Task Force 2
Our Common Digital Future: Affordable, Accessible and Inclusive Digital Public Infrastructure

THE CASE FOR A WHOLESALE CENTRAL BANK DIGITAL CURRENCY ARCHITECTURE

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Abstract

Among the countries currently considering issuing a central bank digital currency (CBDC), including nearly all of G20, there is a strong preference for a retail CBDC made available to the general public through private intermediaries. This Policy Brief sheds light on the technical complexities and financial risks associated with such a design, and suggests that it may not effectively contribute to the realisation of the goals outlined in the 2020 G20 Roadmap for Enhancing Cross-border Payments (G20 Roadmap or Roadmap), at least in the foreseeable future. The brief makes a case for a wholesale CBDC system as an alternative that avoids these problems and thus is more technically and politically feasible, making it more aligned with the G20 Roadmap. The brief offers recommendations on how the G20 can support a wholesale CBDC architecture globally in light of the numerous benefits that CBDCs can bring to cross-border payments.

The Challenge

1

The global preference for a retail CBDC

By the end of 2022, 114 countries, including almost all of G20, representing over 95 percent of the world GDP, were considering issuing a CBDC.[1] A retail CBDC made available to the general public through private intermediaries has become the overwhelmingly preferred CBDC design worldwide.[2] The latest survey of the Bank for International Settlement (BIS) of the countries considering issuing a CBDC shows that in 2022, over 70 percent of central banks were planning to issue a retail CBDC that would be made available through private intermediaries.[3] The survey also shows that all central banks were considering either a wholesale and retail CBDC or only a retail CBDC, with no central bank contemplating solely a wholesale CBDC. In 2023, Saudi Arabia became the only G20 country, and one of very few countries worldwide, to explore an exclusively wholesale CBDC design.[4]

The preference for retail CBDCs can be explained by the belief that such CBDCs can effectively eliminate the risk of the national currency losing relevance in the digital age, which would consequently mean that central banks may lose the capacity to conduct monetary policy in any meaningful way.[5] Additionally, this trend may be driven by the desire of many central banks to create a novel form of public money that can effectively compete with existing and future forms of private money, such as bank deposits and 'stablecoins', respectively.[6]

The risks and design complexities associated with a retail CBDC

Despite the overwhelming popularity of retail CBDCs, both globally and among the G20 countries, they pose risks to financial intermediation (mainly banking activities) and financial stability and require the implementation of complex design features. Those design features, in turn, present two significant challenges: they are technically difficult to implement; and they can potentially undermine the singleness of the currency. Before discussing these risks and challenges, however, it is important to review how modern monetary systems work.

Modern monetary systems are based on the co-existence and full convertibility between public and private money. Public money, which represents

liabilities of the central bank, and is thus considered "risk-free", takes two forms: (1) the national currency, which is primarily used in retail transactions; and (2) bank reserves, which comprise bank deposits held at the central bank as well as deposits held in banks' vaults and are only used in wholesale transactions.[7] Private money, on the other hand, represents liabilities of private issuers and has two forms: (1) commercial bank money or bank deposits, which is liquidity created by banks through fractional reserve banking; and (2) "e-money," which consists of balances held by non-bank financial technology (fintech) companies and used as a means of payment.[8]

The co-existence of public and private money, and the full convertibility between the two with "no questions asked", gives rise to one of the most fundamental characteristics of modern monetary systems, which is the "singleness" of the currency. This means that one dollar in banknotes is always equivalent to one dollar in bank deposits, even though the former is public money and the latter is private money.[9]

For economists, the main concern about a widely adopted retail CBDC, whether issued directly by central banks or distributed through private intermediaries, is that, as a form of risk-free public money, it could easily serve as a superior substitute for bank deposits. By definition, bank deposits are riskier assets because banks can always become insolvent.[10] This could induce individuals to hold CBDCs in large volumes given their digital form, either during normal times thus leading to bank disintermediation,[11] or during periods of financial distress, potentially triggering or worsening bank runs.[12]

Some proponents of retail CBDCs argue that these risks can be mitigated or avoided altogether through certain design features.[13] The literature offers a wide variety of these features, which aim to either (1) differentiate retail CBDCs from bank deposits, thereby reducing their substitutability, and/or (2) limit substitution between the two if it were to ever occur.[14] Another key proposal in the literature is to limit CBDC uptake through quantity-based or price-based safeguards that can be understood as "limitations" on CBDC holdings or use.[15]

