

July 2020

Secretariat to the Financial Stability Board
Bank for International Settlements
Centralbahnplatz 2
CH-4002 Basel
Switzerland

Dear Colleagues,

In response to the Financial Stability Board's consultative document, "Addressing the regulatory, supervisory and oversight challenges raised by 'global stablecoin' arrangements," please find attached my recently published note, "Could the Poor Bank on Stablecoins? Discussion Prompts for Innovators, Regulators, and Consumers."

This note may help to add context to the following questions in the consultative document:

5. [...] What other relevant risks should regulators consider?

The executive summary of the consultative document states that global stablecoins "have the potential to bring efficiencies to payments (including cross-border payments), and to promote financial inclusion" (p. 1). The attached note encourages further study and discussion of five open questions regarding stablecoins and whether they will promote financial inclusion in lower- and middle-income countries.

9. a. Are domestic regulatory, supervisory and oversight issues appropriately identified?

Appendix 3 in the consultative document reports that the most common classifications for stablecoins among EMDEs were e-money and payment instrument (p. 42). If stablecoins are classified as e-money, the attached note identifies an open question regarding how stablecoin issuers will comply with domestic e-money regulations that seek to protect customer funds in some lower- and middle-income countries (see pp. 6-7).

My note is available online at <https://www.findevgateway.org/paper/2020/07/could-poor-bank-stablecoins>.

The findings and conclusions expressed in my note are my own and do not reflect positions or policies of my employer. Thank you for your consideration.

Sincerely,

<signed>

F. Christopher Calabia

Attachment (one)



Could the Poor Bank on Stablecoins?

Discussion Prompts for Innovators, Regulators, and Consumers

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Additional Considerations

- Would a Central-Bank-Issued Stablecoin Be More Accessible to the Poor?
- How Will the Poor Respond to Stablecoins?

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About the Author

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Emerging technology is driving optimism about building a more inclusive digital economy.

Will one innovation—a digital asset known as stablecoins—expand access to financial services among the poor and unbanked?

Success may depend on innovators' answers to five questions—and how regulators and consumers respond.¹ This note encourages further study of these questions to ensure that these digital assets, if intended for widespread adoption, will promote financial inclusion.

Technology has changed how we communicate, work, hail a taxi, and shop. It may now be poised to transform something more fundamental: money itself. Advocates welcomed the launch of privately issued “crypto-assets,” such as Bitcoin in 2009, for their potential to dispense with banks and even with cash. Electronic payments could be made from person to person, with no need for a third-party intermediary to process, clear, and settle payments. Instead, cryptography—hence the name crypto-asset—would secure transactions² and the unit of value between consumers, businesses, and government.

In practice crypto-assets have been of interest primarily to the rich. Dramatic swings in their values have made them less suitable financial tools for the poor. Bitcoin's price has been so volatile that its sponsoring organization warns users “never [to] buy more bitcoins than you can afford to lose.”³

Enter the Stablecoin. A stablecoin is a crypto-asset designed to dampen fluctuations in its value. As a G7 working group describes, stablecoin issuers “seek to stabilize the price of the ‘coin’ by linking its value to that of an asset or pool of assets.”⁴ The Financial Stability Board later defined an asset-based stablecoin as one “that purports to maintain a stable value by referencing real or financial assets or other crypto-assets.”⁵ Some proponents suggest that this new form of crypto-asset is better positioned to “boost financial inclusion by reducing the global poor's dependence on physical cash.”⁶

Could the Poor Bank on Stablecoins? The answer may depend on how innovators address the five key questions below—and how regulators and consumers respond to these innovations.

1. Will stablecoin processing speeds be fast enough for the poor?
2. Will technology available to the poor support stablecoins?
3. What will stablecoins cost the poor?
4. How will stablecoin issuers comply with e-money regulations?
5. How will financial systems with limited foreign exchange reserves adapt to stablecoins?

This note concludes with initial thoughts on whether a special type of stablecoin issued by central banks (central bank digital currency) might be more accessible to the poor than privately issued stablecoins.

