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Research Paper

Impact of COVID-19 on recent trends in digital payments – A case study on China

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Abstract: One of the global megatrends is the expansion of digital financial solutions, and seemingly this expansion will continue as there is still room for adopting technology-driven solutions in finance. Regarding global data, the majority of people already have access to financial services: nearly 69 percent of responding adults confirmed that they have accounts at financial institutions. With the far-reaching development of technology, digital payments came into the public as one of the digital financial solutions. In particular, this development sped up during the COVID-19 epidemic, during which people were using remote services in order to keep their physical distance and avoid contamination. Though legal and cybersecurity concerns emerge, the physical infrastructure is developed enough to provide accessible financial services for many more people than today. Countries in various regions adopt modern financial solutions differently, but digital financial solutions are inevitable. In this research paper, the impact of the COVID-19 epidemic on the recent trends of digital payment is examined and presented. The paper aims to detect how new payment solutions change the landscape. The methodology of this study is a case study and data analysis. The successful example of China as a digital payment adopting country is analysed as a case study since the country experienced a large expansion in digital finance. Digital financial solutions and digital payment data are collected from the World Bank. The paper contributes to the literature on digital financial development in China during and after COVID-19.

Keywords: financial inclusion; financial development; digital payment; China; COVID-19

1. Introduction

In the previous decades, the financial sector was characterised by technological innovations that made transactions faster, cheaper, and more convenient. In the last ten years, this change has continued more rapidly, though in a slightly different way. According to recent academic findings, at least three processes have influenced the recent trends.

The first one is the group of innovations that were delivered by non-bank firms, by the so-called 'fintech industry', which has gained substantial importance all over the world besides the innovations coming from the traditional banks. The second influence is based on the digital innovations that reached the B2C sector, as average people have become the primary users of these new technologies. Thirdly, digital financial solutions contributed to the development of financial inclusion and literacy. Therefore, more people are able to use financial services, especially those who were previously unserved or underserved in emerging countries. Fintech solutions are cheaper than traditional banks, therefore they can provide services in less profitable business segments, and they may be influential in emerging regions where the entry costs are too high for traditional banks.

Financial innovations are one of the megatrends in Asia; however, the landscape is more complex: regional differences, different legislative approaches, and standalone success stories mark the pathway of the fintech industry. The main cause and results of this rapid development are professionally debated. On the one hand, it is a valid argument that the new wave of digitalisation, the 3rd industrial revolution, just hit the financial sector as one of the sectors that didn't extensively adopt new technologies. As Arner et al. (2015) noted, emerging platforms, companies and technological solutions simply became 'too large to ignore' for

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policymakers, and thereby they became an integrant part of the economic ecosystem (Arner et al., 2015). However, in a way it is a similar argument to that of Ansart & Monvoisin (2017): they emphasised the importance of crisis experienced in the emergence of new financial approaches. The new megatrend was born after the global financial crisis, but the development is still ongoing and has a different path in different types of countries and different regions. The paper is going to show the most important differences, with special regard to Asia, while highlighting some good examples of fintech success stories (Ansart & Monvoisin, 2017).

China is one of the most successful countries in implementing new technologies in payment, thus the digitalisation of the financial system is an everyday reality for all Chinese people. Many steps were taken before the COVID-19 as private firms offered costless and easy solutions of payment, which people started to use gladly. These steps, namely the spread of Alipay and WeChatPay supported the aim of local central banks in promoting a cashless society. The coronavirus accelerated this progress. As people became less keen on using cash, these application-based private payment systems increased their share. In the meantime, the central bank, the People's Bank of China launched its pilot project on e-CNY, which offers a state-guaranteed and supervised solution for cashless payments with the ease of application-based solutions. In the case study of the paper, we enumerated the most recent payment trends in China with special regard to the private payment systems and the pilot project of the so-called 'central bank digital currency', the e-CNY. Digitalisation of household financial services has improved significantly since the last global Findex report of the World Bank, so the success of cashless programs in China may be measured in the upcoming updates.

This paper is organised into 5 sections. Following with introduction, Section 2 provides a literature review on financial inclusion and development and the problems related to the measurement. Section 3 summarises the current experiences based on the World Bank's Fintech survey, while Section 4 employs a case study introducing the most important payment innovations in China with special regard to the impact of the COVID-19 crisis. The conclusion is drawn in Section 5.

