

CHINA'S DIGITAL PAYMENTS REVOLUTION

AARON KLEIN

APRIL 2020

EXECUTIVE SUMMARY

While America spent the past decade upgrading its bank-based magnetic striped cards with chips, China experienced a retail payment revolution. Leapfrogging the card-based system, two new payment systems have come to dominate person-to-person, retail, and many business transactions. China's new system is built on digital wallets, QR codes (two-dimensional bar codes), and runs through their own big tech firms: Alipay running through Alibaba (China's version of Amazon) and WeChat Pay running through Tencent (China's version of Facebook). China's system largely disintermediates banks from payment transactions, robbing banks of an important and long-standing source of revenue. It creates an alternative payment ecosystem with different incentives between merchants, consumers, and payment system providers. It challenges the long-standing placement of payments on the side of banking as opposed to commerce. In doing so, this system creates new incentives that could realign existing business models and relationships between merchants, banks, and technology providers. China's new payment system exploded in under a decade, growing from inception to dominance. With over a billion users on each platform, the power of network incentives has been unleashed. The new payment system has replaced cards and cash at registers, how families give gifts, and even how beggars ask for money, with QR codes replacing tin cups.

What does this mean for the future of China's payment system and America's response? First, China's new payment system is here to stay. It will continue to grow domestically and globally, following Chinese travelers

and consumers abroad. Second, new technology makes possible the movement of the payment system away from banking and into technology and social networking. This means that technology and social network firms with sources of data on which to base financial decisions such as providing credit will be able to provide alternative underwriting that is likely to follow. Third, the incentives created by moving the payment system from banking to technology firms are substantial and potentially concerning. The potential for anti-competitive behavior and privacy concerns by tech platforms by using the payment system and data generated from it are real. However, it is not clear whether these concerns can and would be remedied by effective regulation. Finally, the same economics that make China's system beneficial for merchants but bad for Chinese banks are why the Chinese system is unlikely to catch on in America, but may be more viable in other countries with less-developed banking systems.

While America led the global revolution in payments half a century ago with magnetic striped credit and debit cards, China is leading the new revolution in digital payments. In the past decade, China has leapfrogged magnetic cards, moving to a system based on smartphones and QR codes. But the changes from this system go far beyond just a new technological form. The Chinese payment system has done something far more revolutionary: It has largely disintermediated the banking system.

In America, and most developed economies globally, the payment and banking systems have been intertwined for centuries. The connection between the two is clear: Who is better equipped to intermediate

payments between parties than the financial institutions that hold those parties' funds? Yet new financial technology and its application in China have created a viable alternative payments model where banks play a far less central role, and in the extreme, possibly none.

This new payment form requires greater analysis to appreciate the benefits, costs, and implications from a new model. Understanding this model will help answer key questions and inform policy decisions. Will the American-led invention of magnetic stripes and card readers be globally replaced by digital wallets using QR codes to transfer funds external to the banking system? Will banks continue to play the central role in operating payment systems or will new tech disintermediate banks? If disintermediation occurs, what are the ramifications of combining payments with commerce instead of banking?

UNDERSTANDING THE CHINESE SYSTEM: STARTING POINTS

China seemed an unlikely candidate to develop a new payment system. The nation boasts strong banking rates for its citizens, largely as a result of the government's substantial role in providing benefits to citizens through the banking system. Many Chinese citizens have at least two bank accounts, as the government provides subsidies for different benefits through different banks.¹ Additionally, Chinese banks worked collaboratively to create UnionPay, a Chinese-based card network.

China has the largest card network² in the world with 7.6 billion cards.³ According to the People's Bank of China, the vast majority — 6.9 billion — are debit cards, while only 686 million are credit cards. Protected from foreign competition by the Chinese government's refusal to allow market access to Visa, MasterCard, or American Express, it seemed plausible that UnionPay would develop into the dominant payment system within China, mimicking the card-based system in other large economies.

However, adoption of the card-based terminals among Chinese merchants ran into opposition. First, merchants did not like the fees. The idea of paying even 100 basis points for processing payments met

with opposition. Merchants were slow to adopt card readers, reluctant to either absorb the costs or pass them along to customers. Second, card readers require either a wired telephonic system or a wireless system to communicate. Both require merchants to integrate that technology and pay those costs. Again, merchants showed little interest in doing so, which helps explain why there were only just over 34 million point-of-sale terminals in China at the end of 2018.⁴

Cash remained a dominant method for exchange. However, cash has its drawbacks. In China, the highest circulating note is the 100 yuan, worth roughly \$15. This is a relatively low value note for the highest in circulation, compared to the U.S. \$100 bill and the 500 euro note. As a result, cash transactions, particularly for higher value goods and services, are more cumbersome. It is not uncommon for Chinese stores to have a cash-counting machine to facilitate transactions and protect against counterfeit notes.

With merchants resisting cards and challenges with cash, the usage of an alternative system becomes more likely. The strong growth of smartphone adoption created room for an alternative system to develop. Smartphones provide a new network of communication that can compete with card readers that require landlines or wireless internet/Voice over Internet Protocol (VoIP).

The second component of this revolution is the QR code. In the card-based system the customer is not required to be online, and the merchant provides the terminal and a connection. The customer then provides the payment instrument (the card) and swipes. The adoption of a QR code, much like the bar code before it, allows merchants who are not connected via phone or internet to still access the payment system, as only one party needs to be connected for the transaction. This feature flips the prior card system where merchants were responsible for providing the connection.

The QR allows for the customer to provide the connection. All the merchant has to produce is a bar code that can be printed on a simple piece of paper. The consumer can leverage the smartphone to both scan the QR code and go online to process the transaction. This lowers merchant costs even further, particularly for those who do not have easy access

to telecommunications. It even allows for person-to-person transactions for folks who have codes but not smartphones. This is even how beggars on the streets are now asking for and receiving money⁵ — tin cups have been replaced with QR codes in China!

