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Global Financials and Payments

Fintech: A Gauntlet to Riches

Financial and payment firms globally face a growing array of fintech innovations and disruptors. Whether disruptors or incumbents ultimately succeed depends on several factors, but we expect falling VC investment and rising incumbent investment will skew returns to the biggest and most entrenched.

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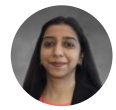
Contributors

MORGAN STANLEY & CO. LLC
James E Faucette
Equity Analyst
James.Faucette@morganstanley.com

MORGAN STANLEY & CO. LLC
Betsy L. Graseck, CFA
Equity Analyst
Betsy.Graseck@morganstanley.com



MORGAN STANLEY & CO. LLC
Vasundhara Govil
Equity Analyst
Vasundhara.Govil@morganstanley.com

MORGAN STANLEY & CO. LLC
Danyal Hussain, CFA
Equity Analyst
Danyal.Hussain@morganstanley.com

MORGAN STANLEY & CO. LLC
Kai Pan
Equity Analyst
Kai.Pan@MorganStanley.com

MORGAN STANLEY ASIA LIMITED+
Anil Agarwal
Equity Analyst
Anil.Agarwal@morganstanley.com

MORGAN STANLEY ASIA LIMITED+
Grace Chen
Equity Analyst
Grace.H.Chen@morganstanley.com

MORGAN STANLEY ASIA LIMITED+
Richard Xu, CFA
Equity Analyst
Richard.Xu@morganstanley.com

MORGAN STANLEY & CO. INTERNATIONAL PLC+
Giulia Aurora Miotto
Equity Analyst
Giulia.Aurora.Miotto@morganstanley.com

MORGAN STANLEY & CO. INTERNATIONAL PLC+
Magdalena L Stoklosa
Equity Analyst
Magdalena.Stoklosa@morganstanley.com

MORGAN STANLEY MUFG SECURITIES CO., LTD.+
Mia Nagasaka
Equity Analyst
Mia.Nagasaka@morganstanleymufg.com

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Payments and Processing
North America Industry View

In-Line

Fintech firms at the gate: Rapid escalation in fintech investment and innovation has increased the stakes for startups, venture capital funds, and incumbents alike. Some of these technologies expand the market while others are zero-sum in nature, but each can drive meaningful ramifications for global financials, which warrants a review of the risk and opportunities they create. We offer up a framework to do so.

Risk to incumbents is case-specific, but shaped by common elements: We assess the circumstances that enable fintech success using our "gauntlet framework." Nine key ingredients: 1) state of the existing financial infrastructure; 2) inflection in consumer technology/behavior; 3) government involvement in driving change; 4) opportunity for regulatory arbitrage; 5) well-defined and accommodating regulation; 6) accessibility of data; 7) whether significant collaboration is required; 8) dependency on capital market access; and 9) whether incumbents are highly concentrated.

In this report, we review **14 high-profile areas of fintech investment**, including US Marketplace Lending, US Mobile Wallets (Brick and Mortar), US Digital Wallets (eCommerce and mCommerce), Electronic Payments in India, Digital Wallets in China, B2B Electronic Payments, Blockchain in Payments Financials, InsurTech, Robo-advisory, Merchant AcquirerTech, Marketplace Lending in China, Online Mobile Money Transfer, Open APIs in Japan, and Digital Mortgage Origination.

Trend positions incumbents favorably, for the most part: Pullback in fintech investment over the past year is indicative of a realization of lower ROIs than initially hoped due to some unique challenges to disrupting in the financials industry, and our suspicion is that VC investors will continue to scale back investing. Meanwhile financials and payments incumbents are likely to be emboldened to step up R&D and take the investment lead, and this combination of VC/incumbent behavior represents a paradigm shift that should benefit incumbents' ROI.

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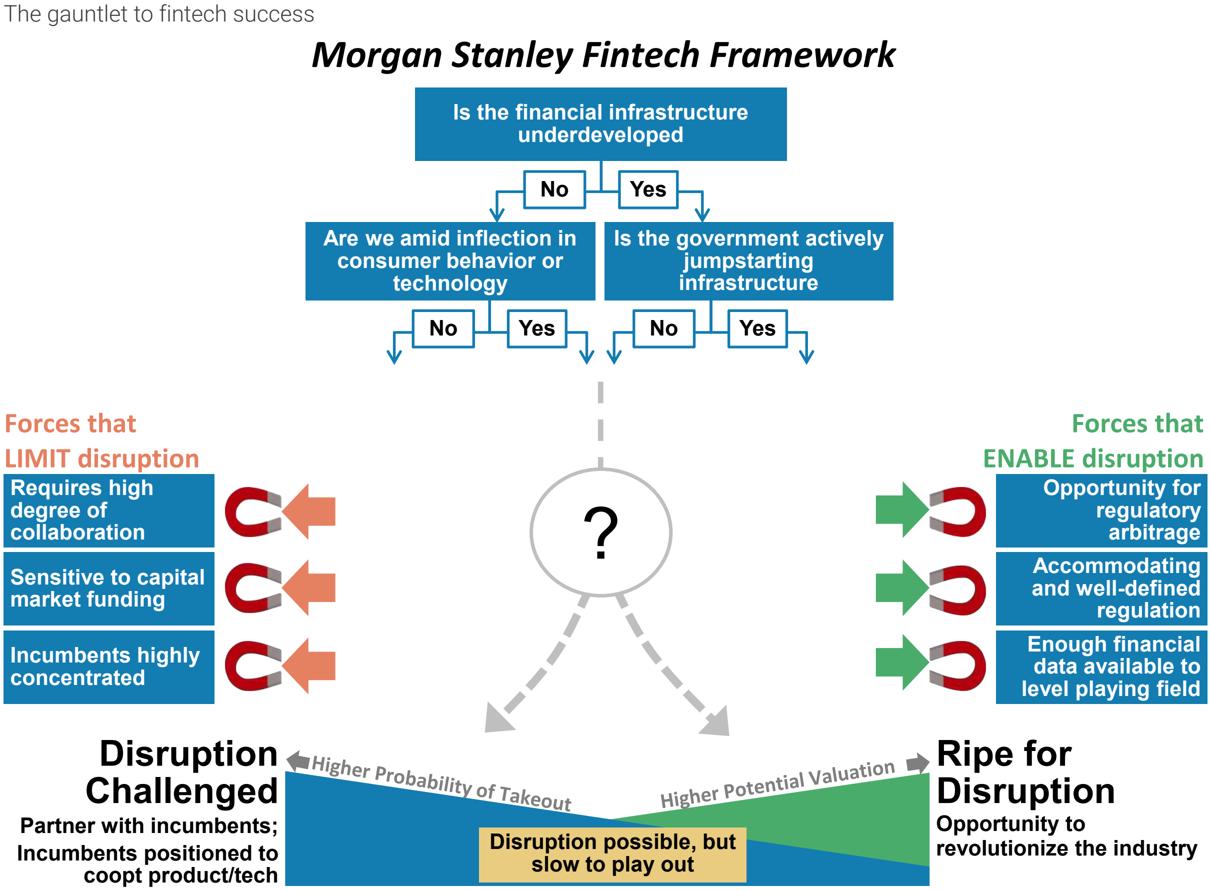
Executive Summary: Running the Fintech Gauntlet

Success in fintech is a run through an unforgiving gauntlet to a glittery prize – a chance at disrupting trillions of dollars in revenue by delivering the right platform, algorithm, or service model to improve products and processes compared to entrenched incumbents.

But it's a challenge, to say the least. Two characteristics that make it difficult to disrupt: 1) the **slow pace of change** of behavior in financials compared to S-curve type changes possible in other sectors, and 2) relatively **intense capital requirements** for financial products and associated regulatory & compliance infrastructure. In short, it is more marathon than sprint, and it is hard to stick around long enough in fintech to scale and be truly disruptive. Accordingly, failure is the norm – only five disruptors have survived as standalone entities out of over 450 fintech firms launched during the dotcom era, McKinsey notes.

Our Fintech Gauntlet Framework: A number of factors influence the pace of change and alter a firm's likelihood of success through disruption vs. partnering with incumbents. We assessed the circumstances that enable fintech disruption vs. innovations that ultimately drive operating improvement for incumbents, and while there is wide variation in environment, constraints, and competition, we distilled what we think are the most important environmental considerations into our gauntlet framework (see Exhibit 1), which we expect to help industry insiders, investors, and companies gauge where a particular fintech effort should position itself vis-à-vis incumbents to maximize impact and potential.

Exhibit 1:
The gauntlet to fintech success

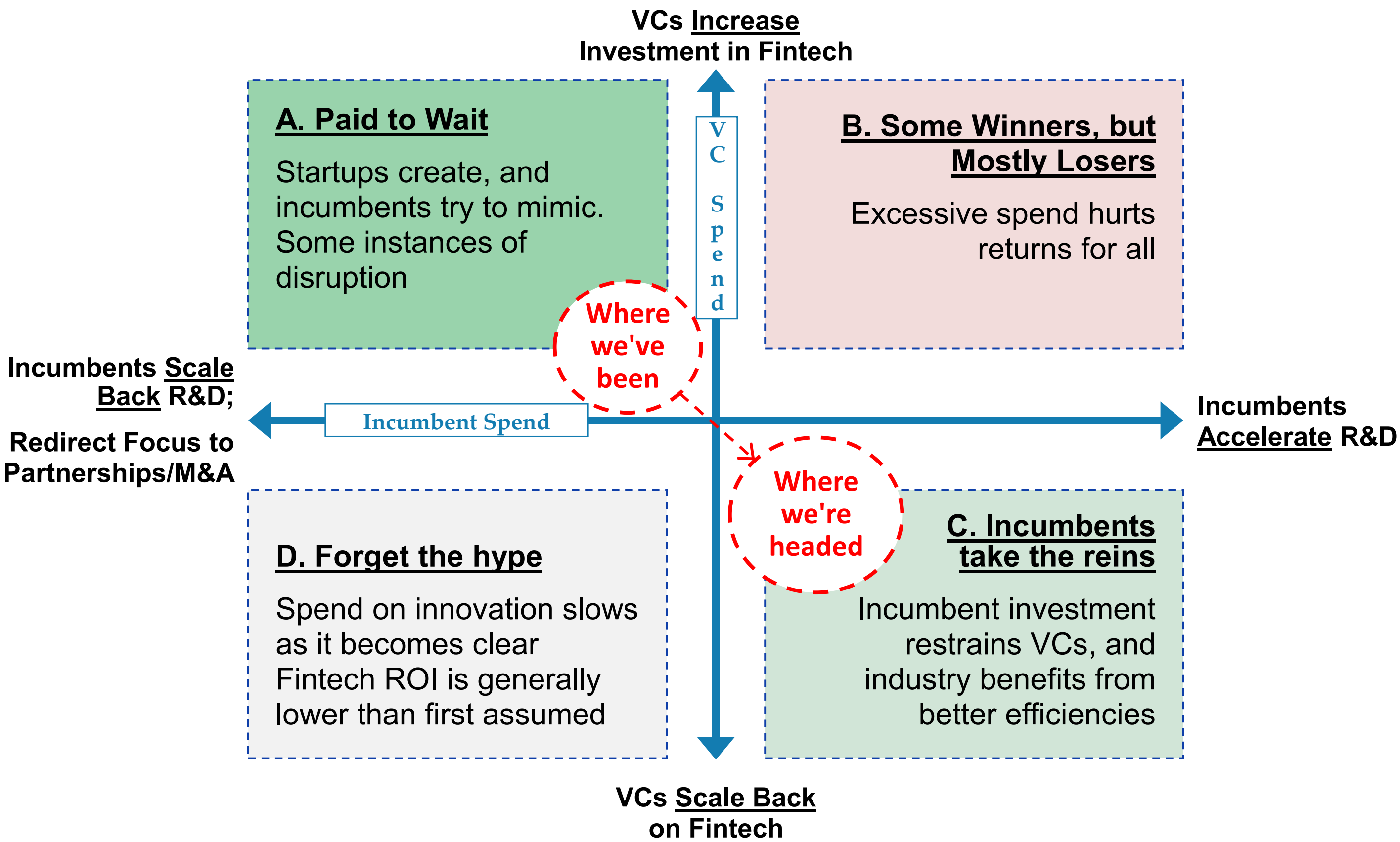


Source: Morgan Stanley Research

VC fintech investment returning to earth after robust growth in 2015; Incumbents to take the reins. Expectations for fintech investments have probably been too lofty, and falling VC-backed fintech investment over the past year is indicative of a realization of some of the issues we raise. Yet the market still needs to go through further rationalization, and our expectation is that VC investors will continue to scale back investing. Financials and payments incumbents, emboldened and increasingly well-capitalized, are likely to step up R&D and take the investment lead as 1) the spike in VC investment has now catalyzed a response from incumbents, while at the same time 2) incumbents are benefiting from the anticipation of lighter regulation and an allocation towards growth investment; 3) consumer behavior change, while slow, is adjusting expectations to new product/service offerings, and 4) banks are still focused on lowering costs, including through fintech. This combination of VC/incumbent behavior represents a paradigm shift that should benefit incumbents' ROI (see **Exhibit 2**).

In this report we review 14 key areas of global fintech innovation, apply our framework, and provide an outlook. Key highlights:

Exhibit 2:
The Fintech Gameboard: Our expectations for VC vs incumbent spend



Source: Morgan Stanley Research

14 Takeaways from 14 High Profile Areas of Fintech

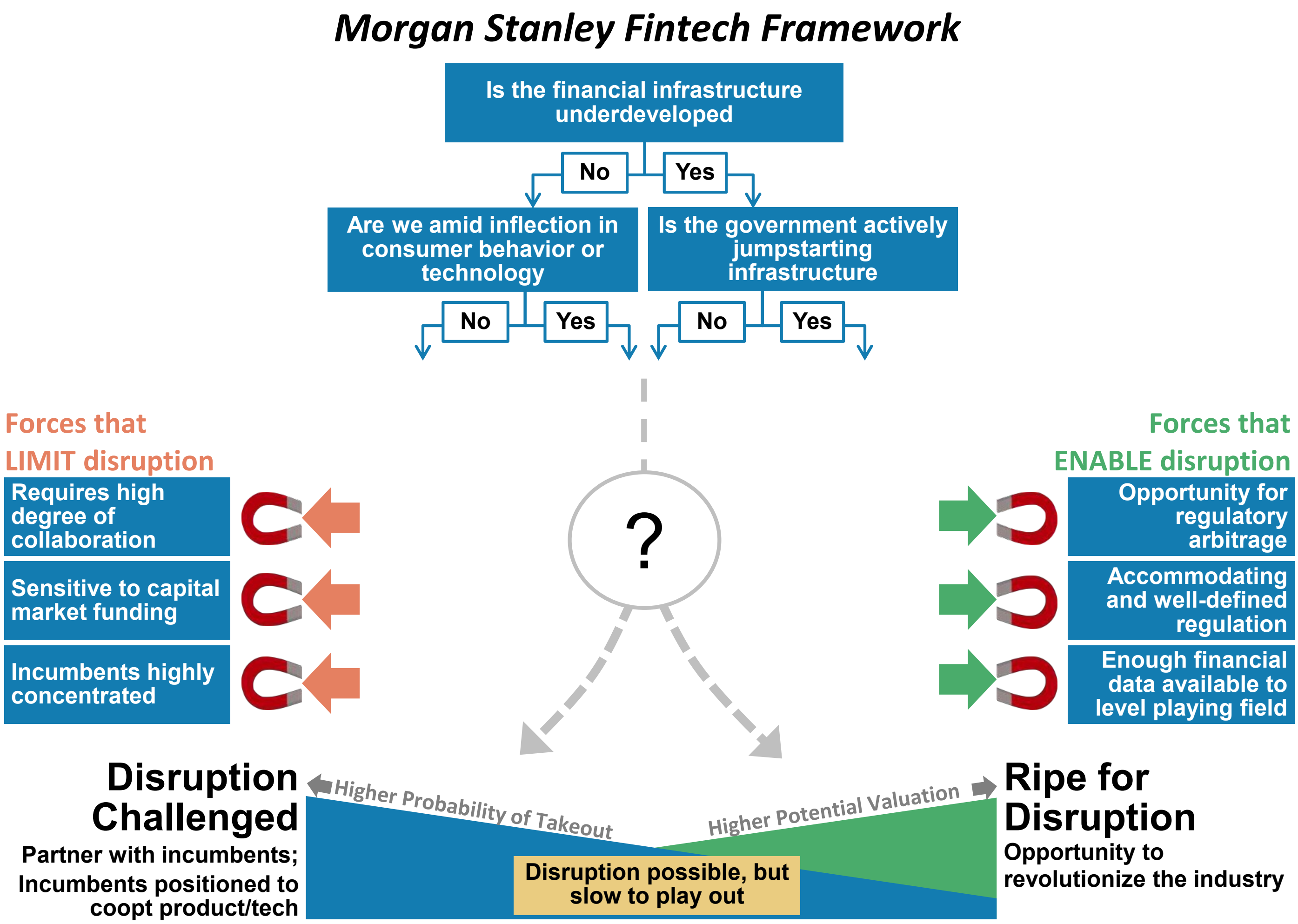
1. US Marketplace Lending: We remain bullish on continued opportunity to take share as disruptors benefit from regulatory arbitrage, though we continue to expect a slower pace of growth than we did originally in 2015 as capital market constraints have proven more limiting than we previously anticipated.
2. US Mobile Wallets (Brick and Mortar): Adoption seems likely to remain slow given lack of clear value proposition, and could take years even with investment by major brands (Apple, Google, etc). Fragmentation to continue with expanding landscape of retailer branded cloud-based wallets. Plastic to remain primary form of electronic payment in the US for the time being.
3. US Digital Wallets (eCommerce and mCommerce): These provide a far clearer value prop than mobile wallets, but PYPL is on the "mature" end of the adoption cycle and growth is priced in, with new opportunities like Pay With Venmo unlikely to be needle-movers against a large revenue base. Some risk over time to PYPL as other wallet providers vie for PYPL's market share, including Apple, Visa, MasterCard, and Google, but our latest Digital Wallet Tracker suggest this story will be slow to play out. We raise our PYPL price target to $49.
4. Electronic Payments in India: Market shares are in flux, but card companies should see pickup in absolute level of transactions. Near term, this will be helped by significant increase in POS terminals – almost 1 million new terminals in the last 4 months. New technologies could leapfrog traditional POS-based payment technology.
5. Digital Wallets in China: Alipay and Tenpay are equally well-positioned to capture significant "Online-to-Offline" growth opportunities (i.e. using digital wallets in brick and mortar locations), and ultimately increase share in broader financials like money market fund product distribution and internet banking.
6. B2B Electronic Payments: We expect VC investments in B2B to outpace consumer payment investments over the next 3-5 years, driven by opportunity to enable speed and efficiency at low cost, capitalize on growing cross-border payments, and consumerize/ Digitize B2B payments for an omni-channel environment.
7. Blockchain in Payments & Financials: Adoption of some form of blockchain technology by incumbents seems likely, though it could take several years to produce measurable cost savings given the amount of collaboration required to reach usable scale. Meanwhile broad-based disintermediation by blockchain technologies seems unlikely at this point.
8. InsurTech: We expect meaningful change in the way Small Business Insurance is sold, and estimate 15-30% of the total SBI market will be sold digitally by 2020, up from ~4% today. This puts smaller agents/brokers (like Brown & Brown, UW) at risk, while carriers have opportunity to reassert share if front-footed. We see meaningful opportunity for InsurTech companies, though lack of data and underwriting expertise could impede or even doom some efforts.
9. Robo-advisory: We expect incumbents to take the lead, given brand and network are key to lower down the cost of acquisition (provided right technology is in place). About 70% of the companies we interviewed either already have an offering or are about to launch one in 2017.
10. Merchant AcquirerTech: We think Square and Stripe are well positioned for two themes: (i) secular shift towards m-Commerce and potential for emergence of new commerce experiences (e.g. Uber, social commerce, etc.) that could fast gain traction, and (ii) democratization of POS technology that is likely to position entrenched software/technology providers in a favorable position. We raise our SQ price target to $20.
11. Marketplace Lending in China: We believe P2P platforms can capture great growth opportunities to serve the large addressable market underserved or not served by banks. The sector is still early stage and P2P platforms that show strong ability to underwriting credit effectively and leverage technology to reduce borrower acquisition cost will stand out in the medium to long term.
12. Online & Mobile Money Transfer: VC investment in online money transfer companies doesn't pose meaningful immediate risk to incumbent operators, but does reaffirm longer-term risk to pricing and profitability as the world's banked population increases and we eventually migrate from cash to online.
13. Open API in Japan: Open APIs could go into use as early as April 2018; fintech companies are already starting to work out contracts with various financial institutions. In the near term, transaction volume growth is likely to outpace profit growth, but over the longer term we expect the development of commission models that will allow banks to monetize these activities, potentially creating a new source of earnings.
14. Digital Mortgage Origination: Non-bank mortgage originators tried to distinguish themselves from incumbents by offering a more seamless mortgage process. Now incumbents are investing heavily in doing the same. We believe this tilts the scale in favor of the incumbents, as their digital capabilities improve to match fintech players, while their broader customer relationships, ability to utilize balance sheet, and lower cost of funding enable

The Gauntlet

Outright disruption in financial services has proven to be challenging with few success stories. The complex nature of financial products/services, often accompanied by onerous compliance requirements, sensitive nature of data (which makes a trust-based relationship with the provider critical – see our foundation note on Data Analytics for FIs: The Journey from Insight to Value), and slow pace of change in consumer behavior (which gives incumbents plenty of time to adapt), has made disruption from outside the industry relatively hard.

Exhibit 3:

The gauntlet to fintech success



Source: Morgan Stanley Research

Gauntlet Components

We evaluated multiple success stories to determine factors/variables that we believe are key to determining potential for success (see flowchart below). While this are not an exhaustive list of circumstances that accommodate success, we identified the following factors as being most critical in governing the path to success.

1) State of the existing financial infrastructure: A well functioning and established infrastructure makes it harder for innovators to break in relative to situations where no solution exists. We see three reasons disruption is more viable in a less developed environment: a) there is more opportunity to add value; b) incumbents are less likely to notice a small disruptive threat and therefore less likely to quash/mimic/acquire it, and c) consumers, already undergoing meaningful change in a nascent market, might be more receptive to a new technology or provider.

2) Inflection in consumer technology/behavior: Even if a financial sector is developed, a meaningful inflection in consumer behavior as a result of changing technology can often create new opportunities. Whether or not true disruption can come about may depend on how quickly behavior shifts and if it that creates an opportunity for the innovator to get enough of a first mover advantage, as more often than not, the incumbents are likely to follow.

3) Government involvement in driving change: While consumer and industry behavior can be slow to change and sometimes not conducive to disruption, a mandate from the government can help break that rhythm. Recent examples of this are the demonetization effort in India, which has inflected usage of electronic forms of payments at a much faster pace than the last several years combined, and in Greece where the government pushed consumers to use cards to make purchases (offering a tax exemption to do so) in order to improve tax collection. But government involvement can be indirect and unintentional as well; e.g. in the US, the 2009 CARD Act limited banks' ability to frequently adjust interest rates on customers based on perceived industry credit conditions, which created opportunity for marketplace lenders (not covered under the regulation) to price substantially lower for the same risk.

4) Opportunity for regulatory arbitrage: Incumbent financial institutions have had to deal with an increasing regulatory burden, hampering practices and pricing. Fintech providers are often not subject to these same regulations, and as such can have an inherent advantage in pricing. Clearly this represents an advantage and would help position a firm for disruption if that arbitrage opportunity is sustainable.

5) Well defined and accommodating regulation: In a highly regulated industry like Financials, regulatory uncertainty can often impede the ability to scale a product/service offering. For example, the Madden vs. Midland lawsuit created uncertainty on true lender status with respect to operation of marketplace lending platforms that are using partner banks such as WebBank to originate the loans. Uncertainty around the interpretation of these rules given lack of regulatory clarity impacted investor appetite in ABS securities back by marketplace loans originated at some of these platforms. The planned US OCC Fintech Charter, meanwhile, could offer clarity and reduce regulatory overhang to some online lenders, which could increase the likelihood that they sign funding partners.

6) Accessibility of data: Data can be a moat or an equalizer. A firm that wants to disrupt, or at least compete with, established players is in a much better position to do so if the acquisition of reference data is possible. This breaks into two separate components. Is the data available, i.e. has the financial infrastructure been well-established for long enough that a useful amount of data even exists? And is this data available broadly, or only selectively, which could limit the ability of a small firm to scale without partnering with the owners of data? Note that we think the availability and accessibility of data is necessary to *rapidly* disrupt most financial subsectors, but the lack of data is not an absolute hurdle; it could be possible to slowly build out a disruptive business that accrues data on its own, and in fact those with unique data sets could have an upper hand against even established companies.

7) Significant collaboration required: Establishing a business that requires buy-in from multiple parties is itself challenging; doing so in a financial industry where trust is critical and incumbents are often risk-averse is even more challenging. And while not impossible, our presumption is that building support from partners takes time, and longer-ramp technologies/products would favor the incumbents, who have the capital and longevity to execute such a strategy.

