

Technical Paper 1.2

Digital currencies and CBDC impacts on least developed countries (LDCs)

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The findings of the Dialogue on Global Digital Finance Governance are packaged into three thematic areas:

Theme 1

BigFintechs and their impacts on sustainable development

- Technical Paper 1.1 BigFintechs and their impacts on sustainable development
- Technical Paper 1.1B BigFintechs and their impacts on macroeconomic policies
- Technical Paper 1.2 Digital currencies and CBDC impacts on least developed countries

Theme 2

Corporate governance innovations

- Technical Paper 2.1 BigFintechs and the UN SDGs: the role of corporate governance innovations

Theme 3

BigFintechs and international governance, policymaking and the SDGs

- Technical Paper 3.1 Policymakers, BigFintechs and the United Nations Sustainable Development Goals
- Technical Paper 3.2 BigFintechs and international governance, policymaking and the UN Sustainable Development Goals: the SDGs in the international governance of finance
- Technical Paper 3.3 A principles-based approach to the governance of BigFintechs

Executive Summary

The purpose of this Technical Paper is to garner a more robust understanding of the potential macroeconomic impacts and related regulatory challenges of central bank digital currencies (CBDCs) and other digital currency initiatives on developing countries. This paper begins from a point of recognition that the landscape of digital currencies, their associated taxonomy as well as related regulations are still evolving alongside their potential implications. As such, we focus on the different types of digital currencies previously in circulation, delineating these from those on the near and immediate horizon. We employ an umbrella definition to encompass CBDCs and digital ledger technology (DLT)-based currencies including stablecoins, as well as earlier versions of digital money, as subsets of digital currency to examine the evolution of macroeconomic impacts on developing countries as well as the emerging regulatory gaps. We cluster key elements and draw assumptions across common parameters in research, for the sake of consistency and to retain the focus on advancing the understanding of the broader macroeconomic impacts on least developed countries (LDCs).

We begin with the evolution of mobile money and e-money as a subset of digital currencies and their well understood positive impact on financial inclusion. We touch briefly upon the regulatory challenges related to the near monopolies of mobile financial services providers and the implications on the traditional commercial banking sector as well as for consumer protection. We also examine the implications of regulatory gaps and risks related to e-money including the market dominance of BigFintech (BFT) companies offering e-money. The

The Dialogue on Global Digital Finance Governance was established by the UN Secretary General's Task Force on Digital Financing of the SDGs. During its investigations, the Task Force recognized that digitalization is not only reshaping the world of finance; it is also driving the emergence of a new generation of global, dominant digital finance platforms (BigFintechs) with increasing cross-border spillover effects on many areas of sustainable development across the world, particularly in developing economies.

The potential impacts of these platforms are both positive and negative, and one of the main challenges in addressing them is that existing policy approaches to BigFintechs have mostly focused on narrow, although important, financial stability, consumer protection and market integrity issues, and some aspects of data, Internet and competition regulation, but have remained largely disconnected from the broader SDG/ESG debate. Another issue is that the governing arrangements of such platforms have seldom involved developing economies, where their impacts are often strongest, and the potential for transformation is greatest.

The Dialogue was established to explore the nexus of BigFintechs and sustainable development. Its goal is to catalyse governance innovations that take greater account of the SDG impacts of BigFintechs and are more inclusive of the voices of developing nations. To this end, the Dialogue has produced a series of Technical Papers that bring new, complementary perspectives on these issues. The papers have been drafted by commanding experts in the field and have been peer-reviewed by leading institutions and academics.

The following paper is [Technical Paper 1.2](#) under Theme 1.

The Dialogue on Global Digital Finance Governance is hosted by the Swiss and Kenyan Governments and stewarded jointly by the United Nations Development Programme (UNDP) and United Nations Capital Development Fund (UNCDF).

paper also examines BFTs from the perspective of their use of government-issued digital currencies and/or development or use of private-issued digital currencies.

An examination of stablecoins is then undertaken with regard to the implications and relationship with existing global payment systems, outlining the limited benefits for developing countries in comparison to existing payment systems. Global stablecoins such as the proposed Diem are examined with a specific emphasis related to the macroeconomic implications for LDCs. Likewise, the paper provides a targeted analysis of the potential macroeconomic implications of CBDCs particularly for LDCs, drawing on key examples of CBDC and digital currencies that have been launched or are being piloted. We provide a section on the implications of digital currencies in the African context as it is home to most of the world's LDCs, and is an ongoing focal point for mobile money, financial inclusion technology and digital currencies. The implications of the COVID-19 pandemic are also discussed for the African context as are the global considerations of shadow banking.

The paper concludes with a summary of the potential risks and macroeconomic implications both nationally and internationally including those related to the fragmented regulatory approaches as well as the emerging technology and governance structures that do not fall within traditional regulatory oversight and mechanisms. It extrapolates key points to better inform the dialogue around a new generation of governance innovations to address the emerging trends, risks and vulnerabilities, particularly in LDCs, and around a potential gap between national fiscal and monetary policy and the capabilities of nations to execute such policies.

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Introduction

Technology has always been a catalyst of change in monetary and payment systems across the globe. The Fintech-led evolution in the payments systems has seen the concept of currency undergo transformation in an unprecedented way.¹ Although currency existed in virtual forms before (such as mobile money and e-money), Bitcoin's launch in 2009 marked an alteration in the conceptualization of 'virtual currency' by introducing a cryptographic form of electronic cash operated on a blockchain protocol—a peer-to-peer distributed ledger technology (DLT) that securely records transactions across computers.² Despite the presence of DLT since 1991,³ it was Bitcoin⁴ that for the first time successfully conceptualized the technology into building a peer-to-peer transaction network and creating a distinct form of cryptographically encrypted currencies, that is cryptocurrencies. Although these blockchain-based cryptocurrencies operated in an unregulated space for a long time,⁵ with some occasional exceptions,⁶ they did not gain popularity as alternative 'currencies'⁷ because of their extremely volatile and speculative nature. However, Facebook's proposal of 'Libra' (now 'Diem')—an asset-backed global stablecoin (GSC)—opened up a new avenue with the prospect of creating a widely available alternative monetary instrument to be used across a range of payments platforms.⁸ With a massive global reach among Facebook, Instagram and WhatsApp users, Libra potentially threatened the 'sovereignty' aspect of money and thus triggered responses from regulators worldwide. Subsequently, Facebook had to step back from its original plan of adopting a multi-currency asset-pegged Libra to issuing a single currency \$-backed coin (now named Diem) as a result of the backlash from regulators. Moreover, Facebook's announcement of a GSC initiative resurfaced the need for regulation to curb the adverse impacts of blockchain-enabled cryptocurrencies and stablecoins.⁹

Recently, the United States Office of the Comptroller of the Currency (OCC) decided to allow banks to transact using digital assets including stablecoins.¹⁰ As Bitcoin's price continues to see dramatic leaps in value, it appears that the market participants¹¹ are also interested in normalizing \$-pegged stablecoins or even Bitcoin as a medium of exchange, which could incentivize the possibility of widespread adoption of blockchain-based digital currencies.

The COVID-19 pandemic boosted the need for 'contactless' payment and the 'digitalization' of payment systems, especially in developed and emerging economies. Interest in DLT both from public and private authorities also culminated in actual releases: China developed its first ever digital form of money—Digital Currency-Electronic Payment (DC/EP),¹² and the Bahamas introduced its US-dollar pegged central bank digital currency (CBDC)—the Sand Dollar.¹³ CBDC is also taking a regional form as the Eastern Central Caribbean Central Bank (ECCB) rolled out its pilot of DCash—a regional CBDC to be operated in seven island nations. Regional collaboration is also under way to establish a single platform for multiple CBDCs ('m-CBDC bridge') among the Hong Kong Monetary Authority, Bank of Thailand, Central Bank of the United Arab Emirates and People's Bank of China's Digital Currency Institute.¹⁴

As technology remains a major catalyst in changing the paradigm of monetary and payment systems (both influenced by public and private authorities), there is

1 For a general discussion, see Arner D, Barberis J, Buckley R, 'The Evolution of Fintech: A New Post-Crisis Paradigm', UNSW Law Research Paper No. 2016-62, 2016, <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2676553>.

2 Nakamoto S, 'Bitcoin: A Peer-to-Peer Electronic Cash System', bitcoin, 2008, <<https://bitcoin.org/bitcoin.pdf>>.

3 The first DLT description which was a precursor to blockchain was Haber S, Stornetta WS, 'How to Time-stamp a Digital Document', 1991, <www.anf.es/pdf/Haber_Stornetta.pdf>.

4 Stuart Harber and W Scott Stornetta first established a cryptographically secured chain of blocks; see 'History of Blockchain', ICAEW, <www.icaew.com/technical/technology/blockchain/blockchain-articles/what-is-blockchain/history>.

5 The regulatory responses were sporadic across the world and did not spur until the beginning of the initial coin offering (ICO) rush.

6 Such as ICO or banning cryptocurrency in many jurisdictions.

7 A currency as a legal tender has three major features: (1) unit of account, (2) store of value and (3) a medium of exchange.

8 Hockett R, 'Facebook's Proposed Crypto-Currency: More Pisces than Libra for Now', Forbes, June 2019, <www.forbes.com/sites/rhockett/2019/06/20/facebook-proposed-crypto-currency-more-pisces-than-libra-for-now/?sh=7b-684b2e2be2>.

9 To address the regulatory risks around stablecoins, the Financial Stability Board (FSB), 18 October 2019, presented a paper before the G20 Finance Ministers and Central Bank Governors setting out the areas of concerns regarding stablecoins; see 'Regulatory Issues of Stablecoins', Financial Stability Board, October 2019, <www.fsb.org/wp-content/uploads/P181019.pdf> and G-Seven Working Group on Stablecoins, 'Investing the Impact of Global Stablecoins', Bank of International Settlement, October 2019, <www.bis.org/cpmi/publ/d187.pdf>. The following year, the FSB prepared a consultative document that critically analyses the regulatory, supervisory and oversight challenges evolving

around the new crypto-asset class; see 'Addressing the Regulatory, Supervisory and Oversight Challenges Raised by "Global Stablecoin" Arrangements: Consultative Document', The Financial Stability Board, April 2020, <www.fsb.org/2020/04/addressing-the-regulatory-supervisory-and-oversight-challenges-raised-by-global-stablecoin-arrangements-consultative-document/>. See also 'Regulation, Supervision and Oversight of "Global Stablecoin" Arrangements: Final Report and High-Level Recommendations', Financial Stability Board, October 2020, <www.fsb.org/wp-content/uploads/P131020-3.pdf>. In the European Union, the EU Commission adopted comprehensive draft on cryptoasset regulation, 'Markets in Cryptoasset Regulation (MiCA)', to enhance consumer and investor protection and reduce the risks associated with digital finance; see Latham & Watkins LLP, 'MiCA: EU Commission Publishes Comprehensive Cryptoasset Market Regulation Proposal', Global Fintech & Payments Blog, October 2020, <www.fintechandpayments.com/2020/10/mica-eu-commission-publishes-comprehensive-cryptoasset-market-regulation-proposal/>.

10 Office of the Comptroller of the Currency (OCC) 'Federally Chartered Banks and Thrifts May Participate in Independent Node Verification Networks and Use Stablecoins for Payment Activities', Washington, January 2021, <www.occ.gov/news-issuances/news-releases/2021/nr-occ-2021-2.html>.

11 Khatri Y, 'Visa Now Settles Payments in USDC Stablecoin on Ethereum Blockchain', The Block, March 2021; 'PayPal Now Allows Crypto Spending at Millions of Merchants', The Block, March 2021; see also, Nicholas K, 'Tesla Now Accepts Bitcoin as Payment for Cars, Musk Says', The Bloomberg, March 2021, <www.bloomberg.com/news/articles/2021-03-24/you-can-now-buy-a-tesla-with-bitcoin-elon-musk-says>.

12 Aredy JT, 'China Creates Its Own Digital Currency, a First for Major Economy', The Wall Street Journal, April 2021, <www.wsj.com/articles/china-creates-its-own-digital-currency-a-first-for-major-economy-11617634118>.

13 Bharathan V, 'Central Bank Digital Currency: The First Nationwide CDC in the World Has Been Launched by the Bahamas', Forbes, October 2020, <www.forbes.com/sites/vipinbharathan/2020/10/21/central-bank-digital-currency-the-first-nationwide-cbdc-in-the-world-has-been-launched-by-the-bahamas/?sh=11b81a5d506e>.

14 The Hong Kong Monetary Authority, 'Fintech Co-operation between the Hong Kong Monetary Authority and the Central Bank of the United Arab Emirates', Press Release, February 2021, <www.hkma.gov.hk/eng/news-and-media/press-releases/2021/02/20210223-4/>; see also, 'Multiple CBDC (mCBDC) Bridge', Bank for International Settlements, <www.bis.org/about/bisih/topics/cbdc/mcbdc_bridge.htm>.



