Future of Finance

The Rise of China FinTech

Payment: The Ecosystem Gateway

Fintech companies are reshaping the way Chinese consumers pay, borrow and invest. Innovators from Tencent and Ant Financial to JD and Ping An have muscled in to the financial sector and are offering everything from easier and faster ways to pay with just a swipe of a smartphone to creating attractive online saving products and loans. With consumers' financial needs unmet by traditional banking and the help of cutting-edge technology, vast new profit pools are being created. In the first of our series on ***The Rise of China FinTech,*** we focus on unique trends investors need to understand and the emergence of electronic new payment methods that have become a crucial gateway for innovators' closed-loop ecosystems.

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Acronym buster:

TPV: Total Payment Value, **B2C:** Business to Consumer, **C2C:** Consumer to Consumer, **B2B:** Business to Business, **QR code:** Quick Response code, **POS:** Point of Sale

The Rise of China FinTech

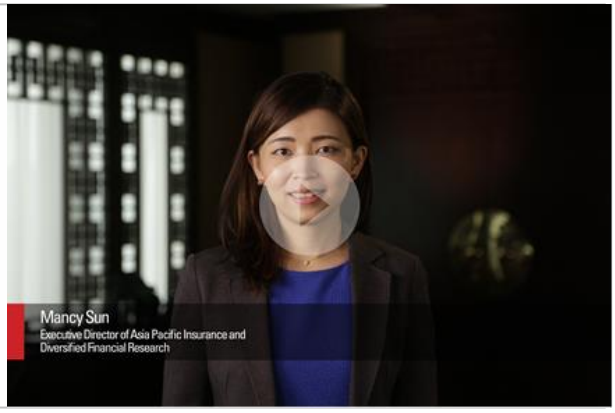
This is the latest report from our Future of Finance series, where we explore how Tech is changing the shape of Finance. See related reports below or visit our GS360 portal for the full coverage:

Payment Ecosystems, Aug 4, 2017

The socialization of finance, Mar 13, 2015

Redefining the `Way We Pay' in the Next Decade, Mar 10, 2015

Watch a video summary from the author here>>



China FinTech in numbers

THIRD-PARTY PAYMENT GROWTH

$155bn → $11.4trn

Third-party payment value in China grew more than 74X from 2010 to 2016. About 16% of that is consumption-related. 56% is peer-to-peer transfer. (p. 22-29)

INTERNET LENDING

$4bn → $156bn

Total internet loan balance outstanding in China grew more than 36X from 2013 to 2016. But in context it is small compared to China's gigantic financial system, at only 0.8% of total social financing. (p. 13)

INTEGRATION MINDSET

95

Alibaba mentioned the word 'ecosystem' 95 times in their 2016 annual report. Similar mentions are observed from other leading FinTech players Ping An, Tencent, JD, Baidu etc. For context, ICBC mentioned the word 'FinTech' or 'Internet' 22 times. (p. 13)

PRIVATE CAPITAL OWNING INFRASTRUCTURE

Private companies (non-state owned) own >60% of the new centralized clearinghouse for online payments. **>60%**

The largest shareholders besides the Central Bank and the State Administration of Foreign Exchange are Ant Financial (9.61%) and Tencent (9.61%). This compares to China's existing basic infrastructure, which are state-owned. (p. 16)

INTERNATIONAL EXPANSION

Chinese consumers can **use their favorite third-party payment method outside of China** at physical retailers in 28 countries and regions. (Alipay: 28; Tenpay: 15). (p. 18) **28**

PAY WITH YOUR PHONE

Third-party payment done via mobile devices account for 75% of the total payment value. For context, 20% of the US e-commerce payment is via mobile devices. (p. 23) **75%**

CASHLESS

40%

Retail consumption paid via third-party payment companies is growing and now comprise 40% of retail. (US: third-party 7%; total cashless 75% by 2015). We expect this to rise to 68% by 2020. (p. 56-57)

TRANSACTION SIZE

In China, traditional bank cards' **average transaction size** of US$930 is almost 10X larger than third-party payment's average transaction size of $88. (p. 24) **10x**

USER BASE

3.4bn There are in total 3.4bn **third-party payment accounts** in China (2016). (p. 47)

Alipay: 520mn (Mar 2017)

Tenpay: 600mn (Dec 2016)

For context, **Paypal** has 197mn users globally (Dec 2016)

GAMIFICATION OF CASH

14bn virtual 'red packets' (China's traditional cash-filled red envelope that people give each other during festivals) were exchanged via WeChat Pay on Chinese New Year's Eve in 2017. (p. 43)

Portfolio Manager's Summary

Why read this report?

Regulatory changes and new technologies are re-shaping China's banking activities. The pace and magnitude of the development is vastly different versus the rest of the world. A group of hybrid tech/finance companies, such as Ant Financial, Tencent, JD and Ping An have emerged at the heart of China's financial industry, making financial services more convenient and accessible for consumers. This has resulted in China leapfrogging from a world where consumers largely relied on cash, to cashless or even cardless transactions, paying, borrowing and investing, all through their smartphones. We expect the changes to continue over the next 5-10 years, with new entrants emerging and new profit pools being created. Within this report – our first in a series – we lay out addressable markets with large untapped consumer demand, then explain three key shaping trends that investors need to understand about the China FinTech space before looking at individual business lines, such as the high integration, evolving regulations and internationalization. Lastly, we focus on third-party payment, an area with the most innovations so far, through 'real-world' cases and a deep dive into business models. In our view, payment is a crucial gateway to most other services, and where the innovators have gained the strongest footholds in China.

See five real-world case studies for payments on pages 25-26, 43, 48, 53

Untapped consumer demand drives FinTech opportunities:

Historically, the traditional banks in China focused more on serving the state-owned enterprises, leaving the financial needs of consumers and SME's underserved. As China's economy slows, consumer spending has become pivotal to transform the economy that was heavily reliant on investment. Some innovators, before they enter the financial sector, had already built a sizeable consumer (and SMEs) user base in their core businesses. To name a few: Ant Financial (33% owned by Alibaba, China's largest e-commerce platform) and Tencent (tech giant who owns China's most popular messenger app WeChat), or Ping An (China's largest non-state owned financial company with a focus on consumer). With the help of technology and the initially supportive regulatory environment, the innovators were able to tap into and expand their existing user base, and capture the unique opportunity set of Chinese consumers. We highlight these addressable markets:

Infographic on China FinTech ecosystem: Pages 6-7

List of key players: Page 9

Total addressable market

- **Payment**: **US$4.6 trillion in 2020E in consumption-related third-party payment value,** from US$1.9 trillion in 2016. The key drivers would be e-commerce growth and increasing penetration in offline retailers as third-party payment replaces cash.
- **Lending**: **US$764 billion in 2020E in loan balance from non-traditional players** (internet lenders and consumer finance companies), from US$156 billion in 2016. The majority of the addressable market comes from consumers (US$480 billion) – China's consumer credit is only 7% of GDP vs 20% in the US in 2016 (excluding mortgages).
- **Investing: US$11.9 trillion in 2020E in financial asset under management**, from US$8.3 trillion in 2016. We note that the innovation in the asset management industry is still at an early stage – much of it is happening within or driven by the incumbents themselves. So it would be too early to define what is non-bank and what is not.

Key trends that are shaping the China FinTech Ecosystem

Trend #1: Integration
- **New conglomerate**
- **Ecosystem**
- **Closed-loop**

- **Integration**: A few hybrid tech/finance companies have started to dominate the space by owning the **entire supply chain** and distinctive **ecosystem** around it. Others are trying to enter as they strive to **close the loop** of their own. The **'integration'** mindset defines how Chinese entrepreneurs view their strategy, competition and profitability.

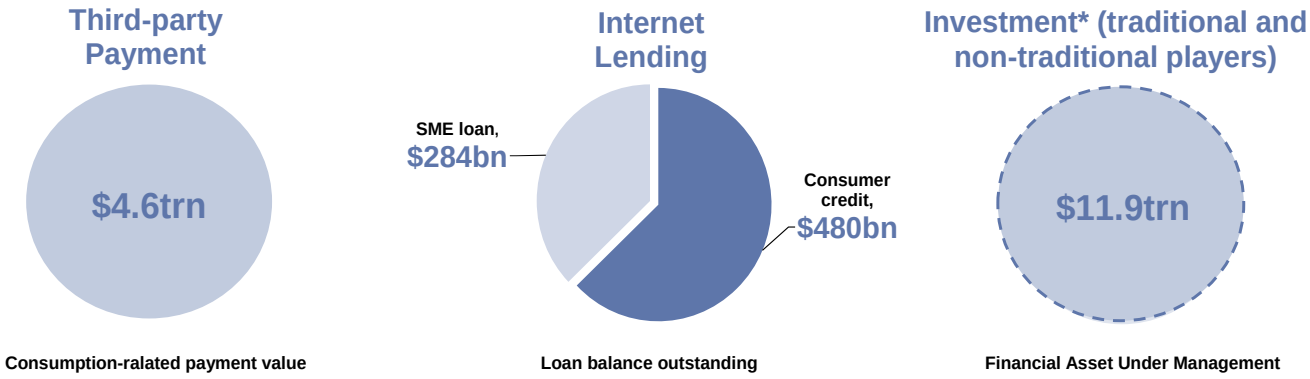
Trend #2: Regulation
- **Pro-growth**
- **Risk management**
- **Private capital participation**

- **Regulation**: Regulation plays a vital role in determining the future evolution. In China it is still **pro-growth**, but getting more sophisticated in **risk management/customer protection**. **Private capital** has uncharacteristically high participation in the FinTech **infrastructure** build-out vs other industries. We will pay particular attention to the evolving regulations and dynamic balance between regulators and innovators.

Trend #3: International
- **User base**
- **DM vs EM**

- **International**: Chinese FinTech players started to expand overseas for a broader user base. Local conditions – legacy infrastructure, regulation, demographic and culture norms – will dictate the adoption. We point out low hanging fruit (**leveraging Chinese tourists**) and explore early cases in exporting their technology standards (QR code).

Exhibit 1: Total Addressable Market by 2020E



*For investment, the traditional asset managers have been investing/acquiring AI based services and expanding online distribution channels. We see great uncertainty around the final market structure between traditional and non-traditional players.

Source: iResearch, National Bureau of Statistics, WIND, PBOC, CBRC, the Asset Management Association of China, China Trustee Association, Goldman Sachs Global Investment Research

Third-party payment: payment processed by non-bank firms

Our takeaways for third-party payment

- **Enablers of growth**: The combination of 1) technology 2) digitization of money 3) low fees 4) unique infrastructure set-up 5) proliferation of e-commerce and social platform allowed China to leapfrog from cash to cashless, or even cardless transactions. The addressable market is large and the share is shifting rapidly. New technology is also expanding the pie in markets that were historically underpenetrated by banks.

The market created: $11bn annual fee pool

- **$11bn annual consumption-related revenue/fees pool to be created by 2020E:** Immediate revenue opportunities come from B2C payments, which is just a small portion of the overall payment value. Monetization initiatives for other transactions (mainly C2C) are still in the early stages. Direct profitability might not be the big players' top priority, as payment is often viewed as the gateway for their integration.

Third-party payment in China is replacing cash, not only cards; See our case study on page 20.

- **Disruptors and competitive landscape**: 40% of the retail consumption today in China is done via third-party payments. Alipay and Tenpay now dominate the space with 84% market share, but sizeable players from other industries are joining the race.

Key debates for future

1. **Monetization:** Direct profits from payment are thin in China, due to low fees, high competition and marketing spending. However, payment serves as a key infrastructure for the big players' ecosystem by granting targeted access to users, and profitability remains secondary. Future monetization will likely come from targeted advertising, consumer financing and wealth management.
2. **Regulation:** There is an increasing need for regulators to monitor the money flow via the closed FinTech ecosystems and payment is the starting point. However, instead of simply banning this activity, regulators are working with the payment companies as that's where the technology know-how lies. This creates unique access for private capital in the next generation of financial infrastructure.
3. **Fee competition/M&A:** We expect fee competition to intensify and expect to see more M&As in the payment space, as players in adjacent industries scramble for payment licenses to close their own loop, and banks themselves catch up in innovation.

FinTech Ecosystem - China vs. US and Japan

		China Incumbents	China Disruptors	US Incumbents	US Disruptors	Japan Incumbents	Japan Disruptors
PAYMENT	DIRECT BANK DEBIT TRANSFER SYSTEM	UnionPay 银联	Alipay (支付宝 ALIPAY)	VISA, MasterCard	PayPal, DWOLLA	JCB	
	MOBILE PAYMENT SOLUTION		WeChat Pay (微信支付), QQ Wallet (QQ钱包)		venmo		Rpay, LINE Pay
	PAYMENT SERVICE PROVIDER		Ping An E-wallet (壹钱包)[1]		amazon pay, square one insurance[1], stripe, adyen		GMO Payment Gateway
FINANCING	PERSONAL LENDING	Banks such as: ICBC, CCB, BOC, ABC, BoCom	Ant Check Later (花呗); Loan issued by MYbank, (former Ant Micro Loan) (蚂蚁小贷, 网商银行[1] MYbank); Antsdaq (蚂蚁达客)	Banks such as: JP Morgan Chase, BoA, Citigroup, Wells Fargo	LendingClub, PROSPER	Banks such as: MUFG, SMFG, Mizuho	
	SME LENDING		WeBank[1] 微众银行 Weilidai through WeBank; Tenpay Micro Loan (财付通小贷); Tencent Gongyi (腾讯公益)		OnDeck, Kabbage		Freee, Money Forward
	CROWD-FUNDING		LuP2P.com (陆金服)[2]; Lufax (LU.com 陆金所)[2]; Ping An Crowdfunding (平安众筹 ZHONG.COM)[1]		KICKSTARTER, AngelList		Crowdcredit
SAVING / INVESTMENT	ONLINE SAVING PLATFORM[5]	Asset mgmt companies such as: ICBC Credit Suisse Asset Mgmt, E Fund Mgmt, China Asset Mgmt	Ant Fortune (蚂蚁财富), Yu'e Bao (余额宝)[1]; Licaitong (理财通); JD Wealth Mgmt (京东理财), JD Xiaojinku (京东小金库); Baidu Financial Supermarket (百度金融商城); 99Bill Wealth Mgmt (快钱理财)[4]	Asset mgmt companies such as: BlackRock, Fidelity, Charles Schwab	Bankrate	Asset mgmt companies such as: Nomura, Daiwa, Nikko AM	
	ONLINE ASSET MANAGEMENT[5]	Insurance companies such as: China Life	Tianhong Asset Management (天弘基金)[1]; Lufunds.com (陆基金); Dongjia Caifu (东家财富)[1]; Baidu Wealth Mgmt (百度理财); 99Bill Wealth Mgmt (快钱理财)[4]	Insurance companies such as: Met Life	wealthfront, Betterment	Insurance companies such as: Dai-ichi Life, Nippon Life	THEO, WEALTHNAVI
	ONLINE - ONLY BANK		Ant Fortune (蚂蚁财富), MYbank (网商银行)[1]; WeBank (微众银行)[1]; Baixin Bank (百信银行)[1]		ally BANK		Japan Net Bank, Rakuten BANK
OTHERS	CLOUD COMPUTING		Ant Financial Cloud (蚂蚁金融云); Tencent Cloud (腾讯云); Ping An Cloud (平安云); Jcloud.com (京东云); Baidu Financial Cloud (百度金融云); Wanda Cloud Company[1]		Google, IBM		NTT
	PERSONAL CREDIT SCORING[6]	Personal Credit Rating: Official personal credit record of PBOC (中国人民银行 THE PEOPLE'S BANK OF CHINA)	Zhima Credit (芝麻信用); Tencent Credit Bureau (腾讯征信); Qianhai Credit Service Centre (前海征信); Xiaobai Credit (小白信用)[3]; Wanda Credit (万达征信)[1]	Personal credit rating such as: FICO	zestfinance		
	ONLINE-ONLY INSURANCE COMPANY		ZhongAn Online P&C (众安保险)[1]		oscar		LIFENET

Other disruptors: SUNING 苏宁金融; 小米; 美团 meituan.com; 唯品会 vip.com; 51信用卡 U51.com; 联想 lenovo; 360; SUNING 苏宁金融; 宜信 CreditEase; 小米 美团; 金山 KINGSOFT; 联想 lenovo; Other insurance companies

NOTE: 1. Not wholly owned. 2. Wholly owned by Lufax Holding. 3. Wholly owned by JD Finance. 4. Wholly owned by 99Bill.com. 5. At current stage, most of the online saving/asset management platforms in China are distributors instead of asset managers, except for Tianhong Asset Management, who has a mutual fund license. 6. Zhima Credit, Tencent Credit and Qianhai Credit, along with 5 other companies, were selected by PBOC as pilot companies. Please refer to the Appendix for further details.

Source: Company data, compiled by Goldman Sachs Global Investment Research

10 things that may surprise you…

1. Key players in the China FinTech space have built **highly integrated** business models and **closed-loop ecosystems**, both with their **offline businesses,** and along the **entire financial supply chain**, owning payment to lending and wealth management and even credit scoring. A few big hybrid tech/finance companies have started to dominate the space. By contrast, companies in the West have typically concentrated on one or just a few particular core business lines (such as Visa and MasterCard, or disruptors like PayPal and Lending Club). **(p. 12-13)**

2. **Private capital started to own (at least part of) the next generation of financial infrastructure**, while historically most of China's existing basic infrastructures are owned by the government. For instance, Ant Financial and Tencent each owns 9.61% of *Wanglian* (China's new centralized clearing house for all online payment). They are the third largest shareholders, just after the Central Bank and the State Administration of Foreign Exchange (34% combined). **(p. 16)**

3. **Third-party payments in China are replacing cash, not only bank cards**, and are widely in small ticket-sized and high frequency transactions. This is starkly different from most developed world where one of the most persistent uses of cash remains the purchase of small ticket items. We estimate that about **40% of the retail consumption** in 2016 was done via third-party payments. **(p. 23-24)**

4. Chinese consumers are not only embracing third-party payments at home, but have also taken their favorite payment method abroad. **Third-party payments are available at physical retailers in at least 28 countries for Chinese travelers.** They can even have VAT (value-added tax) refunded directly to their e-wallet on the same day when they travel abroad (at most EU airports and Korean airports). **(p. 18)**

5. **QR codes**, the two-dimensional barcode that never really took off in the West, **dominates** the daily payment scene of the Chinese way of life. It has made significant progress abroad too, as according to the SCMP, EMVco ("a consortium of smart payments collectively owned by American Express, Visa, MasterCard and UnionPay", adopts it as an industry standard of payment format in July 2017. **(p. 24-25)**

6. An average Chinese consumer has 3.6 debit cards, but only 1 out of 3 of them has a credit card. **The low credit card penetration but extremely high debit card penetration** sets a unique stage for digital payment to grow. **(p. 39)**

7. **16% of the US$11.4trn third-party payment value (TPV) is consumption-related** – that is the major direct fee contributor for payment companies, when compared with C2C transactions (56% of the TPV but usually free of charge). **(p. 29)**

8. **Third-party payment fees are much lower in China vs most other countries**. For instance, Alipay/Tenpay charges a merchant **38-60bps for receiving money from a customer**, while PayPal charges **290bps + US$0.3. (p. 38)**

9. The **net spread for a typical third-party payment processor is 0.1%-0.4**% per transaction. For context, PayPal's net spread is 1.8% in 2016. The direct profit from payment processing is thin, unless the payment companies have other channels for monetization within their ecosystem. **(p. 33)**

10. There have been **at least 40 M&A deals in the third-party payment sectors since 2012**. There are still 250+ third-party payment licenses available, but only 120 of them are allowed to handle online payment – out of which, we believe there are only 20-40 licenses that are not already been bought by or associated with a sizeable player from adjacent industries. **(p. 66-67)**

China FinTech - Key Players

A sample of companies with exposure

Note:
1.By agreement, subject to regulatory approval. 2. By agreement, subject to regulatory approval, after JD Finance's spin-off deal is completed. 3. 44% equity and convertible bonds equivalent to 11% stake. All numbers are as of July 2017.

Source: Company data, compiled by Goldman Sachs Global Investment Research

Sizing the addressable market: Untapped consumer demand

We see underpenetrated markets for underserved consumers in three core businesses of traditional financial services: payment, lending and investing…

Third-party payment TAM by 2020E:

Consumption-related TPV: US$4.6trn

Revenue/fee pool: US$11bn

Payment: We focus on payment in the rest of this report. Whilst we estimate that the TPV of consumption-related **third-party payment will reach US$4.6trn** (Rmb31.6trn) **by 2020E** from US$1.9trn (Rmb13trn) in 2016 and the **annual revenue/fee pool** to be **US$11bn** (Rmb75.8bn), we also highlight the importance of payment services to gain customer account relationships as well as transaction data, which in turn offer payment companies opportunities to tap into consumer lending and investing.

Our analysis is based on the following key assumptions. **1)** By 2020E, 68% of the retail consumption would be processed by payment companies, from 40% in 2016. This assumes that China's digitization of money by 2020 reaches a similar level of US in 2016. This implies that China would need to accomplish in 4 years what took US 14 years (2002-2016). **2)** We see further downward pressure on the take rate in the next few years, given the regulatory tightening, introduction of the new clearing house, and more competition from players in other industries trying to enter the payment space.

We are also aware of a couple of caveats of our method. Please find the details in page 56.

Internet lending TAM by 2020E:

Consumer credit (excl. mortgages) balance: US$480bn

SME loan balance: US$284bn

Lending: We estimate the consumer lending opportunity will be driven by the (still) fast consumption growth as well as the large underserved cohort including c.360mn rural workers, c.170mn migrant workers, 37mn college students as well as some of the c.70mn blue collar workers. We forecast **total balance outstanding of consumer credit** (excl. mortgages) to grow from US$841bn (Rmb5.8trn) in 2016 **to US$1.9trn** (Rmb13trn) **in 2020E**, among which **internet lending** (incl. P2P and consumer finance from internet giants) **to increase from** US$100bn (Rmb691bn) **to US$480bn** (Rmb3.3trn).

China's consumer credit is significantly underpenetrated at 7% of GDP vs 20% in the US. In particular we see untapped market in **1)** subprime-borrower cash and consumption loans; and **2)** small-ticket consumption loans.

The core of a lending business is to price the credit and liquidity risks. We see significant potential value added for big-data-based credit pricing to traditional lending services. However this is yet to be tested over time and through cycles. We also believe that **1)** the ultimate number of winners may be much smaller than the vast number of disruptors who claim to own the best algorithm already; and **2)** A win-win scenario for incumbents and disruptors is more likely than a disruptive one, given the nature of cumbersome capital, liquidity and regulatory requirements of a lending business may not fit the aspirations of a tech company.

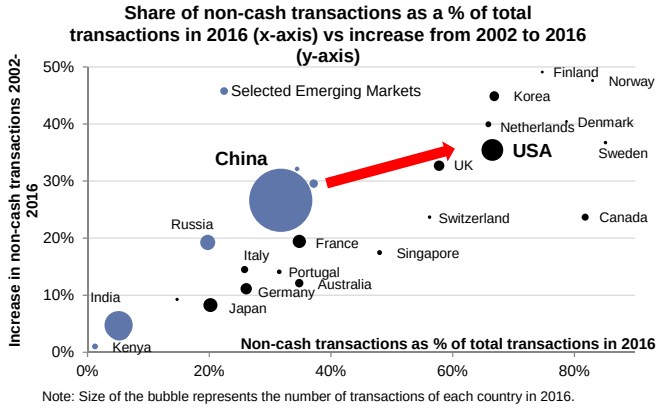
In addition, we also see a US$284bn TAM for underserved SMEs through internet lending by 2020E.

Investing TAM by 2020E:

Financial asset under management: US$11.9trn

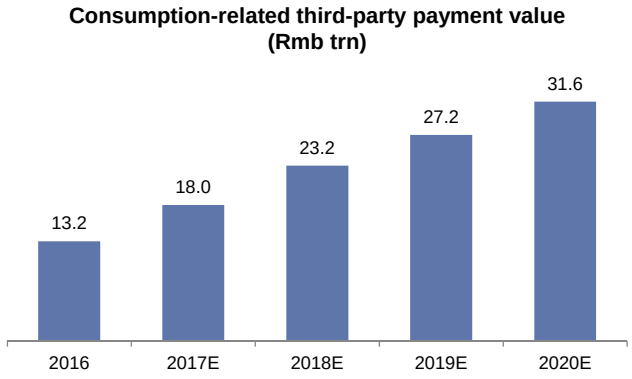
Investing: We forecast **China's total financial asset under management should increase** from US$8.3trn or Rmb57trn (incl. Rmb16trn bank wealth management products which is more of a savings product) in 2016 to **US$11.9trn** or Rmb82trn **in 2020E**, driven by Chinese households' fast wealth accumulation as well as potentially higher wealth allocation to financial assets. We see opportunities for FinTech companies in **1)** distribution of financial products; and **2)** Artificial-Intelligence-based (AI-based) investing advisory services. Incumbent asset managers have also been investing/acquiring AI-based service and expanding online distribution channels and we still see great uncertainty around final investing market structure.

Exhibit 2: We expect China's digitization of money by 2020E to reach a similar level of US in 2016.



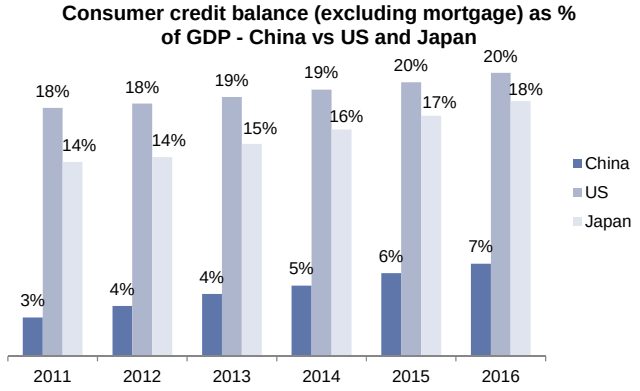
Source: Euromonitor, Goldman Sachs Global Investment Research

Exhibit 3: We estimate the consumption-related third-party payment value to reach Rmb31.6trn by 2020E.



