CHINA'S CENTRAL BANK DIGITAL CURRENCY: AN UPDATE

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EAI Background Brief No. 1664

Date of Publication: 11 August 2022

Executive Summary

1. China is the first major economy to pilot the use of a digital currency (e-CNY). By end-2021, the e-CNY application had 261 million users, with transactions totalling RMB87.6 billion (US$13.8 billion).

2. Possibly the most important effect of the e-CNY is the oversight and control of financial transaction it gives to the People's Bank of China (PBOC). The impact of a greater visibility of money flows in the economy afforded by a central bank digital currency (CBDC) is the reduction of financial crime such as illicit transactions, tax evasion and money laundering.

3. Tax evasion remains one of the most pressing challenges draining the central government's coffers. Due to widespread tax evasion, only 8% of China's total tax revenue came from personal income tax in 2017. By contrast, personal income tax made up (on average) 24% of OECD nations' total tax revenue.

4. The introduction of a CBDC could help increase financial inclusion, particularly for the rural communities. The PBOC's ability to monitor economic transactions could help policymakers use fiscal policy more effectively to meet its policy goal of targeted poverty alleviation such as issuing subsidies directly to the poor populace rather than routing subsidies through intermediary channels.

5. The PBOC has been cautious and prudent in designing the e-CNY with a view to maintaining currency sovereignty and financial stability. The design of digital yuan to replace cash in circulation implies that the magnitude and role of the CBDC in the financial system will be limited.

6. The e-CNY is likely to have a minimal impact on RMB internationalisation. To internationalise the e-CNY, sufficient liquidity in the market and available hedging instruments are needed to facilitate the trading of the digital currency.

7. Despite China's importance as a global trading power, its renminbi (RMB) constitutes approximately 4% of foreign exchange market trade versus the US dollar's over 88%. Besides, RMB share as an international payments currency stood at 2.2%, while it was 41% for the US dollar (USD) and 36% for the euro.

8. For the short and medium term, China may find it even more challenging to internationalise the e-CNY than the physical form of the RMB. Many Belt and Road Initiative loans are in USD, indicating that it is cheaper, less risky and more convenient for both the Chinese lender and overseas borrower to use USD instead of the RMB.

9. The e-CNY is expected to promote the settlement of cross-border payment, trade or investment in a faster, safer and lower-cost manner. However, how it functions in a complicated cross-border payment market with multiple currencies, jurisdictions, regulations and financial infrastructures is unknown.

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Digital Renminbi at the Forefront

1.1 China has been designing and developing its digital currency since 2014. It has also been studying how it would issue and circulate a potential central bank digital currency (CBDC), how this CBDC would function both domestically and internationally, and what technologies would make up its infrastructure. It has launched large-scale pilots of its Digital Currency Electronic Payment (DC/EP) in various Chinese cities since April 2020 to test the digital yuan or renminbi (e-CNY) for retail use by the general public.

1.2 As of 30 June 2021, the e-CNY had been applied in over 1.32 million (application) scenarios, covering utility payments, catering services, transportation, shopping and government services.[1] Supported by local governments, some cities distributed 'red packets' of e-CNY to consumers. By the end of December 2021, 261 million individual users (about one-fifth of the population) had set up e-CNY wallets and RMB87.5 billion (U$13.78 billion) worth of transactions had been made using the digital fiat currency.[2] The Beijing 2022 Winter Olympics is the digital currency's largest pilot to date, marking the first time foreign visitors are free to use China's digital currency via smartphones and wearable payment devices.

1.3 In terms of its readiness for national implementation, China's e-CNY is one of the more developed CBDCs in the world. Compared to China's, other major central banks' CBDC initiatives are still at a nascent stage. According to a survey of 81

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[1] PBOC, "Progress of Research & Development of E-CNY in China", Technical Report, W G on E-CNY Research and Development of the People's Bank of China, July 20221. http://www.pbc.gov.cn/en/3688110/3688172/4157443/ 4293696/2021071614584691871.pdf, accessed 26 April 2022.

