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Global J.P. Morgan Strategy
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A case study in alternative payments

Lessons from the Chinese experience

- Modernization of payments is a global theme, and a key driver of stablecoin projects like Libra
- To complement prior work in this area, we appeal to the Chinese experience with digital payments as a case study in financial disruption and consumer preferences
- We review the major third party payments platforms in China, including business model, market structure, regulatory developments and importantly their interconnections to financial markets
- Money market funds and bank wealth management products for key components of the Chinese financial system
- The integration of these funds into online ecosystems (e.g., YU'E Bao and Alipay/Alibaba) helped drive explosive growth in AUM …
- … but this has since slowed, even as the money supply in China has continued expanding, likely reflecting much less attractive yield pick-up versus traditional bank deposits
- This interaction led to rapid technological and structural change which in this case drove a similarly fast build-up of new risks to financial stability; timely regulatory intervention was key to managing this transition
- Though the convenience and features offered by integration into e-commerce networks was certainly a significant factor, the degree of sensitivity of Chinese MMF AUM to yield pick-up suggests economics was a comparable if not more important consideration compared to the network externalities of participating
- The example of China suggests that the transition to a mostly cashless economy can be managed at scale

Fixed Income Strategy

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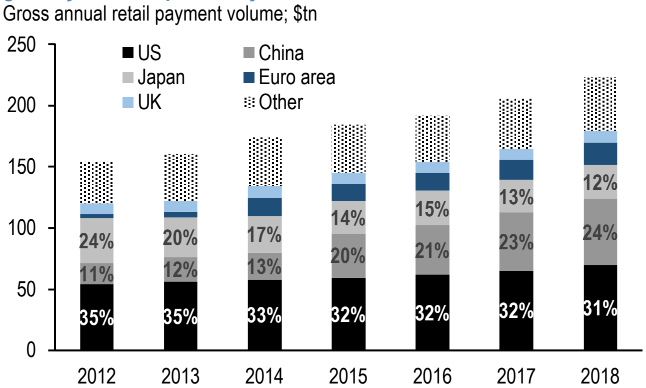
A case study in alternative payments: lessons from the Chinese experience

In a recent publication, we considered the practical implications, and risk posed, by the potential rise of stablecoin-based ecosystems (see *The market implications of Libra and other stablecoins*, J. Younger et al., 9/5/19) as well as the hurdles to them achieving global scale (see *Can stablecoins achieve global scale?*, J. Younger et al., 12/3/19). For that work, we took a more first-principles approach, applying the lessons of more traditional fiat currency payment systems to alternative venues like Libra and its cousins. In doing so **we highlighted two key risks posed by current design choices: the potential for gridlock in the absence of intraday liquidity via either overdraft or netting on the one hand, and the inherent instability of negative yielding collateral on the other**. At this point, Facebook appears to be considering some modest design changes in the wake of several high profile presumptive Libra Association members bowing out. However, news reports suggest no moves to address the concerns raised above.

A complementary approach to evaluating the market and financial stability implications of stablcoins is to appeal to case studies. Given that these projects, including Libra, remain at a very early stage of development, good examples are unsurprisingly difficult to come by. That said, **the recent Chinese experience is, in our view, one worth considering for several reasons**.

Exhibit 1: Asia has driven most of the growth in retail payments globally over the past few years …

Gross annual retail payment volume; $tn



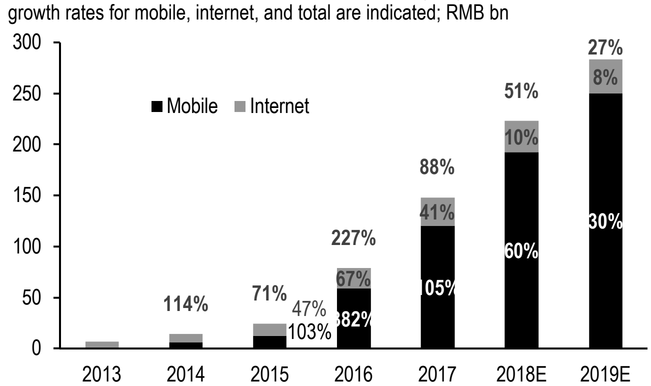
* Includes the remaining six of the top 10 payments systems by value transferred: the U.K., Brazil, Mexico, Korea, India, and Canada.

Note: Payments data from the most recent BIS Red Book.

Source: J.P. Morgan, BIS

Exhibit 2: … which likely reflects increasing levels of financial inclusion via third party payments venues, especially the explosive growth in mobile wallets

Annual volume in mobile and internet-based third party payments in China, annual growth rates for mobile, internet, and total are indicated; RMB bn



Source: J.P. Morgan, PBoC

First, this region in particular is likely to be critical to the success of any new global or cross-border payments system. Asia has already been the engine of growth in global payments over the past few years. In fact, China now makes up nearly a quarter of retail payments activity globally, up from only 11% as recently as 2012 (**Exhibit 1**). This growth has mostly come at the expense of larger developed economies, especially the U.S. and Euro Zone for which market share has fallen. Along similar lines, projections from the McKinsey Global Payments Report for 2019 suggest this should remain the case going forward.

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This has been driven in large part by the expansion of e-commerce, which in China we estimate will exceed RMB 10tn in 2019. **That would represent a more than 400% increase over the past four years**—more than twice the pace of increase in overall retail sales over the same period. In large part this likely reflects broader financial inclusion via online and mobile payments—for example, a survey conducted by the World Bank found that roughly 67% of adults in China made or received digital payments in 2017, up from 45% three years earlier—account ownership at a financial institution, on the other hand, barely budged over the same period. Consistent with this, **third party payments have experienced explosive growth over the past few years, the vast majority of which comes from mobile wallets (Exhibit 2)**. In this sense, the Chinese payments system has already moved significantly towards digital payments, and thus in principle the leap to token-based stablecoin system would be much less disruptive.

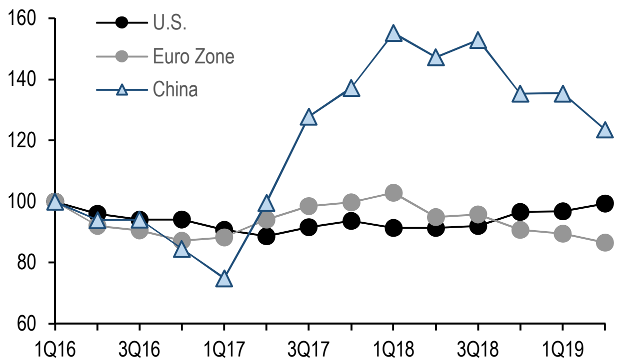
Second, China appears to have more growth potential, particularly in the B2C and P2P e-commerce transactions that would likely be first adopters of stablecoins. Based on official figures, current activity totaled nearly $2tn in 2018, making it the fourth largest market by this measure. **Though impressive, this represents a somewhat smaller fraction of GDP and overall retail payments than other large economies, which implies ample room for further expansion (Exhibit 3)**. And with a higher overall fraction of these payments tied to B2C transactions, this growth is likely more representative of what the Libra Association has highlighted as the intended uses of Libra, and by extension other stablecoins.