Scope and structure of the paper

also an urgency to study the large-scale macroeconomic impacts of digital currencies and how these could alter the dynamics of current monetary and payment systems and global financial stability. Further, this also demands that impacts are studied in the context of least developed countries (LDCs) and how they influence the United Nations' Sustainable Development Goals (SDGs). From a cross-border aspect, digital currencies, including CBDCs are likely to reduce transaction costs for end-users, and hence transfer of remittance is likely to be easier and cheaper. Adversely, depending on the arrangements, this could provide a backdoor to avoid economic sanctions and affect international relations by triggering geopolitical tension.¹⁵ Digital currencies could also pose risks and policy challenges, including impacts on the ability of central banks to implement monetary policy, and of governments to implement fiscal policy. This paper examines these applications and effects, as well as knock-on effects created in socio-economic spheres, particularly in LDCs.

Overall, we observe that the potential availability of foreign currency-denominated CBDCs and GSCs in LDCs could create a growing gap between national fiscal and monetary policy, and the capabilities of nations to execute these policies. CBDCs issued by global superpowers and GSCs denominated in their currencies, are likely to impact central banks' control of money supply in LDCs through currency substitution¹⁶ and in developed countries because of increased efficiencies in commercial or market settlements.¹⁷ Such impacts can be mitigated through regulations¹⁸ and design of CBDCs. Despite the technical opportunity to implement monetary policies via CBDCs with a variable interest-rate, it should be noted that no country has yet indicated its intention to do so.

The acceleration in the issuance of CBDCs is likely to impact both how the commercial banking sector is used to implement monetary policy as well as its pivotal role in moving and storing value. Monetary policy and financial supervision need to be revised internationally to acknowledge these changes and to mitigate potential negative impacts.

As CBDC is emerging as a topic of immediate interest for central banks around the world, the debate about technical structures, accessibility, role of the commercial banking system and the private sector is ongoing. While we refer to some of these implications, discussion of alternative CBDC structures is outside the scope of this paper. For the sake of consistency and focus we are clustering some elements, and drawing conclusions and assumptions across the common parameters of those elements, based on current research and policy dialogues. The scope of this paper is on potential macroeconomic implications of CBDCs (and digital currencies), with a specific focus on the implications for LDCs.

- This paper discusses the growth of money in 'digital'¹⁹ form,²⁰ and is structured around the delineation between the different types of digital currencies in circulation today and those on the immediate and near horizon. It evaluates their current and potential macroeconomic impacts and regulatory challenges on LDCs from national and international perspectives.
- This paper will explore, in a limited capacity, the influence of BigFintech (BFT) companies and their use of government-issued digital currencies and/or development or use of private-issued digital currencies. It is important to note that the supply of both GSCs and, more recently, CBDCs, with China's DC/EP, is seeing accelerated growth.
- This paper notes that domestic CBDCs and, to an extent, domestic denominated stablecoins²¹ have the potential to serve—intentionally or unintentionally—as a technical instrument for implementing monetary or fiscal policy. The design of CBDCs impacts their availability (i.e. barriers to adoption) as well as whether they can be used to implement monetary or fiscal policy—through applying interest rates, taxation or other programmable elements which are likely to be subject to political challenges. However, CBDC design is not within the scope of this paper.

15 Biggs J, 'Venezuela Tries to Avoid US Sanctions by Trading in Rubles and Crypto', Coindesk, May 2019, <www.coindesk.com/venezuela-tries-to-avoid-us-sanctions-by-trading-in-rubles-and-crypto>.

16 CBDC design dictates a wide range of features such as whether the CBDC is used only domestically or also internationally, capital controls which could limit cross-border impacts and barriers to entry preventing it from being used as a substitute currency.

17 CBDCs as a settlement instrument can decrease settlement periods for securities, as well as increasing real-time gross settlement (RTGS) opportunities in commercial markets.

18 LDCs could, for example, restrict use of foreign-denominated CBDCs or GSCs in their countries, although such bans would be hard to enforce without restricting Internet access, especially in the informal economy. Alternatively, regulators could force private issuers to restrict sale of their currencies; however, again, this would be difficult to enforce, while regulators lack motivation to constrain opportunities for national commercial growth at the expense of foreign countries.

19 Digitally or electronically issued, stored-complex, rather understood in the absence of physical cash.

20 The scope of this paper does not allow for an econometric assessment of CBDCs in relation to LDC market functioning. This is also not yet fully feasible because of the nascent and rapidly shifting landscape. In addition, the scope does not encompass decentralized cryptocurrencies, which until now have not served in a substantial role as 'money' in society and have faced barriers to widespread adoption including a lack of regulatory clarity over classification of digital assets, limited utility as a payment instrument, a lack of accessible tools, compatibility with payment devices and terminals, price volatility of cryptocurrencies, limited supply and negative public perception.

21 Although domestic-denominated stablecoins are unlikely to be used directly to implement monetary or fiscal policy, they could help maintain money supply, reduce the risk of currency substitution and increase visibility of commercial activities towards wider collection of taxes.



- The macroeconomic impacts of CBDCs must be considered in terms of design choices which are still highly theoretical. The impacts could also vary depending on the technology used, size of the economy where it is issued, the regulation and macroeconomic policy of the issuing country and other variable factors (such as strong and mature financial institutions); and therefore, these impacts are not fully predictable at this stage as very few economies have adopted CBDCs.
- The paper traces to the earlier versions of digital money, such as Fintech-led mobile money and e-money, and captures the gradual evolution of current discourse of digital currencies, including privately issued stablecoins, GSCs and sovereign-issued digital currencies. Nonetheless, it recognizes that the landscape of digital currencies and their associated taxonomy and regulations are still evolving alongside their potential implications.

Emerging applications for digital currencies

Digital currencies, whether issued by a sovereign central bank, a private sector organization or a community, represent both an innovation in payment systems²² and a form of virtual money.²³ The key innovation behind DLT-based digital currency is the introduction of ‘distributed ledger’, which allows a currency to be used in a decentralized payment system and to be applied to a host of other distributed data systems, with applications ranging from transaction monitoring to certification. Although the concept of currency in ‘digital or virtual’ form is not new (such as mobile money and e-money), we argue that the application of emerging technology in currency-creation requires closer attention because of the technology involved (DLT and non-DLT) and its potential impact on developing macroeconomic risks depending on the design choices and motives and the entities associated (public and private). Therefore, for the purpose of this paper, we define digital currencies as an umbrella term that (1) involves the use of DLT and non-DLT-based technologies; or (2) has an exchange or store-value; or (3) is generated, stored and transferred through a digital technology solution. DLT-based currencies are a subset of digital currencies,²⁴ as are mobile money and e-money.

22 That is, any system enabling the transfer of monetary value to settle financial transactions between parties.

23 That is, a digital instrument used as a medium of exchange or store of value that facilitates economic activity such as manufacturing or trade, and the transfer of purchasing power from the present to the future, aka savings, or a unit of account.

24 There is disagreement on whether pure cryptocurrencies (as opposed to stablecoins) can be considered a store of value because of their price volatility, or a medium of exchange because of the speed and cost of some cryptocurrency transactions. See Blakstad S, Allen R ‘Fintech Revolution: Universal Inclusion in the New Financial Ecosystem’, Palgrave, 2018, <www.palgrave.com/gp/book/9783319760131>.

Mobile money

Mobile money, usually delivered via mobile phones through a mobile financial services (MFS) provider, was one of the earliest forms of Fintech innovation which has significantly impacted the lives of unbanked and underserved populations by giving them access to standard financial services or alternative financial services. Starting with M-Pesa in Kenya in 2007, mobile money has established a strong foothold in Africa with tens of millions of customers. Usually, mobile money originates from users transferring mobile credits in lieu of cash which is escrowed against fiat currency by the MFS provider. As the infrastructure involved in mobile money does not critically require a formal financial institution account to be used, mobile money is convenient, cheap and user-friendly, and thus has become a means of financial inclusion for millions of people across the world.

Given the increasing popularity of mobile money because of its conveniences, BFTs are also collaborating with the MFS providers to expand the customer base of both. For example, Ant Financial has recently entered into a strategic partnership with bKash—the largest MFS network in Bangladesh with more than 180,000 agents and over 30 million registered accounts.²⁵ In a country of 160 million, bKash has established a major infrastructure empowering millions of unbanked and underbanked by giving them access to financial services without requiring them to open a traditional bank account.

In hindsight, MFS providers have given rise to near monopolies,²⁶ having more customers than banks in their native countries.²⁷ In addition, they usually do not require banking licences because they are not providing full banking services. Although some countries have adopted MFS regulations (such as Bangladesh), major mobile money providers like M-Pesa and Ant Financial initially requested regulatory guidance but have been allowed to operate under a special licence by their respective regulators, with Ant Group founding MyBank via a formal banking licence in 2015.²⁸ These special licences were awarded because the benefits were recognized as significant by government regulators and international agencies such as the United Nations and the World Bank Group. For example, Ant Financial helped move the

25 ‘bKash and Ant Financial in strategic partnership to promote financial inclusion for the unbanked in Bangladesh’, bKash, April 2018, <www.bkash.com/node/2473>.

26 See, for example, ‘Interoperability needed to break monopoly of MFS market’, The Business Standard, August 2020, <<https://tbsnews.net/economy/banking/interoperability-needed-break-monopoly-mfs-market-123337>>.

27 M-Pesa had 24.91m customers in Kenya as of end 2019 (‘Financial highlights’, Safaricom, 2020, <www.safaricom.co.ke/annualreport_2020/financial-highlights/>), whereas KCB Bank, Kenya’s largest bank by customer numbers, has 21.6m across six countries including Kenya (‘About us’, KCB Bank Group Kenya, <<https://ke.kcbgroup.com/about-us>>).

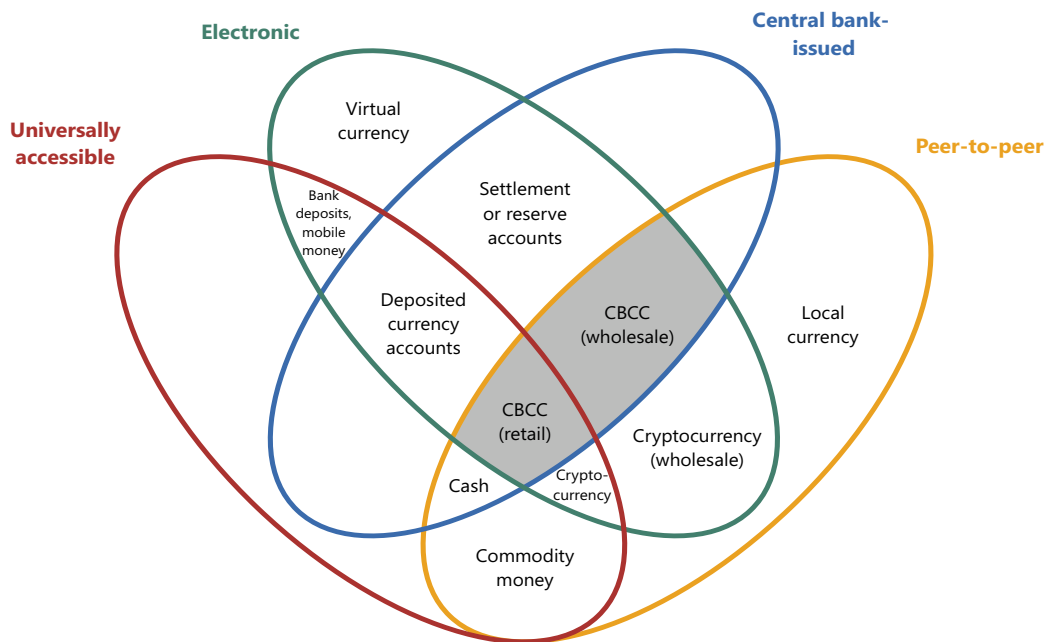
28 Both M-Pesa and Ant were awarded ‘special licences under their respective regulatory regimes, with Ant Group founding MyBank with a formal banking licence in 2015.

banked population of China from 64 per cent to 80 per cent in less than a decade.²⁹ Similarly, M-Pesa, starting from an even lower base in Kenya, has helped increase the percentage of the population that is part of the formal financial sector from about 20 per cent to more than 60 per cent over a 10-year period (2007–2017).³⁰

With the growth in customer bases, M-Pesa and the Chinese payments platforms are now offering a range of services including lending backed by financial institutions³¹ and increasingly off their own books, such as Ant Group's MyBank and M-Pesa's Fuliza.³² The BFTs' unfettered growth in combination with light regulation gives rise

to significant regulatory concerns—the monopolistic behaviour of BFTs threatens the operation of the traditional commercial banking sector and raises concerns about consumer protection. However, regulators are now pushing back, most recently demonstrated by the suspension of Ant Group's IPO³³ by the People's Bank of China (PBOC). This occurred one day before the IPO was to be issued, on the apparent grounds that this would make Ant Group 'too big' and potentially capable of exacerbating the SME credit bubble. To quote Forbes, "Ant is creating the conditions for a repeat of the same sort of 'subprime' credit crisis that triggered the 2008 financial debacle in the U.S."³⁴

Graph 1: The Money Flower: A taxonomy of money



Source: Bank for International Settlement 2018

29 See, for example, Tattersall M, 'Ant Group has filed for its much-anticipated IPO', Business Insider, August 2020, <www.businessinsider.com/ant-group-files-for-ipo-after-enjoying-strong-revenue-growth-2020-8#:~:text=Ant%20Group%20has%20over%201,year%20increase%2C%20per%20the%20filing>.