[2] "China's digital currency: e-CNY wallet nearly doubles user base in two months to 261 million ahead of Winter Olympics", *South China Morning Post,* 16 January 2022.

major central banks conducted by the Bank for International Settlements (BIS), more than three-quarters of central banks worldwide are actively engaged in some form of CBDC work, with three-fifths (62%) moving past initial research towards experimenting and running pilots. [3] Most central banks surveyed are considering a retail CBDC that involves the private sector, in which the central bank would distribute the CBDC to the public, via private sector intermediaries like the banks and financial institutions (a two-tiered model).

1.4 The People's Bank of China (PBOC) has four main motivations for developing the e-CNY: (i) provide the public with a form of digital cash; (ii) support fair competition, efficiency and safety of retail payment services;[4] (iii) increase the efficiency of cross-border payments; and (iv) exert a positive impact on financial inclusion.

1.5 It is not clear to what extent the e-CNY will be utilised for retail payments in China. Although China has been steadily making progress towards a digital currency, it faces the problem of encouraging the domestic use of the e-CNY. On paper, there were over 261 million e-CNY wallets, with transactions totalling RMB87.5 billion being made by the end of 2021. This translates to approximately RMB335 per e-wallet. However, the average monthly transactions made by WeChat Pay was US$83.9 (RMB557) or RMB6,684.[5] As the e-CNY is still on a trial run basis, it may not be able to overtake private-sector alternatives without substantial government interference to the point of mandatory use. The government may in fact have a hard time equalling the convenience of well-established ecosystems of

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[3] Bank for International Settlements, "Gaining momentum – Results of the 2021 BIS survey on central bank digital currencies", BIS Paper No. 125, May 2022.

[4] According to the PBOC (2021) report, the digital yuan will provide the public with a new interoperable way of payment, which will further diversify payment instruments and make the payment system more efficient and safer. The e-CNY draws on existing electronic payment technologies and since it is legal tender in China, it is the safest asset in China. It can be transferred without relying on bank accounts while transactions can be conducted off-line. Finally, the e-CNY supports managed anonymity, which helps protect privacy and user information. Refer to source in Footnote 1.

[5] Data is for 2016. "China's Alipay and WeChat Pay: Reaching Rural Users", World Bank. https://openknowledge.worldbank.org/bitstream/handle/10986/30112/129152-BRI-PUBLIC-Brief-Chinas-Alipay-and-WeChat-Pay-Dec-2017.pdf?sequence=1, accessed 13 June 2022.

merchants and users that super apps (dominant mobile payment apps) have built and tied in with myriad other services.[6]

Economic Rationale Behind CBDC

2.1 There are several reasons why central banks are exploring the possibility of launching a digital currency. Chief among them is the emergence of cryptocurrencies, which might threaten monetary sovereignty and global financial stability. The rising number of cryptocurrencies like Bitcoin and Facebook's Libra has prompted central banks around the world to consider issuing their own digital currencies to compete with these cryptocurrencies provided by the private sector.

2.2 Theoretically, the CBDC has the potential of significantly reducing the cost of cross-border payments. It could also benefit low-income households, which tend to rely heavily on cash, and small businesses, which incur high costs for handling cash or high interchange fees when they take payments using debit and credit cards.[7] At a macroeconomic level, researchers at the Bank of England have estimated that the productivity gains from adopting CBDC would be similar to those of a substantial reduction in distortionary taxes.[8]

2.3 Further, if the CBDC is remunerated, the interest-bearing design of CBDC, together with the obsolescence of paper currency, would contribute to greater macroeconomic stability since interest rate adjustments would no longer be constrained by an effective lower bound in response to adverse economic shocks.[9] As the interest rate on CBDC would serve as the primary tool of monetary policy,

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6 Martin Chorzempa, "China's Pursuit of Leadership in Digital Currency", 15 April 2021.

7 Bordo and Levin, "Central Bank Digital Currency and the Future of Monetary Policy", *NBER,* Working Paper No. 23711, 2017.

8 The introduction of CBDC could lead to higher output (but also inflation), if cash is still in use. The positive impact would result from a fall in real interest rates and transaction costs. Kumhof, Michael and Noone, Clare, 2018, "Central Bank Digital Currencies - Design Principles and Balance Sheet Implications", Bank of England working papers 725, 2018.