Exhibit 3: Though China is not the largest e-commerce market yet, but it has substantial room to grow relative to GDP and overall retail payments, with more B2C activity than most developed countries
2018 e-commerce statistics by country; $bn unless otherwise specified

Economy	Total	% of GDP	% of retail pmts	B2C Share	B2C Value
U.S.	$9,430	46%	14%	8%	$800
Euro Zone	$5,922	35%	36%	29%	$1,727
Germany	$1,640	41%	44%	6%	$96
Italy	$352	17%	19%	7%	$24
France	$778	28%	12%	13%	$98
Japan	$2,975	61%	11%	5%	$147
China	$1,989	18%	4%	31%	$617
Korea	$1,360	84%	7%	5%	$73
U.K.	$820	29%	9%	27%	$224
Canada	$539	31%	12%	12%	$63
India	$404	15%	23%	8%	$31

Source: J.P. Morgan, various official data sources, UNCTAD

Exhibit 4: The linkage between money markets and payment ecosystems like Alipay initially drove a surge of investment into MMFs, but more recently these flows have reversed
MMF assets versus M2 for the U.S., Eurozone, and China; unitless and set to 100 as of 1Q 2016



Source: J.P. Morgan, IIF, Haver Analytics, various official sources

Finally, the connection between non-bank payments in China and domestic money markets offers a valuable laboratory for tracking flows in and out of those ecosystems. In particular, the two largest providers of these services—Alipay and WeChat Pay—recently began offering financial products as a way to earn income on funds kept within their network. These primarily consist of sweeps into money market funds (MMFs) that then invest in short-term onshore securities and bank deposits. They are not, however, required to participate in either system. **In this sense, users of Alipay and WeChat pay can use their servicers in one of two ways: pure payment rails that simply connect more traditional bank accounts, or as an expansive ecosystem in which their transactional cash and even savings is kept within those proprietary networks**. Both were likely at play to some extent in the dramatic growth of MMF assets in China, which outpaced broad money supply by nearly 60%, and their subsequent decline—in sharp contrast to other major economies (**Exhibit 4**).

Are they doing this for economic reasons, for example higher rates of return than traditional short-term investments? Or for the network externalities associated with participation in those systems? And are there any negative financial stability implications of such a rapid and large-scale reallocation of savings? Granted third party payments in China are quite different from stablecoins, especially on the technology front. But they share the arguably more important feature of being a payments and e-commerce network that is both integrated into social media platforms and largely separated from the traditional banking system. In this sense, **the size of Chinese money markets relative to the money supply offers a rather unique, even if imperfect, test of how consumers react to economic versus network-related incentives**.

With this backdrop in mind, this piece presents a deep dive into the Chinese alternative payments system. We consider the mechanics and evolution of these systems, as well as the economic incentives of their providers. We also consider the implications for the structure Chinese financial markets, including wealth management products (WMPs) and money market funds (MMFs). And finally, payments-related MMFs have had a rather dramatic impact on Chinese funding markets, with potential financial stability implications but also value as a diagnostic of the relative importance of different consumer incentives. This is interesting in of itself, as we move towards a cashless global economy. But for all the reasons mentioned above, it should be seen as a case study with lessons for the designers of Libra and other stablecoins.

China's 3rd party payment market

Alex Yao

Market overview

The hyper-growth stage is over; industry focus shifts from customer penetration to usage frequency

According to iResearch, China's third-party payment volume grew from RMB 7tn in 2013 to RMB 223tn in 2018. Such rapid industry development is mainly driven by exponential growth of mobile payments. Mobile payment volume expanded from RMB 1tn in 2013 to RMB 192tn in 2018, representing 86% of total third-party payment volume (**Exhibit 5**).

Exhibit 5: Mobile payment penetration has largely saturated

Alipay	
Global annual active users	~1.2bn
Domestic annual active users	~900m
Tenpay	
WeChat Pay MAU	>800m
Mobile payment penetration %	94.7%

Source: Company data, IPSOS

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Broadly speaking, there are three key use cases for digital payment in China:

- ***Consumption payments***: daily consumption payments both online and offline. This component is by far the largest, comprising roughly 70% of industry revenue.
- ***Financial payments***: non-payment financial products such as loans, wealth management products, and insurance. This represents a significant fraction of value transferred on third party payment networks, but because Alipay, Tenpay and others don't directly charge on payment services, revenue is generated through distribution fees.
- ***Other payments***: money transfer including social payment (e.g. WeChat red pocket) among users. Payment companies only generate revenue when users withdraw money from their payment account to their bank account, but the associated fees are usually sized only to offset the 10bp charged by traditional banks.

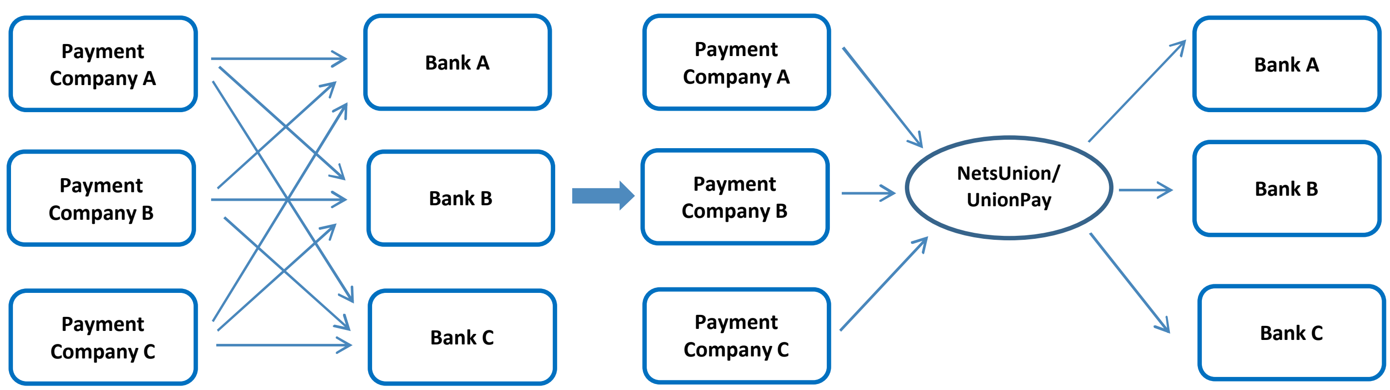
According to IPSOS, China's mobile payment systems have reached the 1bn users milestone, with the penetration rate of total smartphone users close to 95% (**Exhibit 5**). **We believe the industry has therefore shifted from penetration-driven growth to frequency-driven growth**, suggesting the hyper-growth stage is already over: total/mobile payment volume should grow at a more modest 2-year CAGR of 27%/30% during 2018-20E.

Value chain and economics split

NetsUnion is in full operation; the near-term economic impact is likely to be insignificant

As the primary regulatory authority for the third-party payments, PBoC mandated the establishment of NetsUnion to process online payment transactions in that market. Since the second half of 2018, all mobile payment transactions are required to be cleared by this centralized clearinghouse—in contrast to the direct connections among mobile payment providers and individual banks that existed in the past (**Exhibit 6**). So far, this transition has been smooth and we do not anticipate any major operational incident, even during peak time such as Double 11.

Exhibit 6: Online payment model transits from direct connection model to centralized model



Source: J.P. Morgan.

