

China's digital yuan: Motivations of the Chinese government and potential global effects

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Abstract:

This article highlights the key motivations behind China's plan to launch the digital yuan and reviews the potential impacts on China and abroad. The article analyzes the digital yuan's benefits to consumers, such as a reliable low-risk, low cost, and high-efficiency payment solution and the potential to promote financial inclusion. It compares the digital yuan with its most prominent competitors. Also discussed is how the digital yuan is expected to provide the Chinese Communist Party with a new powerful tool to monitor and control its economy and people. The article provides a critical evaluation of the potential of the digital yuan's internationalization. This article also provides a perspective on the digital yuan to set global standards for the development of national digital currencies.

Keywords: China | digital yuan | Digital Currency Electronic Payment (DCEP)

Article:

Introduction

Central banks worldwide have been actively exploring the possibility of replacing their fiat currencies with central bank digital currencies (CBDCs).¹ A survey carried out among more than 60 central banks by the international financial institution owned by central banks, Bank for International Settlements (BIS) in late 2020 about their engagement in digital versions of fiat currency work found that 86% were exploring CBDCs.² Major world economies such as Brazil, China, Eurozone, Japan, Russia, the U.K., and the U.S. are undergoing various phases of research exploration and trial of CBDCs.

¹ N. Kshetri, 'The Economics of Central Bank Digital Currency', *IEEE Computer* 54(6), (2021), 53–58.

Nir Kshetri, 'The Economics of Central Bank Digital Currency' (2021) 54 *IEEE Computer* 53

² C. Boar, and A. Wehrli., 'BIS Papers No. 114 Ready, steady, go?—Results of the third BIS survey on central bank digital currency' *Bank for International Settlements*; (2021) <https://www.bis.org/publ/bppdf/bispap114.pdf>

Codruta Boar and Andreas Wehrli, 'BIS Papers No. 114 Ready, steady, go?- Results of the third BIS survey on central bank digital currency' (*Bank for International Settlements*, January 2021) <https://www.bis.org/publ/bppdf/bispap114.pdf> accessed day Month year

Among major world economies, China's digital yuan (e-CNY), which is also commonly referred to by its original project name, Digital Currency Electronic Payment (DCEP)³ is in the most advanced stage of development. As of January 2022, e-CNY was available for use only in designated cities that included Shenzhen, Suzhou, Xiongan, Chengdu, Shanghai, Hainan, Changsha, Xian, Qingdao, Dalian, and Beijing.⁴ Goldman Sachs has predicted that by 2029, DCEP will reach 1 billion users, who will make US\$2.7 trillion in annual total payment value (TPV) using digital currency.⁵

In the past digital yuan trials, consumers needed to register in advance and win a lottery to open and use e-CNY wallets. As of March 2021, anyone could open an e-CNY wallet without invitation at six major state-owned banks in major cities including Shanghai, Beijing, Shenzhen, and Chongqing.⁶ As of May 2021, China's second-biggest e-commerce company JD.com was paying some of its employees' salaries in digital yuan.⁷

On 4 January 2022, the e-CNY wallet became available for download on Chinese Android and Apple application (app) stores. Before the e-CNY wallet was available in these app stores, users needed to install the wallet through private channels that were provided by banks participating in the DCEP trials. In its first week of launch, the e-CNY wallet was the most downloaded app in China.⁸

The People's Bank of China (PBoC) deputy governor Fan Yifei emphasized the importance of digitalizing fiat currencies noting their various drawbacks such as high costs to produce and store, lack of ease of use, susceptibility to counterfeiting and the possibility of being used for illicit purposes.⁹ CBDCs are also more traceable than fiat currencies and other payment systems for the government. In China, the digital yuan is expected to provide commercial banks with rich transaction data to profile a larger number of consumers and analyze their online behavior. They can thus experiment with different ways to monetize the data.¹⁰ A PBoC official noted that the DCEP's 'controllable anonymity' can help enforce anti-money laundering, anti-terrorism

³ Yolanda Huang, 'China's DCEP project launches biggest digital yuan test yet' (*Forkast*, March 2021). <https://forkast.news/china-dcep-digital-yuan-pros-cons/>

⁴ Coco Feng, '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*, January 2022) <https://www.scmp.com/tech/tech-trends/article/3163953/chinas-digital-currency-e-cny-wallet-nearly-doubles-user-base-two>

⁵ Benjamin Godfrey, 'Goldman Sachs Projects China's DCEP to Hit 1B Users by 2029' (*Coinspeaker*, November 2020) <https://www.coinspeaker.com/goldman-sachs-dcep-1b-users/>

⁶ Forkast.News, 'China opens digital currency door to all. NFTs go wild. Is Singapore's Temasek buying virgin Bitcoin?' (*Forkast*, March 2021) <https://forkast.news/china-digital-currency-nft-craze-singapores-temasek-bitcoin/>

⁷ Jamie Redman, 'Digital Yuan Launch Draws Near: JD.com Employees Paid in e-CNY, Tencent, Ant, Mastercard Engage with PBoC,' (*Bitcoin.com*, May 2021) <https://news.bitcoin.com/digital-yuan-launch-draws-near-jd-com-employees-paid-in-e-cny-tencent-ant-mastercard-engage-with-pboc/>

⁸ Coco Feng and Che Pan, 'China's digital yuan: e-CNY wallet tops download charts in Apple and Xiaomi app stores ahead of Lunar New Year' (*South China Morning Post*, January 2022) <https://www.scmp.com/tech/big-tech/article/3162847/chinas-digital-yuan-e-cny-wallet-tops-download-charts-apple-and>

⁹ Fan Yifei, 'Thoughts on CBDC Operations in China' (*Yicai Global*, April 2020) <https://www.yicai.com/news/thoughts-on-cbdc-operations-in-china>

¹⁰ Lachlann Tierney, 'China and the Future of Money—Central Bank Digital Currency (CBDC)' (*Money Morning Australia*, February 2021) <https://www.moneymorning.com.au/20210216/future-of-money-central-bank-digital-currency-cbdc.html>

financing and anti-tax evasion requirements.¹¹ In China's case, a concern, however, is that the definition of a terrorist also 'includes the [Chinese Communist Party's] CCP's political opponents'.¹²

In light of the above, the objectives of this article are to: (a) highlight the key motivations behind China's plan to launch the digital yuan, and (b) review the social, economic, and political impacts of the digital yuan on China and abroad.

The article is structured as follows. It proceeds by first providing the digital yuan's historical background, overview and current perspective. Next, the Chinese government's motivations for launching the digital yuan are discussed. Then the article looks at the digital yuan's effects on the Chinese economy. Digital yuan's potential internationalization is discussed next. It is followed by a section on discussion and implications. The final section provides concluding comments.

The Digital Yuan: historical Background, Overview and Current Perspective

The DECP's origin can be traced back to the establishment of the Digital Currency Research Institute in 2014 (Table 1). As of 2019, the PBoC had filed more than 50 patents related to digital currency.¹³

The PBoC's digital currency-related activities accelerated from 2019. The urgency was arguably driven by Facebook's announcement in June 2019 of digital currency Libra, which was later renamed as Diem.¹⁴ In mid-2020, the Digital Currency Research Institute's head Mu Changchun argued that the e-CNY would prevent Facebook's Libra from intruding China's monetary system.¹⁵ Mu Changchun's statement may be interpreted as a confirmation of perceived threat from Libra that helped accelerate the development of the digital yuan.

China's 14th five-year plan (2021–2025) contains a chapter on digital transformation with blockchain and digital currency as the key focus areas. This is the first time that the five-year plan document included blockchain and digital currency. About 60 blockchain-based governmental affairs applications were launched in 2020, which include judicial, administrative-approval and electronic-license services. It also discusses the development of the digital yuan.¹⁶

¹¹ Ibid.

¹² John Dobson, 'China aims to turn digital yuan into a truly global currency to rival US dollar' (*Sunday Guardian Live*, March 2021) <https://www.sundayguardianlive.com/news/china-aims-turn-digital-yuan-truly-global-currency-rival-us-dollar>

¹³ Brenda Goh, and Samuel Shen, 'China's proposed digital currency more about policing than progress' (*Reuters*, November 2019) <https://www.reuters.com/article/us-china-markets-digital-currency/chinas-proposed-digital-currency-more-about-policing-than-progress-idUSKBN1XB3QP>

¹⁴ Ye Ruolin, 'China's Government-Backed Digital Currency, Explained' (*Sixth Tone*, May 2020) <https://www.sixthtone.com/news/1005716/chinas-government-backed-digital-currency%2C-explained>

¹⁵ James Kyngé, and Sun Yu, 'Virtual control: the agenda behind China's new digital currency'. *Financial Times*; (2021) <https://www.ft.com/content/7511809e-827e-4526-81ad-ae83f405f623>

¹⁶ Kelly Le, 'China writes blockchain and digital currency into nation's future' (*Forkast*; March 2021) <https://forkast.news/china-blockchain-digital-currency-five-year-plan/>

Table 1. DCEP key milestones

Time	Event
2014	The PBoC established a Digital Currency Research Institute. ¹⁷
2016	The PBoC completed a trial of a digital currency prototype system. ¹⁸
August 2019	The PBoC announced plans to accelerate the development of its digital currency. ¹⁹
June 2020	A former senior official of the PBoC noted that the DCEP's backend architecture development had been completed. ²⁰
October 2020	The PBoC published a draft law to provide legal status to DCEP. Digital yuan was included and defined as part of the country's sovereign fiat currency.
March 2021	Anyone could open an e-CNY without invitation at major state-owned banks.
July 8, 2021	10 million users were in white lists, who were eligible to participate digital yuan trial. ²¹
Mid-September 2021	Digital yuan mobile app was accessible to about 10% of the country's population. ²²