Quantity-based limitations can be instituted through (1) stock-based limits that cap CBDC holdings per

individual or account holder, or (2) flow-based limits that set a maximum value of the transactions that an individual or account holder can conduct using CBDCs during a certain period.[16] One crucial problem with quantity-based limitations is that the fixed quotas can significantly undermine the utility of CBDCs as a means of payment, especially for transactions near or above the cap.[17] Payments that push the payee's CBDC holdings above the cap could be rejected, which would force the payor to use an alternative means of payment.[18] Rejection of payments can, however, be avoided if excess CBDCs are routed to a "waterfall" account held with a pre-selected bank or investment manager.[19] Nevertheless, the advocates of this solution do not specify if the transfer to a waterfall account would trigger a conversion of CBDCs into bank deposits, which could affect the total volume of CBDCs in circulation, or if payees would be able to surpass the allowed cap as long as excess CBDCs are held in the waterfall account.

Unlike quantity-based limitations, price-based limitations work by varying the remuneration (i.e., interest) that is paid on CBDC holdings of different sizes as a means to limit the use of CBDCs as an investment asset.[20] This can be accomplished through either a (1) single-tier system in which the central bank pays low or no remuneration on CBDC holdings across the board, or (2) a two-tier system, where the central bank pays higher remuneration for CBDC holdings below a certain threshold and pays a lower remuneration above that threshold.[21]

How should such a remuneration threshold be determined? Some central banks, such as the European Central Bank (ECB), answer this question by simply setting a targeted total volume of CBDCs in circulation, 1 trillion euros in total or 3000 euros per capita in the case of the eurozone.[22] Would it be necessary for the central bank to impose a ceiling on CBDC holdings above that threshold, or would it be possible for holders of CBDCs to infinitely accumulate them even without remuneration? Absent a ceiling or quota, it is not hard to imagine that over time, CBDC holdings could get concentrated into the hands of a small group of individuals, which is not uncommon in the world of digital assets. Additionally, we should expect that the central bank would need to set different remuneration tiers or quotas for corporate entities and foreigners,

constantly reassess the eligibility of different constituencies to hold CBDCs, and recalibrate all tiers or quotas from time to time.

The aforementioned design complexities pertaining to quantity-based and price-based limitations on retail CBDC holdings or use make the implementation of a retail CBDC system a very technically demanding task. Moreover, these limitations may give rise to CBDC scarcity, potentially creating a gap between the values of CBDCs and other forms of money, which could threaten the singleness of the currency.

The G20 roadmap for enhancing cross-border payments

In 2020, the G20 made the enhancement of cross-border payments a priority, endorsing a three-stage roadmap developed by the Financial Stability Board (FSB) in coordination with the Committee on Payments and Market Infrastructures (CPMI) and several other relevant international organisations and standard-setting bodies.[23] The existing arrangements for cross-border payments are widely criticised for their high cost, low speed, limited accessibility, and insufficient transparency.[24]

The FSB completed Stage 1 of the G20 Roadmap by assessing the existing arrangements and challenges and submitting its findings to the G20 Finance Ministers and Central Bank Governors meeting in April 2020.[25] The CPMI also completed Stage 2 of the Roadmap, publishing a report with 19 building blocks that represent the necessary elements of a response.[26] Building block 19 is exploratory in nature and focuses on factoring an international dimension into CBDC design.

In October 2022, the FSB initiated Stage 3 of the Roadmap by publishing a prioritisation plan and engagement model that moves the Roadmap to the implementation stage along with targeted tangible enhancements to cross-border payments to be achieved by 2027.[27] Between Feb 2023-Feb 2025, CPMI will convene a forum for interested central banks on developing or upgrading their payment systems and factoring an international dimension into fast payment systems and CBDCs. Despite these ongoing international efforts to coordinate CBDC design, such initiatives have so far been

only exploratory and are currently considered incapable of significantly contributing to the achievement of the G20 Roadmap targets by 2027.[28] The technical difficulties associated with the design of retail CBDCs, coupled with opposition from key stakeholders due to concerns over privacy and the stability of the banking system,[29] pose obstacles to the timely launch of CBDC systems. As a result, despite their great potential, CBDCs are not expected to play any meaningful role in advancing the G20 Roadmap.

