



# FINTECH

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## NOTES

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### **Central Bank Digital Currency's Role in Promoting Financial Inclusion**

Ashley Lannquist and Brandon Tan

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September 2023

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**Central Bank Digital Currency's Role in Promoting Financial Inclusion**

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# Contents

<b>I. Introduction and Summary of Findings</b> .....	<b>2</b>
<b>II. Financial Inclusion</b> .....	<b>4</b>
<b>III. How Can CBDC Help?</b> .....	<b>9</b>
<b>IV. CBDC and Other Solutions</b> .....	<b>20</b>
<b>V. Country-Specific Assessment</b> .....	<b>25</b>
<b>References</b> .....	<b>29</b>
<b>Appendix</b> .....	<b>33</b>

## TABLES AND FIGURES

Figure 1. Pathway to Financial Inclusion .....	5
Figure 2. Share of Adults Making Digital Payments, Saving, and Borrowing in 2021 .....	7
Figure 3. Desirable Properties of “Digital Cash” .....	10
Figure 4. Framework for Country-Specific Assessment .....	25

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# I. Introduction and Summary of Findings

## **The level of global interest in central bank digital currencies (CBDCs) is unprecedented.<sup>1</sup>**

According to the Bank for International Settlements (BIS) survey in 2022, 93 percent of central banks are exploring CBDCs, and 58 percent consider that they are likely to or might possibly issue a retail CBDC in either the short or medium term (Kosse and Mattei 2023). Indeed, retail CBDC issuance is being explored in more than 100 countries. Several central banks have already launched pilots or even issued a CBDC.

**Financial inclusion is a key policy objective that central banks, especially those in emerging and low-income countries, are considering for retail CBDC.** About 60 percent of emerging and low-income countries see financial inclusion as one of the top three motivations for issuing CBDC (Kosse and Mattei 2023). Globally, 1.4 billion people remain outside of the formal financial system, and tackling this challenge is a top priority in many regions (Demirgüç-Kunt and others 2022).<sup>2</sup>

**Most financially excluded households rely on cash for payments, which marginalizes them from the formal economy.** Payments form the foundation of financial services, encompassing deposits, withdrawals, overdraft credit lines, and repayments, which are increasingly becoming digitalized. The “cash-digital divide” drives a wedge between low-income households and the formal economy by making it costly for banks, insurance companies, and other institutions to transact with them.

**If properly designed to address the barriers to financial inclusion, CBDCs have the opportunity to gain acceptance by the financially excluded for digital payments.** CBDC can be designed to replicate some of the desirable properties of cash, as “digital cash.” For instance, CBDC can be used without a bank account and made more accessible to financially excluded populations. Similar to cash, CBDC could be used for small transactions with no or low fees and with less stringent identification requirements for low-risk populations that have challenges obtaining formal identity documentation.<sup>3</sup> CBDCs could even be designed to operate in offline environments. As a direct liability of the central bank, a CBDC could also be as trusted and risk free (from a credit-risk perspective) as physical cash.

**CBDC, once adopted by the financially excluded, can then serve as an entry point to the broader formal financial system.** CBDC could allow households to send and receive funds from other digital financial service providers more efficiently, thus expanding their access to a broad array of products and services (including savings, insurance, and credit) that could meet their needs and improve their financial wellness. Additionally, CBDC-based transaction data could be sent to credit providers or other financial

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<sup>1</sup> CBDC is digital money issued by a central bank and is conceivable in both retail and wholesale form. Retail CBDC, sometimes called general purpose CBDC, is the focus of this note and refers to CBDC that is widely accessible to the public and can be held and used by individuals. Wholesale CBDCs are available only to a selected set of financial institutions.

<sup>2</sup> In this note, reference to the formal financial system and to formal products and services refers to those that are licensed and regulated. This note generally assumes that the financial products and services discussed are licensed and regulated.