The DCEP does not utilize blockchain as its underlying technology. Instead, it uses a 'Binary Operating System'. Note that a Binary Operating System interface standard defines a common configuration in order to enable the movement of executable (ready-to-run) binaries²³ between computer systems.²⁴ The PBoC serves as the DCEP's issuance database. Digital wallet operators provide DCEP's circulation services.²⁵

The DCEP is described as a dynamic two-tier program. As the first-tier actor, the PBoC, which is China's central bank responsible for carrying out monetary policy and regulation of financial institutions, builds stable financial infrastructure and supervises the program. The second-tier players include commercial banks, telecom operators and third-party payment platforms.²⁶ The PBoC has announced that the two-tier system will be used to distribute DCEP: 1) between the PBoC and commercial banks, and 2) between commercial banks and

¹⁷ Eden Dhaliwal, 'How China is embracing blockchain, from DCEP to BSN' (*Forkast*, October 2020) <https://forkast.news/China-blockchain-landscape-ever-evolving-outlook-crypto-defi/>

¹⁸ Andrew Fei, 'RMB as a digital currency? China successfully completes its blockchain-based digital currency trial' (*Lexology*, February 2017) <http://www.lexology.com/library/detail.aspx?g=6b306683-2442-4d98-9517-d04da7f812a9>

¹⁹ Ye Ruolin, 'China's Government-Backed Digital Currency, Explained' (*Sixth Tone*, May 2020) <https://www.sixthtone.com/news/1005716/chinas-government-backed-digital-currency%2C-explained>

²⁰ Frank Tang, 'China moves to legalise digital yuan and ban competitors with new draft law' (*South China Morning Post*, October 2020) <https://www.scmp.com/economy/China-economy/article/3107119/China-moves-legalise-digital-yuan-and-ban-competitors-new>

²¹ Bloomberg News, 'China's Digital Yuan Trial Expands to 10 Million Eligible Users' (*Bloomberg*, July 2021), <https://www.bloomberg.com/news/articles/2021-07-08/China-s-digital-yuan-trial-expands-to-10-million-eligible-users>

²² Tim Fries, 'China's Digital Yuan App has Now Been Used by 139 Million People' (*The Tokenist*, September 2021) <https://tokenist.com/chinas-digital-yuan-app-has-now-been-used-by-139-million-people/>

²³ TechTarget Contributor, 'binary file' (*WhatIs.com*, April 2005) [https://whatis.techtarget.com/definition/binary-file#:~:text=A%20binary%20file%20is%20a,exactly%20how%20it%20is%20formatted.&text=In%20general%2C%20executable%20\(ready%2D,bin%22.\)](https://whatis.techtarget.com/definition/binary-file#:~:text=A%20binary%20file%20is%20a,exactly%20how%20it%20is%20formatted.&text=In%20general%2C%20executable%20(ready%2D,bin%22.))

²⁴ Alice Anderson, Michael Cruess, and Edward Wiencek, 'The binary compatibility standard' (1989) 1 COMPCON 32 <https://www.computer.org/csdl/proceedings-article/cmpcon/1989/00301899/12OmNyQGS71>

²⁵ Shuyao Kong, 'Can China's DCEP Challenge Bitcoin?' (*Decrypt*, November 2020) <https://decrypt.co/49517/can-chinas-dcep-challenge-bitcoin>

²⁶ Zhou Xiaochuan, 'Zhou Xiaochuan: China's choices for a digital currency system' (*Nikkei Asia*, February 2021) <https://asia.nikkei.com/Spotlight/Caixin/Zhou-Xiaochuan-China-s-choices-for-a-digital-currency-system>

consumers/businesses.²⁷ The PBoC has stated that it will not directly issue DCEP to consumers and thus will not compete with commercial banks' existing business models.

Several trials of the digital yuan in China have demonstrated its benefits and proven the feasibility and utility (Table 2). As of November 2020, more than 2 billion yuan (US\$309.30 million) was spent using DCEP in 4 million transactions.²⁸ Over time the trials expanded from brick-and-mortar shops to include online shopping and car-hailing and involved technologies such as hardware wallets and ATM machines.

Table 2. Trials of China's digital yuan

City	Trial date and amount spent	Key features
Shenzhen	October 2020: 10 million yuan (about US\$1.5 million) to 50,000 people January 2021: 20 million yuan (about US\$3 million) to 50,000 people February 2021: 20 million yuan (about US\$3 million) ²⁹	Could be spent in designated offline merchants.
Suzhou	December 2020: 20 million yuan (US\$3 million) February 2021: 30 million yuan (US\$5 million) in 150,000 red envelopes each worth 200 yuan (US\$31). ³⁰	Could be spent online and selected offline merchants. It also explored mechanisms to complete transactions by touching two devices via NFC.
Beijing	10 million yuan (US\$1.5 million) to 50,000 residents	Could be spent in offline and online merchants. ³¹ Digital yuan convertible to cash via ATMs. Also involved hardware wallets (including a software wallet) and fingerprint verification. ³²
Chengdu	March 2021: 40 million yuan (US\$6 million)	Could be spent with offline and online merchants. ³³

By the end of 2021, the e-CNY smartphone app had 261 million unique downloads.³⁴ When it comes to the use of the digital currency, however, e-CNY is reported to have lower acceptance rates than expected among businesses and consumers. For instance, during July-October 2021, while the number of individual e-CNY wallets increased by about 700% to reach 140 million, cumulative transaction value grew only by 80% during that period. However, e-CNY userbase is much smaller than China's widely-used mobile payment methods such as Alipay and Tencent Pay. For instance, the U.S.-based pay television business news channel CNBC's calculations suggested that digital yuan transactions totaled US\$8.3 billion in the second half of 2021, which is a tiny fraction of Ant Group's Alipay's payment volume, which averaged US\$1.56 trillion per

²⁷ Elizabeth Chen, 'China Moves Ahead on Digital Yuan Before 2022 Winter Olympics' (*The Jamestown Foundation*, February 2021) <https://jamestown.org/program/china-moves-ahead-on-digital-yuan-before-2022-winter-olympics>

²⁸ Shaurya Malwa, 'China: Private banks to help with the rollout of booming digital yuan' (*Cryptoslate*, February 2021) <https://cryptoslate.com/china-private-banks-to-help-with-the-rollout-of-booming-digital-yuan/>

²⁹ Yolanda Huang, 'China's DCEP project launches biggest digital yuan test yet' (*Forkast*, March 2021) <https://forkast.news/China-dcep-digital-yuan-pros-cons/>

³⁰ Yogita Khatri, 'Chinese city Suzhou to give away around \$5 million in latest digital yuan test' (*The Block Crypto*, February 2021) <https://www.theblockcrypto.com/linked/93764/suzhou-give-away-5-million-digital-yuan-test>

³¹ Wolfie Zhao, 'With Beijing onboard, China has so far issued \$17 million in digital yuan tests' (*The Block Crypto*, February 2021) <https://www.theblockcrypto.com/linked/94144/beijing-digital-yuan-test-China-15manonymous-as-everyone-hoped/>

³² Wolfie Zhao, 'Beijing's new digital yuan test features ATMs that convert digital currency to cash' (*The Block Crypto*, February 2021) <https://www.theblockcrypto.com/post/95266/beijing-digital-yuan-cash-atm>

³³ Yolanda Huang, 'China's DCEP project launches biggest digital yuan test yet' (*Forkast*, March 2021) <https://forkast.news/China-dcep-digital-yuan-pros-cons/>

³⁴ C. Feng, 'China's digital.'

month in 2020. As of October 2021, about 10 million businesses had e-CNY wallets, which is much smaller than Alipay's userbase of more than 80 million in June 2020.³⁵ The slower growth of e-CNY transaction value relative to growth in the number of users downloading the app can be arguably attributed to the difficulties in changing the current payment habits.³⁶

However, e-CNY is getting a big boost from the Chinese government and some major private sector players. The government has taken some policy measures in order to increase the adoption rate of e-CNY. For instance, e-CNY has been designated as a preferred payment option for public utilities such as water and electricity and medical bills.³⁷ Likewise, in January 2022, China's largest messaging app and one of the biggest payment services, WeChat, announced that it would start supporting e-CNY. WeChat Pay had more than 800 million monthly active users then. WeChat Pay users can show a barcode on their phone to pay for items in stores. The solution can also be used to pay for online purchases.³⁸

A Comparison with Bitcoin

Bitcoin is one of the most prominent competitors of the DCEP in developing economies, such as those in Africa.³⁹ Table 3 compares DCEP and bitcoin. Privacy refers to the use and governance of personal data. It is concerned with individuals' rights to control their personal information and how such information is used.⁴⁰ Bitcoin users have control over their personal information. In DCEP's case, the PBoC can see every transaction, and destroy it if it likes.⁴¹

In an exchange relationship, confidentiality involves ensuring that personal information is not disclosed to third parties.⁴² While bitcoin transactions are difficult to track, they are not completely anonymous. All transactions are recorded in a permanent public ledger. After the bitcoins are transferred from that address, financial movements can be traced. Users can also be traced through IP addresses and money flows. A study of 130 major merchants that allowed bitcoin transactions found that at least 53 of the merchants had leaked payment information to at least 40 third parties. Most of the information leaked was intentional, which was used for advertising and analytics. However, some merchant websites also leaked precise blockchain

³⁵ Evelyn Cheng 'China's digital yuan notches \$8.3 billion in transactions in 6 months, taking a tiny share of payments' (CNBC, January 2022) <https://www.cnbc.com/2022/01/18/chinas-digital-yuan-notches-8point3-billion-transactions-in-half-a-year.html>

³⁶ Reuters Staff, 'China's digital yuan wallets swell but usage lags' (Reuters, January 2022) <https://www.reuters.com/article/china-yuan-digital-idCNL4N2TX1HD>

³⁷ Ibid.