8) Dependency on capital market access: Companies that require continuous access to capital markets are subject to a high degree of market volatility, which can put an entire business model in jeopardy if still early in its formation. Marketplace lenders were impacted by a pullback in capital, and several went under, while the largest had the relationships and stability to weather the storm.

9) Incumbents concentrated vs. fragmented: The degree of industry concentration should inform the ambitions of a fintech startup. In financials, we see a spectrum of concentration, from the card network duopoly to the highly fragmented small business lending environment. Simply put, we believe the complete disruption of a highly concentrated industry is all the more challenging because incumbents have the ability to respond in concert to any serious, growing threat. Partnering or settling for a niche part of the market could be more reasonable. In a fragmented free-for-all market, meanwhile, partnerships don't offer much benefit and a superior product, if scalable, is not likely to be quashed by the combined resistance of incumbents.

The Roadmap, Applied

In this report, we highlight several cases of companies/technologies successfully – or not – providing a differentiated fintech product/service, and the ecosystem in which they did so. The main takeaway? The stars will never totally align, though finding some gap or distortion in the market is the most important factor.

Exhibit 4:

Unique set of environmental forces for the various areas of fintech

	1. US Marketplace Lending	2. US Mobile Wallets	3. US Digital Wallets	4. Electronic Payments in India	5. Alipay and Tenpay	6. B2B Electronic Payments	7. Blockchain in Financials	8. InsurTech	9. Robo-Advisors	10. Merchant Acquirer Tech	11. Marketplace Lending in China	12. Online Money Transfer	13. APIs in Japan	14. Digital Mortgage Origintation
Lack of well-entrenched financial infrastructure	↓	↓	↑	↑	↑	↑	↓	↓	↑	↑	↑	↑	↑	↓
Amid inflection in consumer behavior, e.g. technology	↑	↑	-	-	-	-	↓	↑	-	-	-	-	-	↑
Government involved in making change	-	-	↓	↑	↓	↑	-	-	↑	↓	↓	↑	↑	-
Opportunity for regulatory arbitrage	↑	-	-	-	-	-	-	-	-	-	↑	-	-	-
Accommodating and well-defined regulation	-	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Accessible of data	↑	-	↑	-	↑	↑	-	-	-	↑	-	↑	↑	-
Significant collaboration required	-	↓	-	↓	↓	↓	↓	-	↓	-	-	↓	↓	-
Dependency on capital market access	↓	-	-	-	-	-	-	-	-	-	-	-	-	↓
Incumbents concentrated	-	↓	↓	↓	-	-	↓	-	-	-	-	-	-	-

Source: Morgan Stanley Research

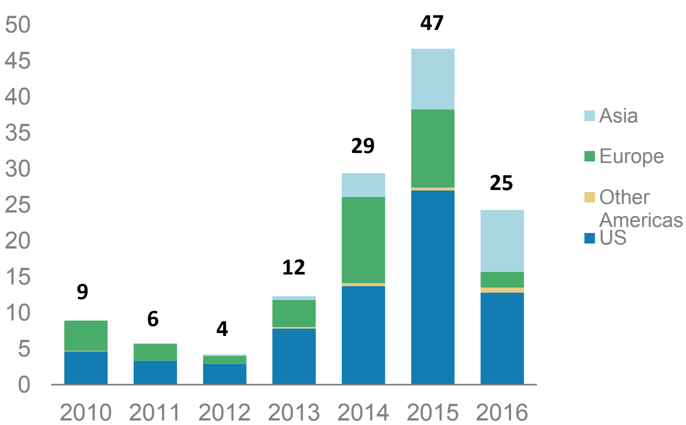
Who Is Positioned to Drive Innovation? Incumbents vs. VCs

VC investing likely to moderate, though some areas will remain popular

Global fintech investment in VC-backed companies has been remarkably volatile. It spiked over 10x from 2012 to nearly $50bn in 2015, but fell by nearly half in 2016 (see **Exhibit 5** below), as direct VC investment was steady while M&A dropped significantly. Why the dramatic swings? The acceleration makes sense – the convergence of mobile technology, eCommerce and mCommerce trends, and hamstrung banks enabled startups to try to serve the industry better than incumbent using the latest technologies and consumer preferences. The pullback, meanwhile, was potentially reflective of an acknowledgment of realities – that hitting home runs in fintech is hard because the slow pace of consumer change and the high cost of doing business in an intensely regulated industry (and high cost of acquiring customers) make getting to scale difficult. In the end, a number of startups would be better off working with incumbents rather than trying to disrupt them, and while this yields a higher likelihood of success, it will probably also lower the firm's valuation, netting out to a lower IRR for its sponsors. Some recent downrounds seem to corroborate that realization of realities.

Exhibit 5:
VC investment in fintech startups fell in 2016 after a rapid increase over prior 3 years

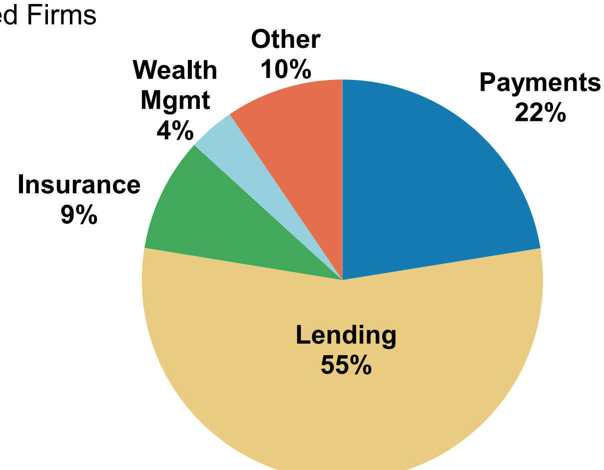
Total global investment in fintech companies ($bn)



Source: Pulse of Fintech Q4 '16, KPMG, CBInsights, PitchBook, Morgan Stanley Research

Exhibit 6:
Fintech investments have concentrated in Payments & Lending, signaling the areas investors find most compelling

% of 2016 Global Fintech Investment to VC Backed Firms



Source: Pulse of Fintech Q4 '16, KPMG, CBInsights, PitchBook, Morgan Stanley Research

Where does VC investing shake out? We still see significant opportunity for fintech startups, and our framework informs our view below:

1. More juice for marketplace lending investments in large Emerging Markets like China vs. developed markets like the US: VC investments in markets with immature financial infrastructures are likely to see better IRR, if successful, as lack of an established infrastructure creates real opportunity for true disruption. E.g. In China, marketplace lending is not only helping drive cost savings for consumers due to technology driven efficiencies but helping increase supply of credit, which is relatively underdeveloped, thereby creating greenfield growth opportunity. In contrast, markets like the US are probably already saturated in terms of VC investment in marketplace lending. Growth expectations have been rationalized given capital market challenges for funding, which can limit the chances of success without partnership with incumbents. Ultimately, the measure of success for marketplace lending in the US has evolved from disrupting incumbents to becoming a technology partner for incumbents through a Lending as a Service model.

2. B2B likely to garner more investment dollars than consumer payments in developed markets: Most of the paymentech investments over the last several years have focused on facilitating consumer payments - digital/mobile wallets, P2P payments, merchant acquiring/POS technology, etc. While the space has gotten crowded, returns for many have been limited, with only a handful of success stories, given the availability of an already established infrastructure that works well. Going forward, we think the B2B payment segment offers more opportunity to innovate and monetize given unmet business needs and would expect to see more fintech investment flow in that direction. We are starting to see incumbents also make a push in that direction as evidenced by MA's acquisition of Vocalink, VNTV's acquisition of Paymetric, FLT's planned acquisition of Cambridge Global Payments, and Visa's launch of blockchain-based B2B Connnect platform for cross-border business payments.
3. Consumer payment innovations have most opportunity for disruption in emerging markets that are leap frogging incumbent technologies: As highlighted above, digital innovation in the consumer payment market in developed countries like the US has gotten crowded with everyone trying to capitalize on the trend towards mobile/digital/omni-channel commerce. But slow pace of change in consumer behavior, strong incumbent foothold, and high degree of collaboration requirement, has meant that few have been able to monetize their innovations successfully. We think emerging markets that lack a well imbedded electronic infrastructure are most ripe for disruption as digital innovation provides potential to leap-frog incumbent technologies. Case in point, Alipay/TenPay in China, and Paytm in India.
4. Wealth Management: We have argued that independent start-ups in the robo-advisor space will struggle to be profitable given high cost of acquisition and intensifying competition from incumbents. We think however that established financial advisors, banks, insurers, etc. will keep automating parts of their value chain (KYC, AML, onboarding, rebalancing, reporting, etc): developing software to improve the infrastructure for established incumbents with an existing client base could be a cheaper (and higher return) way than competing in the Direct-2-Consumer world for VC investments, in our view.
5. InsurTech: We see continued opportunity in InsurTech, as VC-backed startups are poised to fill the needs of small businesses seeking simpler products that are easy to understand & buy. E-brokers provide a consumer-friendly experience. Aggregators give small businesses a quick look at options. Adjacent players are cross-selling insurance. Technology enablers are assisting incumbent carriers/brokers. Some non-incumbent insurers are taking innovative, digital/direct approaches to SBI.
6. Blockchain: Blockchain investments are likely to temper from here, even as the price of Bitcoin surges. The return propositions are yet unclear and exodus of banks from the R3 initiative is likely to put at least some damper on the likelihood that VC-backed blockchain startups are embraced/acquired by incumbents.

Meanwhile incumbents likely to lead more investment

While VC spend may pull back, we expect spend by incumbents to grow for a few reasons:

1. Spike in VC investment catalyzes response: After gaining steam in 2014, we think VC investment may have overshot in 2015 as soaring valuations and early success stories such as LendingClub, Square, etc. drew attention and led to large capital inflows from VCs looking to fund attractive fintech ideas. But as some of these investments struggle to realize gains, we expect capital inflows from VCs to rationalize going forward. In the online lending space, for example, we are seeing a push towards profitability much sooner than what some of the platforms had planned 12-18 months ago, leading to lower growth prospects and much lower valuations. In the meantime, the threat of disruption from fintechs is forcing incumbents to up their investments in technology to gain operating efficiencies and preserve market share.
2. Consumer behavior change, while slow, is adjusting expectations: While pace of change in consumer behavior tends to be slow for financial services, and hence unlikely to blindside incumbents in a big way, we expect incumbents to gradually evolve their product/service offerings to cater to the digital age consumer.
3. Shift from regulatory/compliance driven R&D to revenue generation/product oriented R&D: Easing regulatory burden under the new political environment should allow more investment dollars from incumbents to be allocated towards new products/offerings as opposed to regulatory compliance, which has been a big drag on investment dollars for the last several years.
4. Focus on lowering costs: Managing expenses remains a key focus for incumbents as one of the drivers for earnings growth. It follows that there is an increasing trend towards implementing

more technology to drive efficiencies with moderated headcount growth going forward.

Most banks have spoken publicly about ramping spend to participate in fintech trends, and JP Morgan provided the clearest detail of its fintech initiatives for a major bank when they highlighted the following in their 2016 annual shareholder letter:

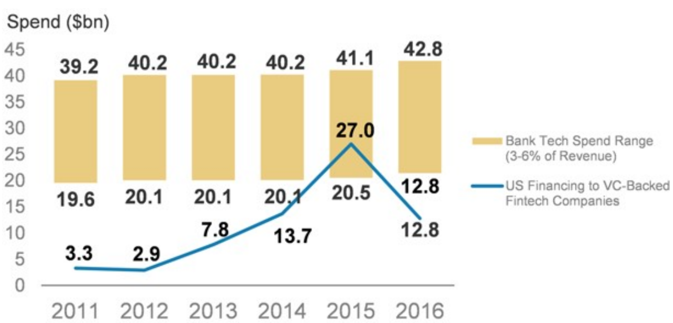
1. How much spend: "In 2016, we spent more than $9.5 billion in technology firmwide, of which approximately $3 billion is dedicated toward new initiatives. Of that amount, approximately $600 million is spent on emerging fintech solutions – which include building and improving digital and mobile services and partnering with fintech companies.

2. Where spending: Investing in "digital, big data [and] machine learning"

3. Focused on partnering as well: "Whether it is consumer payment systems (Zelle), mortgages (Roostify), auto finance (TrueCar), small business lending (OnDeck Capital) or communications systems (Symphony), we are successfully collaborating with some excellent fintech companies to dramatically improve our digital and other customer offerings."

Exhibit 7:

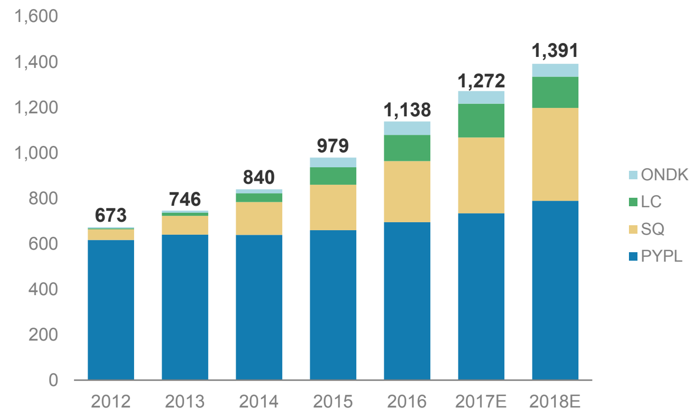
Investment activity to VC-backed firms slowed in 2016, but we believe bank technology spend is likely to grow...



Source: FDIC, KPMG, CBInsights, Morgan Stanley Research

Exhibit 8:

...with even faster R&D growth likely to come from high-profile "fintech incumbents," like PYPL and SQ

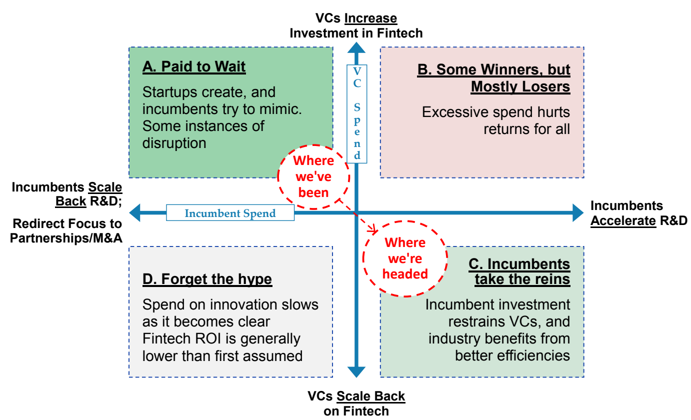


Source: Company Data, Morgan Stanley Research estimates

The net outcome? Better returns for incumbents, we think: As incumbents pick up investment while VCs reduce investment, we tilt towards a world where incumbents are less susceptible to disintermediation and more likely to co-opt new technologies. The balance of spend comprises our "Fintech Gameboard," and a shift to another quadrant could represent upside for incumbents.

Exhibit 9:

Fintech Gameboard



Source: Morgan Stanley Research

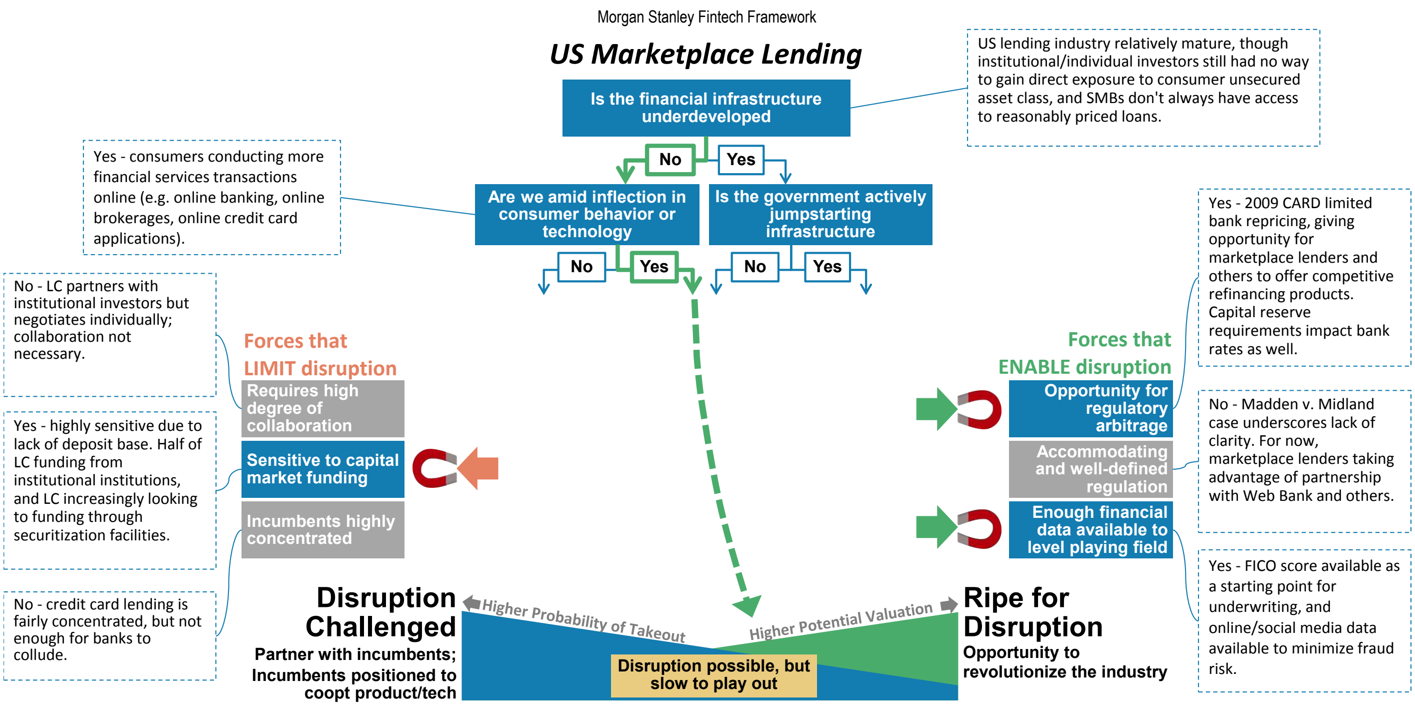
14 High Profile Areas of Fintech

Profile 1. US Marketplace Lending

James Faucette

Exhibit 10:

LendingClub took advantage of a market opportunity + bank regulation that reduced likelihood of a response from banks



Source: Morgan Stanley Research

What's happened so far?

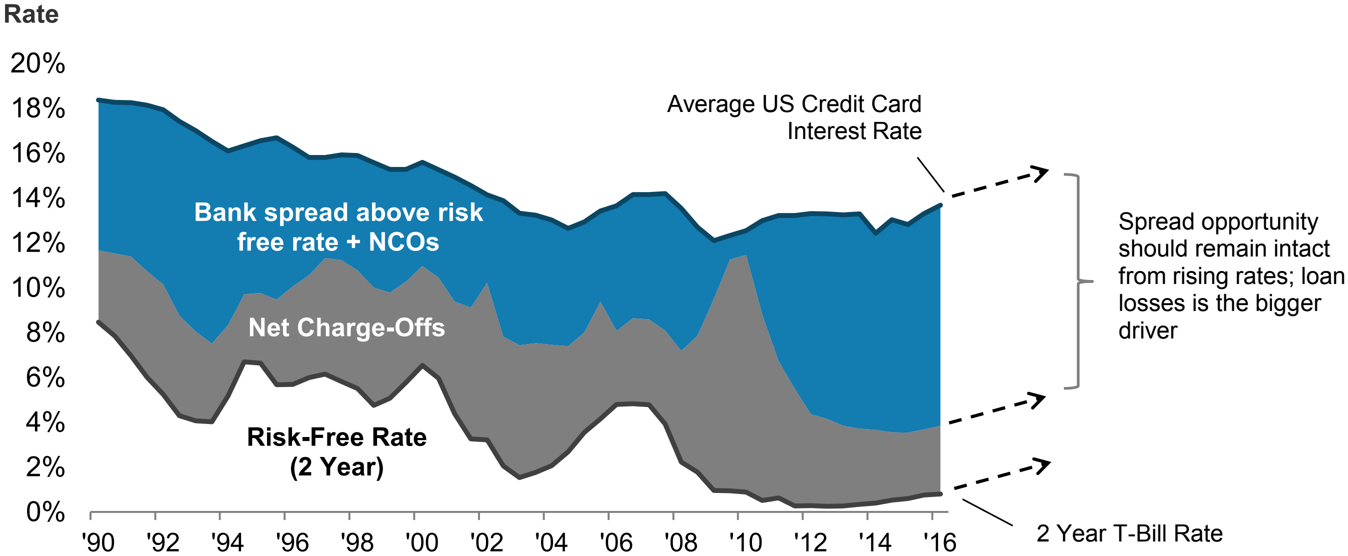
- Marketplace lenders grew rapidly following the financial crisis, benefiting in large part from the low rate environment, pull back in lending from incumbents, and 2009 CARD Act that limited banks' ability to reprice credit risk
- Key driver to growth were regulatory limitations on incumbents, and readily available data for marketplace lenders to quickly ramp
- Loan irregularities at LC in 2016 drove a sharp pullback in funding, with institutional investors reevaluating their investments in the space

What's next?

- With expectations reset, marketplace lenders are poised to grow at a more moderate pace leveraging traditional institutions as primary sources of capital; in essence serving as a more efficient customer acquisition and servicing channel for traditional lenders
- Uncertainty still remains regarding impact of a credit cycle on the industry
- Despite the slower pace of adoption, we remain bullish on the potential for marketplace lenders to take share, as they benefit from regulatory arbitrage and changing consumer behavior

Exhibit 11:

LC took advantage of the wide spread between card rates and chargeoffs, which grew following the 2009 CARD act



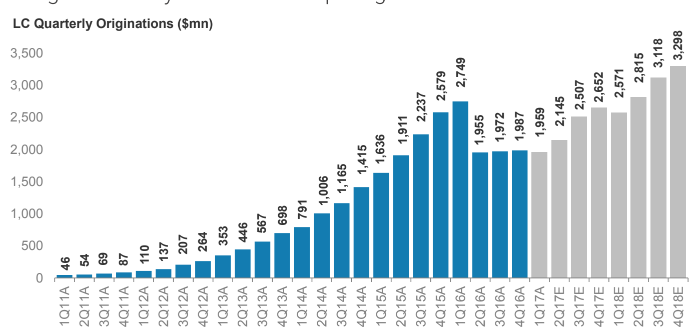
Source: Federal Reserve, FDIC, Morgan Stanley Research

Expectations resetting, with partnerships prioritized over disruption: LendingClub's goal is to serve as a direct capital intermediary between borrowers and lenders, in effect circumventing traditional banks. While this would seem to flout regulation meant to oversee this type of activity, a key enabler for LC was that it **in fact benefited from regulatory action** (the 2009 CARD act) that put constraints on the way banks price for consumer credit. The result was an overpriced credit card consumer, which created the opportunity for LC and other marketplace lenders to offer competitive refinancing products. The second key enabler to LC's success was the **consumer's growing willingness to conduct financial transactions online** (online checking, credit card payments, etc). As in other Fintech success stories, LC took advantage of the existing changes in technology & consumer behavior, and established itself as a trusted brand at the right time. Note that LC's stumble in 2016 (senior management fraud allegations+ turnover) drove weakness to funding which we think has tilted its outlook from "disruptor" to "partner" for the existing lending industry.

Our outlook for Lending Club and US Marketplace Lending

Exhibit 12:

Loan volumes had grown exponentially until small-scale fraud was caught internally in 2016. We expect growth to resume in 2017.



Source: Company Data, Morgan Stanley Research estimates

LC's challenges last year highlight that while the model had potential to be a disruptor – Change in consumer behavior towards transacting online + lack of regulatory capital reserve requirements – scaling effectively can be a challenge when competing with established industry players, particularly when access to capital is a key constraint. As a result, we expect that success in the marketplace lending industry in the US is likely to come from partnering with the incumbents to become services enablers for them (e.g. helping drive efficiency in customer acquisition, credit underwriting, automated origination etc.) as opposed to outright competing with them as independent pure play providers.