30 Reuters Staff, 'M-Pesa helps drive up Kenyans' access to financial services - study', Reuters, April 2019, <www.reuters.com/article/kenya-banking/mpesa-helps-drive-up-kenyans-access-to-financial-services-study-idUSL8N21L2HK>; see also World Bank, 'Findex Global Database', <<https://globalfindex.worldbank.org/>>.

31 See, for example, Oludimu T, 'Safaricom launches Fuliza, an overdraft facility for its M-Pesa customers', Techpoint.africa, January 2019, <<https://techpoint.africa/2019/01/10/safaricom-launches-mpesa-fuliza-feature/>>.

32 See, for example, Shah R, Kumar R, 'Ant Group now makes more money from lending than from payments', Tellimer, October 2020, <<https://tellimer.com/article/ant-group-now-makes-more-money-from-lending-t->>.

33 Wade M, Teracino E, 'China clips Jack Ma's wings with Ant Group IPO delay', Nikkei Asia, November 2020, <https://asia.nikkei.com/Opinion/China-clips-Jack-Ma-s-wings-with-Ant-Group-IPO-delay?utm_source=taboola&utm_medium=msn-msn&utm_campaign=BA%20HK%20RSS&utm_term=1000408&utm_content=RSS&tblci=GiCnObspucYuTOI-Gm7CNhodn_NpDbsaepUZO8EamlyAX6CDAhkE#tblci=GiCnObspucYuTOI-Gm7CNhodn_NpDbsaepUZO8EamlyAX6CDAhkE>.

34 Calhoun G, 'Why China Stopped The Ant Group's IPO (Part 2): Ant's Dangerous Business Model', Forbes, November 2020, <www.forbes.com/sites/georgecalhoun/2020/11/16/why-china-stopped-the-ant-groups-ipopart-2-ants-dangerous-business-model/?sh=3a26725658bf>.

e-money

Fully backed by fiat currency, electronic money (e-money) can be an umbrella term to include money held in pre-paid cards, electronic wallet or web-based services, such as PayPal.³⁵ With the growth of BFTs' product portfolios and their adoption of more innovative technologies, and in the light of recent announcements by Visa³⁶ and others, e-money should be assumed to include stablecoins.³⁷ For the purpose of this paper, we use the European Union's definition: "e-money is a digital alternative to cash," which "allows users to make cashless payments with money stored on a card or a phone, or over the Internet".³⁸ e-money can be used to transact between individuals and businesses via a mobile app or other digital platform. Examples of e-money include WeChat Pay and Alipay's e-wallets, both widely used in China. The major difference between mobile money and e-money is, in the case of e-money, the e-wallet is linked with the users' existing traditional bank accounts or credit cards, while the mobile money wallet does not require an underlying bank account.

Amid the popularity of digital currencies, many BFT companies, including social media companies, are supporting e-money, leveraging the strong network effects

as e-money is convenient, relatively cheap and ensures faster peer-to-peer transactions. Yet, e-money carries the risks associated with a lack of deposit insurance. For instance, any money stored in PayPal is not covered by the deposit insurance scheme delineated under the US Federal Deposit Insurance Corporation.³⁹ The platforms are regulated to a lower standard and hence carry risks of consumer protection, cybersecurity and lax enforcement of Know Your Customer (KYC) requirements. The lack of interchangeability and interoperability⁴⁰ poses a risk that only the largest provider will survive. Central banks could give e-money providers access to their reserve accounts, providing a strong protection regime for depositors with similar regulatory requirements regarding liquidity and KYC as commercial banks. Similar to CBDCs, this would also mean that there is a risk of "potential and partial disintermediation of commercial banks if some depositors preferred holding e-money".⁴¹

Table 1 demonstrates the current trends of digital currencies issued and adopted across the financial markets. The table serves to illustrate that traditional banks and non-bank Fintechs are frontrunners in adopting digital currencies. As this form of currency evolves, the associated risks also change because of the varying nature of technology used and assets involved as collateral.

35 Firpo J, 'E-Money – Mobile Money – Mobile Banking – What's the Difference', World Bank Blogs, January 2009, <<https://blogs.worldbank.org/psd/e-money-mobile-money-mobile-banking-what-s-the-difference>>.

36 Dillet R, 'Visa supports transaction settlement with USDC stablecoin', Techcrunch, March 2021, <https://techcrunch.com/2021/03/29/visa-supports-transaction-settlement-with-usdc-stablecoin/?guc-counter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAADUMEugkSz2Bhy0BtQcXDXgWd_MpUjX-PQMkVwe3HTxf17WcK1sN8q8WtWlUc4qjC_76kKajTwXEJ40Wg-M16K47qOzU2Wi7cMwFP6QUQfri5g771bcV5ftKL27zVsgbxElzEQZUzLOd-TQa3gyaF9DQ9o0G-QLYHgocrFiTVjaAK->>.

37 Tobias A 'Stablecoins, Central Bank Digital Currencies, and Cross-Border Payments: A New Look at the International Monetary System' IMF-Swiss National Bank Conference, Zurich, May 2019, <www.imf.org/en/Publications/fintech-notes/Issues/2019/07/12/The-Rise-of-Digital-Money-47097>.

38 E-money - Directive 2009/110/EC, European Commission, <https://ec.europa.eu/info/law/e-money-directive-2009-110-ec_en>.

39 PayPal User Agreement, <www.paypal.com/us/webapps/mpp/ua/useragreement-full#communications>.

40 There are aggregators that provide interoperability, but these come at an additional cost.

41 Adrian T, 'Stablecoins, Central Bank Digital Currencies, and Cross-Border Payments: A New Look at the International Monetary System. Remarks by Tobias Adrian at the IMF-Swiss National Bank Conference', May 2019, <www.imf.org/en/News/Articles/2019/05/13/sp051419-stablecoins-central-bank-digital-currencies-and-cross-border-payments>.

Table 1: The current landscape of digital currencies⁴²

Issuer	Underlying currency	Collateral	Risk
Bank, e.g. JPM Coin 'Cash on Ledger'	US\$, EUR, other stable fiat currencies	Fractional reserve limits, i.e. no external or central bank collateral requirement but offset 1:1 against bank issued currency ⁴³	Inherits risk of issuing bank (part of fractional reserve by extension—holding same risks and subject to same rules)
Central Bank, e.g. PBOC	National currency	n/a, issued under national monetary policy money supply limits	Inherits risk of national currency
Consortium of banks, e.g. Finality	US\$, CAD, GBP, EUR, YEN	Cash reserve at central banks (Finality)	Partially that of bank but supported by national currency because of cash reserve
Non-bank Fintech (fiat backed stablecoins), e.g. Tether	National currency	Cash reserve in commercial bank	Inherits risk of the holding commercial bank; however (as with Tether), requires transparency to maintain confidence. It also threatens financial stability as it carries the traditional risks of private sector-mandated stablecoins being 'too big to fail' and 'too connected to fail'. Furthermore, it carries the risks of impacting countries' monetary policy transmission and may threaten the effectiveness of the central bank's functions as a lender of last resort ⁴⁴
Non-bank Fintech (collateral backed), e.g. MakerDAO DAI	US\$, EUR, other stable currencies	Collateral reserve held as digital assets	Managed by Fintech and governed by Board, Foundation, etc.
Non-bank Fintech (fiat backed, multiple currency) e.g. Diem	US\$ + YEN + CHF + GBP + EUR...	Can include fiat currency and bonds (i.e. Diem originally proposed a mixture of cash and bonds held in a Swiss Commercial Bank)	Inherits risk of holding commercial bank BUT not clear how currency valuation and fluctuations would be managed

42 Haahr M, Foster K, Blakstad S, 'Blockchain: Gateway for Sustainability Linked Bonds (Green Digital Finance Alliance)', HSBC Center of Sustainable Finance and the Sustainable Digital Finance Alliance, 2019 <https://docs.wixstatic.com/ugd/3d4f2c_a8d74cac6f974984a67f7b8c05146f8e.pdf>.

43 Because a bank-issued coin is backed by cash reserves held at the bank, it carries the same risk as that bank's deposits, unlike CBDCs which are backed by central bank reserves. Theoretically, stablecoins have a 1-1 ratio in reserve; however, this is also bank money and so part of the fractional reserve by extension—they hold the same risks as the bank and are subject to the same sector rules. The question as to whether it is bank-issued currency (not backed by a central bank) is about what level of risk is applied.

44 Calhoun G, 'Why China Stopped The Ant Group's IPO (Part 2): Ant's Dangerous Business Model', Forbes, November 2020, <www.forbes.com/sites/georgecalhoun/2020/11/16/why-china-stopped-the-ant-groups-ipopart-2-ants-dangerous-business-model/?sh=3a26725658bf>.

Stablecoins

Stablecoins, such as Tether or DAI,⁴⁵ are digital currencies pegged to a 'stable' fiat currency, asset or pool of assets.⁴⁶ Bitcoin pioneered the paradigm of a disintermediated peer-to-peer financial transaction network, but because of its volatility, high transaction cost and low throughput, it lacks the necessary characteristics to be an efficient medium of exchange. As a result of an in-built price stability mechanism, stablecoins, in general, have comparative advantages over cryptocurrencies "in terms of privacy, stability, decentralization and solvency".⁴⁷ As a store of value, stablecoins, like some physical assets such as gold, may gain popularity among investors where fiat currencies are unstable.⁴⁸ Stablecoins may be favoured as an underlying asset by a small niche of traders in securities such as futures and options.⁴⁹

While cryptocurrency is popular in some African countries such as Kenya and Nigeria,⁵⁰ adoption in LDCs has been limited to date.⁵¹ In contrast, stablecoins derive leverage from the fact that the coin is backed or collateralized by a store of assets or currencies. Thus, depending on the design and arrangement, stablecoins carry the potential to facilitate secure and convenient transactions without volatility, at a lower cost than telecom-issued mobile money, and, depending on the currency design, held in a wide variety of non-bank wallets. Stablecoins do not share cryptocurrency characteristics such as volatility or predetermined limits on supply.⁵² With the recent OCC ruling that US banks can use stablecoins for payments⁵³—in a move that could be interpreted as opening up

competition for the proposed Diem—their utility has been extended. Therefore, stablecoins could serve as a means of payment and store of value within and alongside existing global payment systems, although for developed countries, the benefits compared to existing payment systems are limited, while they may carry consumer risks such as poorly managed reserves.

Macroeconomic considerations of stablecoins

Domestically, stablecoins, supported by improved accessibility through tools such as mobile apps, can support financial inclusion by enabling people to transact and save digitally without the need for a formal bank account, for example using Fintech wallets with lower KYC requirements, similar to those applied today to mobile money, but at a lower cost than telecom-issued mobile money. As the poorest are very price-sensitive, this is likely to increase the number of people using electronic money for payments and savings. This in turn would allow those currently underserved by financial institutions to build digital histories, which can lead to formalization of a business or access to credit.⁵⁴ Used as a means of payment or settlement cross-border, stablecoins have the potential to overcome significant shortcomings and friction in existing cross-border payments.⁵⁵ This has been trialled within financial institutions as a cost-saving measure, for instance for interbank settlements, but could also extend to reducing friction in cross-border retail transactions, extending trading opportunities for small and micro businesses in LDCs.

Nonetheless, stablecoins could also pose numerous challenges and risks. In 2019, the Group of Seven (G7) Working Group on Stablecoins investigated their global impacts and concluded that such adverse effects could be felt both nationally and internationally on monetary sovereignty and financial stability.⁵⁶ In addition, stablecoins could also affect countries' efforts to combat money laundering, terrorist financing and tax avoidance. Moreover, this emerging sector of financial innovation is yet to be accepted as a payment means on a global scale given that there has been significant fragmentation in regulatory approaches towards stablecoins and cryptocurrencies. For instance, while the OCC has recently declared that federally chartered banks could issue stablecoins for payments,⁵⁷ the UK and EU are

45 FSB has a non-exhaustive list for stablecoins available cross-border, with Tether being the leading one. Other stablecoins include DAO, DAI, TrueUSD, USDPax, PAXGold, Everex, SGDR, 1SG, SDS, USDC, USDS, EURX, JPYX, GBPX, AUDX, NZDX, CNYX, RUBX, CHF, CADX, GLDX and SLVX; see 'Addressing the Regulatory, Supervisory and Oversight Challenges Raised by "Global Stablecoin" Arrangements', The Financial Stability Board, April 2021, <www.fsb.org/wp-content/uploads/P140420-1.pdf>.

46 For a general discussion on the taxonomy of stablecoins, see Bullmann D, Klemm J, Pinna A, 'In Search for Stability in Crypto-Assets: Are Stablecoins the Solution?', <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3444847>.

47 Li C, Shen Y, 'The Potential Impacts and Risks of Global Stablecoins', China Economic Journal, 2019 <<http://doi.org/10.1080/17538963.2021.1872167>>.