9 Goodfriend, Marvin, 2000, "Overcoming the Zero Bound on Interest Rate Policy", *Journal of Money, Credit, and Banking,* 32, 1007-1035; Agarwal, R and Kimball, M, 2015. "Breaking through the Zero Lower Bound", IMF Working Paper No. 15-224. Washington: International Monetary Fund; Rogoff, Kenneth. 2016. *The Curse of Cash*. Princeton, NJ: Princeton University Press.

the central bank could use the interest rate paid on CBDC balances, and the expectation thereof, to guide rates in the economy.[10] With the abolishment or disappearance of cash, interest rates could be set to (any) negative levels, thus doing away with the "zero lower bound" on nominal rates.[11]

2.4 CBDC could be a new tool in the central bank's monetary policy toolkit since it is possible that the currency, being digital, and by *de facto,* programmable, could be designed to ensure that (stimulus) funds could be deposited quickly and directly into CBDC accounts of low-income households in an economic downturn, for instance. When the CBDC is available to all (i.e. universally accessible), it would allow for a direct implementation of monetary policy, directly affecting the intertemporal decisions of households and firms, rather than through the indirect and imperfect banking channel.[12]

2.5 Under imperfect bank competition in the deposit market, the existence of a CBDC would force banks to raise deposit rates to match the CBDC rate in order not to lose retail funding.[13] This would eventually have a crowd-in effect of encouraging saving, reducing borrowing costs and expanding lending.[14] The impact on the real economy would be predominantly through the pass-through of changes in the price and interest rate on CBDC (i.e. yield bearing CBDC) to the rate on commercial bank money (i.e. deposits).

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[10] Bank of England, May 2018. Broadening narrow money: monetary policy with a central bank digital currency, Staff Working Paper No. 724.

[11] Bordo, Michael D and Levin, Andrew, "Central Bank Digital Currency And The Future Of Monetary Policy", Economics Working Papers 17104, Hoover Institution, Stanford University, 2017.

[12] Competition from CBDCs may prompt banks to increase deposit rates. Refer to study by Auer *et al*, "Central bank digital currencies: motives, economic implications and the research frontier", *Bank for International Settlements Working Papers* No. 976, November 2021.

[13] Ibid.

[14] This 'crowd-in effect' is found to occur even in the absence of remuneration when the role of cash declines in the economy. By offering an outside option to depositors, a CBDC could provide a floor on deposit rates, limiting banks' monopoly profits in the deposit market and prompting them to increase lending. An empirical study on the US economy indicates that by enhancing competition in deposit markets, a CBDC could raise bank lending by almost 2% and output by 0.2%. Chiu, J, Davoodalhosseini S M, Hua Jiang, J and Zhu Y (2022), "Bank Market Power and Central Bank Digital Currency: Theory and Quantitative Assessment", Bank of Canada, mimeo.

Implications of the Digital Renminbi

3.1 Monetary policy implications are likely to be more pronounced if the CBDC emerges as an attractive asset to hold, relative to bank deposits.[15] If it is not paid interest, the CBDC would be analogous to physical cash, having a constant nominal value. A former PBOC official suggested that the digital yuan could be programmed in such a way as to target money supply, reduce the time-lag in monetary policy transmission and support the implementation of the monetary policy. As such, the digital RMB could still be considered as a potential tool in the PBOC's monetary toolbox, despite the discount facilities remaining as the main tools for China's monetary policy.[16]

3.2 Given the non-interest bearing design of the e-CNY and the PBOC's general prioritisation of financial stability over innovative forms of financial and monetary policy, it is unlikely that the e-CNY would have any impact on China's monetary policy implementation. Instead of a fractional reserve system used in the traditional banking system, China's CBDC would require financial institutions to maintain a 100% reserve ratio. As a result, there would not be any money multiplier as the deposits would not be used for lending. As such, the magnitude and role of the digital RMB in the financial system will be quite limited.

3.3 As the distribution of the e-CNY takes place via a two-tier system, the risk of disintermediating existing financial institutions is low. This alleviates the risk of any potential systemic financial instability. According to a white paper issued by the PBOC's Working Group on e-CNY Research and Development in 2021, the e-CNY will have a two-tiered structure, with the central bank as the first tier, issuing the digital yuan to commercial banks, and the commercial banks, as the second tier, distributing the e-CNY to the public.