PBoC also indicated that the establishment of NetsUnion is for regulatory purposes and not for commercial gains, and consequently it does not charge a fee for its clearing and routing services. Further, given it will not be profit-seeking, we believe

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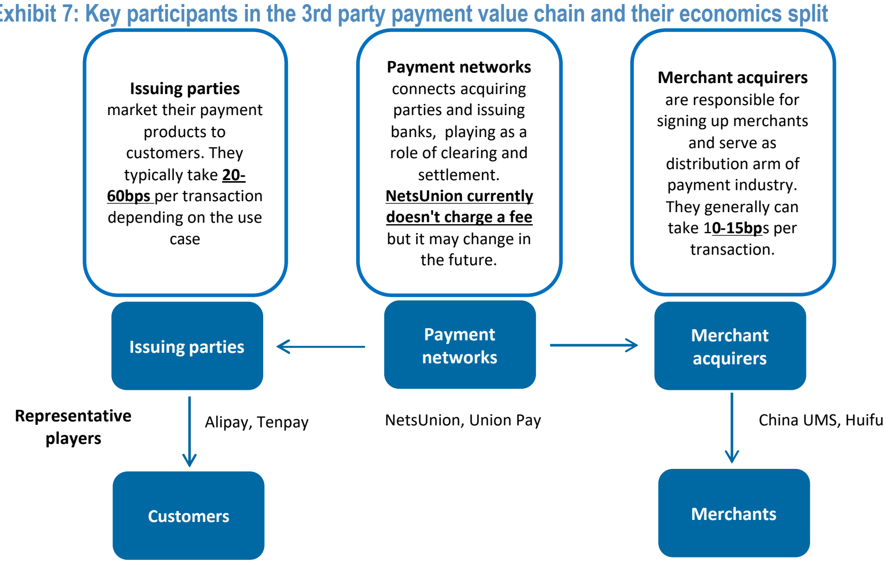
any fees imposed in the future will be small, and therefore with either not constitute a material cost increase to payment companies or can also be easily passed on to merchants/customers. Using UnionPay's offline bank card transaction charge as an example, the rate should be no more than 6.25bps (approximately 10% of total payment service charges). This fee is furthermore borne equally by issuing parties and merchant acquirers.

Exhibit 7: Key participants in the 3rd party payment value chain and their economics split

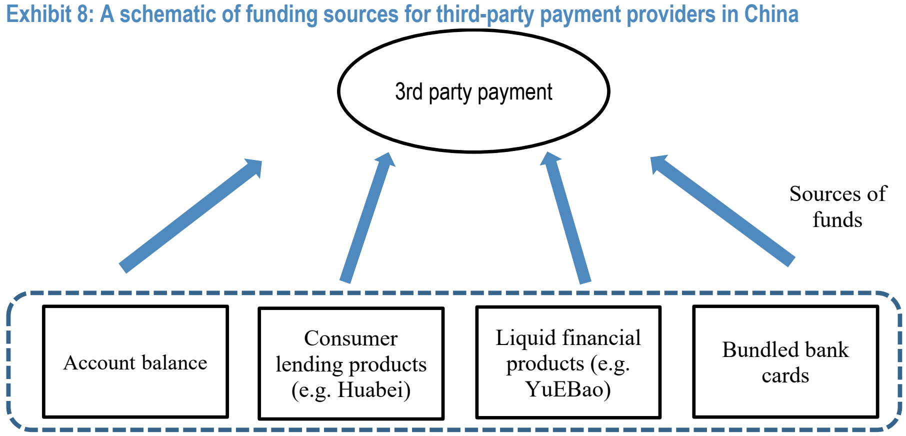


Source: J.P. Morgan

Economics split across the value chain

As NetsUnion currently does not charge a fee, payment service fees are mainly split between issuing parties—e.g., Alipay and Tenpay—and merchant acquirers (**Exhibit 7**)—e.g., China UMS and Huifu, though in some cases Alipay and Tenpay also play the role of merchant acquirers. For these two market participants, take rates are trending lower in the last few years, mainly due to 1) industry competition and 2) small merchant penetration.

Exhibit 8: A schematic of funding sources for third-party payment providers in China



Source: J.P. Morgan

Alipay and Tenpay generally take 20-60bps of total payment value per transaction depending on the use case. For example, the take rate of offline consumption on QR

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code is lower than that of pure online in-app payment. Merchant acquirers can take 10-15bps per transaction, and they sometimes need to share the economics with their channel partners. We think further downside risk on take rate is limited because 1) the charge rate is already low, 2) the main phase of merchant coverage expansion is largely done, and 3) the major players have shifted their focus from pure volume growth towards more balance between growth and earnings.

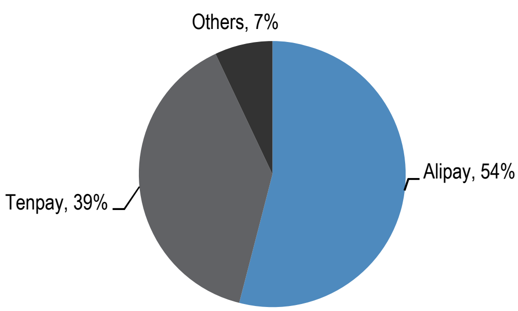
How do third-party payment providers source funding?

There are four major funding sources of third-party payment transactions (**Exhibit 8**), including payment account balance, consumer lending products, money market fund products (e.g. YU'E Bao), and traditional bank accounts. When funds are sourced from a bank account, payment companies are required to pay a 10 bp processing fee to the bank—otherwise there are no fees.

Competitive landscape

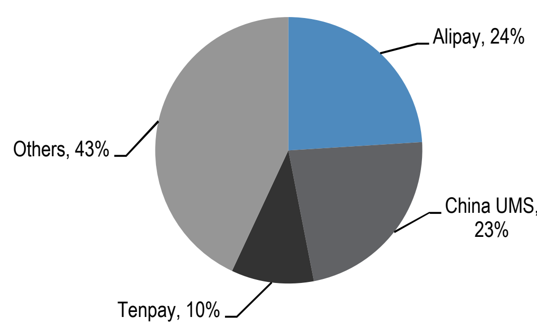
- ***Mobile payment***: Mobile payments remain a duopoly structure, with Alipay and Tenpay combined representing more than 90% market share. We believe Tenpay has an advantage in offline payment market by leveraging WeChat's large user base and high usage frequency, while Alipay still leads in online consumption payment supported by Alibaba's online retail marketplaces (**Exhibit 9**).
- ***Internet payment***: The internet payment market structure is more fragmented than mobile, with top 3 players taking 57% market share. The market scale is also much smaller than mobile payment, only accounting for 14% of total 3rd party payment volume in 2018 (**Exhibit 10**).

Exhibit 9: Market share of 3rd party mobile payment in 2018



Source: Analysys, J.P. Morgan estimates.

Exhibit 10: Market share of 3rd party Internet payment in 2018



Source: Analysys, J.P. Morgan estimates.

What is a client reserve fund?
A CRF represents funds received on behalf of clients (payer) from processing payments, and payable to payees. Previously, CRFs were deposited at qualified commercial banks and generated interest income to payment companies. Since 2019, they are all held in a non-interest bearing centralized depository account assigned by PBOC.