2. Financial development and inclusion

Financial development is defined by the World Bank as the development of countries' financial systems and the measurement mostly consist of macro-level indicators. The four dimensions of financial development are depth, access, efficiency, and stability, and they are measured by several indicators. For example, the depth of the financial system is regarded as a portion of credit compared to the GDP, or similarly the size of stock market capitalization and the amount of marketable government debt. Efficiency is regarded as the size of interest margins in the case of credits, and among others, turnover in the case of exchanged stocks. Stability is connected to the performance of the financial sector. Therefore, it is described with indicators such as liquidity ratios, volatility, and sensitivity to external shocks. The accessibility dimension of financial development is quite natural, and closer to a microeconomic approach. In the case of financial institutions, the number of people that uses financial services daily is the most important one, but similarly, the number of ATM machines and commercial bank branches can be measured as well. This latter dimension is the closest to the concept of financial inclusion. At the same time, the World Bank defines financial inclusion as follows: 'Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit, and insurance – delivered responsibly and sustainably' (Pearce & Ortega, 2012, p. 6).

Financial development and inclusion are two different concepts, but they have an impact on each other. Financial inclusion is more user-oriented, though policy goals usually state that more and more people should be involved, beyond having the theoretical opportunity to access these services. It is possible to regard financial services with a micro-level approach: service provider institutions are providing supplies, while individuals are on the demand side. The financial services usage is mostly connected to end-users such as households, and also to micro, small, and medium-sized enterprises.

As many authors like Demirgüç-Kunt et al. (2018) and Ozili (2018) argue, a financially more inclusive society could reduce the poverty and may decrease inequality. Therefore, increasing financial inclusion globally can provide access to more people around the world, and it is one of the Sustainable Development Goals aimed by the United Nations.

Even if financial inclusions are mostly measured by providing accessibility to formal financial services like bank deposits, loans, ATMs, or the number of bank accounts/debit cards per 1000 persons, digital financial services may open new horizons in financial inclusion and financial development.

IMF categorizes digital financial services based on users' needs to fulfil and differentiates between solutions connected to payment, savings, borrowing, risk management, and advising (IMF, 2019). The most visible and developed area of financial services is payment infrastructure. An increase in mobile payments and P2P payments has rapidly grown recently, sometimes in line with the development of classical bank services, and sometimes it is autonomously. Virtual currencies are highly debated not only in professional discussions but among users as well. While many virtual currencies like Bitcoin, Ethereum, etc. are regarded as risky investments, their technology has advantages. Therefore, many central banks are planning to introduce their own, legal, virtual currency called "CBDC". Both in payment and savings, traditional banking services are developing together with new fintech solutions and sometimes causing uncertainty. However, the technology might be similar in the case of different solutions. The business model and the legal position could largely differ not only from country by country but also the same market. As virtual currencies are highly volatile and difficult to regulate, users are often discouraged to use them, but innovative payment systems are largely encouraged, especially if it shows a bank-like business model. Fintech solutions in borrowing are mostly used in credit evaluation by traditional banks, while in some regions issuing microcredits received popularity in the last decade and shows a potential way forward for less-developed regions as well. Risk management and advising are areas that may have potential expansion both for traditional banks and new financial service providers.

Ozili (2018) argues that there are 5 channels of digital financial improvement that may help to increase financial inclusion:

- Fintech services are cheaper and more affordable for poorer people.
- As they are not burdened by as many regulations as banks, they can focus on improving technology and security.
- Fintech companies may help regular banks to be more sustainable and help them in data-driven processes.
- Because of lower levels of regulation, it is easier to access emerging funds.
- Being location-free is not only convenient but enables people to access financial services anywhere.

From the viewpoint of fintech companies, developing and emerging countries are suitable places to expand market share and gain new customers. And the regulative environment is usually supportive – or at least not so restrictive as these countries have less experience in regulating financial services (Ozili, 2018).

At the same time, it must be added that these innovations are not free of risks and concern any kind of regulator. As mentioned, these companies are not regulated unlike other banks and mostly provide cross-border services that make it more difficult to protect consumer rights. Regarding issues related to cyber security, the landscape is quite unclear. Although banks are obliged to protect their systems, fintech companies 'cannot make mistakes'. In case a fintech company loses its credibility in protecting data and being resilient, customers are more likely to react by restraining their services.