³⁸ Arjun Kharpal, 'China's digital currency comes to its biggest messaging app WeChat, which has over a billion users' (CNBC, January 2022) <https://www.cnbc.com/2022/01/06/chinas-digital-currency-comes-to-tencents-wechat-in-expansion-push.html>

³⁹ Michael Kimani, 'China Leads Africa's Digital Currency Race' (Coindesk, February 2021) <https://www.coindesk.com/china-leads-africas-digital-currency-race>

⁴⁰ Karen D. Schwartz, 'Data privacy and data security: What's the difference?' (ITPro Today, May 2019) <https://www.itprotoday.com/security/data-privacy-and-data-security-what-s-difference>

⁴¹ Andrew Work, 'China's DCEP will be the world's Sputnik money moment' (Forkast, August 2020) <https://forkast.news/china-cbdc-digital-currency-e-rmb-launch-preview-andrew-work/>

⁴² Karen D. Schwartz, 'Data privacy and data security: What's the difference?' (ITPro Today, May 2019) <https://www.itprotoday.com/security/data-privacy-and-data-security-what-s-difference>

transaction information to trackers.⁴³ Note that blockchain is a decentralized ledger that maintains digital records of a transaction simultaneously on multiple computers. In general, Bitcoin blockchain ledgers are searchable, which can be used to track transactions. If a leak involves the amount and time of the purchase, a motivated adversary can convert the purchase amount into bitcoins using the exchange rate at that time. Then, a blockchain can be searched for the specific transaction. In this way, a user's bitcoin address can be identified. Any other transactions associated with the address can then be traced.⁴⁴

Table 3. Key differences between the DCEP and bitcoin

	DCEP	Bitcoin
Governance mechanism	Centralized and state-run	Decentralized
Privacy	Personal data can be accessed by the government	Users have control over their personal information
Security	Asymmetric cryptography makes highly secure	Employs complex cryptography to enhance security
Confidentiality	Described as 'controllable anonymity'. Consumer data could be shared with third parties	Blockchain ledgers are searchable and, hence, can be used to track transactions
Ability to control illegal activities	High	Low/difficult
Nature of the asset: inherent value	Stablecoin with inherent value and backed by sovereign entity: pegged on a 1:1 basis with the yuan	No inherent value or any credit guarantee: based on an algorithm
Speed to process transactions	Extremely fast	Very slow

Advances in computer science, economics, and forensics are being used to help law enforcement track illegal activities that employ bitcoin and other cryptocurrencies. Note that cryptocurrencies functions like money. This means that they define value, serve as a value transfer and they can be used for making and receiving payments. Such currencies are on the blockchain and encrypted using cryptography.⁴⁵ Blockchain intelligence company Elliptic uses artificial intelligence (AI) to scan and analyze the Bitcoin network to identify suspicious transactions. It can trace transactions to individuals and groups. Elliptic's services are used by online exchanges and law enforcement agencies to detect money laundering and other crimes.⁴⁶

The DCEP differs from bitcoin in the above aspect. The Chinese government has stated that transaction records would be encrypted and unauthorized parties cannot access them. However, the DCEP is not fully anonymous. A PBoC official noted that the DCEP's 'controllable anonymity' rather than full anonymity is based on international consensus on this framework to satisfy anti-money laundering, anti-terrorism financing and anti-tax evasion

⁴³ *Technology Review*, 'Bitcoin transactions aren't as anonymous as everyone hoped' (*Technology Review*, August 2017) <https://www.technologyreview.com/s/608716/bitcoin-transactions-arent-as-anonymous-as-everyone-hoped/>

⁴⁴ Ibid

⁴⁵ Nir Kshetri 'Blockchain and sustainable supply chain management in developing countries', Volume 60, October, 102,376, *International Journal of Information Management*, <https://www.sciencedirect.com/science/article/abs/pii/S0268401221000694>

⁴⁶ Nir Kshetri 'Blockchain and sustainable supply chain management in developing countries', Volume 60, October, 102,376, *International Journal of Information Management*, <https://www.sciencedirect.com/science/article/abs/pii/S0268401221000694>

requirements.⁴⁷ There is also a possibility that consumer data are shared with third parties. A 2020 report on CBDC published by the central banks of the U.S., Europe, England, Japan, Switzerland, Canada and Sweden, and the Bank for International Settlements discussed the possibility of allowing service providers access to consumer data and charging them a fee would be a way to cover the cost of a CBDC system.⁴⁸

Security is related to how information is protected.⁴⁹ It includes technical safeguards used to ensure confidentiality, integrity, and availability of data.⁵⁰ Compared to fiat currency, digital currencies are difficult to counterfeit.⁵¹ CBDCs that are supported with blockchain employ complex cryptography in order to prevent double spending. This is the digital equivalent of measures taken to prevent from making an identical copy of a banknote. Blockchains used for CBDCs are likely to be permissioned, which restricts the access to authorized users, providing another layer of defense.⁵² While the DCEP does not necessarily use blockchain, it employs asymmetric cryptography, which makes DCEP highly secure.⁵³ Nonetheless, when users' financial information is centralized, it can be potentially misused by the government or even targeted by criminals.⁵⁴

The Chinese Government's Motivations for Launching Digital Yuan

The CCP hopes to achieve many political and economic goals through the DCEP. First, governments are likely to use CBDCs as a tool to combat economic crimes. At a Bank for International Settlements seminar, the director-general of the PBoC's digital currency institute Mu Changchun proposed global rules which emphasized the importance of synchronizing the flows of information and funds so that regulators can monitor the compliance of transactions.⁵⁵ By tracking and recording the details of all transactions, the government can prevent and control illegal transactions. China has introduced strict restrictions to limit the outflow of capital. Some examples of controls include limits on the amount that can be transferred to overseas accounts and scrutiny of Chinese companies to acquire assets in foreign countries. These measures have been combined with high technology tools. For instance, to

⁴⁷ Wolfie Zhao, 'PBoC official says 'completely anonymous CBDC is not an option'' (*The Block*, March 2021) <https://www.theblockcrypto.com/linked/98925/pboc-anonymous-cbdc-not-option>

⁴⁸ The Bank for International Settlements i 'Central bank digital currencies: foundational principles and core features' (*BIS*, October 2020) <https://www.bis.org/publ/othp33.pdf>

⁴⁹ Steve Symanovich, 'Privacy vs. security: What's the difference?' (*NortonLifeLock*, January 2020) <https://us.norton.com/internetsecurity-privacy-privacy-vs-security-whats-the-difference.html>

⁵⁰ Karen D. Schwartz, 'Data privacy and data security: What's the difference?' (*ITPro Today*, May 2019) <https://www.itprotoday.com/security/data-privacy-and-data-security-what-s-difference>

⁵¹ Martha Wang, 'China's Digital Currency and What This Could Mean For Foreign Companies and Financial Institutions in China' (*JDSUPRA*, February 2021) <https://www.jdsupra.com/legalnews/china-s-digital-currency-and-what-this-7987963/>

⁵² Chen Ye and Kevin C. Desouza, 'The current landscape of central bank digital currencies' (*Brookings*, 2019) <https://www.brookings.edu/blog/techtank/2019/12/13/the-current-landscape-of-central-bank-digital-currencies/>

⁵³ OKEEx, 'Is DCEP Crypto? Industry Experts Discuss China' (*OKEEx*, April 2020) <https://medium.com/okex-blog/is-dcep-crypto-industry-experts-discuss-china-a916352c1750>

⁵⁴ António Madeira, 'Much Anticipated Central Bank Digital Currencies Raise Privacy Concerns' (*CoinTelegraph*, July 2020) <https://cointelegraph.com/news/much-anticipated-central-bank-digital-currencies-raise-privacy-concerns>

⁵⁵ Tom Wilson and Marc Jones, 'China proposes global rules for central bank digital currencies' (*Reuters*, March 2021) <https://www.reuters.com/article/cenbanks-digital-china-rules-idINKBN2BH2CJ>

monitor transactions places frequently visited by mainland Chinese, such as Macau, are reported to install facial recognition software in ATMs.⁵⁶ In order to withdraw money from Macau ATMs, Chinese nationals are required to look into a camera for six seconds so that facial-recognition software can verify their identity. As of mid-2017, China UnionPay Co.'s network had started using the software, with a plan to have installed it in all the city's 1,200 ATMs.⁵⁷ It was reported in 2017 that the PBoC was considering introducing a similar system in Hong Kong. Despite these measures, following the 2015 Chinese yuan depreciation, China lost about US\$1 trillion in reserves since the existing capital control mechanisms were not effective.⁵⁸ DCEP is likely to make it difficult to circumvent China's capital control regulations.