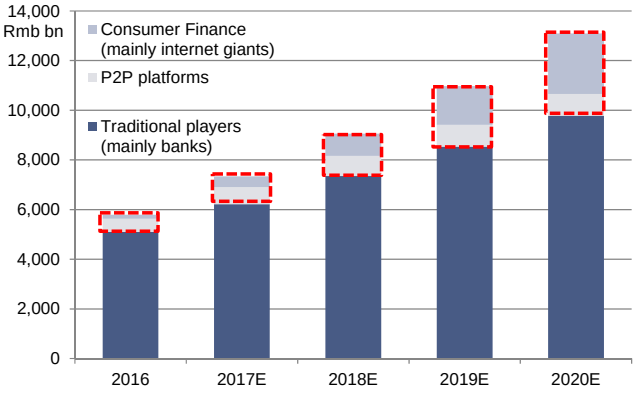
Source: iResearch, National Bureau of Statistics of China, Goldman Sachs Global Investment Research

Exhibit 4: Consumption growth and credit penetration are likely to drive consumer credit



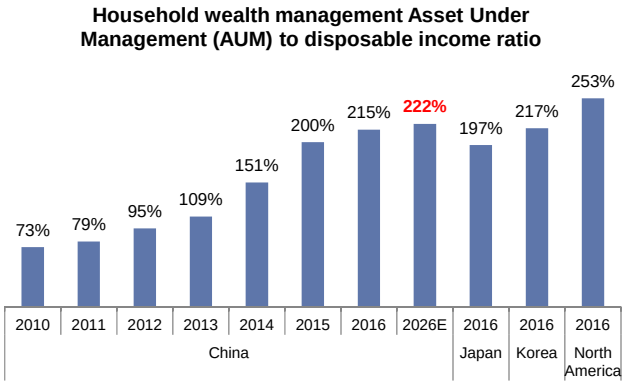
Source: PBOC, Federal Reserve, WIND, datastream, Goldman Sachs Global Investment Research

Exhibit 5: We expect consumer credit balance through internet lending to grow from less than Rmb700bn in 2016 to over Rmb3trn in 2020E.



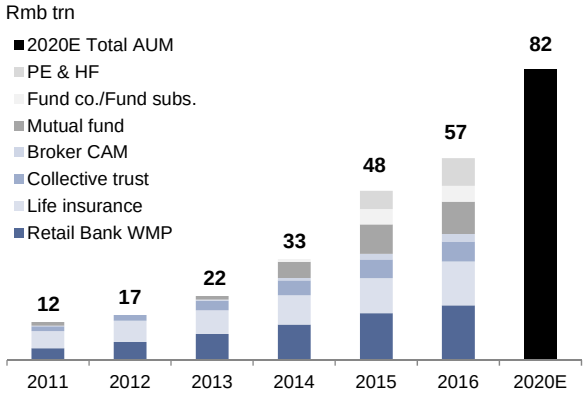
Source: PBOC, WIND, Goldman Sachs Global Investment Research

Exhibit 6: China's per capita wealth management AUM likely to grow with further wealth accumulation



Source: Worldbank BCG, Nomura Research Institute, Korea Financial Investment Association, Goldman Sachs Global Investment Research

Exhibit 7: Overall, we estimate the total AUM of intrinsic AM in China to reach Rmb82trn by 2020E



Source: CBRC, the Asset Management Association of China, China Trustee Association, Goldman Sachs Global Investment Research

Key shaping trends #1: Integration

A group of hybrid tech/finance companies have emerged at the heart of China's financial industry. The integration commences at the core businesses (usually non-finance), and extends to the entire finance supply chain from payment to lending to wealth management. We juxtapose the ecosystem with that in the US and Japan, examine the differences, briefly explain why and assess the likely future path.

A FinTech East vs West dichotomy

One of the most important characteristics investors need to understand about the China FinTech ecosystem is the high level of integration, both with offline businesses and along the entire finance supply chain. The companies with early success have built a distinctive ecosystem along the entire finance supply chain - and more importantly – linked to their core value proposition to Chinese consumers. This ranges from tech giants Alibaba (BABA)/Ant Financial (an Alibaba affiliate; Non-listed), Tencent (0700.HK), JD.com Inc (JD), Baidu (BIDU), to financial conglomerate Ping An (2318.hk), or even the real estate mogul Wanda. This contrasts with firms in the West like Visa (V) and MasterCard (MA), or digital disruptors like PayPal (PYPL) and Lending Club (LC) that focus mostly on one or just a few particular core business lines and no offline integrations.

Why integration?

- **Growth**
- **Efficiency**
- **Consumer behavior**
- **Return on capital**

But why? Conglomerates in China are not a new phenomenon. They have frequently grown since the era of the planned economy, partly because of opportunism and partly because they had little choice. The need to own the entire supply chain, for some of them at least, is for growth. After they successfully accumulated a sizeable user base in their core business lines, firms naturally expand into adjacent industries for growth. But it is mainly a response to inefficient markets, weak infrastructure and underdeveloped legal system and lack of trust. In a country where the market is underpenetrated and the existing infrastructure is incomplete, it makes sense to bring as many processes as possible inside the firm. Given underdeveloped consumer protection mechanism, consumers in this part of the world have also preferred bigger firms with recognized brand names – which, in most cases, mean 'one-stop solutions'. The macro environment in the past few years was also favorable for the FinTech industry - initially free from regulatory oversight, the return on capital was high vs traditional banking (mainly for lending), given much less risk capital requirement. This attracted investors searching for yield in a low interest rate environment.

Alipay: owned by Ant Financial, an Alibaba affiliate

WeChat Pay: owned by Tenpay, a wholly-owned subsidiary of Tencent

New entrants to challenge the established ecosystem: We are seeing other companies currently outside of the FinTech ecosystem either directly or indirectly start entering the FinTech space as they strive to close the loop within their own supply chains, especially in the payment area. Payment is often considered by the entrepreneurs the initial touch point with consumers and a crucial gateway to most other services. Examples are consumer group-buying platform Meituan Dianping, or online discount retailer Vipshop (VIPS). Historically, these companies have relied on Alipay/WeChat Pay to process their payments, but have recently entered the payment business on their own. It is too early to say whether these new entrants will be successful in challenging the existing order, but we highlight that new, large, private entrants cannot be ruled out of the current landscape or ecosystem.

The 'integration' mindset will continue to define how Chinese entrepreneurs think about their strategies. We believe the conglomerate structure and the 'integration' mind set will continue to shape how Chinese business leaders think about their overall strategies, or how they evaluate the value and return of specific business lines – always in context of the whole ecosystem, and rarely by individual lines. This probably explains why companies invest heavily in the payment businesses, although the profit profile is rather unattractive. Companies view payments as the basic infrastructure – a crucial gateway to close the loop for their distinctive ecosystem, and to grant targeted access to users and direct them to more profitable businesses within the ecosystem, and profitability comes secondary. This is a key debate for payment that we will revisit in later chapters of the report.

The integration mind set

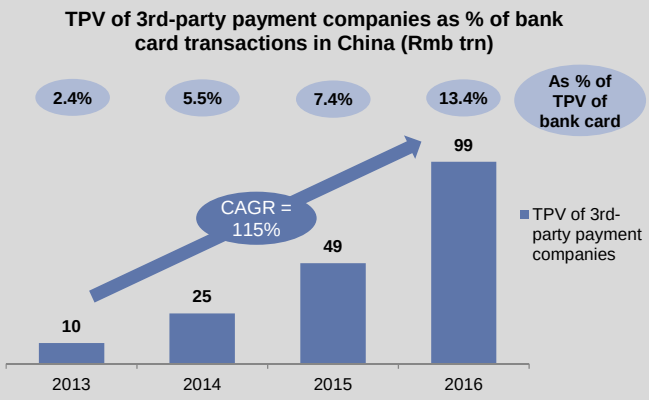
Did you know? In these companies' 2016 annual reports....

- **95 times: Alibaba** mentioned the word **'Ecosystem'**
- **35 times: Ping An** mentioned the word **'Integrated finance/financial', 'Ecosystem', or 'One-stop'**
- **13 times: Tencent** mentioned the word **'Ecosystem', or '"Connection" strategy', or 'Connection/connected'***
- **13 times: JD** mentioned the word **'One-stop' or 'Comprehensive'***
- **10 times: Baidu** mentioned the word **'Ecosystem'**
- **22 times: ICBC** mentioned the word **'Internet' or 'FinTech'***

Note: Strategy product-related context only, excluding accounting/legal/technical terms*

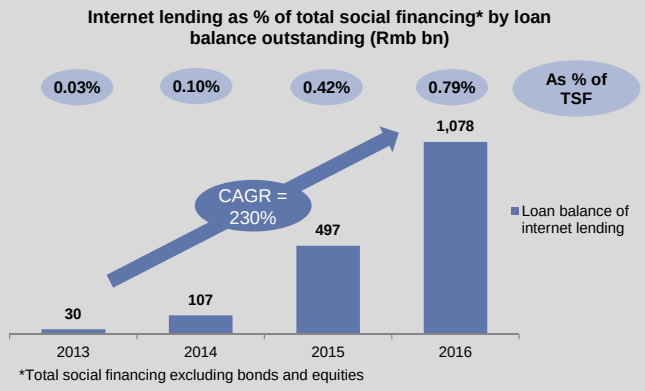
Although the FinTech sector had seen significant growth in the past few years, the combined market share of today is still a fraction of China's colossal financial system, and the regulators are still generally pro-growth – but we believe the final form of the FinTech ecosystem will likely be very different from the current form we observe today. We believe it's likely the government, through many forms including regulatory bodies, will continue to play a big role in the future. It is crucial for us to watch the regulatory direction from here.

Exhibit 8: Total payment value (TPV) of third-party payment firms is 13% of that of bank card transactions.
Third-party payment TPV as % of bank card in China



Source: PBOC, WIND, Goldman Sachs Global Investment Research

Exhibit 9: Internet lending grew exponentially since 2013, but small compared to the total social financing.
Internet lending as % of total social financing in China



Source: PBOC, WIND, Goldman Sachs Global Investment Research

Key shaping trends #2: Regulation

Regulation plays a vital role in determining the future evolution. Over the years, the FinTech regulatory environment has shifted from the initial free hand to promote growth, to a more balanced approach. These regulatory trends will be detailed in each of our Rise of China FinTech reports. We expect it to continue to evolve, especially with private capital's uncharacteristically high participation in infrastructure build-out, and the nascent nature of the industry.

The regulatory environment has supported innovation, especially in 2013-2015. Due to historical protection and strict regulation, traditional financial institutions (especially banks) have mainly served state-owned enterprises (SOEs), and are moving slowly with a continuing structural mismatch between supply and demand. This generates a relatively uncompetitive environment, with consumers and small businesses' financial needs largely underpenetrated. Higher regulatory costs and lack of infrastructure (such as personal credit scoring systems) also hindered banks from entering the space. As China's economy enters the 'new normal', a largely investment-and-SOE-led economy is no longer sustainable, and consumer spending and SME growth are becoming more pivotal drivers. With that macro backdrop, the government and regulators have explicitly expressed support for financial innovation and internet finance since 2013, and imposed far less regulatory constraints vs banks until recently.

Exhibit 10: The regulatory environment has in general supported innovation, but started to get more sophisticated in risk management.
Quotes on internet finance from the Report on the Work of the Government by Premier Li Keqiang

2015

"...**encourage** the **healthy development** of e-commerce, industrial networks, and Internet banking, and to guide Internet-based companies to increase their presence in the international market...

...channel **great energy** into developing **inclusive finance**... "

2016

"...work to see that Internet finance **develops in line with regulations** ...

...make a **major push** to develop inclusive and green finance... "

2017

"...be **fully alert** to the **buildup of risks**, including risks related to non-performing assets, bond defaults, shadow banking, and Internet finance....

...**encourage large and medium commercial banks** to establish inclusive finance departments... "

Source: State Council of the PRC, Goldman Sachs Global Investment Research

The tightening trend of the regulatory environment will increase regulatory costs, although overall the regulatory environment is still supportive. Initially free from regulatory oversights, the FinTech industry boomed and with the rapid growth came fraud and dangerous funding models, especially in the internet lending space. As risks events started to occur, Chinese regulators started to put more emphasis on market order, healthy development, and risk management. In a series of announcements from Jun 2015 to Oct

2016, the government laid out a comprehensive overarching framework, defining who and how they will regulate each business verticals within the 'internet finance' industry, putting more checks and balances on FinTech companies' business practices, especially on compliance, funding models, as well as consumer protection. On May 15, 2017, the central bank introduced a new FinTech committee, who will be responsible for coordinating between different financial regulators and industry participants. Regulators are constantly reviewing and revising the existing rules, and in some cases creating opportunities for incumbents. For instance, a recent CBRC regulation update suspended internet lending companies access to the student loan market, but instead encouraged banks to provide such services, a market that banks were previously not allowed to enter.

The unique closed-loop ecosystems of the big players also call for more sophisticated regulatory oversight and greater efforts in ensuring transparency. Indeed, it is already possible for the few big players to create credit within their closed ecosystem, and completely outside of the central banks' system. Thus, there is an increasing need for monitoring. An important milestone will be the establishment of the centralized clearing house for all third-party payments, *Wanglian,* in March 2017 – which is still in test-run stage and expected to clear all third-party payments in the long run. This will wend the current arrangements where most third-party players connect to each bank directly and effectively circumvent regulator oversights on transaction natures and fund flows.

We do not believe these measures are targeted to suppress innovation, but we do believe this would add speed bumps and induce significant business model changes for some players. We believe that the regulatory costs for FinTech companies will increase significantly over the next few years, thereby reducing return on capital to a more normalized level. Part of the lower return on capital should be compensated by the increase of the revenue pool. Scale will become more important in that context - and we might see waves of consolidations, especially within the payment and lending space.

Exhibit 11: Regulators have laid out and keep updating their framework for regulating the "internet finance" industry
Overview of the regulations on internet finance in China

Guidance on promoting healthy development of Internet Finance (Jul 2015)

Definition of scope of coverage: Financial institutions and internet companies, providing capital intermediation, payment, and investment services, and related-information intermediary services.

Government approach: Promote building of basic infrastructures by industry participants, encourage technology adoption and innovation, broaden financing

Internet lending	Crowdfunding	Internet payment	Online consumer finance	Online insurance	Online mutual fund distribution
CBRC	CSRC	PBOC	CBRC	CIRC	CSRC
Regulation: **Aug 16** Key approaches: 1. Emphasis on platform function; 2. Requirement to use banks as custodian of funds; 3. Cap loan size; 4. 13 non-compliant activities.	Regulation: **Aug 15** Key approaches: 1. Brought into CSRC supervision; 2. Define authorized participants and licensing criteria.	Regulation: **Oct 16** Key approaches: 1. Customer protection by centralized custody of clients' reserve; 2. Risk management by establishing Wanglian, a centralized clearing house for third-party payment.	Regulation: **Mar 16** Key approaches: 1. Broaden financing channel; 2. Encourage the use of interbank market for liquidity; 3. Encourage asset securitization.	Regulation: **July 15** Key approaches: 1. Relax geographic restrictions for certain products; 2. Define applicable products; 3. Define non-compliant activities and actions.	Regulation: **Jul 16** Key approaches: 1. Separation of funds with payment activities; 2. Increase scrutiny on risk and return disclosure.

Establishment of **FinTech Committee** by **PBOC (May 2017)** - to strengthen FinTech research planning and to act as an **overall coordinator.**

RegTech: active adoption of big data, AI, cloud computing and other technology to improve cross-industry/ cross-market risk identification / prevention.

PBOC: People's Bank of China
CBRC: China Banking Regulatory Commission CIRC: China Insurance Regulatory Commission CSRC: China Securities Regulatory Commission

Source: PBOC, CBRC, CIRC, CSRC, Goldman Sachs Global Investment Research

Private capital now has a seat at the table, and technology is the key enabler

Although the regulatory shifts might introduce changes to some disruptors' business models, we note that private capital has uncharacteristically high participation in the FinTech infrastructure ownership, and it will therefore likely have a bigger voice in influencing future policy directions. Most of China's existing basic infrastructures (bridges and roads/electricity grids), regardless of industries, were built and owned by SOEs or government agencies, and hence eventually the government. But we point out that a few big players in the FinTech industry have not only built a sizeable user base for the next generation of financial infrastructure, but also started to own them. Indeed, some innovators have come a long way making themselves more indispensable with a real technological advantage. We believe this could have implications on future industry structure/directions, technological standards as well as customer ownerships.

One of these early examples is *Wanglian*, China's newly established centralized clearing network for all third-party payments. The largest shareholders besides the Central Bank PBOC and the State Administration of Foreign Exchange (SAFE) are Ant Financial (9.61%) and Tencent (9.61%). This is in stark contrast with China's only card network UnionPay, which was built and still owned by PBOC and SOE Banks, and hence eventually the government.

Private participation in infrastructure of this scale is almost unprecedented in other industries in China. We think this is because – in order to regulate in the digital age – the regulators need to work closely with disruptors (who are often private companies instead of SOEs), as that is where the technology know-how and processing power lies.

We emphasize that regulating the FinTech industry is a dynamic balancing act and we might see regulations constantly evolving through trial and error. Owing to the nascent nature of the business model and the public-private collaboration, it would be difficult to surmise the policy directions. Thus, we believe it is important to track the development of how a few early initiatives evolves (such as the payment clearing house), as it could have deep implications for regulating the rest of the FinTech industry.

Exhibit 12: Private companies are playing a bigger role in China's FinTech infrastructure for the first time.
Alipay and Tenpay are the largest shareholders of China's only clearing house for all online payments, besides PBOC and SAFE. This compares to China's only card network, UnionPay, built and owned by PBOC and SOE banks. Data as of 2017.

	China UnionPay	Wanglian (sole clearing house for all online payment)
Number of shareholders	152	45
Capital (Rmb bn)	2.93	2
Main shareholders	**25% by 6 main shareholders:** China Banknote Printing and Minting (4.86%) China Construction Bank (4.78%) Industrial and Commercial Bank of China (3.84%) Agricultural Bank of China (3.84%) Bank of China (3.84%) Bank of Communications (3.84%)	**34% by 6 national institutions, including affiliates of PBOC and State Administration of Foreign Exchange** China National Clearing Center (12%) Wutongshu Investment Platform (10%) Shanghai Clearing House (3%) Shanghai Gold Exchange (3%) China Banknote Printing and Minting (3%) National Association of Financial Market Institutional Investors (3%)
	Joint-stock commercial banks such as: China Merchants Bank, Shanghai Pudong Development Bank, Postal Saving Bank of China, China CITIC Bank, China Guangfa Bank, Everbright Bank, Ping An Bank, Hua Xia Bank, Industrial Bank, Minsheng Bank, etc.	**63% by 38 non-bank payment companies such as:** Alipay (9.61%) Tenpay (9.61%) JD Pay (4.71%) 35 other payment companies (<3% each)
	Municipal commercial banks, credit cooperatives and non-bank institutions	Payment and Clearing Association of China (3%, representing other small & medium-sized payment companies)

Source: Company data, Sina, Goldman Sachs Global Investment Research

Key shaping trends #3: International

Chinese FinTech players have started to expand overseas to reach a broader user base. Local conditions – legacy infrastructure, regulation, demographic and culture norms – will dictate the adoption. It remains to be seen whether they can replicate their success abroad. We explore in this report the current progress in globalization, and point out some low hanging fruit (use by Chinese tourists) and early cases in exporting technology/business know-hows.

Chinese tech giants accelerated global expansion and overseas investment in the past few years. This is partly a natural progression as China plays an increasingly important role in global consumption and global trades, but also driven by the companies' rising need in finding the next growth area and broadening their user base. For example, Alibaba made globalization one of their key strategic goals in the next two decades, aiming to reach 2bn consumers globally by 2036 – They currently have 537mn e-commerce customer (annual active customers), 454mn of which comes from their domestic market China. For context, Amazon had 310mn active customers as of 1Q2016.

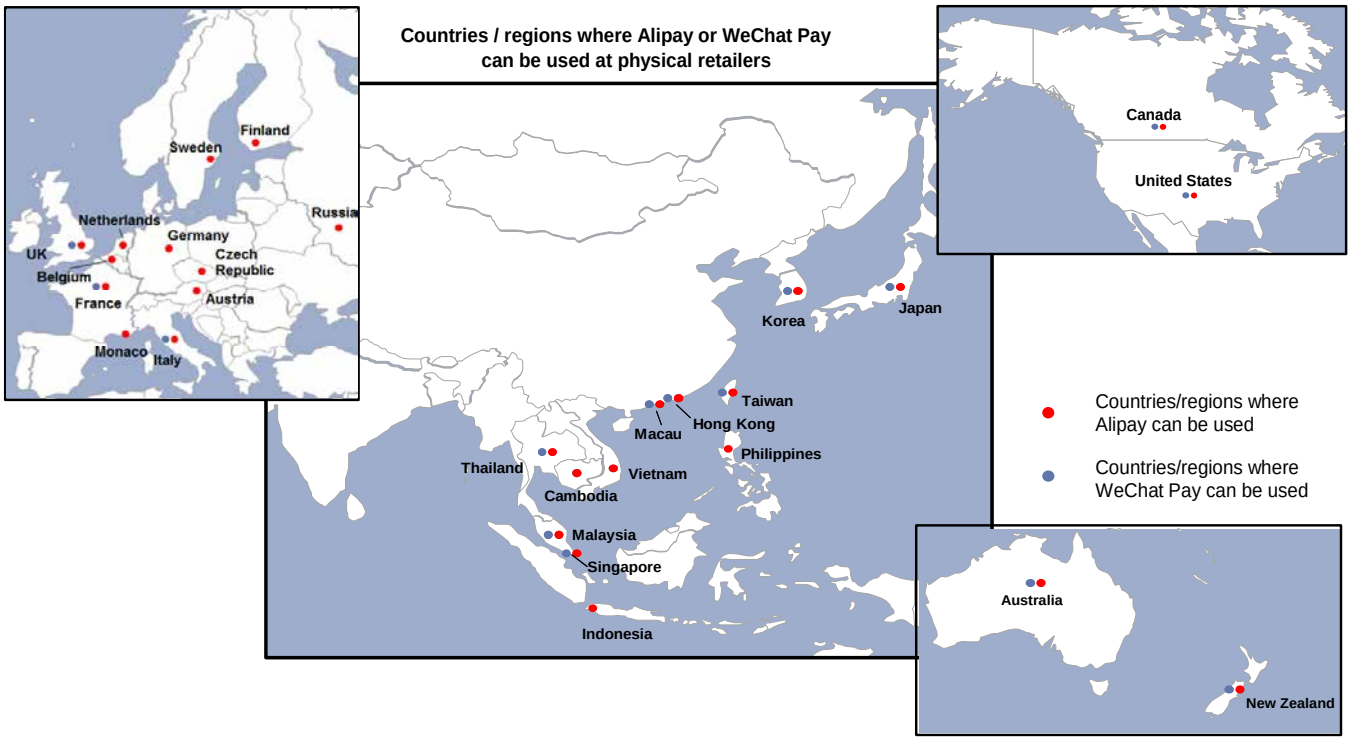
The low hanging fruit are the Chinese globetrotters. We believe the easiest way for Chinese FinTech companies to expand overseas is to leverage on their existing user base – Chinese consumers. As 120 mn Chinese citizens travel overseas every year, they will bring with them their preferences for payment channels. We observe initial success following the footsteps of Chinese globetrotters' payment channel. From there, Chinese companies may leverage the groundwork laid by Chinese overseas travelers in payment, to build up their overseas lending and wealth management presence.

Some examples of overseas services provided by Chinese FinTech firms include:

- **Payment and e-wallet**: Alipay and WeChat Pay - two popular third-party payment methods in China - are already available at physical retailers in 28 countries / regions outside of China for Chinese tourists. In many shops, tourists can even purchase on credit through the **virtual credit** provided via the payment companies or their partners.
- **VAT tax refund:** China tourists abroad can credit value tax refunds on their overseas purchases directly to their e-wallet (e.g. Alipay and WeChat Pay). In most cases, the refund is instant (T+0). For now, the services are available at most European Union airports and Korean airports.
- **International transfer:** Some online payment providers (like Alipay, Tenpay, ChinaPnR, and 99Bill, etc) offer cross-border remittance or international B2B/B2C/C2C payments services to Chinese consumers or business owners, usually with lower fee or more streamlined process. Ant Financial (a private company of which Alibaba has the right to a 33% equity stake subject to regulatory approval. Ant Financial owns Alipay) is recently reported by Bloomberg to be bidding for the global money-transfer service MoneyGram for US$1.2bn. Tencent (owner of Tenpay, with key products WeChat Pay and QQ Wallet) was also reported to have led the $13mn Series A round in Airwallex, an Australia-based cross-border payments startup (SCMP).

Exhibit 13: Alipay and WeChat Pay are already available at physical retailers in 28 countries / regions outside of Mainland China

Countries and regions where Alipay or WeChat Pay can be used at physical retailers



Note: As of June 2017

Source: Company data, Caixin, Goldman Sachs Global Investment Research

For emerging markets, there is opportunity for China FinTech firms to build their presence by exporting their technology and management know-hows to local partners. For many emerging countries, the experience from China showed that with the right infrastructure set-up, the right customer group, technology and timing, it is possible to leapfrog from traditional banking (branch/physical asset heavy) to an asset lite/digital-based business model. Chinese FinTech firms, now with their ample capital and technology know-how, have the opportunity to tap into a broader user base overseas. They also have the incentive to do so, especially as the local user base gets more penetrated. In many cases, the Chinese investors do not only provide capital, but are also heavily involved in the local partners' strategies, operations and technology set-up.

We observe some early success with such investment/cooperation, such as Ant Financial's involvement in South East Asia. Ant Financial/Alibaba is among one of the earliest and largest international investors in emerging Asia's FinTech space. They led a series of strategic investment in India, Korea and South East Asia.

Exhibit 14: Ant Financial (ANT)/Alibaba (BABA) have expanded their FinTech footprint in India, Korea, and Southeast Asia.
Timeline of the overseas investment and partnership of ANT/BABA

Ant Financial	Time	Feb 2015	Nov 2016	Feb 2017	Feb 2017	Apr 2017	Apr 2017
China	Market	India	Thailand	Korea	Philippines	Indonesia	Southeast Asia
1,383	Population (mn, 2016)	1,329	66	51	103	259	641
N/A	Partner	Paytm	Ascend Money	Kakao Talk	Mynt	Emtek	Lazada
N/A	Investment from ANT and/or BABA	US$900mn[1]	Amount unknown	US$200mn Set up Kakao Pay	Biggest non-controlling shareholder	Set up a JV	Merged HelloPay[2] with Alipay
BABA (33%, subject to approval)	Investors	ANT and BABA (40%)[1]	True Corp (80%) ANT (20%)	ANT (stake unknown)	ANT (45%) Ayala (45%) Globe (10%)	ANT (stake unknown)	BABA (54%)[3]
E-wallet and payment personal and SME lending	Nature of business	E-wallet and payment	Cash payment card and E-wallet, micro financing	Social network and online payment	E-wallet, SME and personal loans	Mobile payment	Third-party payment
520	Number of users (mn)[4]	200+	20	48	3	63	23

Note:
1. As of Mar 2017; excluding BABA's investment in Paytm E-Commerce in Mar 2017 and Softbank's investment in Paytm reported in May 2017. (Caixin and Bloomberg)
2. Third-party payment platform of Lazada.
3. Alibaba acquired a controlling stake in Lazada for US$1bn in Apr 2016. (Bloomberg)
It is reported by Bloomberg that BABA plans to invest US$1bn more, potentially increasing its stake in Lazada. (not completed and not included in our number)
4. As of Dec 2016 - Apr 2017 for different partners. Active users/buyers for Ant Financial, Emtek and Lazada.