The following pages explore each of these questions in support of greater dialogue among innovators, regulators, and consumer advocates.

Cover image: A person holds a saving booklet and a 5000 Tanzanian shilling note during a village savings and loan group meeting in Misungwi, Tanzania.

1. I am indebted to Miller Abel, Dilwonberish Aberra, Konstantin Peric, and Kanwaljit Singh, all of the Bill & Melinda Gates Foundation, for their technical advice and input. I would also like to thank Prof. Jonathan Greenacre (Fletcher School of Law & Diplomacy at Tufts University) and John Kiff (International Monetary Fund) for their comments. Any remaining errors are mine. The findings and conclusions are those of the author and do not necessarily reflect positions or policies of the Bill & Melinda Gates Foundation.

2. Definition derived from Financial Action Task Force, “Virtual Currencies—Key Definitions and Potential AML/CFT Risks,” June 2014, pp. 4–5, <https://www.fatf-gafi.org/media/fatf/documents/reports/Virtual-currency-key-definitions-and-potential-aml-cft-risks.pdf>.

3. “No matter what Bitcoin software you use, you should never buy more bitcoins than you can afford to lose. Bitcoin is still an experimental system and bitcoins remain a risky investment.” From “Bitcoin Core Requirements and Warnings,” Bitcoin.org, accessed July 2, 2020, <https://bitcoin.org/en/bitcoin-core/features/requirements>.

4. G7 Working Group on Global Stablecoins, “Investigating the Impact of Global Stablecoins,” Bank for International Settlements, October 2019, p. 1, <https://www.bis.org/cpmi/publ/d187.pdf>.

5. Financial Stability Board, “Addressing the Regulatory, Supervisory and Oversight Challenges Raised by ‘Global Stablecoin’ Arrangements,” Consultative Document, April 14, 2020, <https://www.fsb.org/2020/04/addressing-the-regulatory-supervisory-and-oversight-challenges-raised-by-global-stablecoin-arrangements-consultative-document/>. Another type of stablecoin might not be backed up by any assets, relying instead on an algorithm to control its supply. This type remains largely hypothetical and is not addressed here. See, for example, Dirk Bullmann, Jonas Klemm, and Andrea Pinna, “In Search for Stability in Crypto-Assets: Are Stablecoins the Solution?,” European Central Bank Occasional Paper Series No. 230, August 2019, pp. 26–28, <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op230-d57946be3b.en.pdf>.

6. John Liu and Peter Lyons, “This Digital Currency Could Build a More Sustainable Global Economy,” World Economic Forum website, November 26, 2019, <https://www.weforum.org/agenda/2019/11/digital-currency-economy-sustainable/>.

1 Will Stablecoin Processing Speeds Be Fast Enough for the Poor?

Crypto-asset initiatives such as stablecoins rest on an intriguing business model that assumes no need for a trusted intermediary such as a bank, payments provider, or traditional clearinghouse to initiate, process, and maintain an authoritative record of each transaction.

Instead, transactions are recorded on a shared or “distributed ledger” that is available to all. Groups or “blocks” of individual payments are encrypted and transcribed into the “blockchain”—the distributed ledger—to promote confidence that the record is authentic and immutable. The encryption requirements are computationally intensive and burdensome by design,⁷ so much so that the infrastructure supporting Bitcoin processes about three to seven transactions per second.⁸ This speed remains far below what legacy payments providers already offer.

Significant lags in making payments with stablecoins could decrease consumers’ confidence in the utility of such initiatives compared to current electronic payments services. To gain widespread acceptance and use among the poor, a stablecoin initiative will likely need to match the processing speed of existing payments instruments in lower- or middle-income countries.

