number of bank branches has been growing, though from a very low base. For example, sub-Saharan Africa has historically been the most under-banked region globally because of the high cost of building and operating traditional branches, particularly in rural areas with lower income populations. In Kenya and Tanzania, the early introduction of mobile payments and use of agency banking greatly supported financial inclusion by bypassing these constraints.

In high-income economies, in addition to branch closures, banks are remodeling and downsizing their physical presence, resulting in a smaller branch footprint with fewer employees and more self-serve kiosks. Although the corresponding cost reduction since 2010 has been offset by higher cost per employee in the euro area (Exhibit 8), we view this as partially the result of temporary costs associated with redundancies, restructuring and an increase in euro area labour costs of 11% since 2010.

Exhibit 8

Euro area banks have steadily shed labour without reducing personnel expenses

Evolution of personnel expense (in EUR) and number of employees



Source: Moody's Investors Service



Infrastructure and Cost Management: US banks grow deposit base while closing branches

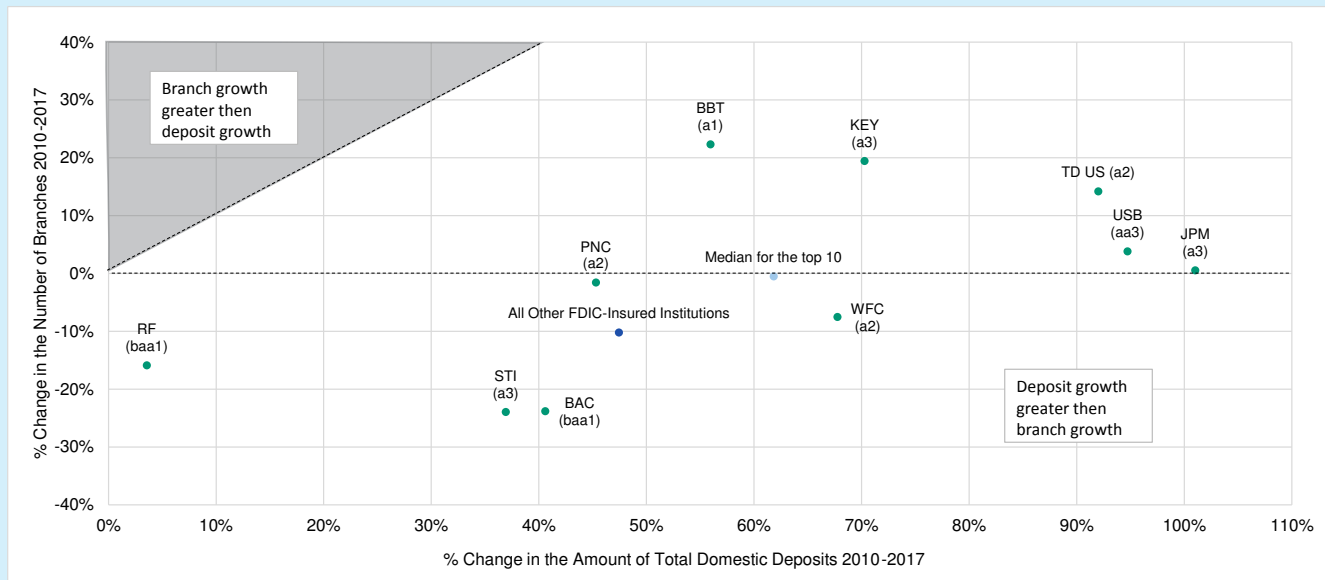
During the early rounds of US banks' digital transformation (2010-17), the banks' ability to materially grow deposits while shrinking their physical branch networks indicates that sizable technology investments to diversify delivery channels are having some success. Federal Deposit Insurance Corporation (FDIC) data shows that FDIC-insured institutions grew median domestic deposits by 54% while reducing branches by 9%. Within this universe, the 10 largest US banks grew domestic deposits by 62% and shrank branches by 1% (Exhibit 9, light blue dot) and all other banks grew deposits by 47% and shrank branches by 10% (dark blue dot).