Regulatory changes reshape industry landscape

Two major regulation-driven changes have been implemented in recent years: 1) diminishing interest income from client reserve funds and 2) establishment of NetsUnion with a centralized clearance model (vs. previously payment companies directly connected to banks; see discussion above). We believe both changes are mainly for risk management purposes, and that Chinese regulators generally remain supportive of market innovation.

These new, tighter regulations have had some negative financial impacts on the industry. In particular, 1) above has effectively eliminated interest revenue from customer reserve funds. We estimate Tencent had RMB 7bn client reserve fund related interest income in 2018, and this number has declined to RMB 200m in 2019 (this interest revenue has reduced to 0% from mid-Jan 2019 onwards; **Exhibit 11**).

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In addition, although NetsUnion has indicated that it has no intention to charge a fee for clearing and routing services, it may change in the future, causing incremental operating cost for payment service providers.

Exhibit 11: Internet income from client reserve fund diminished in Tencent's Fintech & business services segment

(RMB, mn)	1Q18	2Q18	3Q18	4Q18	2018	2019E
Fintech & business services revenue	15,182	16,666	19,343	21,600	72,791	101,981
Interest income	2,500	2,050	1,520	859	6,929	200
as % of segment revenue	16%	12%	8%	4%	10%	0%

Source: J.P. Morgan estimates, Company data.

Exhibit 12: YuEBao adopts a hybrid 1P and 3P model

Source: J.P. Morgan, Company data.

Connections between digital payments and money markets

The rise of YU'E Bao

YU'E Bao was launched by Tianhong Asset Management (51% owned by Ant Financial) in June 2013. Since then, it has quickly gained strong traction and become one of the largest money market funds (MMFs) in the world. As of mid- 2019, YU'E Bao AUM reached RMB 1,034bn, or 14% of China's total MMF AUM.

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YuEBao has expanded from one single MMF operated by Tianhong Asset Management to a marketplace that is made of Tianhong and 30+ 3rd party MMF managers

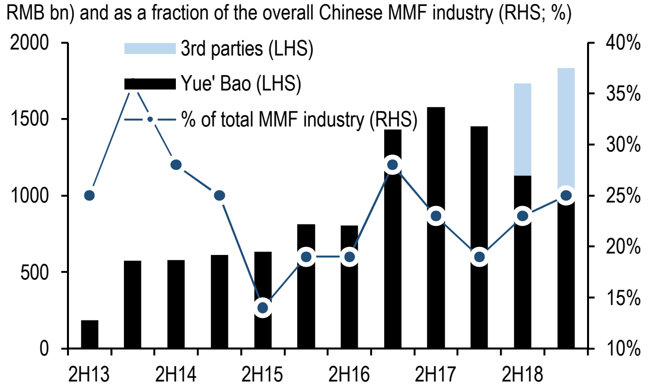
YU'E Bao has expanded from one single MMF operated by Tianhong Asset Management to a marketplace that is made of Tianhong and more than 30 third-party MMF managers.

The decline in AUM since 1H18 is mostly attributable to Ant Financial's decision to shift the YU'E Bao business model (in May 2018) from a pure principal model (1P) to a hybrid 1P and marketplace (3P) model by introducing third-party MMFs. Its overall (1P+3P) AUM remains largely stable (**Exhibit 12**).

According to The Paper (澎湃新闻), YU'E Bao introduced 13 3rd party funds by the end of that year, with a combined incremental AUM of over RMB 600bn. Adding this amount to YU'E Bao's 1P AUM at the end of 2018, this platform actually expanded by approximately 10% YoY in 2018. This past Investor Day, Ant Financial management indicated total AUM (1P+3P) had reached RMB 2 trillion. Given that the Chinese MMF complex experienced some outflows in aggregate (contracting by 4% in 1H19 versus 2H18; **Exhibit 13**), this product appears to be gaining some traction despite the industry-wide slowdown. Though a noticeably slower pace of growth compared to prior years, this is nonetheless a much different story than simply tracking the assets of the main fund.

Exhibit 13: YU'E Bao assets grew explosively in 2016-17, and have continued growing when one in includes MMF investments with third parties facilitated by the Ant Financial marketplace

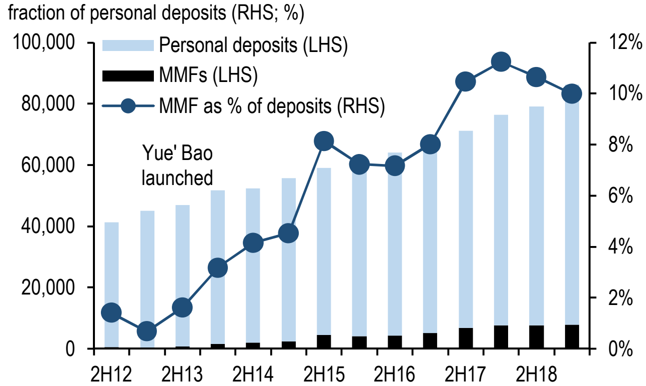
YU'E Bao AUM and that held by 3rd parties on the Ant Financial marketplace (LHS; RMB bn) and as a fraction of the overall Chinese MMF industry (RHS; %)



Source: Company data, AMAC, J.P. Morgan estimates

Exhibit 14: The rise of digital MMFs has led to noticeably outflows of personal deposits into money markets, as evidenced by their growing share of cash management products

Personal deposits and MMF AUM in China (LHS; RMB bn) and MMFs AUM as a fraction of personal deposits (RHS; %)



Source: J.P. Morgan, PBOC, AMAC

Following YU'E Bao, Tencent launched wealth management platform LiCaiTong in Wechat Pay in Jan 2014. In contrast to YU'E Bao, LiCaiTong has adopted a complete marketplace model since inception: in addition to the MMF, LiCaiTong sells a wide range of wealth management products from 3rd party financial institutions including banks, security companies and asset management firms. As of 2Q19, total AUM on the LiCaiTong platform surpassed RMB 800bn, of which we believe a significant fraction is invested in the MMF.

This explosive growth in digital wallet-linked MMFs has driven a material re-allocation from traditional bank deposit to money markets. Before YU'E Bao was launched in Jun 2013, MMFs represented only 1% of personal deposit balances in China; by 2018, bank account balances had doubled but MMF AUM expanded by more than 12x, pushing that ratio to more than 10% (**Exhibit 14**). Since then, however, this ratio has declined somewhat, an interesting development we discuss later in this publication.

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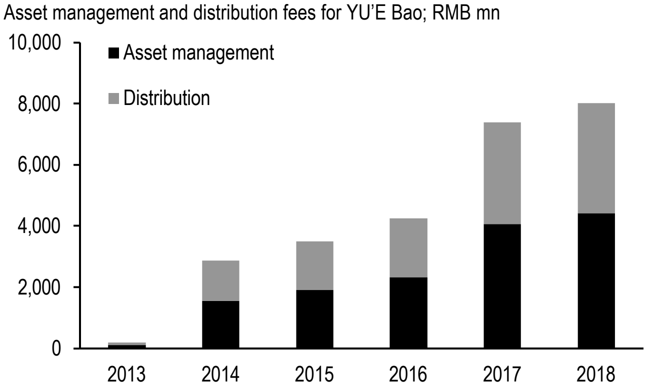
Digital wallets such as Alipay and Wechat Pay do not charge for payment services related to MMF subscriptions. Rather, they charge fund distribution, custody, and asset management fees. Under the 1P model, Ant Financial retains distribution and asset management fee, while custody fees are paid to custodian banks; under the 3P model, the digital wallet only keeps the distribution fee. Taking YU'E Bao as an example:

- ***Asset management fee***, equal to fund NAV on the day before (net asset value)*0.3%/ total calendar days of the year.
- ***Custody fee***, equal to fund NAV on the day before (net asset value)*0.08%/total calendar days of the year.
- ***Distribution fee***, equal to fund NAV on the day before (net asset value)*0.25%/ total calendar days of the year.