For example, in Kenya, M-Pesa, a nonbank “e-money” service provided by a subsidiary of a mobile network operator, processes 900 payments per second.⁹ In Bangladesh, bKash processes seven million transactions per day,¹⁰ while in India, the Universal Payments Infrastructure processes in excess of one billion transactions per month.¹¹

Recent proposals and new technology may help stablecoin initiatives to catch up with legacy providers’ processing speed. One idea is to record only the net results of a batch of payments between counterparties (such as the “Lightning Network”¹²) rather than every payment. An innovator could alternatively reintroduce a trusted intermediary to own and manage the ledger. These approaches may sacrifice some crypto-asset goals to promote transparency or eliminate the need for an intermediary. If successful, they could help to ensure that stablecoin transactions will process as quickly as those of legacy payments providers and reduce the likelihood that consumers might view stablecoins as less useful for daily needs compared to existing electronic alternatives.

7. For more insight into distributed ledger technology, please see Jim Waldo’s “A Hitchhiker’s Guide to the Blockchain Universe,” ACM Queue, January 9, 2019, <https://queue.acm.org/detail.cfm?id=3305265>.

8. “Transaction Rate Per Second,” Blockchain.com, accessed July 3, 2020, <https://www.blockchain.com/charts/transactions-per-second>.

9. Soko Directory Team, “Here Are 19 Milestones as Safaricom Marks Its 19th Birthday,” Soko Directory, October 23, 2019, <https://sokodirectory.com/2019/10/here-are-19-milestones-as-safaricom-marks-its-19th-birthday/>.

10. William Pesek, “Fintech: bKash Turbocharges Bangladesh’s Development,” *Asiamoney*, April 9, 2020, <https://www.euromoney.com/article/b1j316z6yk1905/fintech-bkash-turbocharges-bangladeshs-development>.

11. National Payments Corporation of India, “UPI Product Statistics,” accessed on July 7, 2020, <https://www.npci.org.in/product-statistics/upi-product-statistics>.

12. “What Is Lightning Network and How It Works,” Cointelegraph, accessed on July 2, 2020, <https://cointelegraph.com/lightning-network-101/what-is-lightning-network-and-how-it-works>.

2 Will Technology Available to the Poor Support Stablecoins?

The ubiquity of mobile phones in lower- and middle-income countries has made them instrumental in banking the poor for the past two decades through mobile banking applications and new providers such as nonbank e-money issuers.

Mobile phones remain an attractive platform for innovators seeking to promote inclusion for those who remain unbanked. Of the 1.7 billion adults over the age of 15 who lack a formal financial account today, 1.1 billion own mobile phones.¹³

Yet all mobile phones are not alike in technological capacity. “Smartphones” with advanced computational powers and the ability to run third-party applications are prevalent especially in upper-income countries. Simpler—and generally less expensive—“feature phones” account for 60% of mobile phone connections in Sub-Saharan Africa and about half of connections in South Asia, North Africa, and the Middle East.¹⁴ Feature phones were built for 3G wireless technology and typically have lower processing power, physical keys, and displays limited to a few lines of text.

If a stablecoin wallet is to reside on a user’s phone, innovators should ensure that existing feature phones can host stablecoin wallets, encrypt and decrypt stablecoin transactions, and send payments instructions to other users.

Regarding the last point, feature phones communicate with mobile network towers using the Unstructured Supplementary Service Data (USSD) protocol, like some

instant messaging applications. USSD messages are limited in size to 160 bytes, or 182 alphanumeric characters.¹⁵ In contrast, the simplest Bitcoin message fills 250 bytes, while most Bitcoin transaction messages required up to 600 bytes in 2015,¹⁶ far exceeding the current capacity of feature phones.

Innovators could circumvent technical limitations by building the stablecoin wallet and processing functions on a remote server rather than on the phone. Feature phone users could then send and receive shorter messages to the server for processing and encryption.¹⁷ However, this design may require a trusted intermediary to host the wallet and process transactions, making a stablecoin issuer nearly indistinguishable from a traditional bank or nonbank e-money issuer.

Given disparities in the functionality of differing mobile devices, the poorest customers are unlikely to use stablecoins until the costs of smartphones fall or the capabilities of feature phones rise. Failing to consider the technology gap may, in turn, unintentionally reinforce the existing gender gap in access to financial services. Women in lower- and middle-income countries are 8% less likely to own a mobile phone and 20% less likely to own a smartphone than men.¹⁸ Smartphone ownership rates may mean that unbanked or underserved women could lag behind men in their ability to use stablecoins.