US banks have kept their overhead ratios largely stable during this transition, in part thanks to the efficiency gains and operating leverage generated by branch closures and more agile delivery channels. Brick-and-mortar branches remain most US banks' primary product delivery channel, but the successful adoption of mobile and online banking applications is further shrinking and transforming US banks' footprint. Increasingly, remaining branches are becoming technologically advanced sales and service centers, often with reduced square footage and fewer employees.

Exhibit 9

Deposit growth has substantially outpaced branch growth

Branch growth versus deposit growth for banks with the 10 largest US branch networks, 2010-17



Note: ratings are each firm's bank-level Baseline Credit Assessment, see endnote for list of banks referenced in this exhibit¹⁰
 Source: Federal Deposit Insurance Corporation

The FDIC data suggests that the 10 US banks with the largest branch networks (green dots in chart) have been more adept at managing their deposit businesses to adjust to changing, technology-driven consumer demands. But there were notable differences across this group:

- » [JPMorgan Chase & Co.](#) (A3 stable) and [U.S. Bancorp](#) (A1 review for downgrade) roughly doubled their domestic deposit bases between 2010 and 2017, while keeping the size of their branch networks relatively stable. But both institutions actively upgraded existing branches, added new branches in growing urban areas and closed or consolidated others.
- » [Bank of America Corporation](#) (A3 stable) and [SunTrust Banks, Inc.](#) (Baa1 stable) were far more active in closing branches, each reducing branches by a quarter over the seven-year period. Both banks had slower-than-average overall deposit growth, which suggests they lost some customer relationships despite having well-regarded alternative delivery channels, with respective mobile banking app user-ratings of 4.7 and 4.4 (on a 5-star scale). For Bank of America, slower deposit growth reflects in part its strategy of branch reduction through sales, in which the buyer typically retains most or all deposits and customer relationships.
- » [BB&T Corporation](#) (A2 stable) and [KeyCorp](#) (Baa1 stable) grew their branch networks at the fastest pace, through acquisitions, but both banks only grew their deposit bases closer to the median for the top 10, examples that highlight the challenge of making branch-heavy bank acquisitions amid rapidly evolving digitization in banking.

Inefficient legacy IT systems slow incumbent banks' digital transformation, with partnerships and fintech incubation possible paths to improvement

Successful incumbent banks will have to continue investing heavily in IT systems to support efficient digital solutions. Current banking platforms are often based on a patchwork of outdated IT systems stemming from past acquisitions and expansions, preventing many incumbents from taking full advantage of their data. Challenger banks and fintech firms are not encumbered by legacy systems, and can more quickly implement technological changes.

Modernising or replacing legacy infrastructure is not a small task but it will be required to support digital offerings, improve processes, gain cost efficiencies and better leverage banks' existing big data. Banks that do not allocate sufficient resources to IT upgrades are more likely to be displaced as timely, agile startups fill underserved market niches.

In some situations, banks will join forces to innovate and maintain their central roles. In markets most threatened by non-bank competitors, there could be greater collaboration between banks to keep new entrants at bay. One recent example is the Nordic mobile payment platforms, Vipps and Swish, which are [shared digital ecosystems](#) underpinned by bank-driven innovation and collaboration among multiple Nordic banks to stave off fintech entrants and overseas competitors. Banks will also work with fintech firms to create new infrastructure solutions. For example, in 2016 the UK challenger bank, [Virgin Money plc](#) (Baa2/Baa2 stable, baa2), formed a partnership with 10x Future Technologies Limited (not rated) to develop the bank's digital banking platform.

Beyond partnerships, some larger banks with more resources are likely to invest in fintech firms to help develop promising solutions. For example, [Barclays Bank PLC](#) (A2/A2 stable, baa3) has an incubator platform, Rise, to provide resources to a number of fintech firms. Incubators offer banks a way to establish relationships with fintech firms at an early stage, identify those firms with most potential, test their solutions, and invest when they deem appropriate.

New infrastructure will provide new revenue sources and cost efficiency

Banks that successfully renew their infrastructure to support innovation will improve their origination, upselling and underwriting capabilities. Banks with available capital have recognized this and are actively investing in third-party fintech firms or their own fintech solutions.