<sup>3</sup> Such models can be developed in accordance with the Financial Action Task Force (FATF) standards, as has been discussed by the FATF in its guidance on financial inclusion (FATF 2017). The FATF is the international standard setter body for anti-money laundering/combating the financing of terrorism.

service providers in place of collateral or a more formal credit history when needed and with the consent of the customer.<sup>4</sup>

**Complementary policies can help maximize the potential of a well-designed CBDC to improve financial inclusion.** A major obstacle is that the financially excluded are also often digitally excluded. The use of CBDC requires basic digital literacy and a means of access (for example, a phone). Initiatives to improve digital infrastructure and connectivity, especially in remote areas, and initiatives to improve digital literacy should be explored in support of CBDC. Digital identification systems can streamline the onboarding process for CBDC.

**Overall, CBDC is not a panacea to financial inclusion, and additional experience is needed to fully understand its potential impact.** The impact of CBDC for improving financial inclusion is currently speculative, where further evidence and experience are needed to fully understand benefits and limitations. That said, it provides an opportunity that could be actively explored alongside other solutions for improving financial inclusion. Moreover, CBDC could be considered as one component of a broader set of measures to improve financial inclusion.

**CBDC has unique properties and may offer additional features that other solutions may not provide.** These include being a credit risk-free form of digital money, offline payments, and potentially lower costs and greater accessibility. According to the 2022 BIS survey, more than 80 percent of central banks responded that there may be value in having both a fast payment system and a CBDC (Kosse and Mattei 2023).

**This note ends with a step-by-step framework to help assess CBDC's value proposition for improving financial inclusion in a country.** The suitability of CBDC as a tool for improving financial inclusion must be carefully assessed on a country-specific basis. Each country's conditions and drivers of exclusion must first be thoroughly understood. CBDC's value proposition then relies on the extent to which CBDC can be designed and supported by complementary policies to address the country-specific barriers where significant gaps exist.

**The remainder of the note is organized as follows.** Section II discusses financial inclusion. Section III presents an analysis of how CBDC can support financial inclusion. Section IV discusses CBDC in the context of other solutions. Last, Section V presents a step-by-step framework for assessing CBDC for financial inclusion.

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<sup>4</sup> The sharing of transaction data should take place with the user's consent. Moreover, sharing CBDC data with other financial service providers to supply data on the user in the absence of collateral and formal credit history necessitates linking to users' identities, posing a trade-off with user privacy. Users should be given the agency to decide whether they prefer to keep their data private or to share it.

## II. Financial Inclusion

**This section provides background and context on financial inclusion for the rest of the note.**

**Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs—payments, savings, credit, and insurance** (World Bank 2022a).<sup>5</sup> Financial inclusion has been identified as serving 7 of the 17 United Nations Sustainable Development Goals.

### **Why Financial Inclusion?**

**Financial inclusion can contribute to poverty reduction.** The World Bank considers financial inclusion to be “a key enabler to reduce extreme poverty and boost shared prosperity” (World Bank 2022a). Financial inclusion allows low-income individuals to access financial tools and services that help them manage risks, accumulate savings, and build assets.<sup>6</sup> It provides opportunities for economic empowerment, income generation, and improved livelihoods.

**Financial inclusion can stimulate economic growth.** Increased access to finance promotes entrepreneurship, investment, and productivity, which leads to overall economic expansion.<sup>7</sup> Khera and others (2021) finds that digital financial inclusion is correlated with economic growth.

**Financial inclusion can help reduce income inequality.** Financial inclusion provides marginalized populations, such as women, rural communities, and disadvantaged groups, with more equal access to financial services. This promotes a more equitable distribution of resources and opportunities, helping the underserved improve their economic situations (Sahay and others 2015).

**A more inclusive financial system can enhance financial stability and the effectiveness of monetary policy transmission.** Financial inclusion could lead to a broader deposit base that fosters greater financial stability. When a larger share of the population has access to interest-bearing formal financial services, changes in policy rates and other monetary measures can more effectively influence borrowing costs, lending activities, and overall economic activity (Das and others 2023). Regulatory oversight can help contain any financial stability risks that arise as credit grows (Sahay and others 2015). Overall, the aggregate impact of financial inclusion will vary across countries and is limited by the relative contribution of the financially excluded population to overall borrowing and saving.

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<sup>5</sup> In this note, we focus on the financial inclusion of individuals, but the lessons are also applicable to small businesses. Additionally, where this note implies reference to the voluntarily financially excluded, it does not intend to include those who avoid the usage of formal financial services in order to perform illicit activity.