13. Asli Demirgüç-Kunt, Leora Klapper, Dorothe Singer, Saniya Ansar, Jake Hess, “The Global Findex Database 2017,” World Bank Group, p. 2, <https://globalfindex.worldbank.org/>.

14. GSMA, “The State of Mobile Internet Connectivity 2019,” GSMA Connected Society, p. 25, <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2019/07/GSMA-State-of-Mobile-Internet-Connectivity-Report-2019.pdf>.

15. “Unstructured Supplementary Service Data,” Wikipedia, accessed July 2, 2020, https://en.wikipedia.org/wiki/Unstructured_Supplementary_Service_Data.

16. “Analysis of Bitcoin Transaction Size Trends,” TradeBlock, October 15, 2015, <https://tradeblock.com/blog/analysis-of-bitcoin-transaction-size-trends#:~:text=Basic%20bitcoin%20transactions%20with%201,typically%20~250%20bytes%20of%20data>.

17. One Bitcoin-based example might be Cointext, which enables transactions via text messages. See <https://cointext.io/en/>, accessed on July 5, 2020.

18. GSMA, “Mobile Gender Gap Report 2020,” March 2020, pp. 9 and 20, <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/05/GSMA-The-Mobile-Gender-Gap-Report-2020.pdf>.

3 What Will Stablecoins Cost the Poor?

Proponents of stablecoins tout the lower costs of stablecoin transactions compared to fees that legacy providers charge,¹⁹ such as for remittances.

Lower costs could make a stablecoin transaction attractive to a migrant worker sending money home to support family members. Yet a migrant worker faces two costs when transmitting international remittances using a stablecoin:

1. the transaction fee that a provider might charge to make a stablecoin payment; and
2. the costs associated with the “bid-ask” spread when converting a traditional fiat currency into a stablecoin.

Even if we exclude the transaction fee, poor consumers could be deterred from using stablecoins because of the loss of value they may incur when converting funds into or out of stablecoins. As the chief executive officer of one Bitcoin-based remittance provider noted, using a crypto-asset such as bitcoin to send remittances adds a third “currency” to the transaction. He explained that “You go from U.S. dollar to bitcoin, and then from bitcoin to whatever the local currency is. You’re adding an extra FX [foreign exchange] move right there alone. That increases friction.”²⁰

This friction arises because the seller of the foreign exchange may retain a portion of the bid-ask spread as a profit, resulting in a cost to the customer. Friction could increase further for migrant workers earning a wage in another country’s fiat currency that might need to be exchanged first for a major hard currency like the U.S. dollar before the worker could purchase a stablecoin.

Would lower-income consumers convert their fiat currency-denominated savings and hold them in a stablecoin-denominated wallet? By design, a stablecoin might maintain its value better over time than the fiat currency of a country

experiencing high inflation. So an incentive to hold savings in stablecoin-denominated accounts could exist.²¹

Still, costs will be a factor in this decision. The bid-ask spread for fiat currencies that are less liquid—that is, currencies for which there are few sellers and buyers, such as the fiat currencies of some lower- and middle-income countries—tend to be wider than bid-ask spreads for more frequently traded, and hence more liquid, currencies. This means that a worker who exchanges an illiquid fiat-currency for a more liquid foreign currency could face what recent research estimates can be the equivalent of “two-digit percentage costs to clients.”²² If this cost is similar for exchanges of illiquid fiat currency for more liquid stablecoins, it could be prohibitively expensive for some lower income workers to exchange their local currency for stablecoins, potentially making them less appealing as a store of value.

Paying interest on stablecoin holdings might be one way to incent consumers to hold such instruments. At present, however, jurisdictions that license nonbank e-money services differ in whether they permit interest payments to customers on e-money holdings.

Innovators should consider how best to account and make up for costs that may arise from the bid-ask spreads in the exchange rates between illiquid fiat currencies and a stablecoin.