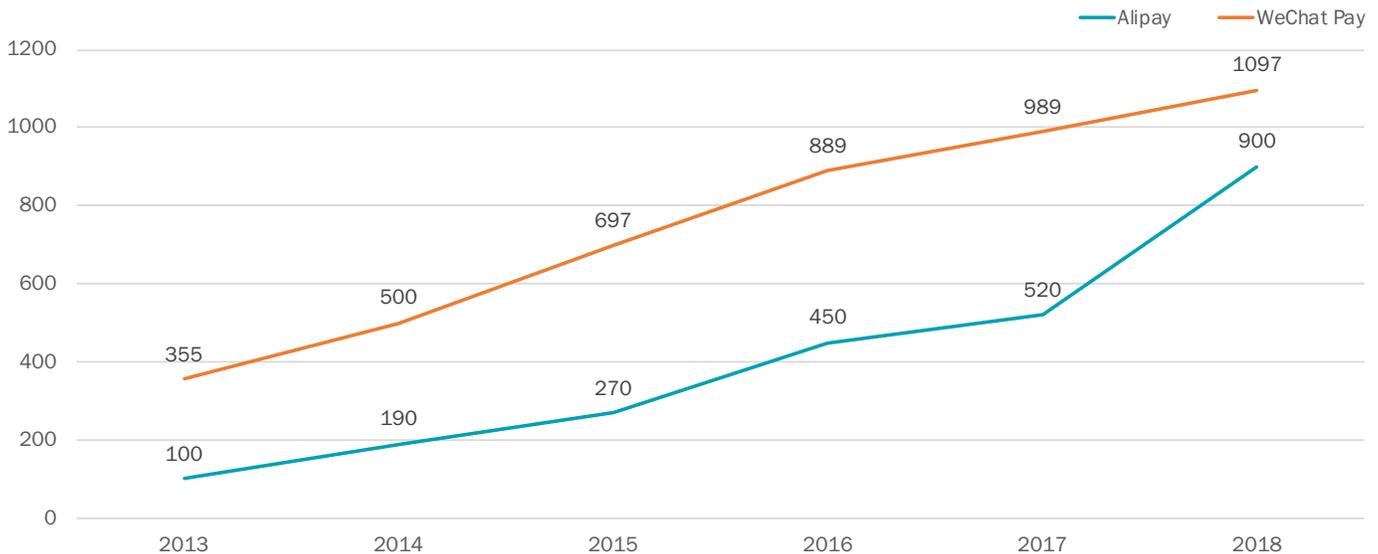
China's transformation

Given where China began the decade, today is stunning. The rise of two major digital payment platforms, Alipay and WeChat Pay, has transformed China's payment system, reaching near ubiquity in under a decade.

Starting from zero at the beginning of the decade, these two payment platforms are now the largest system in China and among the largest in the world.

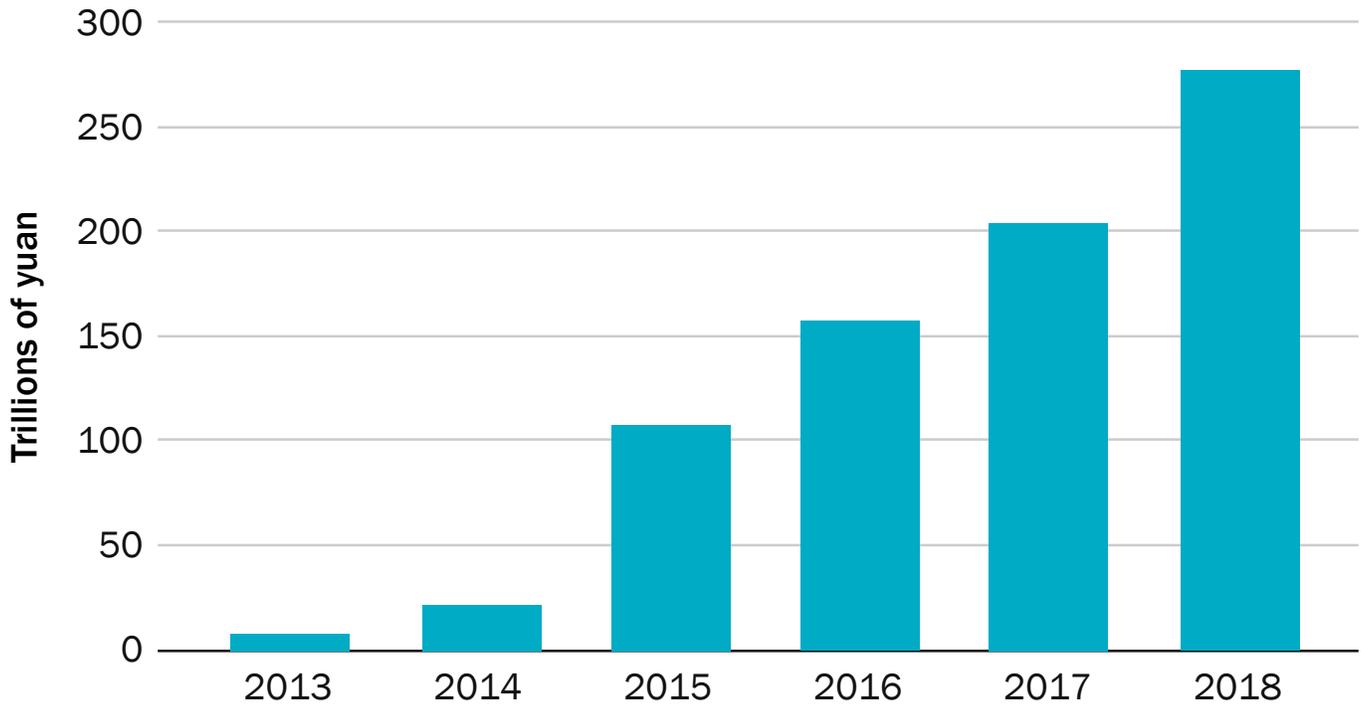
Alipay has perhaps surpassed WeChat Pay in active users. Alipay reached 1.2 billion monthly users in 2019⁶ and WeChat Pay surpassed one billion users in 2018.⁷ These two forms of payment dominate the Chinese market. Over 90% of people in China's largest cities use WeChat Pay and Alipay as their primary payment method, with cash second, and card-based debit/credit a distant third.⁸

FIGURE 1: ALIPAY VS. WECHAT PAY: NUMBER OF ACTIVE USERS (MILLIONS)



Source: Statista, Xinhua, China Plus, Tech in Asia⁹

FIGURE 2: MOBILE PAYMENT TRANSACTION VOLUME



Source: People's Bank of China, Caixin Data, CEIC¹⁰

Mobile payments in China have reached over \$41 trillion (277 trillion yuan) annually.¹¹ More than 92% of the mobile payments are made over the two dominant platforms: Alipay (53%) and WeChat Pay (39%).¹² This rise is even more stunning when considering its rapidity.