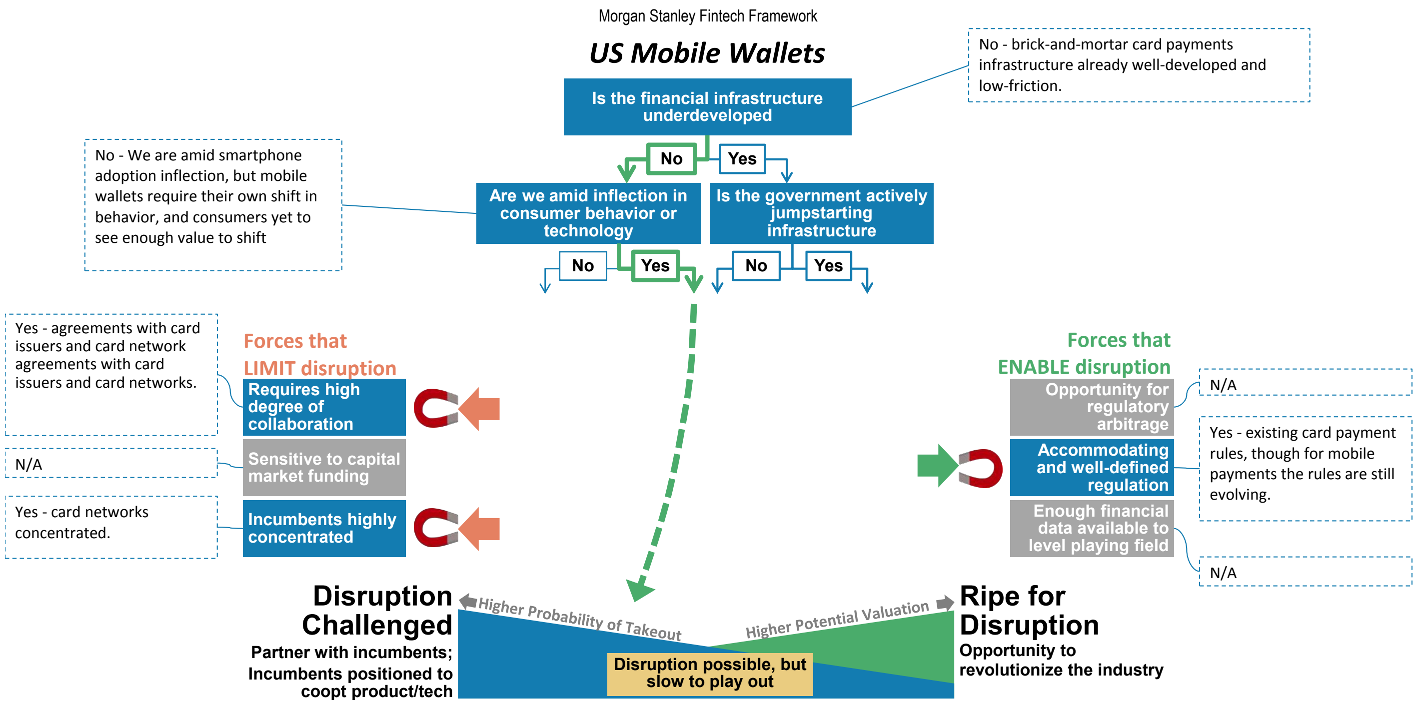
We think near-term growth in the industry represents low hanging fruit but that long-term success will come from the disruptors adopting a Lending-As-A-Service model.

Profile 2. US Mobile Wallets and Apple Pay

James Faucette, Katy Huberty

Exhibit 13:

Adoption of Apple Pay and other Mobile Wallets has been underwhelming, in large part because the existing infrastructure functions so well



Source: Morgan Stanley Research

What's happened so far?

- Apple, Android, Samsung, and others have introduced their mobile wallets over the past 2-3 years, hoping to redirect brick and mortar (and later, e-Commerce) card payment flows through their pipes. But traction in brick and mortar retail has been underwhelming.
- Key hurdle has been the efficiency of the existing card payment ecosystem (i.e. lack of true value-add), combined with inertial consumers and inadequate acceptance infrastructure.

What's next?

- Mobile phone providers will likely continue offering mobile wallets, but traction likely to be slow and could take years to build up; NFC acceptance infrastructure should grow with terminal upgrade cycle over coming years

What has hampered initial success? The first hurdle...a very well-entrenched infrastructure: Apple Pay was met with high hopes when it launched in September 2014 but initial user adoption was slow, and we see one defining reason: A well-established card payments infrastructure, which when paired with inertial consumer behavior in financials tends to favor incumbents. Specifically, Apple Pay and NFC payments in general are often faulted for "fixing a problem that doesn't exist," and while there are some advantages to using it (you don't have to carry your cards around; your transactions process faster than an EMV chip), the upside has not been enough to incentivize consumers to change payments methods. This is exasperated by the infrastructure disadvantage that Apple Pay has faced – that NFC acceptance itself has been slow to roll out vs. mature existing card payments technology. Merchant willingness to accept ApplePay has also been limited even where NFC exists, and goes back to issue of perceived lack of value add.

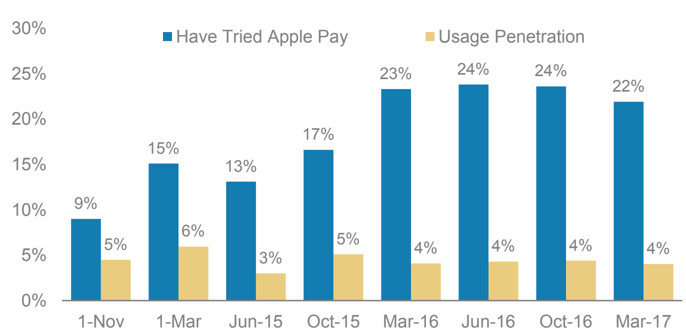
And while adoption has accelerated in recent quarters, global penetration remains low. Close to 6 months after launching the Apple Pay service, the company reported that there were 700,000 locations in the US that were accepting Apple Pay. Fast forward to 2017 and over 20 million contactless-ready locations accept Apple Pay, with more than 4.5 million in the US alone, according to Apple. Furthermore, the number of Apple Pay customers has tripled YoY and transaction volume has increased over 450% in the last 12 month, albeit off a low base. However, customer adoption still has a ways to go, as Apple Pay is only available in 15 countries worldwide (the service expanded to Taiwan and Ireland in the most recent quarter) and Apple Pay usage penetration has leveled off in the low-to-mid single digits, according to Pymnts.com.

Our outlook for Apple Pay and Mobile Wallets

Exhibit 14:

Apple Pay usage penetration has stagnated in the low-mid single digits

Apple Pay Adoption (among eligible devices/merchants)



Source: Pymnts.com/Infoscout, Morgan Stanley Research

In the US, we believe that adoption of Apple Pay at the physical POS remains challenging in the near-term. Even though the shift from mag stripe to EMV is driving some disruption in consumer behavior, the value proposition to consumers and merchants remains unclear and lack of ubiquity in terms of contactless acceptance infrastructure remains an important hurdle. Further, points of acceptance has been a gating factor to Apple Pay usage. For instance, points grew 44% in the UK over the last year while monthly Apple Pay transactions grew by nearly 300%. To fight the inertia of using well-established card payment infrastructure, it is important for Apple Pay to attract points of acceptance for transactions completed on a regular basis. For example, in Japan, more than 500k transit users complete 20 million Apple Pay transactions per month.

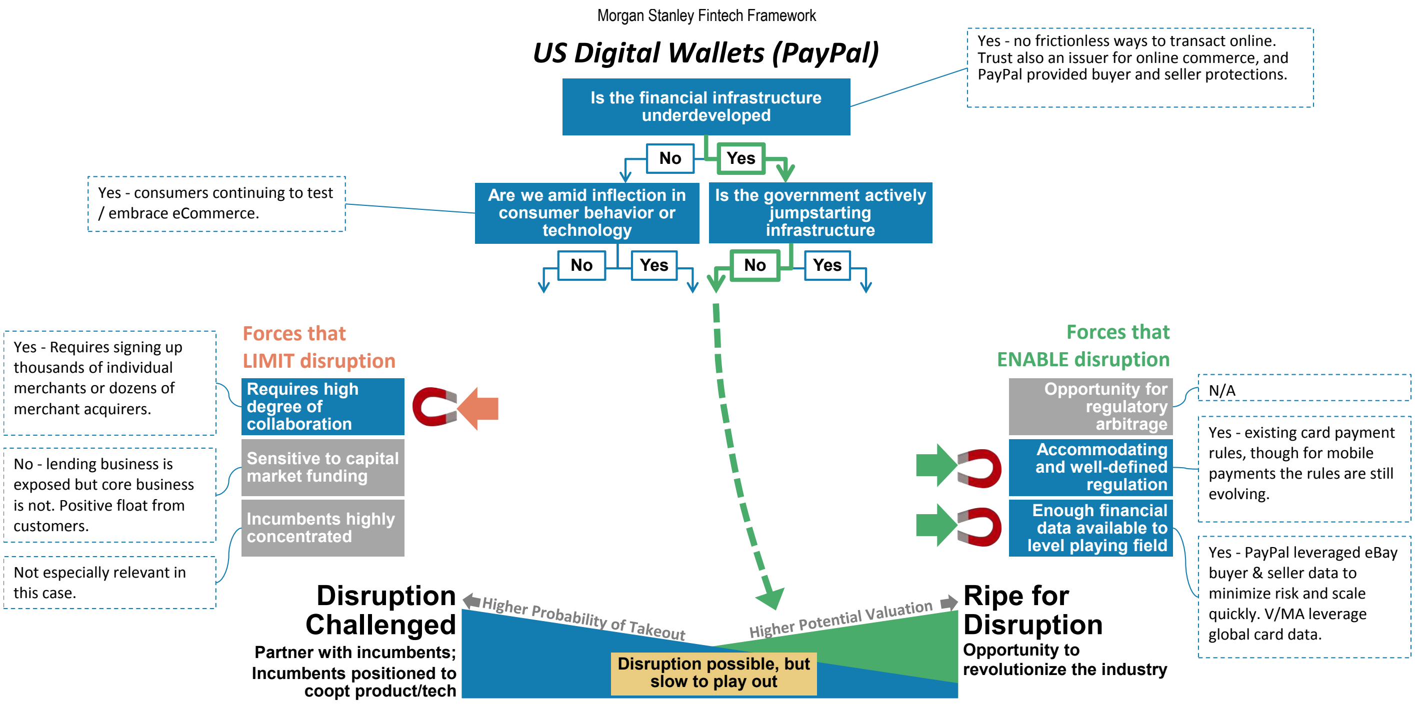
We see Apple Pay's frictionless touchID-enabled checkout as more valuable for mobile-based in-app or in-browser payments, but ubiquitous acceptance is a challenge here as well. As the acceptance gap bridges over time, Apple Pay could have a fair shot at gaining meaningful traction, particularly if it adds new customers "by default" as they purchase iPhones. Longer-term, we think meaningful traction is only likely if Apple Pay (and other mobile wallet providers) can parlay traction in digital wallets (see **Profile 3. US Digital Wallets**), particularly as lines between online and offline commerce become blurred, e.g. consumers find value in using digital wallets for e- and mCommerce, and out of habit continue using the wallet in brick and mortar locations as well. One example of better mCommerce integration is with iMessage where Apple customers can now send a Starbucks gift card via iMessage. Expanding these use cases could encroach on other peer-to-peer platforms.

Profile 3. US Digital Wallets (eCommerce and mCommerce)

James Faucette

Exhibit 15:

PYPL has been riding the wave of eCommerce inflection, gaining significant traction before incumbents reacted



Source: Morgan Stanley Research

What's happened so far?

- After getting to scale by processing eBay transactions, PYPL has diversified into the leading eCommerce digital wallet, accepted at more than 70% of major websites in the US and processing over 20% of global eCommerce
- Other digital wallets have been launched by large firms, including Visa, MasterCard, Chase, American Express, Apple, and Google

What's next?

- Still a long runway for growth as 1) mobile commerce and eCommerce take share from brick and mortar, and 2) as PayPal expands acceptance among merchants globally.
- But as compared to other fintech companies, PYPL is more on the "mature" end of the spectrum, with new opportunities like Pay With Venmo unlikely to be needle-movers against a large revenue base
- Some risk as other wallet providers vie for PYPL's market share, including Apple, Visa, MasterCard, and Google, but recent progress suggests PYPL is well entrenched

Digital Wallet provider PayPal is the payments pure-play on eCommerce: PayPal represents one of the most notable payment innovations for e-commerce. Established in 1998, PYPL transactions now represent a leading share of US e-commerce. We think PYPL's success in gaining traction depended on a few key factors.

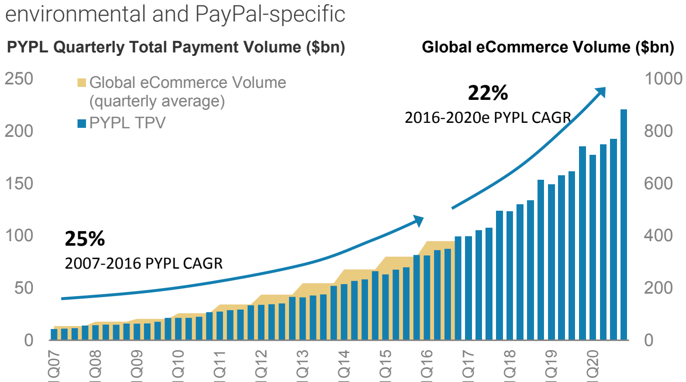
(i) **Exponential growth in e-Commerce** and **lack of an efficient payment system** for online payments: While card networks like V and MA provided a workable solution for making payments online (where none other existed), there was clear friction to having consumers enter 16 digit card details, leading to high rates of cart abandonment. Moreover, there were security and trust issues with consumers not wanting to share their payment credentials with a merchant that was not well known to them. PYPL's digital wallet helped solve both these issues.

(ii) Another equally important factor for PYPL's success was **PYPL's acquisition in 2002 by eBay**, a leading e-commerce platform at the time. Being the preferred payment option on eBay allowed PayPal to gain adoption with both consumers and small merchants that sold on the eBay platform. This gave them a head start in establishing widespread merchant acceptance, one of the biggest hurdles faced by any new forms of payment.

(iii) **Finally, riding existing network rails** (like V and MA) was likely an important factor for PYPL's success given that this allowed for easy access to consumer funds in a way that consumers were already accustomed to (and trusted), thereby reducing friction in the process.

Our outlook for PayPal; Raising price target to $49

Exhibit 16:
PayPal's exponential growth benefited from several factors, both environmental and PayPal-specific

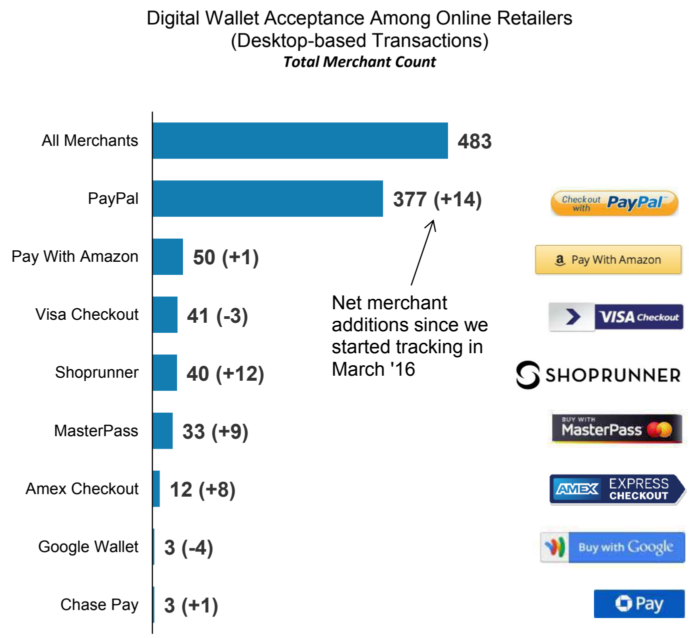


Source: Company Data, Morgan Stanley Research

We expect PYPL to remain a growing force in the payments ecosystem given the continued shift in consumer behavior towards e-Commerce and m-Commerce. While many new entrants are trying to replicate PYPL's value proposition, PYPL has a significant lead in online acceptance, which in a role reversal now positions it as the incumbent against digital wallets from the likes of Visa, MasterCard, Apple, Android, and others.

While there is risk to PYPL if its online wallet acceptance advantage diminishes out over time, e.g. as well-funded competitors continue to push their own wallets, evidence so far does not suggest much traction by Visa Checkout, MasterPass, ApplePay, AndroidPay, Pay With Amazon, and others – see our latest Online Payment Tracker for more detail. Given the slow pace of adoption for many of these new wallets and PYPL's agreements with V and MA to stop steering to ACH, we think there is potentially incentive for at least some of the other wallet providers to slow their investment, thereby limiting overall risk to share loss by PYPL.

Exhibit 17:
Despite already having the highest acceptance, PYPL also added the most merchants over the past year



Source: internetRetailer, Morgan Stanley Research

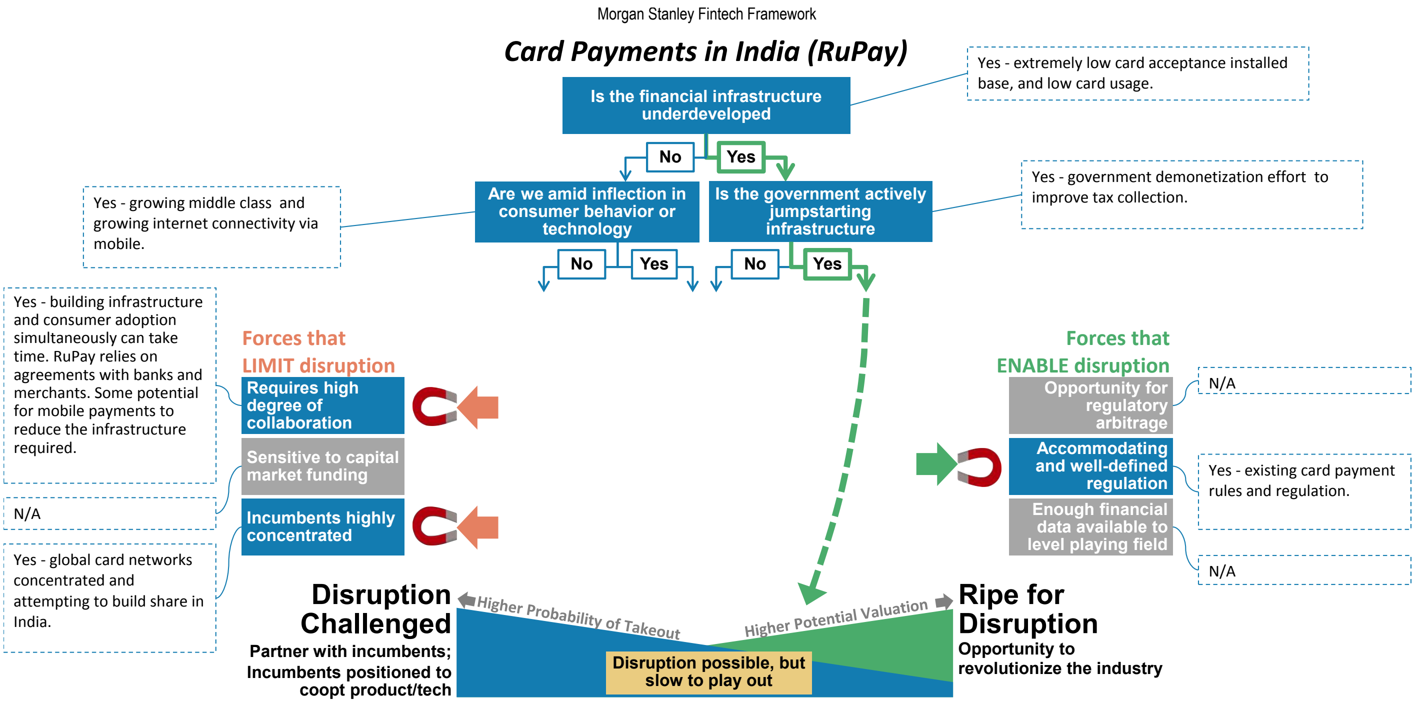
Raising PYPL PT to $49: While PYPL represents a disruptor in its own right, it is now more than ever firmly entrenched in its position as online commerce share leader. Moreover its 2016 partnership agreements with V/MA, while creating some risk to margins, reduce risk of share loss. We raise our price target on PayPal to accommodate this positioning more as an incumbent with a reduced risk profile, as we more willingly bake in PYPL's higher out-year EPS growth into our target multiple. Specifically, we raise our target 2018 P/E target multiple to 29x from 26x, which represents a 10% premium to V/MA current 26.5x avg C2017 P/E. This 10% premium is justified by ~20% forward earnings growth premium (19% 2018-2020 EPS growth for PYPL vs. 15.5% V/MA 2017-2019 avg).

Profile 4. Electronic Payments in India

Anil Agarwal

Exhibit 18:

India is a perfect example of government mandate driving change



Source: Morgan Stanley Research

What's happened so far?

- The infrastructure for digital payments in the form of real time gateways like UPI (Unified Payment Interface) are up and running. Digital wallets like Paytm have also attracted significant number of consumers and merchants.
- The process of digital payments got a big leg up in end 2016 when the government conducted the currency replacement programme, and started pushing digital payments aggressively.

What's next?

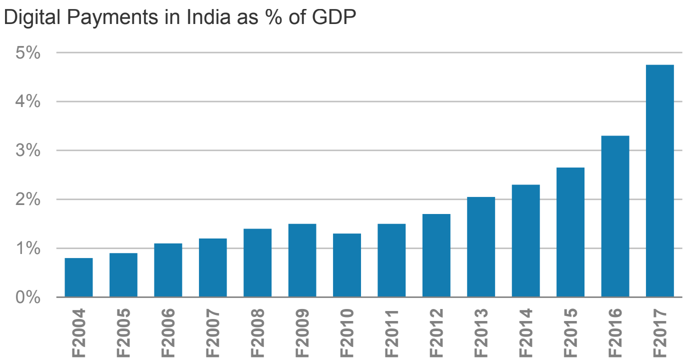
- The infrastructure is now in place and we would expect digital payments to continue to gain share of overall consumer spend in India. We will be keeping track of the continued pickup in adoption of digital payments.

Government is giving digital payments a material boost. While cards (credit and debit) have existed in India for a long time, traction had been fairly limited given highly cash centric consumer payment behavior, weak penetration of physical infrastructure (POS machines), existence of large informal (unaccounted for) economy, and to some extent a cultural aversion to debt.

Cash and checks make up for ~80-90% of personal consumption expenditure based on various estimates for the fiscal year ended March 2016, the highest compared to a group of other key developing and developed markets.

Exhibit 19:

Digital Payments in India as % of GDP



Source: Reserve Bank of India, MS Research

However, this is changing. Digital payments have seen a big leg up since November 2016 after the government initiated its currency replacement programme. The shortage of cash prompted the move to digital payments and this was helped by government initiatives in this regard (cutting interchange rates, increasing POS penetration, etc). Total merchant spends through digital means (primarily cards but including mobile wallets, UPI) has increased to ~4.5% of GDP in F17 (year ending March 17) from 3.3% in F16 and 2.7% in F15. Some of this pickup will likely ebb as cash has come back into the system, but the trend of digital payments is likely to be fairly well entrenched now.

Our outlook for electronic payments in India

It is likely that a large part of pickup in digital payments over next 3-4 years will be through UPI. This is a real time payment gateway for P2P, P2B transactions with almost all the large banks connected. Mobile wallets have also seen material pickup since November with Paytm having seen significant jump in customer and merchant acquisition.

For card companies too, the pie has become larger. We need to wait and see how much market share new platforms will take away, but card companies should see pickup in absolute level of transactions. In the near term, this will be helped by significant increase in POS terminals which are being set up in India - banks installed almost 1 million new terminals in the last 4 months. Moreover, a new payment mechanism based on QR core (Bharat QR) has been launched which is interoperable across networks (Visa and MasterCard are a part of this) where payments will not need any POS terminals.

The various steps taken should enable India to leapfrog traditional POS-based payments technology.

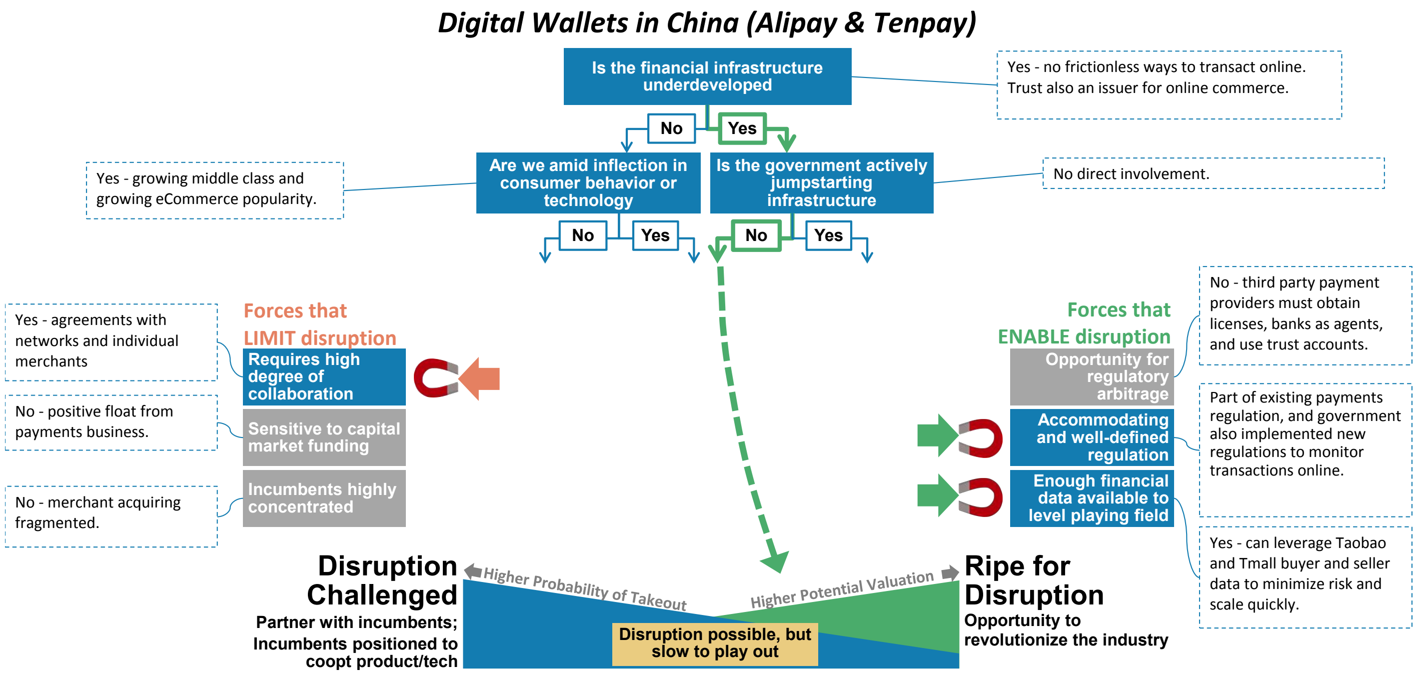
Profile 5. Digital Wallets in China

Grace Chen

Exhibit 20:

Like PYPL, Alipay has been the big eCommerce beneficiary in China; Tencent is following suit with Tenpay

Morgan Stanley Fintech Framework



Source: Morgan Stanley Research

What's happened so far?