3.4 Such a structure is expected to reduce the disintermediation risk of Chinese state-owned banks which face competition from Alipay and WeChat Pay, two third-party

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15 Refer to Sarah Chan, "China's Central Bank Digital Currency: Impact and Policy Implications", *EAI Background Brief,* No. 1600, 15 July 2021.

16 Yao Qian, *A Glimpse of Digital Currency*. China Finance Publish House (Beijing: 2018).

platforms that have monopolised the payments sector given that they jointly account for 94% of the mobile payments market.[17] By controlling vast amount of financial transactions data and users' credit information, these two firms are able to build better financial products and provide extremely low borrowing rates in the market, thus posing competition to traditional banks. The digital yuan is expected to break the duopoly of Tencent and Ant Financial, and allow the PBOC to compete against the two digital payment giants in a bid to provide a safe and more inclusive retail payment infrastructure. By being able to view the financial transaction data in its entirety, it would be able to backstop any financial disruptions from the tech giants and ensure stability of the financial system.

3.5 The DC/EP system is also intended to reduce the cost of printing and circulating notes, reducing costs for cash management. It is likely to facilitate inclusive financing and poverty alleviation. Advancing financial inclusion through digital finance has been a long-term goal of the PBOC. Some researchers have argued that the e-CNY will increase financial inclusion by accelerating the development of digital payments and finance, which would increase financial accessibility for anyone with a smartphone and stable internet access. However, given that the majority of smartphone users in China already use mobile payment platforms, it is unclear how a shift to the e-CNY will accelerate the adoption of digital Fintech unless a mandatory shift away from the cash RMB accompanies it (there is no indication that the country will quickly remove paper currency from circulation if and when it distributes the e-CNY nationally).[18]

3.6 China's rural population is most in need of expanded financial inclusion; however, the majority of the rural populace does not have a bank account or stable internet access. The e-CNY could increase financial inclusion by allowing the PBOC to issue subsidies directly to citizens rather than having to pass through intermediary channels (i.e. various levels of government). As the DC/EP would enable broader visibility of money flows in the economy, it could allow the governments to target

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[17] Data is for 2020. Refer to Carstens A, Claessens S, Restoy F and Shin H S (2021), "Regulating Big Techs in Finance", *BIS Bulletin*, No. 45, 2021.

[18] Elijah Fullerton and Peter Morgan, "The People's Bank of China's Digital Yuan: Its Environment, Design and Implications", Asian Development Bank Discussion Paper Series, No. 1306, February 2022.

spending and put purchasing power in selected wallets with greater efficiency. Hence, the PBOC's ability to monitor DC/EP transactions could also help policymakers target fiscal policy more effectively to meet their policy goal of targeted poverty alleviation.

3.7 Specifically, the digital RMB is expected to help improve financial regulation and achieve financial regulatory goals. It could play a role in discouraging and combating tax evasion, money laundering and strengthen other anti-fraud activities since it would enable the central bank to see and track all necessary real-time data on money flows. Possibly the most important effect that the e-CNY will have is that it will give the PBOC oversight and control of financial transactions. If the e-CNY were to replace cash in the People's Republic of China (PRC), then the PBOC would have the capability to monitor, trace, block and revert transactions that were previously invisible. This could deter capital flight and would make financial crimes such as money laundering, tax evasion, terrorist financing and purchasing of illicit goods far easier to identify and combat.

3.8 Tax evasion remains one of the most pressing challenges draining the central government's coffers. Due to widespread tax evasion, only 8% of the PRC's total tax revenue came from personal income tax in 2017.[19] By contrast, personal income tax made up (on average) 24% of OECD nations' total tax revenue. Officials within the finance ministry have estimated that only 28 million people (2% of the population) paid income taxes in 2017 out of the 187 million people who should have done so.[20] This alone provides a compelling reason to innovate to prevent tax evasion. The e-CNY's increased surveillance capacity is likely to be an effective means of curtailing tax evasion.