HOW ALIPAY AND WECHAT PAY WORK

Alipay and WeChat Pay integrate technologies that are widely available but not commonly used in the United States. Doing so allows each an easy, low cost, method to transmit payment between parties nearly instantly. The technologies are those of a digital wallet and QR codes. Understanding each is necessary for understanding how the system works.

A digital wallet stores one or more of a consumer's payment credentials electronically and allows consumers to electronically transmit funds in multiple settings.¹³ The wallet is generally funded either by transfer from another digital wallet, or directly by linking a bank account and transmitting funds. This concept is different from a digital representation of a credit card, like what is commonly done on Apple Pay. A digital wallet stores money, whereas a digital representation of a card simply substitutes the physical card for a virtual one.

Each entity in the Alipay and WeChat Pay ecosystems is assigned a unique QR code. Individuals have them for their accounts, merchants have them for their stores, and even specific payment points such as a parking garage have them.

The payment starts when one party scans the other's QR code. It does not matter if this scanner is the payer or the payee. The scan can be done by one smartphone to another, or by a smartphone to a QR code that is digitally represented or physically printed on a piece of paper. The payer can total the amount due into the transaction for the payee to scan, or the payee can scan the code and insert the amount to be paid. This is analogous to swiping a credit or debit card into a card reader and either accepting the amount shown or entering an amount you want to pay.

One advantage of this system is that the card-reading terminal has been cut out completely. The Chinese system works instead directly from account to account via WeChat Pay or Alipay, without a processor in between the sender and receiver. This increases speed (as anyone who has waited for a credit card terminal to process can attest) and reduces cost. It also explains why China has so few point-of-sale terminals and one of the strongest digital payment systems in the world. Cutting out the middleman saves time and money.

How to fund a Chinese digital wallet

The simplest and most common way to get funds onto your digital wallet is to upload them from your bank account. Customers link a bank account and can upload funds instantly from their bank account to either platform. In general, this service is provided at no cost to the consumer. If the sending bank charges a fee, it is usually paid by the digital wallet provider for funds being uploaded; downloaded is a different proposition as will be discussed later.

Prefunding digital wallets makes the Chinese system similar to debit and prepaid cards in the U.S. context. The Chinese wallets generally do not function on a revolving line of credit system and should not be thought of as substitutes for credit cards. Thus, the simplest model is for users to link bank account(s) to digital wallet(s) and then upload funds as needed. Those funds survive in the ecosystem and can be augmented by future uploads or other funds received in transfers from other persons or businesses, with consumer digital wallets more likely to be replenished by personal transfers, and business digital wallets likely to be filled by new revenue.

Digital wallets still require funds to be moved into the banking system for banking purposes. Digital wallets themselves do not pay interest, as they are not interest-bearing bank accounts. For the user to generate interest s/he must move funds into a money market, bank account, or other investment account. Investing requires customers to move funds out of the Alipay/WeChat Pay wallets and back into the banking system. This is commonplace and can be done quite easily through both applications. Of course, the products available, and banks able to offer services on those platforms are a function of the relationships and partnerships between the tech platform parents and other institutions.

Originally, the parent company could and did use customer funds for their own purposes to park in overnight funds and earn interest for the business. The Chinese government took steps to crack down on this, beginning in 2017 with a requirement that 20% of customer funds had to be kept in a custodial account at a Chinese bank that did not bear interest.¹⁴ That figure was subsequently raised to 50% in 2018 and then to 100% beginning in 2019. The result is estimated to transfer \$1 billion in interest being earned by Alipay and WeChat Pay back to the banking system. This move was interpreted as an attempt by the Chinese government to either reign in the mobile payments and/or support Chinese banks.¹⁵

Origins of WeChat Pay and Alipay still impact usage and business models

WeChat Pay and AliPay differ in how funds are spent. The difference is largely derived from the origin and purpose of each system. WeChat Pay is based on a social media platform, Tencent (think Facebook), and is heavily engaged in person-to-person payments. Alipay is rooted in a digital commerce platform, Alibaba (think Amazon), and hence more likely to receive business revenue or be used for business purposes.

Tencent, WeChat's parent company, wanted to incentivize purchases for online games and ecosystems (think CandyCrush) or other popular in-game purchases. Widespread credit/debit cards linked to game accounts makes this easy. But in 2007, Tencent had a user base that lacked this system, so it created a digital coin: QQ. The QQ coin went viral

both as a means of online game payment and as a speculative digital currency. Estimates were almost \$1 billion of coins trading with an appreciation of over 70% in value.¹⁶

The process of uploading QQ coins and spending them offline, coupled with speculators sharply influencing the price of the coins, made them ultimately non-viable as a medium of exchange. There are similarities to Bitcoin's inability to gain a foothold for routine payments. However, the experience certainly shaped Tencent's thinking and demonstrated the willingness of Chinese citizens to use digital currency.