Second, a properly designed CBDC can be used by the government as a tool for social control, which is especially important for authoritarian regimes. The CCP has regarded its centralized banking system as a key instrument of its economic power. By putting every transaction on to the PBoC's radar, the DCEP can strengthen the surveillance state.⁵⁹ When the CCP's control is threatened, it has taken strong and decisive actions. A notable example of this is how China closed all companies in the peer-to-peer (P2P) lending sector.⁶⁰ The number of P2P lenders decreased rapidly from the peak of about 6,000 in 2015 to a few hundred in 2019 (Figure 1). By 2020, the industry was completely shut down. Likewise, Ant Group's initial public offering (IPO) planned for November 2020 was suspended. The CCP arguably viewed Ant Group as a destabilizing force to the Chinese economy, which can potentially reduce its ability to control the economy.⁶¹

China may also be able to achieve its global ambitions through the digital yuan. China hopes that subsequently the digital yuan will be made available in foreign countries. The English-language Chinese newspaper *Global Times*, which runs under the auspices of the CCP's flagship *People's Daily* newspaper, expects that DCEP will have 2 billion international users in the first phase mainly from Southeast Asia and countries participating in the Belt and Road Initiative (BRI), global development and industrial strategy adopted by the Chinese government in 2013.⁶² The BRI has promised over US\$1 trillion in infrastructure projects in over 60 countries accounting for two-thirds of the world's population.⁶³

⁵⁶ Maximilian Kärfelt, 'China's tight capital controls fail to address underlying problems' (*Financial Times*, 2017) <https://www.ft.com/content/1d288888-c613-11e7-b2bb-322b2cb39656>

⁵⁷ Bloomberg News, 'Macau's ATMs Are Using Facial Recognition to Help Follow the Money' (*Bloomberg*, November 2017) <https://www.bloomberg.com/news/articles/2017-06-28/macau-atms-need-face-time-before-payout-to-help-follow-the-money>

⁵⁸ Dirk Willer, 'Central Bank Digital Currencies: Challenges and Prospects' (*Valdai Club*, March 2021) <https://valdaiclub.com/a/highlights/central-bank-digital-currencies-challenges/>

⁵⁹ James Kyngé, and Sun Yu, 'Virtual control: the agenda behind China's new digital currency'. *Financial Times*; (2021) <https://www.ft.com/content/7511809e-827e-4526-81ad-ae83f405f623>

⁶⁰ *Ibid.*

⁶¹ David Pan, 'How Ant's Suspended IPO Is Related to China's Digital Yuan' (*CoinDesk*, November 2020) <https://www.coindesk.com/how-ants-suspended-ipo-is-related-to-chinas-digital-yuan>

⁶² *globaltimes.cn*, 'China may slash yuan/greenback usage gap with digital currency technology' (*Global Times*, December 2019) <https://www.globaltimes.cn/content/1172326.shtml>

⁶³ Andrew Chatzky and James McBride, 'China's Massive Belt and Road Initiative' (*Council on Foreign Relations*, January 2020) <https://www.cfr.org/backgrounder/chinas-massive-belt-and-road-initiative>

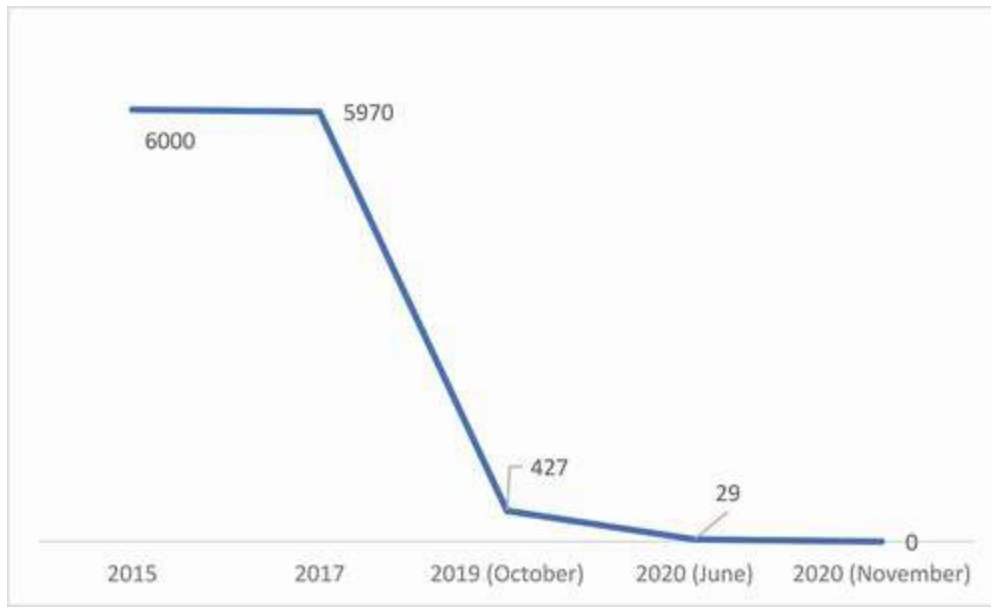


Figure 1. Number of P2P firms operating in China.
Data source: 2015 and 2019 (October),⁶⁴ 2017,⁶⁵ 2020 (June and November)⁶⁶

DCEP could work as a contingency plan for China if the U.S. prevents China from using the Society for Worldwide Interbank Financial Telecommunication (SWIFT) and the U.S. private clearinghouse for large-value transactions, Clearing House Interbank Payments System (CHIPS). The experiences of some countries indicate that financial sanctions have among the most negative consequences. For instance, the U.S. imposed sanctions on Iran's import of nuclear-related items (2006–2007). In 2012, the sanctions were expanded to restrict Iran's exports and then the country's access to global financial systems such as the SWIFT. It was reported that the Iranian public felt the impact of the 2012 SWIFT/banking sanctions more acutely and severely.⁶⁷ In light of a situation such as this, China established its own international payment system in 2012, which is known as the Cross-Border Interbank Payment System (CIPS) to offer clearing and settlement services in cross-border Yuan payments and trade. Among the goals of CIPS are to deal with trade conflicts with the U.S. and be ready with countermeasures and increase the preparedness in case of U.S. monetary sanctions. DCEP's combination with CIPS is expected to increase the speed of international payments. While transaction information is released to everyone, only the central bank can see transaction information in DCEP.⁶⁸

⁶⁴ Reuters Staff, 'China gives P2P lenders two years to exit industry: document' (*Reuters*, November 2019) <https://www.reuters.com/article/us-China-p2p/China-gives-p2p-lenders-two-years-to-exit-industry-document-idUSKBN1Y2039>

⁶⁵ Nadeem Xu, 'China shut down all P2P platforms by mid-Nov' (*Asia Times*, November 2020) <https://asiatimes.com/2020/11/China-shut-down-all-p2p-platforms-by-mid-nov/>

⁶⁶ Chong Koh Ping and Xie Yu, 'China Hails Victory in Crackdown on Peer-to-Peer Lending' (*Wall Street Journal*, December 2020) <https://www.wsj.com/articles/China-hails-victory-in-crackdown-on-peer-to-peer-lending-11607515547>

⁶⁷ Jamal Ibrahim, Haidar, 'Sanctions and Exports Deflection: Evidence from Iran' (2017) 32 *Economic Policy* 319

⁶⁸ Lim Chang-won, 'Chinese scholar cites digital currency as tool to bypass U.S. sanctions in case of escalating conflict' (*AJU Business Daily*, March 2021) <https://www.ajudaily.com/view/20210317180131596>

Third, China's national elites are determined to exercise powerful influence of China-originated technologies and standards at home and abroad and prevent encroachment by foreign technologies. In order to promote the interests of Chinese companies, the Chinese government is increasing its influence in standards-setting bodies such as the International Telecommunication Union (ITU).⁶⁹ One especially notable initiative is the project 'China Standards 2035', which serves as a blueprint for setting standards for emerging and next-generation technologies, such as 5 G Internet, Internet of things (IoT), AI, e-commerce traceability, smart and green manufacturing, and clean energy.⁷⁰ The DCEP is also a response to the threats represented by digital tokens such as Facebook's Diem. In 2018, PBoC researchers expressed concerns that stablecoins that are linked to the U.S. dollar can hinder China's efforts to internationalize the renminbi.⁷¹ Note that a stablecoin is a cryptocurrency that is designed to have a stable price. This is mostly done through pegging to a commodity or currency or by ensuring the supply by an algorithm.

The Digital Yuan's Effects on the Chinese Economy

Some of the key potential benefits of the digital yuan/DCEP vis-à-vis fiat currencies and other payment systems in use are presented in Table 4. First, a state-backed digital currency such as the DCEP could be a more reliable means to carry out payment settlements. In a digital currency transaction, just like in an exchange of banknotes, as soon as the possession changes, a final settlement is reached between the parties. Due to the 'immediate finality' feature of CBDCs, no clogging will occur in the payment system unlike in the clearing and settlement systems involving bank-to-merchant transactions.⁷² With transactions such as cashless payments by card, wire, check and digital apps, a deal is not fully settled when one party makes a payment to another. That is, until the banks have recorded, reconciled, and settled their respective debits and credits, there is a possibility that the transaction could be reversed.⁷³ In China, for instance, Alipay and WeChat Pay rely on commercial banks to settle payments.⁷⁴ Parties that rely on private companies such as Alipay and WeChat pay face risks such as business failure and bankruptcy of various companies in a payment ecosystem.