3.9 The traceability of transactions through digital transfers of money from one electronic wallet to another will provide a visible and indisputable record of how money has been circulated in the economy. Over time, the raising of tax revenue

[19] "Why Only 2% of Chinese Pay Any Income Tax", *The Economist*, 1 December 2018. https://www.economist.com/china/2018/12/01/why-only-2-of-chinese-pay-any-income-tax, accessed 24 April 2022.

[20] Ibid.

can be administered contemporaneously, with the relevant proportion of revenue, profit or income (depending on the basis of the tax) being deducted directly from the relevant digital wallet following a transaction. Given that the relevant economic data is provided in real time, the efficiency gains of such a system of taxation would clearly be significant. If a key limitation on the state's ability to collect tax revenues has been a reliance on voluntary compliance, then such a limitation would not necessarily exist in the world of a digital central bank currency.[21]

3.10 The increased transparency that the e-CNY provides could help address the inefficiencies arising from China's current fiscal system. The long-standing misalignment of revenue and spending across levels of government has been a source of inefficiency and tension between central and local governments. The implementation of the DC/EP could provide the means to levy tax at the local level with greater efficiency and ease. Moreover, given that the underlying transactional information on which taxes are levied would be traceable and known to both local and national authorities, it may encourage the national government to devolve tax-raising powers to the regions, which in turn may alleviate their debt burden.[22]

e-CNY and RMB Internationalisation

4.1 The internationalisation of the RMB has advanced substantially over the past decade. Policy measures to promote RMB internationalisation, particularly its use as an investment and funding currency, have covered three main areas – gradual opening of the capital account, steps to strengthen the domestic financial system[23] and offshore liquidity support through central bank swap lines.

4.2 While the internationalisation of the RMB has been supported through broad reforms, the globalisation of the currency is ultimately market driven. So far, years

[21] Refer to source in Footnote 15.

[22] Ibid.

[23] The authorities have initiated financial reforms aimed at achieving more market-based pricing. Over the past decade, the PBOC has gradually relaxed controls over commercial bank interest rate settings. Lending rates were completely liberalised in 2013. In August 2015 the PBOC modified RMB fixing to make it more market driven; specifically, this decision aimed at correcting the discrepancy between the reference rate exchange rate (also known as the daily fixing or the central parity) and the market spot rate.

of Chinese efforts to internationalise the RMB have borne limited fruit. Beijing has prioritised domestic financial stability and protected its economy with capital controls over making its currency freely usable in a way that would boost its use abroad. For instance, despite the inclusion of the RMB in the IMF's Special Drawing Rights currency basket, there is still limited currency conversion on the capital account. The August 2015 episode where China moved to weaken the yuan against the US dollar, changing the central parity rate of the renminbi, underscored the hesitation of China's policymakers in letting the exchange rate move more freely with market forces.

4.3 Even as RMB use and trading is increasing, it still has a long road ahead before it becomes an international funding currency and acquires the attributes associated with a global reserve currency. Data shows that despite China's importance as a global trading power, its RMB constitutes approximately 4% of foreign exchange (forex) market trade compared to the US dollar which is involved in over 88% of forex trades.[24] The RMB's use in forex reserves is even more disproportionate than its use in trading. As of Q4 2021, the RMB only makes up 2.6% of the global forex reserves compared with the euro (19%) and the US dollar (55%). In addition, the share of RMB as an international payments currency stood at 2.2%, according to data from SWIFT (Society for Worldwide Interbank Financial Telecommunication), the world's largest international electronic payment system.[25] By comparison, the US dollar and the euro were used in 41% and 36% of transactions, respectively.

4.4 Evidently, it will be hard for the RMB to gain ground on a currency as dominant as the US dollar. The IMF's Chief Economist Gita Gopinath and former Federal Reserve Governor Jeremy Stein had recently found in their study that at least over the medium term, "the renminbi would have a hard time gaining much traction in international banking and finance" compared to the dollar. Yet, in the long term, "if the gap between Chinese and U.S. shares in world exports widens far enough, we

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24 https://blog.ibanfirst.com/en/renminbi-internationalisation-chinas-path-to-a-world-currency, accessed 12 June 2022.