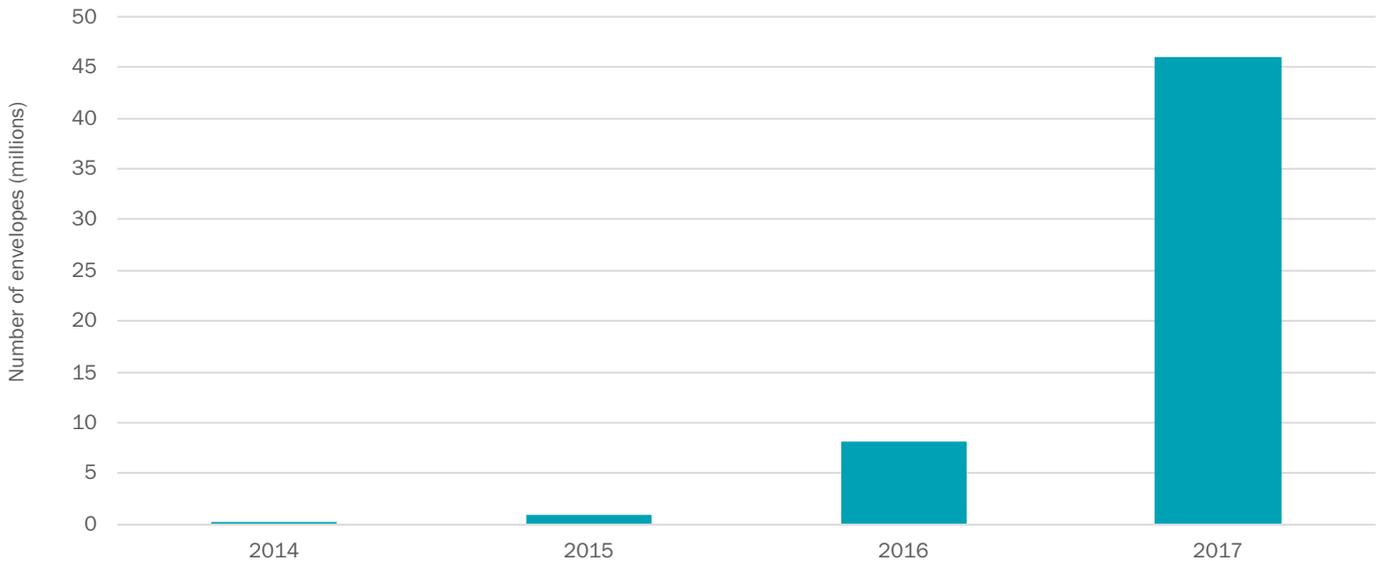
WeChat Pay first rolled out as a service to facilitate personal funds in the form of "Red Envelopes" (or "Red Packets") around the Lunar New Year in 2014.¹⁷ It is common in China to give cash on the new year, particularly between parents, children, and other family members. WeChat Pay proposed digitizing this exchange, which given their person-to-person social

media network was clearly synergistic.

The popularity of Red Envelope exchanges seeded many customers' WeChat Pay accounts with initial funds.¹⁸ WeChat Pay launched the Red Envelopes digital payment idea in 2014 and 16 million packets were sent. The next year, 1 billion packets were sent. By 2016, it was over 8 billion and in 2017, 46 billion.

With QR codes widely available, cheap for merchants to adopt, and a large user base funded with Red Envelopes, WeChat Pay's path to creating an alternative payment platform was clear. What started with consumers then translates to merchants as merchants see their accounts filled when customers purchase goods. As their digital wallets fill, merchants can use those funds to pay their bills to other businesses, or transfer funds for personal uses. Most small businesses, after all, are closely integrated with personal accounts.

FIGURE 3: TOTAL RED ENVELOPES EXCHANGED VIA WECHAT PAY (MILLIONS)



Source: Momentum Works¹⁹

Alipay's origin differs. The historical lack of a widely used card system was a major problem for its parent company, Alibaba. Internet commerce required electronic payment systems, which were integrated with credit and debit cards. As the Peterson Institute's Martin Chorzempa illustrated in a detailed analysis, the lack of such a system in China incentivized Alibaba to develop Alipay such that its Taobao web platform could take off.²⁰ With UnionPay only having recently launched and not having gained too many customers, the payment market was wide open. Alibaba offers several incentives for merchants to use Alipay for purchases throughout their platform. First is a lack of any fees on such purchases for either party. Second is the potential preferential placement on digital platforms for both merchants. Third is the ease of payment integration into business processing. Each provide substantial economic benefits that are not widely available in the bifurcated credit/debit card system. There are also potential drawbacks of this integrated model, including the lack of fees to provide services customers want with payments — such as interest-free grace periods of credit — and anti-competitive concerns of integrating business platforms and social networks with payment platforms.

The lack of fees is a huge incentive for merchants. Consider a small business that pays over 2% for payment processing fees, which is the United States average for major card companies like Visa, MasterCard, and Discover.²¹ Businesses can save 2% of gross sales by using Alipay, provided that revenue is also spent on the platform. Payment processing fees are based off of gross sales, not net revenue, and as a result, the savings potential as a share of profits are far greater. In general, business profits average only 7.5% of total gross revenue.²² Saving 2% of gross revenue could have an impact closer to 20% of profit margins.

The implications differ based on business size, although it is not clear in which direction. While larger businesses are often able to negotiate lower credit card processing fees, they also typically have smaller net profit margins as a share of gross revenue. Smaller businesses generally pay more for card processing, although new entrants into the marketplace like Square and PayPal are driving down costs. However, small businesses also typically have larger gross margins and depending on the nature of the business may receive fewer payments from cards. Either way, lowering processing fees is a win for merchants.

There is also an important caveat to the zero-fee system: the funds have to be spent on the Alibaba ecosystem. Granted, that ecosystem accounts for almost 60% of digital commerce in China. This is because there is a cost to downstream funds back into the banking system. This may have a larger impact for merchants when they receive revenue through Alipay. It now creates a different final cash flow/profit structure depending on whether they received the funds through Alipay and were able to spend it elsewhere in the Alibaba ecosystem, had to download it to their bank account, or received funds through an alternative digital platform (WeChat Pay), debit cards, credit cards, or cash. It is not clear depending on the merchant's business model and payment usage whether the business can effectively use all of the funds on Alipay to purchase the intermediate goods and services it uses within the Alibaba ecosystem.