Source: Datastream, Bloomberg, Reuters, Caixin, Digital News Asia, TechCrunch, company data, Goldman Sachs Global Investment Research

For developed markets, China offers a vision of the one-stop shop - ubiquitous apps/platforms that combine payment, lending and wealth management. Their success mirrors what some western tech giants are only now doing. Facebook first expanded into messenger services and then to peer-to-peer payments. Apple, Amazon and Google, who already have built huge ecosystems around their core business, moved into payment in recent years. However, we note that whether the success of Chinese or Western companies can be replicated overseas depends on local conditions - legacy infrastructure, culture, regulatory environment and availability of capital.

As we will explain in later sections of this report, Chinese FinTech players' business model is designed specifically to tap into markets where incumbents are less efficient, usually due to cumbersome legacy process and high regulatory costs, such as in small-scale consumer lending. Their success is enabled by the unique infrastructure set-up, as well as regulatory support and the availability of cheap capital in the past few years. In developed markets, especially where consumers' financial needs are better addressed by existing businesses and the market order is already established, we think the immediate opportunity for Chinese FinTech players remain in serving Chinese travelers overseas financial needs, as well as cross-border transfers. Partnership is one way to address such demands. As an example, Alipay and WeChat Pay announced in May their entry into US payment space via First Data and CITCON respectively.

Third-party payment – Case Studies

How does QR code payment work in China?

QR codes (Quick Response codes) have become an integral part of the Chinese way of life. It is most commonly used in China to transfer payment, connect with other users, and as a link for content distribution or digital marketing. In this case study, we illustrate how a typical QR code payment transaction works in real life in China. (**p. 25**)

Can a phone replace your wallet?

In this case study, we examine what an average consumer in China (Shanghai) or the US (New York City) can pay for if he/she only has a smartphone (with prevailing third-party payment methods enabled), but not a wallet/cash or bank cards. (**p. 26**)

Gamification of cash gifting

In 2014 WeChat Pay launched 'red packet' – a digital twist on China's traditional cash-filled red envelope that people give each other during festivals. The feature went viral. It helped WeChat Pay to grow its initial user base and triggered the broader consumer adoption of mobile payments, especially C2C transfers. In this case study, we examine the gamification of cash gifting and how that helped the payment adoption. (**p. 43**)

The "one-stop" shop – what do WeChat Pay and Alipay look like?

In this case study, we showcase the user interface of WeChat Pay and Alipay, ubiquitous apps that handle much more than payment itself, and how they serve as a gateway to other financial or non-financial consumer services. (**p. 48**)

Incumbents' response

As Alipay and WeChat Pay gradually replace cash and cards in people's daily transactions, many Chinese banks are starting to reexamine their digital strategy and revamping online platforms to stay relevant to their end consumers. In this case study, we look into the incumbents' response by comparing WeChat Pay with CCB Mobile Banking platform. (**p. 53**)

The current state of play

Third-party payment: The current state of play

Our definition of third-party payment: Payments processed by non-bank firms. It is usually done via desktop, mobile devices or non-bank terminals.

Third-party payment TPV via mobile (2016):

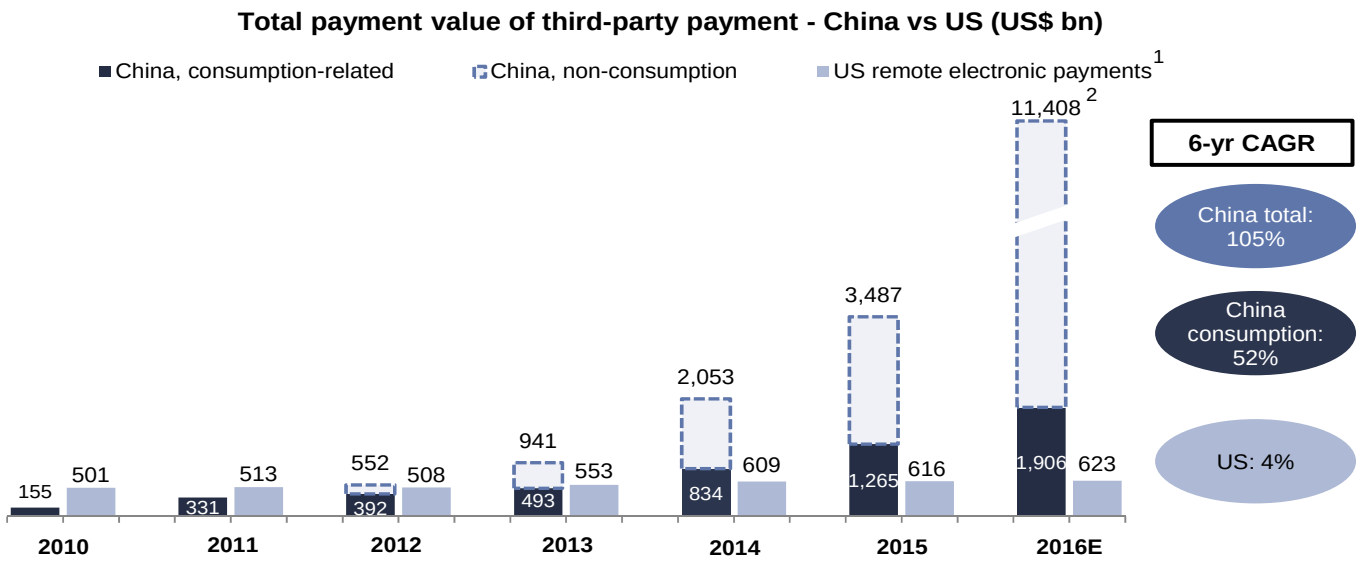
- **75% of total**
- **58% of consumption-related**

Sheer size and speed of adoption: China's leapfrog

Third-party payment, especially mobile payment, is one of the most notable areas of the rise of FinTech in China. In 2016, third-party payment made through third-party processors (via desktop and mobile) reached US$11trn in 2016 in China vs. $623mn in the US (In this report, we use US$/Rmb = 6.9 flat, the rate as of May 2017). Of course, these comparisons might not be apples-to-apples. For one thing, a large portion of the payment value in China was peer-to-peer (C2C) transfers for which few services charge explicit fees, while most of the US$623mn payment value in the US was likely commercial rather than C2C transfers. But even if we only look at consumption-related transactions, the value in China is still large at US$1.9trn in 2016 from close to zero in 2010.

Mobile payment has gained popularity even faster. By 2016, 95% of China's internet users go online via mobile devices, and 68% of them have used mobile payments. 2015 marks the year where mobile payments finally overtook those via desktop (in value). In context, c.80% of the e-commerce payment in US today is still done via desktop. By 2016, Chinese mobile payments were nearly 70 times greater than those in the US. Those consumption related payments were nearly 8 times greater than in the US.

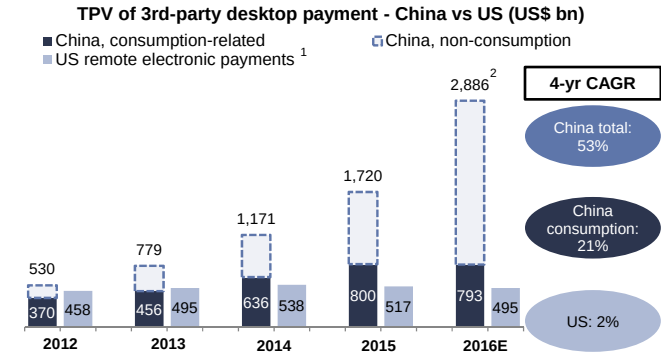
Exhibit 15: Third-party payment grew exponentially in China during the past few years
Total payment value of third-party payment, China vs US (US$ bn)



Note:
1. No directly comparable data in the US. We are using the remote payments data from the Nilson Report as a proxy. The 2016 number is our estimate.
2. Actual number from iResearch. Non-bank TPV based on PBOC disclosure is $14,387bn. The main discrepancy vs iResearch data is that PBOC includes UnionPay's affiliates and some internal money transfers within corporates. The TPV breakdown of China is our estimate based on iResearch.

Source: iResearch, Nilson Report, Goldman Sachs Global Investment Research

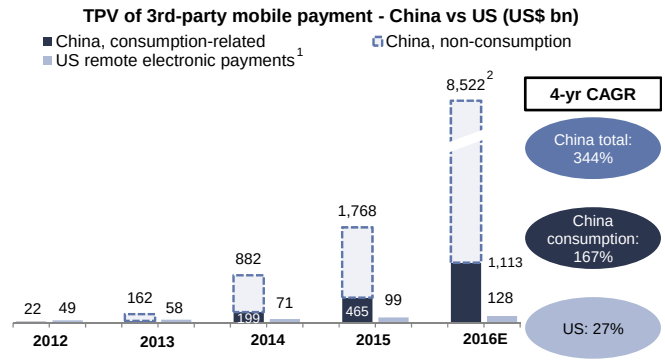
Exhibit 16: Third-party payment via desktop has grown rapidly in China...
Total payment value of third-party desktop payment (US$ bn)



Note:
1. The desktop TPV of the US is estimated based on the desktop payment mix in e-commerce.
2. The TPV of China in 2016 is actual number. The breakdown is our estimate based on iResearch.

Source: iResearch, Nilson Report, comScore State of the US online Retail Economy, Goldman Sachs Global Investment Research

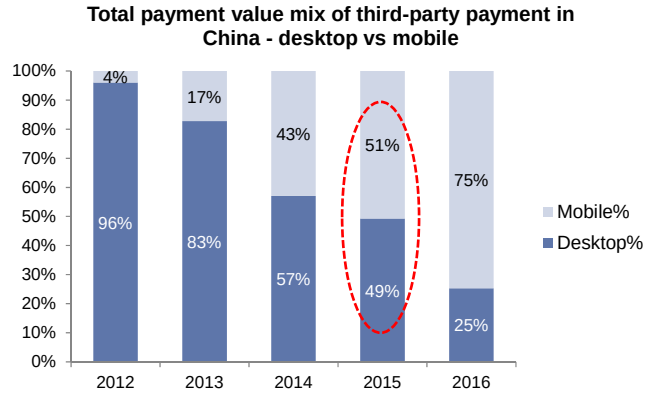
Exhibit 17: ...but mobile payment has grown even faster
Total payment value of third-party mobile payment (US$ bn)



Note:
1. The mobile TPV of the US is estimated based on the mobile payment mix in e-commerce.
2. The TPV of China in 2016 is actual number. The breakdown is our estimate based on iResearch.

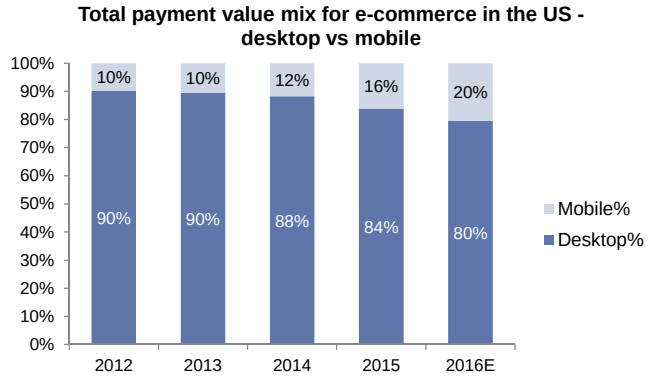
Source: iResearch, comScore State of the US online Retail Economy, Nilson Report, Goldman Sachs Global Investment Research

Exhibit 18: Mobile payment overtook desktop payment in 2015
Total payment value mix of third-party payment in China – desktop vs mobile



Source: iResearch, Goldman Sachs Global Investment Research

Exhibit 19: In the US, mobile payment is also gaining popularity, but desktop payment still dominates the market.
Total payment value mix for e-commerce in the US – desktop vs mobile



Source: comScore State of the US online Retail Economy, Goldman Sachs Global Investment Research

See our Case Study on Alipay and WeChat Pay on Page 48

Third-party payment in China is replacing cash, not only cards

The explosive growth was initially brought on by the proliferation of online shopping in China – Alipay, the payment arm of Alibaba, was first launched in 2004 by Alibaba an internet payment service for the Group's e-commerce platforms (Alipay now is owned by Ant Financial, a partially owned Alibaba affiliate). Others soon caught up, especially with the arrival of smartphones and the proliferation of social media and online-to-offline services like travel agencies, rides hailing and food delivery apps. There are now around 250 third-party payment licenses in China (Apr 2017, PBOC). Tencent, the internet giant who owns the popular messenger app WeChat, launched a payment function in the WeChat app in 2011, and quickly become one of the largest payment players. Baidu, JD, Ping An and many others all followed with their own payment app/functions. Sizeable players from other industries are getting into the payment businesses, such as Meituan Dianping, Vipshop and GOME (an electronic appliance retailer).

See our Case Study on QR codes on Page 25

See our Case Study on Gamification of Cash on Page 43

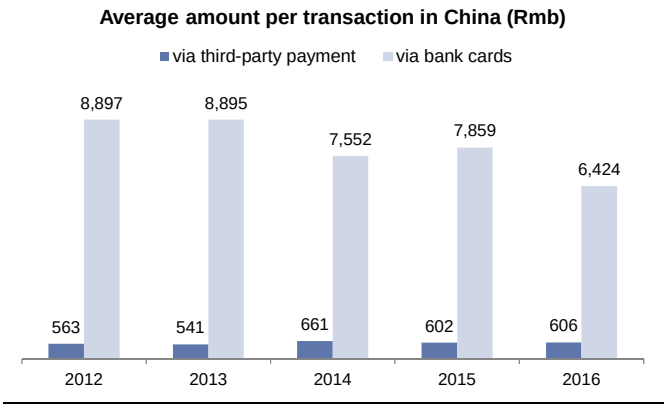
See our Case Study on Cashless on Page 26

Third-party payments have also moved into physical retailers, including supermarkets, restaurants, and many brick-and-mortar shops where bank cards have yet to penetrate. Even public services fees, such as the utility bill or traffic tickets, can now be settled via mobile phone with just a few clicks. QR codes, the two-dimensional barcode that never really took off in the West, have now become a standard for mobile payment in China. Users simply open a payment app (usually WeChat Pay or Alipay. WeChat Pay is embedded in Tencent's wildly popular messenger app WeChat), scan a QR code and make a payment. It is also as easy for people to send money to each other as it is to send a text message – Chinese consumers even do that for fun sometimes. The QR code has made significant progress abroad too, as EMVco ("a consortium of smart payments collectively owned by American Express, Visa, Mastercard and UnionPay", adopts it as an industry standard of payment format in July 2017 (according to South China Morning Post, July 16, 2017). Growth was also robust as other internet financial services becoming more popular, like online money market funds and peer-to-peer lending. For example, consumers can easily move money between their e-wallet and online market funds provided within the payment apps. Alipay's Yu'e Bao has attracted Rmb 1.43trn assets under management by Jun 2017 (Yu'e Bao is an online money market fund provided by Tianhong Asset Management, an asset manager 51% owned by Ant Financial).

As a result, third-party payment in China is starting to replace cash, especially in small ticket-sized and high frequency transactions. Chinese consumers have become so accustomed to cashless or even cardless transactions – you can easily spend a day in a major Chinese city with only your smartphone (with payment apps installed). This is starkly different from most developed world as one of the most persistent uses of cash there remains the purchase of small ticket items. Typically, these purchases under $20 tend to be habitual - which makes the shifts to electronic payments in this category particularly difficult. But that is exactly where third-party payment companies excel in China. We estimate that about 40% of the retail consumption in 2016 was done via third-party payment. Caixin quoted a Chinese bank official, saying that Alipay and WeChat Pay now dominate the small ticket (< Rmb 5,000) and high frequency transactions with roughly 80% market share.

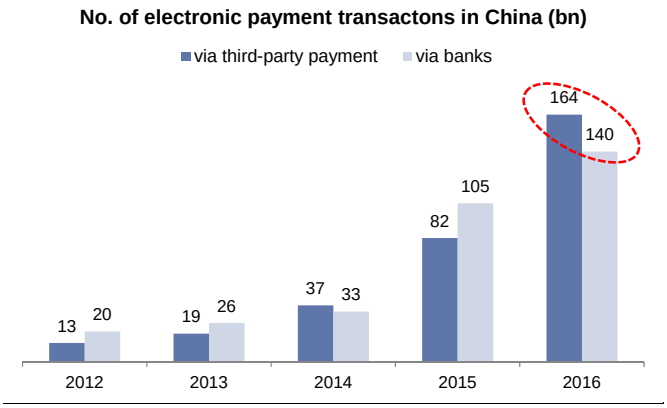
We think the fast adoption of third-party payment was enabled by technology, the proliferation of e-commerce and social media, but also by China's late mover advantage in digitization of money, unique infrastructure set-up fee structure. We will examine in detail in the Enablers of Growth section.

Exhibit 20: Third-party payment in China tends to have much smaller ticket sizes than bank cards…
Per transaction amount of third-party payment and bank card transactions in China



Source: PBOC, Goldman Sachs Global Investment Research

Exhibit 21: … and higher frequency.
Number of electronic payment transactions via third-party payment and banks



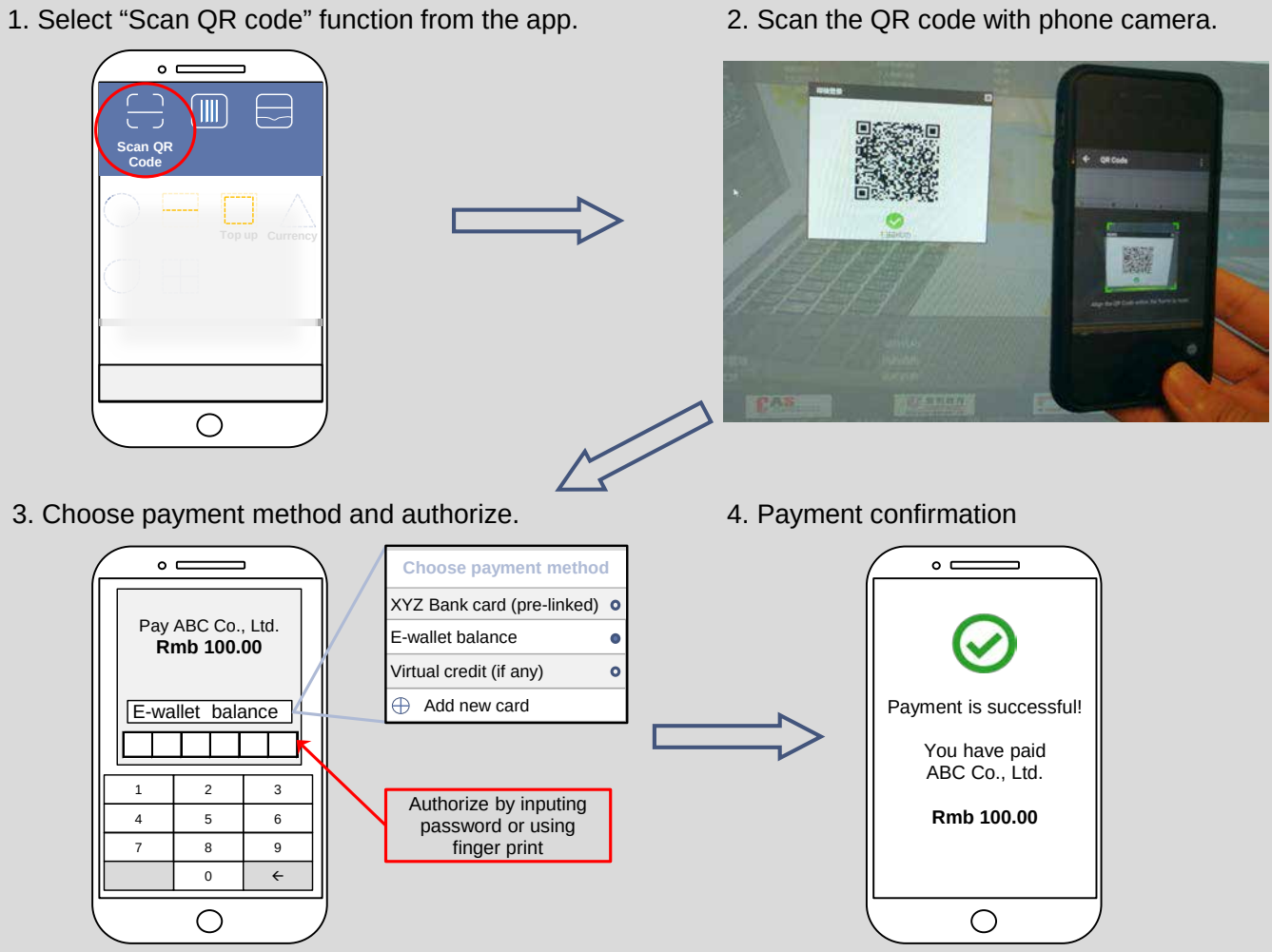
Source: PBOC, Goldman Sachs Global Investment Research

CASE STUDY: How does QR code payment work in China?

QR or Quick Response codes have become an integral part of the Chinese way of life. It is most commonly used in China to transfer payment, connect with other users, and as a link for content distribution or digital marketing. Although the QR code method is only one of the many ways in China to handle payments and hardly the most secure one, QR code has gained the widest adoption, partly because of the heavy promotion from Chinese tech companies (initially led by social network giant Tencent through WeChat). The other reason we believe why QR code payment has taken off was the ease of use, low adoption costs, and the lack of existing infrastructure (such as Point-of-Sale terminals), especially for small business owners.

Below we illustrated how a typical QR code payment transaction works in China.

Exhibit 22: 4 steps to make a QR code payment



Source: Goldman Sachs Global Investment Research

CASE STUDY: Can a phone replace your wallet?

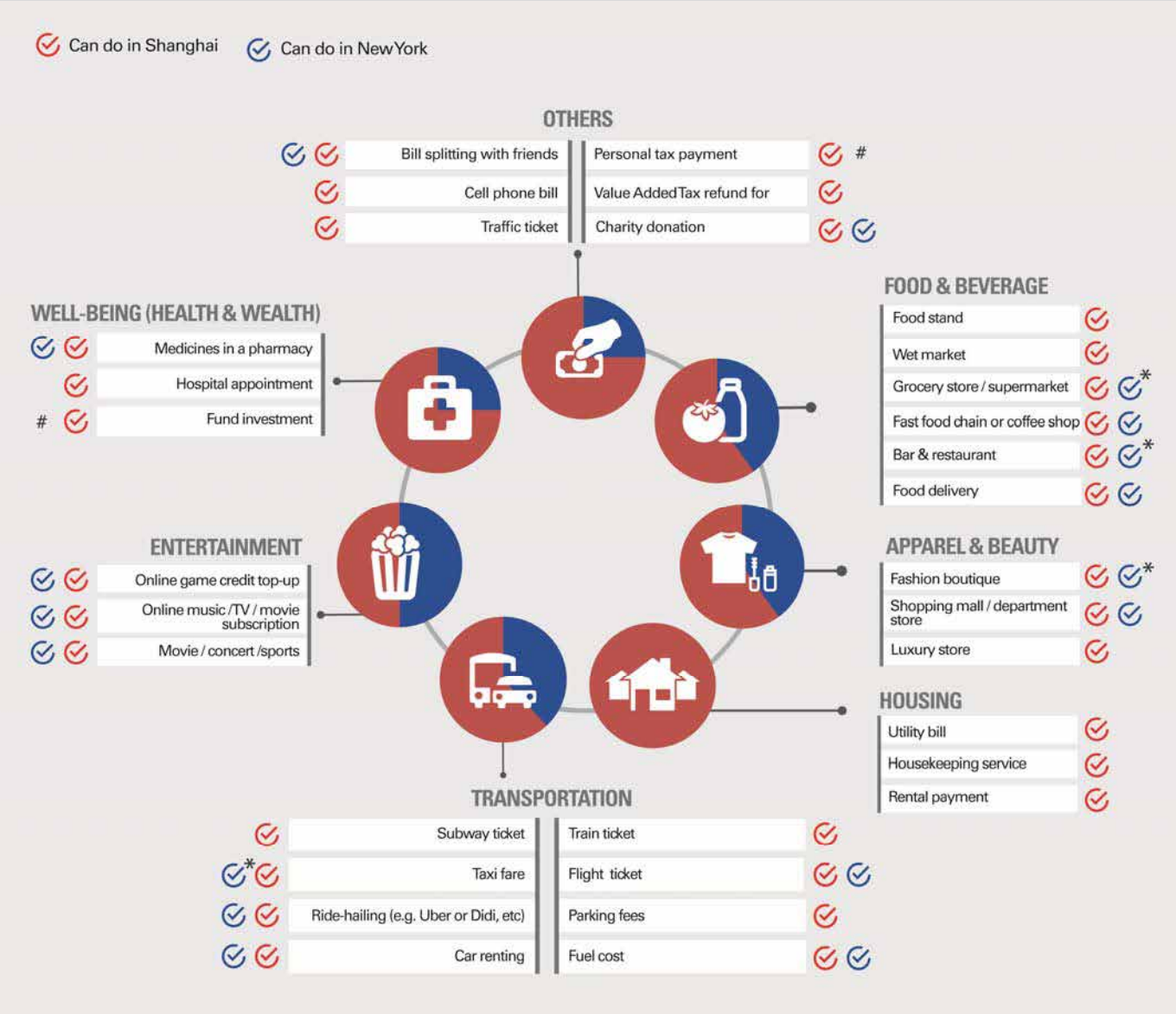
In this study, we examined what an average consumer in China (Shanghai) or the US (New York City) can pay for if they only have a smartphone (with prevailing third-party payment methods enabled), but not a wallet/cash or bank cards.