Second, parties in a transaction may achieve high efficiency and low costs with CBDCs. Eliminating intermediaries could be a key mechanism to reduce transaction costs. The vendors are required to pay a service fee when consumers use e-payment systems such as WeChat pay and Alipay or credit cards. In China, the fee is usually 0.6% of the total amount.⁷⁵ The indication

⁶⁹ J. Kynge and S. Yu, 'Virtual control: the agenda behind China's new digital currency'. Financial Times; (2021) <https://www.ft.com/content/7511809e-827e-4526-81ad-ae83f405f623>

⁷⁰ Carsten Stöcker, 'Identity in a Multi-polar World and China's 2035 Standards' (*Medium*, January 2021) <https://medium.com/spherity/identity-in-a-multi-polar-world-and-chinas-2035-standards-66f14865b800/>

⁷¹ James Kynge, and Sun Yu, 'Virtual control: the agenda behind China's new digital currency'. Financial Times; (2021) <https://www.ft.com/content/7511809e-827e-4526-81ad-ae83f405f623>

⁷² Danny Nelson, 'BIS: CBDC Research Gaining Steam but Widespread Issuance Years Away' (*Coindesk*, January 2021) <https://www.coindesk.com/cbdc-central-bank-digital-currency-survey-2020>

⁷³ Michael J. Casey, 'Why the U.S. shouldn't let China dominate the digital currency race' (*Fortune*, April 2020) <https://fortune.com/2020/04/07/china-us-digital-currency-coronavirus/>

⁷⁴ Arjun Kharpal, 'China has given away millions in its digital yuan trials. This is how it works' (*CNBC*, March 2021) <https://www.cnbc.com/2021/03/05/chinas-digital-yuan-what-is-it-and-how-does-it-work.html>

⁷⁵ Yolanda Huang, 'China's DCEP project launches biggest digital yuan test yet' (*Forkast*, March 2021) <https://forkast.news/china-dcep-digital-yuan-pros-cons/>

is that the Chinese government will make it free for vendors to accept payments in the digital yuan.

Table 4. Key benefits of the digital yuan/DCEP to consumers

Benefit	Explanation	The effects of DCEP
Reliable low-risk payment solution	More reliable means to carry out payment settlement compared to other available means No clogging in the payment system	Private companies such as Alipay and WeChat pay face risks such as business failure and bankruptcy
Low costs and high efficiency	Faster transactions at lower costs	Indications that it will be free for vendors to accept the digital yuan payments PBoC working with other jurisdictions to tackle inefficiencies and high costs
Promoting financial inclusion of disadvantaged groups	Traceability and the possibility to conduct transactions without a smartphone can promote financial inclusion of disadvantaged groups.	The PBoC can monitor the flow of money and deliver targeted programs to improve the well-being of high-risk and disadvantaged groups Dec. 2020 Suzhou trial: involved offline payments.

CBDCs can promote financial inclusion of low-income groups and small and medium-sized enterprises (SMEs).⁷⁶ The International Monetary Fund argues that digital currency offers a great promise to reach disadvantaged groups.⁷⁷ A retail CBDC system, in which a central bank issues digital currency directly to people without the need of traditional bank accounts, could be the game changer to eliminate poverty. This can be achieved through the establishment of an inclusive digital payment ecosystem and creation of financial data identities. For instance, individuals can have a CBDC accounts on the central bank’s ledger. A digital wallet application linked to the CBDC account through Application Program Interfaces (APIs) can allow users to access their account and engage in transaction.⁷⁸ Since the digital yuan is highly traceable, the PBoC can monitor the flow of money in the Chinese economy.⁷⁹ This allows the government to deliver targeted programs to improve the well-being of high-risk and disadvantaged groups such as SMEs and low-income households.

Viewed from the perspective of the rural low-income population, the trial conducted in December 2020 in city of Suzhou in Jiangsu Province in eastern China deserves mention. The trial involved the digital yuan’s offline payments. It explored mechanisms that allow the completion of transactions by touching two devices through near field communication (NFC) without an Internet connection. Huawei’s and some models of Vivo Communication Technology’s smart phones supported the offline wallet function. The users needed to download

⁷⁶ Sarah Allen, James Grimmelmann, Ari Juels, and Esvar Prasad, ‘Design choices for Central Bank Digital Currency: Policy and technical considerations.’ (*Brookings*, July 2020) https://www.brookings.edu/wp-content/uploads/2020/07/Design-Choices-for-CBDC_Final-for-web.pdf

⁷⁷ Victor Chatenay, ‘Facebook-backed Diem has cleared regulatory hurdles to finally launch in Q1’ (*Business Insider*, February 2021) <https://www.businessinsider.com/facebook-digital-currency-to-finally-launch-q1-2021-2>

⁷⁸ Nikhil Raghuvveera, ‘Central bank digital currency can contribute to financial inclusion but cannot solve its root causes’, (*Atlantic Council*, June 2020) <https://www.atlanticcouncil.org/blogs/geotech-cues/central-bank-digital-currency-can-contribute-to-financial-inclusion-but-cannot-solve-its-root-causes/>

⁷⁹ Yolanda Huang, ‘China’s DCEP project launches biggest digital yuan test yet’ (*Forkast*, March 2021) <https://forkast.news/china-dcep-digital-yuan-pros-cons/>

an offline payment app to use this feature.⁸⁰ Since one-third of China’s population lacks Internet access, the Suzhou trial is important to understand the opportunity of expanding the digital yuan’s adoption in rural China.

Table 5 compares the throughputs of some major payment systems in terms of transactions per second (TPS). Specifically this table compares the throughputs of China’s DCEP, Ripple (being considered by the Banque de France), Hyperledger Fabric (used by ‘Aber’ project of the central banks of Saudi Arabia and the UAE), and Ethereum (used to develop a POC by the Reserve Bank of Australia) with some other crypto and non-crypto payment solutions. As Table 2 makes it clear, the DCEP is expected to have potentially much higher transaction processing rates than other CBDCs and other payment systems.

Table 5. Efficiency and performance indicators of some major payment systems

Payment system	Transactions per second (TPS)	Remarks
DCEP	Designed to handle: 300,000 ⁸¹	December 2019: reported to reach a peak TPS of about 220,000. ⁸²
Ripple	Average: 1,500 ⁸³ .	CBDC Private Ledger: Ripple has claimed that it can handle tens of thousands of TPS in the initial phase, which can be increased to hundreds of thousands TPS over time
Bitcoin	Average: 5.15	Complete decentralization has reduced performance
Ethereum	Average: 20	Ethereum 2.0: expected 100,000 TPS.
Hyperledger Fabric	Average: 3500	Deployed in a single cloud data center (early 2018)
Visa	Average: 1,700	Can handle more at peak load
Diem	Average: over 3 (January 2021) in the testing phase, testnet ⁸⁴	Original Libra white envisioned 1,000. ⁸⁵

Data source: For bitcoin, Ethereum and Visa (Lucas Mearian, ‘MIT’s blockchain-based “Spider” offers 4X faster cryptocurrency processing’ (*ComputerWorld*, February 2020) <https://www.computerworld.com/article/3518893/mits-blockchain-based-spider-offers-4x-faster-cryptocurrency-processing.html>); Hyperledger Fabric (IBM Research Editorial Staff, ‘Behind the Architecture of Hyperledger Fabric’ (*IBM*, February 2018) <https://www.ibm.com/blogs/research/2018/02/architecture-hyperledger-fabric/>)

Digital Yuan’s Potential Internationalization

⁸⁰ Chen Jia, “‘Offline payment services’ added to digital currency trials’ (*China Daily*, December 2020) <https://www.chinadaily.com.cn/a/202012/16/WS5fd94b02a31024ad0ba9c08d.html>

⁸¹ Sundeep Gantori, Yifan Hu, Hyde Chen, and Kathy Li ‘Information technology Understanding China’s digital currency and blockchain initiatives’ (*Chief Investment Office GWM. UBS*, April 2020)

⁸² Global Times, ‘China may slash yuan/greenback usage gap with digital currency technology’ (*Global Times*, December 2019) <https://www.globaltimes.cn/content/1172326.shtml>

⁸³ Stephen O’Neal, ‘Who Scales It Best? Inside Blockchains’ Ongoing Transactions-Per-Second Race’ (*Cointelegraph*, January 2019) <https://cointelegraph.com/news/who-scales-it-best-inside-blockchains-ongoing-transactions-per-second-race>

⁸⁴ Shaurya Malwa, ‘China: Private banks to help with the rollout of booming digital yuan’ (*Cryptoslate*, February 2021) <https://cryptoslate.com/China-private-banks-to-help-with-the-rollout-of-booming-digital-yuan/>

⁸⁵ Arthur Linuma, ‘Facebook’s Libra: Potential To Increase Demand For Bitcoin’ (*Forbes*, July 2019) <https://www.forbes.com/sites/forbesagencycouncil/2019/07/17/facebooks-libra-potential-to-increase-demand-for-bitcoin/?sh=21b91da375cb>

China has made efforts on many fronts to internationalize its currency. China's ambition has been to internationalize the renminbi and challenge the West-centric global financial architecture. The BRI is emerging as a key force that can shape the current global financial system. Indeed, the BRI is viewed as the most ambitious infrastructure project. When DCEP is integrated with other cryptocurrencies and they are incorporated into the BRI initiative, foreign dependency on China's production processes is likely to grow. It increases China's geopolitical significance and financial autonomy.⁸⁶

Currently only 2% of international transactions cleared on the society for worldwide interbank financial telecommunication's (SWIFT) financial payment messaging system are settled in renminbi. To internationalize renminbi and offer clearing and settlement services in cross-border renminbi payments and trade payment, China launched the China International Payments System (CIPS). The first phase of the CIPS was launched in October 2015. Businesses in Asia and Europe can send funds in yuan to bank accounts in China, via CIPS without using the SWIFT system.