Exhibit 15: The growth of YU'E Bao has generated sizeable asset management and distribution fees for Tianhong ,,,

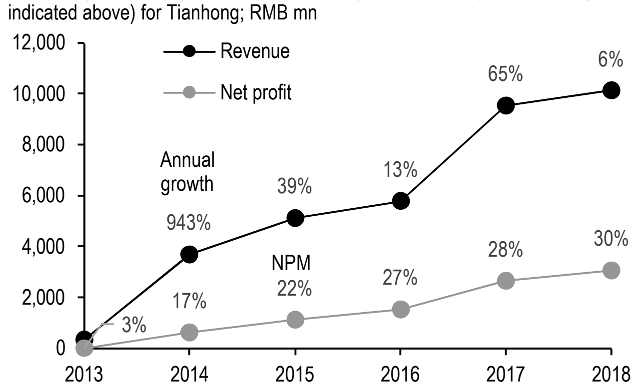
Asset management and distribution fees for YU'E Bao; RMB mn



Source: Company data

Exhibit 16: … and the move to a third party business model significantly reduced the revenue growth, though net profit margins remained constant

Revenue (annualized growth indicated above) and net profit (net profit margin indicated above) for Tianhong; RMB mn



Source: J.P. Morgan, company data

With exponential growth of AUM, YU'E Bao's revenue (asset management fee + distribution fee) expanded by more than 40x from RMB 190mn in 2013 to RMB 8bn in 2018. Riding on the rapid growth of YU'E Bao, Tianhong (51% owned by Ant Financial) saw its revenues grow by 28x from 2013 to 2018, during which the YU'E Bao contribution went from 54% to 79% (**Exhibits 15** and **16**).

We believe there are three possible explanations for the dramatic growth of YU'E Bao and other similar funds:

- ***Strong traffic support from Alipay*: Alipay already had more than 300m active users when the fund was launched in 2013. Because YU'E Bao is embedded in Alipay, it can fully leverage that traffic and visibility to quickly drive user adoption. By the end of 2018, Yue Bao had more than 600m investors, suggesting a close to 70% penetration rate compared to all domestic Alipay users.
- ***Better payment account balance management*:** Alipay launched this cash management product to address large amounts dormant cash in users' accounts, which doesn't generate any economic value to users. The higher rate of interest offered by MMFs, specifically YU'E Bao, was a significant selling point of the product.

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- **Integrated investment and consumption**: YU'E Bao provides a smooth user experience for both fund subscription and redemption. It also offers improved liquidity in the form of T+0 redemption, rather than T+1 settlement offered by traditional financial institutions. In addition, YU'E Bao is uniquely integrated into everyday payments.

Bank Wealth Management Products

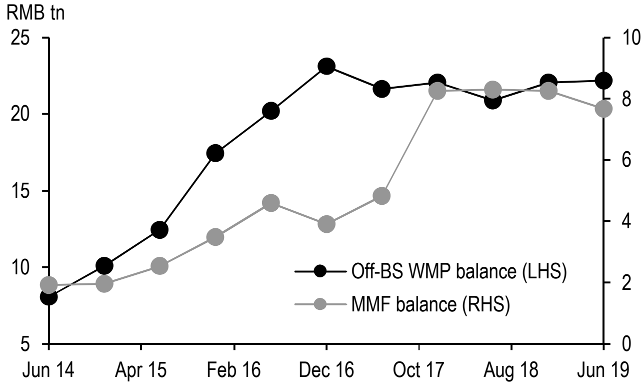
Katherine Lei

MMFs and bank WMPs are the most popular quasi-cash investments in China at RMB 7.3tn and RMB 22.2tn, respectively, in 1H19. Two factors primarily explain the rapid growth of these products (**Exhibit 17**):

- ***Limited options for wealth preservation in China***: equity markets have been sluggish (Shanghai Stock Exchange Composite Index, -9% in the past decade), access to offshore investment opportunities is limited due to capital controls, and authorities have moved to curb money inflow into real estate via property purchase restrictions.

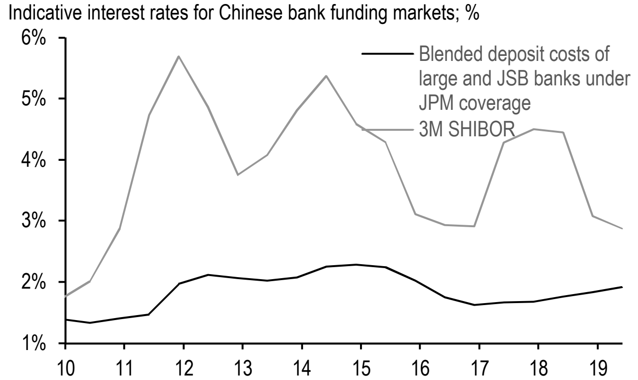
- ***Segmented money markets***: the two-track interest rate system has led to a wide spread between institutional money market rates (i.e. interbank and bond yields) and household deposits (**Exhibit 18**).

Figure 17: Both Off-BS WMP and MMFs in China have experienced rapid growth over the past few years
Off-balance sheet WMP (LHS) and MMF AUM balance by quarter; both axes in RMB tn



Source: 2019 Private banking reports published by CCB and BCG

Figure 18: Blended deposit costs for large and JSB banks under JPM coverage are consistently lower than interbank funding rates (e.g., SHIBOR) owing to the two-track interest rate system in China
Indicative interest rates for Chinese bank funding markets; %



Source: Company reports, WIND

According to ChinaFund, 81% of mutual funds are distributed through online channels. There is no system-wide data on WMP distribution, but if we take the best retail bank, China Merchant Bank (which is the largest private bank in China), as example, 70% of WMPs are distributed through mobile channels. This shows a high acceptance among China's netizens to purchase investment products online. For example, data suggests that 170mn Chinese (20% of the total) have purchased wealth management products online, a sharp increase from 63mn (or 10% of the total) as of five years ago (**Exhibits 19**).