Notes:

*: The ability to use Apple Pay in grocery stores, restaurants, fashion boutiques and for taxi fares are widely available in the US, but the penetration is relatively low.

#: It is possible to pay personal tax or invest in funds with mobile payment method in the US, but we believe the adoption rate is low.

Exhibit 23: What can one pay for with third-party mobile payments?



Source: Goldman Sachs Global Investment Research

THIRD-PARTY PAYMENT

Key payment channels and how does it work

Key payment channels by type of transaction: B2C, C2C and B2B

Although there are multiple ways to classify payments, we believe they are best discussed in terms of commercial channels/type of transactions. People often discuss third-party payments without distinguishing between different channels; we think that is misleading because each has its own characteristics, drivers and more importantly different economics. We identify B2C (Business to Consumer), C2C (Consumer to Consumer) and B2B (Business to Business) as the three main payment channels in China based on nature of the transaction. Within B2C, we further break it down into consumption-related payments and those for online financial products.

B2C Payments:

We define B2C payments as any payment made from consumers to businesses in exchange for goods and services. Within this category, we further break it down into consumption-related transactions and those used to purchase online financial products.

- **Consumption-related payments**: We define consumption-related payments as payment made from consumers to merchants, in exchange for consumer products and non-financial services. This is arguably the most important type of payments from an economic perspective. We estimate that consumption-related transactions only account for a small portion of the total payment value (16% in 2016), but they are the main fee/profit contributor (if any). It also offers more insight into people's consumption behavior, when compared with C2C transactions. For the purpose of this report, we will focus more on consumption-related payment unless otherwise mentioned.
- **Payments for online financial products**: We define payment for online financial products as payment made from consumers to purchase online money market funds or other financial products. This is rather unique to China. Many large payment companies offer money markets funds or other financial products (usually provided by a third-party) to users on their platform. One example would be Yu'e Bao offered by Alipay. Users can move money from their Alipay wallet to Yu'e Bao without a transaction fee. We believe these transactions are not profit generating since there the fee so small. In 2016, 27% of the TPV from payment companies went into this category based on our estimate.

Yu'e Bao is offered by Tianhong Asset Management, which is 51% owned by Ant Financial. Most other payment companies do not yet possess a fund/brokerage license.

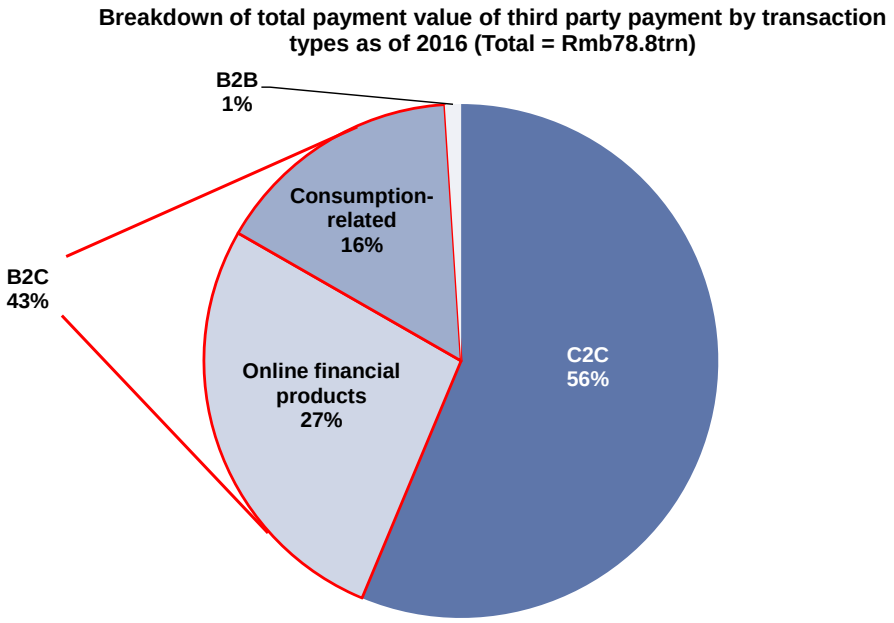
C2C Payments:

Here we define C2C payments as any payment made from one person to another for any purpose (to split a bill, to settle a debt, to give a gift, etc.) other than exchange for goods and services. Payment companies usually do not charge customers on those transactions. C2C transactions thus contribute very little to the bottom line. In 2016, more than half of the TPVs from third-party payment companies are C2C transactions. Because cash payments between individuals are virtually impossible to track, the exact size of the C2C payment market in China is difficult to estimate.

B2B Payments:

It refers to payments made between companies for goods or services rendered. This tends to move very slowly given the significant time and cost required to change technology infrastructure. Plus the adoption of electronic payments (such as bank transfer) is much higher to begin with in the B2B area. We could see significant shift in the long run, especially in international B2B payments. But for now, most disclosure on payment company TPV includes only B2B payments related to e-commerce and the growth has been relatively slow.

Exhibit 24: Breakdown of China's third-party payment market by type of transactions
Total payment value of China's third-party payment by transaction types in 2016 (estimated)



Source: iResearch, Goldman Sachs Global Investment Research

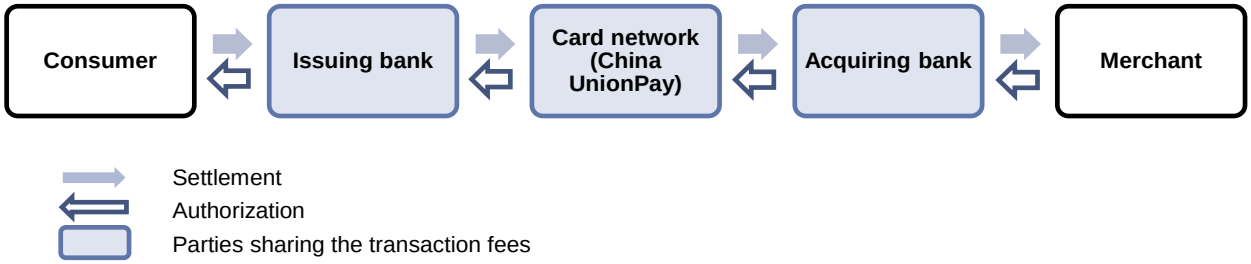
How does it work? Traditional vs Third-party

How does a traditional payment value chain work?

Apart from cash transactions, banks have dominated an ecosystem which includes bank accounts/bank cards management technology providers and payment networks (or card networks) – mainly UnionPay, which itself is owned by a consortium of government agencies and state-owned banks.

Traditionally, the payment chain contains three links – issuing bank, card networks, and merchant acquirer – every one of which will claim a proportion of each transaction. **Most of the money ultimately goes to the banks.**

Exhibit 25: Traditionally, the payment chain contains three links -issuing bank, card network and merchant acquirer (also known as acquiring bank), every one of which will claim a proportion of transaction fees.
Illustration of the value chain of a traditional bank card transaction



Note: If the acquiring bank is the same as issuing bank, card network will not be involved. The fund would be transferred within the bank directly

Source: Goldman Sachs Global Investment Research

Third-party payment value chain: now and future

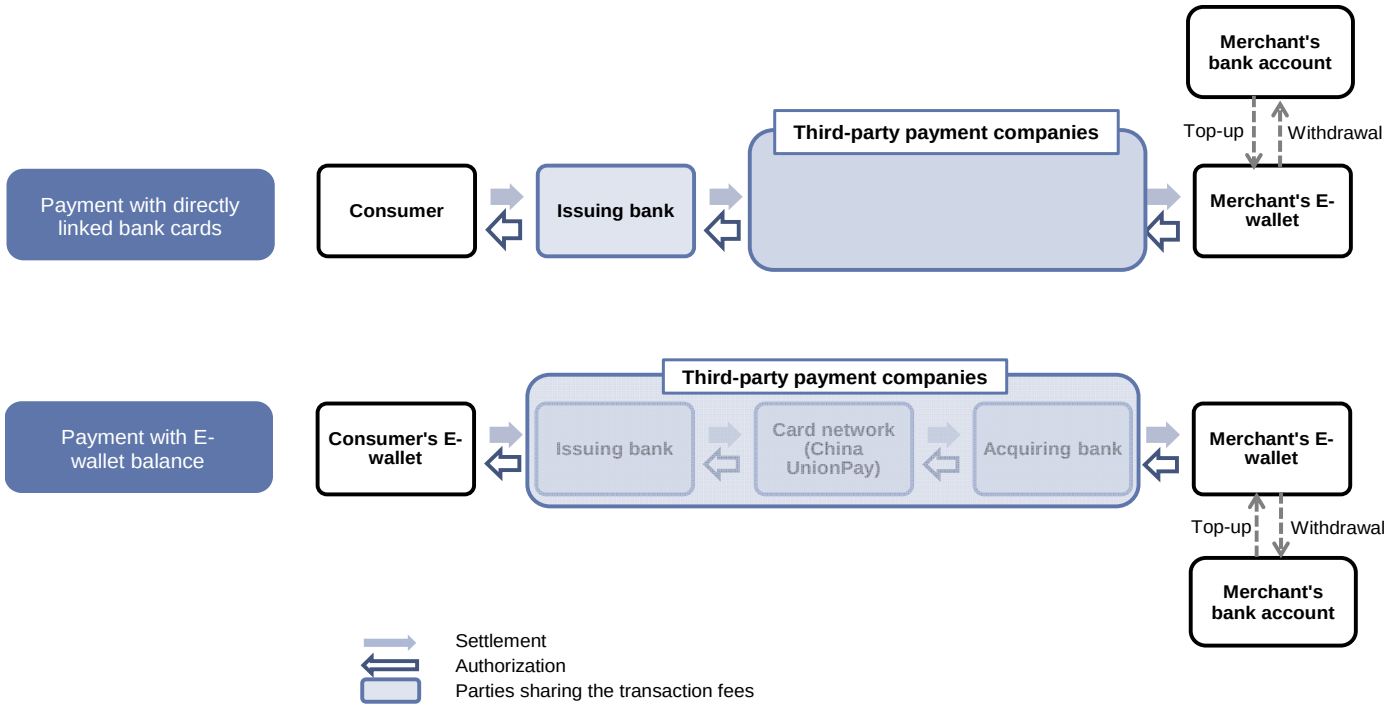
Payment companies started out by challenging all three links. There are now third-party newcomers targeting each of the three parts, with around 250 active third-party payment licenses. Some contestants might even play all three roles.

While most banks have built their own online payment systems**, paying using the banks' system was cumbersome** until recently – usually requiring authentication through a combination of SMS messages, USB dongles and random token generators.

By contrast, payment with Alipay or WeChat is much more streamlined and requires a few clicks after the customer has tied his/her payment account to his bank cards. At physical retailers, it usually requires only the scan of a QR code from a retailer's point-of-service terminal, a smartphone, or a piece of paper printed with the QR code. NFC (near field communication) payment is available too, through Apple Pay or UnionPay's Quick Pass, but we believe it is less prevalent for small ticket items or at brick-and-mortar shops.

All transactions eventually are backed by the seller and buyers' bank account, but the path varies. In order to use third-party payments, buyers and sellers need to go through a one-time set-up to link their bank card to their accounts with the payment companies. The payment companies will handle the transaction process and interactions with buyers and sellers banks. The payment from the buyer, net of transaction fees, will be credited to the merchant's account with the payment companies. For Alipay and WeChat Pay, a customer can choose to pay either from the linked bank card for each transaction, or pay directly from their e-wallet balance with Alipay or WeChat Pay.

Exhibit 26: Third-party payment companies typically play more than one role of the traditional payment value chain
Illustration of two typical flows of third-party payment transactions



Roles on traditional payment value chain	What does it do?	Who can play these roles?			
		Banks	Card network (e.g. China UnionPay)	Centralized clearing house (e.g. Wanglian)	Third-party payment companies
1) Issuing bank	Providing fund for the payment on behalf of the consumers	√			√
2) Card network	Settling the cross-bank fund transfer when necessary		√	√	√
3) Acquiring bank	a. Acquiring merchants b. Providing devices and services c. Processing the payment	√			√

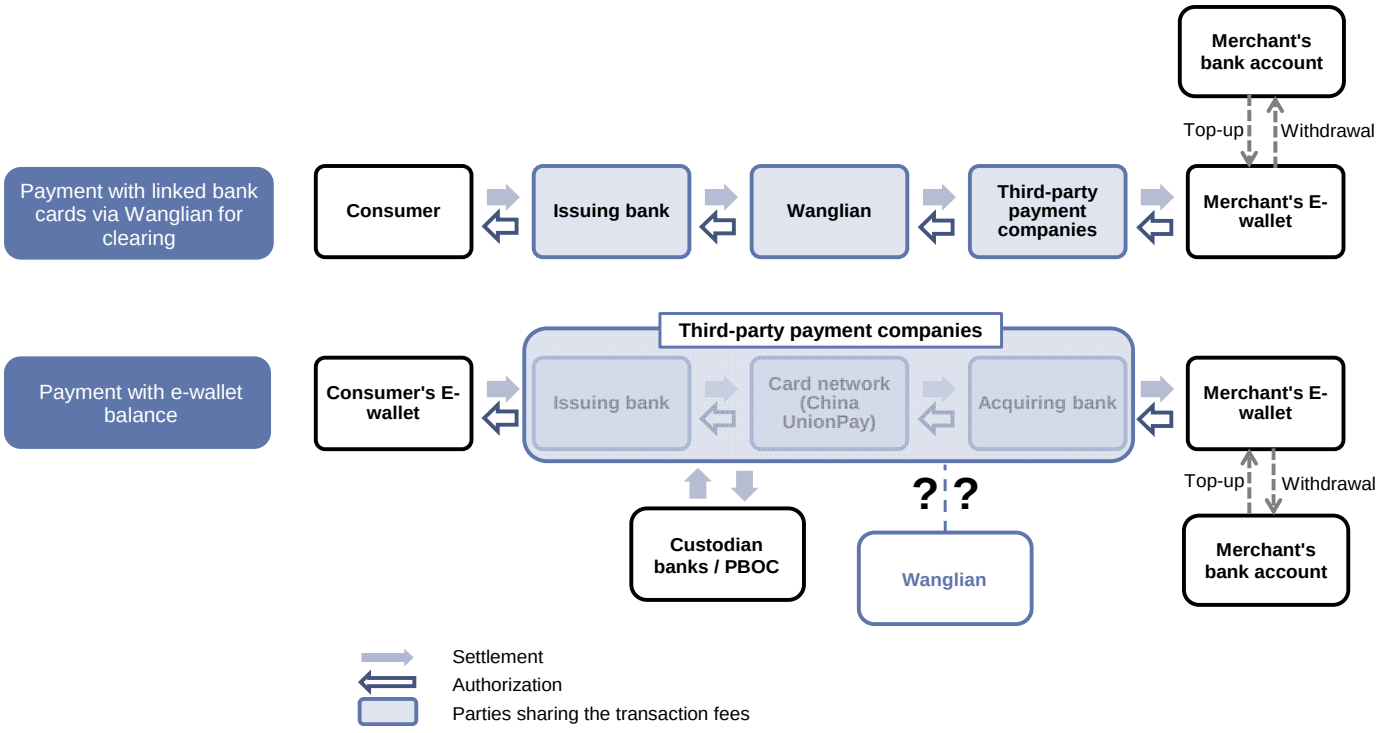
Source: Goldman Sachs Global Internet Research

But payment companies face significant model change with the new clearing house.

Currently, third-party companies connect to banks via different means, and UnionPay which is China's only card network, is often bypassed. Many payment companies, especially big players like Alipay and WeChat Pay, have negotiated with major banks and have their account systems directly connected with the banks'. Payment companies effectively act as a clearing house in this case. This has increasingly become an issue with the regulators, given the opacity and potential challenges it presents to other parts of the financial system (such as AML).

On Mar 31 2017**, a centralized clearing house** (Wanglian) for online third-party payments went live. In the long run, all transactions theoretically can go through Wanglian or UnionPay. **This might prompt changes to the information and money flow of the current third-party payment value chain**. We will discuss the implications in the later sections.

Exhibit 27: After Wanglian is fully implemented, funds need to be cleared by Wanglian and Custodian Bank/PBOC will be able to monitor fund flow. However, the exact implementation and fee structure is unclear, especially for the interim.
Illustration of two typical flows of third-party payment transactions when Wanglian is fully implemented



Source: Goldman Sachs Global Internet Research

How do they make money? Traditional vs Third-party

The economics for a typical card transaction through the banks' network:

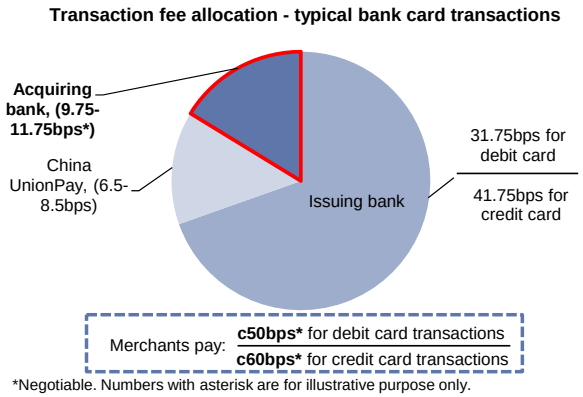
- The **merchant** is charged a fee of 0.6% for every card purchase.
- The buyer's bank **('issuing bank'**) takes 0.4175%,
- **UnionPay (card network)** typically gets 0.065% to 0.085%, and **the merchant's bank** ('acquiring bank') takes the rest.
- The exact divide usually depends on the bargaining power of the banks, in our view.

The economics of a typical transaction through third-party payment processors:

Payment companies might take a bigger share of the fee versus banks, given the multiple roles they play in the process. However, the net spread for Chinese payment companies is much lower vs global peers. For example, PayPal's blended net spread is 1.81% in 2016, in contrast to a typical Chinese third-party payment handler the net spread would be around 0.1% to 0.4%.

This is partly due to **the low headline fee** to begin with in China. A typical credit card transaction charges merchants a meager 0.6% in China, vs c.3% in the US. The actual fee payment companies charge merchants might be even lower**, due to competition for user sign-ups**. The competition is especially intense for physical retailers to sign up. We believe **the gross fee** charged on merchants in many cases can be as low as 0.38%, making the **net spread** for payment companies merely is 0.1-0.2%.

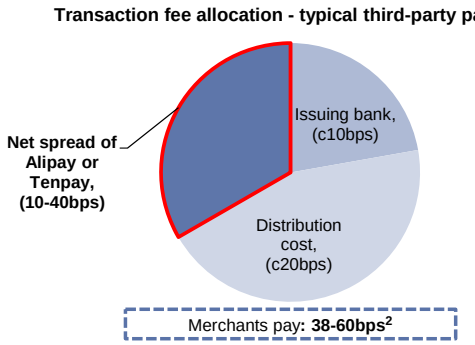
Exhibit 28: Economics of a typical traditional payment transaction



*Negotiable. Numbers with asterisk are for illustrative purpose only.

Source: PBOC, Goldman Sachs Global Investment Research

Exhibit 29: Economics of a typical third-party payment transaction



Note:
1. Distribution cost includes infrastructure cost, marketing cost paid to acquiring companies, etc.
2. Numbers for each component are showing an illustrative range so they don't always add up.

Source: Company data, Goldman Sachs Global Investment Research

For most third-party players themselves, we believe the direct profits from payment handling are thin. In Tencent's 2015 annual report, there was a net loss of over Rmb300mn on payments due to bank handling fees. One other revenue source many third-party players rely on is the internet income on the idle funds passing through their system. The ownership of those idle funds was not clearly defined until recently when in a recent review PBOC required third-party payment companies to start to set aside the idle funds into a special-purpose account, instead of booking interest income for their own. Although this might take some time to be fully implemented, a business model that is fully reliant on the arbitrage seems less feasible for the future. We will discuss more on the rationale of such an unprofitable business model, and possible monetization in the key shaping trend section. **The bottom line: It will be hard for third-party payment companies to make**

meaningful direct profits from payment processing, unless they have other channels for monetization within their ecosystem.

The competition for merchant sign-ups, especially physical retailers, has become more intense, when Tencent joined the market in 2015 which used to be dominated by Alipay. It is common for third-party players to offer rebates or higher payment aggregators to attract more merchants, further driving down the actual fee. The gross fee charged on merchants in many cases can be as low as 0.38%, of which Alipay/Tencent takes 0.20% (before settling with the banks), and the rest 0.18% goes to the distribution channel.

THIRD-PARTY PAYMENT

Enablers of growth

Enablers of growth

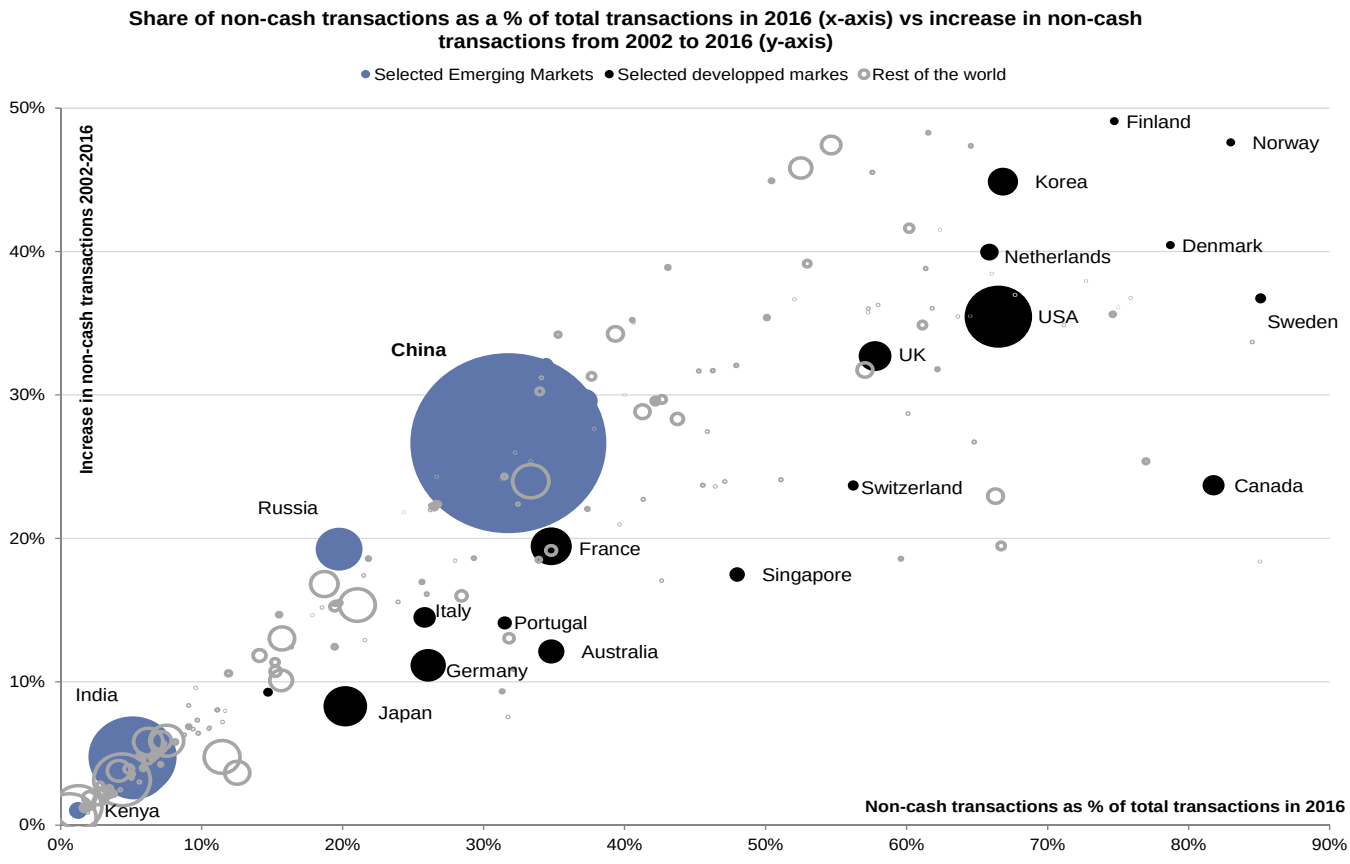
Growth enabler #1: Digitization of money

Late mover advantage in digitization of money

Developed economies moved from cash to mostly cashless payments (credit/debit cards etc) a long time ago. On the other hand, China was still overwhelmingly cash-based until the early 2000s. Although debit cards were widely available, but small and high frequency purchases - especially day-to-day activities - were still predominantly done in cash – partially due to the lack of infrastructure like Point-of-Sale (POS) terminals, partly due to the cumbersome security verification process when using bank cards.

The shift to digital payments in China happened at a time as the internet took off, and accelerated with the introduction of e-commerce and arrival of smartphones. Many Chinese consumers never owned a personal computer, and went straight to smartphones. Today 95% of Chinese internet users go online via mobile devices. This, along with other enablers of growth (such the unique infrastructure set-up, reduced transactional frictions and fees, and improved ease of use), set the stage for Chinese consumers to leapfrog directly from cash to digital payments, skipping a whole generation of plastic cards.

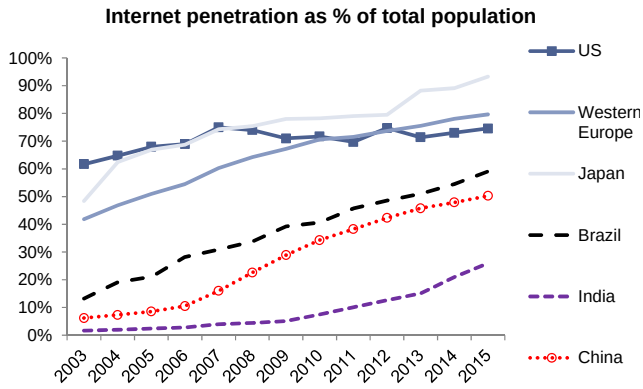
Exhibit 30: Number of non-cash transactions in China has increased significantly since 2002.
Share of non-cash transactions as a percentage of total transactions in 2016 (x-axis) vs increase in non-cash transactions from 2002 to 2016 (y-axis)



Note: Size of the bubble represents the number of transactions of each country in 2016.