The connection between financial innovation and inclusion, and in general the impact of financial inclusion, became one of the most dynamically growing fields in development economics. Regarding the respective literature, theoretical discussion on the topic mostly concluded that financial technology has a positive impact on emerging markets, offsetting possible risks. Philippon (2020) argues that financial technologies make financial services cheaper and more affordable, meanwhile, the usage of big data may enable the financial sector to reach a broader scale of users. In his contribution, Philippon highlighted the usage of big data in Robo-advising, which may help to overcome prejudice, but the regulatory framework will be challenged by this. This argument is close to that of Thomason et al. (2018).

They argued that the technology, specifically blockchain technology, may provide an affordable digital identity for less-worthy customers helping to overcome the current barriers (Thomason et al., 2018).

Studying the empirical findings of respective literature, one finds it hard to find evidence of the net impact of such technologies for several reasons. Firstly, these trends are still ongoing and in most cases, they are not fully developed. Therefore, we may not be sure of their medium or long-term impacts. Secondly, as it is shown, there is a large heterogeneity among the countries and many other factors also coexist at the same time. Thirdly, digital finance is not a standalone phenomenon, and we also need to consider the changes in the institutional, legal, and economic environments.

On the other hand, many papers argued that technology may have an impact on parts of the financial sector. For example, Bayero (2015) found that awareness of technology, customer value, and infrastructure are associated with financial inclusion in the sample of Nigerian adults. In his paper, Bayero used a survey-based approach and argued that the business model of service providers is not significant but the customer approach toward technology and availability is indeed significant (Bayero, 2015).

Using a quantitative general equilibrium model, Beck et al. (2018) found that mobile money has a positive impact on growth and macroeconomic development. After building the model with market frictions, such as enforcement constraints, information asymmetries, and theft, they calibrated the model for the Kenyan economy and used a firm-level survey to show that companies benefited from mobile money solutions (Beck et al., 2018).

Regarding the reactions of the households, we found two similar papers with interesting contradictions. Using survey data, Jünger & Mietzner (2019) outlined those factors that make German households use Fintech solutions more likely, and Li, Wu and Xiao (2019) did the same in the case of Chinese households. The first paper found that those German households are more sensitive to Fintech that have a higher financial education level and are financially more literate. In China, households with lower incomes and less financial literacy gained more from using digital financial services (Jünger & Mietzner, 2019; Li et al., 2019).

3. Pre-COVID trends in financial inclusion

Regarding country-level data, the digitalisation of the financial sector is far from complete, but the rapid progress is worth further consideration. As has been mentioned earlier, the first level we may analyse is rather the accessibility of financial services than financial inclusion. In this chapter, two databases published by the World Bank will be used. In the Global Financial Development Database, many variables are collected in connection with financial services and financial development. Nearly half of them are statistical data on the respective economy or local financial markets, and the other half is survey-based, connected to the Findex database. This latter is a cross-country survey-based database that quantifies the level of financial inclusion of the respective countries at a given time. Participants in the Findex survey are asked to answer about the way they use financial services. Also, the reasons for not using certain services (such as having bank accounts or using credit cards) are asked to draw a better conclusion about the causes of being financially unserved.

However, there are some good proxies for measuring the accessibility to conventional financial services. It is challenging to find suitable measures for the advancement of digital financial services. The fact that someone has a bank account is the basic indicator in measuring financial accessibility. Those who do not have access are called financially unserved or underserved, and their integration of either classical or digital tools into the financial system is an identified goal. This measure is similar to the approach of counting those people who have their wages to be transferred to their bank accounts. Therefore, the ratio of the people who have an account in a financial institution (among people over 15 years of age), and the ratio of working people receiving wages on a bank account are two indicators that show the general classic approach to financial services. Regarding digital financial services, the ratio of people who made or received digital payments seems to be logical and used. The ratio of people who use mobile phones or the Internet to reach their accounts is considered a proxy of digital financial literacy. However, this accessibility belongs to a normal account, maintained at a financial institution. In the database, there is an indicator, the ratio of people

who claimed they have mobile money accounts, but these innovations are not widespread enough to draw meaningful cross-country conclusions.