- Alipay has been the market pioneer, and hold the leading market share on both PC and mobile payment. According to iResearch, Alipay accounted for 43% of total PC online payment market in terms of transaction value as of 4Q16 by leveraging its strong presence in e-commerce. It also makes up 55% of the mobile payment market as a result of successful mobile transition and increasing O2O (online-to-offline) efforts.
- Tenpay, as an emerging payment player, has been catching up since 2015 from a lower base, by leveraging the large and sticky user base on its social platform as well as supportive O2O investments. According to iResearch, Alipay accounted for 19% of total PC online payment market in terms of transaction value as of 4Q16 mainly through strong e-commerce partners, such as JD, while, on mobile, Tenpay achieved 37% market share thanks to the extensive ecosystem in offline payment.

What's next?

- While Alipay continues to dominate the PC online payment market given Taobao and Tmall capture the majority of the e-commerce transactions in China, offline transactions will increasingly become a focus, and the primary competitive arena for online payments.
- China's government is imposing more stringent regulations on online payments, which could lead to short-term volatility in market development, but which should also be constructive in the long run, helping avert potential systemic risks.
- By leveraging its strong social properties and rich strategic investment portfolio, especially in O2O, Tencent is, we believe, well positioned in the mobile payment space to capture significant growth opportunities by monetizing the increasing payment transactions in both the online and offline arenas.
- Backed by a large volume of payment transactions and better user-profiling techniques, Tencent could, in our view, become a strong player in the internet finance space, especially in money market fund product distribution.
- We are also positive on Tencent's strong presence in the internet banking space, and we believe the credit system established through banking business is another element of fundamental infrastructure for Tencent's user ecosystem.

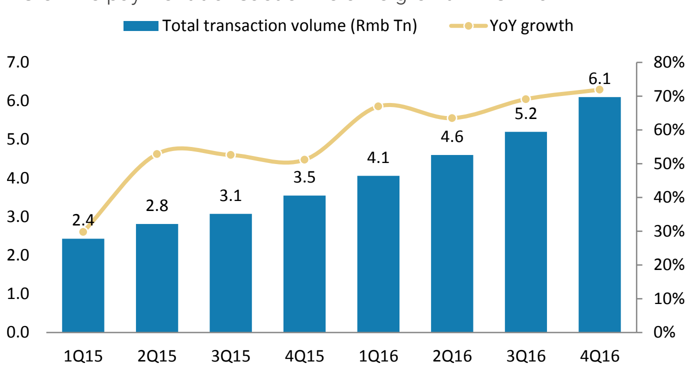
What drove Alipay's success? Alipay benefited from the secular trend of e-commerce booming and lack of strong entrenched card payment culture in China, and enjoyed large traffic and transaction volumes from Taobao and Tmall, in which Alipay is set to be the default and dominate payment channel. With the fast adoption of mobile Internet and payment, Alipay has also successfully transformed from a PC centric payment solution to a mobile payment gateway with a wider coverage in terms of service categories.

Alipay - Innovating China's financial market. Alipay has become China's largest third-party payment service provider, with 55% market share in terms of mobile transaction value as of 4Q16, according to iResearch. It is also actively developing offline payments and small loans/personal financing and wealth management products. Ant Financial's success with Alipay and other financial products has profoundly changed China's financial industry as these financial services were developed from the e-commerce players rather than traditional financial institutions.

O2O (online-to-offline) initiatives to drive offline payment adoptions. As one of the key O2O initiatives, Koubei serves as a façade in offline to connect various local merchants with over 695mn mobile internet users in China. We believe besides increasing mobile commerce transactions, incrementally, offline payment offer a larger revenue opportunity. Alipay has been well positioned to capture the ongoing wave of service digitalization as well as offline payment, and leverage O2O initiatives to drive faster offline payment adoptions.

Exhibit 21:

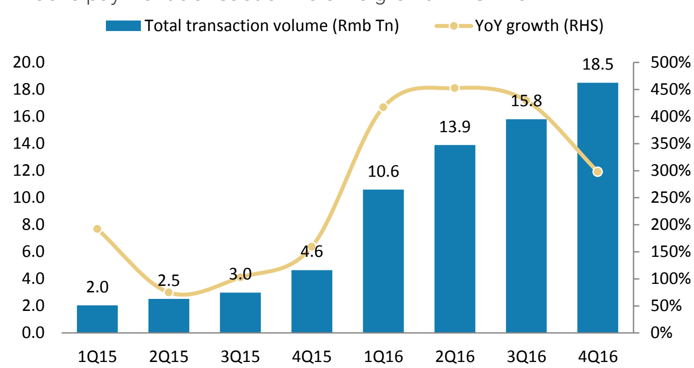
PC online payment transaction volume growth in China



Source: iResearch

Exhibit 22:

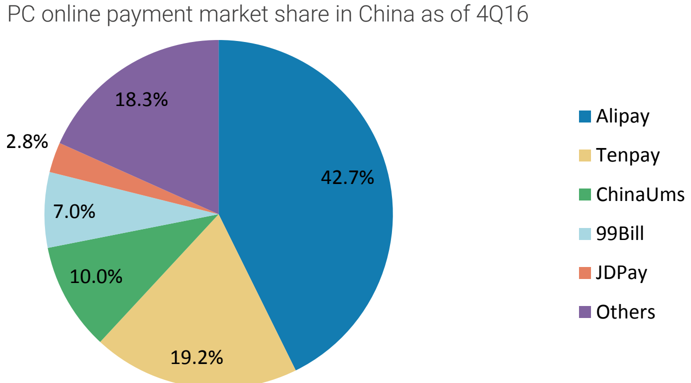
Mobile payment transaction volume growth in China



Source: iResearch

Exhibit 23:

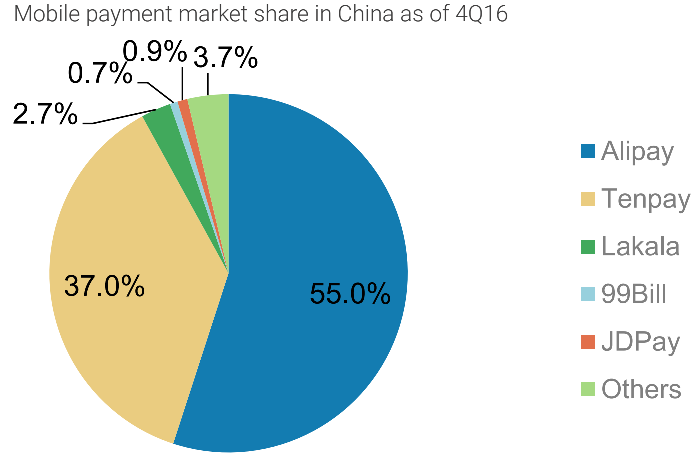
PC online payment market share in China as of 4Q16



Source: iResearch

Exhibit 24:

Mobile payment market share in China as of 4Q16



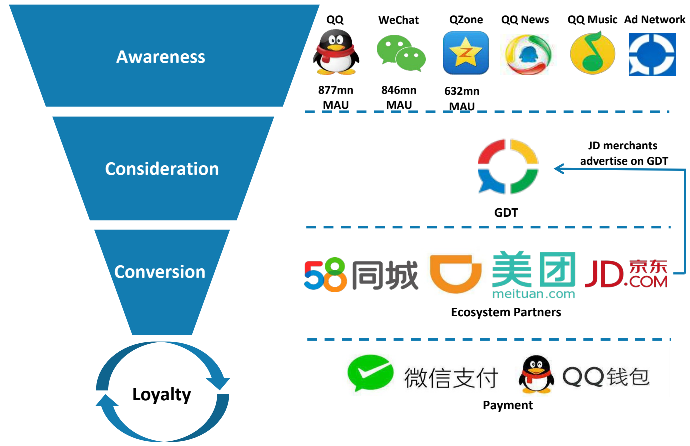
Source: iResearch

Tenpay - The fundamental infrastructure for Tencent. We believe payments represents the fundamental infrastructure for Tencent to improve product and service offerings and drive user engagement and stickiness to the platform given the social settings, as payment, especially peer money transfer, is one of the most frequent activities in the social environment. At the same time, Tenpay also benefits from the large transaction volumes generated on the platform, despite C2C money transfer still dominating the majority of the transactions. Tenpay has shown significant growth in online payment volume as more O2O transactions were done through mobile, and as C2C payment transactions have been on the rise.

Strategic investments in ecosystem partners to incubate payment scenario. With over 800mn monthly active users on both WeChat and QQ and highly engaging social activities on the platforms, Tencent has a solid foundation for monetizing its payment business, in our view. Tencent is also incubating more comprehensive payment options by strategically investing in various transaction-oriented players, such as JD.com, Meituan Dianping, Didi Taxi, and 58.com. We have a positive view on the potential synergies created by cooperation among partners in different use scenarios, and we expect Tencent to benefit from the increasing volume of commercial payment transactions through its payment vehicles, which we think could offer significant upside in payment monetization.

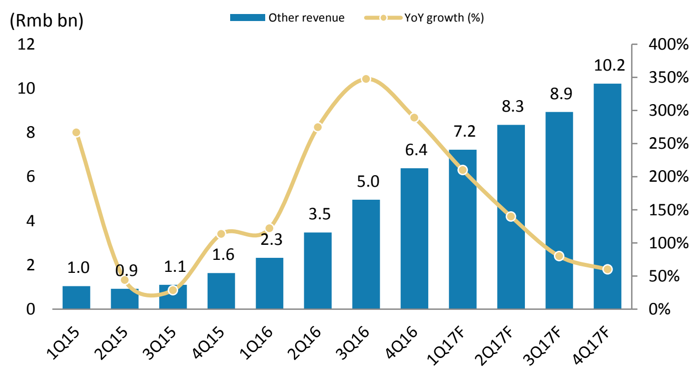
Margin improvement on track mainly driven by increasing third-party payment volume. Since March 2016, Tencent started to charge WeChat Pay balance withdrawal fees of 0.1% if the accumulated amount exceeds Rmb1,000 in order to alleviate the cost burden associated with increasing C2C transfer payments. As a result, revenue contribution from other revenues, mainly payments, has increased meaningfully over the past few quarters, reaching 20% as of 4Q16, up from 10% in 2015. As a side effect of C2C handling fee charges, users are more willing to keep residual money in their WeChat/QQ wallet rather than transferring back to their bank accounts. Such funds grew significantly in 1H16, and reached over Rmb125bn as of 2Q16. Tencent removes this item from its total cash balance to comply with regulation changes in 3Q16, but we believe such residual funds in WeChat/QQ wallets should continue to grow as transaction volume grows. We view the impact of these balances as positive, as they could be monetized through rising payment scenarios on WeChat and QQ to drive more commercial transactions. We are seeing Tencent building payment scenarios both online and offline to improve payment monetization.

Exhibit 25:
Tenpay leverage the large and sticky user base on Tencent's social platform as well as supportive O2O investments



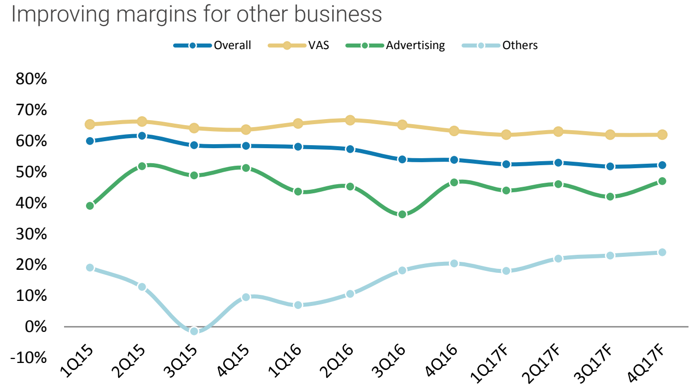
Source: Company data, Morgan Stanley Research

Exhibit 26:
Strong growth of other revenues (mainly payment)



Source: Company data, Morgan Stanley Research estimates

Exhibit 27:
Improving margins for other business



Source: Company data, Morgan Stanley Research

Our outlook for Alipay and Tenpay

Alipay: We expect Alipay to maintain its dominant position in online payment ecosystem, as Taobao and Tmall continue to capture majority of the e-commerce transaction GMV in China. While Tenpay as an emerging payment channel, especially in offline, is ramping up very aggressively, we believe the payment battle in offline realm is early, and both Alipay and Tenpay are proactively building payment ecosystem, especially in offline, to further incubate customer behavior in adopting mobile payments.

We believe Alipay will also continue to drive Internet finance innovations by leveraging its strong presence in e-commerce, extensive user base, and tremendous transaction and user behavior data. On one hand, we expect Alipay to further develop wealth management products to cater to the increasing needs in financial investment by China Internet users. On the other hand, Sesame Credit, as a leading credit assessment tool, has laid out solid foundation for consumer finance product pricing and risk management.

Tenpay: By leveraging its strong social properties and rich strategic investment portfolio, especially in O2O, Tencent is, we believe, well positioned in the mobile payment space to capture significant growth opportunities by monetizing the increasing payment transactions in both the online and offline arenas. Although C2C money transfers still dominate payment transactions, we see an encouraging progress of payment monetization. We also expect Tencent to fully utilize its valuable payment transaction data together with its large social data to better understand its users, creating a virtuous cycle in its ecosystem that fosters development of more products and product features, and again gathers more data.

Backed by a large volume of payment transactions and better user-profiling techniques, Tencent could, in our view, become a strong player in the internet finance space, especially in money market fund product distribution. As the market is still in an early stage of development, the majority of the transactions were conducted across a variety of channels, given aggressive subsidies offered by the players in the market. However, we believe that as the return rate normalizes, platforms with a high volume of payment transactions, such as Alipay and LiCaiTong, could consolidate the market, and become strong product distribution channels.

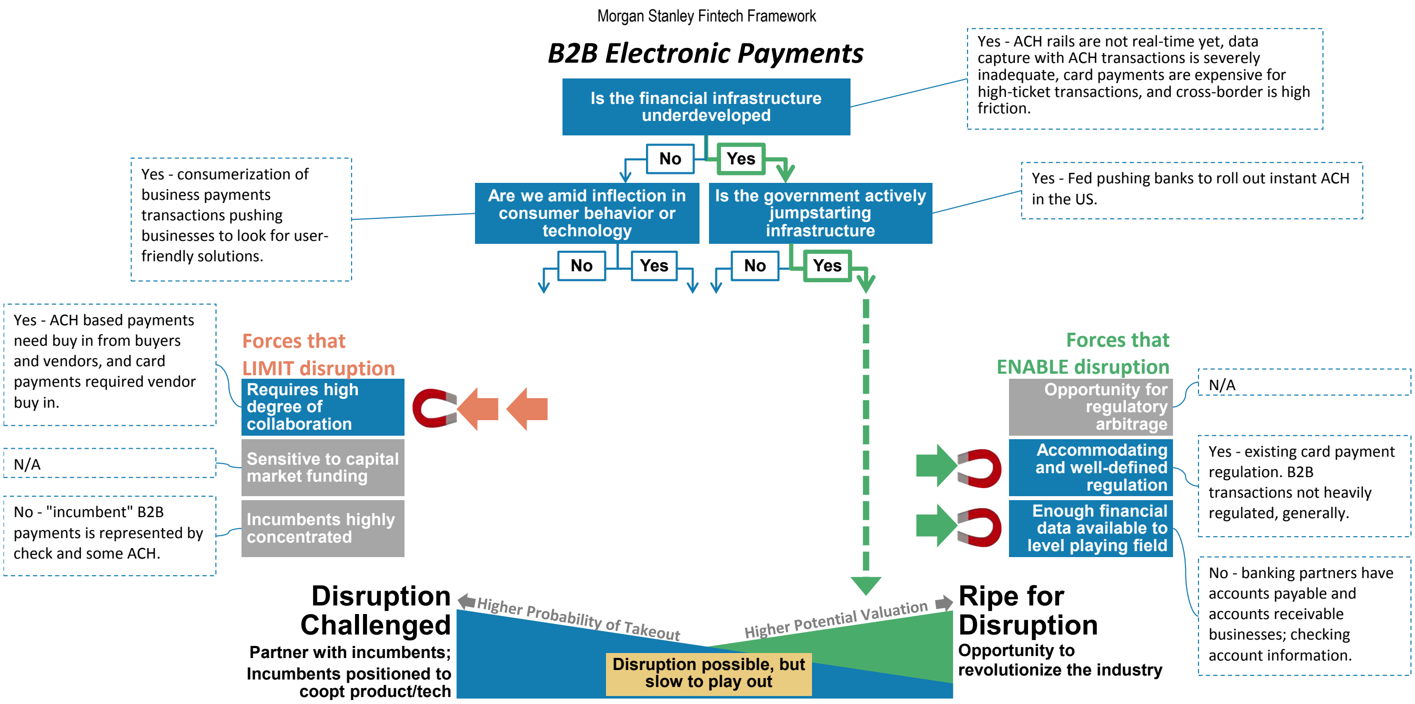
Moreover, beyond internet finance product distribution, we are also positive on Tencent's strong presence in the internet banking space, and we believe the credit system established through banking business is another element of fundamental infrastructure for Tencent's user ecosystem.

Profile 6. B2B Electronic Payments

James Faucette

Exhibit 28:

B2B payments, long an elusive TAM for electronic payments providers, could see some fintech interest as we move towards instant ACH in the US



Source: Morgan Stanley Research

What's happened so far?

- Large, but underserved, TAM. ~50% of B2B payments are still made via checks. With ACH being the last major innovation, B2B electronic payment options are lacking, particularly for SMBs that don't get as much attention from banks as large multinationals.
- Other alternatives include commercial virtual card programs offered by card networks in conjunction with issuing partners, but penetration of B2B card transactions remains low - low to mid single digit penetration, according to MasterCard.
- Cross-border B2B payments are particularly a pain point as most available options are time consuming and expensive.

What's next?

- While large amounts of investments have pursued consumer payments over the last several years, investment in B2B payments have been limited. We expect VC investments in B2B to outpace consumer payment investments over the next 3-5 years.
- Consumerization/Digitization of B2B payments - We see increasing expectation from corporate clients to be able to transact in an omni-channel environment with speed, accuracy, and ease of click of a button.
- Increasing focus from payment networks to tap into B2B opportunity. e.g. MA's planned acquisition of Vocalink; V's partnership with Chain for rolling out B2B Connect, a platform for banks to settle funds cross-border.

Pain Points make B2B Ripe for Disruption: Investments and hence improvements in payments have been mostly focused on the retail side over the last several years, with corporate payments lagging meaningfully in terms of product innovation. Data indicate that paper checks still constitute a majority of Business-to-Business (B2B) payments in the US. Although the mix has been shifting towards electronic payments, the pace of conversion has been slow relative to consumer payments.

Today, majority of B2B payments are conducted via Check, ACH (Credit and Debits), Wire Transfers, and Purchasing Cards. The industry has been slow to innovate on the B2B side with ACH representing the last notable innovation, circa 1978. But we see strong potential for increased focus on the B2B space over the next several years. Why?

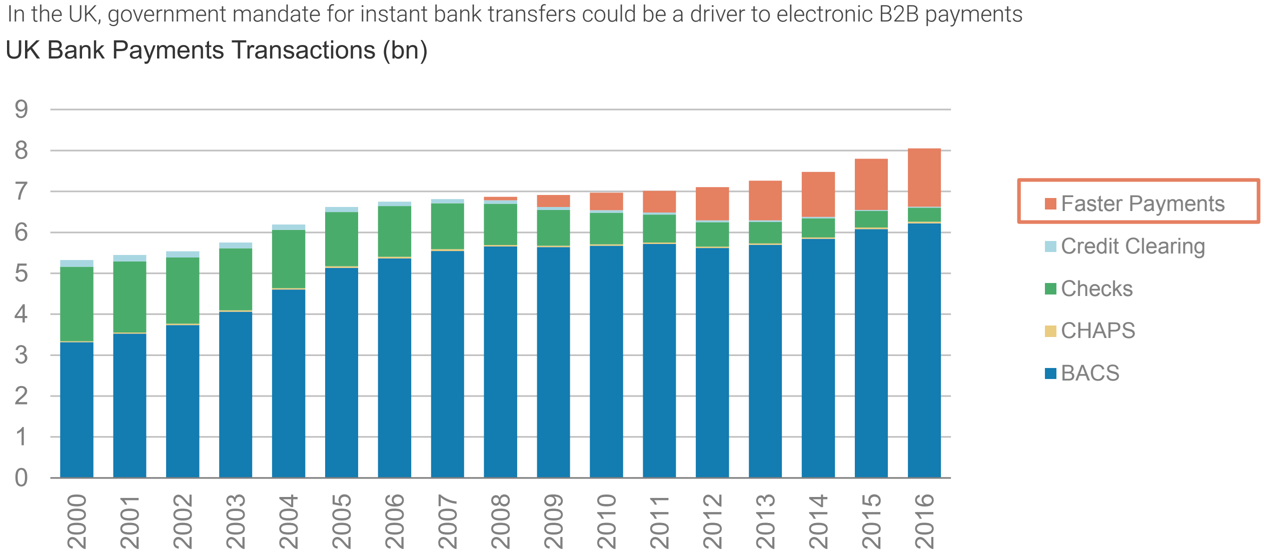
1. Lack of well established and efficient infrastructure: Electronic payment options available to businesses are subpar. ACH transfers require sharing of sensitive account information, can be prone to fraud, and transmission of data for automatic processing is often inadequate, requiring manual intervention for account reconciliation, which is a critical component of B2B payments. Card based payments are more seamless, capture detailed remittance information, but can be fairly expensive for high value transactions.
2. Huge Addressable market: Global TAM for B2B payments is $90 trillion+ vs. ~$50 trillion for consumer payments
3. Government mandated changes in the US/UK could create unique opportunity for innovation: In the US, the Fed convened a Faster Payments Task Force in 2015 with the objective of implementation of an improved payment system with a focus on speed, ubiquity, safety & security, and efficiency. This should not only allow banks to upgrade their offerings but also pave the way for new entrants to innovate fast and convenient payment solutions for corporate clients. In Europe, application of PSD2 should drive increased use of APIs for B2B payments.
4. Change in transaction behavior towards digital: While individuals can conduct cashless transactions seamlessly from their mobile device for retail purchases, corporate transactions still use clunky, cumbersome rails. Corporate clients are increasing demanding ability to transact in an omni-channel environment with real-time capability.

Our outlook for B2B Electronic Payments

We expect VC investments in B2B to outpace consumer payment investments over the next 3-5 years. Similar to consumer payments, we expect innovation in B2B to be led by fintechs that can develop targeted solutions by layering technologies on top of bank ACH rails. We see automation and improvement in data/ information availability along with the payment transaction to be a key focus area for innovation as that remains an important pain point with ACH payments, requiring manual (and expensive) reconciliation. Cross-border payments is another area which could benefit from innovation given the difficulty in making timely payments through the correspondent bank network that exits today. New technologies like blockchain could have some applicability in solving for efficient cross-border B2B payments.

Exhibit 29:

In the UK, government mandate for instant bank transfers could be a driver to electronic B2B payments



Source: Faster Payments, Morgan Stanley Research

With change in transaction behavior towards digital channels, we expect innovation to focus on making B2B payments available in an omni-channel environment, such that business managers can make transactions from their mobile devices with the ease of click of a button, something that most people are becoming increasingly accustomed to when making consumer payments.

We expect virtual card and other B2B payments to remain a key focus for Visa and MasterCard. While not all B2B payments are cardable, the companies have identified a TAM of $5-15 trillion (out of total of more than $90 trillion in B2B payment volumes), where they think card payments could provide a valuable solution for inefficient B2B payments, but overall penetration of this TAM remains limited. With MA's pending acquisition of Vocalink, it should be able to go after a much larger $90 trillion + addressable market, which is mostly transacted on ACH rails and where card payments may not make much sense.