48 Reuters Staff, 'Bitcoin emergence as 'digital gold' could lift price to 146000, says JPM', Reuters, January 2021, <www.reuters.com/article/crypto-currencies-jpm/bitcoin-emergence-as-digital-gold-could-lift-price-to-146000-says-jpm-idUSL8N2JG2MM>.

49 Russell D, 'Crypto Futures Are in Contango, Creating Potential Opportunities for Savvy Traders', TradeStation, April 2021, <www.tradestation.com/insights/2021/04/01/crypto-futures-contango-cash-carry/>.

50 See, for example, 'The rise of crypto adoption in Africa', International Finance, May 2019, <<https://internationalfinance.com/the-rise-of-crypto-adoption-in-africa/>>.

51 Nigerian Central Bank banned the use of cryptocurrency on 5 February 2021, see Ogunrinola I, 'Banning Cryptocurrency Trade in Nigeria: Was the CBN Right?', Business Today, April 2021, <<https://businessday.ng/opinion/article/banning-cryptocurrency-trade-in-nigeria-was-the-cbn-right/#:~:text=On%20February%205%202021%2C%20Nigeria%2C%20through%20its%20Central,perceived%20dangers%20to%20both%20end-users%20and%20the%20country.>>.

52 The reserve capability of the issuer is related to the amount of money that goes into the system, so, in theory, could extend to the entire money supply of a particular currency.

53 Sun M, 'OCC Says Banks Can Use Stablecoins in Payments', The Wall Street Journal, January 2021, <<https://www.wsj.com/articles/occ-says-banks-can-use-stablecoins-in-payments-11610068515>>.

54 Blakstad S and Amars L, 'Fintech at the Frontier: Technology developments supporting financial inclusion in Niger', Journal of Digital Banking 4(4), 2020, <www.henrystewartpublications.com/jdb/v4>.

55 Arner D, Auer R, Frost J, 'Stablecoins: risks, potential and regulation', BIS Working Paper No. 905, 2020, <www.bis.org/publ/work905.pdf>.

56 G7, International Monetary Fund [IMF], and The Committee on Payments and Monetary Infrastructures [CPMI], 'Investigating the impact of global stablecoins', IMF, 2020, <www.imf.org/~media/Files/Research/G7SC-Report-on-Global-Stablecoins102019.ashx?la=en>.

57 Supra note 20.

still cautious in measuring the appropriate regulatory approach. The HM Treasury put forth in its 'Consultation and call for evidence' paper that such an approach should be "proportionate" and "sensitive to risks posed, and responsive to new developments in the market".⁵⁸

At the EU level, the proposed Markets in Crypto-assets (MiCA) regulation aims to provide legal certainty for cryptocurrency firms within the EU and beyond.⁵⁹ In contrast, some developing economies where cryptocurrencies have been popular as an alternative store of wealth, or used to avoid taxation or AML controls and, in many cases, exposed consumers to risk, have responded with strict regulations for cryptocurrencies. An example of such a ban is Nigeria, where the Central Bank of Nigeria banned banks from holding accounts which are used to trade in cryptocurrencies.⁶⁰ Previously, Bangladesh imposed a ban on all types of virtual currencies during the Bitcoin frenzy in 2017.⁶¹ Such bans have previously been implemented prior to a country launching its own digital currency, for example in Venezuela and then China. However, many LDCs are yet to clearly define regulation of cryptocurrencies or other digital assets. In the context of regulatory uncertainties and fragmented opinions, there is a lack of uniform standardized practice in regulating digital currencies, including stablecoins. The most recent probe on Tether and Bitfinex⁶² divulges that without a robust and strong regulatory enforcement, stablecoins could be a means of market manipulation hurting retail investors and causing general distrust among consumers.

On a macroeconomic level, for LDCs, stablecoins could substitute national currencies and trigger capital flight which could lead to reduction in cash supply (in local currencies) and thus change the basic monetary structure in a sovereign country.⁶³ A large-scale issuance of stablecoins is likely to have an impact on the legal tender of a country. In a small and open economy, US\$-backed stablecoins could enhance the dominant position of the US\$ and undermine the domestic currency.⁶⁴

Because of its faster circulation, GSC could "evolve into a bridge between the US dollars and the local currency" and thus "expedite the transformation of local legal currency to the stablecoin".⁶⁵ This could potentially lead to the gradual dollarization of small economies and aggravate the devaluation of their domestic currencies.⁶⁶ Furthermore, stablecoins use a novel technology and governance structure⁶⁷ that falls outside the scope of traditional regulatory oversight and therefore may give rise to new risks such as poorly managed reserves, exposing customers to potential losses.⁶⁸ If stablecoins are adopted globally and grow to be systemically significant, cross-border transactions in regions could be possible without financial intermediaries and third-party payment institutions which would raise holdings of GSCs significantly.⁶⁹ In the absence of effective regulations and monetary policies, these risks will be amplified and could potentially subvert the national monetary and financial systems to the extent that it could widely substitute cash and deposit in LDC economies, and eventually threaten the safety, efficiency and integrity of the financial system. Comprehensive regulation, supervision and oversight mechanisms combined with domestic and international cooperation will be needed to curb the adverse impacts of GSCs.⁷⁰

Global stablecoins (GSCs)

According to the Financial Stability Board (FSB) three major characteristics distinguish GSCs from other stablecoins and cryptocurrencies: (i) stabilization mechanism; (ii) usable as a means of payment and/or store of value (these two make them separate from cryptocurrencies); and (iii) the potential to achieve substantive volume across multiple jurisdictions (this feature keeps a GSC separate from other stablecoins).⁷¹ Diem (formerly 'Libra') is an example of a GSC. Diem is an independent "global, digitally native, reserve-backed cryptocurrency" and subject to its own association.⁷² Originally proposed as 'Libra' by Facebook, Diem has scaled back its ambitions of pegging the coin to a basket of assets comprising currencies and bonds following pushbacks by US regulators and is likely to offer only US\$-backed stablecoins. Facebook's massive global reach

58 HM Treasury 'UK Regulatory Approach to Cryptoassets and Stablecoins: Consultation and Call for Evidence', January 2021, <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/950206/HM_Treasury_Cryptoasset_and_Stablecoin_consultation.pdf>.

59 MiCA also seeks to harmonize national legislations, including Malta which is known as 'Blockchain Island', and provide uniform rules for all cryptocurrency markets.

60 BBC News, 'Nigerian cryptocurrency: CBN ban Crypto [Dogecoin, Bitcoin, Ethereum] trading in Nigeria, how Atiku, Davido, odas use 'CowtoCurrency' react', February 2021, <www.bbc.com/pidgin/world-55961189>.

61 Mowla G, 'Central Bank Issues Notice Banning Bitcoin in Bangladesh', Dhaka Tribune, December 2017, <www.dhakatribune.com/business/banks/2017/12/27/bangladesh-ban-bitcoin#:~:text=Bangladesh%20Bank%20has%20banned%20the%20use%20of%20Bitcoin,,currency%20in%20any%20other%20country%20in%20the%20world>.

62 Browne R, 'Cryptocurrency firms Tether and Bitfinex agree to pay \$18.5 million to end New York probe', CNBC, February 2021, <www.cnbc.com/2021/02/23/tether-bitfinex-reach-settlement-with-new-york-attorney-general.html>.

63 'Crypto-Asset Markets: Potential Channels for Future Financial Stability Implications', Financial Stability Board, 2018, <www.fsb.org/wp-content/uploads/P101018.pdf>. See also supra note 61.

64 Ibid.

65 Ibid., p. 5.

66 Ibid.

67 As distributed ledgers and the systems built on them authorize and validate transactions via distributed security and consensus protocols, there is no financial institution to regulate.

68 Supra note 68.

69 As VISA and other major payment networks are increasingly becoming involved in transactions using stablecoins, distribution opportunities are expanding exponentially, raising the potential for systemic significance. See supra note 15.

70 For a discussion on GSCs' regulatory, supervisory and oversight challenges and G20 and FSB's high-level recommendation in response to them, see supra note 14.

71 'Addressing the Regulatory, Supervisory and Oversight Challenges Raised by "Global Stablecoin" Arrangements', FSB, April 2020, <www.fsb.org/wp-content/uploads/P140420-1.pdf>.

72 'Whitepaper 2.0', Diem, April 2020, <www.diem.com/en-us/white-paper/>.

among billions of users through its social networks and platforms could position Diem as a systemically important GSC. With sufficient reach and utility to consumers, Diem could pose an existential threat to countries' monetary systems as Diem's confidence effect, convertibility and easy exchangeability could potentially restrict the central banks' control on money supply. Even in its revised dollar form, it presents a risk of currency substitution to less stable currencies. However, currency substitution by Diem or any other GSCs may depend on the degree of adoption, monetary stability, including legal frameworks and regulation.⁷³

Macroeconomic considerations of Diem: BFT's adoption of a GSC

Diem, in its stablecoin form, presents several potential risks specific to LDC currencies. These risks include a flight from illiquid currencies to more stable ones such as the euro or dollar. An easily accessible alternative payment instrument and store of value, more stable than local currencies and with utility across borders, could be adopted as a substitute currency and once adopted, used as a store of value. The likely high cost of exchange to fiat could lead to further concentration.⁷⁴ Although the economic consequences of Diem or any GSC depend on the degree of adoption,⁷⁵ in smaller countries like the Pacific Islands, Diem could eradicate national currencies altogether. This existential threat, combined with a BFT's aggressive customer acquisition, proprietary e-wallet and low barriers to entry—such as less rigorous KYC and accessibility over a mobile phone—presents a scenario of significant risk across Africa and in other developing economies to lose currency sovereignty. Further, BFTs' capitalization of network effects coupled with big customer-base gives a conducive environment to gain consumer confidence. Once consumers' trust is achieved, GSCs can de-link from fiat currencies and run as an independent payment method.⁷⁶ Because of the potential for an easily accessible alternative payment instrument and store of value, more stable than local currencies and with utility across borders, to be adopted as a substitute currency, the likely outcome would be widespread adoption in countries with less stable currencies. It is important to understand that, although potentially valuable in enabling unbanked or underbanked people to save or trade without the risks of cash, such alternative monetary systems are able to exist because of a lack of globally coordinated regulation, allowing corporations with large,

internationally distributed financial resources to commit regulatory arbitrage (intentionally or unintentionally), with unintended consequences such as potentially destabilizing national interests in pursuit of their corporate objectives.

Central bank digital currencies (CBDCs)

CBDCs are a new form of digital central bank currency distinguished from reserves or settlement balances held by commercial banks at central banks.⁷⁷ In response to the rapid rise of digital payments in preference to cash and the emergence of commercial GSCs, most central banks are now researching or actively developing CBDCs as an "alternative safe, robust, and convenient payment instrument."⁷⁸ The BIS reports that 86 per cent of central banks around the world are now undertaking extensive research on CBDCs.⁷⁹

Although large-scale CBDC adoption has not been achieved, the Bahamas launched the first CBDC in October 2020.⁸⁰ The Eastern Caribbean Central Bank (ECCB) went live with their pilot CBDC project, DCash, in April 2021,⁸¹ which involved "secure minting of a digital version of the Eastern Caribbean dollar as legal tender."⁸² Along with CBDC, central banks are also considering digital versions of their local currencies—such as China's DC/EP and Cambodia's Bakong. In Europe, Sweden launched a year-long sovereign digital currency project called 'e-krona'. Moreover, the US has also been contemplating establishing a CBDC infrastructure⁸³ and saw additional discussion and proposals in the wake of

73 'Digital Money Across Borders— Macro Financial Implications', International Monetary Fund, September 2020, <www.imf.org/en/Publications/Policy-Papers/Issues/2020/10/17/Digital-Money-Across-Borders-Macro-Financial-Implications-49823>.

74 Blakstad S, 'Libra: Economic Implications of Global Cryptocurrency', The Alt Coin Magazine, July 2019, <<http://medium.com/the-capital/libra-economic-implications-of-global-cryptocurrency-8a5eef8bc9b7>>.

75 Ibid.

76 Ibid.

77 Mancini-Griffoli T, et al., 'Casting Light on Central Bank Digital Currencies', IMF Staff Discussion Notes 18/08, 2018, <www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2018/11/13/Casting-Light-on-Central-Bank-Digital-Currencies-46233>.

78 'Central Bank Digital Currencies', BIS, March 2018, <www.bis.org/cpmi/publ/d174.pdf>.

79 Boar C, Wehrli A, 'Ready, Steady, Go? – Results of Third BIS Survey on Central Bank Digital Currency', BIS Papers No. 114, 2021, <www.bis.org/publ/bppdf/bispap114.pdf>. In a previous survey before the pandemic, BIS reported that 80 per cent of central banks were conducting research on CBDC. See Boar C, Holden H, Wadsworth A, 'Impending Arrival - A Sequel to the Survey on Central Bank Digital Currency', BIS Papers No. 107, 2020, <www.bis.org/publ/bppdf/bispap107.pdf>.