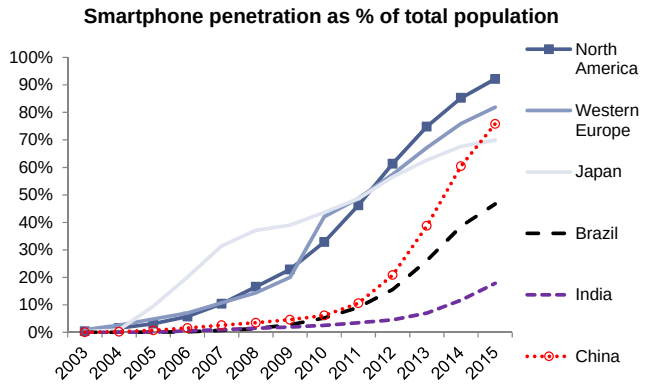
Source: Euromonitor

Exhibit 31: The shift to digital payments in China happened at a time as the internet took off...
Internet penetration as % of total population



Source: World Bank

Exhibit 32: ...and accelerated with the introduction of e-commerce and arrival of smartphones
Smartphone penetration as % of total population



Source: Datastream, Gartner, Global Mobile, World Bank, Goldman Sachs Global Investment Research

According to PBOC, non-cash transaction value in China grew by 187% since 2012. Euromonitor estimated that more than 30% of the transactions in China today are non-cash, from close to zero in 2002. The growth of third-party payments benefited from the overall digitization of money. We estimate that 40% of the retail consumption today (by value) are processed via third-party payment companies.

Fee structure that is closer to cash vs cards

Growth enabler #2: Low fee

Like we mentioned earlier, third-party payments in China is replacing cash, not only bank cards. In order to replace cash, by design, an alternative payment infrastructure must be cheap, convenient and ubiquitous. The low fee and unique infrastructure in China happened to tick most boxes for digital payment to take off.

The bank card transaction fees we observe in China are generally relatively low, especially for credit cards (c. 60bps for merchant's vs 150-300bps in the US). Third-party payment providers started off with similar rates as their bank counterparts, but actual fees merchants end up paying are often lower, given the subsidies offered by payment companies to attract more user sign-ups. We estimate that the effective fee a merchant pays is typically 38-60 bps per commercial transaction based on company disclosures and channel checks. Most C2C payments are free of charge in China.

For context, third-party payment fees are higher in many other countries. Using PayPal in the US as an example, the fee for receiving payment (personal or commercial) is typically at 290bps + US$0.3 – it is far more akin to credit card, and much more expensive than cash, especially for small ticket sized items. People probably have less incentive to replace those cash transactions with digital payments vs their China counterpart, especially when traditional alternative methods are already widely available, such as personal checks.

On the other hand, the fee structure in China is much closer to using cash, but more convenient in many cases. We think the fee structure difference could partially explain the faster adoption in China, especially for small-ticket sized and high frequency items.

We note that the payment companies in China can afford the low fee, partly because some infrastructure cost is borne by the traditional banks, partly also due to their highly integrated business model – we will explain both in later sections. Although the transactional cost is lower for merchants and potentially consumers, we note that third-party payment has not necessarily made the overall payment process leaner.

Exhibit 33: Third-party payment is generally competitively priced in China vs the traditional banking channel, and significantly lower cost vs that in the US.
Payment fee schedule for banks and third-party payment in China and the US

China

Transaction type		Traditional channel (i.e. banks)		Alipay / WeChat Pay	
		Debit card	Credit card	Pay with linked debit/ credit cards	Pay with e-wallet balance
Sending money	Personal payment	0-100bps[1]	N/A	Free	Free
	Purchase payment for goods and services	Free	Free	Free	Free
Receiving money	Personal payment	Free	N/A	Free	Free
	Purchase payment for goods and services	Around 50bps	Around 60bps	38-60bps	38-60bps
Withdrawing money	Cash out	Rmb 0-4 per transaction[1]	N/A	N/A	10bps[2]

US

Transaction type		Traditional channel (i.e. banks)		PayPal	
		Debit card	Credit card	Pay with linked debit / credit cards	Pay with e-wallet balance
Sending money	Personal payment	Usually US$0-6.5 per transaction[3]	N/A	290bps + US$0.3[4] by payer or payee	Free
	Purchase payment for goods and services	Free	Free	Free	Free
Receiving money	Personal payment	Free	N/A	290bps + US$0.3[4] by payer or payee	Free
	Purchase payment for goods and services	Usually 40-60bps	Usually 150-300bps + US$0.2-0.3	290bps + US$0.3	290bps + US$0.3
Withdrawing money	Cash out	Usually US$0-6.5 per transaction[3]	N/A	N/A	Free

Note:
1. Domestic ATM transactions.
Personal payment: No charge for the transfer between the same bank in the same city. Otherwise it varies across banks and subject to different caps and floors.
Cash out: No charge if the card and ATM belong to the same bank. Otherwise it depends on banks and the number of withdrawals in a day/month.
2. Each real-name Alipay/WeChat Pay user has a lifetime quota of Rmb 20k/1k for free withdrawal.
The charge rate is 10bps exceeding that quota, with min charge of Rmb 0.1 per transaction.
3. Domestic ATM transactions.
No charge if the card and ATM belong to the same bank. Otherwise it depends on the banks and the ATM operators.
4. The payer can choose who bears the cost. If the payee declines to pay, the transfer will be cancelled.

Source: Company data, Goldman Sachs Global Investment Research

Exhibit 34: By design, Chinese third-party payment's transaction limit and fast process time makes them more suitable for personal payments (vs. business).
Transaction limit and time for third-party payment solutions in China and the US

		Alipay		WeChat Pay		PayPal	
		Pay with linked debit/ credit cards	Pay with e-wallet balance	Pay with linked debit/ credit cards	Pay with e-wallet balance	Pay with linked debit /credit cards	Pay with bank account / e-wallet balance
Transaction limit[1]	Personal payment	Rmb 10k-50k /day or /transaction	Rmb 200k /year	Rmb 10k-20k /day or /transaction	Rmb 200k /year	US$10k / transaction	US$10k / transaction
	Purchase payment for goods and services	Rmb 10k-50k /day or /transaction	Rmb 200k /year	Rmb 10k-50k /day or /transaction	Rmb 10k /day Rmb 200k /year	US$10k / transaction	US$10k / transaction
	Cash out to bank cards	N/A	Rmb 50k /transaction	N/A	Rmb 50k /transaction Rmb 50k /day	N/A	No limit for real-name users
Transaction time	Personal payment	Real-time to T+1[2]	Real-time to T+1[2]	Real-time	Real-time	3-4 business days	3-4 business days
	Cash out to bank cards	N/A	Below Rmb150k /day: **T+0** Otherwise: **T+1**	N/A	Before 4pm, **T+0** After 4pm, **T+1**	N/A	3-4 business days

Note:
1. The transaction limit for linked bank card of Alipay and WeChat Pay varies across different banks and card types. Some may be outside of the illustrative range.
The limit for e-wallet balance depends on the verification status of the account. The limits shown above correspond to the highest verification level.
2. Real-time if transferring to e-wallet balance; T+0 (same day, may not be real-time) or T+1 if transferring to bank card, depending on transfer amount.

Source: Company data, Goldman Sachs Global Investment Research

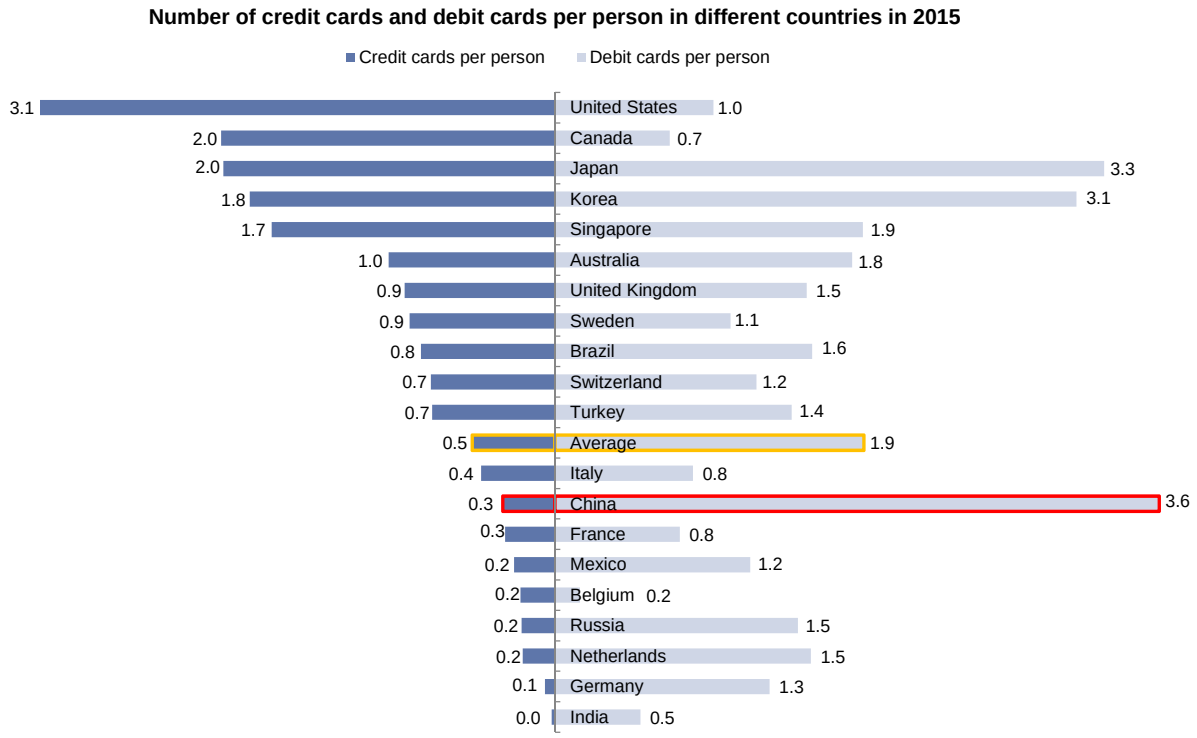
Unique infrastructure set-up

Growth enabler #3: Unique infrastructure set-up

In our view, it is too simplistic to explain the rise of third-party payment in China by the lack of infrastructure - such as low penetration of credit cards or personal checks. The **penetration of credit cards are indeed low**, but third-party payments probably would not have taken off without the other available infrastructure in the banking system**: extremely high penetration of debit cards**, **strict ID and phone number verification at the bank –** in our view, it is these factors combined, that enabled the explosive growth third-party payment.

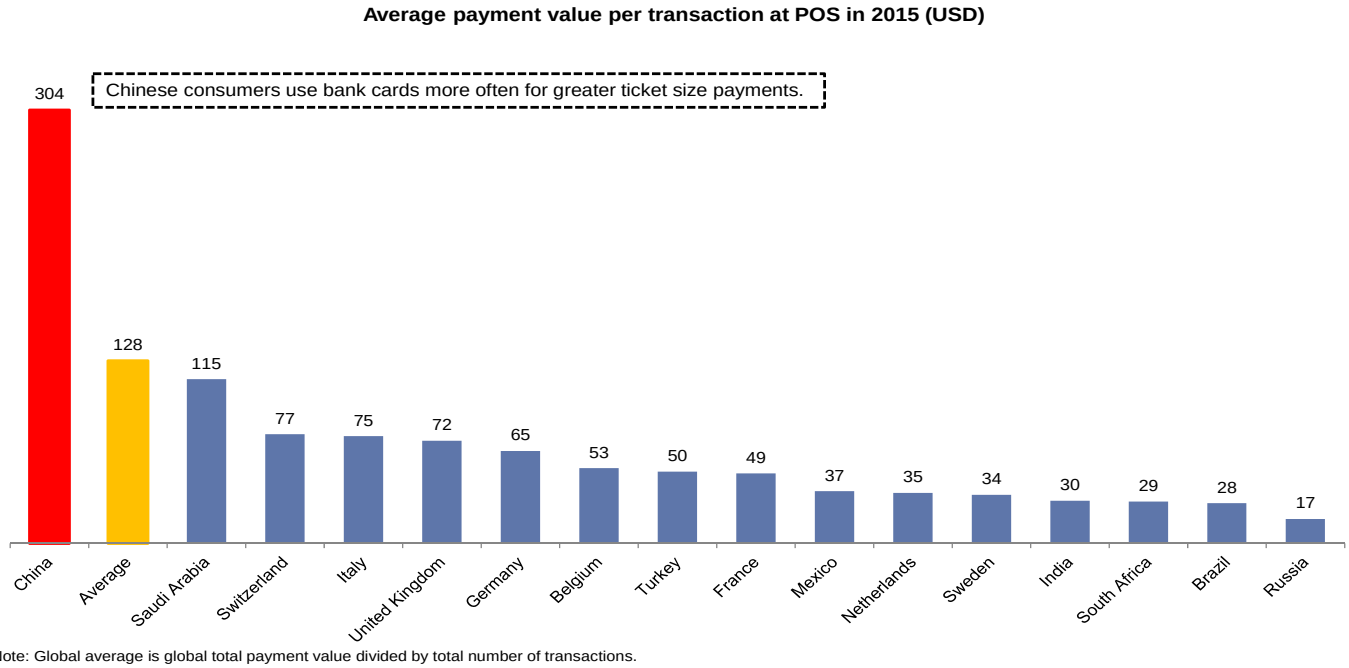
- **Low credit card penetration but high debit card penetration**: Low penetration of credit cards gave room for digital payment to grow. But it would not have been possible had the debit card infrastructure not been readily available. Each third-party payment account is linked to a bank card eventually. An average Chinese consumer has 3.6 debit cards – it cleared the obstacle for the first step to set up a third-party payment account.

Exhibit 35: China has low credit card penetration, but the highest debit card penetration in the world.
Worldwide bank card penetration in 2015 – credit card and debit card



Source: Bank for International Settlements

Exhibit 36: Chinese consumers use bank cards more often for greater ticket size payment vs. other countries.
Average payment value per transaction at POS in 2015 (US$)



Note: Global average is global total payment value divided by total number of transactions.

Source: Bank for International Settlements

Identity verification is crucial for anti-fraud, KYC and AML.

For each mobile payment transaction, one needs to establish and verify the linkage between:

- **Bank account**
- **Payment account**
- **Mobile device**

- **Strict ID and phone number verification at the bank**: In order to have a digital payment infrastructure that is interoperable, identity verification is crucial – for security reasons, as well as KYC (know-your-customer)/AML (anti-money laundering) practices. For each mobile payment transaction, the user needs to be verified as the owner (or authorized user) of the bank account, third-party payment account as well as the mobile device. Building such a system from scratch could be costly and takes time.

  In China, the verification (or pre-clearance) process is usually implicitly handled by the bank. Opening a bank account or third-party payment account in China requires multiples level of identity verification and fund ring-fencing. Specifically, starting from 2016, individual customers need to go to a physical bank branch in order to open a fully-functional bank account with their personal ID and valid mobile phone number (*'Type I'* accounts, with which the customer can save, transfer, withdraw cash or pay). Although other types of bank accounts (*Type II and Type III* accounts) can be opened online, they have to be tied to a Type I account with the same ID and are subject to limitations (no cash withdrawal/daily transaction limits).

  Third-party payment accounts are subject to even more restrictions, in terms of transaction limits and ID verification process. Currently, as long as the accumulated payment amount exceeds Rmb1000 (c. US$145), face-to-face identity verification is required by the central bank, and that process is implicitly handled by the bank when the customer links their third-party payment account with their bank card.

  If a customer wants to change the mobile phone number associated with her Alipay / WeChat payment account, she has to visit her bank branch in person and have her ID verified. It is effectively the banks (and bank branches) that are handling the KYC (know-your-customer) process, including in-person ID verification and mobile phone number registration, saving them an important cost.. That helped establish the linkage between unique ID, unique phone number, bank cards, and then payment account. It

implicitly saves third-party payment company costs on KYC and anti-fraud. It is debatable though, how sustainable this unique set-up is as banks become more conscious of the competition, and have started to enter the small ticket size payment market themselves.

Exhibit 37: Banks effectively handled the Know-Your-Client process for third-party payment companies, through the implementation of strict bank account classification
China bank account classification

Classification	Account opening requirements	Functions	Account balance	Transaction limit	Account format
I	Counter, self-help machine with staff verification	All functions: deposit; buy financial products such as wealth management product; transfer; withdraw; consumption; pay fees	No limit	No limit	Debit card, Bank book
II	Counter, self-help machine with/without staff verification, online/ mobile banking	Deposit; buy financial products such as wealth management product; transfer to binded account; consumption; pay fees.	No limit	Rmb10k daily, Rmb200k annually. No limits on investing in WMP/ precious metal/ mutual fund, etc.	E-account
III	Counter, self-help machine with/ without staff verification, online/ mobile banking	Consumption; pay fees.	Less than Rmb1k	Rmb5k daily, Rmb100k annually	E-account

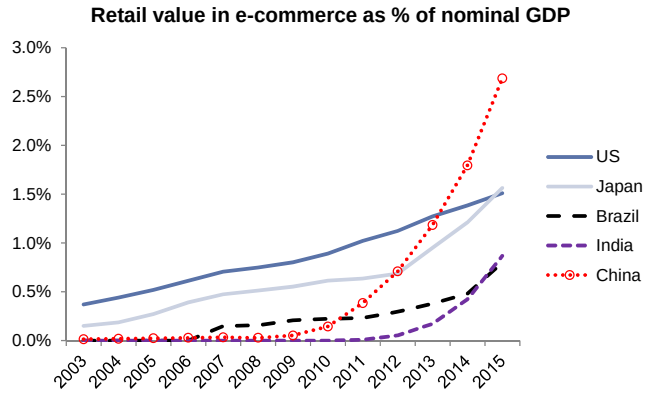
Source: PBOC.

Growth enabler #4: Proliferation of e-commerce and social platforms

Proliferation of e-commerce /social platforms enables viral growth

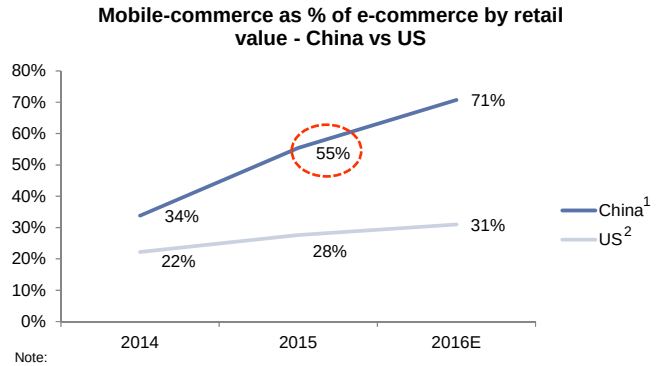
In China, the first wave of third-party payment growth was enabled by **the e-commerce boom.** Alipay, the Chinese e-commerce giant's 10-year-old payment platform, was one of the first players and by far the largest one with 50% market share as of 2016. Alipay was first launched in 2004 by Alibaba Group (Alipay now is owned by Ant Financial, an Alibaba affiliate) as an internet payment service for the Group's e-commerce platforms. The initial business model drew similarities with the early PayPal and eBay. It was one of the earliest online payment solutions in China. A mobile version of Alipay was introduced in 2009. The use has been expanded over time beyond Alibaba's own ecosystem. By 2016, Alipay was processing 175mn transactions per day and has 450mn active real-name users. We estimate its TPV has grown from US$479bn in 2013 to US$5.8trn in 2016.

Exhibit 38: The proliferation of e-commerce in China is a key growth driver of third-party payment.
Retail value in e-commerce as % of nominal GDP



Source: Euromonitor, IBGE, Japan METI, iResearch, NBS China, Goldman Sachs Global Investment Research

Exhibit 39: Mobile-commerce is playing an increasingly important role in e-commerce.
Mobile-commerce as % of e-commerce by retail value – China vs US

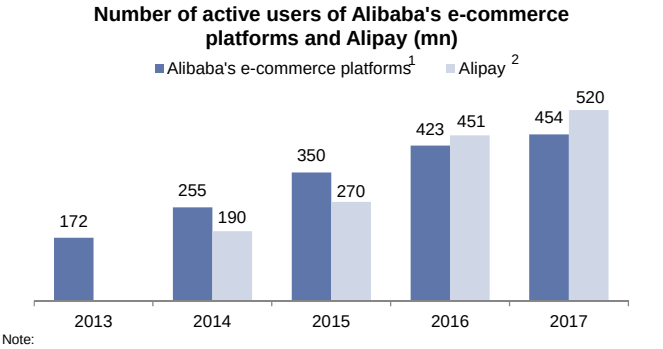


Note:
1. Retail value of online-shopping from iResearch. Actual number for 2016.
2. E-commerce excluding sales tax, mobile-commerce excluding travel.

Source: iResearch, Euromonitor, Goldman Sachs Global Investment Research

If e-commerce is the backbone of Alipay**, social interactions** are the driving force behind WeChat Pay. WeChat Pay, the key product of Tenpay, entered the payment arena in 2013. It is owned by Tencent and integrated into its hugely popular mobile communication platform Weixin (WeChat, as it is known in English). Weixin/WeChat has monthly active users of 889mn as of 2016. WeChat Pay made enormous progress in a short time and is closing the gap in terms of market share. We believe WeChat Pay's viral growth stems from Tencent's strong social networks. At inception, WeChat leveraged its huge communication platform user base to tap into the peer-to-peer payment market, and later expanded into online-to-offline services and eventually offline contexts.

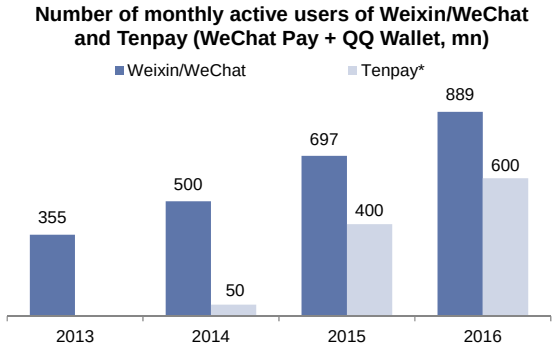
Exhibit 40: Alibaba's e-commerce platform provides a sizeable customer base to Alipay.
Number of active users of Alibaba's e-commerce platforms and Alipay (mn)



Note:
1. Active buyers of Taobao, Tmall, etc. during the past 12 months ended in March of each year.
2. Data of 2014 and 2015: active users of Alipay App during the 12 months ended in Oct 2014 and Apr 2015. Data of 2016 and 2017: active users of Alipay during the past 12months ended in March of each year.

Source: Company data, Goldman Sachs Global Investment Research

Exhibit 41: Social interactions are the driving force behind Tenpay.
Number of monthly active users of WeChat and Tenpay (WeChat Pay + QQ Wallet)



Note:
*The number for 2014 and 2015 are estimated based on company's disclosure.

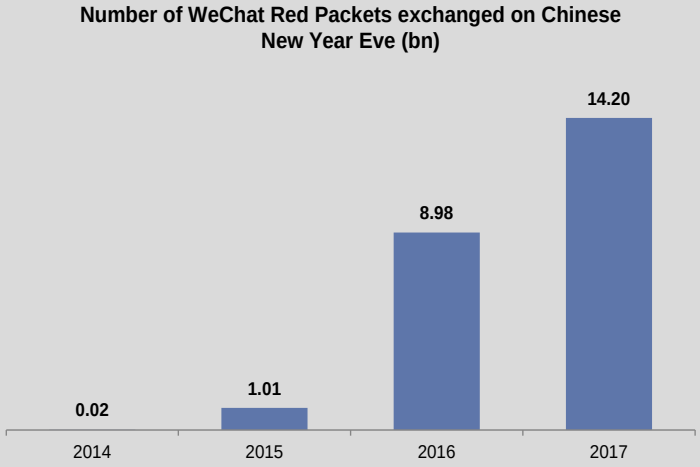
Source: Company data, Goldman Sachs Global Investment Research

CASE STUDY: Gamification of cash gifting

In 2014 WeChat Pay launched 'red packet' – a digital twist on China's traditional cash-filled red envelope that people give each other during festivals. It let WeChat users gift money up to about US$29 (Rmb200) to friends and family – the receivers can even compete with each other to grab the red packet when the number of red packets is less than the number of people in a group chat. The feature went viral in China – around 16mn red packets exchanged on Chinese New Year's Eve in 2014, according to Tencent. A year later, that number jumped to 1 billion.

Thanks to 'red packets', WeChat Pay was able to grow its user base in a short period of time. By the end of 2014, more than 100mn users had linked their bank accounts with WeChat Pay and QQ Wallet (the other payment system Tencent owns, tied with the messenger program QQ).

Exhibit 42: The popularity of gamification of cash gifting is witnessed by the rapid growing number of WeChat Red Packets distributed and received on Chinese New Year Eve, almost 1000-fold in three years.

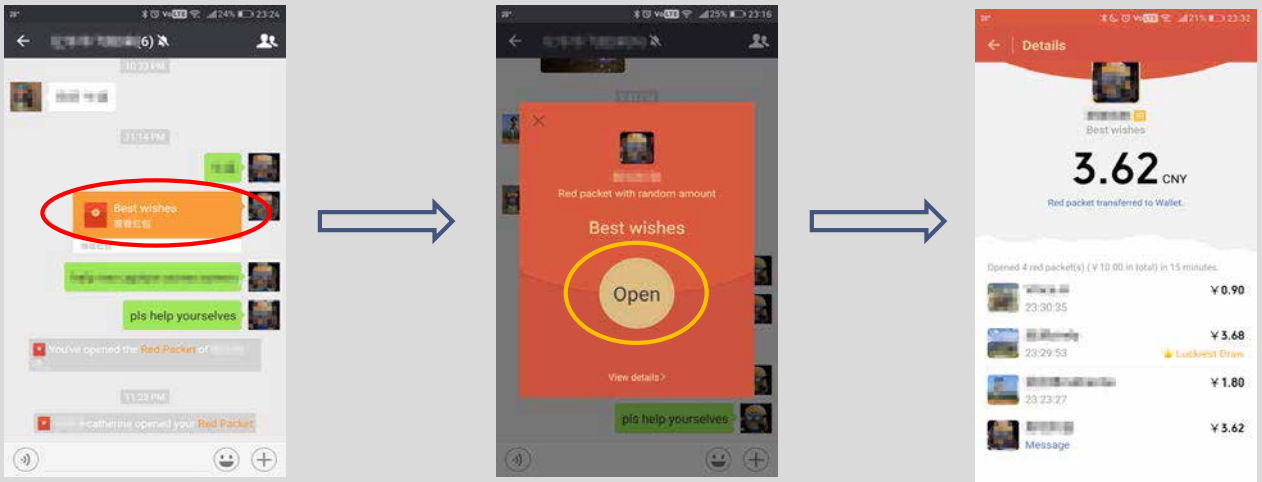


How to "snatch" a WeChat Red Packet?