This creates incentives for the Alibaba ecosystem to expand to provide greater services to businesses. It also creates a comparative advantage for pricing within the Alibaba ecosystem. This could create competitive disincentives for off-platform business. It is possible that Alibaba can recapture some (or all) of this value through alternative charges for conducting business on the platform, such as advertising fees.

This second incentive to create further avenues to expand the goods and services available on the same ecosystems as the Chinese payment networks is quite different from the American and European system. Banks do not host large platforms for consumers and merchants to purchase goods and services. The payment processing sector of the economy — Visa, MasterCard, Square, Verifone, Venmo, PayPal, etc. — exists to facilitate merchants accessing the payment system to handle the transaction.

The movement of payment processing from banking into the commerce system in China raises a series of economic incentives and competitive forces that are largely absent in the American context. This is not because of America's separation of banking and commerce. In America, the separation of banking and commerce does not place payments into the sphere of banking. Banking is generally tied to the taking of deposits or making of loans.²³ While economists appreciate the intellectual equivalency of

a bank providing a revolving line of credit that allows consumers 90 days to repay with interest charged, and a service provider offering a similar window with a series of escalating late fees, the legal system defines one as banking and the other as commerce.

Payments have historically existed within banking because banks had the technology, networks, knowledge of customers, and funding structure to most easily provide these services. The Chinese payment revolution is fundamentally changing that equation. Technology — particularly interconnections on social media, scale of digital e-commerce platforms, and adoption of modern bar codes — broadens the capability of new entrants into the system.

The final point is the converse of the earlier: what other non-banking services that use the payment system could potentially become integrated into a Chinese model? One possibility would be payroll processing. Rather than having employers take revenue off the digital payment system into their banks, then transfer to employee banks, only to have the employee then transfer the funds back onto the ecosystem, why not have the ecosystem handle payments directly?

There is little data or reports that payrolls are being met through Alipay and WeChat Pay, at least not in the formal economy. Whether this is happening in the informal economy, is more difficult to research. The lack of payment processing adoption may be due to government or private record keeping systems, tax policy, or habit. Expansion by Alibaba or Tencent into payment processing may be logical extensions, aided by the funds in digital wallets that retailers and employees share. (imagine if Amazon or Facebook offered payroll processing to compete with firms like ADP).

If this expansion were to happen then it may be more likely on WeChat Pay than Alipay. For the merchant, there are broader options to spend funds on Alipay, such as buying intermediate goods. Given the merchant generally receives sales from both platforms it may be easier for them to use their Alipay funds for business supplies and WeChat Pay for payroll. Further, WeChat Pay's origin and strength in person-to-person payments (Red Envelopes) may give it a comparative advantage in payroll.

How to get money out of the ecosystem — but why would you?

The Chinese payment system makes it easy to continually keep funds in digital wallets. The ubiquity of acceptance, lack of fees, and ease of commerce motivate consumers. Money brought into the digital wallet system can be moved into interest-bearing accounts, like money market funds, or invested into Chinese stocks directly through broker-dealer accounts partnered with the platform.

This is particularly the case with the Alipay part of Ant Financial, the banking and financial services of Alibaba established in 2014. Ant's largest mutual fund, Tianhong Yu'e Bao has almost 600 million investors, over \$168 billion in funds, and offers short term interest of over 2%, and generally provides a better return than leaving funds in a Chinese bank.²⁴ The growth of this fund, mirroring the growth of Alipay as a digital wallet, highlights the opportunity to merge digital wallets with broker-dealer accounts directly, further disintermediating the bank deposit relationship.

Businesses have similar motives and opportunities to keep funds in the ecosystem, but greater demands to bring funds out of the ecosystem to make payments using the banking system. Both consumers and businesses need an off ramp and though it exists, it is not designed to be terribly attractive.

Account holders can move funds out of Alipay or WeChat Pay and back into their linked bank account. Alipay imposed a fee of 10 basis points with a minimum, 20,000 yuan²⁵ (roughly \$3,000) and a minimum of 0.1 yuan for smaller transactions. WeChat Pay charges a similar fee, 10 basis points for all transfers above 1,000 yuan (roughly \$150) into bank accounts. For transfers under 1,000 yuan there is a flat fee of 0.1 yuan.²⁶ While this fee is small relative to American standards — credit card transfer fees are usually in the range of 2 to 4%, and digital wallet providers like PayPal pass those fees directly on²⁷ — the fee appears directly to Chinese consumers. This is a stark contrast to the fee-free zone of all payments within the ecosystem. That is by design, as one analyst describes: “The transaction fees will encourage users to make fewer withdrawals and thus keep more money circulating within the WeChat Wallet ecosystem, therefore increasing the opportunities for other spending within it.”²⁸

COSTS OF THE SYSTEM, WHO PAYS WHAT

A central element of this system is that transactions between parties on the same platform are free. That is, the sending and receiving of funds occur without a charge by the platform. This is not the same as if the transactions were costless. With all transactions there is some cost, however small, in building, maintaining, and operating the platform, a non-zero cost in digital transfers, and some cost for an error resolution system. Most of these costs are relatively fixed; that is marginal transactions have very little cost, and the more transactions in the system, the lower the average cost per transaction. However, the costs of operating the system are run by the platform and hence from the user's perspective both consumers and businesses can experience costless payments and instant settlement.

In addition to direct costs, there are also opportunity costs. Generally speaking, funds left in the main digital wallet on either platform are not interest bearing. Thus, the holders of the account are losing possible interest. Recognizing this, the platforms, particularly Alipay, have built in partner operations that provide interest-bearing accounts. Alipay in particular has developed a robust eco-system of financial services applications including money market funds and stock brokerage accounts for consumers and lending operations for small businesses.²⁹

Importantly, in the Chinese context the payment provider has access to a broader set of information regarding customers' financial life. For example, a regular bank probably does not know the exact relationship of everyone who sends you a birthday gift but does know the amount and name of the sender if sent by a check. But by merging the social media network of WeChat with the Red Envelope fund transfers, WeChat Pay does. For example, if you are a younger adult who is lucky enough to receive regular or even sporadic support from your parents, grandparents, or other extended family, WeChat Pay is able to see into your network both socially and financially.