80 Bharathan V, 'Central Bank Digital Currency: The First Nationwide CBDCs in the World has been Launched by the Bahamas', Forbes, October 2020, <www.forbes.com/sites/vipinbharathan/2020/10/21/central-bank-digital-currency-the-first-nationwide-cbdc-in-the-world-has-been-launched-by-the-bahamas/?sh=d780b3506eb7>; Sekiguchi K, Onishi T, 'Cambodia Debuts Digital Currency as Emerging Countries Lead Charge', The Nikkei Asia, October 2020 <<http://asia.nikkei.com/Spotlight/Cryptocurrencies/Cambodia-debuts-digital-currency-as-emerging-countries-lead-charge>>.

81 King R, 'ECCB Launches Lives CBDC Pilot', Central Banking, April 2021, <www.centralbanking.com/fintech/cbdc/7817766/eccb-launches-live-cbdc-pilot>.

82 'ECCB Digital EC Currency Pilot: What You Should Know' Eastern Caribbean Central Bank, <<http://eccb-centralbank.org/p/what-you-should-know-1>>.

83 Brett J, 'Federal Reserve Reveals Research Plans for Digital Dollar', Forbes, August 2020, <www.forbes.com/sites/jasonbrett/2020/08/13/federal-reserve-reveals-research-plans-for-digital-dollar/?sh=241f1bf25946>.



the COVID-19 pandemic.⁸⁴ Similarly, dozens of central banks in emerging economies are considering issuing CBDCs,⁸⁵ while many international commercial banks are already issuing internal ‘cash on ledger’ based on blockchain to manage settlements and internal transfers.

Current international efforts regarding CBDC projects revolve around CBDC’s designs, underlying technologies and benefits. It is argued that CBDC has the potential of creating “synergies with private payment solutions” and contributing to an “innovative, competitive and resilient” payment system across regions.⁸⁶ It is likely to digitalize the economy and achieve innovation across the payments and monetary systems. It can create more efficient, faster, and secure cross-border payments ensuring smooth capital flow internationally. A large-scale adoption of digital currencies by emerging market economies may promote financial inclusion, especially for the unbanked population.⁸⁷ However, the success of CBDCs hinges heavily on performance as a true alternative to cash among users, including private consumers, financial intermediaries and central banks. In other words, the core success of CBDC depends on its functionality as a better and more stable medium of exchange.

Another important aspect of CBDC is the type issued (retail⁸⁸ or wholesale⁸⁹) and the associated design choices. Designs of CBDCs and/or sovereign digital currencies may vary in terms of access, technology, degree of anonymity, operational availability and interest-bearing characteristics.⁹⁰ Design choices may depend on the broader policy objective a central bank is likely to achieve through adoption of CBDC. A domestic CBDC has the potential to act as a central bank’s new monetary policy tool and thus affect the central bank’s policy objectives.⁹¹ Different forms of CBDCs may have varying impacts on payment systems, monetary policy transmissions as well as the structure and stability of the financial system. CBDC choice needs to be carefully weighed as CBDCs could trigger macroeconomic shocks with their “effect on portfolio choices of households and the probability of bank runs.”⁹² Therefore, flexibility in designing a CBDC to curb macroeconomic shock is paramount.⁹³ It is possible for CBDCs to be designed in a way to represent public–private collaboration.⁹⁴

84 See, for example, a number of bills introduced in both the US House and Senate in March 2020, ‘US Democrat bill for Covid-19 plans digital dollar for stimulus to unbanked’, Ledger Insights, March 2020, <www.ledgerinsights.com/digital-dollar-us-democrat-bill-for-covid-19-central-bank-digital-currency-cbdc/>.

85 Supra note 60.

86 ‘Report on a Digital Euro’, European Central Bank, October 2020, p. 2, <www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf>.

87 Mancini-Griffoli T, et al., ‘Casting Light on Central Bank Digital Currency’, in C. Brummer (Ed.), *Cryptoasset: Legal, Regulatory, and Monetary Perspectives* (First ed., pp. 307–339). The United States: Oxford University Press; 2019.

88 Also known as ‘general purpose’ CBDC, a retail CBDC will be issued for the general consumers. For a critical analysis on retail CBDC and its design choices, see Auer R, Bohme R, ‘The Technology of Retail Central Bank Digital Currency’, BIS Quarterly Review, March 2020, <www.bis.org/publ/qtrpdf/r_qt2003j.pdf>.

89 A wholesale CBDC is for financial institutions holding reserve deposits with a central bank. A wholesale CBDC could be exclusively for interbank payments, see supra note 79 and also infra note 93.

90 Agur I, Ari A, Dell’Ariccia G, ‘Designing Central Bank Digital Currencies’, IMF Working Paper WWP/19/252, 2019, <www.imf.org/en/Publications/WP/Issues/2019/11/18/Designing-Central-Bank-Digital-Currencies-48739>. See also Auer R, Cornelli G, Frost J, ‘Rise of the central bank digital currencies: drivers, approaches and technologies’, BIS Working Papers, no. 880, 2020, <www.bis.org/publ/work880.htm>.

91 Although in practice, no central bank has yet expressed an intention to do so. See Francesca Carapella F, Flemming J, ‘Central Bank Digital Currency: A Literature Review’, FEDS Notes, November 2020, <www.federalreserve.gov/econres/notes/feds-notes/central-bank-digital-currency-a-literature-review-20201109.htm>.

92 Ibid.

93 Ibid.

94 For further analysis see Allen S, et al., ‘Design choices for Central Bank Digital Currency: Policy and technical considerations’, Brookings Institute, 2020, <www.brookings.edu/wp-content/uploads/2020/07/Design-Choices-for-CB-DC_Final-for-web.pdf>.

Box 1: Design choices of CBDC

CBDC could be either retail issued to the public for retail payments or wholesale issued to financial institutions for exclusively interbank settlement purposes.⁹⁵ Within retail and wholesale CBDCs, there are several design choices available as per the existing CBDC literature.⁹⁶

1.1. In terms of CBDC's ability to provide anonymity, it could be divided between account-based and token-based. In an account-based CBDC, funds are transferred from account to account,⁹⁷ whereas in a token-based CBDC the transfer occurs via wallets. For an account-based CBDC, the central bank maintains a central ledger for settlement, while settlement in a token-based CBDC could be either centralized or decentralized. For both CBDCs, central banks could verify the users' identities. Therefore, it is unlikely that CBDC would be fully anonymous like cash, yet some degree of pseudonymity is achievable through token-based CBDCs.

1.2. In terms of access and legal claim, a retail CBDC could be direct, indirect or hybrid.⁹⁸

Direct CBDC	Hybrid CBDC ⁹⁹	Indirect CBDC
<ul style="list-style-type: none"> • CBDC is a direct claim on central banks • Central Banks handle payments directly 	<ul style="list-style-type: none"> • CBDC is a direct claim on central banks • Central banks handle retail balances periodically 	<ul style="list-style-type: none"> • A CBDC claim belongs to an intermediary • Intermediaries handle retail payments and central banks deal with wholesale payments

1.3. Although, to date, none of the central banks are considering interest-bearing CBDC, theoretically, CBDC can be interest-bearing (with attributes similar to deposits) or non-interest-bearing (similar to cash).¹⁰⁰ While an interest-bearing CBDC could trigger bank disintermediation, it could alleviate the macroeconomic shocks arising from the disappearance of cash.¹⁰¹

A CBDC can carry a wide range of macroeconomic impacts, depending on the design and technology used, CBDC's characteristics (cash-like and interest-bearing) and the size of the economy. Several studies have considered the macroeconomic implications and financial stability issues raised by the possible introduction of CBDC.¹⁰² These studies used a more or less closed-economy as the context in which trade and capital flows are restricted.¹⁰³

95 Adrian T. Mancini-Griffoli T, 'The rise of digital money', IMF Note, no 19/001, July 2019; Kumhof M, Noone C, 'Central bank digital currencies – design principles and balance sheet implications', Bank of England Working Papers, no 725, 2018, Mancini-Griffoli T, et al., 'Casting light on central bank digital currencies', International Monetary Fund, November 2018.

96 Ibid.

97 This is more like today's commercial banks' transactions between depositors.

98 See supra note 91.

99 Also known as 'synthetic CBDC'; for a general discussion on 'synthetic CBDC', see supra note 99.

100 See supra note 93.

101 Ibid.

102 Ibid. See also, Barrdear J, Kumhof M, 'The Macroeconomics of Central Bank Issued Digital Currencies', Bank of England Working Paper No. 605, 2016, <www.bankofengland.co.uk/working-paper/2016/the-macroeconomics-of-central-bank-issued-digital-currencies>; Andolfatto D, 'Assessing the Impact of Central Bank Digital Currency on Private Banks', Federal Reserve Bank of St. Louis, 2018, <www.sfu.ca/~dandolfa/CBDC.pdf>; Brunnermeier MK, Niepelt D, 'On the equivalence of private and public money', Journal of Monetary Economics 106(27), 2019, <www.sciencedirect.com/science/article/abs/pii/S0304393219301229>; Chiu J, Al Hosseini MD, Jiang J, 'Bank Market Power and Central Bank Digital Currency: Theory and Quantitative Assessment' Bank of Canada Staff Working Paper (2010-20), 2019 <www.econ.ntu.edu.tw/uploads/asset/data/5ef0594348b8a1027b00180e/HKBU_1090703.pdf>; Fernandez-Villaverde J, et al., 'Central Bank Digital Currency: Central Banking For All?', NBER Working Paper Series No. 26753, 2020, <www.sas.upenn.edu/~jesusfv/Central_Banking_All.pdf>.

103 Minesso Ferrari M, Mehl A, Stracca L, 'The International Dimension of a Central Bank Digital Currency', Vox EU, October 2020, <<https://voxeu.org/article/international-dimension-central-bank-digital-currency>>.

The macroeconomic and social welfare implications were also studied using a CBDC model with adjustable interest rate in a small but open economy context with trade and capital flows.¹⁰⁴ This showed that an interest-bearing CBDC "could be a versatile instrument that would, in theory, improve monetary policy by allowing non-linear transfers and more direct implementation and transmission."¹⁰⁵ Economists also explored the potential of offering a negative interest rate on CBDCs and argued that "paying a negative interest rate on CBDC can cause a decrease in capital investment and GDP."¹⁰⁶ However, understanding the full macroeconomic implications of a CBDC at this exploratory stage is beyond the scope of this paper. Hence, based on the current literature, publicly available information and resources, this paper forwards some general macroeconomic considerations of CBDC keeping LDC economies in the focus. It is our observation that each of these macroeconomic considerations requires a full in-depth analysis and could vary depending on CBDC's design, technology used and the size of the economy in which it is issued.

104 George A, Xie T, Alba JD, 'Central Bank Digital Currency with Adjustable Interest Rate in Small Open Economies', SSRN, 2020, <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3605918>.

105 Al Hosseini MD, Rivadeneyra F, Zhu Y, 'Central Bank Digital Currency and Monetary Policy', Bank of Canada, February 2020, <www.bankofcanada.ca/2020/02/staff-analytical-note-2020-4/>.

106 Jia P, 'Negative Interest Rates on Central Bank Digital Currency', MPRA Paper No. 103828, 2020, <https://mpra.ub.uni-muenchen.de/103828/1/MPRA_paper_103828.pdf>.

Macroeconomic considerations of CBDCs

Given the decentralized nature of DLT, a CBDC issued on DLT could lead to a reduced role for traditional players such as commercial banks and other financial intermediaries and may lead to a decrease in their lending.¹⁰⁷ This is more likely in LDCs with limited financial infrastructure, which could choose to rely on non-bank distribution opportunities offered by Fintechs to achieve penetration to largely unbanked populations, leading to credible alternatives to traditional banks for those who do have access to financial services. While most jurisdictions will opt for a centralized or hybrid architecture giving banks and even non-banks a key role in the distribution of money and opening of accounts, in the case of LDCs with limited financial infrastructure, banks' role as custodians of store of value and payments intermediaries could diminish in favour of Fintechs, impacting their potential to implement monetary policy. Unlike developed economies in which the financial institutions are mature, a large movement of bank deposits to domestically issued CBDCs held by private individuals, businesses or non-bank custodians in LDCs (where there is low trust in institutions), could reduce banks' liquidity, impacting their ability to offer credit, which could be offset by limits to transaction sizes or account sizes, as currently applied to non-bank deposits in many countries. Conversely, CBDCs used as a wholesale settlement instrument would reduce settlement times and the amount of value locked up in gross settlements.¹⁰⁸ Economists and policymakers will need to respond to these impacts on money supply when designing monetary policy.

Emerging market economies are especially advanced in experimenting with the possibility of issuing CBDCs. These economies are motivated to test CBDCs, given the opportunities presented for financial inclusion, financial stability, domestic payments efficiency, reduced monopoly of private payments systems, payments safety and because they fear that cross-border payment alternatives, such as Diem and foreign-issued CBDCs, could displace their own currencies. An IMF study shows that if CBDCs issued by stable economies are not well-designed, they could cause or accelerate 'currency substitution' in emerging markets and developing economies, particularly in countries with weaker macroeconomic policies, which are unable to control cash-based currency substitution through regulation and may face the same or greater challenges with those currencies in digital form.¹⁰⁹

107 Disintermediation can be avoided if banks still have access to reserve that will facilitate their lending businesses. For reference, see supra note 93 citing Andolfatto D, 'Assessing the Impact of Central Bank Digital Currency on Private Banks', Federal Reserve Bank of St. Louis Working Paper (2018-25), 2018, <www.sfu.ca/~dandolfa/CBDC.pdf>.