The CIPS is especially attractive for countries that are adversely affected by U.S. sanctions. Iran has joined CIPS. The Venezuelan government was also reported to be discussing adopting the CIPS. African nations that are receiving investments from China-led infrastructure projects under the BRI are also using the CIPS. As of mid-2019, hundreds of banks from 89 countries had participated in this initiative. Efforts such as the BRI and CIPS are attempting to make the global financial system more China-centric. According to Morgan Stanley, Chinese yuan accounted for 2% of global foreign exchange reserve in September 2020, which is predicted to increase to 5% to 10% by 2030.

On the digital currency front, in January 2021, SWIFT established a joint venture—the Finance Gateway Information Services Company Limited (金融网关信息服务有限公司, *jinrong wangguan xinxi fuwu youxian gongsi*) in Beijing with the PBoC's digital currency research institute and clearing center.⁸⁷ The other shareholders of the joint venture are China's Cross-border Interbank Payment System (CIPS) and the Payment and Clearing Association of China. Many believe that the DCEP's internationalization is a major motivation behind this joint venture.⁸⁸ This joint venture is viewed as a threat by other major economies. In the past SWIFT been used by the U.S. as a mechanism to impose financial and economic sanctions against adversaries such as Russia, Iran and Pakistan.⁸⁹

The joint venture with SWIFT is an indication that China wants to internationalize its digital currency. As of early 2021, 60% of global foreign exchange reserves were held in US dollars,

⁸⁶ Michael Casey and Sheila Warren, 'Understanding China's Fast-Approaching Digital Yuan' (*Coindesk*, November 2020) <https://www.coindesk.com/podcasts/coindesk-reports/digital-yuan-china-dcep-podcast>

⁸⁷ Elizabeth Chen, 'China Moves Ahead on Digital Yuan Before 2022 Winter Olympics' (*The Jamestown Foundation*, February 2021) <https://jamestown.org/program/china-moves-ahead-on-digital-yuan-before-2022-winter-olympics>

⁸⁸ Martha Wang, 'China's Digital Currency and What This Could Mean For Foreign Companies and Financial Institutions in China' (*JDSUPRA*, February 2021) <https://www.jdsupra.com/legalnews/china-s-digital-currency-and-what-this-7987963/>

⁸⁹ E. Chen, 'China Moves Ahead.'

compared to 4% for the yuan. The US dollar had a 38% share as a global payments currency in compared to the yuan's 2%.⁹⁰ Note that foreign exchange reserves are cash and other reserve assets held by central banks in order to balance payments, influence foreign exchange rates of their currencies, and maintain confidence in their financial markets. They are also used by a country to influence the foreign exchange rate, and to maintain confidence in the country's financial markets.⁹¹

In order to achieve the digital yuan's global adoption, China has also started to work with trading partners and financial hubs to develop platforms that facilitate the digital yuan's technical, legal and financial interoperability with other countries' digital currencies.

In February 2021, the PBoC started working with central banks of Thailand, United Arab Emirates and Hong Kong to explore a cross-border payment project using digital currency.⁹² The project, Multiple CBDC Bridge (m-CBDC Bridge), aims to address barriers in cross-border fund transfers, such as high cost, inefficiencies, and complex regulatory compliance. The project plans to develop a prototype for real-time cross-border foreign exchange transactions using distributed ledger technology (DLT). The first phase of the project, Inthanon-LionRock, was completed in December 2019 by the Hong Kong Monetary Authority (HKMA) and the Bank of Thailand (BOT). Eight Thai banks and two Hong Kong banks participated in the project to test the feasibility of digital currency-based transactions between Thailand and Hong Kong. In the second phase, the People's Bank of China and the Central Bank of the United Arab Emirates (UAE) joined the project, and the project was renamed as m-CBDC Bridge. It is possible for China to negotiate with the central bank of each of its trading partners to establish exchange rates and develop legal frameworks between two currencies. The project is likely to develop as a cross-border corridor network for financial institutions. In the current open market, each country needs to buy other local currencies from intermediaries and pay a premium. m-CBDC can offer a more competitive foreign exchange rate than the open market to attract more central banks to the network.⁹³

China has taken other measures to reduce dependence on the US dollar. In September 2020, Indonesia and China signed a memorandum of understanding to promote local currencies rather than world currencies, such as the US dollar (US\$) and euro. A key goal is to make the direct exchange rate quotations and interbank trading between the Chinese yuan and the Indonesian

⁹⁰ Jhon Dobson, 'China aims to turn digital yuan into a truly global currency to rival US dollar' (*Sunday Guardian Live*, March 2021) <https://www.sundayguardianlive.com/news/china-aims-turn-digital-yuan-truly-global-currency-rival-us-dollar>

⁹¹ Marshall Hargrave, 'Foreign Exchange Reserves' (*Investopedia*, September 2020) <https://www.investopedia.com/terms/f/foreign-exchange-reserves.asp>

⁹² Arjun Kharpal, 'China's PBOC joins cross-border digital currency project with other central banks' (*CNBC*, February 2021) <https://www.cnbc.com/2021/02/24/chinas-pboc-joins-cross-border-digital-currency-project.html>

⁹³ David Pan, 'How Ant's Suspended IPO Is Related to China's Digital Yuan' (*CoinDesk*, November 2020) <https://www.coindesk.com/how-ants-suspended-ipo-is-related-to-chinas-digital-yuan>

rupiah possible.⁹⁴ China is the biggest trade partner of Indonesia and a key source of foreign investment.⁹⁵

Chinese technology companies' operations in developing countries have created horizontal linkages and prerequisites for China's digital currency's adoption in these countries. For instance, since the mid-2000s, Chinese technology companies accelerated their activities in Africa. Chinese companies account for about 50% in the mobile handset market and 70% of the mobile network infrastructures in Africa. Chinese handset companies are in a position to embed chips to facilitate the adoption of China's digital currency in their handsets in African and other developing countries.⁹⁶ For instance, Huawei's Mate 40 brand smartphone has been launched in South Africa, which comes with a hardware wallet for the DCEP. Chinese ride-hailing company Didi, which operates in Latin America, has announced plans to enter the European market. Didi could offer rides in digital yuan.⁹⁷

The DCEP's Potential Performance Relative to Competitors

This section starts with a brief outline of the competitive landscape in the cryptocurrency industry. Africa is considered as an illustrative case. Three key contenders have been identified in Africa's cryptocurrency market: China's DCEP, Facebook-backed Diem (formerly known as Libra), and bitcoin.⁹⁸

A benefit of Diem is that it is a stablecoin that is pegged to the value of an underlying asset and thus does not suffer from price volatility like other established cryptocurrencies such as bitcoin.⁹⁹ Among the key barriers that can limit Diem's success include a fragmented regulatory regime for mobile money and the lack of regulatory framework for digital currencies.

Similar barriers exist for bitcoin. Eco Bank's analysis of 39 countries in sub-Saharan Africa found that only two had a favorable policy environment for bitcoin—South Africa and Eswatini.¹⁰⁰ From bitcoin's perspective, however, an encouraging note is that the Central American country of El Salvador has gone as far as to adopt the digital currency as legal tender. In June 2021, the country's Congress passed the Bitcoin Law by a supermajority vote.¹⁰¹

⁹⁴ Xinhua, 'China, Indonesia sign MoU to boost use of local currencies' (*Xinhua Net*, September 2020) http://www.xinhuanet.com/english/2020-09/30/c_139410036.htm

⁹⁵ Agustinus Beo Da Costa, Angie Teo, and Stanely Widiyanto, 'China to import more Indonesian products to balanced trade' (*Reuters*, January 2021) <https://www.reuters.com/article/indonesia-china/update-1-china-to-import-more-indonesian-products-to-balanced-trade-idUSL1N2JO0SZ>

⁹⁶ Michael Kimani, 'China Leads Africa's Digital Currency Race' (*Coindesk*, February 2021) <https://www.coindesk.com/china-leads-africas-digital-currency-race>

⁹⁷ Dashveenjit Kaur, 'Can China's digital yuan give the dollar a run for its money?' (*Techwire Asia*, March 2021) <https://techwireasia.com/2021/03/can-chinas-digital-yuan-overtake-the-dollar-as-the-top-global-currency/>

⁹⁸ Michael Kimani, 'China Leads Africa's Digital Currency Race' (*Coindesk*, September 2021) <https://www.coindesk.com/china-leads-africas-digital-currency-race>

⁹⁹ Victor Chatenay, 'Facebook-backed Diem has cleared regulatory hurdles to finally launch in Q1' (*Business Insider*, February 2021) <https://www.businessinsider.com/facebook-digital-currency-to-finally-launch-q1-2021-2>

¹⁰⁰ Ibid.

¹⁰¹ Arjun Kharpal, 'El Salvador becomes first country to adopt bitcoin as legal tender after passing law' (*CNBC*, June 2021) <https://www.cnbc.com/2021/06/09/el-salvador-proposes-law-to-make-bitcoin-legal-tender.html>

Despite unfavorable policy environment facing bitcoin in most countries, Africa's informal economy has benefitted from its decentralized feature. In major African markets such as Nigeria, Ghana and Kenya, informal trading has stimulated a rapid increase in bitcoin use.¹⁰² Thanks to Nigeria's tech-savvy young population, an unstable currency, and a high remittance activity, in late 2020, Nigeria ranked No. 2 in the world, behind the U.S. in bitcoin trading.¹⁰³

Small businesses in developing countries are increasingly using bitcoin to settle international transactions rather than in major international currencies such as U.S. Dollar and Euro. The banking application process is complex, which requires many supporting documents and takes a long time. Moreover, even if a business's application to make a payment in international currencies is approved, wire transfers are costly. Due to such practical uses, which is unique to developing economies such as those Africa, bitcoin's use has been reported to grow in these economies.