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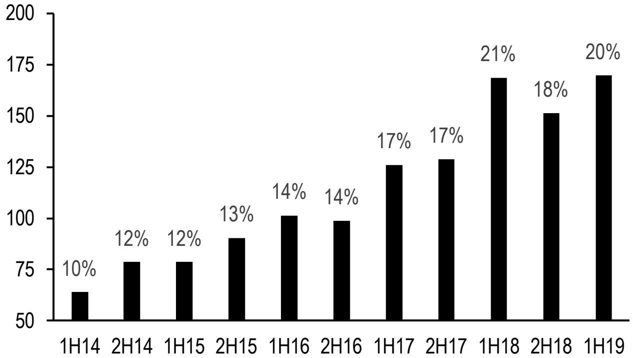
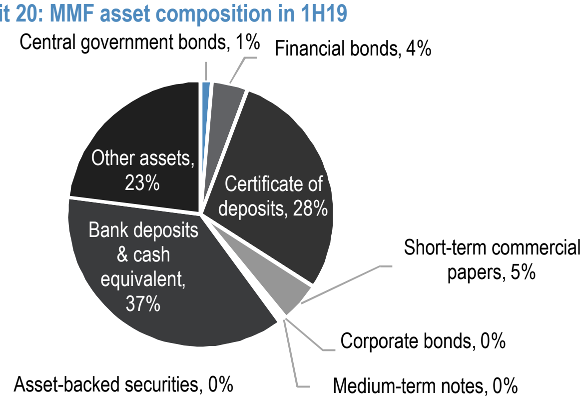
Figure 19: Online users of wealth management products have been growing rapidly, and faster than all Chinese netizens

Number of online wealth management services in China at semi-annual frequency, % of all netizens indicated as well; millions



Source: NBS, CEIC

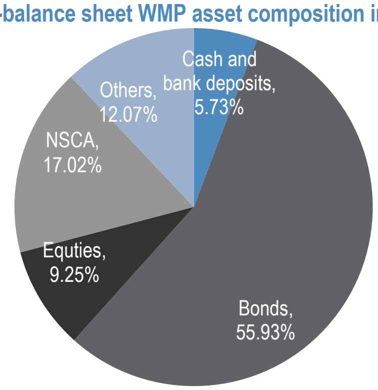
Exhibit 20: MMF asset composition in 1H19



Source: WIND, fund reports, AMAC, J.P.Morgan

Currently, mobile banking platforms are the largest distribution channel for online sales of WMPs. But this is going to change with the launch of banks asset management subsidiaries. Going forward, third party wealth distributors, such as Alipay or Tenpay platform will be also able to offer WMPs issued by these managers. If these internet platforms are able to integrate their payment function with banks' asset management capacity, we expect a rise in digital distribution.

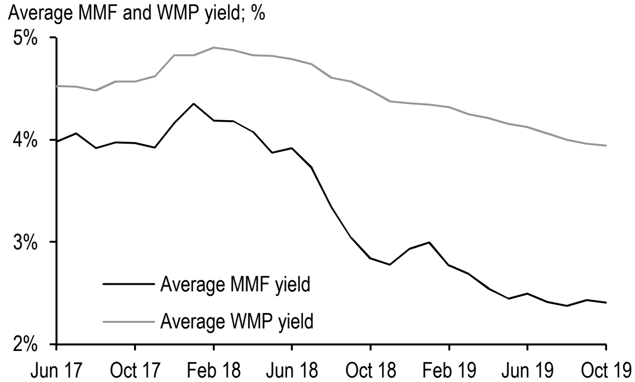
Exhibit 21: Off-balance sheet WMP asset composition in 1H19



Source: ChinaWealth, J.P. Morgan

Figure 22: WMP products tend to run longer duration portfolios and focus more on yield enhancement, leading to higher returns than typical MMFs

Average MMF and WMP yield; %



Source: WIND, J.P. Morgan

Understanding the underlying investments and risks

Exhibits 20 and 21 show the underlying assets of MMF and WMP, respectively. Note that these two products are not mutually exclusive as RMB 2.4tn of WMPs (or 11% of AUM) are allocated into MMF. However, in aggregate key difference emerge. First, about 17% of WMP portfolio are alternative investments products (non-standardized assets) as yield enhancers. Also, MMF AUM mainly consist of cash & equivalents—e.g., deposits, interbank products and banks negotiated certificates of deposit (NCDs)—while WMP portfolios hold a higher proportion of bonds and have a somewhat longer portfolio WAM (~6 months). WMPs are consequently somewhat higher yielding than MMFs, though this difference has fluctuated over time (**Exhibit 22**).

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Regulatory moves to transform banks' WMP into MMF

The rapid growth and evolution of the WMP industry has led to a material shift in industry landscape. Though we refer the reader to two previous publications for details (e.g., *China Financials – Thoughts on regulatory impact on money market fund development outlook* and *China Banks – WMP regulation is more lenient than the AM rule, temporary relief for credit supply*).

- ***Banks transforming WMPs into MMF under the new regulation***: Under new regulations, banks are required to reinforce WMP portfolios with their own Treasury operations. Major banks have applied to set up asset management subsidiaries in order to run their WMP book similar to MMF managers. This aims to stop banks from providing a guarantee, implicitly or explicitly, on the principal or return of the WMPs they issued. Also, through reducing the NSCA in banks' WMP portfolio, yields should converge with those of MMFs. Both measures push banks to transform their WMPs portfolio to products similar to MMF, in our view.

- ***Setting daily redemption cap on MMF reduces its competiveness***: Earlier in their evolution, MMFs could use bank credit facilities as bridge loans to manage the liquidity risk introduced by offering same-day liquidity. In light of the much larger financial footprint of these funds, however, regulators capped daily redemptions at RMB10k to reduce stability risks. Though those limits have subsequently been removed, WMPs are not subject to the same potential restrictions.

The impact of alternative payments on Chinese money markets

Arthur Luk

Money Market Funds (MMFs) are the most popular fund type in China: As of August 2019, the NAV of all money market funds is RMB 7.4tn (up from RMB 300bn in early 2012), which represents 54% of total size of the fund industry (**Exhibit 23**). The rapid development of MMFs started in 2013, when the Tianhong-managed YU'E Bao fund enters the investment landscape of hundreds of millions of Alipay users.

YU'E Bao's 1P Tianhong-managed money market fund has an AUM of 1.055tn as of September 2019 and is one of the largest MMFs in the world, and alone accounts for roughly 14% of Chinese MMFs. **As discussed earlier in this publication, the success of the fund is attributed to it being China's first ever Internet fund specially designed for Alipay**. YU'E Bao set up is distinctive from most other funds in the sense that it has virtually no barriers of entry (minimum subscription: 1 RMB; easy subscriptions through mobile phones); no handing fees; and high liquidity (account balance can be instantly converted to banks, or used in Alipay payments or general bill payments, subject to a cap). Over the years, other financial institutions have also launched their MMFs, some of them can also be purchased from the revamped YuEBao platform which moved into a 3P model.

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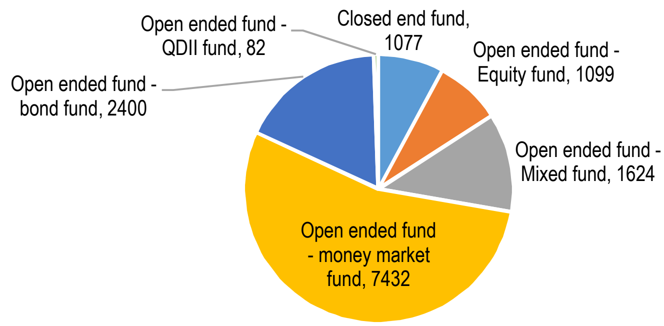
YU'E Bao Tianhong-managed MMF holdings include a variety of money market instruments (**Exhibit 24**): While the "benchmark" of the fund is the 7-day call deposit rate, its asset allocation mix appears to favor modest yield enhancements. For example, the majority of its assets are bank deposits (60.3% of AUM), followed by financial assets held under repo agreements and fixed income securities (predominately being NCDs and commercial paper). The weighted average maturity of YU'E Bao's assets is 57 days, and 40% of the assets the fund holds have a remaining maturity of above 60 days. To provide extra protection to customers, the fund's asset are fully covered by Zhongan Insurance.