19. “Ethereum, and blockchain technology generally, have the capacity to lower transaction costs, increase transparency and onboard diverse swathes of individuals who don’t have access to the financial services many of us take for granted.” Alexi Lane, founder and CEO of Everex, a stablecoin provider, as quoted in Daan Pepijin, “Here’s How Blockchain Can Potentially End Global Poverty,” TNW, July 25, 2017, <https://thenextweb.com/contributors/2017/07/25/heres-blockchain-can-potentially-end-global-poverty/>.

20. Ali Goss, cofounder and chief executive officer of HelloBit, as quoted in Aaron van Wirdrum, “Remittance Startups Agree: Bitcoin Does Not Make Remittance Cheaper (But Does Allow for Innovation),” Bitcoin Magazine, October 22, 2015, <https://bitcoinmagazine.com/articles/remittance-startups-agree-bitcoin-does-not-make-remittance-cheaper-but-does-allow-for-innovation-1445528049>.

21. Tobias Adrian and Tommaso Mancini-Griffoli, “Digital Currencies: The Rise of Stablecoins,” *IMF Blog*, September 19, 2019, <https://blogs.imf.org/2019/09/19/digital-currencies-the-rise-of-stablecoins/>.

22. Dirk A. Zetsche, Ross P. Buckley, and Douglas W. Arner, “Regulating Libra: The Transformative Potential of Facebook’s Cryptocurrency and Possible Regulatory Responses,” [2019] UNSW Law Research, Series 47, p. 15, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3414401.

4 How Will Stablecoin Issuers Comply with E-Money Regulations?

For stablecoins to be useful to the poor, they will likely need to be accepted by other consumers, merchants, businesses, and government.

If public authorities do not object to stablecoins' use on that scale, they may demand that such a widely utilized instrument be subject to regulation to ensure that it does not threaten financial stability or the well-being of consumers. Others have questioned how nonbank stablecoin issuers may comply with global standards for anti-money laundering.²³ Another key question is how they will comply with regulations that protect customers' funds.

Because nonbank providers of stablecoin wallets would accept cash from consumers and issue stablecoins into a digital account in exchange, this business model may resemble that of nonbank e-money providers. In some jurisdictions, for example, subsidiaries of mobile network operators are permitted to accept cash from consumers and issue e-money into a digital account in exchange. Given this functional similarity, regulators might decide to subject stablecoin issuers to existing regulations that apply to nonbank e-money issuers in many lower- and middle-income countries. Such a decision might reflect the Financial Stability Board's "same business, same risks, same rules" principle.²⁴

Such jurisdictions typically require nonbank e-money issuers to deposit customers' funds into commercial bank accounts. In some of these jurisdictions, commercial banks hold those funds for the benefit of the customers. Some also permit a portion of the funds to be invested in short-term government securities. Examples of these requirements appear below.

Under these rules, when a customer gives cash to a typical nonbank e-money issuer, the issuer credits the customer's account with e-money. It next deposits that cash into a commercial bank account. In some jurisdictions, the commercial bank may then have a fiduciary duty to return that cash to the customer should the e-money issuer become insolvent or fail. By moving at least part of the customer's funds away from the issuer, regulators reduce the risk that an issuer might pledge those funds as collateral or use them to repay its own debts should it become insolvent or fail.²⁶

Innovators seeking to offer stablecoins to the poor should explain how their business model would comply with such customer funds protection regulations in relevant jurisdictions. This challenge may be even more significant in the case of a stablecoin launched by a firm with a global footprint, which the G7 working group and Financial Stability Board refer to as a "global stablecoin."²⁷

(Continued on following page)