Regarding global numbers, the majority of people already have access to financial services. Nearly 69 percent of the responding adult-age people have an account at a financial market institution. It is a notable increase in the last decade as the ratio was 51 percent in 2011 and 62 percent in 2014. Similarly, in earlier years, there is some heterogeneity in accessibility regarding the users' gender and age. In 2017, 72 percent of male respondents have a bank account, while 65 percent of the women also have one. Older adults (aged above 25) with higher incomes in urban areas had larger financial accessibility.

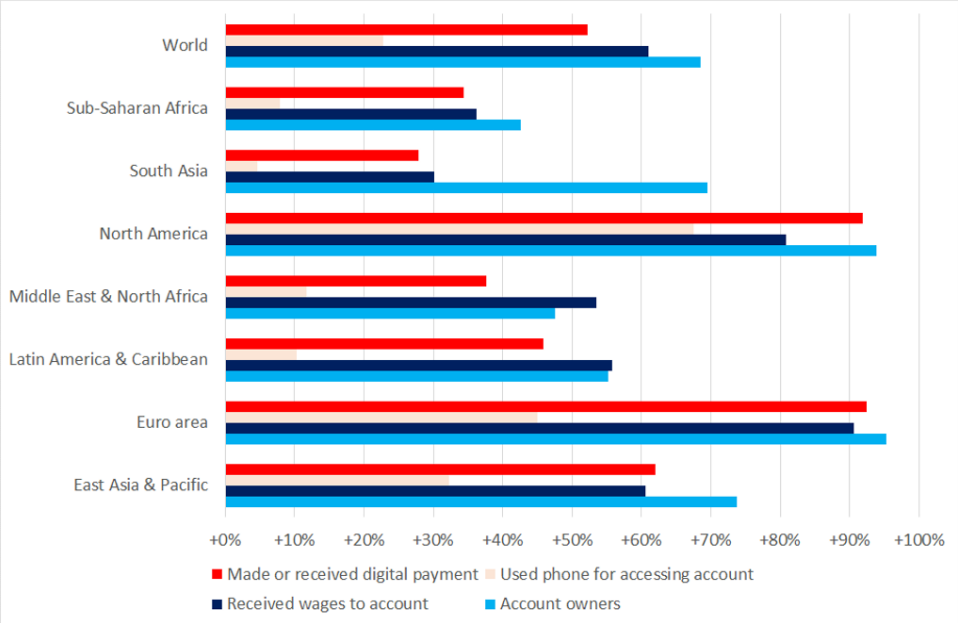

Figure 1. Regional differences, in using different types of financial services.
Source: Global Findex Database, authors' edition

Beyond account ownership, it is worth looking at the results from survey questions related to wages: whether wages are received on the account using mobile banking and mobile payment. The first two may be regarded as traditional proxies of financial inclusion, while the latter two reflect the importance of a new, technology-driven involvement. As shown in Figure 1, there is heterogeneity among the regions in the popularity of banking services. Those who have bank accounts mostly used them to receive wages, except in Sub-Saharan Africa and South Asia, the majority of people with accounts receive their wages on accounts. Many people who receive governmental subsidies opened accounts because it was required in some countries.

In recent years traditional banks started to develop online banking applications, and the survey investigated how popular they are. Although it is required to have a mobile phone and Internet connection to use online banking, it is closer to traditional banking than to tech-driven modern banking, as the bank account is managed by a traditional bank. It is in line with the survey result showing that in regions with high income, the popularity of online banking is higher. Although mobile purses in Sub-Saharan Africa and tech-driven payment systems in East Asia are popular, they are not directly connected to traditional financial service providers.

The popularity of digital solutions might be proxied mostly by the usage of digital payments. More than half of the people in this survey used any kind of digital payment in 2017, but there is still large heterogeneity among regions. In poorer regions, the usage was smaller, but a more detailed analysis would be needed to assess the difference between emerging and advanced countries.

In general, we may say that classical banking solutions largely correlate with modern financial ones, but some of the results are interesting to point out. In East Asia and the Pacific region, it seems that the difference in usage of traditional and new financial solutions is narrower, but in regions like Sub-Saharan Africa and South Asia, it is still larger.