25 Data as of March 2022.

could eventually get to a point where a renminbi-dominant equilibrium becomes inevitable”.[26]

4.5 As China’s economy expands, the RMB will inevitably play a greater role in the financial system. The DC/EP could enhance the RMB’s international clout and help facilitate its internationalisation. The BRI projects, for instance, could provide the testing ground for the internationalisation of the digital yuan, with the e-CNY potentially being used for RMB-invoiced trade with foreign countries. In addition, Chinese tourists using the digital RMB may well motivate vendors in other countries to accept the digital currency as a mode of payment.[27] This could encourage the use and circulation of the digital yuan abroad, but the impact is expected to be limited. Chinese sovereign lending is already on the decline after many of its borrowers ran into financial problems.[28] Less prospects of future lending reduces Beijing’s leverage over other countries to dictate what currencies they use.[29] In fact, China does not appear to have been successful in boosting the RMB even in the past, since the majority of BRI loans have been denominated in USD, not in RMB.

4.6 China has been introducing technology that allows its CBDC to be used in cross-border payments. It has built a robust ecosystem of digital payment technology to support the e-CNY usage but there is still a long way to go before it will be accepted eventually by other countries. While China has made substantial progress over the past several years in developing a digital currency, it still faces many significant challenges that prevent the widespread use of the e-CNY. For instance, digital yuan wallets were reportedly used almost exclusively among Chinese visitors while foreign visitors used either Visa or physical cash during the 2022 Olympics.[30] This

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26 Gopinath, Gita and Jeremy Stein, “Banking, Trade, and the Making of a Dominant Currency”, *The Quarterly Journal of Economics*, Volume 136, Issue 2, May 2021, pp. 783– 830.

27 The e-CNY is starting to extend its reach beyond mainland China. The Hong Kong Monetary Authority will be working with the PBOC to test the usage of e-CNY for the purpose of cross-border retail and tourism spending.

28 Acker, Kevin and Deborah Brautigam. 2021. “Twenty Years of data on China’s Africa lending”, SAIS CARI Briefing Paper Number 4. http://www.sais-cari.org/, accessed 10 June 2022.

29 Refer to source in Footnote 6.

30 CSIS, “China’s Progress Towards a Central Bank Digital Currency”, 19 April 2022. https://www.csis.org/blogs/new-perspectives-asia/chinas-progress-towards-central-bank-digital-currency, accessed 10 June 2022.

suggests that while Chinese consumers could and would use the digital yuan if no alternative existed, its failure to find a footing among foreign consumers seems to reflect the relative lack of use of the digital yuan outside of China.[31]

4.7 For the short and medium term, China may find it even more challenging to internationalise the e-CNY than the physical form of the RMB. Internationalising the physical RMB has proven challenging to date, given that there is less liquidity to trade the yuan compared to the USD, which enjoys a more liquid market that makes hedging the US dollar cheaper and less risky. The fact that many BRI loans are in USD attests to the fact that it is cheaper, less risky and more convenient for both the Chinese lender and the overseas borrower to use USD instead of the RMB. To internationalise the e-CNY, there would have to be sufficient liquidity in the market and available hedging instruments to facilitate the trading of the digital currency; however, there is currently no network of parties to accept or trade the e-CNY, nor is there a mechanism to trade the e-CNY with other digital non-USD currencies.

4.8 In February 2021, China announced that it will be participating in a central bank digital currency project for cross-border payments – the Multiple Central Bank Digital Currency (m-CBDC) Bridge, together with Hong Kong, Thailand and the United Arab Emirates. This project explores the cross-border use of CBDC in payments and facilitate the settlement of both international trade and capital market transactions. According to the BIS, multi-CBDC (m-CBDC) arrangements, which join up CBDCs across borders and feature a jointly operated payment system hosting multiple CBDCs, offer the greatest potential for improving cross-border payments. If the m-CBDC network is developed, or China helps other nations to develop their own CBDCs to be interoperable with the e-CNY, this may help expedite efforts to internationalise the RMB and spur the increasing adoption of the Cross-Border Interbank Payment System (CIPS) as an international payment system. China's CIPS[32] allow yuan-denominated transactions to bypass the

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31 Ibid.