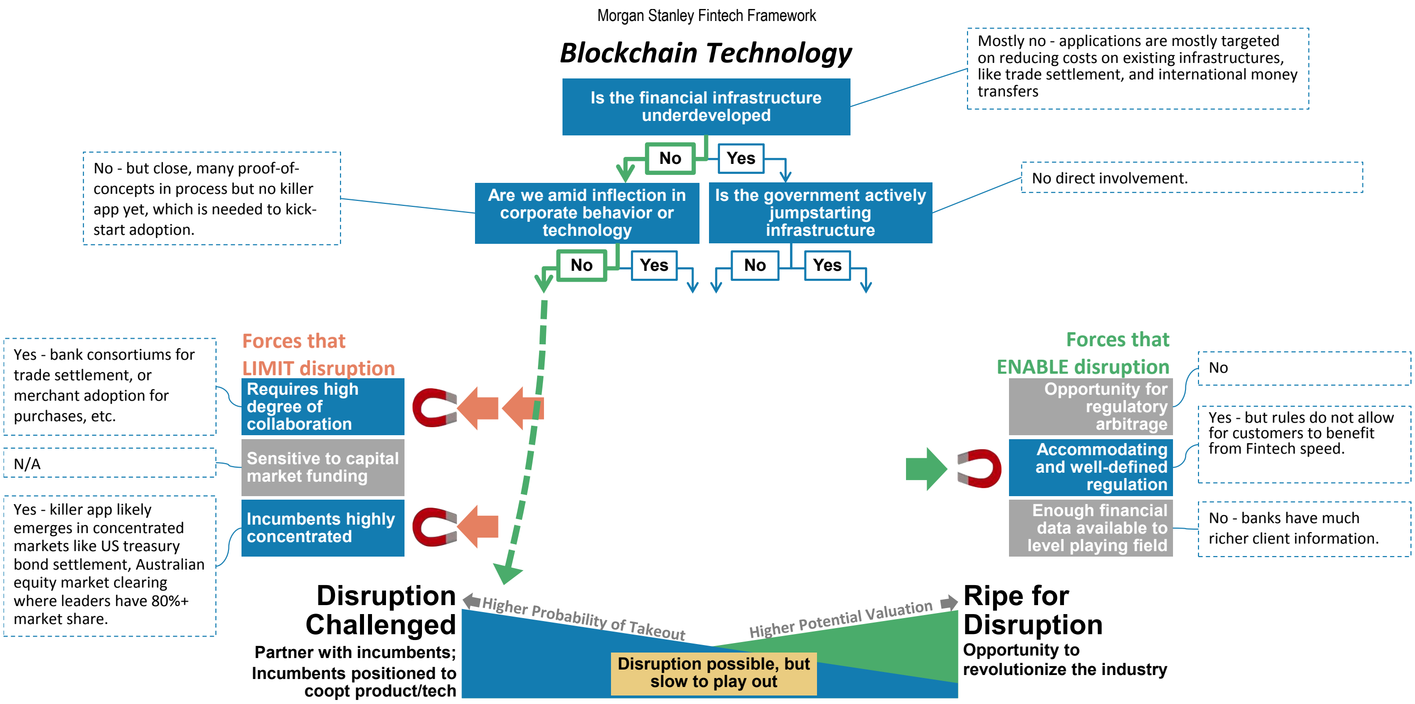
Visa has also been making investments in the B2B opportunity outside of card payments. One example is its partnership with Chain, a blockchain enterprise company, to offer B2B Connect, a platform for banks to settle funds cross-border with a consistent process through Visa's standard pactices.

Profile 7. Blockchain Technology for Financials

Betsy Graseck, James Faucette

Exhibit 30:

Blockchain requires a lot of buy-in to be fully utilized, which suggests a longer time to scaled implementation and therefore favors incumbents



Source: Morgan Stanley Research

What's happened so far?

- Blockchain, the technology behind Bitcoin and other cryptocurrencies, erupted onto the fintech scene several years ago. By creating a parallel financial system based on decentralized ledger (independent of existing infrastructures) there was perception of meaningful tail risk to incumbents, including the card networks, money transfer networks, and banks. Blockchain technology in the context of banking and financial institutions really refers to the more general Distributed Ledger Technology. Importantly, banking requires a private, permissioned network as opposed to an open, permission-less network such as the one underpinning Bitcoin.
- Several consortiums led by high market-share incumbents have emerged to test proof-of-concept blockchain technologies, particularly in the securities clearing and settlement space. Leaders including BNYMellon, Northern Trust, State Street, and JPM are assessing if blockchain can deliver services more cheaply and more securely than current systems.
- Applications for distributed ledger have broadened, and various efforts are underway to assess the business case: whether the benefits exceed the costs and risks of implementation, particularly relative to simpler alternatives such as incremental updates to legacy infrastructure.

What's next?

- Proof-of-concept for some applications (like securities clearing and settlement) and slowing enthusiasm for others (Bitcoin at the point of sale).
- We expect adoption will come in waves, asset class by asset class. Asset classes ripe for proof-of-concept efforts are those with:
  1. Mature legacy process with existing friction/inefficiencies that warrants disruption (e.g. NTRS' private equity fund administration, ASX)
  2. Concentrated market share where incumbents could effectively lead the proof-of-concept effort (i.e. BNY Mellon U.S. treasury bond settlement)
- Adoption of some form of blockchain technology by incumbents likely. Given the amount of collaboration required, we expect it could take several years to replace existing back office functions / produce measurable cost savings in the asset classes adopted.

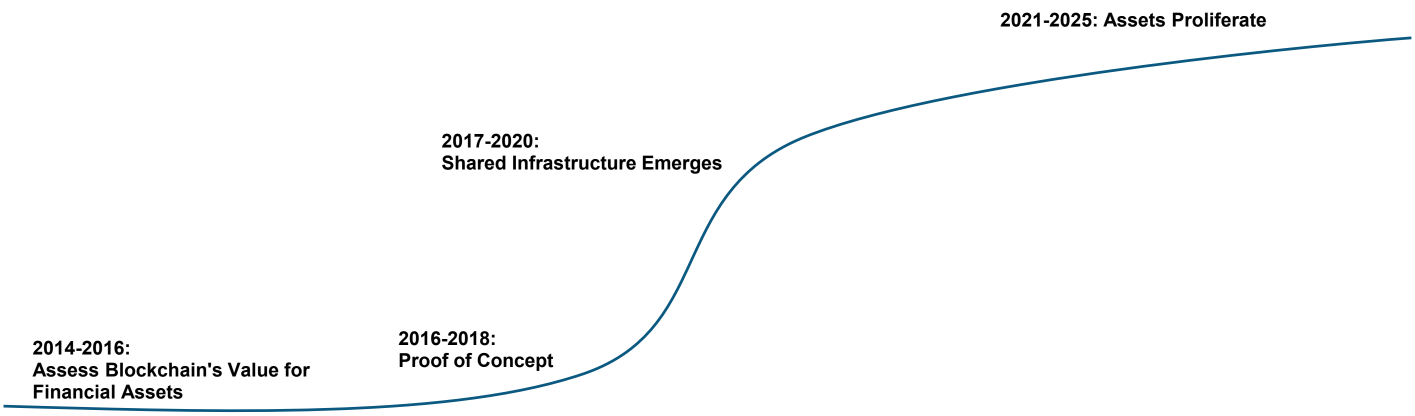
Many uses, but technology likely to be co-opted by incumbents: Blockchain represents a breakthrough database technology with clear *potential* application across a broad array of financials and payments. A key factor for success is ubiquity among users. This is why we believe incumbents will drive any blockchain adoption. Customers need to know and trust their counterparties. Incumbents with significant market share needed to sponsor the technology implementation.

Our outlook for Blockchain in Financials

We buy into the concept that distributed ledger has the potential to help reduce the costs of post-trade activities dramatically. Studies range from $15bn to $20bn (BCG, Santander Infoventures June 2015) at this stage. However, we think we are 5-10 years away from widespread adoption of current proof-of-concept efforts. As certain proof-of-concepts succeed, we expect shared infrastructure to emerge over the next 2-3 years. Success of those platforms would drive other assets to follow suit. With the technology at the beginning of the S-curve in our chart below, we do not expect Blockchain to be material to 2017/18 earnings of any financials we cover.

Exhibit 31:

Our roadmap for adoption of distributed ledger by financial institutions… Expect adoption comes in waves, asset class by asset class. More in our Blockchain in Banking note here



2014-2016: Assess Blockchain's Value for Financial Assets
- Banks and other financial infrastructure intermediaries (FIIs), including Central Depositories, Exchanges, & Technology Vendors, size potential efficiencies from permissioned, shared, secure distributed ledgers
- Banks and financial infrastructure intermediaries form industry groups to discuss opportunities
    - R3
    - Linux Hyperledger Foundation

2016-2018: Proof of Concept
- Banks and FIIs tee up specific assets as a test case for Blockchain
    - CDS
    - Repo settlement
    - Corporate syndicated loan settlement
    - Trade finance
    - International currency transfer
    - Exchanges for post trade settlement
- POC Goal: Assess if Blockchain can scale and reduce costs
    1) Does Tech work and scale
    - Does the asset transact between buyer and seller smoothly
    - Does it offer benefits beyond existing technologies on a performance, cost, speed, scale analysis
    - Fails are de minimis
    2) Can buyer, seller, and their 3rd parties (i.e., lawyers, auditors, regulators) validate the transaction with few human touch points, replacing teams of people
    3) Does it offer benefits beyond existing technologies on a performance, cost, speed, scale analysis
- POC Tiering: Segment into most to least important assets to address
- Focus resources on most important assets, most inefficient processes
- Engage regulators, lawyers, auditors
    - Enable access
    - Assure functionality addresses requirements

2017-2020: Shared Infrastructure Emerges
- Proven assets adopted well beyond initial POC group
    - Develop interface for external users
    - Leverage APIs
- Reduce costs with fewer heads and increased mutualization of infrastructure costs

2021-2025: Assets Proliferate
- More assets move onto Blockchain as efficiencies prove out

Source: Morgan Stanley Research

Blockchain application to securities clearing and settlement: We believe securities clearing and settlement will be the first best use case for Blockchain given high reconciliation costs and concentrated market shares. As we covered in our Global Insight report Blockchain in Banking: Disruptive Threat or Tool?, banks are potentially looking to blockchain-architected financial system utilities to provide some reduced expenses, improve operating leverage and boost earnings. Still in Proof-of-Concept phase, it seems reasonable that banks that participate can strip out some redundant costs from trade reconciliation. From our interview with Blythe Masters as part of our Global Insight report:

"So why is that relevant to this context? Well one way out of that box, there need to be several solutions but one way is to radically restructure your cost base. And we're not talking five, ten, 15% cuts in costs we're talking 30/40/50% and there's only one way to do that and that is to share a mutualized common infrastructure that previously was kept separately and run independently by every market participant."
– Blythe Masters

For custodians such as BNY Mellon, State Street, Northern Trust, Citi, JPM, which generate profits from ensuring securities are accurately measured and moved and which benefit from the carry from T+2/3, blockchain technology threatens their value add and shorter settlement periods could cut into revenues more than they could free up capital for buybacks – but that's why the custodians are at the leading edge of distributed ledger work to ensure that they can deliver the most efficient blockchain solutions to their clients. In addition, we do not expect to go to a world of T+0 for trading securities. A T+0 environment reduces leverage in the system which reduces liquidity and raises bid/ask spreads – a negative outcome for market participants.

We see recent bank departures from the R3 consortium not as a sign of waned interest in the technology, but *in fact* reflective of a more targeted approach to assessing blockchain feasibility. Banks have been narrowing their focus to consortiums in which each participant's incentives are most aligned. These participant banks tend to have relatively high market shares in services that could be threatened or benefitted by a successful blockchain . A few recent examples:

- Utility Settlement Coin:
  - Focus: digital cash instrument for international settlement
  - Formed: August 2016
  - Members: UBS, DB, Santander, ICAP, BK, UBS, Clearmatics
- Global Payments Steering Group:
  - Focus: creation and maintenance of rules on Ripple's global payment network
  - Formed: September 2016
  - Members: BAML, Santander, UniCredit, SCB, Westpac, RBC, CIBC, MUFG
- Enterprise Ethereum Alliance:
  - Focus: Adopting Etherum (smart contract Blockchain) for business needs
  - Formed: February 2017
  - Members: 30+ members including JPM, BK, Santander, UBS, CS, Fubon Financial, ING, Microsoft, and Intel

Custodians and clearing firms have also made headway in Blockchain commercial proof-of-concepts. A few examples:

- BNY Mellon BDS360: platform for U. S. treasury bond settlement
  - In production internally since March 2016 to run in parallel to the primary ledger – act as a potential alternative if primary system is down
- NTRS / IBM private equity fund accounting:
  - Launched in Feb 2017 with one client: Unigestion ($20Bn AUM); expect gradual rollout to selective clients
  - Represents the first commercial adoption of Blockchain technology in financial services industry
  - Received local regulatory approval from the Guernsey Financial Services Commission
  - Based on open-sourced Hyperledger Fabric technology
- DTCC / IBM / Axioni / R3 $11Tn Credit Default Swap processing platform rebuild:
  - Launched in early 2017 and expected to go live in early 2018
  - Receiving input from market infrastructure players: Barclays, Citi, CS, DB, JPM, UBS, WFC, HIS Market, ICE

R3 Blockchain Consortium

http://www.r3cev.com/

Established in September 2015, R3 is a consortium of banks that planned to jointly develop a new financial services infrastructure inspired by Blockchain technology. In November 2016, R3 open-sourced the brainchild of its labor: Corda. MS, GS, Banco Santander, and JPM subsequently exited the consortium. There remain 80+ financial institutions from around the globe in the consortium.

The Hyperledger Project

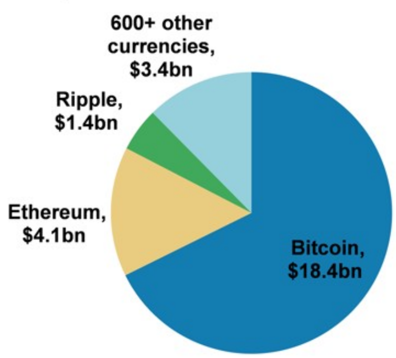
https://www.hyperledger.org/

Established in December 2015 by the Linux Foundation, the Hyperledger Project is a cross-industry open source forum for all things Blockchain with 8 code bases and 130 members across finance, banking, Internet of Things, supply chain, manufacturing and technology companies.

Exhibit 32:

Virtual currencies dominated by Bitcoin

Virtual Currency Value in Circulation



Source: coinmarketcap.com, Morgan Stanley Research

Note: In comparison, US dollar in circulation is $1.54Tn and M2 money stock is $13.4Tn as of April 2017 (Fed)

Virtual currencies as an alternative to card payments: Early bitcoin proponents pushed the notion that bitcoin, with minimal transaction costs (besides converting in/out of BTC), could be a more inexpensive way for merchants to accept payments online. A wave of merchants (including Overstock, Expedia, Dell, and PayPal/Braintree) partnered with Coinbase to accept Bitcoin at the POS, but adoption slowed, and some clear hurdles stand in the way of longer term viability.

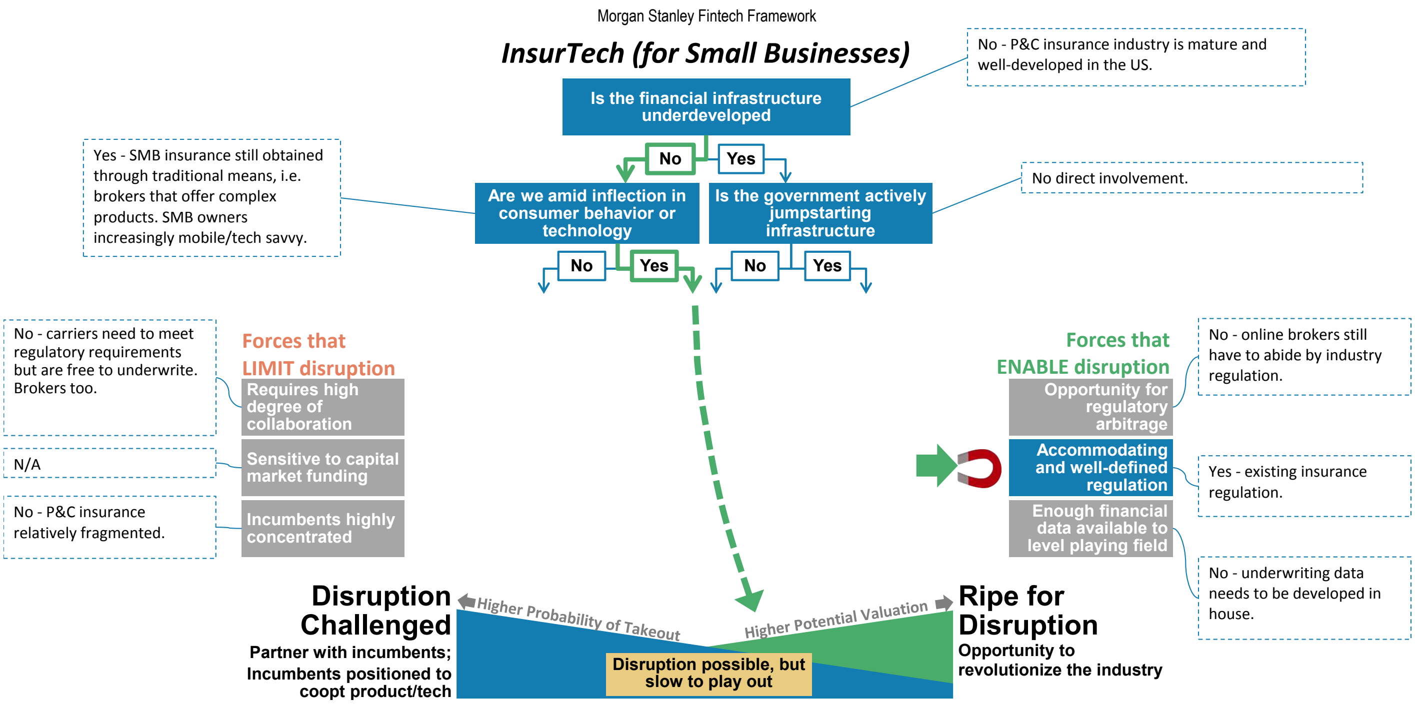
1. Cost to accept is not materially lower: BTC transactions require a miner fee (variable – today about 40-50c to get a transaction cleared in the next block) plus conversion costs for those consumers and merchants that prefer not to use BTC as a store of value. On a high-ticket transaction this could be viable (though the card networks also offer lower interchange rates for high-ticket transactions). For small-ticket and micro transactions this cost can be several percentage points or higher. And as miner fees increase (which they will, because "block subsidies" decrease over time), the costs look set to grow. We expect these "processing costs" for other currencies to grow.
2. We see few reasons for consumers to use BTC over card given that paying online with BTC represents a marginally more inconvenient way to pay, in our view, given push nature of the transaction, longer and more uncertain transaction settlement (due to miner fee bidding), and in the US lower merchant/bank funded rewards (vs. credit).

Profile 8. InsurTech and Digital Disruption in Small Business Insurance

Kai Pan

Exhibit 33:

InsurTech firms meet a real need and can ride on existing market trends, though underwriting expertise could prove to be a hurdle



Source: Morgan Stanley Research

What's happened so far?

- Only a small portion of Small Business Insurance is bought digitally (~4%), which has left friction in the market as small, unsophisticated buyers are forced to acquire through brokers and deal with excessively complicated products

What's next?

- We estimate 15-30% of the total Small Business Insurance market will be sold digitally by 2020, up from ~4% today. This translates into a $17-33b premium market opportunity
- Smaller agents/brokers (like Brown & Brown, UW) are most negatively exposed; carriers have opportunity to reassert share if front-footed
- Meaningful opportunity for InsurTech companies, though lack of data and underwriting expertise could impede or even doom some efforts

In Small Business Insurance, turn digital or face disruption: Small business insurance (SBI) represents a $100bn market, and is in the early stages of a digital disruption. Changing demographics of small business owners, increasing number of InsurTech startups, and heightened focus of traditional carriers (both incumbents and new entrants) in this sizeable and profitable market are catalysts for a trend where SMBs increasingly opt to do business with the most tech-savvy insurers, I.e. those that can offer a consumer-like experience.

What gives us conviction? 1) The **demographics favor digital insurance** solutions – by 2020, more than 60% of small business in the US will be owned by Millennials and Gen Xers, two groups that prefer to purchase and manage insurance digitally, and according to our recent survey, 38% of small businesses would buy insurance online if they were starting their businesses today; 2) There are **unmet insurance needs of small businesses**, and proprietors need simpler products that are easier to understand and buy ("Mom and pop" agents have difficulty filling this demand as commissions are too small and the investments too big); 3) **InsurTech startups are zeroing in on this opportunity**, backed by venture capital and even traditional insurers, and these startups are leveraging experiences from personal auto and other financial services, including other fintech companies; and 4) **Traditional carriers are already positioning for digital disruption** and defending against disintermediation by ramping up their digital efforts.

Our outlook for InsurTech

We see a few viable paths, but the most probable assumes that e-brokers gain significant traction and that mid-market and large brokers become increasingly interested in the small business space — prompting rapid development of distributor-enabling software and technology. The scenario further assumes that two of these distributor platforms get adopted by major incumbent carriers, prompting other carriers to step up their digital insurance initiatives. We expect carriers' and distributors' digital business will still mostly come from new companies that are relatively small in size, but expect digital to start making inroads with traditional customers and with companies in the ten to 50 employee range in lower-risk industries.

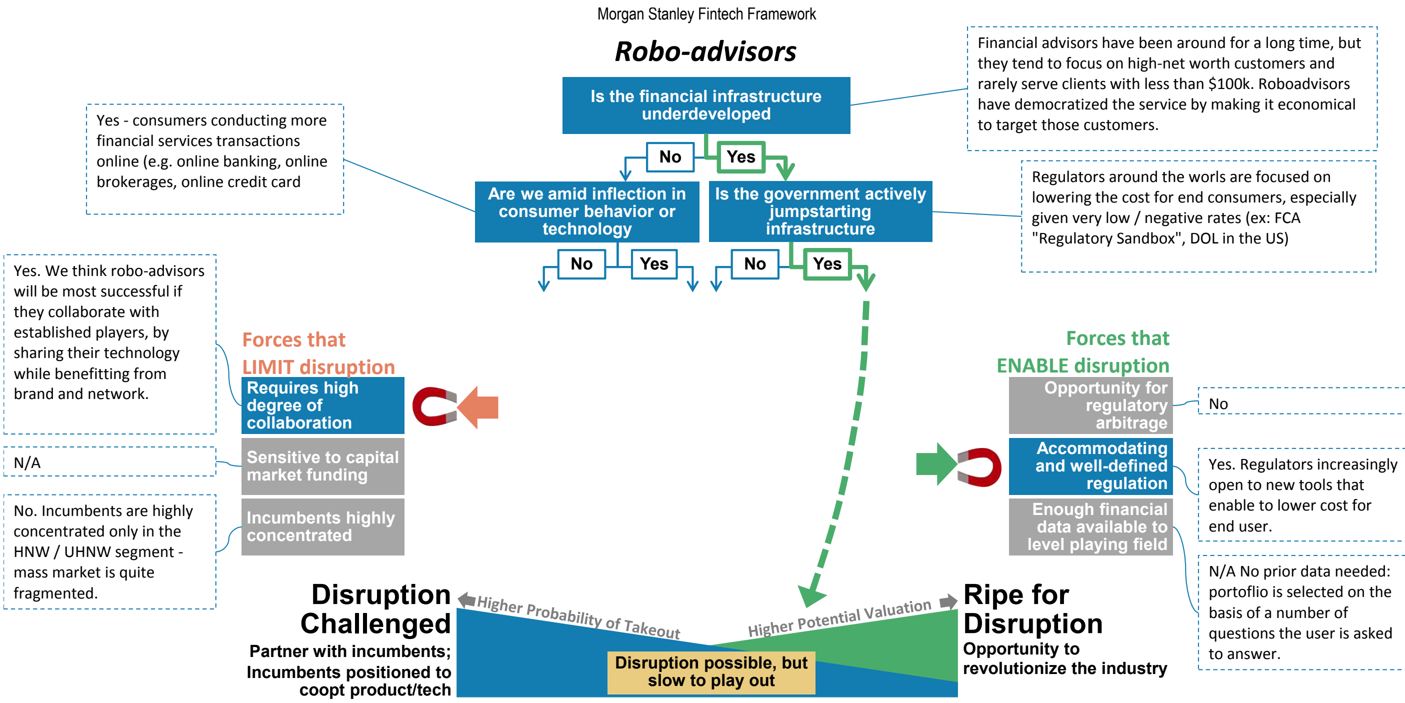
Who are the likely winners (and laggards)? Among our coverage, Hartford (EW), Travelers (EW), Chubb (OW) & AIG (OW) have the most exposure in SBI. We estimate each point of share gain could boost their earnings by 4-14%. They have financial & technology resources but could be constrained by channel conflict and inertia. Smaller insurers and brokers could face the biggest challenges. In our broker coverage, Brown & Brown (UW) is most exposed. New entrants (startups or traditional insurers) could be the biggest beneficiaries in the digital transformation of SBI.

Profile 9. Roboadvisors

Giulia Aurora Miotto, Magdalena Stoklosa, Betsy Graseck

Exhibit 34:

Robo-advisors address mainly the mass market, traditionally an underserved segment. However, brand and network are very important and key to lower cost of acquisition. Way forward for start-ups is to partner up with established players, in our view.



Source: Morgan Stanley Research

What's happened so far?