1. A ***red packet*** was sent in a group chat. **Compete** to snatch by clicking it.

2. Successfully snatched one! Click "open" to see the **random** amount in the ***red packet***.

3. **Real money** was saved into E-wallet. See who has the best luck.



Source: Company data, Goldman Sachs Global Investment Research

Improving ease of use with technology advancement

Growth enabler #5: Improving ease of use with technology advancement

Prior to the rise of third-party payment, online payment with bank cards was cumbersome - consumers usually need to go through multiple steps of verification, either by text messages, USB dongles or other physical token generating devices. By contrast, payment with a third-party application (e.g. Alipay or WeChat Pay) is much more streamlined after the customer has tied the payment account to his/her bank cards. It requires only a scan of QR code from a retailers' POS terminal, a smartphone, or even a piece of paper. From a retailers' perspective, especially brick-and-mortar shops, the fixed cost is also extremely low with QR codes as no additional device is required. NFC (near field communication) payment was available too, through Apple Pay or UnionPay's Quick Pass, but we believe it is less prevalent for small ticket items.

Exhibit 43: QR code payment methods have become widely popular given its simplicity and low adoption costs. Consumers can choose either to scan the merchant's QR code with their smartphones, or to get their Pay QR code scanned at the cashier.
Two common payment methods using QR code

Source: Goldman Sachs Global Investment Research

THIRD-PARTY PAYMENT

Key players and competitive landscape

Understanding the key players and competitive landscape

The competitive landscape of China's payment industry is crowded, between traditional banks, UnionPay (China's only card network, owned by banks), and third-party or even fourth party payment aggregators. There are around 250 payment companies targeting one or more links of the traditional payment value chain. Among which there are more established players like Alipay and Tenpay - they together hold 84% of the market share in third-party payment as of 2016. The rest are tiny compared to the top two. But the already intense competition did not stop many sizeable players from other industries getting into the payment businesses (such as Meituan Dianping, Vipshop and GOME).

However, even with the exponential growth in the past few years, TPV processed through payment companies is still only 13% vs those via bank card (some bank card volumes might be re-directed via payment companies), and 4% of electronic payment via banks in China, according to the PBOC (Exhibit 65-66 in Appendix). This is because most B2B transactions and large tickets items are still handled via traditional financial systems, while payment companies deal more with small ticket-size and high frequency transaction needs.

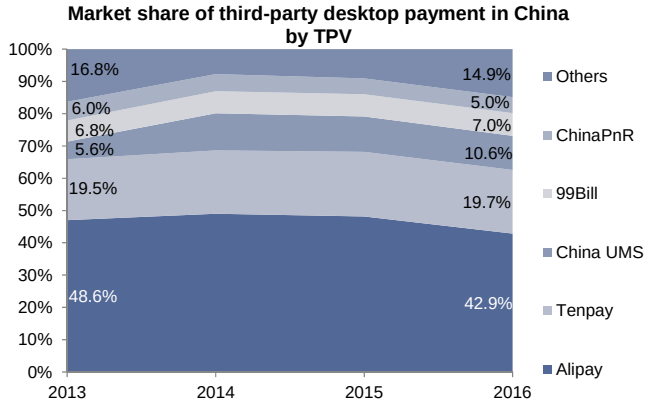
Payments are increasingly made through mobile devices over desktop. This is consistent with the global trend of mobile overtaking desktops in internet usage in general. In China, this may have been reinforced with Tencent expanding aggressively into both C2C and physical retailers. Mobile payments now account for 75% of all third-party payments, from 4% in 2012 (Exhibit 18 on Page 23). The mobile market is even more concentrated with Alipay and Tenpay taking up 91% of the market share. The majority of the payment is C2C transfers, rather than consumption-related - this is even more true for mobile payments.

Key companies in the third-party payment (desktop + mobile) space (Exhibit 45-48):

- **Alipay** is the biggest payment company with 51% overall market share in 2016 (54% for mobile payment). Their market share has been declining since 2014, especially in mobile payment, as Tenpay entered the race. However, we believe Alipay handles more B2C/consumption-related payment activities, while Tenpay has a larger share of C2C transfers.
- **Tenpay (WeChat Pay and QQ Wallet**) is currently the second largest player with 33% market share in 2016. Their market share has doubled since 2014. Given Tencent's inherent social nature, we believe a lot of these transactions are C2C. But B2C/consumption related transactions increased significantly since 2015 when Tencent started to focus more on physical retailer expansions. We estimate 85% of Tenpay's TPV in 2016 are from mobile users.
- The rest of the market is scattered. Among the other players, the relatively sizeable ones are **Ping An e-wallet** (77% owned by Ping An Group (2318.hk)), **JD Pay** (wholly owned by JD Finance, 40% of whose equity JD.com Inc (JD) has the right to claim subject to regulatory approval), **Yifubao** (60% owned by Suning Commerce Group (002024.ss)). There are also payment companies that specialize in only one platform or product. For example, **Lakala** mainly focuses on providing mobile payment solution to physical retailers. Players like **China UMS** (c60% owned by UnionPay), **99Bill** (c96% owned by Wanda Group) and **ChinaPnR** have sizeable market share in desktop payment, but little exposure to mobile.

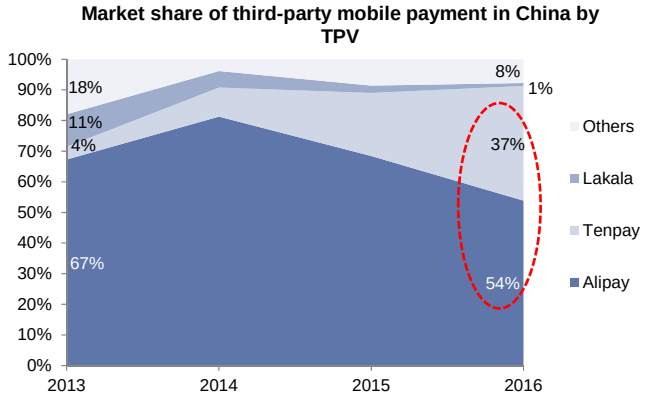
Banks have also been trying to play catchup, providing much more streamlined mobile payment service through its mobile application, such as QR code scans and innovative functions such as payment through mobile phone number. Leading players such as CCB booked total mobile banking transaction volume of Rmb31trn, +98% yoy and compares to Rmb79trn of total third party payment industry TPV in 2016.

Exhibit 44: Desktop payment: Alipay is the biggest player, followed by Tenpay, China UMS, 99Bill, ChinaPnR, etc.



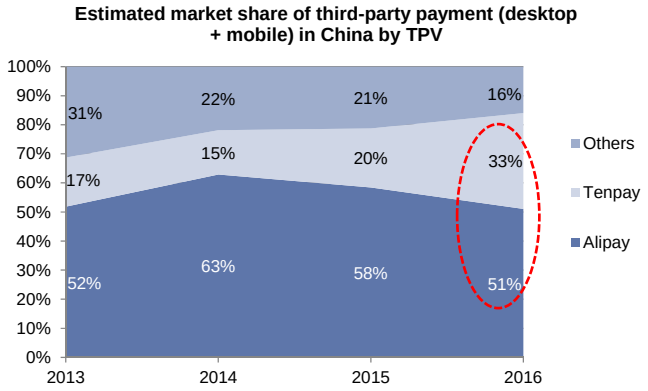
Source: iResearch, Goldman Sachs Global Investment Research

Exhibit 45: Mobile payment: Alipay and Tenpay now dominate with 91% market share combined.



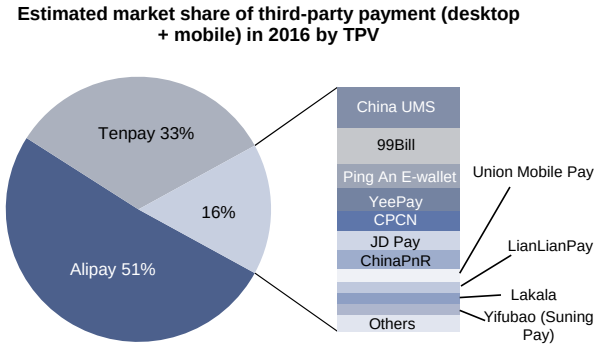
Source: iResearch, Goldman Sachs Global Investment Research

Exhibit 46: Overall third-party payment: Alipay and Tenpay possess 84% of the market share as of 2016.



Source: iResearch, Goldman Sachs Global Investment Research

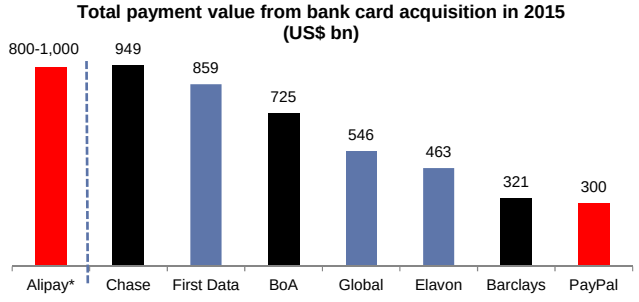
Exhibit 47: The rest of third-party payment market is scattered.



Note:
Estimated based on market share of third-party desktop payment and mobile payment from iResearch. The rank may not be accurate due to insufficient data availability.

Source: iResearch, Goldman Sachs Global Investment Research

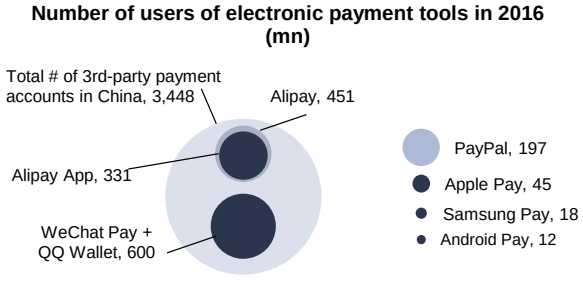
Exhibit 48: Alipay is one of the largest merchant acquirers in the world



*The TPV of Alipay is our estimate based on the data from PBOC and iResearch. TPV of US merchant acquirers is from the Nilson Report, which is not perfectly comparable with Alipay's TPV.
Color code: Red: 3rd-party payment companies. Black: banks. Blue: pure payment processors.

Source: PBOC, Nilson Report, Goldman Sachs Global Investment Research

Exhibit 49: Alipay and Tenpay's user base vs other global players

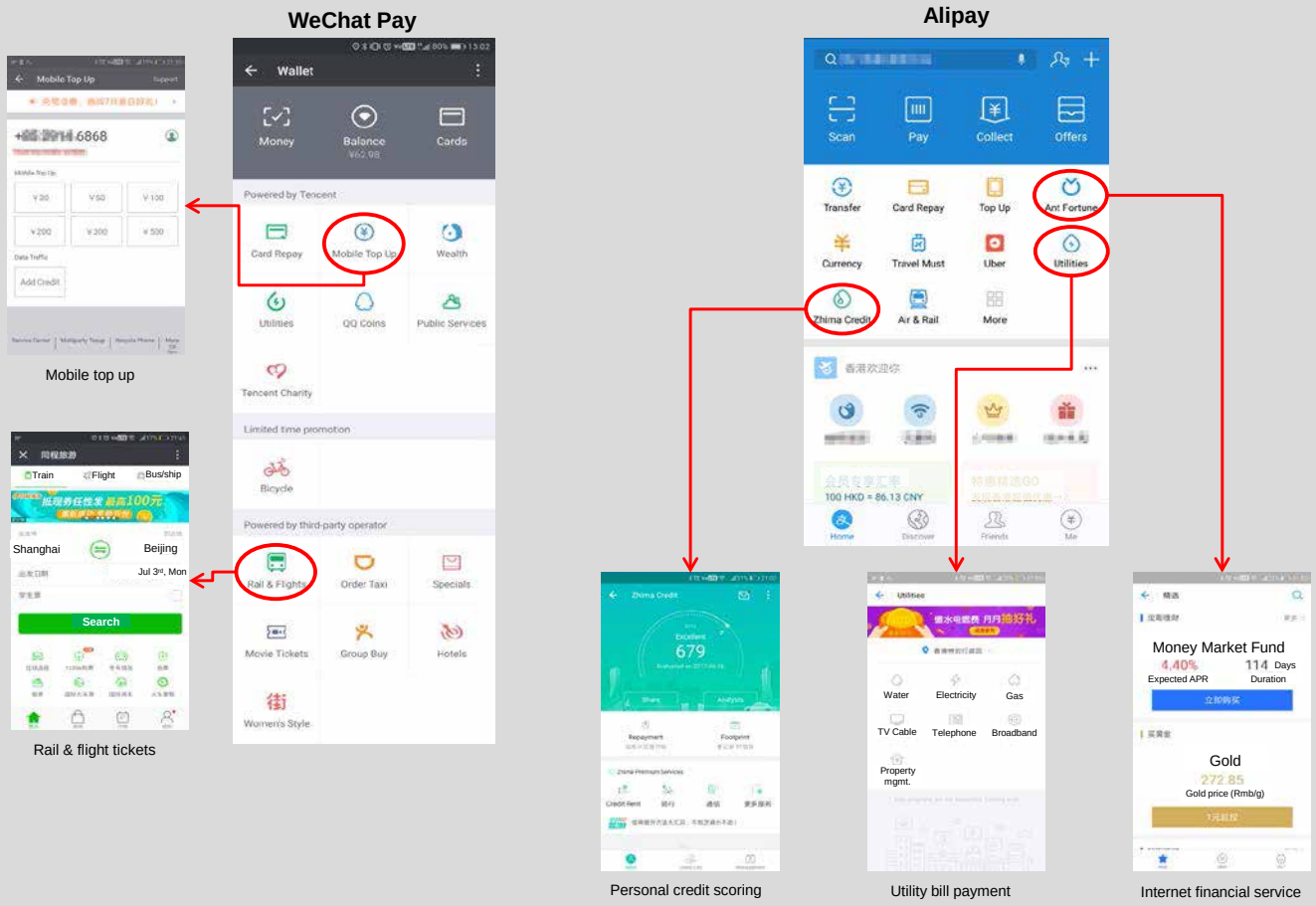


Note:
1. Company numbers above: annual active users as of Mar 2016 for Alipay, annual active users as of Dec 2016 for PayPal, monthly active users as of Dec 2016 for others.
2. Color code: Dark blue circles represent # of mobile payment accounts.

Source: Company data, PBOC, Analysys, Juniper Research, Goldman Sachs Global Investment Research

CASE STUDY: The "one-stop shop" - What do WeChat Pay and Alipay look like?

Exhibit 50: The user interface and some functions of WeChat Pay and Alipay



Mobile top up

Rail & flight tickets

Personal credit scoring

Utility bill payment

Internet financial service

Source: Company data, Goldman Sachs Global Investment Research

Alipay

Company snapshot

Year launched: 2004

Headquarters: Hangzhou, China

Countries: 110

Employees: >3,600

Funding to date: >$6bn

Last disclosed round: Series B

Last funding amount: $4.5bn

Key investors: Junhan and Junao (controlled by Jack Ma), China Investment Corporation, China Life Insurance, China Post

Alipay is the payment arm of Ant Financial Services Group, and operates a third-party online payment platform with 520mn annual active users. According to iResearch, Alipay is the largest player in China's third-party payment market (desktop + mobile) with ~51% market share in 2016. Beyond payment processing and escrow services to Alibaba's ecosystem, Alipay's mobile payment app serves as an important entry point for its users to access other services provided by Ant Financial, Alibaba, and their business partners.

- **Key merchants:** Taobao, Tmall, Ctrip, Weibo, Didi Chuxing, millions of offline merchants (per People.cn), and millions of SMEs in Alibaba's ecosystem.
- **Pricing:** Alipay offers various payment services for merchants, including PC online payment, mobile online payment, in-App payment and offline payment (mainly QR code payment) designed for offline small merchants. The pricing of these services are set from 0 to 1.2% of transaction value. Alipay is currently promoting QR code payments to small offline merchants and this service is offered for free when consumers pay by scanning the merchant's QR code ("Shouqianma"). For SME merchants, other than those in online gaming business, they are entitled to a cheaper rate of 0.55%. Individual merchants can transfer their money in Alipay to the linked bank card for free, while individual consumers will be charged 0.1% after reaching a lifetime quota of Rmb20k.

Exhibit 51: Pricing for transaction services

Alipay transaction services	Cost	Term
PC online payment	0.6%	1 year
Mobile online payment	0.6% - 1.2%	1 year
In-App payment	0.6% - 1.2%	1 year
Offline payment (mainly QR code payment)	0.6%	1 year
QR-code payment	Free[1]	In promotion
For SME merchants[2]	0.55%	In promotion

1. Free when consumers scan merchant's QR code.
2. SME promotion excludes SMEs in online gaming businesses

Source: Company data, Goldman Sachs Global Investment Research

Exhibit 52: Pricing for cash withdrawal

Alipay cash withdrawal	Cost	Note
Individual consumer	0.10%	Cumulative Rmb20k free transfer quota for real-name verified individuals
Individual merchants	Free	N/A
Enterprise merchants (T+0)	0.025% /0.20%	0.025% for transactions over Rmb100k; 0.20% otherwise.
Enterprise merchants (T+1)	Free	Per day or per transaction limit: Rmb5mn

Source: Company data, Goldman Sachs Global Investment Research

- **Competitors:** Alipay mainly competes with Tencent's Tenpay and China UnionPay, as well as smaller competitors such as JD Pay, Baidu Wallet, Lakala, and Wanda Group's 99Bill.

A brief history and drivers of success

Alipay was established in 2004, and first acts as an escrow service provider to Alibaba's Taobao marketplace. Alipay allows consumers to verify the receipt and quality of goods before releasing money to sellers, which solved the lack of trust for e-commerce in early stage and helped Alibaba to emerge as China's leading e-commerce platform. Starting 2005, Alipay has expanded its operation to external payment scenarios including online gaming, transportation ticketing, public utilities, other e-commerce platforms, and mobile payment, and has established itself as the leading third-party payment platform in China. In 2014, Ant Financial Services Group was founded, and Alipay became their payment arm and important entry point for Ant's other four pillars: wealth management, financing, insurance, and credit system.

Core product offerings

Alipay, together with other services by Ant Financial, provides comprehensive financial services for consumers:

- **Payment**: Alipay's payment function enables transactions between 520mn annual active users and millions of merchants/organizations online and offline. Consumers top up their Alipay account with linked bank account, after which they can transfer it to

their friends and families, or spend the money by buying products and services through desktop, mobile, in-App, and offline payment channels.

- **Wealth management**: Alipay allows users to access Ant Financial's wealth management products including Ant Fortune, an online investment marketplace; and Yu'e Bao, the world's largest money market fund (per Financial Times) with Rmb1.4 trillion AUM. According to Alibaba, Ant Financial's wealth management products have attracted 330mn cumulative users by the end of Mar, 2017.
- **Financing**: Alipay users can also access consumer financing product Ant Credit Pay (also known as Ant Check Later) and Ant Cash Now, which now have 100mn annual active users. Ant Credit Pay allows users to buy on credit and repay next month, and it supports Taobao, Tmall, and several other external platforms. Ant Cash Now provides consumer credit to creditworthy users, and can grant loans up to Rmb50k for as much as 12 months.
- **Ant Insurance Service**: Ant Financial's insurance arm operates an online marketplace for Alipay users to purchase insurance products from various insurers, including Cathy Insurance and Zhong An Insurance, two companies invested in by Ant Financial. Insurance products on the platform cover accident, health, life, property, car and travel, and the platform now has 392mn annual active users.
- **Credit system**: Ant Financial also provides Alipay users with personal credit system called Zhima Credit, which calculates a credit score leveraging cloud computing and deep learning technology. Users with high Zhima Credit score are entitled to greater credit lines from Ant Credit Pay and Ant Cash Now, riding shared bicycles without deposits, among other privileges.

Exhibit 53: Ant Financial's leading breadth and scale

Payment	Wealth Management	Financing	Insurance	Credit System
支付宝 ALIPAY	蚂蚁聚宝 余额宝	花呗 借呗	蚂蚁保险服务 Ant Insurance Service	芝麻信用 ZHIMA CREDIT
520mn	**330mn**	**100mn**	**392mn**	**257mn**
Annual Active Users	Cumulative Users	Annual Active Users	Annual Active Users	Annual Active Users
	+17%	**73%**	**+43%**	**+95%**
	Yoy AUM growth per active user	use Ant Credit Pay 6+ times in 1 year	YoY premium growth per user	YoY growth

Source: Company data.

Differentiation and growth strategy

Alipay's role as the payment infrastructure of Alibaba and Ant Financial's ecosystem differentiates itself as being more commercially relevant compared to competitors. According to Alibaba, 70% of Alipay's transactions are commercial transactions (30% money transfer and red packets). This helps Alipay to gain 61.5% market share in monetize-able third party payment market, as per iResearch.

Alipay has launched the **Cashless Society** initiative in Feb 2017, aiming to transform China into a cashless society in 5 years. Along with this initiative, Alipay has pushed its offline applications into more scenarios, including public transportation and small offline merchants (with free QR-code payment). Alipay is also rapidly **expanding overseas**: it now has members coming from 110 countries, and recently signed strategic cooperation with Monaco to build a cashless country.

Tenpay

Company snapshot

Year launched: 2005

Headquarters: Shenzhen, China

Countries: 15

Employees: N/A

Funding to date: N/A

Last disclosed round: N/A

Last funding amount: N/A

Key investors: Tencent

Tenpay is Tencent's third-party payment platform and it provides technical infrastructure support for WeChat Pay and QQ Wallet, two products based on Tencent's dominant social and communication platforms WeChat and QQ. According to Tencent, its mobile payment function has surpassed 600mn monthly active users (MAUs) and 600mn daily payment transactions in Dec, 2016. According to iResearch, Tenpay has about 33% share in China's third-party payment market in 2016, second only to Alipay.

- **Key merchants:** JD, Didi Chuxing, Meituan Dianping, Watsons, 7-Eleven, eLong, and more than 700k offline merchants (per "Cash-Free Day" on Aug 8th, 2016).
- **Pricing:** for WeChat Pay merchants, Tencent charges them no more than 0.6% of transaction volume for most of the industries other than virtual online services, which is charged 1.0%. For enterprise accounts that subscribe to Tenpay's instant transfer services, they are charged 0.4% to 1.5% of transaction volume, depending on the plan they choose and transaction volume. To transfer money to bank accounts using WeChat Pay, merchants can transfer for free, while individuals are subject to 0.1% charges (each individual are entitled to Rmb1,000 cumulative free transfer amount).

Exhibit 54: WeChat Pay and Tenpay cost structure

WeChat Pay

Industries	Cost
Online virtual services	1.00%
Gas station, logistics	0.30%
Public utility bills	0.10%
Public school, hospital, philanthropy	0.00%
Other industries	0.60%

Tenpay

Tenpay Plan fee (Rmb)	Plan limit (Rmb)	Implied cost within plan	Cost exceeding plan limit	Term
1,200	100,000	1.20%	1.50%	1 Year
2,000	200,000	1.00%	1.50%	1 Year
4,000	500,000	0.80%	1.50%	1 Year
6,000	1,000,000	0.60%	1.50%	1 Year
11,000	2,000,000	0.55%	1.50%	1 Year
25,000	5,000,000	0.50%	1.50%	1 Year
40,000	10,000,000	0.40%	1.50%	1 Year

Source: Company data, Goldman Sachs Global Investment Research

- **Competitors:** Tenpay mainly competes with Ant Financial's Alipay and China UnionPay, as well as smaller competitors such as Baidu Wallet, Lakala, and Wanda Group's 99Bill.

A brief history and drivers of success

Tenpay was established by Tencent in 2005 along with their e-commerce platform Paipai, and served similar escrow function as Alipay. Tenpay subsequently expanded its usage to various other scenarios, marked by strategic cooperation with China Southern Airline (2007), China Unicom (2009) and Deppon Logistics (2010). Tenpay and WeChat launched WeChat Pay in Aug 2013, and gained strong momentum through its red packet feature, the rapid advancement of O2O model, and the rise of online taxi hailing and Didi Dache (backed by Tencent). WeChat Pay has developed into a critical pillar in Tencent's "Connect" strategy by commercially connecting its 938mn MAUs with the WeChat Official Account, strategic partners (JD, Meituan Dianping, Didi, Mobike), and offline merchants.

Core product offerings

Other than payment processing for merchants, Tenpay's main product offerings is through WeChat Pay and QQ Wallet, which provide similar feature though based on different platforms.

- **Peer transfer and red packet**: this feature leverages and reinforces WeChat's social feature, allowing users to transfer money to WeChat friends (can be in red packet

format), to send probability-based red packet to group chats, and to request for payment in a group chat. QQ Wallet also innovate "Password Red Packet", giving red packet only to those who repeat a certain "password", making money transfer more social and engaging.

- **Products/services by partners and merchants**: Tencent "connects" the mass amount of its social network users with strategic partners and other merchants, with WeChat Pay and QQ Wallet serving as critical infrastructure and entry points. Through these two, users can access JD (e-commerce), Meituan Dianping (O2O), Didi Chuxing (ride hailing), Mobike (bicycle sharing), eLong (hotel), and 58 Home (local services). In addition to existing mobile and offline payment functions (bar code and QR code payment), WeChat Pay also provides payment services for WeChat Mini Program, empowering offline SMEs and connecting offline services to online users.
- **Wealth management**: WeChat Pay and QQ Wallet provide entry point to Tencent's wealth management platform Licaitong, which is a marketplace for wealth management products such as money market fund and index fund. According to Licaitong, they have 100mn total users and Rmb140bn asset invested.

Differentiation and growth strategy

Tenpay's key advantage lies in the ubiquity of Tencent's social and communication assets, WeChat and QQ (with 938mn and 861mn MAUs respectively as of 1Q17), through which Tenpay's services are offered. This significantly lowered the customer acquisition cost (CAC) for WeChat Pay and QQ Wallet, and underpinned their strong performance in mobile and offline payment scenarios.

We believe Tenpay's key focus for growth is still offline payment. We expect promotion events such as August 8 "Cash-Free Day" (continued in 2017 as well) and initiatives such as Mini Program will help Tenpay further enhance its position in mobile and offline payment market. According to iResearch, Tenpay's share in third party mobile payment market has increased from 4% in 2013 to 37% in 2016 (Ex 45).