This has ramifications for a host of financial services possibilities. The ability to lend against expected gift income becomes far more possible, as does a potential notification system of financial stress. Corresponding

privacy concerns arise, as do questions regarding liability should such future gifts not follow historical patterns. The point here is not to go into depth on the pros and cons of possible financial innovations or their resulting problems, but rather to point out that combining information regarding social connectivity and financial flows between people and businesses opens up a new range of possibilities.

For small businesses, a similar but broader set of options is also available. The ability to lend against payment flows is greatly enhanced under the Chinese model. Alipay has already provided millions of loans to small businesses, with more than half going to business owners who are under the age of 30, according to the United Nations High-level Panel on Digital Cooperation.³⁰ This has a direct comparison with the United States where certain payment processors, such as Square, have begun directly lending to small businesses on the basis of cash flow conducted through payment processing.³¹

CHINESE PAYMENTS GLOBALLY

If the American card-based system came to dominate retail payments in the developed and in the non-cash developing world, will China's new system replace it abroad, if not in the United States? In the developed world, the answer is likely no. China's system will find a place, but it will be challenging for it to supplant the card-based system. In the developing world the answer is not as clear and may depend on the actions taken by Chinese companies.

Europe, the United Kingdom, Japan, South Korea, Singapore, and other highly developed economies remain with bank-focused payment systems. While the usage of cards, in physical or digital form, varies, those countries' systems share the common structure of the U.S. system: banks sending and receiving the funds on both ends with various payment processors in-between. A widespread transition by retail and merchants to the Chinese system is unlikely for any of these countries, for reasons similar and different than in the U.S. America's payment system is skewed to providing substantial rewards to wealthier consumers, through tax-free rebates on high-end credit cards, creating an incentive that will be hard for alternative lower cost models to match.

The prevalence of adoption, familiarity, and sunk costs of the existing payment system serve as impediments to a large change in these developed countries. While some of these countries have different rules and structures regarding payment fees, including a higher incidence of passing along payment surcharges for card fees, by and large merchants and banks have reached an equilibrium of acceptance and partnership.

National differences in payment methods can be sticky and hard to explain. As Vânia G. Silva, Esmeralda A. Ramalho, and Carlos R. Vieira found in a cross-national comparison within the EU of national check usage: “socio-demographic characteristics of consumers can have an important role in improving the results of measures adopted by authorities or in slowing them.”³² In particular, the study found that younger and higher-educated consumers are more likely to replace checks, although legal factors and fees were also important factors.

Another key component is the prevalence, or lack, of mobile wallets. For example, Singapore, a country with a reputation for early adoption of technology particularly financial, is reported to have one of the lowest adoption rates of mobile wallets and highest loyalties to credit cards.³³ Countries where mobile wallet adoption rates are high, or where mobile wallet providers are hoping to make that the case, will be more likely to see greater adoption. This is happening in some European countries, where a partnership was just launched between six digital wallet providers in 10 countries and Alipay.³⁴ However, these six mobile wallet providers together have only five million users combined, a far cry from the one billion on Alipay alone. Interestingly, the harmonization of this platform focuses on QR code compatibility,³⁵ a reminder that the future battlefield for payment platforms may well be on QR codes, not on fees for using bank-built payment rails.

Most have real-time payments, which improve the quality and value proposition for consumers, particularly lower-income consumers who need to more closely align their expenditures with their income. This important, but often overlooked feature of Europe, the U.K., Japan, and other economies adds to the value of their existing debit system as compared to the U.S. where overdraft charges cost lower-income consumers tens of billions annually.

In addition, some of the economic advantages of the Alipay and WeChat Pay systems are predicated on businesses and consumers transacting more heavily throughout those ecosystems. Without large-scale adoption of those platforms more generally, the value proposition of just their payment system is lower for businesses, consumers, and for the Chinese payment systems.

However, the Chinese payment system revolution will still impact these countries. The impact will differ between the U.S. and other countries. The first difference is how quickly and widespread some merchants will begin to provide Chinese payment alternatives. The simplest prediction from this research is that where Chinese travelers and multinationals are a large enough share of business, payment alternatives should follow. The most popular international destinations for Chinese travelers are: Japan, Thailand, South Korea, the United States, and Singapore.³⁶

Retail businesses that deal with large numbers of Chinese customers should be among the first to adopt these payment forms. Indeed, this is already the case in many of these nations. One study found that “77% of Chinese tourists spent more via mobile payments on their most recent overseas trip than on previous trips over the past two years.”³⁷ This is why stores in Manhattan, Orlando, San Francisco, and Las Vegas have begun accepting Chinese payments in the U.S.

Global companies, like Royal Caribbean International (RCI), are quickly adopting Chinese mobile payments not only on their China-based specific ships but throughout their fleet. RCI began with integrating Alipay on Quantum of the Seas, a ship “designed with our Chinese guests in mind” that sails directly out of mainland China, but has now expanded to accept WeChat Pay and is currently piloting UnionPay mobile QuickPass two smaller competitive forms of Chinese payments.³⁸ Launching in 2018, RCI has experienced over \$10 million in sales on the platforms.³⁹ As Royal Caribbean Senior Manager Frank Tuscano puts it: “Widespread digital wallet adoption in China was the catalyst for Royal Caribbean’s latest innovation providing mobile payment services for guests that has significantly increased the velocity of commerce onboard China-based cruise ships. Guests are delighted to have a familiar, frictionless mobile payment experience at sea.”

Other differences will result in how quickly banks in these countries form partnerships with the Chinese payment providers and their affiliated banks. In South Korea, Tencent was able to execute a partnership⁴⁰ with Woori Bank in 2015 to provide payment services for WeChat Pay. The economics of this transaction relied on foreign exchange fees between the Chinese customer and the South Korean merchant, a system that is more like the credit card model previously employed.