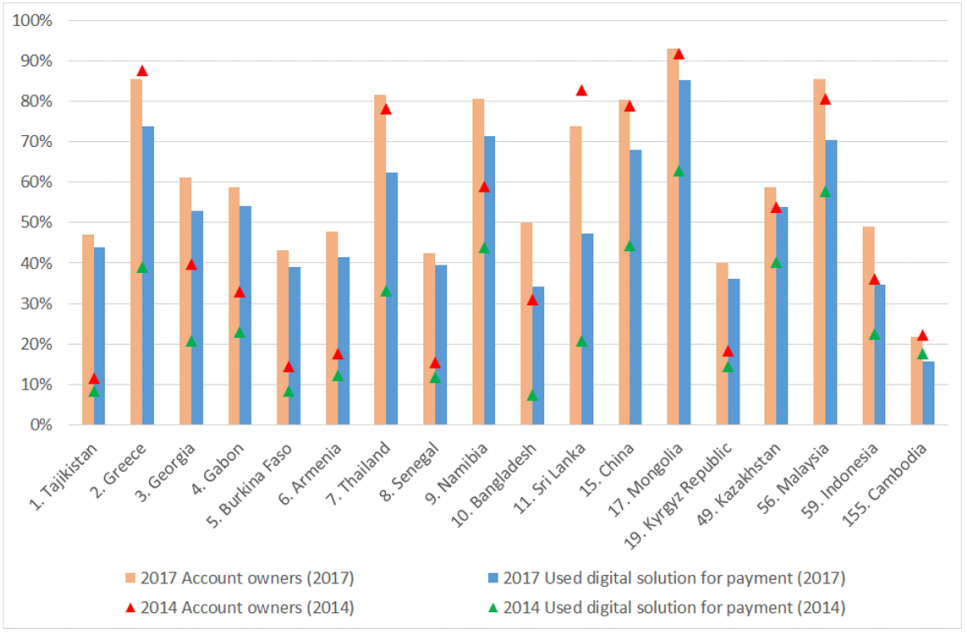

Figure 2. Change in popularity of chosen financial services, in some countries.
Source: Global Findex Database, authors' edition

On average the level of financial development and inclusion improved significantly in the last decade in Asia. However, this comes with a large amount of heterogeneity. Intra-regional differences are more pronounced, as highly developed countries are competing with emerging regions. And differences within the countries are substantial (Jahan et al., 2019). For example, the number of ATMs per 100,000 adults is over 200 in Japan, while 2 in Myanmar. In larger countries where within-country inequality is significant, people in rural areas and poorer regions are usually much more excluded from financial services than in urban, wealthier regions.

Regarding trends, many countries made significant improvements between 2014 and 2017. In most of the cases, the improvement was a quick jump from a very low base. In Tajikistan, Armenia, and Senegal, neither traditional nor digital banking was popular in 2014, but significant improvement took place in 3 years. The fastest growth in account ownership and in digital payment was observed in Tajikistan where it increased by 37 and 34 percentage points in three years, respectively. More importantly, in some countries, the change was smaller in absolute terms, but the outcome is more visible. In Mongolia, around 92 people have their accounts, and the usage of digital payments rose from 62 to 84 in 3 years. Digitalisation in China and Indonesia not only grew significantly, but these countries are regionally influential in economic terms. Therefore, their way of implementation has an important impact on other Asian countries. Indonesia has a drastic increase in account owners from 35% of the population in 2014 to nearly 50% in 2017. Digital solutions used for payment increased from 21% in 2014 to 35% in 2017. In China, 80 out of 100 people own an account, and 68 people out of 100 used digital solutions for payment purposes compared to 2014 when it was only 44 people.

In Section 4 recent trends in China are going to be further analysed. For further results of the Findex please see Demirgüç-Kunt et al. (2018).

4. Case study on China: intensive growth led by private companies

4.1. General Trends

As discussed in the previous section, Asia is far from homogenous in terms of financial services, but the general attitude toward financial inclusion is promising. Like in many cases, a country-level analysis enables us to understand the differences better, as the legal environment is broadly similar within a country and companies usually consider one or more countries as their 'markets'. On the other hand, intra-regional differences, and heterogeneity

within the same country reflect structural issues that cannot be disregarded by stakeholders. However, the gender gap in financial inclusion and the difference between rural and urban regions is possible to detect, even from the Findex database, so the country-level approach has been chosen. The above-mentioned dimensions are truly interesting but are beyond the scope of this article.