Exhibit 23: MMFs make up the largest onshore fund type in China, with more than RMB 7tn, or more than half the total

NAV of funds in China by fund type in RMB bn

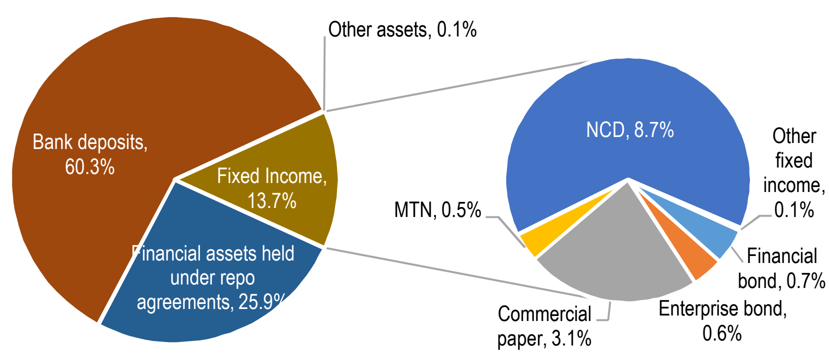


Source: Asset Management Association of China

A significant aspect of YU'E Bao's appeal is to allow retail investors participation in money markets. Given China's dual-track interest rate system (i.e. lack of transmission between banks deposit/lending rates vs. interest rates in the money market/bond markets), this was not previously possible. For example, given its size, YU'E Bao's is also able to negotiate higher yields for interbank products like bank deposits and NCDs allowed retail investors to "invest" in interbank market rates which were traditionally out of reach for these investors.

Exhibit 24: YU'E Bao holds mostly bank deposits and CDs, though they do some repo as well

YU'E Bao holdings by type as of Q3-end 2019



Source: J.P. Morgan, Fund Quarterly Disclosure

This proved particularly attractive in late-2016 and 2017, when the PBoC tightened liquidity conditions to address a cyclical turn-up in growth by withdrawing monetary stimulus. One result was higher interbank rates, which increased YU'E Bao's investment yield relative benchmark deposit while lending rates were unchanged

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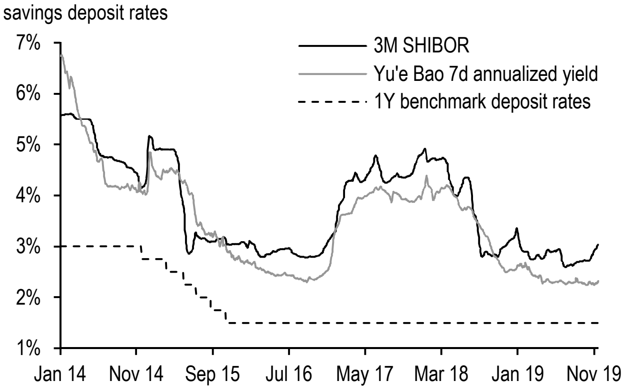
(**Exhibit 25**). This large yield pickup led to substantial inflows from bank deposits, leading YU'E Bao assets to more than doubled by 4Q 2017, peaking at nearly RMB 1.7tn (~240bn US$ at the time). This growth was substantially faster than the overall MMF complex in China, likely owing in part to much easier access via Alipay. At its peak, this one fund represented more than 28% of all MMF assets in China (**Exhibit 26**). With Ant Financial shifting the business model of YuEBao into a marketplace model from 1H18, customers could choose from a selection of MMFs instead of just buying the Tianhong-managed fund. There is a tight competition among money market funds as they offer very similar 7-day annualized yields and Tianhong MMF's market share inevitably fell.

Exhibit 25: Chinese MMF yields tend to track SHIBOR, and at times have offered much higher yields than bank deposits …

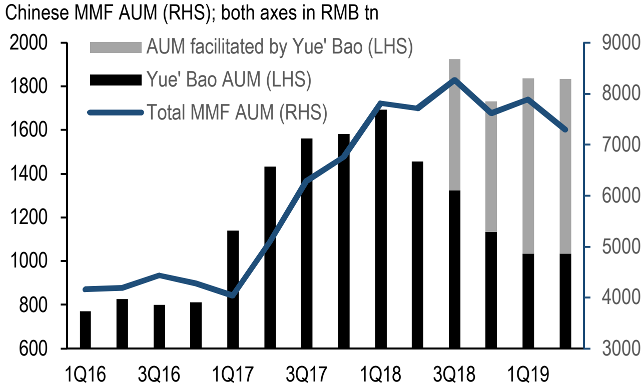
3-month SHIBOR, YU'E Bao 7-day annualized yield, 1-year benchmark household savings deposit rates



Source: J.P. Morgan, Bloomberg

Exhibit 26: … but as that spread has compressed, inflows into MMFs have slowed and YU'E Bao in particular has shrunk quite a bit

YU'E Bao direct AUM and that facilitated but placed with 3rd parties (LHS) and total Chinese MMF AUM (RHS); both axes in RMB tn



Note: 3Q 2019 data only available for YU'E Bao AUM and therefore is excluded.

Source: J.P. Morgan, Bloomberg, IIF

These developments have attracted the attention of regulators, who have grown concerned about possible financial stability risk introduced by the rapid growth of the MMF industry. They have specifically highlighted

1) ***Redemption risks during periods of rising interbank rates***: in November 2016, 1-month NCD rates rose by over 200bp and the China bond index fell by 2%, leading the NAV of money market funds to fall by 13% from mid-November to mid-December

2) ***Concentration risks of institutional investors***: it stands to reason that MMFs can better predict potential redemptions when their investor base is predominately small, retail investors. However, as of late-2017 roughly 45% of end-users were financial institutions such as banks and insurance companies—in part due to targeted marketing to large institutional investors on the part of some funds to growth their assets. This raised the risk of unexpected and large redemptions that could impair liquidity.

3) ***Cross market transmission risks***: MMFs are major participants in various parts of the money market and bond market. During periods of large redemptions-— e.g. in December 2016—MMFs had to meet redemptions of up to RMB 50bn/day. This was meaningful size relative to the NCD and bond markets, which saw ~RMB 1tn and 5tn in average daily volume, respectively. In several trading days, MMFs selling of NCDs led to spikes in NCD yields, impaired price discovery, and various instruments eventually sold at a discount.