Incumbents' response: CCB Mobile Banking platform

As Alipay and WeChat Pay gradually replace cash and credit cards in people's daily transactions, many Chinese banks are starting to reexamine their digital strategy and revamp online platforms to stay relevant to their end consumers. In our case study, we found that compared to WeChat Pay, CCB's platform

- provides **similar functionalities** in terms of mobile payment and transfer, e.g. bill payments, and payment via QR code
- has **higher transaction limits**
- but has a **lower adoption rate** (measured by daily transaction volume of payment and transfer services in 2016), potentially due to
  - Customer behavior (e.g. WeChat Pay is fully integrated with WeChat, a popular social network platform with very high user stickiness), and
  - User experience (the requirement of a token verification), sometimes as a result of **banks' more rigid risk control** compared to internet companies
- Fund transfer via mobile number is an **innovative function** worth noting, where users can receive funds with any bank account in China.

Going forward, we think banks will continue to embrace their online/mobile banking strategy. Though it could be challenging for banks to achieve Alipay/WeChat Pay's level of market share in online payment and transfer in the near term, we see opportunities remain for banks with comprehensive infrastructure and superior services to be better positioned in the retail banking race.

Exhibit 55: Payment & Transfer: CCB's mobile banking platform provides similar services to WeChat Pay
Mobile-based payment and transfer product overview

	CCB Mobile Banking	WeChat Pay
Account opening	Registered CCB clients, account verification in bank branch; no need for CCB account via Dragon Pay (limited amount)	Registered WeChat users, verification with bank account required only for certain functionalities
# of clients	223 mn (340mn retail clients)	889mn WeChat users as of 2016 (200mn linked to a bank card as of 2015)
Daily transaction volume in 2016	57mn	600mn
Total payment value in 2016	Rmb30.6trn	Around Rmb20trn (GSe)
Transaction type		
	B2C Scan QR code (Dragon Pay, small amount) C2C Scan QR code (Dragon Pay, small amount) Via mobile banking Via mobile number (no CCB account required for payee)	B2C Scan QR code C2C WeChat red packet Peer-to-peer transfer
Transaction limit		
	SMS token: Rmb5k/transaction, Rmb5k/day SMS token + verified device: Rmb500k/transaction (Rmb50k for cross-bank), Rmb1mn/day (unless indicated by local branch) Physical token: Rmb5mn (Rmb50k for cross-bank)/transaction, Rmb5mn/day	B2C/C2C payment with e-wallet balance: Unverified: Rmb1k/day, Rmb2k/month Verified: Rmb10k/day B2C payment with linked bank cards: Depending on banks (Typically Rmb10k-50k/day or /transaction) C2C payment with linked bank cards: Rmb20k/day Red packet: Rmb200 per red packet
Supported transactions		
QR code payment	Yes	Yes
Bill payment (e.g. credit card, cellphones, utilities)	Yes	Yes
Game credit top-up	Limited (merchants with CCB accounts)	Yes
Charity donation	Limited (charity with CCB accounts)	Yes
Wealth management products purchase	Yes	Yes
Foreign exchange purchase	Yes	No
Ride-hailing / bike-renting	No	Yes

Source: Company data, iResearch, Goldman Sachs Global Investment Research.

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THIRD-PARTY PAYMENT

Sizing the addressable market

Sizing the addressable market

For the market sizing in this this report, we will focus on the fee generating consumption-related businesses, which is payment from consumers to merchants in exchange for consumer products and non-financial services, as this is where the most direct revenue and profit lies. For other channels like online financial products or C2C payments, the profit model is less clear under the current regulatory framework or industry infrastructure set-up. Monetization initiatives for those transactions are still in early stages. We note that given the big players' vertically integrated ecosystem, direct profitability might not be their priority, as payment is often viewed as the first touch point to engage customers and an indispensable gateway that leads other services.

We estimate that the annual TPV of consumption-related third-party payment will reach Rmb31.6trn by 2020E. That would translate into $11bn annual fee pool by 2020E.

Our analysis is based on the following key assumptions:

- By 2020E, 68% of retail consumption would be processed by payment companies, from 40% in 2016. This assumes that China's digitization of money by 2020E reaches a similar level of US in 2016. This implies that China would need to accomplish in 4 years what took US 14 years (2002-2016).
- We see further downward pressure on the take rate in the next few years, given the regulatory tightening, introduction of the new clearing house, and more competition from players in other industries trying to enter the payment space.

Key caveats of our method:

- While our estimated fee pool reflects the current product offering and fee structure, it could increase over time if third-party payment expands into other verticals or larger ticket sized items.
- The retail assumption data (disclosed by the National Bureau of Statistics of China) captures consumption in physical goods, restaurants and e-commerce, but does not include broader consumptions in items like education or healthcare. It could understate the overall retail consumption in China.

Exhibit 56: We estimate that the TPV of consumption-related third-party payment will reach Rmb31.6trn by 2020, and the annual fee pool is estimated to be Rmb75.8bn or US$11bn.
Total addressable market of third-party payment

Rmb bn	2013	2014	2015	2016	2017E	2018E	2019E	2020E	2016-2020E CAGR
Total retail, online + offline	**24,272**	**27,184**	**30,093**	**33,232**	**36,222**	**39,480**	**42,952**	**46,433**	**9%**
Offline retail (goods and restaurants)	22,329	24,276	26,216	28,076	29,787	31,524	33,227	34,747	5%
Online retail (goods and services)	1,943	2,909	3,877	5,156	6,435	7,957	9,724	11,686	23%
Online retail (goods only)	1,749	2,464	3,242	4,194	5,137	6,237	7,489	8,892	21%
Consumption-related third-party payment as % of retail	14%	21%	29%	40%	50%	59%	63%	68%	
Offline retail (implied)	7%	12%	19%	29%	40%	50%	55%	60%	
Online retail (assumptions)	93%	95%	95%	95%	94%	93%	92%	92%	
Third-party total payment value (TPV)	**6,494**	**14,166**	**24,063**	**78,715**	**128,856**	**211,324**	**294,163**	**391,825**	**49%**
Consumption-related third-party payment value[1]	**3,400**	**5,756**	**8,730**	**13,155**	**17,963**	**23,161**	**27,221**	**31,599**	**24%**
Offline retail (implied)	1,593	2,992	5,047	8,257	11,915	15,762	18,275	20,848	26%
Online retail (assumptions)	1,807	2,763	3,683	4,898	6,049	7,400	8,946	10,751	22%
Non-consumption third-party payment value[2]	**3,094**	**8,410**	**15,333**	**65,560**	**110,893**	**188,163**	**266,942**	**360,226**	**53%**
Revenue and fee pool									
Consumption-related third-party payment value	3,400	5,756	8,730	13,155	17,963	23,161	27,221	31,599	24%
Take rate% (assumptions)[3]	0.40%	0.39%	0.38%	0.31%	0.28%	0.26%	0.25%	0.24%	
Consumption-related third-party payment fee income	**13.6**	**22.4**	**33.2**	**40.8**	**50.3**	**60.2**	**68.1**	**75.8**	**17%**
Market share	2013	2014	2015	2016	2017E	2018E	2019E	2020E	
Third-party consumption-related payment as % of total retail	14%	21%	29%	40%	50%	59%	63%	68%	
Consumption-related payment as % of total third-party TPV	52%	41%	36%	17%	14%	11%	9%	8%	
Non-consumption payment value as % of total third-party TPV	48%	59%	64%	83%	86%	89%	91%	92%	
Yoy growth	2013	2014	2015	2016	2017E	2018E	2019E	2020E	
Total retail sales (online + offline)		12%	11%	10%	14%	10%	10%	10%	
Total payment value from third-party companies		118%	70%	227%	64%	64%	39%	33%	
Consumption-related third-party payment value		69%	52%	51%	37%	29%	18%	16%	

Note:
1. The consumption-related third-party payment value is our estimate based on iResearch data (including eCommerce B2B due to similar fee rate).
2. It includes C2C transfers and internet financial product purchases etc. The 2013 number is our estimate based on iResearch data.
Key assumptions are shown in red numbers.
3. There are no official disclosures of take rate from the companies. Our estimate is based on fee schedules on companies' website, news report and our channel check.

Source: iResearch, National Bureau of Statistics of China, Goldman Sachs Global Investment Research

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THIRD-PARTY PAYMENT

Key debates for future

Key debates for future #1: Monetization

Direct profits from payment are thin in China, due to low fee, high competition and marketing spending. However, payment serves as a key infrastructure for the big players' distinctive ecosystem, by granting targeted access to users, and profitability remains secondary. We explore in this section the rationale of such a business model, as well as potential monetization sources.

No money to be made out of just fees. Transaction fees in China are much lower vs the developed world, and there is no shortage of competition with around 250 third-party payment licenses. Even with payment companies charging the highest possible fee allowed by the current regulatory framework without sharing with banks, the take rate would still only be 0.6%. That is significantly lower vs PayPal's 1.81% in 2016. Note that for PayPal, 1.2% out of that 1.81% goes to sales and marketing, customer acquisition, development and various costs. So inherently the low fee structure to begin with makes it extremely difficult for payment companies to make direct profit from it, especially those with no scale. Unless we see a complete overhaul of the fee structure in the payment industry, bank or non-bank, the top-line rate is not likely to improve.

A walletful of data. This comes back to our earlier discussion on the conglomerate structure in China's FinTech space. For giants like Alibaba, Tencent, or even Ping An, payment is an important gateway to get hold of data, which would give them even more insight into their customers' lives. Making money directly from payments is probably not the main objective. Debit cards are widely available, but Chinese consumers never really got used to transacting on them, especially in day-to-day activities. They also skipped a whole generation of NFC prepaid cards that were popular in some other Asian countries. So the vast consumption data, especially that concerning small and high frequency purchases, is waiting to be mined.

Payment is also an indispensable part of the infrastructure to help e-commerce or FinTech companies to close the loop on their eco-system, so they can utilize the data and profit through targeted marketing/advertising, or other value-added services including financial services.

The conglomerate's payment arms have an incentive to encourage customers to put money into their online 'e-wallet' and spend it from there - that way the bank is reduced to a utility and loses out not only on fees, but also access to transactional data.

However, we point out that data privacy and data ownership will likely increasingly become a focus of entrepreneurs and public scrutiny, as well as the government. It remains to be seen whether and for how long the disruptors can keep the wallet full of data to themselves.

Exhibit 57: When the consumers put their money into e-wallet and spend it from there, the bank is reduced to a utility and loses out not only on fees, but all access to transactional data.
What data do the banks own using different payment methods?

	What data do the banks own?		
Transaction data type	Traditional bank card transaction	Alipay/WeChat Pay directly linked to bank cards for each transaction	Alipay/WeChat Pay E-Wallet
Time	√	√	
Location	√		
Amount	√	√	
Nature	√		
Counterpart	√		

Source: Goldman Sachs Global Investment Research

What are some possible monetization models?

As we explained earlier, third-party payment is not profitable on its own. But it is an important gateway to get hold of customer data. The monetization therefore depends on what one does with the data.

- **Targeted advertising** is one obvious way - most internet companies that make money do so by selling online ads. Players can also make profits by providing other financial services such as consumer financing, or other value-add services like distributing money market funds or other financial/wealth management products.
- **Consumer financing**: When purchasing goods and services, Alipay now offers consumers an option of paying through 'Ant Check Later', a virtual credit card provided by Ant Financial, instead of from Alipay balance or the linked bank card. This service is available on Alibaba's Taobao platform, and also available at several online and offline co-op merchants such as Didi, Xiaomi and Walmart.
- **Money market funds/financial products:** Both Alipay and WeChat offer access to money market funds or other financial products to users on their platform. While money in the WeChat wallet balance can only be used to purchase money market fund, Alipay allows users to buy higher risk financial products within Alipay directly, including money market fund, wealth management products and mutual funds. One the most popular choices is Yu'e Bao, Alipay's money market fund. Users can move money from Alipay wallet to Yu'e Bao without a transaction fee. Yu'e Bao also allows users to use their balance to make a Taobao Payment. This increases the asset utilization of users' idle cash and fills the void of consumers savings needs by giving them easy access to institutional rates. At the end of Jun 2017, Yu'e Bao's assets stood at Rmb1.43trn, with over 300mn users. Both Alipay and WeChat started offering third-party products such as mutual fund of E Fund Management.

Key debates for future #2: Regulatory

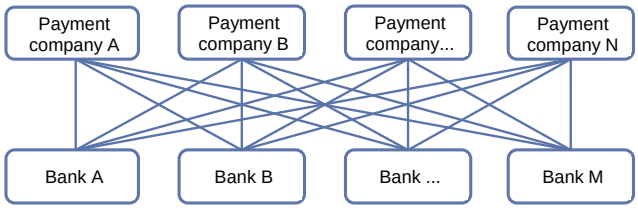
There is an increasing need for regulators to monitor the rapidly increasing money flow via the closed FinTech ecosystems and payment is the starting point. However, instead of simple blocking, regulators need to work with the payment companies as that is where the technology know-how lies. This creates unique access for private capital in the next generation of financial infrastructure.

Regulators start to focus more on transparency, risks and customer protection

On Mar 31, **a centralized clearing house**, Wanglian, administered by PBOC went live for online third-party payments. Although it might still take time and multiple stress-tests for all third-party payments to be transferred here, this marks the end of the prevailing business model where many third-party payment companies implicitly act as clearing agencies themselves.

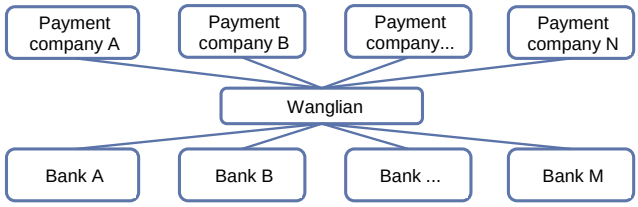
The move itself should not come at a surprise as the market had been expecting major infrastructure changes since July 2016, when PBOC announced a plan to create this new platform. There has been a series of other **disciplinary rules** to regulate the third-party payment market, mainly targeting **risk management and customer protection.** For example, PBOC required third-party payment companies to start to set aside clients' reserve (customer advances) into a special-purpose account with the central bank or commercial bank, instead of booking interest income for their own. Initially 20% of the customer advances is required to be deposited with either the central bank or a commercial bank, but it is expected to increase to 100% eventually. We provided a summary of the major regulatory requirements/changes in Ex 61.

Exhibit 58: Currently (without Wanglian), most payment companies link to banks directly. It is difficult for the central bank to monitor each transaction.



Source: Goldman Sachs Global Investment Research

Exhibit 59: When fully implemented, Wanglian will be responsible for centralized clearing of payment companies, easier for the central bank to monitor.



Source: Goldman Sachs Global Investment Research

New clearing house: a watershed event

From the central bank and regulators' perspective, we believe transparency and risk management is the priority. With closed ecosystems with full line of lending/wealth management product and even credit scoring services, many FinTech players today can effectively create credit that is completely outside of the central bank's system. It poses challenges to know-your-customer and anti-money-laundering exercises for the banking system, when the key counterpart and transaction nature information is missing. Payment is the gateway to all those activities. It is crucial that the central bank is able to monitor all digital transactions, hence the introduction of a centralized clearing house is necessary.

Private capital's participation in the industry infrastructure: The shareholder structure of the new clearing house, *Wanglian,* is surprising to many, when it was first touted around back in July 2016. Alipay and Tenpay are the largest shareholders besides the PBOC and

SAFE (including their affiliates), and the rest of the shareholders are all private third-party payment companies, while UnionPay and traditional banks are missing from the shareholder list. Most of China's existing basic infrastructure, regardless of industries, were built and owned by state owned enterprises or government agencies, hence eventually, the government themselves. Even UnionPay, China's only card network, was built and is still owned by the PBOC and SOE banks. The establishment of Wanglian is one of the very rare cases of private capital playing a key role in the infrastructure building of an industry. If this model turns out to be successful, it could have profound implication for future policy directions and market participant.

Exhibit 60: Private companies are playing a bigger role in China's FinTech infrastructure for the first time.
Alipay and Tenpay are the largest shareholders of China's only clearing house for all online payments, besides PBOC and SAFE. This compares to China's only card network, UnionPay, built and owned by PBOC and SOE banks. Data as of 2017.

	China UnionPay	Wanglian (sole clearing house for all online payment)
Number of shareholders	152	45
Capital (Rmb bn)	2.93	2
Main shareholders	**25% by 6 main shareholders:** China Banknote Printing and Minting (4.86%) China Construction Bank (4.78%) Industrial and Commercial Bank of China (3.84%) Agricultural Bank of China (3.84%) Bank of China (3.84%) Bank of Communications (3.84%)	**34% by 6 national institutions, including affiliates of PBOC and State Administration of Foreign Exchange** China National Clearing Center (12%) Wutongshu Investment Platform (10%) Shanghai Clearing House (3%) Shanghai Gold Exchange (3%) China Banknote Printing and Minting (3%) National Association of Financial Market Institutional Investors (3%)
	Joint-stock commercial banks such as: China Merchants Bank, Shanghai Pudong Development Bank, Postal Saving Bank of China, China CITIC Bank, China Guangfa Bank, Everbright Bank, Ping An Bank, Hua Xia Bank, Industrial Bank, Minsheng Bank, etc.	**63% by 38 non-bank payment companies such as:** Alipay (9.61%) Tenpay (9.61%) JD Pay (4.71%) 35 other payment companies (<3% each)
	Municipal commercial banks, credit cooperatives and non-bank institutions	Payment and Clearing Association of China (3%, representing other small & medium-sized payment companies)

Source: Company data, Sina, Goldman Sachs Global Investment Research

Technological know-how is the key enabler for the public private collaboration

Technological know-how is one of the key prerequisites to ensure the clearing house to run smoothly. Instead of simply blocking, regulators chose to work with privately-owned payment companies. We believe that is because that is where the technological know-how lies. The regulators need the key industry participants' help in order to build the technical capacity to handle tens of thousands transactions per second.

- The new clearing house for online payments, Wanglian's capacity target is to average 120,000 transactions per second and 180,000 transactions per second at peak.
- In comparison, the capacity of VISA, MasterCard and UnionPay is about 80,000 transactions per second, while Alipay handles 86,000 transactions per second at peak.

Potential implications remain to be seen; More questions than answers

It will take time and multiple stress-tests for Wanglian to be fully functional in our view. Owning to the nascent nature of the business model and the public-private collaboration, it would be difficult to surmise the end form of the regulatory framework now. We expect the regulatory environment to constantly evolve, and believe it will be important to track the development of how the payment clearing house evolves, as it could have deep

implications on how the payment industry, and the rest of the FinTech industry should will regulated.

For the payment industry, the ultimate impact of the new regulatory framework remains to be seen, depending on many moving factors and debates. Among which, the crucial ones are:

- When and whether Wanglian will become the sole clearing house for non-bank payments? How will the role of UnionPay evolve? In a sense, Wanglian is a direct competitor of UnionPay, especially when the online-to-offline boundary in payment gets increasingly blurred. This is complicated further that UnionPay (or traditional banks) is not included as a shareholder of the newly established Wanglian, but can still run parallel with Wanglian at the current stage.
- Who owns the data? To what extent will data be shared between different participants? As we explained above, we believe the key purpose for the centralized clearing house Wanglian is for the regulators to better monitor fund flows. As a result, third-party companies may need to share transactional data and some exclusive customer data with the regulators, and possibly with the banks. This could take away one key advantage of the third-party payment companies (data exclusivity). It might also affect how they monetize the transactional data via their other business lines, such as lending, credit scoring, online advertisement etc. However, we reiterate that it will still take time and possibly multiple stress tests for the system to be fully up and running. It is still too early to conclude the ultimate information sharing mechanism and its implications. Thus we will need to closely monitor the development.

Exhibit 61: Recent regulations on internet payment focus more on transparency.
Regulation summary - payment

Date	Regulation	Key message
Jun-2010	**Regulations on non-financial institution payment service business** 《非金融机构支付服务管理办法》	Defined 3 types of payment services Required licenses for payment institutions to provide each type of service
Jun-2013	**Regulation on custodian of clients' reserve** 《支付机构客户备付金存管办法》	Required **separate deposit of the clients' reserve** into a custodian bank account Prohibited misappropriating the clients' reserves
Jul-2015	**Guiding opinions on promoting healthy development of internet finance** 《关于促进互联网金融健康发展的指导意见》	The first comprehensive regulation on internet finance in China Set out "**small, fast and convenient**" as the principles of internet payment The PBOC is the regulator of internet payment
Dec-2015	**Regulations on non-bank internet payment service business** 《非银行支付机构网络支付业务管理办法》	The first comprehensive regulation on internet payment in China **Classified payment accounts** into 3 categories. Each has different quota for different transaction types **Graded and regulated payment institutions** differently, mainly based on their use of clients' reserves
Mar-2016	**Announcement on revamping pricing mechanism of bank card transaction fees** 《关于完善银行卡刷卡手续费定价机制的通知》	**Reduced the average fee** of bank card transaction significantly
Aug-2016	**Consultation on barcode payment standard** 《条码支付业务规范（征求意见稿）》	**Official acknowledgement of barcode** payment by the PBOC for the first time
Oct-2016	**Implementation plan for risk management on non-bank payment institutions** 《非银行支付机构风险专项整治工作实施方案》	Establishes **centralized clients' reserve custody** without interest payment Establishes a **centralized clearing house** for payment institutions ("Wanglian") Prohibited payment institutions directly transferring funds from issuing banks
Jan-2017	**Announcement on regulations for custodian of clients' reserves with payment institutions** 《关于实施支付机构客户备付金集中存管有关事项的通知》	Required c20% of the clients' reserves to be deposited into a custodian account without interest The percentage is reviewed quarterly by the PBOC

Source: PBOC, State Council of the PRC, Goldman Sachs Global Investment Research

Key debates for future #3: Fee competition and M&A

Fee competition: With the introduction of Wanglian, the already fierce fee competition will likely get more intense, when more banks and UnionPay join the battleground. Banks have been offering their own payment solutions, many adopting the new QR code standards set by PBOC in Aug 2016. Many of them have simplified the user interfaces, hoping to lure back more customers. UnionPay recently (Apr 2017) started to offer rebates to offline merchants to promote their own contactless payment (via traditional POS), effectively lowering the rate to similar levels as payment companies. Part of the prevailing fee charged on offline merchants can be as low as 0.38% from many payment companies, vs the 0.6% official guideline.

M&A: On the other hand, the license itself is still valuable. Many cash-rich players from other industries are looking to close their own loop. Among the suitors, there are not only traditional industry magnates who look to keep their competitive advantages in the digital age, but also rising tech stars in the online-to-offline service industry. Meituan, for example, acquired its own payment license in Sep 2016. Although there are in total around 250 payment licenses available, only 120 of them that are allowed to handle online payment - out of which, we believe there are only 20-40 licenses that are not already being bought nor associated with a sizeable player from adjacent industries. We expect the demand for a payment licenses continue to rise, especially from tech start-ups with an early success. They either want to close the loop with their own supply chains, or are incentivized to expand onto adjacent growth area to boost their respective valuations. In either case, the fact remains that new, large, private entrants cannot be ruled out of the current landscape or ecosystem.