In the case of China, the development of financial services is visible, and many Chinese confirm that the evolution of the payment system is rapid. And the accessibility to digital services, at least in terms of payment, is convenient and reliable (Huang et al, 2020).

As it is noted in one of the working papers by IMF, China's digital economy has expanded rapidly in recent years. (Zhang-Cheng, 2019) However, the development is far from even. As China is a large country, regional differences are huge. Therefore, the average digitalisation of the economy is lower than that in advanced countries. And notable progress is visible in digitalisation, especially in certain regions and sectors, namely the coastal regions and e-commerce and fintech sectors. As a result, this development boosted productivity growth, but it has an uneven impact on different sectors of the economy. As Zhang and Chen (2019) note digitalisation is likely to further reshape the Chinese economy by improving efficiency and softening the downward trend of potential growth as the economy matures. The digital economy of China has entered a new stage of the framework of 'four orientations'. Realizing the importance of digital technology, the 'two orientations' framework was put forward in 2017 with the perspective of digital industrialization and industry digitalisation to improve economic productivity and growth. The 'three orientations' were proposed to improve the 'two orientations', adding one more aspect of digital governance and aiming to accelerate the transformation of economic development. This framework is to optimise the governance efficiency of the government, organizations, and enterprises. Currently, digital development is improved to fit the framework of 'four orientations', where data is becoming the key of production. Data becomes a driving force of economic development by transforming traditional economies into digitalisation (CAICT, 2020). The digital economy has been the key driver in the national economy, with an added value of RMB 2.6 trillion in 2005 to RMB 35.8 trillion in 2019. And the share of the digital economy in China's GDP increased from 14.2% in 2005 to 36.2% in 2019. Beijing and Shanghai are the most important ones in the regional economy, accounting for more than 50% of the digital economy in GDP (CAICT, 2020).

Looking at the data, it is worth mentioning that the three most influential fintech companies are at the core of China's Internet finance revolution. However, this concentration is not exceptional in developed countries. In the case of China, it is visible that large companies had the power to change the overall landscape. These companies dominate the Internet ecosystem and together generated USD 39 billion revenue during 12 months by the end of June 2016 (Patwardhan, 2018).

In terms of reaching unserved people, the largest company, Alibaba, made huge progress. For example, it has consumer spending behaviour data of over 420 million customers, which have been used to build its proprietary Sesame credit score. In comparison, National Credit Bureau, run by the People's Bank of China has data of 300 million people.

What lies behind Alibaba's success story? As Patwardhan (2018) notes, there was a large population of people underserved by the banking sector in general, but many of them recently developed as mid-income consumers due to the transformation of the Chinese economy. The innovative payment methods are widely spread because people found them convenient. However, cash remained part of the economy, and the physical form has a traditional value. The new users of the digital financial ecosystem could adjust accordingly. On the other hand, as Patwardhan notes, a high smartphone penetration rate and the development of the large e-commerce ecosystem developed hand-in-hand, therefore we conclude that a decrease in infrastructural barriers largely contributed to this progress.

The wide use of smartphones and the break of the pandemic prompted the digitalisation of payment. COVID-19 has extended financial inclusion with more financial services. On the one hand, contactless financial services are needed to reduce the risks of contagion. On the other hand, limited mobility and lockdown restrictions accelerate online shopping and digital payments. Customers and citizens are supported by the government and private firms to use smartphones to finish transactions (GPFI, 2021). What's more, the central bank was also motivated to issue central bank digital currencies (CBDCs). The digital economy grows fast in advanced economies, but in emerging and developing economies, the usage of physical cash is declining. Digital payment instruments include online banking transfers, mobile phone

transfers, and automated transfers. And the non-cash payment is increasing at an unprecedented rate in total GDP (BIS, 2021).