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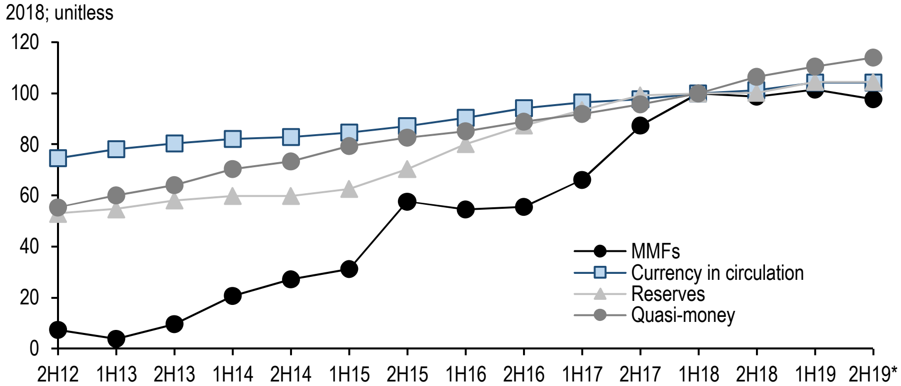
4) *Timing mismatches between assets and liabilities*: Some internet-based MMFs adopted T+0 redemption mechanisms to compete with savings deposits, but the funds themselves are not subject to equity requirements or reserve requirements. These funds also deposited the aggregate funds in banks with T+1 settlement, which could potentially amplify withdrawal risk due to timing mismatches.

To address these concerns, in July 2018 the CSRC and PBoC imposed regulations over the distribution of internet-based MMFs, including individual limits over their holdings of YU'E Bao funds as well as daily subscription amounts—though these were removed in April 2019. They also implemented T+0 withdrawal maximums (10k RMB/day) to reduce the perception of "infinite liquidity" provided by the MMFs. Over time, measures including caps on MMFs holdings' residual maturity, minimum amount of liquid asset holdings, and limits to MMF's credit bond investments will be strengthened. There will also be additional oversight on systematically important MMFs including possible inclusion of the country's largest MMF's into PBoC's Macro Prudential Assessment Framework. Thanks to the increased competition between different MMFs in the YU'E Bao platform, idiosyncratic risks brought by a rapid buildup of AUM into a single fund was reduced and therefore a maximum holding cap of the Tianhong managed MMF per customer was removed in 2019.

Exhibit 27: The decline in Chinese MMF AUM, even after regulations have been relaxed, stands in contrast to continued growth in private and public money, and suggests investors in these funds are motivated primarily by yields and other economic benefits than network externalities

MMF AUM, currency in circulation, other MB, and quasi-money (M2 minus MB), in China, normalized to 100 as of 1H 2018; unitless



* Includes data through September 2019.

Source: J.P. Morgan, IIF, Haven Analytics

Also, to reduce and monitor financial stability risks, in late-2018 the Chinese mutual fund industry was recently subjected to liquidity stress tests designed by the PBoC. A total of 4851 funds were included, which required calculating risk-weighted assets for comparison to potential withdrawals under stress (10% confidence) and heavy stress (5%) for each fund type. If the risk-weighted asset less liabilities related to pledged-repo transactions exceeded the potential withdrawal amount, the fund was deemed to have pass the test. All 371 MMFs passed the heavy stress scenario by this measure, which for this fund type assumed 67% of the assets were redeemed. By contrast, 8.5% of all medium-to-long-term fixed income funds and 12.5% of all short-term fixed income funds failed to pass the heavy stress scenario test, likely because these funds are known to deploy some leverage on the fund level to boost potential returns.

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What can we learn from this experience? Though MMFs have been a key component of Chinese financial markets for some time, the rise of internet-based funds with tie-ins to alternative payments venues like Alipay was a key development. **The rise of YU'E Bao is a case study in the mix of simultaneously reducing barriers to entry by incorporating the fund into online platforms while at the same providing a strong economic incentive by allowing access to higher returns in markets from which retail customers were previously restricted**. The result was a rapid build-up of several forms of financial stability risk—a cautionary tale regarding linkages between traditional financial markets and new FinTech platforms and investment products. The subsequent evolvement of regulatory landscape is also an example of a similarly rapid and seemingly effective response. There are also advantages to this marriage, in particular the ability of fund managers to leverage AI and data analytics offered by the YU'E Bao platform to better predict the liquidity fluctuations by the hour, and therefore effectively enabling them to design more cost-effective investment strategies, and better manage liquidity

However, **perhaps the most interesting lesson of the Chinese MMF experience in the context of Alipay and other alternative payment systems is the responsiveness of retail investors to purely economic incentives**. For example, though it is tempting to blame the stabilization of YU'E Bao AUM (including that facilitated by the fund but placed with third parties) on regulations, the fact that the removal of these limits earlier this year has not resulted in a resumption of inflows suggests that investors were responding primarily lower yields on offer, rather than liquidity and network related incentives. In fact, the Chinese MMF complex as a whole appears to have shrunk modestly through 3Q 2019. This is striking in the context of continued growth in both the monetary base and quasi-money (**Exhibit 27**). In other words, MMF assets in China have likely stabilized primarily because the yield pick-up relative to traditional bank deposits. That investors appear to be most responsive to economic considerations is striking given the other strong incentives to participate in payments-related MMFs—e.g., accessibility, convenience, scale, integration, etc. **This is but one example, but holds important lessons as we contemplate the scalability and likely reception of other alternative payment systems, including Libra and other stablecoins**.

Conclusion

Having covered quite a bit of ground, we concluded by taking a step back and considering what lessons the Chinese experience holds for the broader global payments system. **The first, and most important, take-away is how rapidly new technology can take hold**. Mobile payments in China went from virtually non-existent to systemic in only a few years. This may owe in part to the idiosyncrasies of the Chinese financial system, particularly a lack of competition from other forms of cashless payments such as credit cards, not to mention an arguably more flexible regulatory framework. But it is also likely not unique to China either, and we see no reason why other major economies cannot experience similarly rapid shifts.

Another important lesson of high speed financial disruption is the potential for an unforeseen concentration of risk. In the case of China, digital MMFs grew out of a genuine desire for alternatives to low-yielding traditional bank accounts convolved with the potential for rapid penetration and integration into existing online ecosystems via e-commerce platforms. As that occurred, subtle design features such as same-day liquidity that work on a smaller scale can be transformed by exponential

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growth into true threats to financial stability. **A corollary is the value of the kind of rapid regulatory response that China has been able to mount to address these risks**—one which is arguably somewhat less feasible in most other major economies.

Also, **consumers appear most sensitive to economic incentives**. YU'E Bao and other digital MMFs were attractive in part because of ease of adoption and extensive integration into existing and pervasive e-commerce and social media platforms. Ultimately, however, **inflows have slowed in the absence of a meaningful yield pick-up relative to transactional accounts in the traditional financial system**—even after other gates had been removed. That this has occurred despite continued expansion in the overall money supply—both the money base and quasi-money like traditional bank deposits—suggests **the primary motivation for investors in Chinese digital MMFs has been yield pick-up, rather than the network externalities and other benefits associated with participation**. For Libra, other stablecoins, and potential alternative payments venues more generally, the message is clear: convenience and synergies are likely insufficient without a compelling economic rationale.

Finally, the Chinese experience shows us that a cashless economy can work. The early phases are of course likely to be met with challenges and excesses. But the Chinese payments infrastructure and financial system has mostly made it through without major incident. Ensuring financial stability going forward requires close attention and discipline—even China still has a long way to go before its payments are truly fast and cashless. But **the opening act appears to have been successful thus far, with clear gains from greater efficiency and financial inclusion**.

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