Partnerships are not limited to the developed world. WeChat Pay has partnered with Standard Bank to allow customers to withdraw WeChat Pay amounts at ATMs in South Africa.⁴¹ Both Alipay and WeChat Pay are accepted in over 40 countries⁴² globally. Financial payments infrastructure can be part of the broader vision of China's Belt and Road Initiative, deepening China's economic linkages across the global.

CONCLUSION

China's payment system has evolved into a framework based on non-bank payment platforms and QR codes. It stands in sharp contrast to the Western, bank-centric, card-based model.

Absent a substantial shock, China is likely to remain on this alternative platform. Businesses serving Chinese retail customers will likely have to adopt Chinese payment platforms. Possible partnerships between western financial institutions and Alipay and WeChat may make that transition easier. Or transaction costs and frictions may remain, creating impediments for non-Chinese firms to accept Chinese payment systems. Those developments will impact the marginal penetration of Chinese payment systems. But the overall outcome seems clear: Chinese payment systems will increasingly be integrated into global payments.

REFERENCES

- 1 “Toward Universal Financial Inclusion in China: Models, Challenges, and Global Lessons,” (Washington, DC: The World Bank / The People’s Bank of China, February 2018), <http://documents.worldbank.org/curated/en/281231518106429557/pdf/123323-FinancialInclusionChina-9Aug18.pdf>.
- 2 Gerry Shih and Jeanne Whalen, “Beijing’s blockade of U.S. credit card companies may finally end – now that Chinese companies dominate,” *The Washington Post*, January 21, 2019, https://www.washingtonpost.com/business/economy/beijings-blockade-of-us-credit-card-companies-may-finally-end-now-that-chinese-companies-dominate/2019/01/20/d52d8ad4-1354-11e9-803c-4ef28312c8b9_story.html.
- 3 “Payment System Report,” (Beijing: The People’s Bank of China, 2018), <http://www.pbc.gov.cn/en/3688259/3689026/3706133/3825632/3793316/index.html>.
- 4 Ibid.
- 5 Alyssa Abkowitz, “The Cashless Society Has Arrived – Only It’s in China,” *The Wall Street Journal*, January 4, 2018, <https://www.wsj.com/articles/chinas-mobile-payment-boom-changes-how-people-shop-borrow-even-panhandle-1515000570>.
- 6 Shi Yinglun, “Alipay reports 1.2 bln users,” Xinhua, October 1, 2019, http://www.xinhuanet.com/english/2019-10/01/c_138440413.htm.
- 7 Harrison Jacobs, “One photo shows that China is already in a cashless future,” *Business Insider*, May 29, 2018, <https://www.businessinsider.com/alipay-wechat-pay-china-mobile-payments-street-vendors-musicians-2018-5>.
- 8 Steven Millward, “WeChat sees bigger spenders as China goes cashless,” *Tech in Asia*, April 24, 2017, <https://www.techinasia.com/wechat-cashless-china-data>.
- 9 “Digital Payments,” Statista, <https://www.statista.com/markets/413/topic/984/digital-payments/>; Xiang Bo, “Alipay seems more mobile users in 2017,” Xinhua, January 2, 2018, http://www.xinhuanet.com/english/2018-01/02/c_136867491.htm; “Alipay active users exceeding 900 million across the globe,” *China Plus*, November 29, 2018, <http://chinaplus.cri.cn/news/china/9/20181129/216184.html>; Steven Millward, “Wechat is close to a billion users,” *Tech in Asia*, August 16, 2017, <https://www.techinasia.com/wechat-near-billion-users>.
- 10 “Chart of the Day: China’s Mobile Payment Transaction Volume Hits \$41.51 Trillion in 2018,” *Caixin Global*, March 22, 2019, <https://www.caixinglobal.com/2019-03-22/chart-of-the-day-chinas-mobile-payment-transaction-volume-hits-4151-trillion-in-2018-101395789.html>.
- 11 Ibid.
- 12 Cecily Liu and Wang Mingjie, “New ways to pay make life easier on the road,” *China Daily*, October 19, 2018, <http://global.chinadaily.com.cn/a/201810/19/WS5bc93a59a310eff303283525.html>.
- 13 “Bureau of Consumer Finance Protection: Prepaid Accounts Under the Electronic Fund Transfer Act (Regulation E) and the Truth In Lending Act (Regulation Z), *U.S. Federal Register* 81, no. 225 (November 22, 2016), 83934-84387, <https://www.govinfo.gov/content/pkg/FR-2016-11-22/pdf/2016-24503.pdf>.
- 14 Gabriel Wildau, “Tencent and Alipay set to lose \$1bn in revenue from payment rules,” *Financial Times*, July 15, 2018, <https://www.ft.com/content/b472f73c-859e-11e8-96dd-fa565ec55929>.
- 15 Martin Chorzempa, “Beijing’s Grip on Internet Finance Is Tightening,” *Peterson Institute for International Economics*, January 9, 2018, <https://www.piie.com/blogs/china-economic-watch/beijings-grip-internet-finance-tightening>.