COVID-19 also has a significant negative impact on Chinese household consumption. However, the isolation and lockdown accelerate new consumption demands and patterns in China. Mobile payment plays a more important role during COVID-19 since it processes transactions online rather than offline. It is very convenient for consumers to make orders online using mobile phones. And mobile payment tools break the obstacles of personal mobility and space limitations. On the other hand, more urban households benefit from mobile payments than rural households. The heterogeneity in consumption shows that the urban-rural economy has different structures. Urban households have a higher demand for consumer goods while rural households have lower demand because they can produce agricultural goods to satisfy their needs. Therefore, mobile payment tools are more useful and popular in urban areas while rural areas have worse access to financial services (Liu et al., 2020). During COVID-19, contactless digital payments at a certain point of sale (such as facial recognition, QR codes, or NFC) can prevent the virus from spreading to others through cash transactions. Digital payments reduce face-to-face transactions and ensure consumers buy necessities from their homes safely. The growth of e-commerce also helps small businesses maintain revenue growth during economic uncertainty. Online payments can even stimulate people to make more consumption. For example, local governments in China have distributed vouchers through WeChat Pay to encourage people to spend instantly (Yan, 2020).

4.2. Impact on private firms

Well before the coronavirus crisis, notable improvement took place in access to digital financial services as some of the service providers gained large popularity during the second half of the 2010s. One great example is WeChat Pay, which is an online payment and wallet application incorporated into the social app WeChat. Since its original launch in 2013, the number of users reached 900 million in 2021. Initially, WeChat Pay had a lot fewer consumers than its rival Alipay, but in 2014 it launched a new feature, the red packet (红包) function. This function enabled users to send money as a gift, and the recipient could use the credit without having any banking, only by using the application. This innovative approach toward new users resulted in huge progress in reaching unbanked people, especially in rural areas (Chui, 2021). 16 million red packets were sent in the first 24 hours. WeChat Pay users expanded from 30 million to 100 million after a month (Calvo et al., 2018). Tang et al. (2021) identified several factors behind the success of WeChat Pay. They found that service quality, ease of use perceived security, social influence, and compatibility are associated with the willingness to the usage of the application. However, surprisingly, age did not seem to be an important factor. Users are willing to use the application regardless of their age (Tang et al., 2021). However, Alipay was established in 2004, which is 10 years earlier than WeChat Pay. Until 2013, Alipay was nearly the monopoly on the market, accounting for over 80% of the transaction value. The users have reached 1 billion by 2021. Alipay has been successful in the field of digital payment with its core competence in competing with other digital payments like WeChat Pay, UnionPay, and JDPay. Only Alipay is accepted by Alibaba's e-commerce platforms such as Taobao and Tmall, which provides Alipay with large advantages for mobile e-commerce transactions. Because Taobao and Tmall comprise the majority of e-commerce transactions in China (Liu et al., 2020). What's more, Alipay developed financial products, such as Yu'ebao, Huabei, Jiebei, etc. Yu'ebao is the world's largest money market fund which has a low threshold with only one yuan for users to do an investment. Alipay is more preferential compared to WeChat Pay. Alipay charges a 0.1% service fee when users withdraw over 20,000 yuan, while WeChat Pay charges the same amount fee when users withdraw over 1000 yuan (Liu et al., 2020).

During COVID-19, the number of WeChat users increased from 1200 to 1240 million, and WeChat Pay users increased from 865 to 900. After COVID, it was required to scan a COVID QR code when entering community neighborhoods, hospitals, shops, etc. And people make online orders in order to avoid the contagion. However, unlike the fast-growing trend from 2016 to 2019, it grew slower after the break of COVID-19. The reason is the users of digital payment applications developed very mature and increased well before COVID-19.

Table 1. The number of WeChat and WeChat Payment users (million).
Source: Tencent, author's edition.

Year	WeChat User (million)	WeChat Pay User (million)	Percentage of WeChat Pay User among WeChat User (%)
2016	762	430	56%
2017	938	600	64%
2018	1040	720	69%
2019	1170	800	68%
2020	1200	865	72%
2021	1240	900	73%

The two large tech firms, Alibaba with Alipay and WeChat with WeChat Pay made a breakthrough in approaching retail customers and paved the way for a digitalized, modern financial ecosystem.

4.3. Central bank digital currency – the eCNY

As it is explained in the literature, there are three characteristics of central bank digital currencies that differentiate such currencies from other payment options and money types. They are as follows:

1. Digital currencies are issued by central banks, of which the liability of the state is similar to cash.
2. CBDC is digital money, unlike actual cash, but it is more like digital accounts that were already popular in China.
3. The eCNY uses a centrally controlled settlement system, unlike other digital currencies like Bitcoin, which uses distributed ledger technology (DLT).