Some [efficiency gains will come from artificial intelligence](#) (AI) and machine learning. For example, since 2016 JPMorgan Chase & Co. (A3 stable) has used its COIN program to interpret commercial loan agreements, a task that formerly consumed 360,000 annual hours of manual work.

Banks that invest the time and resources to overcome technical hurdles will be empowered to leverage their data to better anticipate customer needs, develop more efficient, customized marketing to cross sell, and drive more revenue. The untapped potential will be greatest for large banks that have accumulated massive amounts of data, but house it in multiple silos that their legacy IT systems cannot easily access, organise and integrate. New AI solutions will provide opportunities for both retail and commercial banking, and could improve origination or upselling; for example, if an AI application learns when customers are most likely to apply for a loan, it could push a targeted promotion based on this finding.

Lastly, on the regulatory and compliance front, incumbents are increasingly developing and applying new technologies to streamline processes and cut costs, particularly in the area of regulatory technology, or regtech. Artificial intelligence platforms, such as IBM's "Watson", are being used by banks to absorb large amounts of legal and regulatory information that banking officers can draw on to interpret different rules. Artificial intelligence is also being used to automate regulatory processes such as client onboarding and [anti-money laundering](#), enabling firms to increase the speed and accuracy of these control processes.

Regulatory requirements are a moat protecting incumbents, but recent initiatives signal increasing openness to innovation and competition

The competitive advance of Fintech has been successful in areas where regulatory compliance has been manageable, such as payments, data aggregation, lending and robo-advice. In most countries, many of the products and services offered by fintech firms are not subject to the same capital, funding or liquidity requirements as banks.

This means that the main limit on fintech offerings is the size of their balance sheets, which falls short of requirements for many essential banking products and has historically allowed banks to weather attempts to disintermediate the asset side of their balance sheets. Importantly, most fintech firms do not enjoy access to the stable retail deposits that banks enjoy and instead are dependent on confidence-sensitive and often expensive wholesale funding. To the extent that regulatory barriers continue to wall off retail deposits from non-banks, and customers continue to value deposit insurance, banks will continue to have a funding advantage over fintech firms; however, this may eventually change.

Successful competitors may choose to bypass the banking regulatory moat by forcing a change to banks' existing business models through a partnership where big tech companies leverage their existing customer relationships while banks white-label their balance sheet and products. In this disruptive scenario, banks would remain subject to all regulatory requirements while their partners avoid regulatory barriers.

Regulatory sandboxes and open banking initiatives indicate a shift in regulatory perspective

For their part, regulatory authorities are assessing the various risks that new technology and new entrants pose to consumer protection, individual firm safety and soundness as well as broader financial stability. To date, the official sectors in major advanced economies are focused on encouraging innovation as part of broader economic development goals, with many bodies actively encouraging the entrance of new financial service providers. Regulators often provide support – including through regulatory incubators or 'sandboxes' – to help fintech firms understand the regulatory landscape and regulators assess the fintechs' activities and risks in such a context.

Regulatory scrutiny of the fintech sector is focused differently according to the particular type of company in consideration:

- » **Service providers and partnerships** – For companies that develop technological solutions to be applied by traditional incumbents, or that work in partnership with incumbents, existing regulations generally capture requirements related to risk management of third-party affiliates.
- » **New entrants providing direct service to the market** – Garnering more attention is the regulatory regime for fintech firms that provide services directly to customers, with two key areas being lending and payments, each already heavily regulated activities. Many of the new entrants in these businesses are less steeped in the long-standing compliance requirements related to the specific activities. Indeed, many have developed business models that include a goal of minimizing compliance burdens and that, through speed to market, can test the capacity of regulators to develop and apply new or updated rules and regulations.

The European Union's Second Payment Services Directive (PSD2, see case study below) is an example of a regulatory approach that encompasses three key objectives: 1) encouraging increased competition in financial services, 2) evaluating options for new technology and 3) mitigating overall systemic risk. The PSD2 aims to encourage competition in the payments space by requiring banks to provide account and payment data access to third-party providers (banks and fintech firms) if the end-user provides consent. However, such access to, and sharing of, information raises a host of issues related to data privacy and security.