Bitcoin has already gained some foothold in international business among developing countries. The crypto-denominated (in bitcoin) international commerce has become increasingly common.¹⁰⁴ Nigerian vendors sourcing their products from China and other countries reported that their suppliers prefer payments in cryptocurrency. These vendors have found it more attractive to pay with cryptocurrencies because they do not have to buy US dollars using the Nigerian naira or pay expensive fees to money-transfer agencies. Due to such practical uses, bitcoin's use has been reported to grow in Africa. According to the U.S. blockchain research firm Chainalysis as quoted by Reuters monthly cryptocurrency transfers of under US\$10,000, which are typically made by individuals and small businesses, to and from Africa increased by more than 55% during June 2019-June 2020 to reach US\$316 million.¹⁰⁵

Chainalysis' analysis showed a similar pattern in Latin America. During June 2019-June 2020, Latin America sent US\$25 billion worth of cryptocurrency and received US\$24 billion.¹⁰⁶ East Asia was Latin America's significant counterparty during that period.¹⁰⁷ The blockchain research firm's interviews with cryptocurrency operators indicated that many of the payments were commercial transactions between East Asia-based exporters and Latin American importers. Businesses in Paraguay import a significant amount of goods from China, some of which are then exported to other countries such as Brazil. Many of the importers make payments using

¹⁰² Victor Chatenay, 'Facebook-backed Diem has cleared regulatory hurdles to finally launch in Q1' (*Business Insider*, February 2021) <https://www.businessinsider.com/facebook-digital-currency-to-finally-launch-q1-2021-2>

¹⁰³ Uwagbale Edward-Ekpu, 'Nigeria is now the No. 2 bitcoin market on this fast-growing global marketplace' (*Quartz Africa*, September 2020) <https://qz.com/africa/1947769/Nigeria-is-the-second-largest-bitcoin-market-after-the-us/#:~:text=In%20the%20last%20five%20years,%2Dto%2Dpeer%20bitcoin%20marketplace.&text=Between%20January%20and%20September%2C%20Paxful,in%20new%20registrations%20in%20Nigeria>

¹⁰⁴ Alexis Akwagyiram, and Tom Wilson, 'How bitcoin met the real world in Africa', 8 September 2020 <https://www.reuters.com/article/us-crypto-currencies-africa-insight-idCAKBN25Z0Q8>

¹⁰⁵ Chainalysis, 'How Latin America Mitigates Economic Turbulence with Cryptocurrency' (*Chainalysis*, September 2020) <https://blog.chainalysis.com/reports/latin-america-cryptocurrency-market-2020>

¹⁰⁶ Mike Orcutt, 'Cryptocurrency may be supercharging trade between Latin America and Eastern Asia' (*The Block*, September 2020) <https://www.theblockcrypto.com/post/76839/cryptocurrency-eastern-asia-latin-america-trade-chainalysis>

¹⁰⁷ Chainalysis, 'How Latin America Mitigates Economic Turbulence with Cryptocurrency' (*Chainalysis*, September 2020) <https://blog.chainalysis.com/reports/latin-america-cryptocurrency-market-2020>

bitcoin because of the speed and ease with which they can settle the payments. Due to concerns related to money laundering, banks in Paraguay are reluctant to do businesses with most companies. By making payments in cryptocurrencies, firms can also avoid import taxes.¹⁰⁸

Bitcoin use, however, is likely to be hampered by an uncertain regulatory environment. For instance, some developing countries have banned cryptocurrency trading.¹⁰⁹

Bitcoin's growing popularity as a means of payment in international transactions combined with its slow transaction speed and high fees and unfavorable regulatory environment may work in DCEP's advantage. In 2018, 128 countries traded more with China than with the U.S.¹¹⁰ In 2020, China overtook the U.S. to become the EU's (European Union) biggest trading partner. China is also the biggest source of imports for Nigeria. A clear advantage that China has is its political influence over African governments. Many African countries also have debt obligations to China. In 2018, 14 African nations' central bankers and officials met at a forum in Harare to consider the possibility of using China's yuan as a reserve currency.¹¹¹ Thus, some preconditions already exist. This is for China's efforts to internationalize its digital currency in Africa.

China's Regional and International Power and Influence

A currency's role in the international political economy needs to be analyzed in terms of power relations. Three forms of power relations have been identified—bargaining power, structural power and socializing power.¹¹² Bargaining power, or relational power¹¹² involves the use of 'force, payment or persuasion' to change the affected party's perceived costs and benefits of available options.¹¹³ Following the 2008 global financial crisis, China has been taking measures to increase the use of the yuan in cross-border trades. Since 2012, Chinese companies have been allowed to invoice foreign trade businesses in yuan.¹¹⁴

Structural power is the 'ability to gain by re-writing the rules of the game.'¹¹⁵ Such rules can modify the options available to governments and private actors and shape the structure of interaction. One way to exercise structural power is to adopt rules that create an open market for

¹⁰⁸ Ibid.

¹⁰⁹ Fred Muvunyi, 'Nigeria's cryptocurrency crackdown causes confusion' (*Deutsche Welle*, February 2021) <https://www.dw.com/en/nigerias-cryptocurrency-crackdown-causes-confusion/a-56547374>

¹¹⁰ Iman Ghosh, 'How China Overtook the U.S. as the World's Major Trading Partner' (*Visual capitalist* January 2020) <https://www.visualcapitalist.com/China-u-s-worlds-trading-partner/>

¹¹¹ Reuters Staff, 'African finance leaders to debate China's yuan as a reserve currency—Xinhua' (*Reuters*, May 2018) <https://www.reuters.com/article/us-China-yuan-africa/african-finance-leaders-to-debate-chinas-yuan-as-a-reserve-currency-xinhua-idUSKCN1IU00N>

¹¹² Carla Norrlof, 'Dollar hegemony: A power analysis' (2014) 21 *Review of International Political Economy* 1042 <https://www.tandfonline.com/doi/abs/10.1080/09692290.2014.895773>

¹¹³ Ibid.

¹¹⁴ Antje Beckert, 'RMB as an Invoice Currency for Import and Export Transactions with China' (*The Global Treasurer*, November 2012) <https://www.theglobaltreasurer.com/2012/11/09/rmb-as-an-invoice-currency-for-import-and-export-transactions-with-China/>

¹¹⁵ Benjamin J. Cohen, 'Organizing the World's Money: The Political Economy of International Monetary Relations' (*New York: Basic Books*, 1977)

goods and capital.¹¹⁶ That is, the government refrains from directly managing a currency and allows the foreign exchange market to clear the market for goods and capital.¹¹⁷ It is argued that China's strict capital control system and the lack of currency convertibility act as a hindrance for the renminbi to outperform the US dollar in terms of currency influence.¹¹⁸

Socializing power involves getting the cooperation of states and non-state actors into supporting the DCEP by influencing perceptions about China and the digital yuan.¹¹⁹ China has developed some foundations of such power at least in some developing economies. Despite some tension in areas such as trade, especially in the balance of trade favoring China, many African rulers are attracted to China's alternative development model. These rulers have been especially gravitated towards China due to the absence of conditions in Chinese aid, non-interference in state sovereignty and the opposition to Western hegemony¹²⁰

Despite an expansion and successful use of soft power, China has not yet developed an ideal mix of soft power resources to achieve desired foreign policy objectives. The gap between an increasingly cosmopolitan and confident foreign policy and a closed and rigid domestic political system is responsible for the imbalance between three pillars of soft power: cultural attractiveness, examples set by domestic values and policies, and values expressed through foreign policy. This lack of balanced soft power resources also accounts for Beijing's legitimacy and coherence problems in the exercise of soft power.¹²¹

Discussion and Implications

According to the BIS, emerging market central banks are engaged with CBDC projects more enthusiastically compared to their counterparts in advanced economies, mainly to promote financial inclusion and enhance payments efficiency.¹²² The above discussion has uncovered additional motivations in China's case that may not be applicable to other emerging economies.

The relative importance of different benefits differs across different economies. A survey of 63 central banks, 41 located in emerging market economies (EMEs) and 22 in advanced economies, found that EMEs value domestic payments efficiency and financial inclusion as the top two benefits of CBDCs. Cross-border payments efficiency was the least important benefit for EMEs. Central banks in advanced economies, on the other hand, viewed payments safety and financial stability as the primary benefits of CBDCs. Financial inclusion was considered to be the least

¹¹⁶ Carla Norrlof, 'Dollar hegemony: A power analysis' (2014) 21 *Review of International Political Economy* 1042 <https://www.tandfonline.com/doi/abs/10.1080/09692290.2014.895773>

¹¹⁷ Marc Chandler, 'The Dollar's Five Keys in the Week Ahead' (*Business Insider*; February 2013) <https://www.businessinsider.com/the-dollars-five-keys-in-the-week-ahead-2013-2>

¹¹⁸ Carla Norrlof, 'Dollar hegemony: A power analysis' (2014) 21 *Review of International Political Economy* 1042 <https://www.tandfonline.com/doi/abs/10.1080/09692290.2014.895773>

¹¹⁹ Ibid

¹²⁰ Piet Konings, 'China and Africa: Building a Strategic Partnership' (2007) 23 *Sage Journals* 341 <https://journals.sagepub.com/doi/10.1177/0169796X0702300303>

¹²¹ Gill Bates and Huang Yanzhong, 'Sources and limits of Chinese 'soft power'' (2006) 48 *Survival* 17 <https://www.tandfonline.com/doi/abs/10.1080/00396330600765377?tab=permissions&scroll=top>

¹²² Danny Nelson, 'BIS: CBDC Research Gaining Steam but Widespread Issuance Years Away' (*Coindesk*, January 2021) <https://www.coindesk.com/cbdc-central-bank-digital-currency-survey-2020>

important factor by this group of economies.¹²³ As noted above, financial inclusion is a potentially positive impact of the digital yuan. Moreover, the possibility of using the digital yuan with NFC without internet connection is even more important for DCEP's internationalization. Internet penetration rates in most developing countries are lower than in China. For instance, in least developed countries (which are poorest among the developing countries), 73% of the population lacks Internet access.¹²⁴ If CBDC is to be adopted by these populations, the NFC trial holds special significance.