108 Supra note 14.

109 Supra note 78.

Furthermore, the availability of CBDCs associated with large economies, such as China, lays the ground for a potential flight to the currency from illiquid currencies and speculation on the open market (mirroring the concerns regarding Diem). While China has introduced control mechanisms to maintain stability, there was significant interest from investors in the DC/EP when it was first announced, bolstered by the idea that a widely available, accessible digital currency has potential to replace the US\$ as the world's de facto reserve currency.¹¹⁰ The impact on less stable economies of a significant flight to alternative currencies would be to reduce the ability of governments to collect tax and to maintain control of their fiscal or monetary policy. It can be argued that in some LDCs with very high inflation, currency substitution could actually stabilize the economy to the benefit of people and SMEs, as has recently been seen in Venezuela,¹¹¹ which has also seen higher demand for cryptocurrencies alongside US\$.¹¹² However, the benefits may be difficult to achieve if a CBDC is tied to foreign reserves.¹¹³ A CBDC pegged to foreign currency could also "[increase] asymmetries in the international monetary system by reducing monetary policy autonomy in foreign economies."¹¹⁴ For instance, if a foreign government's CBDC is available in developing economies that have better control of monetary policy, but higher inflation, it is likely that the foreign government's CBDC could gradually substitute the local currency and thus can have a negative impact. In short, the LDCs' central banks would lose control of money supply as a result of gradual currency substitution, impacting sustainable development of that country.¹¹⁵

Although it is debatable whether China's DC/EP will have the characteristics likely to offer first mover advantages, such as increased use as a reserve currency or in international trade, over other nations as a result of its digital nature alone,¹¹⁶ its effort to internationalize RMB

110 The Yuan is currently the third reserve currency behind the US\$ and EUR, and some speculate that it could become more dominant both through investment and through currency substitution. See Birch DGW, 'The Currency Cold War: Cash and Cryptography, Hash Rates and Hegemony', London Publishing Partnership, 2020; John A, 'Explainer: How does China's digital yuan work?', Reuters, October 2020, <www.reuters.com/article/us-china-currency-digital-explainer-idUSKBN27411T>.

111 'Venezuela Economic Outlook', Focus Economics, November 2020, <www.focus-economics.com/countries/venezuela>.

112 Helmes K, 'Venezuela's Bitcoin Use Soars Amid Hyperinflation: 3rd on Global Crypto Adoption Index', Bitcoin.com, August 2020, <<https://news.bitcoin.com/venezuela-bitcoin-use-hyperinflation-crypto-adoption/>>.

113 Iancu A, et al. 'Reserve Currencies in an Evolving International Monetary System', IMF, November 2020, <www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2020/11/17/Reserve-Currencies-in-an-Evolving-International-Monetary-System-49864>.

114 Supra note 108.

115 See 'Selected sustainable development trends in the least developed countries – 2019', United Nations Conference on Trade and Development (UNCTAD), 2019, <http://unctad.org/system/files/official-document/ald-c2019d1_en.pdf>.

116 While accessibility gives the first CBDC issued by a major economy a head-start in retail and potentially trade, its potential to replace US\$ as a global reserve currency is dependent on additional factors such as existing global reserves: Carsten A, 'Central bank digital currencies: putting a big idea into practice', Bank for International Settlements, March 2021, <www.bis.org/speeches/sp210331.pdf>.

and decrease dependence on the dollar-dominated financial system is taking on real shape as China is working closely with regional financial hubs to establish a platform where DC/EP is interoperable with other countries.¹¹⁷ CBDC's interoperability and cross-border operability with other jurisdictions could also give rise to multifaceted macroeconomic impacts in LDCs, although such features have certain advantages in establishing an efficient, cheaper and faster international payment system.¹¹⁸

Table 2: Countries in which retail CBDC/digital currencies have launched, or are being piloted or researched

Launched	The Bahamas (Sand Dollar) Cambodia (Bakong) Eastern Caribbean (DCash) (comprising St Kitts and Nevis, Saint Vincent and the Grenadines, Saint Lucia, Grenada, Dominica, Caribbean, Antigua and Barbuda)	
Pilot stage	China Ecuador Jamaica Japan Republic of Korea	Singapore Sweden Turkey Ukraine Uruguay
Research	Australia Bahrain Brazil Brunei Canada Czechia Eurozone Finland Ghana Iceland India Indonesia	Kenya Madagascar Mauritius Morocco New Zealand Norway South Africa Suriname Thailand Tunisia United Kingdom USA

Source: *Bank of International Settlements 2021*¹¹⁹

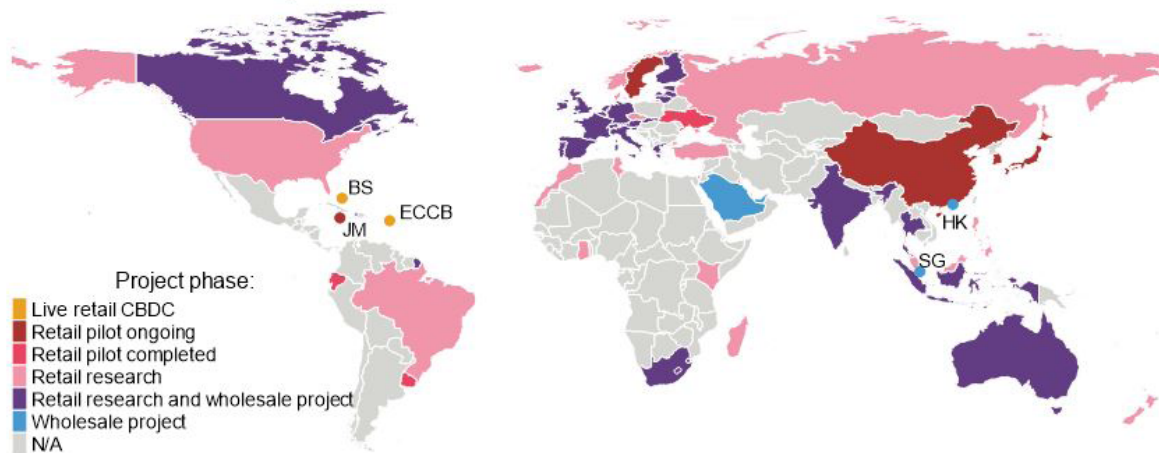
117 Inthanon-LionRock is a CBDC project for cross-border payments by the Hong Kong Monetary Authority (HKMA) and the Bank of Thailand (BoT). Recently, the Inthanon-LionRock project has been extended to include China's Digital Currency Institute and the UAE. The joint initiative is supported by the BIS and renamed as 'mCBDC Bridge'. For reference, see supra note 19.

118 For a general analysis on the cross-border aspects of CBDCs, see Auer R, Haene P, Holden H, 'Multi-CBDC Arrangements and the Future of Cross-Border Payments', Bank for International Settlements, March 2020, <<https://www.bis.org/publ/bppdf/bispap115.pdf>>.

119 Auer R, Cornelli G, Frost J, 'Rise of the central bank digital currencies: drivers, approaches and technologies', Bank of International Settlements Working Paper No. 880, August 2020, <www.bis.org/publ/work880.htm>.

Graph 2: Interactive map of CBDC status (updated to 7 April 2021)

CBDC research and pilots around the world



BS = The Bahamas; ECCB = Eastern Caribbean Central Bank; HK = Hong Kong SAR; JM = Jamaica; SG = Singapore. The use of this map does not constitute, and should not be construed as constituting, an expression of a position by the BIS regarding the legal status of, or sovereignty of any territory or its authorities, to the delimitation of international frontiers and boundaries and/or to the name and designation of any territory, city or area.

Source: Raphael Auer, Giulio Cornelli and Jon Frost, *Rise of the central bank digital currencies: drivers, approaches and technologies*. BIS Working Papers No 880. 24 August 2020. <https://www.bis.org/publ/work880.htm>

National Bank of Cambodia's Project Bakong

With a view to simplifying and expediting access to financial services for its citizens, the Central Bank of Cambodia recently launched 'Project Bakong'—leaning on a mixture of more established financial services and more novel CBDC approaches. The recently launched project allows users to transact in Cambodian Riel or US\$ and features DLT to help record transactions in a way that lowers compliance burdens for financial institutions. To date, 18 of the country's 43 commercial banks have signed up to be able to process Project Bakong payments, facilitated by Hyperledger Iroha¹²⁰ and its ability to connect with ease to legacy systems.¹²¹

Hub and spoke model in China: DC/EP

China's DC/EP has been extensively tested and is undergoing extensive piloting with plans for launch in 2022. Because China already has a mature digital payments infrastructure, with 95 per cent of payments going through digital wallets, the Central Bank of China is using BFTs, WeChatPay and AliPay, and the state-owned commercial banking system (Bank of China (BOC), the China Construction Bank (CCB), the Agricultural Bank of China (ABC) and the Industrial and Commercial Bank of China (ICBC)), to distribute its CBDC through digital

wallets (CGTN 2020).¹²² Although the digital cash will be tracked on databases held in the various institutions, mimicking a blockchain node structure, the currency will not initially use blockchain technology, somewhat protecting Chinese commercial banks while reducing potential settlement benefits.

Riksbank's e-krona

The growing disappearance of cash prompted Sweden's central bank to launch a pilot project, e-krona, a CBDC with attributes similar to Swedish krona.¹²³ Although it can be designed in various ways—either in physical form (such as banknotes and coins) or electronic (such as money in bank accounts)—currently the Riksbank is testing e-krona in a token form, "a uniquely identifiable digital unit of value" similar to the value of a Swedish krona.¹²⁴

Under the distribution model of e-krona (similar to the current model for cash) developed on blockchain technology, transactions are made through nodes run by the Riksbank and other participants, such as payment service providers.¹²⁵ e-krona requires the user to have a debiting account in the Riksbank's settlement system—RIX. KYC obligation lies with the participants in distribution of e-krona.¹²⁶

122 'China to Begin Pilot Run of Digital Currency Electronic Payment', CGTN, August 2020, <<https://news.cgtn.com/news/2020-08-14/China-to-begin-pilot-run-of-Digital-Currency-Electronic-Payment-SWz6W63E1q/index.html>>.

123 Fulton C, 'Sweden Starts Testing World's First Central Bank Digital Currency', Reuters, February 2020, <www.reuters.com/article/us-cenbank-digital-sweden-idUSKBN20E26G>.

124 'E-krona Pilot Phase 1', Sveriges Riksbank, April 2021, p. 5 <www.riksbank.se/globalassets/media/rapporter/e-krona/2021/e-krona-pilot-phase-1.pdf>.

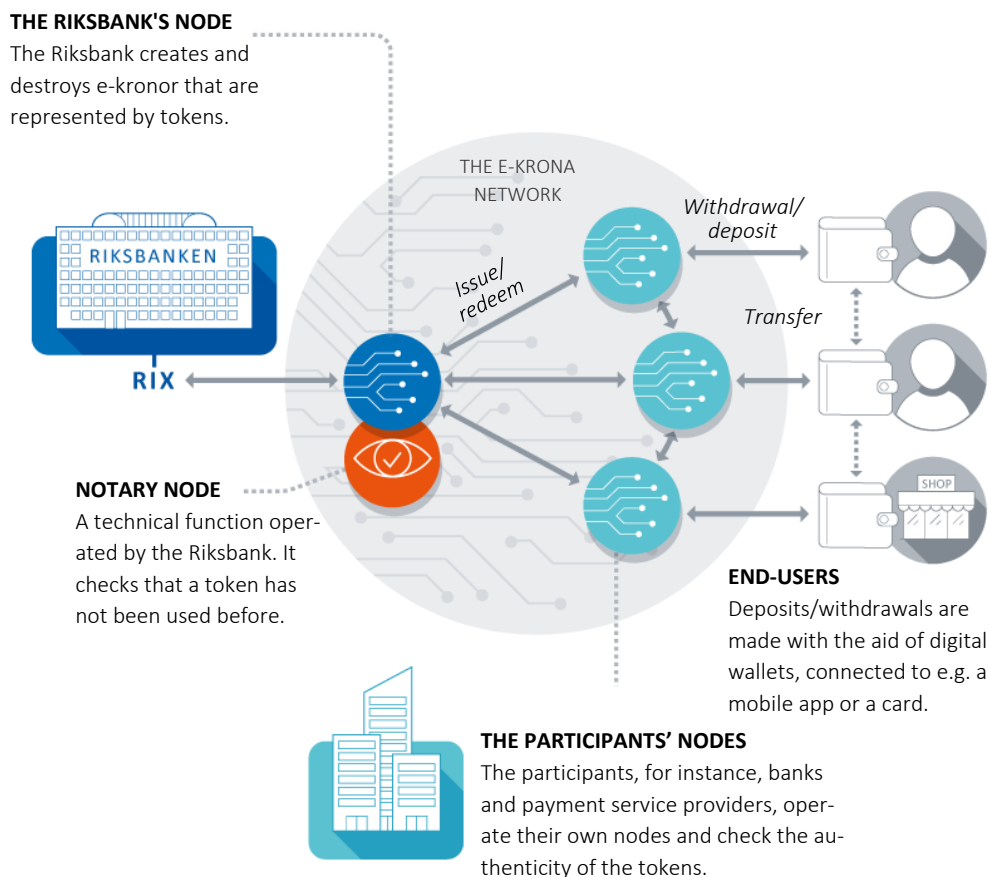
125 Ibid.