Regulation: PSD2 sets rules to move Fintech forward

PSD2 will accelerate digital transformation but result in disruption. The second payment services directive of the European Union (EU, Aaa stable) is a new regulation designed to liberalise the European payments market by requiring banks to share customer data with competitors at the customer's request. PSD2, which took effect on 13 January 2018, is designed to promote competition in the European payments space by making it easier for non-banks and fintech companies to enter the market. By obliging banks to share customer data with new entrants and other established players, the directive will allow new payment initiation and cross-bank account aggregation services to develop. This will increase competition from incumbents and newcomers into this space. The directive will force banks to develop their digital capabilities more quickly to remain competitive, although we expect incumbents will initially retain an advantage because of their large customer bases, superior financial strength and extensive compliance capability.

Banks' strategic responses to PSD2 will distinguish leaders from laggards. Leaders will provide ecosystems that aim to generate value by offering a wide range of financial products and services through partnerships, or actively seek new revenue streams and cross-selling opportunities. Laggards will be passive providers that comply with PSD2's minimum requirements. We expect PSD2 to have greater impact in countries with (i) high internet banking penetration; (ii) low reliance on cash; and (iii) profitable and well-capitalised banking systems. These include the Nordic countries, where digital payment solutions are already popular.

PSD2 will drive innovation and create opportunities. PSD2 will offer more agile and strategic incumbent banks, as well as new entrants, an opportunity to seize revenue and market share by becoming payment service information providers (PISPs) and account information service providers (AISPs). Leading banks will gain access to additional consumer data, allowing them to improve their loan underwriting and debt collection processes.

But opportunity will not come without disruption: incumbent banks also face increased competition. Leveling the playing field will attract more peer banks and technology-driven new entrants into competition. PSD2 could also challenge banks' historic funding advantage if new services emerge that encourage more frequent movement of retail deposits. Aggregation services provided by new AISPs could limit banks' direct contact with customers, reducing their cross-selling opportunities. At the same time, competition from new PISPs will over time erode their card payment fees, and new players offering payment initiation and account information services will hinder their ability to collect valuable customer data.

Endnotes

- 1 Regulatory sandboxes offer businesses an environment to test new products, services, business models and delivery mechanisms without incurring all of the normal regulatory requirements of engaging in these activities, while also ensuring that any associated risks are not transferred from firms to consumers.
- 2 For example, the Second Payment Services Directive (PSD2) in the European Union, which will open access to bank user and account data, with the customer's permission, allowing application programming interface (API) developers to build apps that deliver a customized user experience.
- 3 See [Migration and Remittances Data](#), The World Bank, November 2017
- 4 In this report 'blockchain' refers to the broader distributed ledger technology rather than just the Bitcoin blockchain
- 5 N26 claims to add between 1,500 and 2,000 new customers per day.
- 6 Austria, Belgium, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Portugal, Slovakia, Slovenia and Spain.
- 7 As a backup option, N26 also offers German customers a paper-based verification process via Deutsche Post's PostIdent system.
- 8 See N26 press release: [N26 raises \\$160m co-led by Allianz X and Tencent](#).
- 9 Global Investment Banks' data included in the chart: BAC = Bank of America Corporation; C = Citigroup Inc.; GS = The Goldman Sachs Group, Inc.; JPM = JPMorgan Chase & Co.; MS = Morgan Stanley; BCS = Barclays Plc; CS = Credit Suisse Group AG; DB = Deutsche Bank AG; UBS = UBS Group AG
- 10 BAC = Bank of America Corporation; BBT = BB&T Corporation; JPM = JPMorgan Chase & Co.; KEY = KeyCorp; PNC = PNC Financial Services Group, Inc.; RF = Regions Financial Corporation; STI = SunTrust Banks, Inc.; TD US = TD Group US Holdings LLC; USB = U.S. Bancorp; WFC = Wells Fargo & Company

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