- The past 5-6 years have seen a flurry of robo-advisors: Betterment, Wealthfront, (in the US), Nutmeg (in the UK) are some of the most well known. Total AUM remains small though, ~$100bn globally as of Dec 2016.
- At first, the Direct-to-consumer, fully digital model seemed poised to disrupt traditional financial advisors, but more recent evidence suggests that the "cyborg" model, i.e. the combination of robo and human, can be more successful.
- Robo advisory technology allows to lower the cost of financial advisory, and hence democratize the service. Initially a market created by start-ups, it was next entered by discount brokers (Schwab and Vanguard), and only recently established banks / wealth managers / wholesale brokers have started to make a move in the space.

What's next?

- We expect AUM managed under robo to increase to $6.5tr by 2025, thanks a number of tailwinds: regulation focused on lowering the cost for end used, generational shift of asset, increased familiarity with digital applications.
- Given value of brand and network, we assume incumbents are the best positioned to win market share: Schwab, Bank of America in the US, Standard Life, UBS and Hargreaves in Europe and AMP in Australia. A handful of start-ups to survive on their own, most to partner up or get sold to incumbents in our view.

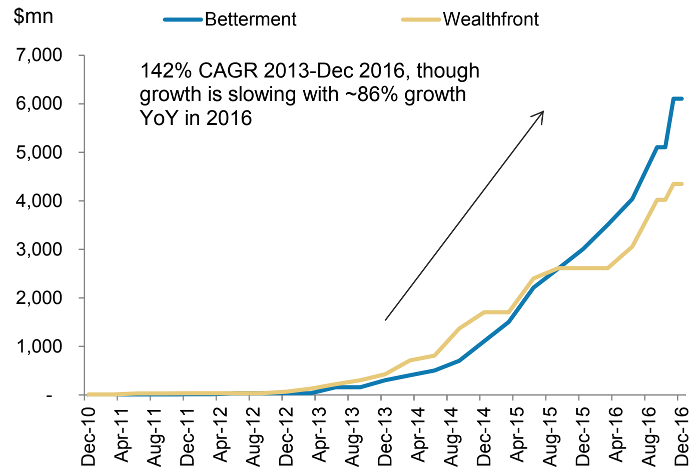
Robo-advisers are perceived to have democratized the investment process. Typically, it is uneconomical for financial advisors to pursue accounts with less than $100,000: only 8% of traditional advisors target clients with less than $100,000 in investable assets, according to Cerulli Associates; however, the average 401k is $78,000, while the average UK pension pot is ~£30k. A similar advice gap exists in the UK, where, according to Deloitte, ~5.5 million households have financial assets below £100,000, stating that they would like to access financial advice, but high costs make it uneconomical. Robo advisors have tackled this underserved part of the market with accessible costs (0bps-100bps, about half of the cost via traditional channels).

A simplified financial advisory service - we see scope in the mass market segment. A traditional financial advisory service includes many steps: the process typically entails a thorough assessment of customer assets and liabilities, future commitments, family, employment situation, savings and retirement goals and so on, before suggesting a suitable asset allocation that generally also considers tax optimisation. In our view, the robo-advisers currently available in the market do not provide the full range of steps, but are limited to client onboarding, investment allocation and rebalancing. For this reason, we think they are an appealing proposition for the entry level, or the "mass affluent" (less than $1m in investable assets), a market which we see around $89tr globally in assets.

Brand and network have proven very powerful. Despite the impressive growth of robo-advice platforms, hitting triple digits in recent years, the case of Vanguard and Schwab has showed that network and brand are key to lower cost of acquisition, and allow for faster expansion.

Exhibit 35:

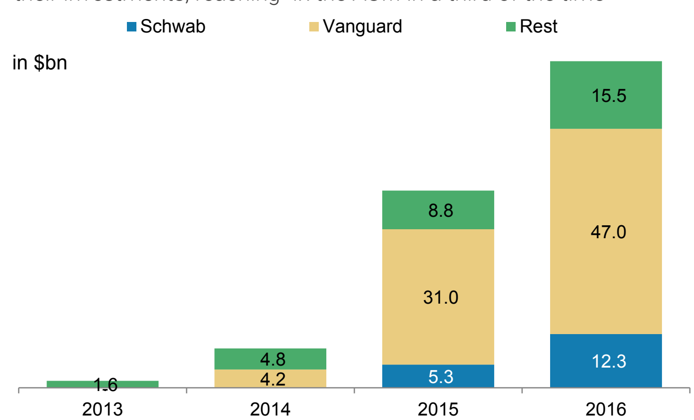
Pure robos have been growing in triple digits since 2013 ...



Source: https://www.sec.gov/foia/iareports/inva-archive.htm

Exhibit 36:

... but Schwab and Vanguard had the fastest and highest returns on their investments, reaching 4x the AUM in a third of the time



Source: Company Data, https://www.sec.gov/foia/iareports/inva-archive.htm

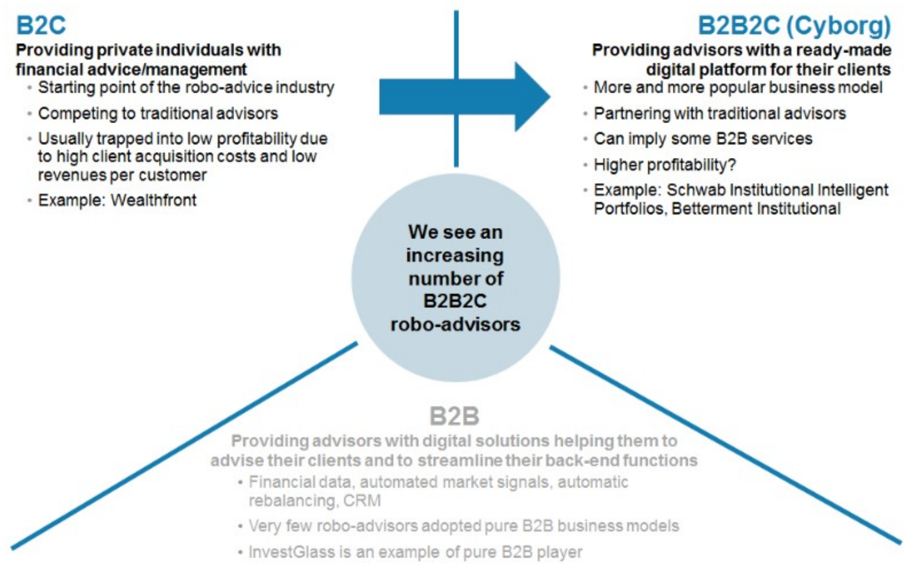
Our outlook for Robo-advisors

Cyborg model the way forward. We expect the higher success for those robo platforms that combine the human component with automation to continue. Our conversations with the companies we cover, venture capital funds, and key start-ups suggest that new robo advisory companies are more likely to partner with incumbents, to offer a more advanced and nimble technology, while benefitting from scale, regulatory know-how, and brand.

Threats and Opportunities. We expect the growth of robo advisors to further push ETF growth, as these platforms try to lower the end cost for the consumer by lowering the manufacturing cost. Secondly, our analysis of start-ups and conversations with incumbents suggests that the technology should allow to reduce the cost base of established wealth manager by 10-20%, as back office processes, such as KYC, AML, onboarding, rebalancing, along with the least value added and repetitive tasks are automated. Finally, while we think the incumbents are best positioned to win market share, and we see the fact that ~70% of the companies we interviewed either just launched or are about to launch such offering as a step in such direction, we think the path for gross margins and fees will head lower, especially for those players offering commoditized services at a premium price. On the upper part of the market instead (high net worth and ultra high net worth individuals), we still see scope for margins resilience given the need for a more tailored service.

Exhibit 37:

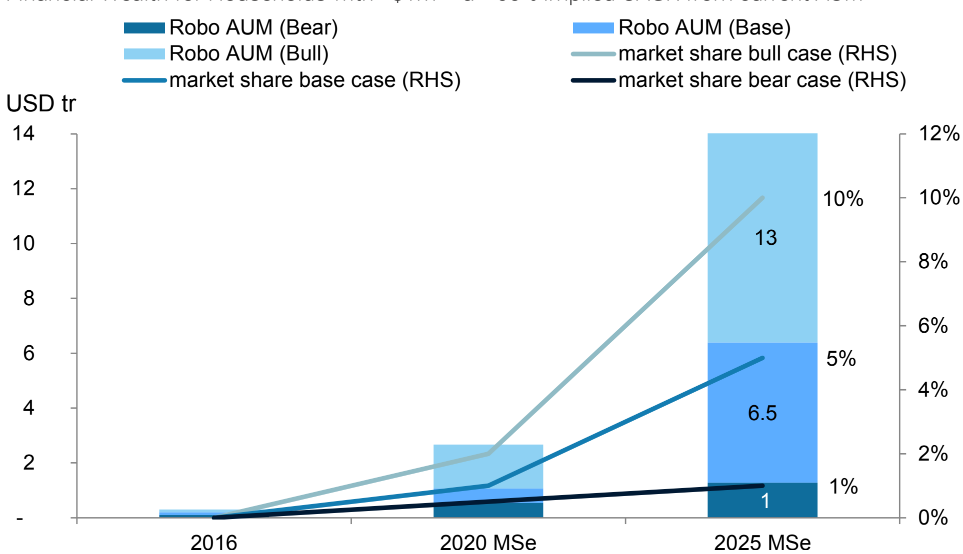
We see more advantages in a 'Cyborg' model – the likely winner



Source: Morgan Stanley Research

Exhibit 38:

We think robo-advice global AUM could reach ~$6.5tr by 2025 – equivalent to 5% of projected Private Financial Wealth for Households with <$1m – a ~60% implied CAGR from current AUM

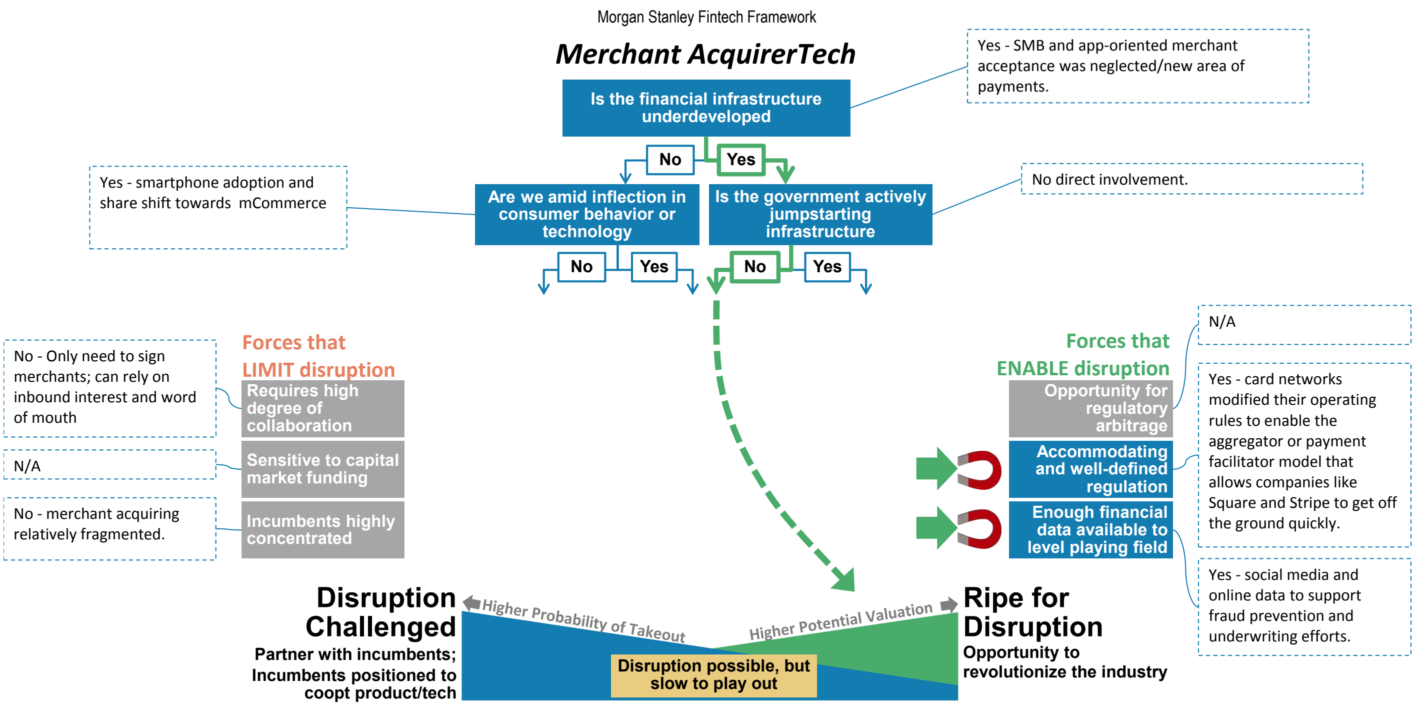


Source: BCG Wealth Report for 2015 and 2020 wealth figures, MS Equity Research estimates elsewhere

Profile 10. Merchant AcquirerTech

James Faucette, Vasundhara Govil

Exhibit 39:
Square and Stripe's success grew out of a market gap (micro-merchants and app providers were underserved), plus consumer/tech innovation (the smartphone)



Source: Morgan Stanley Research

What's happened so far?

- SQ took advantage of changing technology to serve a previously underserved market
  - Tech proliferation (smartphones, dongles, etc.) allowed SQ to reduce cost of signing up a class of merchants that previously had been too expensive to reach
  - Developing its data analytics allowed it to reduce pain associated with getting new merchants up and running quickly
- Adoption of cloud-based POS solutions has allowed incumbents the opportunity to differentiate
  - Incumbents such as VNTV and GPN have taken advantage of trend towards POS adoption among SMBs to partner with ISVs and VARs to expand distribution.
  - Integration with software solutions / technology tools has allowed acquirers to take share away from the traditional commoditized feet on street sales model

What's next?

- Merchant acquirer role is evolving as commerce shifts towards digital channels
- Innovation to cater to evolving commerce needs will be key. e.g. Uber type transactions, social commerce, etc.
- Longer-term, decision making among SMB merchants may shift from acquiring/processing relationships to software/technology relationships and hence being perceived as an entrenched technology provider will be key to long term success

Square and Stripe positioned at confluence of favorable trends: Square's traction among micro merchants and SMBs was made possible by several drivers: 1) a financial **infrastructure that was at least partly undeveloped**, with micro merchants broadly excluded from the card payment ecosystem, 2) the growing use of **smart phones and continue consumer payment shift toward cards**, which made it more important for micro merchants to accept cards while also reducing the up-front cost to do so, and 3) the **broad availability of Small Business data**, which SQ was able to leverage to limit fraud and underwrite merchants in a cost effective manner. All of these were key to creating greenfield opportunity in a scalable way. And importantly, SQ has done it by primarily partnering with existing ecosystem players (e.g. V/MA to aggregate purchases, and Chase to process transactions), which helped foster trust and also made for a quicker ramp to profitability.

Where has the outperformance been? Square's revenue growth has consistently exceeded our expectations. Its differentiated underwriting technology and hardware continues to show traction against an increasingly larger average client, and the result is an impressive purchase volume growth rate (which we expected) with a stable revenue take rate (which has been more surprising to us). It has become increasingly clear that the combination of simplified pricing, inexpensive/good-looking (and already-certified) hardware, and integrated software is finding traction among larger, more sophisticated merchants, and this means SQ could be a viable competitor among the core SMB merchant acquiring market, positioning it for a larger TAM than we thought previously.

Stripe/PayPal's Braintree: Prepared to support the next Uber app/experience? New entrants like Stripe and Braintree have differentiated themselves by focusing on the developer community and delivering value where incumbents have lacked focus such as easier onboarding, easier integration into mobile apps and commerce websites, enabling social commerce experiences through buy buttons, etc. While the jury is still out on how the future evolves for these entities, we see potential for success given:

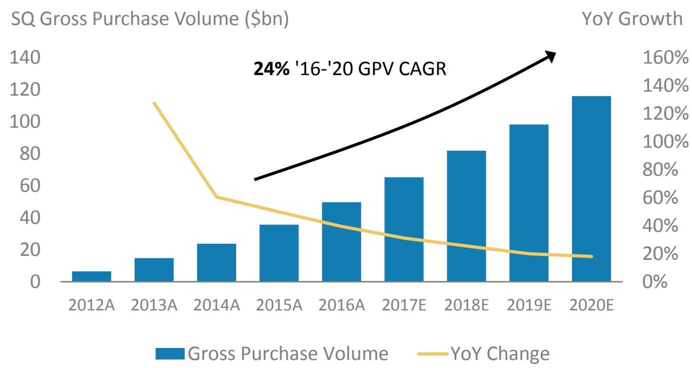
(i) secular shift towards m-commerce: As the lines between physical and digital commerce start to blur, the addressable market for mobile commerce could expand dramatically. Uber and order-ahead functionality offered by several restaurant apps are examples. We believe Braintree and Stripe may be best positioned to benefit from this trend given the attractiveness of their technology stack to the developer community that enables easy integration into innovative new commerce solutions.

(i) emergence of new commerce experiences that could gain traction: The disruption in payments technology is less likely to be driven by providers themselves and potentially more by the emergence of the next new commerce/payment experiences. Amazon is the perfect example where share shift of retail spend toward Amazon puts its acquirer/processor in a favorable position. Uber is another such example. Hence adaptability to support the next new trend in commerce and payments will be key. The engineering talent and innovation culture at Stripe positions it favorably vis-à-vis the incumbents, in our view. E.g. Although Buy Buttons haven't taken off in a big way, Stripe developed products such as Relay that goes beyond processing payments but allowed for deep integration with a merchant's inventory such that Stripe could manage payments and inventory information flow for the merchant. Merchants can provide their product info and SKUs to Relay, which then enables them to launch buy buttons on third party apps such as Twitter or Pinterest.

Our outlook for Square and Stripe; Raising SQ price target

Exhibit 40:

SQ's steady growth among micro-merchants and SMBs stems from its insight that recent technological advancements could allow SQ to acquire in an underserved market



Source: Company Data, Morgan Stanley Research

Square and Stripe were first or early movers that took advantage of technology shifts, and Square now has an edge with a specific merchant base (micro-merchants and, increasingly, SMBs) while Stripe has an edge with a specific product (mobile apps). We expect both to continue building volume, both from the greenfield opportunity they have helped create, and by taking share of economics from traditional acquirers' space as their respective areas of focus grow. Importantly, both have taken their businesses to scale that doesn't seem to require further capital markets access, a key hurdle for fintech startups. And at this point incumbent acquirers can push back with solutions of their own, but we expect SQ and Stripe will own mindshare among their respective core customers/products.

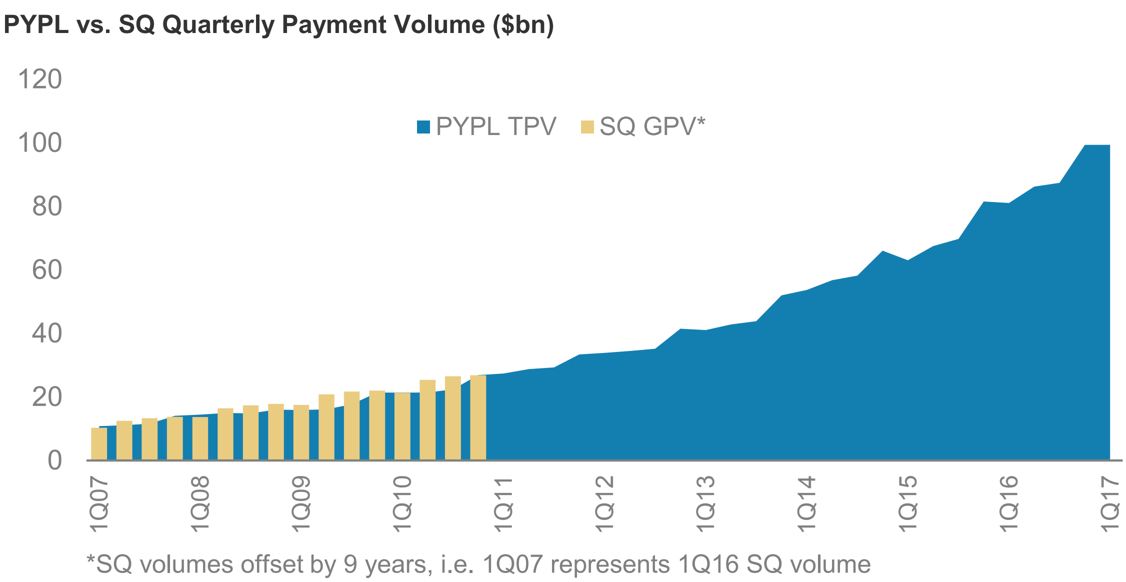
Square – positioned for continued disruption and TAM creation; raise PT to $20: Our framework analysis of the merchant acquiring industry highlighted the opportunity for disruptors like SQ and Stripe to build share quickly enough to be viable disruptors. While we are hardly making a new call on SQ's ability to create value (that has already been proven out, we think), the expanded addressable market as software adoption among SMBs provides tailwinds for all and lack of dampening of SQ's momentum has given us growing confidence that SQ can maintain fairly rapid growth, and importantly that it can demonstrate substantial operating leverage in the model along the way. In essence, we see SQ as having a solid runway for growth similar to PYPL, with the implication that continued double digit growth in SQ's GPV appears sustainable over the medium-term.

Further, we are encouraged by SQ's recent positioning regarding Stock-comp expense, specifically that it intends to transition increasingly towards RSU or cash compensation as SQ matures. Note treatment of stock comp expense creates a significant valuation gap between SQ and its competitors, and we see a reduction of that gap as positive.

As a result we update our valuation in two ways and raise our price target to $20, from $17. First, we raise our target 2018 EV/EBITDA multiple to 20x from 18x, to be in line with PYPL's 20.5x C2017 trading multiple. In short we see no clear reason for a discount to PYPL given the longer runway to growth and our confidence that SQ's path to growth is clear. Second, we raise our target "Steady State" EBITDA margins to 35% (the low end of SQ's 35-40% medium term guide), as we see Stock-Comp as likely to continue declining as a percent of revenues in line with recent management commentary, and more importantly see upside to SQ's own medium term guidance given the pace of margin expansion demonstrated so far. We remain EW.

Exhibit 41:

SQ - clear path to see volume growth like PYPL



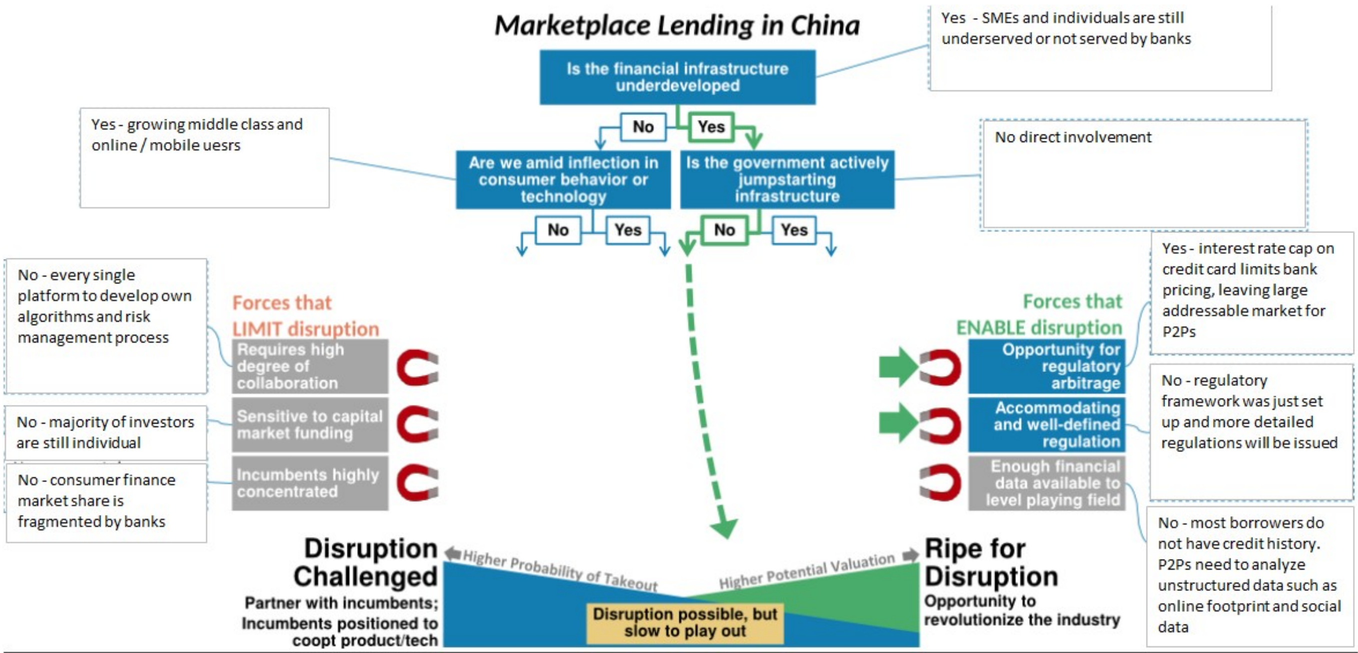
Source: Company Data, Morgan Stanley Research

Profile 11. Marketplace Lending in China

Richard Xu

Exhibit 42:

P2P platforms leverage technology to provide financing to large addressable market underserved by banks



Source: Morgan Stanley Research

What's happened so far?