32 Currently, most cross-border transactions' processing takes place through the dollar-dominated SWIFT system. The PRC established its own alternative system, the CIPS, in 2015. Built to increase RMB convertibility across the globe, the CIPS has a presence in all major countries, including the United States, Singapore, Britain, France, Germany, South Korea, Russia and Japan. Currently, 31 institutions directly

Western-dominated SWIFT system for international payments, hence reducing China's reliance on SWIFT.

4.9 The digital yuan's success depends heavily on the ability and the willingness of the rest of the world to embrace digital currencies as a payment instrument. It would not be easy to promote e-CNY use among foreigners, since that would mean operating as a payment provider in foreign jurisdictions, requiring licences and compliance with a host of myriad local rules.[33] Since the e-CNY enables surveillance by the Chinese authorities, foreign regulators are likely to resist letting their country's populace adopt the e-CNY even if the digital currency is cheaper and more efficient.

4.10 The increased control that the PBOC would have over the e-CNY may inevitably disincentivise the international use of the digital yuan rather than encourage it. For instance, if the PBOC has the capacity to issue expirable e-CNY and block/revert transactions, foreign parties will need sufficient assurance that the e-CNY which they receive would be a stable store of value and means of exchange.[34]

4.11 In addition, some developing countries with not so developed financial systems could face the threat of currency substitution from the cross-border payment convenience of China's CBDCs. Citizens in countries with high inflation and volatile exchange rates could substitute their domestic currency for China's CBDC; when this happens, monetary policy independence would be undermined, hence reducing the foreign central bank's control over domestic liquidity by reducing the proportion of money in circulation that it has direct influence over.[35]

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participate in CIPS and over 847 institutions participate indirectly. In addition to trade payments, CIPS supports instant settlement for cross-border financial transactions. China launched the CIPS clearing and settlement services system in 2015, and within four years, CIPS reported processed transactions worth RMB135.7 billion ($19.4 billion) per day, with 96 countries and regions participating. Notably, it took CIPS just four years to establish its wide network. These offshore networks play a significant role in facilitating the use of RMB globally. Rajesh Bansal and Somya Singh, "China's Digital Yuan: An Alternative to the Dollar-dominated Financial System", Carnegie Endowment for International Peace, 31 August 2021.

[33] Refer to source in Footnote 6.

[34] Refer to source in Footnote 16.

[35] According to the BIS, currency substitution also reduces the stability of money demand, which may weaken the monetary transmission mechanism (i.e. the mechanism through which policy-induced changes in monetary instruments such as short-term nominal interest rates affect macroeconomic variables). Currency substitution can also undermine the ability of the domestic central bank to carry out the lender of last resort function. The reason is that if domestic banks have large liabilities in non-domestic currency, which might

4.12 Countries that have not liberalised their financial accounts to cross-border capital flows may have no choice but to restrict the use of foreign CBDCs if they are not ready for the level of capital flow liberalisation that the unrestricted use of foreign CBDCs would imply.[36] For China, shifts in foreign demand for its CBDC could mean large movements in capital flow. In the event of an overheated domestic economy caused by the large inflow of foreign money converted to RMB via DC/EP, the PBOC may raise interest rates to address inflationary concerns. The volatility of capital flows poses a key challenge for China, given that its financial system is not fully developed yet.

4.13 The digital currency is expected to promote the settlement of cross-border payment, trade or investment in a faster, safer and lower-cost manner, thus improving transaction efficiency. However, it remains uncertain how the e-CNY would function in a complicated cross-border payment market that deals with multiple currencies, jurisdictions, regulations and financial infrastructures. The benefits of the CBDC for use domestically and across borders remain largely theoretical but the risks are real and possibly detrimental. BIS Managing Director Agustin Carstens does not believe that the CBCDs are a game changer nor will it create a first mover advantage for reserve currency competition or geopolitics since digital money *per se* is not new and much of the rhetoric appears to be overhype.[37]

How Might the Digital Yuan Evolve?

5.1 The PBOC has explained that it is issuing and circulating digital currency for several purposes – to keep up with the pace of the rapidly digitalising economy, optimise RMB's payment function, improve efficiency and reduce cost, and maintain and enhance RMB's status as a fiat currency.[38]

occur as the result of extensive currency substitution, the central bank will not be able to create foreign currency in order to provide liquidity assistance and must instead rely on currency reserves or liquidity provision from foreign central banks. See International Monetary Fund, "Digital Money Across Borders: Macro-Financial Implications", October 2020.