In general, China's state strategies toward information and communications technologies (ICTs) have been to balance economic growth and modernization with political control.¹²⁵ The digital yuan can be used to improve the well-being of marginalized groups. In this way, the intervention in poverty reduction is an aspect of the digital yuan that other modern technologies such as 5 G and AI lack but the digital yuan has.

While several benefits of DCEP are attractive, it also presents risks to consumers. Privacy is among the biggest concerns that critics have about DCEP. It is argued that the digital yuan is 'more about policing than progress.'¹²⁶ By putting every transaction on to the PBoC's radar, the DCEP can strengthen the surveillance state.

CBDCs may adversely affect the businesses of financial and payment intermediaries such as mobile and online payment platforms, banks, and microfinance institutions. In China, for instance, the digital yuan may pose a direct challenge to the existing payment systems such as WeChat Pay and Alipay. In its prospectus for its IPO, Ant Group stated that DCEP could pose a risk to its business.¹²⁷

The DCEP is also driven by the Chinese Communist Party's (CCP) desire for social control. The controllable anonymity feature requires users to register with their real name and provide personal information to the central bank. However, users can remain anonymous with their counterparties. China's authoritarian model of privacy and governance can be exported to CBDCs of other countries, in which the government has access to users' transaction

¹²³ Christian Barontini and Henry Holden 'Proceeding with caution—a survey on central bank digital currency.' (*Bank for International Settlements*, January 2019) <https://www.bis.org/publ/bppdf/bispap101.pdf>

¹²⁴ International Telecommunication Union, 'Statistics' (2021) <https://www.itu.int/en/ITUUD/Statistics/Pages/stat/default.aspx2021>

¹²⁵ Shanthi Kalathil, 'China's new media sector: keeping the state in' (2003) 16 *Pacific Review* 489 <https://www.tandfonline.com/doi/abs/10.1080/0951274032000132227>

¹²⁶ Brenda Goh and Samuel Shen, 'China's proposed digital currency more about policing than progress' (*Reuters*, November 2019) <https://www.reuters.com/article/us-China-markets-digital-currency/chinas-proposed-digital-currency-more-about-policing-than-progress-idUSKBN1XB3QP>

¹²⁷ Soon Chen Kang, 'Digital yuan poses threat to Alipay-WeChat online payments duopoly' (*S&P Global*, October 2020) <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/digital-yuan-poses-threat-to-alipay-wechat-online-payments-duopoly-60459079>

information.¹²⁸ The lack of anonymity is thus likely to be a matter of concern for China's trading partners.¹²⁹

Making transaction data anonymous means preventing the identification of parties engaged in the transaction using special techniques. CBDCs such as the DCEP and decentralized cryptocurrencies such as Bitcoin may differ in terms of who is intended to be prevented from identifying the parties in a transaction. For instance, both parties in a transaction involving DCEP can be anonymous to the public. DCEP thus provides a higher degree of anonymity when it comes to ability of parties other than the government to identify the participants in the transactions. DCEP transactions, however, can be monitored by the PBoC. The digital yuan has users' personal information and other details to track and record every movement such as where it is stored and how it is spent.

The digital yuan's internationalization will help China achieve its geopolitical and economic goals. By facilitating a cheaper and faster payment system and helping avoid U.S. sanctions, DCEP could pose a challenge to the U.S. dollar's dominance. DCEP is especially likely to improve efficiency in China's international trade. It is likely to make China's supply chains hyper-efficient by facilitating payments. Real benefits will come from DCEP's interoperability with other tokens and blockchains, which would allow Chinese companies and their foreign trading partners to move money across borders without depending on US dollars as an intermediary.¹³⁰ China is already working in this direction. The PBoC has teamed up with central banks from other jurisdictions to facilitate DCEP's use in cross-border transactions.¹³¹

The DCEP's internationalization can also result in a decline in the geopolitical importance of Western powers such as the U.S. From the U.S. perspective, this challenge is increasingly being recognized as China developing cutting edge technologies. Chinese firms are in the forefront of emerging technologies such as 5 G telecoms and AI. Second, China has been aggressively exporting these technologies, especially in countries that have participated in the BRI. The receiving countries are influenced to conform and adhere to the Chinese standards and protocols.¹³² It would therefore be a mistake to underestimate China's capability to set global standards in CBDCs. In the area of digital currency, Kumar and Rosenbach presented a hypothetical scenario in which China can share its CBDC technology with other countries that the U.S. views as adversaries.¹³³ For instance, if Iran builds a digital currency system that is compatible with DCEP, the U.S. cannot track the trade between the two countries.

¹²⁸ Mercy A. Kuo, 'China's Digital Currency: Implications for the US' (*The Diplomat*, March 2021) <https://thediplomat.com/2021/03/chinas-digital-currency-implications-for-the-us/>

¹²⁹ John Dobson, 'China aims to turn digital yuan into a truly global currency to rival US dollar' (*Sunday Guardian Live*, March 2021) <https://www.sundayguardianlive.com/news/China-aims-turn-digital-yuan-truly-global-currency-rival-us-dollar>

¹³⁰ Michael Casey and Sheila Warren, 'Understanding China's Fast-Approaching Digital Yuan' (*Coindesk*, November 2020) <https://www.coindesk.com/podcasts/coindesk-reports/digital-yuan-China-dcep-podcast>

¹³¹ Arjun Kharpal, 'China's PBOC joins cross-border digital currency project with other central banks' (*CNBC*, February 2021) <https://www.cnbc.com/2021/02/24/chinas-pboc-joins-cross-border-digital-currency-project.html>

¹³² J. Kynge and S. Yu, 'Virtual control: the agenda behind China's new digital currency' (*Financial Times*, 2021) <https://www.ft.com/content/7511809e-827e-4526-81ad-ae83f405f623>

¹³³ Aditi Kumar and Eric Rosenbach 'Could China's Digital Currency Unseat the Dollar?' (*Foreign Affairs*, May 2020) <https://www.foreignaffairs.com/articles/China/2020-05-20/could-chinas-digital-currency-unseat-dollar>

Prior research has noted that the geographic scale of currency use can vary widely.¹³⁴ While some are truly global, others are used in a few countries or a single region. Chinese policy makers are not expecting that the entire world will use the digital yuan. It is obvious from the above discussion that digital yuan's value proposition is likely to be higher for emerging economies such as those in South East Asia and Africa. Despite bitcoin's foothold, it is argued that DCEP is likely to lead the race.

Concluding Comments

The benefits of CBDCs such as DCEP include lower costs to produce and store, ease of use and protection against counterfeiting. They can also reduce transaction costs by removing third party intermediaries such as banks. The DCEP's case suggests that CBDCs can be issued in a pro-poor manner to address various barriers to financial inclusion. In addition to the government's ability to track transactions to ensure that disadvantaged groups can benefit, consumers involved in digital yuan trials completed transactions with NFC technology, which did not require an internet connection. The possibility to use DCEP with NFC is especially attractive for individuals and organizations in remote areas that lack internet access or bank accounts.

From consumers' standpoints, a downside of CBDCs is that the government is likely to track all transactions. Privacy concerns are even more salient in authoritarian regimes given their aim of maintaining social control at all costs. For instance, among key driving forces in the development of the DCEP is the CCP's desire of social control. The CCP has regarded its centralized banking system as a key instrument of its economic power. The digital currency can give the Chinese Communist Party unprecedented visibility over financial transactions conducted in the country and control them. Such concerns are also likely to be prevalent in other countries, especially in emerging economies. Just like China's exports of facial recognition technologies in these economies, there are privacy concerns associated with the use of digital yuan. This means that some countries might not like the idea of trading CBDCs on a platform designed by China due to privacy concerns.

The DCEP is also China's attempt to achieve multiple goals on the international front. This aspect should be looked at from the perspective of measures taken by China to boost regional and international power and influence and help to internationalize the yuan. This means that the U.S. has long benefited from its structural power and some of the benefits may no longer be guaranteed. For instance, DCEP can accelerate the internationalization of the yuan, facilitate China's economic and trade links with other countries and reduce its reliance on the SWIFT system. All these mean that DCEP can reduce the dominance of the U.S. dollar in the global financial system. With its first-mover advantage, the DCEP has the potential to set a global standard for CBDCs.

Acknowledgments

¹³⁴ Benjamin J. Cohen and Tabitha M. Benney 'What does the international currency system really look like?'(2014) 21 Review of International Political Economy 1017 <https://www.tandfonline.com/doi/abs/10.1080/09692290.2013.830980?journalCode=rrip20>

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