- 16 Geoffrey A. Fowler and Juying Qin, "QQ: China's New Coin of the Realm?" *The Wall Street Journal*, March 30, 2007, <https://www.wsj.com/articles/SB117519670114653518>.
- 17 Louise Lucas, "Chinese embrace red envelopes for lunar new year," *Financial Times*, February 21, 2018, <https://www.ft.com/content/74e9c2a0-1792-11e8-9376-4a6390addb44>.
- 18 Samuel Hsiao, "In just 4 years, WeChat has changed the way people give out Red Packets," Momentum Works, February 28, 2018, <https://thelowdown.momentum.asia/just-4-years-wechat-changed-way-people-give-red-packets/>.
- 19 Ibid.
- 20 Martin Chorzempa, "How China Leapfrogged Ahead of the United States in the Fintech Race," Peterson Institute for International Economics, April 26, 2018, <https://www.piie.com/blogs/china-economic-watch/how-china-leapfrogged-ahead-united-states-fintech-race>.
- 21 Chris Kissell, "How Small Businesses Can Save on Credit Card Processing Fees," *U.S. News & World Report*, October 24, 2018, <https://creditcards.usnews.com/articles/how-small-businesses-can-save-on-credit-card-processing-fees>.
- 22 Mark J. Perry, "The public thinks the average company makes a 36% profit margin, which is about 5x too high," American Enterprise Institute, April 2, 2015, <https://www.aei.org/carpe-diem/the-public-thinks-the-average-company-makes-a-36-profit-margin-which-is-about-5x-too-high/>.
- 23 "What is the economic function of a bank?" Federal Reserve Bank of San Francisco, July 2001, <https://www.frbsf.org/education/publications/doctor-econ/2001/july/bank-economic-function/>.
- 24 Stella Yifan Xie, "More Than a Third of China Is Now Invested in One Giant Mutual Fund," *The Wall Street Journal*, March 27, 2019, <https://www.wsj.com/articles/more-than-a-third-of-china-is-now-invested-in-one-giant-mutual-fund-11553682785>.
- 25 "Alipay to charge bank transfer free from Oct 12," *China Daily*, September 13, 2016, http://www.chinadaily.com.cn/bizchina/2016-09/13/content_26778445.htm.
- 26 Zen Soo, "Tencent to charge users in China for transferring money from WeChat Wallet to bank accounts," *South China Morning Post*, February 16, 2016, <https://www.scmp.com/tech/apps-gaming/article/1913503/tencent-charge-users-china-transferring-money-wechat-wallet-bank>.
- 27 PayPal charges 2.9% plus a flat fee of 30 cents, which is not always the actual cost they pay as that differs depending on the type of card, negotiation between PayPal and the bank sponsoring the card, etc. More information about PayPal fees can be found here: <https://www.paypal.com/en/webapps/mpp/paypal-fees>.
- 28 Zen Soo, "Tencent to charge users."
- 29 "Alipay Ramps Up Supply Chain, Lending Services to SMBs," PYMNTS, October 30, 2018, <https://www.pymnts.com/news/b2b-payments/2018/alipay-small-business-loans-supply-chain/>.
- 30 "The Age of Digital Interdependence: Report of the UN Secretary-General's High-level Panel on Digital Cooperation," (New York: UN Secretary-General's High-level Panel on Digital Cooperation, June 2019), <https://digitalcooperation.org/wp-content/uploads/2019/06/DigitalCooperation-report-web-FINAL-1.pdf>.
- 31 "Square Cash is Open for Business," Square, March 23, 2015, <https://squareup.com/us/en/press/introducing-cashtags>.

- 32 Vânia G. Silva, Esmeralda A. Ramalho, and Carlos R. Vieira, "The Use of Cheques in the European Union: a Cross-Country Analysis," *Open Economies Review* 28, no. 3 (July 2017): 581-602, <http://dx.doi.org/10.1007/s11079-016-9412-1>.
- 33 "Singapore consumers still prefer to pay for online purchases by credit card versus e-wallet," *The Straits Times*, November 12, 2018, <https://www.straitstimes.com/business/banking/singapore-consumers-still-prefer-to-pay-for-online-purchases-by-credit-card-versus>.
- 34 John Detrixhe, "A Chinese-style payment network to challenge Visa and Mastercard is taking shape in Europe," *Quartz*, June 10, 2019, <https://qz.com/1639652/alipay-teams-up-with-european-smartphone-wallets-for-qr-code-payments/>.
- 35 "EU Mobile Wallet Players, Alipay Team on QR Code Interoperability," PYMNTS, June 10, 2019, <https://www.pymnts.com/news/mobile-payments/2019/europe-mobile-wallet-alipay-qr-code/>.
- 36 "2017 Survey: Outbound Chinese Tourism and Consumption Trends," (Beijing: Nielsen, February 28, 2018), <https://www.nielsen.com/wp-content/uploads/sites/3/2019/05/outbound-chinese-tourism-and-consumption-trends.pdf>.
- 37 Ibid, 6.
- 38 "Quantum of the Seas," Royal Caribbean, <https://www.royalcaribbean.com/cruise-ships/quantum-of-the-seas>.
- 39 Data provided to the author by RCI.
- 40 Jung Suk-ye, "Woori Bank Partners Tencent Provide Fund Settlement Service, Targeting Chinese Tourists," *BusinessKorea*, November 26, 2015, <http://www.businesskorea.co.kr/news/articleView.html?idxno=13116>.
- 41 "WeChat Wallet," Standard Bank, <https://www.standardbank.co.za/southafrica/personal/products-and-services/bank-with-us/digital-wallets/wechat-wallet>.
- 42 Cecily Liu and Wang Mingjie, "New ways to make life easier on the road."

ABOUT THE AUTHOR

Aaron Klein is a fellow in Economic Studies at the Brookings Institution where he also serves as policy director for the Center on Regulation and Markets. He served as deputy assistant secretary for economic policy at the U.S. Treasury Department from 2009 through 2012, working on a wide ranging set of topics including financial regulatory reform, responding to the financial crisis, housing finance, transportation and infrastructure policy, and macroeconomic issues. Before his appointment, he was the chief economist for the U.S. Senate Banking, Housing, and Urban Affairs Committee, a position he held for both chairmen Christopher Dodd (D-CT) and Paul S. Sarbanes (D-MD).

EDITOR'S NOTE

A version of this paper was published by the Brookings Institution's Economic Studies program in June 2019 as "Is China's new payment system the future?"

ACKNOWLEDGEMENTS

The author thanks the David M. Rubenstein President's Strategic Impact Fund at Brookings for its generous support of this research. Special thanks goes to Siddhi Doshi, Amy Liu, Jasmine Zhou, Cheng Li, Martin Chorzempa, Cayli Baker, Qi Ye, and Zizhu Pan for their assistance during various phases of this project. Ted Reinert edited this paper, and Rachel Slattery provided layout.

The Brookings Institution is a nonprofit organization devoted to independent research and policy solutions. Its mission is to conduct high-quality, independent research and, based on that research, to provide innovative, practical recommendations for policymakers and the public. The conclusions and recommendations of any Brookings publication are solely those of its author(s), and do not reflect the views of the Institution, its management, or its other scholars.