126 Ibid.

120 For reference, see Hyperledger Iroha <www.hyperledger.org/use/iroha>.

121 See Project Bakong <<https://bakong.nbc.org.kh>>.

Graph 3: How e-krona is distributed¹²⁷



Source: 'E-krona Pilot Phase 1', Sveriges Riksbank, April 2021, p. 5
<www.riksbank.se/globalassets/media/rapporter/e-krona/2021/e-krona-pilot-phase-1.pdf>.

CBDCs versus stablecoins

A key difference between CBDCs and their fiat equivalent is the accessibility of that currency both to national residents and potentially to non-residents (unless the decision is taken to issue solely for domestic use). If granted access, residents in high-inflation countries may turn to CBDCs issued by a low-inflation country (as they do nowadays with cash).¹²⁸ Like CBDCs, commercially issued stablecoins, which share many characteristics with CBDCs, could present an alternative or—for the unbanked—a primary store of value for their assets. Similarly, central banks could partner with e-money providers to issue 'synthetic CBDCs' which provide a desired stability of e-money and stablecoins from market, liquidity and foreign exchange risks.¹²⁹

From a monetary policy transmission perspective, this public-private entanglement means that in the absence of strong capital control by central banks and enforceable regulations against holding foreign CBDC, emerging economies may face the risks of currency substitution as the BFTs may prefer a mode of currency preferable to them, such as US\$. Privately issued stablecoins used as a store of value, backed by commercial bank fiat or other assets, present an asymmetry to CBDCs backed by central bank reserves. This could reduce bank retail deposits in favour of protected accounts¹³⁰ and consequently reduce the central bank's ability to implement monetary policy via the commercial banking system.

127 Ibid, p. 7.

128 Supra note 126.

129 Supra note 79.

130 Under Basel III, escrowed deposits have lower fractional reserve allowances.

In light of these emerging macroeconomic challenges, it is likely that many governments and central banks will need to rethink fiscal and monetary policies. Some weak economies, dependent on foreign investment and aid for infrastructure development, may already have lost much of their fiscal control; however, this challenge will be amplified and likely spread to additional countries, even as the benefits of digitization are delivered.

Combined macroeconomic impacts of CBDCs and digital currencies on LDCs

The traceability of digital money could build confidence to reignite foreign direct investment (FDI) and offer opportunities for sustainability-linked investment such as green and impact bonds, to encourage greater cashflow into LDC economies.¹³¹ Most LDCs¹³² are likely to be behind other countries in issuing domestic CBDCs as governments lack the resources to focus on development, leaving them vulnerable to an influx of foreign-issued CBDCs and commercial GSCs, which may increase dollarization of countries with weak monetary control, but could improve financial resilience for the poor, by offering a stable store of value.¹³³ Domestic CBDCs, like GSCs or foreign CBDCs, could also accelerate financial inclusion in excluded populations by giving people access to stores of central bank currency in a wallet issued by a Fintech, without the need for a bank account, so that the very poorest are able to avoid the high costs charged by banks and mobile money providers. However, this will depend on central banks either lowering KYC restrictions in an account-based system, or choosing to issue their currency as a truly cash-like CBDC with no KYC restrictions, such as in a token-based system.¹³⁴ This will be one of the key decisions that central banks need to make between control and utility.

Unlike China, in most countries the central bank and government-owned banking institutions are dwarfed by the commercial sector, thus the state's ability to control and maintain low pricing on bank-issued wallets would be lower. LDCs generally have limited formal financial infrastructure, with the majority of people outside the

financial system and more likely to turn to private Fintechs than banks. Furthermore, digital financial inclusion is dependent on access, via technology. Adoption rates for mobile, while rapidly rising, are still low in rural areas and for traditionally excluded demographics such as women, refugees and disabled people. BFT's business models would allow them to benefit these last mile populations through alternative channels such as community-focused mobile solutions, which allow account access to those without devices. However, they may lack motivation to reach these last mile demographics because of the greater income potential from wealthier (urban) customers.

The introduction of digital substitute currencies, including CBDCs and GSCs, could benefit LDCs as they have the potential of making cross-border payments faster, reducing trade barriers and stabilizing savings for people in LDCs. Nonetheless, this may also mean that the LDC governments' abilities to benefit from local entities through taxation could, rather than improving through greater visibility, be curtailed because of a lack of visibility for substitute currency transactions. It could further minimize regulators' ability to control consumers' choice of currency for savings and stores of value, which could potentially affect their ability to implement monetary policy. As noted previously, while in some LDCs with very high inflation this could stabilize the economy, benefiting the population and SMEs, in less volatile economies this could have a negative impact on development.

Digital currencies in the African context

Africa is home to most of the world's LDCs,¹³⁵ which are also facing the hardest economic impact from COVID-19. The COVID-19 pandemic is responsible for reducing previously forecasted 2020 growth from nearly 4 per cent to between -1.7 per cent and -3.4 per cent.¹³⁶ As the population growth rate across the continent is 2.7 per cent annually, many businesses, especially from China and the US, are recognizing the continent's huge market potential and have started to both invest in and distribute goods and services there, including technology and infrastructure, enabling wider adoption of mobile devices thanks to cheap imports and improving networks. Some BFTs such as M-Pesa are home-grown African businesses, although more are now moving into Africa from elsewhere through acquisition or horizontal expansion from other service offerings.

131 Supra note 43.

132 With exceptions, for example, Cambodia: 'Cambodia launches national blockchain payment system Bakong', Ledger Insights, December 2020, <www.ledgerinsights.com/cambodia-national-blockchain-payment-system-bakong-cbdc/>.

133 Mobile penetration in LDCs is relatively low, while other adoption barriers such as low literacy and device ownership are likely to prevent rapid adoption of GSCs in the short term. However, as mobile penetration increases (to 50% in 2025 for sub-Saharan Africa, according to GSMA <www.gsma.com/mobileeconomy/wp-content/uploads/2020/09/GSMA_MobileEconomy2020_SSA_Eng.pdf>) and Fintech solutions enabling wallets to be held without a smartphone emerge, adoption is likely to grow.

134 While issuing institutions will have KYC restrictions, there is no KYC on peer-to-peer transactions and a token-based versus account-based structure is still very much up for debate. See, for example, <https://www.bis.org/publ/qrtpdf/r_qt2003j.htm>.

135 'Map of least developed countries', UNCTAD, <<https://unctad.org/topic/vulnerable-economies/least-developed-countries/map>>.

136 'African Economic Outlook 2020', African Development Bank <<https://www.afdb.org/en/news-keywords/african-economic-outlook-2020>>.



Potential evolution of an African bloc currency

Facebook's Free Basics rollout has reached hundreds of millions of customers, giving people access to free data to view a curated range of websites, despite being banned in India because of concerns about data harvesting and 'fake news'. Ant Group is targeting Africa's areas with low levels of financial infrastructure, as the service offerings do not require physical or server infrastructure (i.e. no need for one centralized data centre but rather on cloud or DLT).¹³⁷ While its recent IPO attempt was blocked by regulators, Ant's expansion seems inevitable. At a macro level, both of these organizations have the scale and reach to potentially weaken local financial institutions, even unintentionally, through the introduction of accessible substitute currencies and to materially compromise central banks' abilities to control monetary policy. Although platforms like Facebook Free Basics do not yet offer wide-scale financial services, with the advancement of Facebook's digital wallet and the maturation of the Diem stablecoin, this is unlikely to be far off. This is a key example of a BFT's ability to use an existing platform as a key enabler and vehicle through which to reach large, underserved populations—in many cases circumventing national financial services providers. Privately issued stablecoins are increasingly being adopted through various Fintech platforms, further encouraging central banks to move into this space because of the "mushrooming of private cryptocurrencies."¹³⁸ Some technically savvy Africans have embraced cryptocurrencies: consumers in Kenya, Nigeria and South Africa are all in the top 10 users of cryptocurrency globally¹³⁹ according to Chainalysis, although these countries are not necessarily representative of sub-Saharan Africa or LDCs as a whole. In addition, Senegal launched a digital version of the West African Franc in 2016, although it failed to gain traction with other West African Economic and Monetary Union (WAEMU) countries and lost the support of Senegal's Central Bank. However, other West African countries have digital currencies planned and Senegal is trying again with Akoin, a commercially issued stablecoin.¹⁴⁰

Beyond the current landscape of digital currencies, Africa is developing a distinct trend to use digital currency as a means to promote regional trade and economic integration among countries within the region.¹⁴¹ African countries have been working towards a continental free trade agreement (African Continental Free Trade Area or AfCFTA¹⁴²) to encourage cross-border trade facilitated by several regional organizations, such as the South African Development Community (SADC), the East African Community (EAC), the West African Economic and Monetary Union (WAEMU), Central African Economic and Monetary Community (CEMAC) and Economic Community of West African States (ECOWAS). There is also a region-specific trend towards establishing a common monetary zone with a common currency under a common central bank. Fourteen African countries currently use bloc currencies—the Central African Franc and the West African Franc.

With the proliferation of digital currencies, especially projects undertaken by sovereigns and regions like the EU, there have been similar attempts to create both an Anglophone West African bloc currency by ECOWAS (to be known as 'Eco')¹⁴³ and an East African¹⁴⁴ bloc currency by EAC. Unlike the Euro, these bloc currency zones are a "legacy of colonialism"; however, this legacy also provides a template for currency blocs.¹⁴⁵ Overall, this provides a foundation for the potential emergence of bloc cryptocurrencies across Africa, likely starting with existing bloc currencies. The move from paper to national bank-backed digital currencies could provide significant cross-border trade opportunities, particularly for Francophone West African countries, in which telco mobile money has, to date, had lower penetration than in Anglophone East Africa.¹⁴⁶

137 Tudor-Ackroyd A 'Where will Ant Group's Next Billion Users Come from as it Ploughs its Jumbo IPO Proceeds into Overseas Expansion?', The South China Morning Post, October 2020, <www.scmp.com/business/banking-finance/article/3105634/where-will-ant-groups-next-billion-users-come-it-ploughs>.

138 See Huillet M, 'Kenya's central bank exploring CBDCs due to 'mushrooming' of private cryptos' Cointelegraph, October 2020, <<https://cointelegraph.com/news/kenya-s-central-bank-exploring-cbdc-due-to-mushrooming-of-private-cryptos>>.

139 Stephon C, 'Revealed: The countries with the highest levels of everyday crypto use', Modern Consensus, September 2020, <<https://modernconsensus.com/cryptocurrencies/bitcoin/revealed-the-countries-with-the-highest-levels-of-everyday-crypto-use/>>.

140 Rahul N, Baird K, 'How Digital Currency Could Change Senegal's Financial System Forever', be in crypto, July 2020 <<http://beincrypto.com/how-digital-currency-could-change-senegals-financial-system-forever/>>.

141 See, for example, 'How online payments can deepen regional trade', Business Daily, September 2020 <www.businessdailyafrica.com/corporate/tech/How-online-payments-can-deepen-regional-trade/4258474-5618318-u9gfgnz/index.html>.

142 Mukeredzi T, 'Africa's free trade agreement hinges on commitment and implementation', Africa Renewal, <www.un.org/africarenewal/news/africa%E2%80%99s-free-trade-agreement-hinges-commitment-and-implementation>.

143 For regional efforts in Africa, see Uche Ordu A 'An Evaluation of the Single Currency Agenda in the ECOWAS Region', Brookings, September 2019 <www.brookings.edu/blog/africa-in-focus/2019/09/24/an-evaluation-of-the-single-currency-agenda-in-the-ecowas-region/>.

144 See The East African Monetary Union [EAMU] <www.eac.int/monetary-union>. See also, KNA 'Common East African Currency To Be In Use Soon', Kenya News Agency, August 2019, <www.kenyanews.go.ke/common-east-african-currency-to-be-in-use-soon/>.

145 See, for example, Maclean R 'West African Countries Take a Step Away From Colonial-Era Currency', The New York Times, December 2019, <www.nytimes.com/2019/12/21/world/africa/west-africa-currency-france-franc.html>.

146 See 'State of the Industry Report on Mobile Money', GSMA, 2019, <www.gsma.com/sotir/wp-content/uploads/2020/03/GSMA-State-of-the-Industry-Report-on-Mobile-Money-2019-Full-Report.pdf>.