- P2P platforms have seen rapid growth since the beginning of 2014 with number of P2P platforms at historical high of about 3,500 by Nov-15. P2P sector is very fragmented and under-regulated with no single platform having over 1% of market share in terms of loan balance.
- Key growth driver is the large addressable market underserved by banks. In China, P2P platforms serve as supplement to the banking industry and provide credit to SMEs and individuals which are largely not served or underserved by banks. As there is cap on the interest rate that credit card can charge (18-19%), china banks target lower risk borrowers with NPL ratio of below 2%. This leaves a large addressable market for P2P platforms.
- Regulatory framework: In December 2015, the CBRC issued the first consultation paper aimed to support proper financial innovation and reduce related risks with a negative list approach. In April 2016, the State Council convened a meeting on the regulatory scrutiny on Internet Finance including P2P sector. In August 2016, CBRC issued Provision Measures and P2Ps were given a grace period of 12 months for business restructure.
- Following the new regulations, some unqualified P2Ps started to exit and number of P2P platforms declined to 2000+.

What's next?

- We believe P2P platforms that show strong ability of credit underwriting and leverage technology to reduce borrower acquisition cost will stand out in the medium to long term.
- P2P sector is still at early stage with unproven track record. Uncertainty remains on credit cycle and regulatory scrutiny.

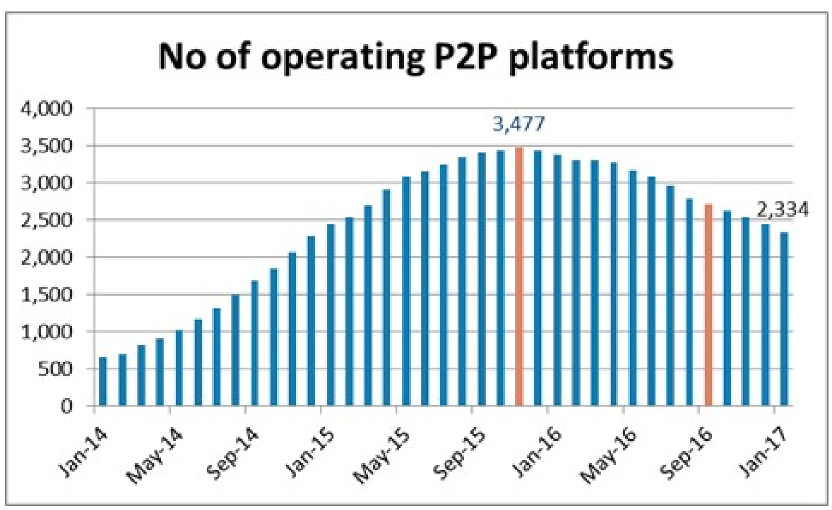
Supplementary to the banking system and leveraging data analytics to improve credit underwriting: Yirendai serves as information intermediary between borrowers and investors. There's a large addressable market for P2P platforms in China as 1) china banks have low risk appetite given the interest rate cap on credit cards and thus large number of borrowers are not served or underserved by banks; 2) it is not cost efficient for china banks to find the potential borrowers with limited information. Therefore, banks will not compete directly with Yirendai in short term. Yirendai strives to use data analytics to improve its credit underwriting capability. For example, it uses a fraud detection system to appraise the credit profile of borrowers. It also contains a watchlist with over 1,000,000 fraud detection datapoints. By leveraging such extensive credit database, Yirendai can lower its credit risk.

Where do P2Ps go in the medium to long term: P2P sector is highly fragmented in China with over 2,000 operating platforms by end of 2016 and no single platform having over 1% market share in terms of loan balance. There are two kinds of business model so far. One type of business model focuses on small loan size with short loan duration like revolving credit. The other type of business model provides borrowers with large loan size and long loan duration to meet their large sum credit demand. It is hard to tell which one is better given the short and unproven track record. The intensified regulations will likely end up washing out over 50% of P2P platforms in China. We believe P2P platforms that will stand out in the medium to long term are those that show strong ability of credit underwriting and leverage technology to reduce borrower acquisition cost.

Exhibit 43:
Yirendai: The risk management system utilizes over 250 decision-making rules and contains a blacklist with over 1,000,000 fraud detection data points.

Source: Company Report

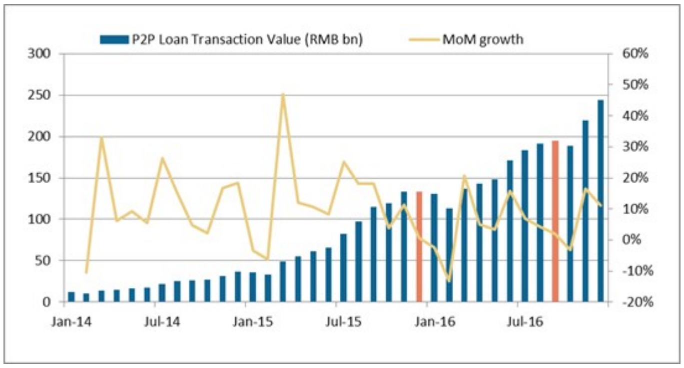
Exhibit 44:
Following the consultation paper in Dec-15, number of operating P2P platforms started to decline.



Source: Wangdaizhijia.com

Exhibit 45:

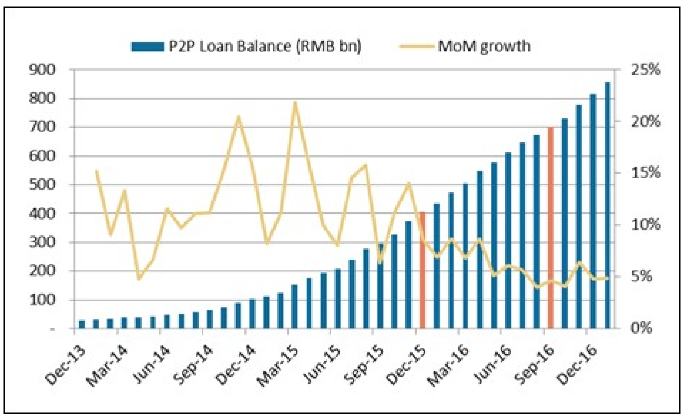
Total loan originations reached Rmb2trn in 2016 and yoy growth remianed strong at 110%, vs 289% in 2015.



Source: Wangdaizhijia.com

Exhibit 46:

Total P2P loan balance was Rmb0.8trn so far, up 101% yoy.



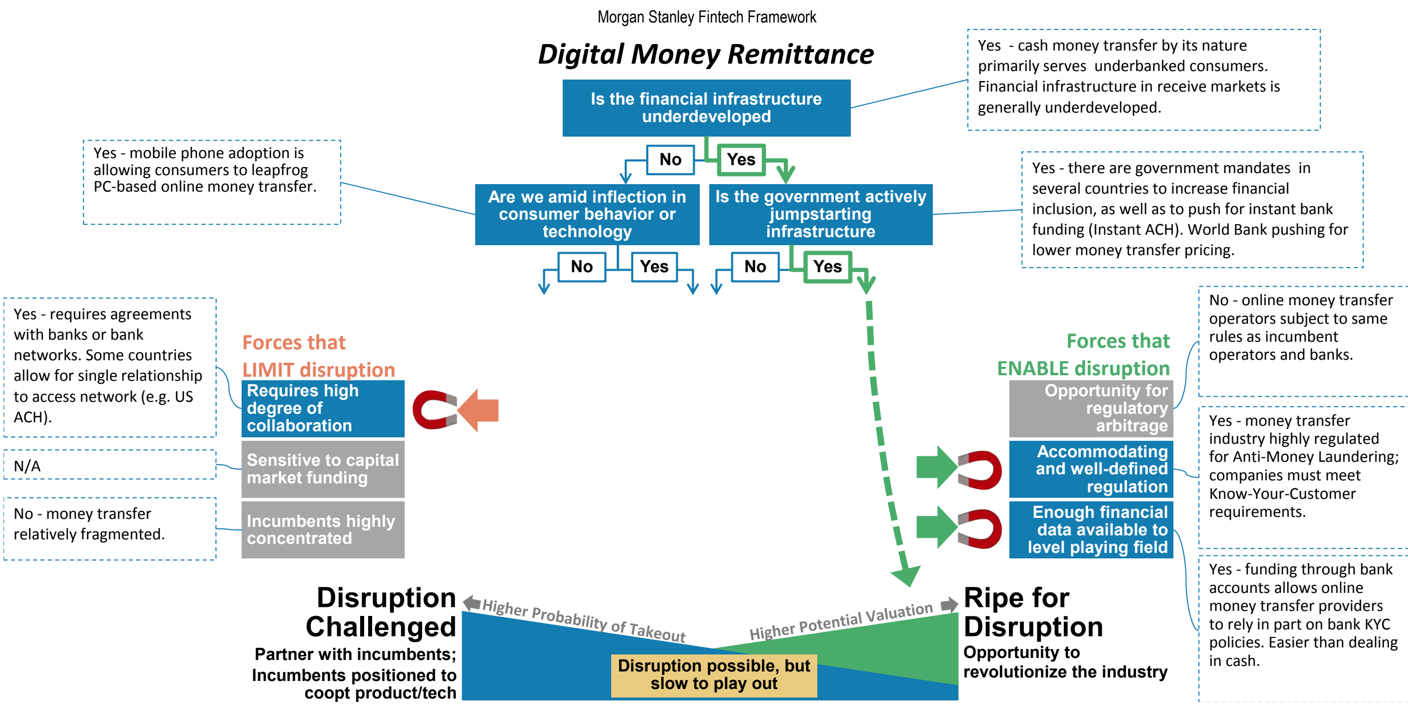
Source: Wangdaizhijia.com

Profile 12. Digital Money Remittances

Danyal Hussain, James Faucette

Exhibit 47:

For money transfer fintech, a key consideration is that governments are pushing to increase financial inclusion, which pushes towards a pace that allows disruptors to get to scale and succeed



Source: Morgan Stanley Research

What's happened so far?

- Money Transfer pricing for market leader Western Union has been in decline for several years, primarily as competition in brick and mortar channels has intensified.
- But revenue is also increasingly levered to online Money Transfer, where VC-backed firms like Xoom, Transferwise, and WorldRemit have continued to expand.

What's next?

- Pressure from fintech providers has not registered yet, and global financial inclusion is a rate determining step to outright disruption, but intensifying competition seems inevitable over the long haul.

Consumer behavior helps startups, but banking access still a hurdle for disruption: Across the industry, and even among incumbents, a slow but steady shift towards online money transfer is taking place – market leader Western Union most recently generated 9% of its segment revenue from westernunion.com, up from a only two percent in 2012. We expect this trend to continue as consumers increasingly embrace the online version of everything, and as the population skews increasingly towards Millennials and Gen Z.

At the same time, however, the core customer base of money transfer companies is unbanked or underbanked (on either the send side or the receive side), and that **puts the pace of money transfer disruption at the mercy of another trend – financial inclusion**. Progress on this front in the US has been unclear – in the US the unbanked or underbanked portion of the population actually rose from 2009 to 2015, according to FDIC data (see exhibit). World Bank data, meanwhile, suggests a rosier picture with a substantial increase in global banked population from 2011-2014 (increase from 51% to 62% of the 15+ global population; US data does not tie to FDIC data). We assume the trend is in the right direction, but like other areas of finance we think the pace of change will prove slow.

Our outlook for Digital Money Transfer

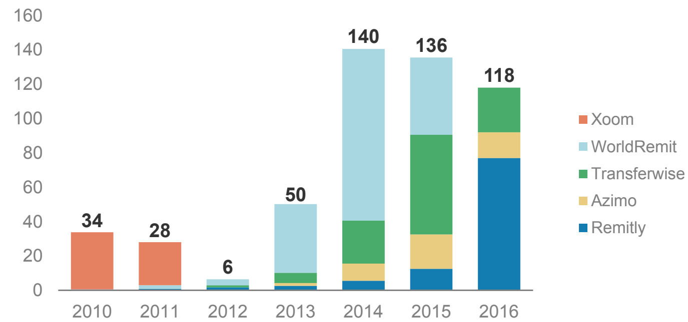
Does a slow pace of change mean we think VC-backed online money transfer companies do not represent a threat to incumbents? Not at all. Longer term we think a greater portion of the global migrant population will conduct money transfers online, where pricing will be more competitive. And although WU, MGI, and other incumbents may have time to react (WU has embraced digital and built itself into an online leader), we think this is a clear case of Innovator's Dilemma, where moving online is the right decision but ultimately dilutive to earnings.

Importantly, we think that even as incumbents prove themselves front-footed and assert themselves online early, VC-backed money transfer companies will still grow and pressure pricing. In other words we expect online money transfer evolve into a commoditized product with competitive pricing and a low margin profile. For VC-backed firms, the opportunity could still be attractive with an efficient cost structure and breakeven or positive cash flow, as an industry shift towards financial inclusion and online money transfer could drive growth for years to come, at the expense of offline providers and bank branches. The key here will be execution of a long game.

Exhibit 48:

Online money transfer providers have done meaningful equity raises and gotten unicorn status...

VC Equity Raised by Money Transfer Companies ($mn)

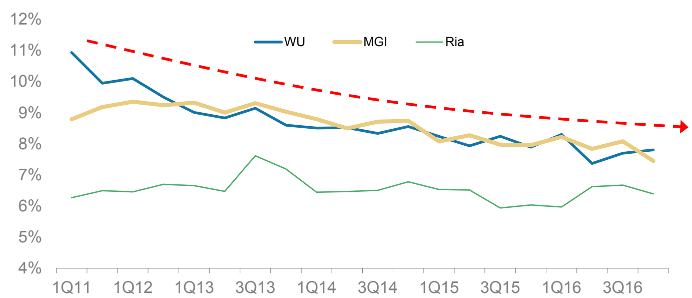


Source: Crunchbase, Company Data, Morgan Stanley Research

Exhibit 49:

...and for incumbents, this comes at a time when pricing has already been under pressure

Cost to Send $200 Remittance (as % of Send Amount)



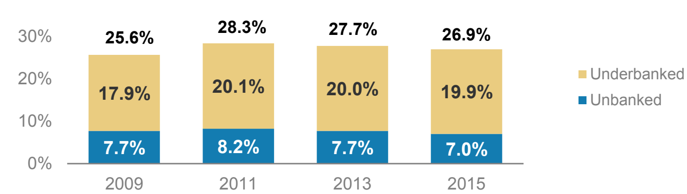
Note: For best sequential comparability, we calculate average pricing using the 38 corridors where WU, MGI, and Ria reported pricing in all periods

Source: The World Bank, Morgan Stanley Research

Exhibit 50:

In the US, the portion of households that are unbanked/underbanked has not come down in a consistent manner. How this trends globally can impact growth of online money transfer

Percent of US Households

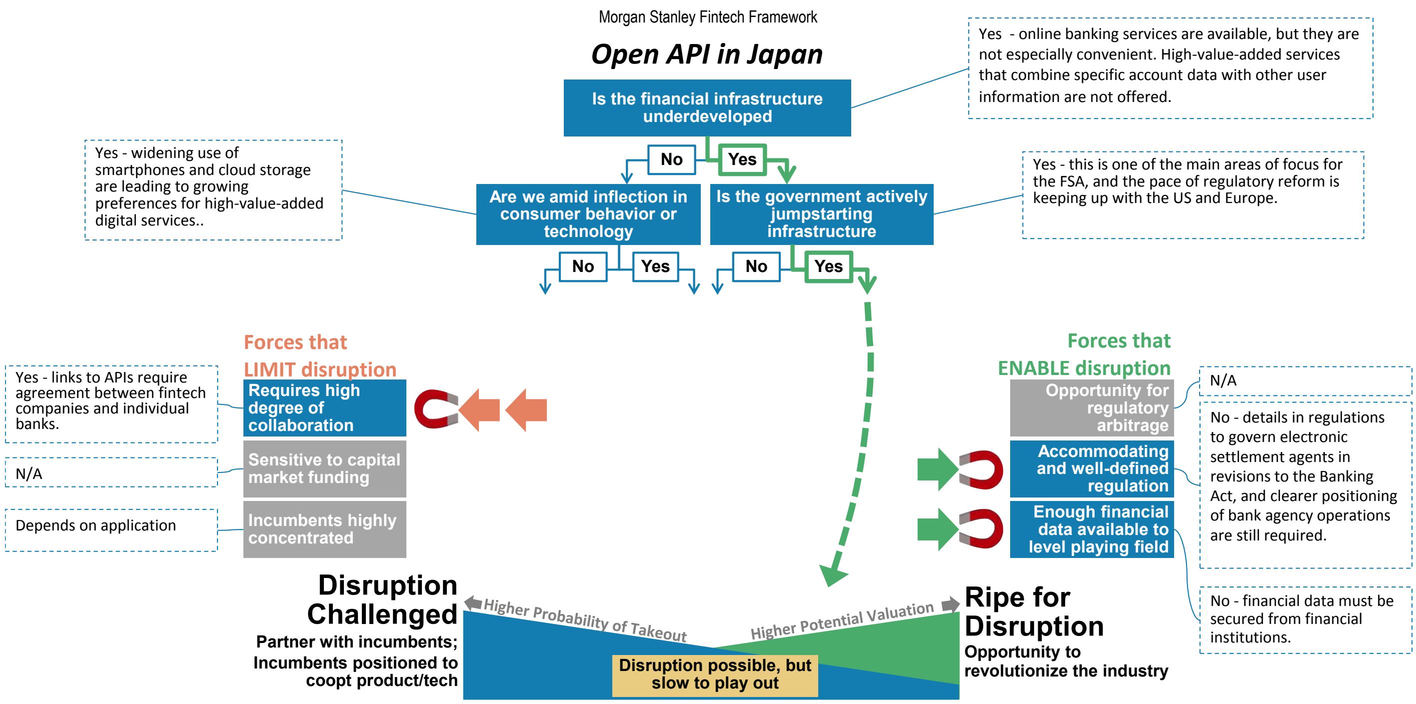


Source: FDIC, Morgan Stanley Research

Profile 13. Earnings opportunities from open APIs in Japan

Mia Nagasaka

Exhibit 51:
The introduction of APIs among financial institutions in Japan normalizes data, creating opportunity for fintech companies to service the industry in innovative ways



Source: Morgan Stanley Research

What happened so far?

- Up to now, the only gateway to banking services outside of branches has been the online banking functions offered by individual banks.
- Currently, the main means by which fintech companies can access financial institutions' data is screen scraping via online banking, which requires that a third party application use a customer's credentials to log in to each institution each time in order to secure the most recent data. During 2017, however, a number of banks have made progress toward the introduction of innovative application programming interfaces—APIs—that allow apps to access data safely and securely.
- Despite the massive amounts of data that have been stored in the past, the Japanese financial services industry has yet to establish formats to monetize this data.

What's next?

- In March 2017, the FSA submitted to the Diet a draft of proposed revisions to the Banking Act, and changes that would open the door to open API innovations enabling fintech companies to access banks' systems could be enacted as early as April 2018. We think the establishment of a legal framework for the use of APIs by financial service provider in Japan is advancing at a pace that matches similar development in the US and Europe.
- It is possible that open API innovations will help create new earnings opportunities as operational and financial data accumulated through fintech services is monitored in real time, potentially boosting online financing and stimulating latent loan demand. In the near term, transaction volume growth is likely to outpace profit growth, but over the longer term we expect the development of commission models that will allow banks to monetize these activities, potentially creating a new source of earnings that is less vulnerable to shifts in the market environment.

Open APIs offer hope for new channels in the field of finance

Moves toward opening payment service APIs in the financial sector are picking up. Banks are establishing frameworks based on open APIs to make it easier for electronic settlement agents (fintech companies) to access account and other information. Up to now, individual banks offered online banking services that customers could use instead of going into a physical branch, but in the future they will be able to access financial services via smartphone apps offered by various fintech companies.

Fintech companies in the past have used a process known as "scraping" to access data, by which apps extract needed data via the online banking websites of individual institutions, but this requires that customer credentials such as usernames and passwords be registered with venture firms in advance. This raises issues, particularly from a security standpoint. Open APIs provide enhanced security, which may lead to new sources of earnings.

Open APIs could go into use as early as April 2018; fintech companies are already starting to work out contracts with various financial institutions

In March 2017, Japan's Financial Services Agency submitted a draft of proposed revisions to the Banking Act to be debated in the Diet. Proposals include the establishment of a registration system for electronic settlement agents (fintech companies), and the creation of an open API platform that will allow registered fintech providers to access banks' systems. Assuming the proposals are approved in the Diet, we think there is a good chance that the registration system and platform could be in place as early as April 2018. At that point, registration of electronic settlement agents would begin, but companies are already starting to work out contracts with various financial institutions before registering.

Open APIs likely to lead to earnings opportunities for Japanese banks as well

We expect that open APIs in Japan are likely to develop first in areas such as personal asset management, account opening, and fund transfers, but over the coming few years we think that the most interesting area will be the use of data analysis to maximize lending efficiency. Despite the massive amounts of data that have been stored in the past, the Japanese financial services industry has yet to establish formats to monetize this data. Accordingly, there are likely to be cases where corporate groups that have an established ecosystem in non-finance business are able to approach customers more efficiently and thus secure profit growth in financial services more successfully than existing financial institutions. Using open APIs, companies will be able to monitor and collate sales and inventory data and financial information in real time, potentially enabling them to undertake low-risk loans in a timely fashion. This may also lead to the creation of new earnings opportunities, through the timely stimulation of online financing and latent lending demand.

Potential business models that could be supported by the use of open APIs might include 1) a transaction fee model, 2) a commission model, 3) a revenue sharing model, and 4) a "freemium" model. We think it may be difficult for traditional financial institutions to generate substantial revenues through open APIs, but it is possible that they will find new sources of income that are less vulnerable to changes in the market environment. However, for the largest financial institutions, we expect that growth in transactions via APIs will have a larger impact in the near term than the expanded scope of new fee and commission business.

Exhibit 52:

Examples of open API efforts: Megabanks open up to API link services for corporate online banking; personal services to expand from 2017

	Bank	Principal efforts
Japan	Mizuho	Began API linking service (reference type) in October 2016 for Money Forward, freee and online banking service Mizuho Business Web for corporate clients. Expanded functions in March 2017, and began providing an integrated bank transfer API (update type). Aims around May 2017 to start providing authentication/approval and inquiry menu API for corporate online bank Mizuho e-Business Site and personal online bank Mizuho Direct.
	SMBC	Began corporate API connection service from spring 2017. Teamed up with Money Forward in March and launched service using an update API. Collaborates with NTT Data for API connection services. Plans to start providing API for service allowing individuals to check balances and deposit/withdrawal details from July 2017. Working with Japan Research Institute.
	SBI Sumishin Net Bank	Began API connection with Money Forward in March 2016 and freee in August 2016. Launched automated deposit service finbee and update-type API connection in December 2016. Began transfer linked function (update type) using API service for Money Forward and company services and began handling transaction lending from March 2017. Began providing transfer linked function using API services with freee in April 2017 (update type).

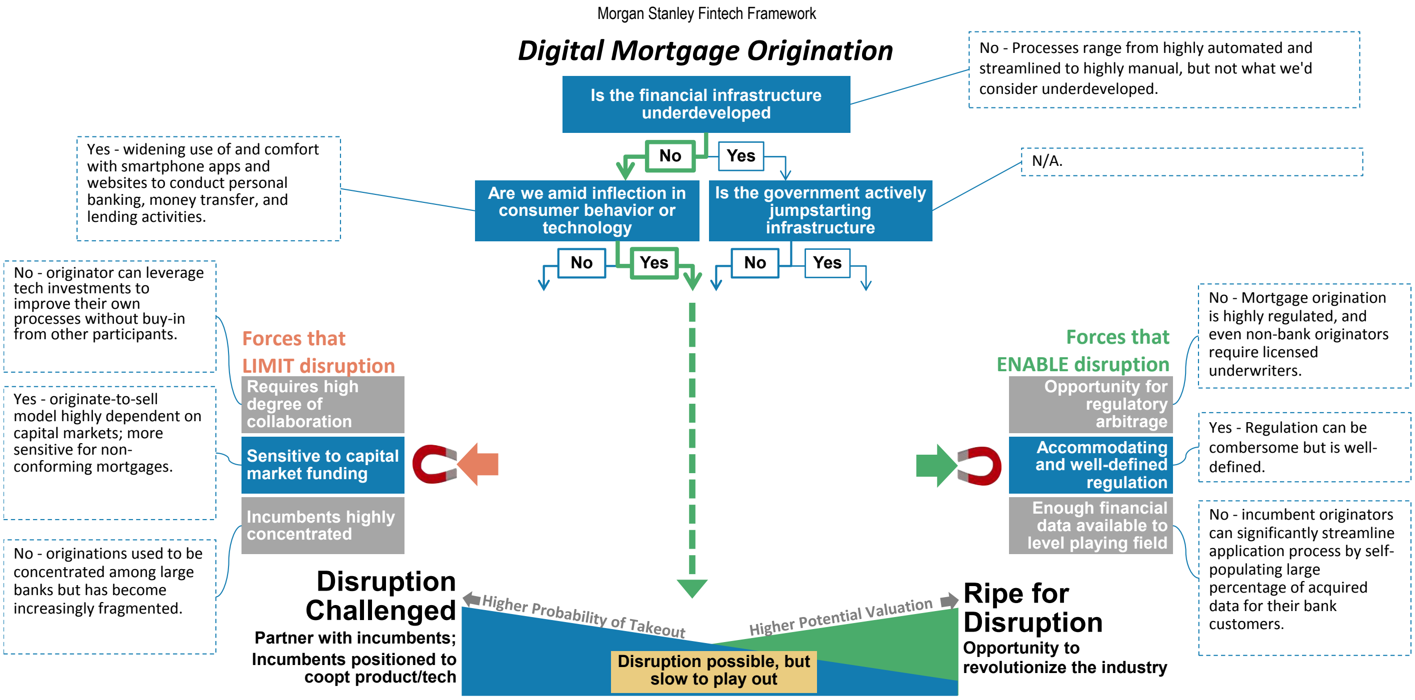
Source: FSA, Company data, Morgan Stanley Research.