Sample E-Money Regulations to Protect Customers' Funds²⁵

Colombia	Kenya	India	Rwanda
<ul style="list-style-type: none"> Funds equal in value to outstanding e-deposits must be held in current accounts in the central bank or another financial institution These funds are covered by direct deposit insurance 	<ul style="list-style-type: none"> Funds equal in value to outstanding e-money must be held in non-commingled trust accounts in at least four commercial banks Funds must be managed by a trustee 	<ul style="list-style-type: none"> At least 75% of customer funds must be invested in short-term government securities Up to 25% of customer funds may be held in commercial banks, with direct coverage by deposit insurance 	<ul style="list-style-type: none"> Funds equal in value to e-money must be isolated, unencumbered, and held in trust in bank deposits and short-term government securities A maximum of 25% of float may be stored in a single bank Float must be less than 25% of core capital

23. G-7 Working Group on Global Stablecoins, p. 7, and Financial Action Task Force, p. 9. These concerns may be significant for lower- and middle-income countries, given that weaknesses in a country's anti-money laundering regime could lead to international sanctions or to financial institutions "de-risking" their exposures by curtailing or ceasing transactions with institutions in the country.

24. Financial Stability Board, p. 15.

25. Bill & Melinda Gates Foundation, "Inclusive Digital Financial Services: A Reference Guide for Regulators," July 2019, pp. 42-75, <https://www.gatesfoundation.org/What-We-Do/Global-Growth-and-Opportunity/Financial-Services-for-the-Poor/Digital-Financial-Services-Reference-Guide>.

26. Jonathan Greenacre, "Safeguarding Funds Stored with Mobile Network Operators," forthcoming.

27. G7 Working Group, p. 2; Financial Stability Board, p. 4.

4 How Will Stablecoin Issuers Comply with E-Money Regulations? *(Continued)*

(Continued from previous page)

In a global stablecoin initiative, a customer will give cash to the stablecoin issuer, which in turn will credit the customer's account with an equivalent amount in stablecoin. The issuer would next transmit the customer's funds potentially in hard currency form to its asset basket, which could be abroad, to support the value of outstanding stablecoins. This may mean that the issuer will not deposit the customer's funds in a local commercial bank as might be required under regulations typical for nonbank e-money issuers.

- The stablecoin issuer could deposit some of the customer's cash into a commercial bank account and transmit the rest to its asset basket. However, the issuer would still not be in compliance with typical requirements to deposit all of the customer's cash in a bank account. Moreover, it is unknown whether sending only a portion of the customer's funds to the asset basket would be enough to maintain the stablecoin's value.
- Rather than holding the cash in the stablecoin's asset basket abroad, the stablecoin issuer could hold the cash in each jurisdiction in which it operates, perhaps in a local commercial bank account. However, managing segregated reserves of hard currencies across multiple jurisdictions

may introduce difficult operational challenges: the stablecoin issuer may need to rebalance reserves to match changes in outstanding holdings of stablecoins regularly and across all markets in which it operates. Capital controls could prevent the issuer from doing so easily.

If stablecoin issuers will be subject to customer funds protection regulations similar to those currently applied to nonbank e-money issuers, how they will comply with those rules may be one of the most fundamental and still-open regulatory questions for stablecoin innovators.

5 How Will Financial Systems with Limited Foreign Exchange Reserves Adapt to Stablecoins?

Stablecoin initiatives that require an exchange of hard currency may present special challenges for lower-income jurisdictions that lack adequate foreign exchange reserves.

Traditionally, foreign exchange–denominated remittances sent to a migrant worker’s home country would be added to that country’s holdings of foreign reserves. Such holdings often help protect the value of a country’s currency, forming financial resources that may be used to conduct monetary policy.²⁸ A government might additionally draw on foreign exchange reserves to service foreign exchange–denominated debt, support the country’s international trade, or fund investments in the infrastructure more broadly.

An initiative that requires an exchange of a hard currency for stablecoins could reduce a country’s holdings of foreign exchange reserves. Rather than adding the foreign exchange to the local jurisdiction’s stock of reserves, a stablecoin issuer might transmit that foreign exchange back to its asset basket in its home country to support the stablecoin’s value. The local government’s supply of foreign reserves may dwindle,

and with that its ability to conduct monetary policy. Likewise, the government might have fewer resources available to service debt or fund infrastructure investments. Moreover, consumers might sell local currency for foreign exchange in order to buy stablecoins; this local currency would no longer be available for domestic banks to lend, potentially reducing the supply of credit available in the country.