The G20's Role

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While CBDC design is commonly perceived as a domestic matter driven by specific national considerations, harnessing the potential of CBDCs in advancing the G20 Roadmap requires close international cooperation on CBDC design. For this reason, the collaborative efforts among the G20 countries to establish common CBDC design principles are of paramount importance. By assuming a leadership role in coordinating CBDC design efforts, the G20 can ensure that the international dimension of CBDCs is accounted for in their design from the outset.[30]

Comprising the world's largest 20 economies, the G20 naturally emerges as the ideal platform for coordinating CBDC design efforts. Its membership includes key economies whose successful integration in a CBDC-based cross-border payment network can serve as the foundation for a novel payment system with universal participation. Moreover, the globally influential position of the G20 and its convening power can facilitate collaboration among relevant international organisations and frameworks, such as the FSB, the CPMI, the International Monetary Fund, and the World Bank, that would otherwise work independently. Such collaboration amplifies the effectiveness of these entities as well as their contribution to enabling a CBDC-based cross-border payment system that can disrupt existing arrangements.

Recommendations to the G20

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The following recommendations aim to support the G20's leadership role in coordinating CBDC design efforts, which seek to enlist CBDCs to serve the goal of enhancing cross-border payments.

The G20 must prioritise the exploration of CBDCs' role in cross-border payments.

While improving existing arrangements can enhance cross-border payments, CBDCs can disrupt the status quo, allowing countries "to start with a clean slate", and address the frictions inherent in current cross-border payment systems and arrangements from the outset."[31] The G20 must prioritise exploring the role of CBDCs in cross-border payments as one of the most efficient pathways toward achieving its Roadmap's goals.

This prioritisation is warranted because the large-scale adoption of CBDCs would render both the existing arrangements for cross-border payments and any improvements thereof obsolete. For instance, whereas messaging and settlement— the two sides of any payment transaction—will remain separate under the proposed reforms of the current arrangements for cross-border payments, CBDCs can be used to develop a payment system where the two sides of payments are seamlessly integrated. Such integration would make secure and instantaneous settlement possible, thus drastically reducing the cost and time required to complete cross-border transactions. Additionally, the availability of CBDCs on a 24/7 basis eliminates operating hour mismatches, which persist under existing and improved cross-border payment arrangements.

The G20 CBDC design coordination efforts should pay close attention to the wholesale alternative

Despite the overwhelming global preference for a retail CBDC design, the G20's CBDC design coordination efforts should pay close attention to wholesale CBDCs as an option worthy of consideration, if not a superior alternative. Such superiority can be explained by the following reasons. First, a wholesale CBDC system would preserve the role of financial intermediaries and, thus, avoid any

disruptions in the banking system. By avoiding the risk of disintermediation altogether, the central bank would not need to impose or constantly adjust limitations on CBDC holdings or use, which makes this solution technically easier to implement, more politically feasible, and thus easier to launch. Consequently, wholesale CBDCs can achieve the goals of the G20 Roadmap more rapidly than the retail alternative.

Second, a wholesale CBDC system would maintain the national currency's function as an anchor of the entire monetary system since such a role does not necessarily depend on the currency's use in retail transactions. Only banks and other wholesale entities would use the national currency in the form of CBDCs as a unit of account, a store of value, and a medium of exchange, whereas all other economic actors would use the currency as a unit of account but rely on private money for the other two functions.

Third, the use of wholesale CBDCs in settlement systems creates space for innovation at the wholesale level and offers many benefits, including increasing efficiency, improving risk management, reducing risks in the financial system; improving financial supervision, enabling multi-asset and multi-currency settlement systems, and allowing programmability.[32]

The G20 must adopt a pragmatist, gradualist approach to cross-border CBDC systems

The concerns motivating this Policy Brief's argument for a wholesale CBDC system, particularly the design complexities of retail CBDCs, which are necessitated by the risks retail CBDCs pose to financial intermediation and financial stability, are not insurmountable. Furthermore, the CBDC-induced disruption of the dominant business model in the banking system should not be concerning per se. What should, however, be concerning is the lack of compelling proposals for how financial intermediation could be performed if banks were to be disintermediated, especially since almost all central banks currently lack the technical capacity required to serve as universal banks for all economic actors.

Policymakers can and should address these challenges before proceeding with the implementation of a retail CBDC system. Until this happens, however, a wholesale CBDC system remains a

more feasible and "safer" option that can immediately unleash the immense potential of CBDCs in revolutionising cross-border payments. By promoting a wholesale CBDC design, the G20 would not only fulfil but also surpass the targets outlined in its Roadmap.

Accordingly, the G20 should recognise that implementing a wholesale cross-border CBDC system does not preclude the future adoption of a retail CBDC system. If the main challenges facing a retail CBDC design are addressed, and if an initial wholesale cross-border CBDC system proves successful and enjoys sufficient political support, the G20 should remain open to shifting the focus of its coordination efforts to a retail CBDC design.

Attribution: Mohammad Hamdy, "The Case for a Wholesale Central Bank Digital Currency Architecture," *T20 Policy Brief*, June 2023.

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