Unbanked communities: the frontline for maintaining currency sovereignty

Digital currencies are likely to have a proportionally greater impact on the unbanked in LDCs and other countries with larger unbanked populations, with macroeconomic consequences if rolled out on a large scale. With some exceptions, as previously noted, LDCs, with weak financial infrastructure, are also likely to introduce domestic CBDCs later than richer countries, based on the state of known research, which, to date, is very low in LDCs. This, together with weak financial systems, leaves them uniquely vulnerable to widespread adoption by unbanked people of non-native CBDCs or commercially issued stablecoins. Where Fintechs choose to issue stablecoins in domestic currencies, they have the potential to partially act as a proxy for a CBDC by preventing encroachment of foreign CBDCs and maintaining national currency sovereignty, although they would not fulfil other functions of CBDCs, such as implementing monetary policy. Given the scale of this community population in LDCs, the choice between allowing privately issued stablecoins or allowing foreign-issued currencies to encroach, is likely to have systemic impact for currency substitution.

We have witnessed that digitalization has already enabled millions of people to access digital money without needing a bank account through the introduction and development of telco-issued mobile money since 2007. This access has had broadly positive impacts such as greater financial inclusion, a reduction in the gender gap for access to financial services and the ability to purchase via PAYG clean energy and other utilities.¹⁴⁷ However, negative impacts have also been observed, such as crowding out existing microenterprises because in the poorest economies demand for the goods and services being offered does not grow to meet supply. This was observed by Bateman et al.¹⁴⁸ in their study of the impact of M-Pesa on Kenya's microbusinesses, where access to credit enabled people to establish microbusinesses, increasing competition in a saturated market, ultimately leading to failures and defaults.¹⁴⁹

BFTs and other Fintechs do, however, have the potential to support market-based interventions to increase both demand and supply, by going beyond provision of basic products like payments and lending, to include services

such as blended financing for agricultural inputs (as M-Pesa has done in Kenya¹⁵⁰), increasing transparency in supply chains and lenders' terms. They have the potential to open up investment corridors to communities such as agricultural cooperatives, and to improve efficiency in export production, bringing much-needed foreign capital into LDCs.¹⁵¹

BFTs and other Fintechs can also play an important role in the formalization and commercialization of unbanked savings and lending groups, which typically form where communities lack access to formal finance, and membership is disproportionately female. Community groups like these provide an important social safety net for their members, and typically have a low default rate, as the members are encouraged to borrow realistically and to repay based on strong social bonds.¹⁵² Formalization of these groups, by giving them access to identity, finance and markets, can be the first step in creating better market economies, enabling community members to find new markets, such as urban or international markets, for products which may not find a market locally. Because these communities typically have low levels of literacy and poor access to both mobile devices and signal, the design, technology requirements and digital literacy required to use BFT products may exclude these groups, missing a significant development opportunity.

Global considerations: shadow banking and COVID-19

While many BFTs include a broad range of consumers into their financial services, promoting financial inclusion for the unbanked and underbanked, Fintech credits could be more costly than traditional credit services. This is partly because of taxes on mobile money transactions in many countries.¹⁵³ In addition, although BFTs' use of technology improves the quality of financial services in economically prosperous conditions, it also exhibits a higher risk of financial instability during economic downturn. For instance, shadow deposits (e.g. PayPal money) are not covered by a government's guarantee on deposits. Therefore, it is likely that these deposits will not be covered by the deposit insurance coverage in case of a bank run. For markets that have a high penetration rate for 'market finance' solutions, the adoption of a CBDC can help create data trails to better map the flow of funds, thereby helping to maintain financial stability.¹⁵⁴

147 For analysis, see World Bank Group and IMF 'Fintech: The Experience So Far', EPolicy Paper No. 19/024, 2019, <www.imf.org/-/media/Files/Publications/PP/2019/PPEA2019024.ashx>.

148 Bateman M, Duvendack M, Loubere N, 'The Curious Case of M-Pesa's Miraculous Poverty Reduction Powers', *Developing Economics*, June 2019, <<https://developingeconomics.org/2019/06/14/the-curious-case-of-m-pesa-miraculous-poverty-reduction-powers/>>.

149 See 'The Ins And Outs Of Inclusive Finance: Some Lessons From Microfinance And Basic Income', UNCTAD, 2018, <https://unctad.org/system/files/official-document/gdsmdp2017d3_en.pdf>.

150 Bateman M, Duvendack M, Loubere N, 'The Curious Case of M-Pesa's Miraculous Poverty Reduction Powers', *Developing Economics*, June 2019, <<https://developingeconomics.org/2019/06/14/the-curious-case-of-m-pesa-miraculous-poverty-reduction-powers/>>.

151 *Supra* note 85.

152 Karlan D, et al., 'Impact of savings groups on the lives of the poor', *PNAS* 114(12), 2017, <<https://www.pnas.org/content/114/12/3079>>.

153 Kiruga M, 'Kenya M-Pesa Tax Risks Killing the Goose That Laid the Golden Egg', *The Africa Report*, August 2019, <www.theafricareport.com/16057/kenya-m-pesa-tax-risks-killing-the-goose-that-laid-the-golden-egg/>.

154 *Supra* note 55.



With regards to the impact of the COVID-19 pandemic, it is projected to cause the first increase in global poverty since 1998,¹⁵⁵ and has already been seen to, and is widely expected to continue to, fuel digital transformation in the financial services sector.¹⁵⁶ While digital transactions/ payments and e-money in particular have experienced a surge in popularity since the beginning of the pandemic, central banks around the world have already made one thing clear: they will not be rushing the introduction of CBDCs as a result.¹⁵⁷ There is a clear need to separate digital money and CBDC, as the latter is an official counterpart of a fiat currency and not merely a digital token representing physical value.

Further, the resilience of the Fintech credit market remains largely unassessed. For example, during an economic downturn, it is unclear how these Fintech lenders will perform. The large consumer bases and interconnectedness across financial sectors and national boundaries of BFTs¹⁵⁸ can give rise to significant volatility in the financial system. Moreover, unlike traditional big banks, the BFTs' shadow banking encourages regulatory arbitrage, as similar risks are regulated more tightly in the traditional lending sector, especially since the banking crisis of 2008.¹⁵⁹ For instance, traditional banking sectors are required to comply with the Basel capital adequacy requirements and stress testing to prove their resiliency during a time of financial stress, while BFTs are not subject to these types of requirements.

Key extrapolations and conclusions

Based on our research and expert analysis, we draw the following key extrapolations and conclusions.

Despite the benefits of digitization such as broader financial inclusion, the potential impacts over fiscal control of weaker economies dependent on foreign investment and aid for infrastructure development are showing preliminary warning signs that warrant further investigation. The impact on these economies will be amplified and spread to additional countries, particularly upon issuance of CBDCs by major economies such as

the US and China (or GSCs based on stable currencies). This will lead to further penetration of the much maligned 'dollarization' (or stable alternative) of emerging financial markets already prevalent in so many emerging economies, where majority unbanked populations are more likely to adopt easily accessible substitute currencies.

Once foreign CBDCs and GSCs based on stable currencies are available to citizens in LDCs, the LDC central banks will have limited ability to control their adoption as substitute currencies. Furthermore, greater accessibility provided by BFTs' tooling could restrict central banks' abilities to control monetary policy, playing a role in destabilizing sovereign control and economic agency in LDCs. LDCs issuing their own CBDCs will need to ensure they have higher utility than foreign CBDCs or GSCs, including low barriers to adoption, to control this capital flight.

However, bloc currencies and even foreign CBDCs and GSCs could provide greater stability for citizens by giving them access to a store of value, enabling them to save without having to overcome high barriers to entry for banking services. They could benefit businesses as a store of value, and as a payment instrument, reducing cross-border trade barriers. The challenge for central banks and governments will be to advance innovative governance approaches that enable an influx of substitute currency without losing tax revenues or losing currency sovereignty.

LDCs are not at the leading edge of CBDC issuance, and, with large unbanked populations, will be particularly vulnerable to loss of currency sovereignty to powerful foreign currencies, and therefore control of monetary and fiscal policy. To mitigate this effect, LDC central banks could work together to encourage the disbursement of domestic stablecoins by BFTs and other Fintechs (as synthetic CBDCs or as domestic GSCs) in preference to foreign currencies, to maintain currency sovereignty in the absence of a domestic CBDC. While this is a less desirable solution than domestic issuance, if combined with clear regulatory controls it could provide a needed transitional solution towards domestic CBDC issuance. Economic area partners could investigate the potential of accelerating the development of bloc currencies to leverage collective strength and reduce cross-border trade barriers, encouraging adoption of those currencies in preference to substitute currencies. While there is no single model for global collaboration between LDC central banks, governments and regulators, best practice could be derived from existing economic unions such as the Eurozone, or African RECs.

CBDCs and GSCs will provide alternative stores of value even when held as national fiat, impacting commercial

155 Mahler DG, et al., 'The impact of COVID-19 (Coronavirus) on global poverty: Why Sub-Saharan Africa might be the region hardest hit', World Bank Blogs, 2020, <<https://blogs.worldbank.org/opendata/impact-covid-19-coronavirus-global-poverty-why-sub-saharan-africa-might-be-region-hardest>>.

156 von Allmen UE, et al., 'Digital financial inclusion in the times of COVID-19', IMF Blog, July 2020, <<https://blogs.imf.org/2020/07/01/digital-financial-inclusion-in-the-times-of-covid-19/>>.

157 For reference, see Faridi O, 'Norway Is Not in a Rush to Launch its Own Digital Currency Even though Cash Usage has Declined Significantly', Crowdfund Insider, November 2020, <www.crowdfundinsider.com/2020/11/168954-norway-is-not-in-a-rush-to-launch-its-own-digital-currency-even-though-cash-usage-has-declined-significantly/>.

158 Birla A, 'Your Next Bank Will Be a Tech Giant', CrunchBase, September 2020, <<https://about.crunchbase.com/blog/your-next-bank-will-be-a-tech-giant/>>.

159 'BIS Quarterly Review: International Banking and Financial Market Developments', September 2018, <www.bis.org/publ/qtrpdf/r_qt1809.pdf?mod=article_inline>.

banks, their pivotal role in moving and storing value, and their ability to implement monetary policy. Central banks could consider implementing monetary or fiscal policy directly through exploiting the programmable nature of CBDCs, for example by implementing interest (positive or negative) on stores of value to encourage saving or spending, demurrage to encourage spending or by levying direct taxation on certain types of payments. These measures may be viewed as having an overreaching influence on private assets from a political perspective, although in effect they would be equivalent to commercial bank charges and interest, or Pay as You Earn (PAYE) taxation. CBDCs as settlement instruments will impact money supply considerations and monetary policy, prompting new regulatory considerations and alternative approaches to implementing monetary policy, including directly through the design of CBDCs. Monetary policy and financial supervision needs to be revised with international collaboration to acknowledge these changes and to mitigate potential negative impacts.¹⁶⁰

BFTs can leverage large existing consumer bases in LDC economies who are often disenfranchised from participation in the formal financial sector to quite a high degree. This existing consumer base, with growth in both product depth and availability, presents a lucrative alternative to traditional financial services. BFTs can skirt around most prudential regulation incumbent upon banks and other financial institutions, and this landscape of light regulation poses concerns that BFTs may intentionally or unintentionally distort free market competition from

their often dominant, if not monopolistic, position. Such a position would pose a hazard to financial stability as deposits in non-bank institutions would rise, as well as the ability to circumvent consumer protections as typically found in prudential regulation targeting only banks or traditional financial institutions.

BFTs' 'data-network-activities' loop gives these companies a competitive advantage when they enter into financial services. While this brings benefits as previously outlined, with no additional cost, the perils are associated with market power, operational resilience and data privacy. To resolve this, Mr. Agustín Carstens, General Manager of the BIS and former Governor of the Bank of Mexico, proposes that "[p]ublic policy regarding big techs in finance... needs to build on a more comprehensive approach that combines financial regulation, competition policy and data privacy."¹⁶¹

It is in light of these findings that a risk-based method of regulation is suggested, with a focus on outcomes in financial markets that are especially related to global and local financial stability but also to broader sustainable development outcomes, and which maintain macroeconomic authority in implementing jurisdictions. While globally interconnected financial systems are seen as a positive outcome of global digital transformation, it is important to ensure that markets making use of these solutions are sufficiently able to protect both consumers and their economies from unforeseen externalities.

160 China proposed Global Rules on CBDC and how they can be regulated through monitoring and information sharing. For reference, see Wilson T, Jones M, 'China Proposes Global Rules for Central Bank Digital Currencies', Reuters, March 2021, <www.reuters.com/article/cenbanks-digital-china-rules-idUSL8N2LN46B>. The Bank of Japan also recommended 'common rules' on CBDCs with major central banks, see 'BOJ Sees Scope to Set Common Rules on CBDCs with Major Central Banks', Reuters, April 2021, <www.reuters.com/article/cenbanks-digital-japan-idUSL4N2M1265>. Previously, a group of seven central banks together with BIS published a report laying out the key requirements for any publicly available CBDCs. For reference, 'Central Bank Digital Currencies: Foundational Principles and Core Features', Bank of International Settlement, October 2020, <www.bis.org/publ/othp33.pdf>.

161 Carstens A, 'Public Policy for Big Techs in Finance', BIS Speech, January 2021, <www.bis.org/speeches/sp210121.htm>.

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