These effects could lead public authorities to impose or tighten capital controls to safeguard national foreign exchange reserves. A widely adopted stablecoin could lead a local central bank to hold stablecoins as part of its foreign exchange reserves; it is unknown whether reserves held in stablecoins could be used equivalently to reserves held in hard currencies.

²⁸. The International Monetary Fund is currently considering the impact of global stablecoins on monetary sovereignty. Financial Stability Board, p. 7.

Would a Central Bank-Issued Stablecoin Be More Accessible to the Poor?

Private sector innovators seeking to scale stablecoins sufficiently to make them useful for the poor should address the five practical and regulatory questions mentioned above. Would a stablecoin alternative—issued by a public authority, such as a central bank—be more successful in addressing these questions?

Central bank digital currency is a twist on stablecoins that could employ many of the technological features that make crypto-assets appealing but would be managed by a central bank. The role that a central bank might play in issuing its own stablecoin—more commonly known as central bank digital currency or CBDC—could alleviate challenges associated with the five questions cited above.

Q1. Processing Speed: Customers might manage their CBDC using wallets offered by third parties but that are ultimately tied to a central bank account.²⁹ In some cases, the central bank might offer accounts directly to consumers.³⁰ Transactions might simply be recorded on the central bank's ledger, reducing the need for time-intensive encryption and blockchain technologies.

Q2. Type of Mobile Phone: A CBDC initiative might not require a distributed ledger since the accounts may ultimately be held on the central bank's own balance sheet. Freeing the customer's mobile device from managing the encryption and messaging requirements of privately issued stablecoins might make simpler and lower-cost feature phones just as capable of handling CBDC transactions as smartphones.

Q3. Cost: Since the central bank is the same authority that typically issues a country's fiat currency, CBDC could theoretically have the advantage of a 1:1 exchange rate with the fiat currency.³¹ A bid-ask spread may still exist between

the liquid hard currency and the country's own less liquid fiat currency. Remittance transactions would nonetheless involve just one step—foreign hard currency to CBDC that is linked 1:1 to the local fiat currency—rather than two (or three) if a privately issued stablecoin is used as the transmission currency, so costs might be lower.

Q4. Customer Funds Protection Requirements: Because cash exchanged for CBDC could be maintained on the central bank's own ledger, funds received from customers would already be moved away from a financial services provider. This arrangement may alleviate the need for customers' funds to be deposited in a commercial bank account.

Q5. Impact on Foreign Exchange Reserves: Because foreign exchange would be exchanged for CBDC, the central bank would ultimately hold the foreign exchange. Hard currency would not be sent overseas to an asset basket supporting a privately issued stablecoin.

If public confidence in the central bank is high, its role in regulating and administering aspects of the CBDC infrastructure could contribute to greater trust in its use. This trust could lead to a rapid scaling of CBDC among businesses, consumers, and government—potentially achieving the vision that stablecoin proponents have for widespread adoption of a crypto-asset across the economy.

More work needs to be done before reaching this conclusion. While 80% of central banks surveyed for a Bank for International Settlements report are conducting research on CBDC or developing experiments and proofs-of-concepts at the beginning of 2020, only a handful have conducted limited pilots.³² Additional study is necessary to determine whether CBDC may promote greater inclusion in the formal financial system compared to existing approaches offered by bank and nonbank e-money issuers.

29. Tommaso Mancini-Griffoli, Maria Soledad Martinez Peria, Itai Agur, Anil Aril, John Kiff, Adina Popescu, and Celine Rochon, "Casting Light on Central Bank Digital Currency," an IMF Staff Discussion Note, November 2018, p. 10, <https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2018/11/13/Casting-Light-on-Central-Bank-Digital-Currencies-46233>.