Exhibit 62: Since 2012, a series of M&A transactions have taken place in the third-party payment industry
M&A transactions in third-party payment industry since 2012

Date	Company Name	Location	Business Type*	% Holding	Transaction Value (RMB mn unless otherwise stated)	Acquirer
Jun-17	Beijing Yinyingtong Management Consulting Co., Ltd 银盈通支付有限公司	Beijing	Prepaid card (Beijing, Shanxi, Yunnan, Guizhou) Internet	100%	720	Gome Fintech 国美金融科技
Mar-17	Hangzhou Qima Technology Co., Ltd 杭州起码科技有限公司	Hangzhou	Technology	51%	2,096 (HK$ mn)	Innovationpay 中国创新支付
Dec-16	Shandong E-business Comprehensive Operations and Management Co., Ltd. 山东省电子商务综合运营管理公司	Jinan	Internet	>50%	NA	Greenland Holding 绿地集团
Nov-16	Shanghai Deyi Network Technology Co., Ltd 上海德颐网络技术有限公司	Shanghai	Bank card (Nationwide)	100%	c600	Shanghai YY Electronic Technology 银嘉金服
Oct-16	Fujian Guotong Xingyi Network Technology Co., Ltd 福建国通星驿网络科技有限公司	Fuzhou	Bank card (Nationwide)	60%	680	Fujian Newland Computer 新大陆
Oct-16	Beijing Guohua Huiyin Technology 北京国华汇银科技有限公司	Beijing	Prepaid card (Beijing)	100%	70	Xinhua Financial Holding 新华金控
Oct-16	Zhejiang VIP Pay Co., Ltd 浙江唯品会支付服务有限公司	Hangzhou	Internet	100%	400	Vipshop 唯品会
Oct-16	Shanghai Dianbaiqu Information Technology Co., Ltd 上海点佰趣信息科技有限公司	Shanghai	Bank card (Nationwide)	45%	945	Shenzhen Keybridge Communications 键桥通讯
Sep-16	Guangzhou Helibao Payment Technology Co., Ltd 广州合利宝支付科技有限公司	Guangzhou	Bank card Internet Mobile	90%	1,400	Meson Fintech 民盛金科
Sep-16	Qiandai Information Tech., Ltd 北京钱袋宝支付技术有限公司	Beijing	Bank card Internet Mobile	100%	NA	Meituan Dianping 美团点评
Aug-16	Shenzhen Midea Payment Technology Co., Ltd 深圳市美的支付科技有限公司	Shenzhen	Internet Mobile	50%	300	Midea Group 美的集团
Aug-16	Shenzhen Sharelink Network Co., Ltd 深圳市讯联智付网络有限公司	Shenzhen	Internet Mobile TV	90%	386	E-Capital Transfer 证通公司
Aug-16	Guangxi Evergrande Wantong Payment Co., Ltd 广西恒大万通支付有限公司 （曾用名"集付通"）	Nanning	Prepaid card (Guangxi, Guangdong, Yunnan) Internet	100%	570	Evergrande Group 恒大集团
Jun-16	Union Mobile Pay E-commerce Co., Ltd 联动优势电子商务有限公司	Beijing	Bank card Internet Mobile	91.6%	3,039	Qingdao Haili Metal One 海立美达
Apr-16	Zall Fintech Co., Ltd 深圳卓尔智联科技股份有限公司	Shenzhen	Technology	51%	126	Zall Group 卓尔集团
Apr-16	China Public Procurement Pay Technology Co., Ltd 天下支付科技有限公司	Shenzhen	Internet Mobile Telephone	100.0%	100	Jiangsu Hongtu High Technology 宏图高科
Jan-16	Fujian Yikatong Network Co., Ltd 福建一卡通网络有限责任公司	Quanzhou	Prepaid card	100%	38	Thaihot Group 泰禾集团
Jan-16	Jiefu Ruitong Co., Ltd 捷付睿通股份有限公司	Hohhot	Bank card Internet Mobile	65%	600	Xiaomi 小米
Nov-15	Zhejiang Shangmeng Business Service Co., Ltd 商盟商务服务有限责任公司	Hangzhou	Prepaid card (Zhejiang & Shanghai) Internet	63%	35.6 (US$ mn)	500.com 500彩票网
Aug-15	ExaDigm	California, USA	License in California	100%	4.7 (US$ mn)	Nexgo Inc 新国都
Aug-15	Shanghai Runtong Industrial Investment Co., Ltd 上海润通实业投资有限公司	Shanghai	Prepaid card (Shanghai)	80%	268	Shanghai Dasheng Agriculture Finance Technology 上海大生农业金融科技(原上海株华石油化工)
Jul-15	Open Union Payment Service Co., Ltd 开联通支付服务有限公司	Beijing	Prepaid card Internet	25%	1,000 (HK$ mn)	Shanghai Lujiazui Finance & Trade Zone Development 陆家嘴
Jul-15	Guangzhou Huitongji Automotive Service Co., Ltd 汇通宝支付有限责任公司	Guangzhou	Prepaid card (Shanghai, Guangdong, Fujian)	100%	NA	Bluedon Information Security Technologies 蓝盾股份
Jul-15	Baofoo Internet Technology (Shanghai) Co., Ltd 宝付网络科技（上海）有限公司	Shanghai	Internet	27%	250	East Money Information 东方财富
Jun-15	Shanghai Kayou Information Service Co., Ltd 卡友支付服务有限公司	Shanghai	Bank card (Nationwide)	6.9%	25	Tatwah Smartech 达华智能
Jun-15	Shanghai Handpay Information & Technology Co., Ltd 上海瀚银信息技术有限公司	Shanghai	Internet Mobile	7.7%	50	Kunming Sinobright Group 昆百大A
May-15	Edenred China Ltd 艾登瑞德（中国）有限公司	Wuxi	Prepaid card (Jiangsu, Shanghai, Beijing, Sichuan)	100%	190	Property & Credit Electronic Payment 资和信电子支付
Apr-15	Taiwan Mobile Payment Co. 台湾行动支付	Taipei	Mobile	2%	NA	Chunghwa Telecom 中华电信
Mar-15	Jiupai Tianxia Payment Co., Ltd 九派天下支付有限公司(原鹰皇金佰仕网络技术有限公司)	Changsha	Prepaid card (Hunan, Beijing, Shanghai) Internet Mobile	70%	70	Tongchuang Jiuding Investment Management 九鼎投资
Mar-15	Jieyifu Technology Co., Ltd 捷易付科技有限公司(原深圳市兄弟高登科技有限公司)	Shenzhen	Prepaid card (Guangdong, Beijing, Shanghai)	100%	113	Shenzhen Jieshun Science (JSST) 捷顺科技
Feb-15	Guangdong Shanglian Payment Network Technology Co., Ltd 广东商联支付网络技术有限公司	Guangzhou	Technology	51.0%	175	Guangdong Highsun Group 海印股份
Dec-14	Kuaiqian Payment and settlement service Co., Ltd 快钱支付清算信息有限公司	Shanghai	Bank card Internet Mobile	68.7%	315 (US$ mn)	Dalian Wanda Group 大连万达集团
Oct-14	Shanghai Tangdi Information Technology INC. 上海棠棣信息科技股份有限公司	Shanghai	Technology	51%	131	Hebei Huijin Electromechanical 汇金股份
Aug-14	Guangxi Evergrande Wantong Payment Co., Ltd 广西恒大万通支付有限公司 （曾用名"集付通"）	Nanning	Prepaid card (Guangxi, Guangdong, Yunnan) Internet	100%	600	China Soft Power Technology Holdings 中国软实力(原中国金海集团)
Jul-14	Shandong Wangshangyouming Technology Co. Ltd 山东网上有名网络科技有限公司	Qingdao	Prepaid card (Beijing, Qingdao) Internet	NA	NA	GA Science & Tech. Group 赢联集团
Jun-14	Suzhou Citizen Card Co., Ltd 苏州市民卡有限公司	Suzhou	Prepaid card (Jiangsu)	20%	33	Soochow Securities 东吴证券
Mar-14	Beijing Yada Communication Network Co., Ltd 北京亚大通讯网络有限责任公司	Beijing	Technology	75%	165	Fujian Newland Computer 新大陆
Feb-14	AndPay Information Technology Co. Ltd 上海和付信息技术有限公司	Shanghai	Technology	100%	NA	YeePay 易宝支付
Dec-13	Kuaijietong Payment Service Co. Ltd 快捷通支付服务有限公司	Hangzhou	Internet	100%	147	Haier Network Technology 海尔网络科技
Nov-13	Beijing Guohua Huiyin Technology Co., Ltd 北京国华汇银科技有限公司	Beijing	Prepaid card (Beijing)	100%	30	Guizhou Changzheng Electric 长征电气
Nov-13	Open Union Payment Service Co., Ltd 开联通支付服务有限公司	Beijing	Prepaid card (Beijing)	33.0%	156	Innovationpay 中国创新支付
Aug-13	Ping An Fu Electronic Payment Co., Ltd 平安付电子支付有限公司	Shanghai	Bank card Internet Mobile	0%	Undisclosed (few hundred millions)	Ping An Ventures 平安创新投资基金
Jul-13	Beijing 19pay Technology Co., Ltd 北京一九付支付科技有限公司	Beijing	Internet	100%	819	Gohigh Data Networks Technology 高鸿股份
Oct-12	Chinabank Payments (Beijing) Technology Co., Ltd 网银在线（北京）科技有限公司	Beijing	Bank card (Beijing) Internet Mobile	100%	NA	JD Group 京东

Source: China Economic Net, PBOC, Sohu, Goldman Sachs Global Investment Research

Appendix

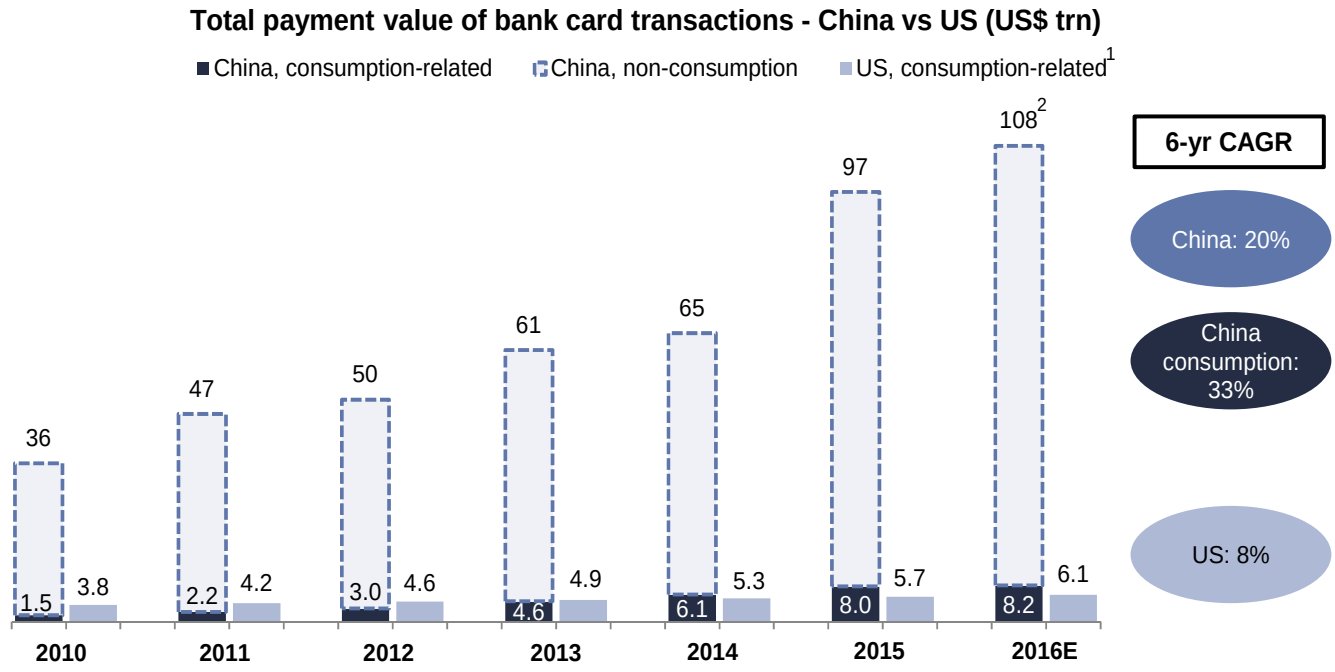
Exhibit 63: Comprehensive list of private companies mentioned in the report

Company name	Headquarters	Year founded	Primary Segment	Business model	Latest financing	Series round	Capital raised (USD mn)	Total capital raised[1] (USD mn)
Multi-segment internet / e-commerce magnates								
Ant Financial (蚂蚁金服)	Hangzhou	2014	Payment, financing, saving / investment and others	Leveraging on Alibaba Group's (BABA) resources, Ant Financial has created its own ecosystem including payment, consumer credit, wealth management, credit scoring, cloud computing, etc. **Alibaba Group has the right to a 33% equity stake of Ant Financial subject to regulatory approval.**	Apr-16	B	4,500	6,350+
JD Finance (京东金融)	Beijing	2013	Payment, financing, saving / investment and others	Leveraging on JD.com's (JD) resources, JD Finance offers a wide range of financial solutions of consumer credit, supply chain financing, asset management, payment and crowdfunding. **JD.com has agreed to sell JD Finance (to be finished by mid 2017) and reserves the right to claim 40% of JD Finance's equity, subject to regulatory approval.**	Jan-16	A	About 1,000	About 1,000
Lufax Holding (陆金所)	Shanghai	2011	Financing, saving / investment and others	Lufax Holding is a leading internet finance transaction information service platform in China, with strength in wealth management, institutional trading of financial assets and consumer finance. **Ping An Group (2318.hk) holds 44% equity and convertible bonds equivalent to 11% equity holding of Lufax, if exercised.**	Jan-16	B	About 1,200	About 1,700
Suning Financial Services (苏宁金服)	Shanghai	2016	Payment, financing, saving / investment and others	Suning Financial Services has built a connected finance product portfolios both online and offline including payment account, investment and wealth management, consumer and business loans, crowdfunding, etc. **Suning Commerce Group (002024.ss) owns 60% of its equity.**	Apr-16	A	About 1,000	About 1,000
99Bill (快钱)	Shanghai	2004	Payment, financing, saving / investment	99Bill is an internet financing company, starting from a third-party payment service provider in China and expanding its business to financing and investment. **Wanda Group owns about 96% of 99Bill's equity.**	Dec-12	E	27	84
Payment								
Alipay (支付宝)	Shanghai	2014	Payment	Alipay is a third-party payment platform under Ant Financial, integrating various consumption scenarios & industries like payment, lifestyle services, civil services, social networking, wealth management, insurance and public welfare.	N/A	N/A	N/A	N/A
Baidu Wallet (百度钱包)	Beijing	2008	Payment	Baidu Wallet is a payment platform that connects users, merchants, and Baidu's products to provide money transfer, payment, top up and other services. It aims to become a one-stop payment solution for its users.	N/A	N/A	N/A	N/A
ChinaPnR (汇付天下)	Shanghai	2006	Payment	ChinaPnR provides financial service packages for new financial industries, covering 50% of P2P lending platforms as well as other new financial institutions.	Sep-11	B	7	Unknown
China UMS (银联商务)	Shanghai	2002	Payment	China UMS provides merchant acquiring services such as POS solutions for bank cards. **China UnionPay owns about 60% of its equity.**	Oct-16	D	290	313+
JD Pay (京东钱包,原网银在线)	Beijing	2003	Payment	Chinabank Payments (Beijing) Technology Co. Ltd, the provider of JD Pay, is the payment platform wholly owned by JD Finance. It provides payment services for consumptions, personal transfer and wealth management.	N/A	N/A	N/A	N/A
Lakala (拉卡拉)	Beijing	2005	Payment	Lakala Payment is an online financial service platform that provides services such as mobile payment, POS solution, credit rating, etc. **Lenovo Holding Co. (3396.hk) owns 31% equity of Lakala Payment.**	Jun-15	Strategic investment	240	>312
Paytm	Noida, India	2010	Payment	Paytm is India's largest mobile payments and commerce platform. It started with online mobile recharge and bill payments and has an online marketplace today. **Alibaba and Ant Financial own about 40% of Paytm as of Mar 2017.**	May-17	NA	1,400	2,400+
Ping An E-wallet (平安壹钱包)	Shenzhen	2005	Payment	With payment as the bridge between finance and living, E-wallet is developing an O2O life and financial service platform integrating prepaid cards with E-wallet app. **Ping An Group owns 77% of the company.**	N/A	N/A	N/A	N/A
Tenpay (财付通)	Shenzhen	2005	Payment	With the sizable user base of WeChat and QQ, Tenpay has a considerable market share in mobile payment, and provides payment services including consumption, personal transfer and wealth management. **With its major products Wechat Pay & QQ wallet, Tenpay is wholly owned by Tencent (0700.hk).**	N/A	N/A	N/A	N/A
China UnionPay (银联)	Shanghai	2002	Payment	China UnionPay is a bankcard association established under the approval of the State Council and the PBOC. **It is built and owned by the PBOC and SOE banks.**	N/A	N/A	N/A	N/A
Financing								
Antsdaq (蚂蚁达客)	Shanghai	2015	Crowdfunding	Antsdaq is Ant Financial's online crowdfunding platform. Leveraging on internet and big data technology of Antsdaq, companies can raise money and gain business support from investors using Antsdaq.	N/A	N/A	N/A	N/A
Ping An Crowdfunding (平安众筹)	Shenzhen	2015	Crowdfunding	Ping An Crowdfunding is a crowdfunding platform that facilitates connection between borrowers and investors. **Ping An Group owns about 79% of the company.**	N/A	N/A	N/A	N/A
luP2P.com (陆金服)	Shanghai	2014	P2P - consumer and SME	luP2P is the P2P lending platform under Lufax holding. It focuses on building a stable platform that provides both investors and borrowers efficient and low cost financial solutions.	N/A	N/A	N/A	N/A
Wanda Loans (万达贷)	Shanghai	2016	SME lending	Wanda Loans, provided by Wanda Micro Loan, conducts business in online SME lending, consumer finance, wealth management and other financial services. **Wanda Group owns about 92% of the company.**	N/A	N/A	N/A	N/A
Saving/Investment								
Baixin Bank (百信银行)	Beijing	2017	Online-only bank	Baixin Bank is a direct bank that uses online banking to offer financial services. **Baidu (BIDU) owns 30% of the company.**	N/A	N/A	N/A	N/A
Dongjia Caifu (东家财富)	Shanghai	2016	Online asset management	Dongjia Caifu is a high end financial service platform that focuses on providing asset and wealth management services for high net worth families in China. **JD Finance owns 75% of the company.**	N/A	N/A	N/A	N/A
Lufunds.com (陆基金)	Shanghai	2014	Online asset management	Lufunds.com is a fund distribution plaform, wholly owned by Ping An Group, that conducts business in wealth management and investment consulting, and sells investment fund online to promote online trading of funds.	N/A	N/A	N/A	N/A
MYbank (网商银行)	Hangzhou	2015	Online-only bank	MYbank is one of the first private online-only banks in China. The bank provides financial solutions for SMEs, consumers, and rural population, etc. **Ant Financial owns 30% of the company.**	N/A	N/A	N/A	N/A
Tianhong Asset Mgmt.(天弘基金)	Tianjin	2004	Online saving	Tianhong Asset Management is a nationwide mutual fund management company in China. The company manages Yu'e Bao, Alipay's money market fund. **Ant Financial owns 51% of the company.**	N/A	N/A	N/A	N/A
WeBank (微众银行)	Shenzhen	2014	Online-only bank	WeBank is one of the first private online-only banks in China. The bank focuses on providing different financial services to SMEs and the general population. **Tencent owns 30% of the company.**	Jun-16	A	About 180	About 180
Others								
Ant Financial Cloud (蚂蚁金融云)	Hangzhou	2015	Cloud computing	Leveraging on Alibaba and Ant Financial's cloud computing technology, Ant Financial Cloud provides cloud computing services to help financial institutions to build new generation of financial service business models.	N/A	N/A	N/A	N/A
Baidu Financial Cloud (百度金融云)	Beijing	2016	Cloud computing	Baidu Financial Cloud provides IT infrastructure, AI, data management, payment and other business solutions to financial institutions.	N/A	N/A	N/A	N/A
Didi Chuxing (滴滴出行)	Beijing	2012	Transportation services	Didi Chuxing is an integrated transportation service company that provides taxi hailing, private car hailing, bus sharing and other ride-sharing services.	Apr-17	About 10[2]	5,500	About 16,000[2]
Jcloud.com (京东云)	Beijing	2016	Cloud computing	Jcloud is JD's cloud computing service provider. Leveraging on JD's business and technology, it provides cloud computing services to the whole society and helps to provide companies with more "internet +" business solutions.	N/A	N/A	N/A	N/A
Ksyun (金山云)	Beijing	2012	Cloud computing	Ksyun is a leading provider of cloud computing service to customers and enterprises.	May-16	C+	50	About 200
Meituan Dianping (美团点评)	Beijing	2010	Online-to-offline services	Meituan Dianping is a group buying platform that helps consumers to enjoy discounted quality services and products.	Jul-16	F[3]	Unknown	4,360+[3]
Ping An Cloud (平安云)	Shenzhen	2013	Cloud computing	Leveraging on Ping An Group's finance and health IT ecosystem, Ping An Cloud provides cloud computing services to financial institutions and healthcare type companies.	N/A	N/A	N/A	N/A
Qianhai Credit Service Centre (前海征信)	Shengzhen	2013	Personal credit scoring	Qianhai Credit Service Centre is a third party credit scoring company under Ping An Group. It focuses on building a credit scoring system that eliminates information asymmetry and improves financial opeartional efficiency.	N/A	N/A	N/A	N/A
Tencent Cloud (腾讯云)	Beijing	2013	Cloud computing	Tencent Cloud is Tencent's cloud computing business that serves hundreds of millions of people via Tencent's flagship products like QQ and WeChat.	N/A	N/A	N/A	N/A
Tencent Credit Bureau (腾讯征信)	Hangzhou	2015	Personal credit scoring	Tencent Credit Bureau is a company under Tencent that conducts business in anti-fraud technology, identification technology and credit scoring.	N/A	N/A	N/A	N/A
Wanda Credit (万达征信)	Shanghai	2015	Personal credit scoring	Leveraging on Wanda Group's merchant and consumer spending data, Wanda Credit provides and develops credit scoring services. **Wanda Group owns about 96% of the company.**	N/A	N/A	N/A	N/A
Zhima Credit (芝麻信用)	Hangzhou	2015	Personal credit scoring	Zhima Credit is a third party credit scoring company under Ant Financial. It generates personal and corporate credit ratings using technologies such as cloud computing and machine learning.	N/A	N/A	N/A	N/A
Zhong An Online P&C Insurance (众安保险)	Shanghai	2013	Online-only insurance company	Zhong An Online P&C Insurance Co., Ltd is the first online-only insurance company in China, writing new business and handling claims completely online. Based on e-commerce scenarios, it offers various products such as account safety insurance, travel insurance, health insurance, etc. **It is 16% owned by Ant Financial, 12% owned by Ping An Group and 12% owned by Tencent.**	Jun-15	A	934	934

Note:
1. Total capital raised is estimated based on publically disclosed information. All numbers are as of Jun 2017.
2. Series round and total capital raised for Didi Chuxing is calcuated based on Didi Kuaidi's pre-merger plus post-merger funding
3. Series round and total capital raised for Meituan Dianping is calcuated based on Meituan's pre-merger plus post merger funding

Source: Ministry of Science and Technology of the PRC, Company data, Crunchbase, Itjuzi, Goldman Sachs Global Investment Research

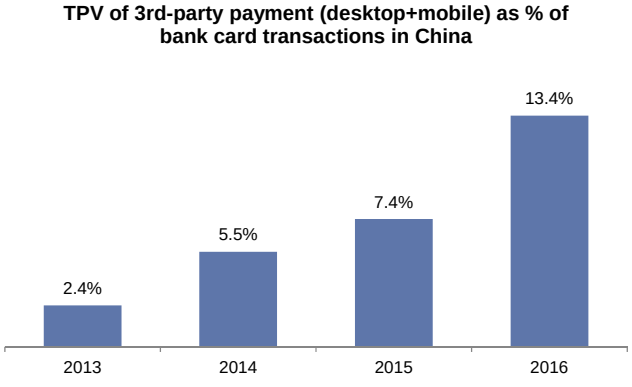
Exhibit 64: We note the scale difference in the bank card transactions between China and the US.
Total payment value of bank card transactions in China and the US (US$ trn)



Note:
1. The consumption-related TPV of China and US includes consumptions from consumers and commercial activities. Non-consumption payment includes bank card transfer, cash deposit and withdrawal, etc
2. Actual number from PBOC.

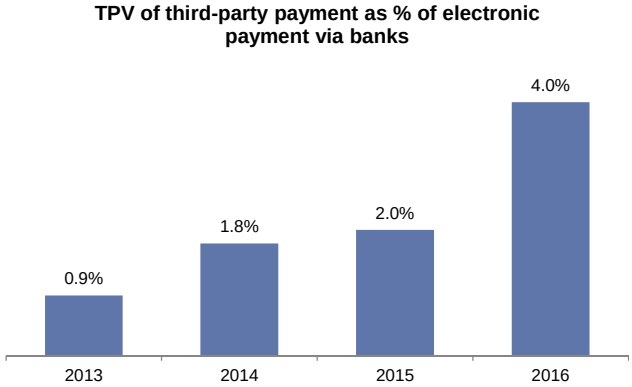
Source: PBOC, Nilson Report, Goldman Sachs Global Investment Research

Exhibit 65: TPV processed through payment companies is still only 13% of those via bank cards…
TPV of third-party payment as % of bank card transactions in China



Source: PBOC, Goldman Sachs Global Investment Research

Exhibit 66: … and 4% of electronic payment via banks
TPV of third-party payment companies as % of electronic payment via banks in China



Source: PBOC, Goldman Sachs Global Investment Research

Exhibit 67: Terminology table

Term	Explanation
Issuing bank	A bank that issues payment cards branded by card networks, directly to consumers.
Merchant acquirer	A party in the payment value chain that processes payments on behalf of a merchant, so that the merchant can receive payments from consumers. It is also known as "acquiring bank" when the merchant acquirer is a bank.
Card network	Also known as card association, a financial institution that control where payments can be accepted and to facilitate transactions between an issuing bank and a merchant/merchant acquirer. Visa, MasterCard and UnionPay are examples of a card network.
Desktop payment	A payment transaction initiated by personal computers (desktop and laptop).
Mobile payment	Payment transactions initiated by mobile devices such as smartphones, tablets, smartwatches, etc. The transaction order can be made via web browsers, APPs, NFC, barcode, etc.
E-wallet	An electronic account that an individual can use to make electronic transactions. An individual can also link his/her bank accounts/bank cards to an e-wallet.
POS terminal	Point of sale terminal, an electronic device that can process electronic payments at retail locations.
Take rate	The fees and commissions a payment company collect for a transaction, as percentage of the total payment value processed
Third-party payment	In China, it refers to payments processed by non-bank firms. It is usually done via desktop, mobile devices or non-bank point of sale (POS) terminals. In the US, the closest concept is remote electronic payment.
Wanglian	China's newly established centralized clearing house for all online payments (mid 2017)

Abbreviation	Explanation
B2B	Business to Business. It refers to payments made between companies for goods or services rendered.
B2C	Business to Consumer. We define B2C payments as any payment made from consumers to businesses in exchange for goods and services.
C2C	Consumer to Consumer. We define C2C payments as any payment made from one person to another for any purpose (to split a bill, to settle a debt, to give a gift, etc.) other than exchange for goods and services.
CBRC	China Banking Regulatory Commission, the regulator of banking industry of China.
CIRC	China Insurance Regulatory Commission, the regulator of insurance industry of China.
CSRC	China Securities Regulatory Commission, the regulator of securities industry of China.
KYC	Know Your Customer, a process by which a business obtain and verify the identity of its customers.
NFC	Near field communication, a wireless communication technology that enables electronic devices to communicate within a short distance of a few centimeters.
PBOC	People's Bank of China, the central bank of China.
SAFE	State Administration of Foreign Exchange
SOE	State-owned enterprise.
TPV	Total payment value.

Source: Goldman Sachs Global Investment Research

Company logos

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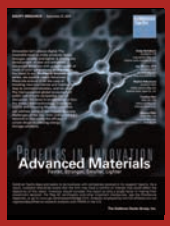


Artificial Intelligence

Space

5G

OLED

Rise of the Asian Consumer

Chinese Consumer

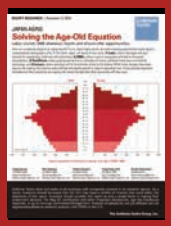
Chinese Millennials

Asia Leisure

China E+Commerce

China Banks

Japan Aging

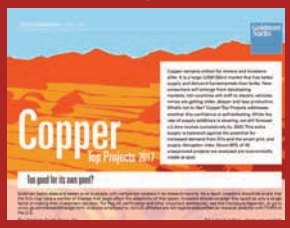


Old China Commodities

Top Oil & Gas Projects

Reforming China Energy

Copper: Too good for its own good?



New Old China: 4R's Beyond 2016

The Future of Finance

Future of Finance

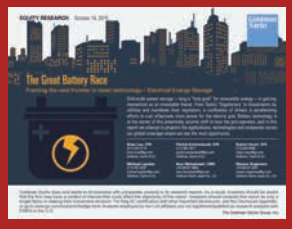
Blockchain

Asia Digital Banking

The Low Carbon Economy

Tech in the Driver's Seat

The Great Battery Race



China's Environment

China's Battery Challenge

Low Carbon China

Music's Return to Growth

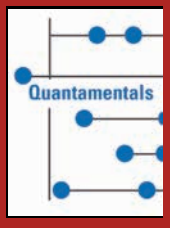
Opportunity

Risk

Creating Tomorrow's Greater Bay

Apple Suppliers' Dilemma

Asian Quantamentals



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Credit

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Disclosure Appendix

Reg AC

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Financial Returns and Multiple use the Goldman Sachs analyst forecasts at the fiscal year-end at least three quarters in the future. Growth uses inputs for the fiscal year at least seven quarters in the future compared with the year at least three quarters in the future (on a per-share basis for all metrics).

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