Initial research on launching e-CNY was started as early as the end of 2017. The goal of these research was to provide a general, wallet-based ecosystem that is available for a wide range of business partners. And at the same time it is reliable, safe, and standard. These requirements are connected to the special status of e-currency. While private companies do not need to support full compatibility and ensure fair competition, the state-led financial system must handle such concerns (PBOC, 2021).

Several technical solutions were tested so far. One of the most interesting answers to technological challenges is the offline version of the wallet. In case of a lack of Internet service, it is possible to pay with a hardware-based wallet between mobile phones of close proximity (Soderberg, 2022).

In April 2020, the People's Bank of China launched the largest pilot project concerning the issuance of a central bank digital currency by distributing 10 million e-CNY to Shenzen residents. The ongoing pandemic situation was a favourable timing for the pilot project. People were discouraged from using cash and initial results of using e-CNY were generally positive. In the second part of 2020, the pilot project was extended to 6 new cities and regions. The overall share of the population currently involved in the project is around 10 percent as the number of users reached 123 million in October 2021 (Soderberg, 2022).

The international debut of the ecosystem was at the Winter Olympic Games in Beijing in February 2022. The turnover during the 2 weeks of Winter Olympic games was 2 million RMB per day. Feedback from users was generally positive, but the capacity of settlement is still below the largest domestic competitors' such as Alipay and WeChat pay. On the other hand, it is already larger than Visa's. Despite positive experiences, the large-scale launch of central bank currency is yet to come as it's still needed to further develop in capacity regulation and security aspects (Cheng, 2022).

4.4. Conclusion of case study

China made large steps toward digitalising its financial system in the mid-2010s. While the accessibility of financial services was similar as other countries with similar development levels, China as the first comer in this field enjoys advantages provided by digital financial revolution.

On the road toward a well-digitalised financial system, the first payment solution was done by two private and Bigtech companies: Alipay and WeChat Pay. They provided an easy and accessible digital solution that was supported by local regulators to a large extent (Chui, 2021).

A research project was initiated in 2017 to develop a central bank digital currency-the so-called e-CNY. Though several countries decided to start a pilot project in the late 2010s, the scale of the Chinese project is the largest in the world, with 123 million users involved in October 2021. An interesting implication of the digitalized renminbi is its cross-border usability and promotion, which is the direct focus of the ongoing research and consultation process. Aysan & Kayani (2022) noted that the competition in introducing digital currencies may reshape the global payment habits. They argued that in Asian regions an international usable digital currency would be extremely popular. China is competitive to set up the digital currency because of its well-developed infrastructure.

On the other hand, Aysan & Kayani (2022) explained that the success of international e-CNY is largely dependent on the future version of USD, as well as the usability and willingness of Asian countries to support the Chinese payment system on a daily basis (Aysan & Kayani, 2022). The pilot project was launched parallel with the COVID-19 pandemic, which provided a favourable environment for the spreading of digital solutions. Huang et al. (2021) argued that this technological advancement largely contributed to the economic rebound of China following the pandemic crisis. They expect further rapid growth due to 5G and other technical advancements (Huang et al., 2021).

All in all, several factors contributed to the rapid digitalisation of the Chinese financial ecosystem in the second part of the 2010s and the future of these developments appears to be bright. All stakeholders like final users, businesses, regulators, and the state are interested in a digitalized and modern economy. This does not only make daily payment convenient, mitigate the risks associated with using cash, but also facilitates business and economy.

5. Conclusions

Financial innovations are one of the megatrends in Asia. However, the landscape is more complex. Regional differences, different legislative approaches, and standalone success stories mark the pathway of the fintech industry. On average, the level of financial development and inclusion has been improved significantly in the last decade in Asia. However, this coexists with a large heterogeneity. Intra-regional differences are more pronounced as highly developed countries are competing with emerging regions. Meanwhile, differences within countries are also substantial.

In the case of China, the development of financial services is visible, and the evolution of the payment system is rapid, even before COVID-19. Digital economy and mobile payment are significantly used by firms and households since there are fewer risks of getting infected due to the pandemic. So digital services, especially digital payment is getting more accessible and popular due to its convenience and reliability.

The success is mostly attributed to the coexistence of the newly emerging middle class and the accessibility of digital services in general. At the same time, the Chinese fintech story will continue in the future, and the success of payment solutions will spill over to other parts of financial services as well.

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