30. Jesús Fernández-Villaverde, Daniel Sanches, Linda Schilling, and Harald Uhlig, "Central Bank Digital Currency: Central Banking for All?," Federal Reserve Bank of Philadelphia, WP 20-19, June 2020, p. 1, <https://www.philadelphiafed.org/-/media/research-and-data/publications/working-papers/2020/wp20-19.pdf>.

31. Tobias Adrian, "Stablecoins, Central Bank Digital Currencies, and Cross-Border Payments: A New Look at the International Monetary System," Remarks at the IMF-Swiss National Bank Conference, May 2019, <https://www.imf.org/en/News/Articles/2019/05/13/spo51419-stablecoins-central-bank-digital-currencies-and-cross-border-payments>.

32. Codruta Boar, Henry Holden, and Amber Wadsworth, "Impending Arrival—A Sequel to the Survey on Central Bank Digital Currency," Bank for International Settlements, January 2020, p. 3, <https://www.bis.org/publ/bppdf/bispap107.pdf>.

Additional Considerations

How Will the Poor Respond to Stablecoins?

The use of stablecoins, whether issued privately or by a central bank, may introduce other challenges not addressed in this note.

Nonetheless, ultimately consumers' behavior will determine whether stablecoins scale sufficiently for them to be useful to all, including women, the unbanked, and the poor. With little history as a guide, how low-income consumers may respond remains unknown.

Stability in the value of a payments instrument may be appealing but alone may leave unaddressed other factors of importance to people living in poverty. For example, stablecoins, no matter how well designed, may not help the poorest and most vulnerable overcome challenges with access to identity. Twenty percent of the world's unbanked cite their lack of appropriate identification documentation to meet financial institutions' customer due diligence requirements ("know your customer" rules) as a barrier to opening a financial account.³³ This impediment can be

significant for women in lower-income countries, where 44% percent of women lack traditional identity documents such as birth certificates, national identity cards or numbers, or passports.³⁴

Moreover, people living in rural or remote areas may not have access to adequate or consistent mobile network connectivity or even electricity to rely on a mobile phone-based payments system for daily transactions. The poorest and most vulnerable members of some societies may have lower levels of literacy or numeracy that could raise questions about the suitability of stablecoin as a payments instrument. Finally, marginalized populations may decline to enroll in financial accounts of any kind if they lack confidence in financial services providers or public authorities' oversight of the financial system.

Taken together, these potential barriers make it difficult to predict how low-income individuals may respond to stablecoin offerings.

33. Demirgüç-Kunt et al., p. 40.

34. World Bank Group, "Global ID Coverage, Barriers, and Use by the Numbers: Insight from the ID4D-Findex Survey," 2017, <http://documents1.worldbank.org/curated/en/953621531854471275/Global-ID-Coverage-Barriers-and-Use-by-the-Numbers-Insights-from-the-ID4D-Findex-Survey.pdf>.

Additional Considerations

Innovation Is Welcome; Dialogue Is Critical

Despite these unknowns, we should welcome innovators' goals to serve the poor. This note was written to highlight initial practical and regulatory questions and encourage further study and discussion.

Dialogue is crucial before stablecoin offerings are launched on a large scale to ensure that they will promote inclusion and prevent exclusion. In addition to addressing the five questions raised here, innovators, regulators, and consumer advocates should discuss more broadly how stablecoin or other crypto-asset initiatives will serve society's needs for efficient and secure payments and meet regulatory expectations for safety and soundness.

Stablecoins initiatives, if adopted, should protect financial stability, prevent the abuse of the financial system, and safeguard all consumers from harm.

Today, 69% of adults have a financial account of some kind, up from 51% in 2011.³⁵ Progress in achieving financial inclusion reflects in part the initiative and ingenuity of innovators in understanding the financial needs of the poor and developing appropriate and useful tools for them. Likewise, improvements in inclusion over the past decade reflect the openness of regulators to reconsider the orthodoxy of who may provide services and how.

Greater engagement between innovators, regulators, and consumer advocates will be important in determining whether stablecoins or other crypto-assets could help to build a more inclusive digital financial system and an economy that serves the needs of all, including the poor.

35. Demirgüç-Kunt et al., p. 2.