Profile 14. Digital Mortgage Origination

Betsy Graseck

Exhibit 53:

Large banks have been investing in their digital mortgage platform… we believe this tilts the scale in favor of the incumbents, as their digital capabilities improve to match fintech players, while their broader customer relationships, ability to utilize balance sheet, and lower cost of funding enable them to take share



Source: Morgan Stanley Research

What happened so far?

- Post crisis, banks have been subject to increasing regulation with a higher requirement for documentation, due diligence, and capital
- Banks have ramped up investment in mortgage origination platforms to highly automate the origination process
- Banks accelerated their investment plans to match the benefits of fintech products
- Automation has driven a four-fold benefit: reduced the time from application to close, improved user experience, reduced expenses and provided an audit trail for compliance and regulatory oversight

What's next?

- Expect large banks with scale such as WFC, JPM, BAC, USB press their advantage through additional investments and marketing
- As higher rates drive down refi volumes, and household formation drives up purchase volumes, expect mortgage origination share shifts to the larger banks
- Large banks with product depth can leverage customer data from other products to automatically populate significant portions of the application
- Banks should maintain their lead in high FICO jumbo loans, given overlap with their affluent/HNW customer set and their ability to use balance sheet (fintech players unable to retain loans, are at a disadvantage given that there is almost no securitization for non-conforming loans)
- Significant excess capital at large banks, coupled with potential for easing regulation under the Trump administration, should tilt the scale further toward banks
- Competition and need to launch digital products quicker, could accelerate the partnership model between banks and fintech players (eg. WFC's partnership with Blend Labs, JPM's partnership with Roostify)

Our outlook for Digital Mortgage origination

While non-bank players first introduced digital mortgage products (most notably Quicken's Rocket Mortgage product in late 2015), some larger banks have already followed suit with their own digital offerings. BAC announced its Online Mortgage Navigator in June 2016. JPM introduced its digital mortgage platform earlier this year in partnership with Roostify, and is set to complete the rollout in 2018. Wells Fargo also showcased its digital mortgage platform (in partnership with Blend Labs) at its May 2017 Investor Day.

The speed and ease of use of the new offerings should drive more mortgage applications online. Features of the new digital platforms include:

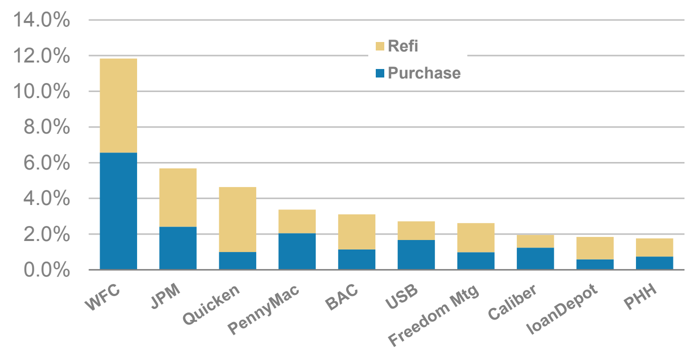
- Ability to choose between completing the entire application online, or initiating the application online and then transitioning into advice over the phone or an in-person meeting with a banker
- Exchanging messages with bank staff and real estate agents to speed up the time to close
- Pre-populating information from source data available through other products the customer already holds with the bank
- Coordination with third-party aggregators to collect additional data
- Facility to take pictures of documents and submit them to the bank
- Ability to electronically sign documents

Large banks with scale have been making significant investments to provide the same ease of use as their fintech counterparts. We believe this tilts the scale in favor of the incumbents, as their digital capabilities improve to match fintech players, while their broader customer relationships, ability to utilize balance sheet, and lower cost of funding enable them to take share as the purchase market improves

Exhibit 54:

WFC, JPM, BAC and USB are among the top 10 mortgage originators

Top 10 Mortgage Originators
(2016, Market Share %)



Source: Inside Mortgage Finance, Copyright 2017 www.insidemortgagefinance.com

Appendix: Lessons Learned

Card Payments – Success Decades in the Making

Credit and debit cards have been proliferating at a measured pace for over 60 years, and now comprise ~15% of global transactions and ~40% of consumer spend. At this point we believe scale and network effect makes is virtually impossible to provide better price and acceptance than the established networks.

Card networks marched a slow but steady path to building consumer adoption: Credit cards were a disruptive force, not only displacing cash and check transactions, but providing consumers access to a revolving line of credit that was accepted across a variety of stores vs. store credit that many retailers offered to their known customers. The first bank credit cards were introduced circa 1951 by Diners Club and American Express launched its credit card product later that decade. Both were closed loop cards. Open loop cards made their debut in 1966, offered by Bank of America under the BankAmericard brand, which later came to be known as Visa. MasterCard's predecessor, InterBank card Association, came about the same year as well. Half a century later, cash still exists but card-based payments continue to gain share, representing 60% of all PCE in the US.

We think the proliferation of card payments benefited from a few key drivers:

1. Market gap 1: Global consumer access to a revolving line of credit that in turn helped retailers benefit from larger ticket transactions and created a buy in for card acceptance. One can argue that this was the bigger innovation at the time vs. simple electronification of card-based payments.
2. Market gap 2: Existence of an inefficient cash/check-based payments ecosystem. Cash based ecosystems are often accompanied by problems such as high costs of handling cash, theft, incentive for tax evasion, etc. While this may not have been the key driver for the innovation, we belive these factors played an important role in the secular shift towards card-based payments over time.
3. Slowly building out ubiquity. This is key for any payments instrument gaining widespread adoption. It took V and MA several decades to build the kind of ubiquity they enjoy in the US today, but replication is not easy and has created barriers to entry for new forms of electronic payments that have sought to disrupt them. Network effects play a key role as wider merchant adoption helps increase consumer adoption and increased consumer interest helps drive merchant adoption but by the same logic "chicken and egg" dilemma at the beginning tends to be an issue for a new payment form to take off.

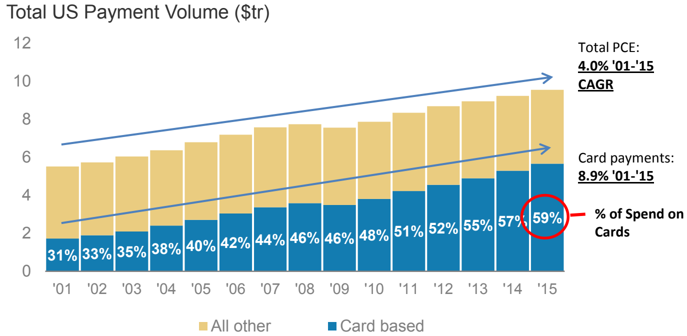
Now that card networks have become "incumbents," what's next?

Even mature markets still have more runway, and some emerging markets are likely decades away from a mature card/cash mix. Higher consumer spend growth from less mature markets also extends the runway. It's still "fintech" in that it's technology driven – further advancements like mobile wallets, give opportunity for markets to leapfrog traditional hardline card payment infrastructure, and global e-Commerce share gain from brick and Mortar supports continued shift towards card. But at this stage growth is likely to stay at a measured, yet healthy, pace, and represents an aspiration for other fintech innovations.

Exhibit 55:

Card payments grew at a steady pace, underscoring the difficulty in hypothetically changing consumer behavior rapidly

Total US Payment Volume ($tr)



Source: The Nilson Report, Morgan Stanley Research

A challenging road for startups, even with interesting ideas

Who did we look at to develop our framework? Besides the public companies and large privates, we ran through a list of prominent and lesser-known fintech firms, with our take on the defining environmental attribute that contributed to success or failure. The most common hurdles were unsustainable cash burn (i.e. couldn't get to scale as fast as hoped) and regulatory involvement.

Firm	Brief Description	Company's Edge	Still going? Or key flaw + what happened
Balanced	Merchant acquirer	Aggressive volume based pricing	Failed - cash burn, thin margins, couldn't get to scale. Customers acquired by Stripe.
Betterment	Wealth management	Low-cost tech blatform	Operating
BitLendingClub	P2P loans in Bitcoin	First mover in a niche space	Failed - regulated out of business
BitPhone	Encrypted calls paid with Bitcoin	First mover in a niche space	Failed - regulated out of business
CAN Capital	Merchant Cash + SMB Lender	Early mover	Halted - management turnover + internal investigation
Card.io	Mobile wallet tech	Camera technology -> better user experience	Acquired by PayPal
DealStruck	SMB Lending	Technology + platform -> lower rates for SMBs	Failed - cash burn + market turmoil
Dwolla	Money transfer / payment network	Low cost of acceptance	Pivoted from consumer app to API
iZettle	Merchant acquiring	"Square of Europe"	Operating
Jumio	Mobile wallet tech	Camera technology -> better user experience	Failed - Cash burn + regulatory investigation
Manilla	Personal financial management	Technology -> aggregated and better user experience	Failed - cash burn, couldn't reach scale
Monese	Online banking/money transfer for Immigrants	Technology to Validate Identity -> Efficient cost structure -> Low cost provider	Freemium model; Customers unwilling to pay
Nutmeg	Wealth management	Low-cost tech blatform	Operating
Powa Technologies	Mobile wallet	Camera technology -> better user experience	Failed; burned through $200mn+
Quirky	Crowdfunding	First mover	Failed - cash burn
Revolut	Checking + Money Transfer	Technology -> Low cost provider	Operating
SMS Wallet	SMS based money transfer (via Bitcoin)	Technology -> Low cost provider	Failed - lack of adoption
TransferWise	Money transfer	Efficient cost structure -> Low cost provider	Operating
TrustBuddy	P2P lender	Efficient cost structure -> Low cost provider	Failed - Misconduct + regulatory investigation
Wealthfront	Wealth management	Low-cost tech blatform	Operating

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(as of April 30, 2017)

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Stock Rating Category	Count	% of Total	Count	% of Total IBC	% of Rating Category	Count	% of Total Other MISC
Overweight/Buy	1167	36%	297	42%	25%	563	37%
Equal-weight/Hold	1403	43%	311	44%	22%	677	45%
Not-Rated/Hold	59	2%	8	1%	14%	8	1%
Underweight/Sell	624	19%	87	12%	14%	270	18%
Total	3,253		703			1518	

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INDUSTRY COVERAGE: PAYMENTS AND PROCESSING

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/16/2017)
Danyal Hussain, CFA		
Automatic Data Processing Inc (ADP.O)	E (12/05/2013)	$98.32
Fleetcor Technologies Inc (FLT.N)	O (10/16/2014)	$139.57
MoneyGram International Inc (MGI.O)	E (06/18/2013)	$17.13
Paychex Inc (PAYX.O)	U (12/05/2013)	$57.16
TriNet Group Inc (TNET.N)	E (08/04/2016)	$31.20
Western Union Co (WU.N)	U (02/02/2015)	$19.15
WEX Inc (WEX.N)	E (07/09/2014)	$100.91
James E Faucette		

First Data Corp. (FDC.N)	O (03/28/2016)	$16.51
LendingClub Corp (LC.N)	O (11/03/2016)	$5.85
MasterCard Inc (MA.N)	O (03/28/2016)	$118.49
On Deck Capital Inc (ONDK.N)	E (05/05/2016)	$3.60
PayPal Holdings, Inc. (PYPL.O)	E (03/28/2016)	$50.34
Square Inc (SQ.N)	E (03/28/2016)	$20.34
VeriFone Systems Inc. (PAY.N)	E (06/10/2014)	$18.01
Visa Inc. (V.N)	O (03/28/2016)	$93.15
Vasundhara Govil		
Evertec Inc (EVTC.N)	E (08/08/2013)	$17.25
Global Payments Inc (GPN.N)	E (10/03/2014)	$89.36
Green Dot Corp (GDOT.N)	E (02/18/2014)	$36.22
Total System Services Inc. (TSS.N)	E (06/18/2013)	$58.52
Vantiv Inc (VNTV.N)	O (07/09/2014)	$62.28

Stock Ratings are subject to change. Please see latest research for each company.

* Historical prices are not split adjusted.

INDUSTRY COVERAGE: BANKING - LARGE CAP BANKS

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/16/2017)
Betsy L. Graseck, CFA		
Ally Financial Inc (ALLY.N)	E (12/20/2016)	$18.97
American Express Company (AXP.N)	E (01/25/2016)	$78.13
Bank of America (BAC.N)	O (04/23/2013)	$23.99
Bank of New York Mellon Corp (BK.N)	E (10/21/2016)	$47.18
BB&T Corporation (BBT.N)	U (11/14/2016)	$43.73
Capital One Financial Corporation (COF.N)	O (07/30/2015)	$80.69
Citigroup Inc. (C.N)	O (11/14/2016)	$62.49
Discover Financial Services (DFS.N)	O (01/28/2014)	$60.17
Goldman Sachs Group Inc (GS.N)	O (10/26/2015)	$225.60
J.P.Morgan Chase & Co. (JPM.N)	O (12/11/2006)	$87.61
Northern Trust Corp. (NTRS.O)	U (11/28/2011)	$90.60
PNC Financial Services (PNC.N)	E (07/25/2013)	$122.62
Regions Financial Corp (RF.N)	E (02/11/2016)	$14.54
Santander Consumer USA Holdings Inc (SC.N)	E (12/20/2016)	$12.02
State Street Corporation (STT.N)	E (11/14/2016)	$82.90
SunTrust (STI.N)	U (11/14/2016)	$57.04
Synchrony Financial (SYF.N)	O (09/09/2014)	$26.84
U.S. Bancorp (USB.N)	U (11/14/2016)	$51.96
Wells Fargo & Co. (WFC.N)	O (09/20/2016)	$53.26

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INDUSTRY COVERAGE: CHINA INTERNET AND OTHER SERVICES

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/16/2017)
Amanda Chen		
58.com (WUBA.N)	E (11/15/2016)	$43.30
Autohome Inc. (ATHM.N)	O (11/24/2014)	$39.88
Bitauto Holdings Limited (BITA.N)	E (09/20/2016)	$31.03
China Online Education Group (COE.N)	O (07/05/2016)	$17.76
Ctrip.com (CTRP.O)	O (08/05/2015)	$56.43
Meitu Inc. (1357.HK)	E (01/18/2017)	HK$9.80
Momo Inc. (MOMO.O)	O (10/19/2016)	$43.82
New Oriental Group (EDU.N)	O (04/14/2016)	$75.82
SouFun Holdings Limited (SFUN.N)	E (02/23/2017)	$3.52
TAL Education Group (TAL.N)	O (04/14/2016)	$131.29
Tuniu Corporation (TOUR.O)	O (02/23/2017)	$8.20

Weibo Corp (WB.O)	O (12/17/2015)	$78.60
YY Inc. (YY.O)	U (02/23/2017)	$54.00
David Sun		
Changyou.com (CYOU.O)	E (02/23/2017)	$31.51
Cheetah Mobile Inc. (CMCM.N)	U (05/23/2016)	$11.17
NetEase, Inc (NTES.O)	E (09/24/2015)	$289.70
Sohu.com Inc (SOHU.O)	U (09/24/2015)	$40.82
Grace Chen		
Alibaba Group Holding (BABA.N)	O (12/08/2016)	$124.02
Baidu Inc (BIDU.O)	E (01/17/2017)	$190.64
Baozun Inc (BZUN.O)	O (06/15/2015)	$22.78
JD.com, Inc. (JD.O)	O (12/17/2015)	$40.77
Tencent Holdings Ltd. (0700.HK)	O (01/09/2017)	HK$259.80
Vipshop Holdings (VIPS.N)	E (02/29/2016)	$13.76

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INDUSTRY COVERAGE: DIVERSIFIED FINANCIALS

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/17/2017)
Adedapo O Oguntade, CFA		
3i (III.L)	O (03/28/2017)	841p
CMC Markets PLC (CMCX.L)	E (03/17/2016)	128p
Alvaro Serrano		
Banca Farmafactoring SpA (BFF.MI)	O (05/16/2017)	€4.74
Anil Sharma, CFA		
Aberdeen Asset Management (ADN.L)	U (01/23/2014)	291p
AMUNDI SA (AMUN.PA)	++	€59.86
Ashmore Group PLC (ASHM.L)	E (02/05/2013)	355p
Bolsas y Mercados Espanoles (BME.MC)	U (05/08/2012)	€32.37
Deutsche Boerse (DB1Gn.DE)	O (01/26/2017)	€92.65
Euronext NV (ENX.PA)	O (08/04/2014)	€46.99
Flow Traders NV (FLOW.AS)	O (08/24/2015)	€25.87
Hargreaves Lansdown (HRGV.L)	E (01/26/2017)	1,347p
Henderson Group (HGGH.L)	E (06/29/2016)	231p
Hoist Finance publ AB (HOFI.ST)	O (05/09/2016)	SKr 85.00
London Stock Exchange (LSE.L)	O (01/26/2017)	3,427p
Man Group (EMG.L)	E (10/04/2011)	156p
Moscow Exchange (MOEX.MM)	E (01/26/2017)	RUB 107.05
NEX Group Plc (NXGN.L)	E (12/09/2015)	610p
Nordax Group AB (NDX.ST)	E (07/28/2015)	SKr 44.00
Partners Group (PGHN.S)	E (07/12/2013)	SFr 582.00
Resurs Holding AB (RESURS.ST)	E (05/15/2017)	SKr 53.45
Schroders (SDR.L)	E (01/26/2017)	3,141p
TP ICAP PLC (TCAPI.L)	O (12/09/2015)	468p
Antonio Reale		
Poste Italiane SpA (PST.MI)	E (12/02/2015)	€6.26

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INDUSTRY COVERAGE: INSURANCE - PROPERTY & CASUALTY

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/16/2017)
Kai Pan		
Allstate Corporation (ALL.N)	E (07/06/2010)	$84.33
American Int'l Grp (AIG.N)	O (05/16/2017)	$62.08

Aon PLC (AON.N)	E (05/31/2012)	$125.98
Arch Capital Group Ltd. (ACGL.O)	E (07/06/2010)	$95.30
Arthur J. Gallagher (AJG.N)	E (05/31/2012)	$55.31
Axis Capital Holdings (AXS.N)	E (08/14/2015)	$63.13
Berkshire Hathaway Inc (BRKb.N)		$163.61
Berkshire Hathaway Inc (BRKa.N)	E (03/20/2017)	$245,701.00
Brown & Brown Inc. (BRO.N)	U (01/27/2016)	$42.49
Chubb LTD (CB.N)	O (11/12/2015)	$137.02
Everest Re Group, Ltd. (RE.N)	E (05/16/2013)	$244.54
Intact Financial Corp (IFC.TO)	O (05/23/2016)	C$92.92
Marsh & McLennan Cos (MMC.N)	E (02/09/2015)	$74.08
National General Holdings Corp (NGHC.O)	E (11/18/2016)	$21.79
Progressive Corp (PGR.N)	E (01/05/2017)	$40.12
RenaissanceRe (RNR.N)	E (03/09/2015)	$135.86
The Travelers Companies, Inc. (TRV.N)	U (01/05/2017)	$119.93
Third Point Reinsurance Ltd (TPRE.N)	E (01/06/2014)	$12.10
W.R. Berkley Corp. (WRB.N)	E (01/21/2016)	$66.45
Willis Towers Watson PLC (WLTW.O)	O (02/12/2015)	$142.65
XL Group PLC (XL.N)	O (05/12/2015)	$42.01

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INDUSTRY COVERAGE: INDIA FINANCIALS

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/17/2017)
Anil Agarwal		
Axis Bank (AXBK.NS)	E (03/21/2017)	Rs502.80
HDFC Bank (HDB.N)	E (03/21/2017)	$85.66
HDFC Bank (HDBK.NS)	E (03/21/2017)	Rs1,557.15
ICICI Bank (ICBK.NS)	U (03/21/2017)	Rs309.75
State Bank of India (SBI.NS)	U (12/15/2014)	Rs307.65
Subramanian Iyer		
Bajaj Finance Limited (BJFN.NS)	O (07/29/2016)	Rs1,324.80
Bharat Financial Inclusion Ltd (BHAF.NS)	O (12/16/2015)	Rs780.05
HDFC (HDFC.NS)	++	Rs1,552.50
IDFC Bank (IDFB.NS)	U (03/21/2017)	Rs63.40
Indiabulls Housing Finance (INBF.NS)	E (06/22/2015)	Rs1,082.00

LIC Housing Finance Ltd. (LICH.NS)	O (04/26/2017)	Rs690.35
Mahindra and Mahindra Financial Services (MMFS.NS)	E (03/21/2017)	Rs333.10
Multi Commodity Exchange of India Ltd (MCEI.NS)	O (03/21/2017)	Rs1,068.70
PNB Housing Finance Ltd (PNBH.NS)	U (02/20/2017)	Rs1,321.80
Shriram City Union Finance Ltd (SHCU.NS)	O (09/05/2016)	Rs2,255.05
Shriram Transport Finance Co. Ltd. (SRTR.NS)	E (11/07/2016)	Rs1,012.65
Sumeet Kariwala		
Bank of Baroda (BOB.NS)	U (05/16/2016)	Rs191.75
Bank of India (BOI.NS)	U (06/08/2015)	Rs184.85
Canara Bank (CNBK.NS)	U (09/19/2014)	Rs373.95
Federal Bank (FED.NS)	E (03/21/2017)	Rs114.80
ICICI Prudential Life Insurance (ICIR.NS)	O (11/01/2016)	Rs415.70
IndusInd Bank (INBK.NS)	O (03/10/2014)	Rs1,425.45
Kotak Mahindra Bank (KTKM.NS)	O (05/18/2014)	Rs951.20
Max Financial Services (MAXI.NS)	++	Rs671.10
Punjab National Bank (PNBK.NS)	U (09/19/2014)	Rs165.05
RBL Bank Limited (RATB.NS)	E (10/03/2016)	Rs564.25
Yes Bank (YESB.NS)	O (03/10/2014)	Rs1,454.65

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INDUSTRY COVERAGE: IT HARDWARE

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/16/2017)
Katy L. Huberty, CFA		
Apple, Inc. (AAPL.O)	O (05/26/2009)	$155.47
CDW Corporation (CDW.O)	E (08/06/2013)	$59.57
Electronics for Imaging Inc (EFII.O)	E (07/21/2015)	$47.55
Fitbit Inc (FIT.N)	E (11/03/2016)	$5.74
Hewlett Packard Enterprise (HPE.N)	E (11/11/2015)	$19.11
HP Inc. (HPQ.N)	O (03/18/2013)	$19.47
IBM (IBM.N)	O (02/18/2016)	$153.68
NCR Corp. (NCR.N)	E (09/25/2011)	$41.27
NetApp Inc (NTAP.O)	U (03/24/2014)	$41.62
Nutanix Inc (NTNX.O)	E (05/10/2017)	$16.94
Pure Storage Inc (PSTG.N)	O (11/01/2015)	$11.95
Seagate Technology (STX.O)	E (07/11/2016)	$44.00
Teradata (TDC.N)	U (12/03/2013)	$29.26
Western Digital (WDC.O)	O (04/28/2017)	$88.96
Xerox Corp (XRX.N)	O (01/12/2017)	$7.14
Yuuji Anderson		
Garmin Ltd (GRMN.O)	E (01/07/2015)	$52.60
GoPro Inc (GPRO.O)	U (12/13/2015)	$8.68

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INDUSTRY COVERAGE: BANKS

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/17/2017)
Mia Nagasaka		
Japan Post Bank (7182.T)	E (03/06/2017)	¥1,401
Mizuho Financial Group (8411.T)	O (06/03/2013)	¥198
Resona Holdings (8308.T)	O (04/19/2017)	¥563
Sumitomo Mitsui FG (8316.T)	O (12/07/2012)	¥4,111
Sumitomo Mitsui Trust Holdings (8309.T)	U (04/19/2017)	¥3,733

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The Americas
1585 Broadway
New York, NY 10036-8293
United States
Tel: +1 (1) 212 761 4000

Europe
20 Bank Street, Canary Wharf
London E14 4AD
United Kingdom
Tel: +44 (0) 20 7 425 8000

Japan
1-9-7 Otemachi, Chiyoda-ku
Tokyo 100-8104
Japan
Tel: +81 (0) 3 6836 5000

Asia/Pacific
1 Austin Road West
Kowloon
Hong Kong
Tel: +852 2848 5200