[36] IMF, 'Digital Money Across Borders: Macro-Financial Implications', October 2020.

[37] Carstens, Agustin. 2021b. "Central bank digital currencies: putting a big idea into practice." Remarks at the Peterson Institute for International Economics. 31 March 2021. https://www.bis.org/speeches/ sp210331.pdf.

[38] Refer to source in Footnote 1.

5.2 By far, the greatest impact that the e-CNY will have is with the prevention and prosecution of financial crimes, such as money laundering, tax evasion and the purchasing of illicit goods and services, due to the digital currency's tracing capabilities. By contrast, the e-CNY will have little to no impact on financial and monetary policy or RMB internationalisation. However, the development of multi-CBDCs, which join up national digital currencies in common interoperable platforms, could further internationalise the RMB with cheaper and safer cross-border payments and settlements, though this is still at an early experimentation stage.

5.3 To allow the m-CBDC to work, some key challenges await: for instance, how to simplify cross-border payments flow while respecting regulatory differences across jurisdictions is one issue. Payments regulations are different in each country and participants are subject to different regulatory frameworks. Further, there are other key questions that need to be resolved if the m-CBDC were to be feasible, such as whether non-resident banks (i.e. banks which do not have a local presence and are not authorised to operate or provide domestic financial services) can be trusted to access and make payments with CBDCs when they do not have a presence in the jurisdictions.[39] Building effective cross-border payment systems requires collective action by governments on standards, underlying technologies and regulations.

5.4 The construction of the digital fiat currency has not crystalised yet in most economies. The eventual global adoption of CBDCs is likely to proceed at different speeds in different jurisdictions, which calls for interoperability with payment arrangements. So far, the PBOC has been cautious and prudent in designing the e-CNY with a view to maintaining currency sovereignty and financial stability.[40] The

[39] Multi-CBDC platform would be designed so that participating banks can transact directly with each other using different CBDCs without the need to hold foreign currency accounts with correspondent banks. Instead, CBDCs can be transferred directly from the sender to the recipient bank. Refer to Bank for International Settlements, "Central bank digital currencies for cross-border payments", Report to the G20, July 2021.

[40] Aside from payment efficiency (i.e. no cost of holding digital currency), another benefit of a CBDC is information efficiency. When households make a run on the financial system by withdrawing cash, the central bank only becomes aware of this with a lag. In the case of a CBDC, the story is different because transfers are digital and (should be) immediate. When households make a run on the financial system, they transfer their commercial bank deposits into a CBDC. Then the central bank can learn the origin of the funds that are being transferred. With such real-time data, the central bank can react quickly and take measures to

design of digital yuan to replace only cash in circulation implies that the magnitude and role of the digital RMB in the financial system will be quite limited.

5.5 However, within internal financial circles in China, the PBOC might hold greater ambition for the future use of the digital RMB. Former officials at the PBOC[41] and financial experts have raised questions about the design of the digital yuan to replace only cash in circulation and the expectation that the digital RMB will impact the whole financial system in the foreseeable future.[42] In future, the e-CNY may even be used to replace short- and long-term deposits in banks, and in issuing loans and buying bonds. The central bank could issue digital yuan to the market via asset purchasing to achieve monetary policy goals. How China's CBDC will evolve in future is dependent on the domestic priorities of the Chinese authorities and how the financial landscape changes.

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stop the outflow of funds, either by proclaiming a bank holiday or by lending funds to the institutions undergoing a run.

41 "The full text of Yao Qian's latest speech: Digital currency will definitely move towards smart currency. The two-tier architecture does not need to exclude Ethereum, etc" [In Chinese.] Sina.com.cn, 31 May 2021. https://finance.sina.com. cn/blockchain/2021-05-31/doc-ikmxzfmm5683886.shtml, accessed 27 April 2022.

42 Alex He, "Digital RMB: A Possible Way to Reassert Data Control in the Digital Economy", Centre for International Governance Innovation, Policy Brief No. 169, November 2021.