<sup>6</sup> The benefits vary across the dimensions of financial inclusion; see Martinez Peria and Shin (2020).

<sup>7</sup> Access to financial services can facilitate the adoption of new technologies, support small and medium-sized enterprises, and foster entrepreneurship, thus leading to greater innovation, job creation, and economic diversification (Demirgüç-Kunt, Klapper, and Singer 2017).

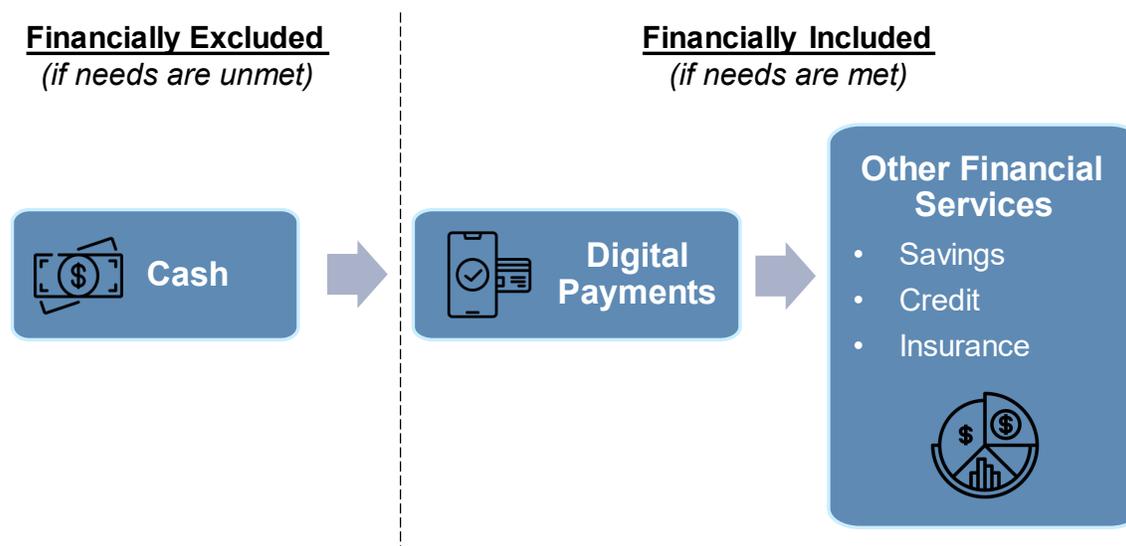
**Financial inclusion may or may not be an explicit component of a central bank's mandate.** In some countries, financial inclusion is an implicit or supportive component as part of ensuring sound and efficient payment systems, implementing effective monetary policy, or guaranteeing universal access to domestic payments and a store of value. Moreover, in many countries, other government authorities and policymakers have purview of financial inclusion and may be involved in decisions about whether to issue CBDC for this purpose.

### Pathway to Financial Inclusion

**Access to digital payments is a key first step toward broader financial inclusion (Figure 1).**

Payments form the foundation of financial services, encompassing deposits, withdrawals, overdraft credit lines, and repayments, which are increasingly becoming digitalized.

**Figure 1. Pathway to Financial Inclusion**



Source: Authors.

**Most financially excluded households that lack access to quality and affordable digital payments rely on cash for payments, which marginalizes them from the formal economy.**<sup>8,9</sup>

- **The infrastructure required to handle cash transactions with households drives a wedge between poor households and the formal economy.** A financial service provider aiming to serve households that primarily use cash must first establish the physical infrastructure to store, transport, and process cash. Such infrastructure can be highly costly. For instance, cash-in/cash-out points or agents in remote areas involve setting up physical locations equipped with secure

<sup>8</sup> It is possible that individuals prefer to use cash for various reasons, such as budgeting, and that their needs are met through cash usage. In this case, the person may not be considered financially excluded.

<sup>9</sup> See Radcliffe and Voorhies (2012) for more detail.

storage and transportation facilities, which adds to the financial service provider's operational expenses.

- **Financial service providers have limited information about cash-based households.** This information asymmetry arises because the absence of digital records in cash transactions results in a lack of knowledge about the financial activities of cash-based households. This market failure is particularly evident in insurance and credit markets, where financial service providers are forced to group households with varying levels of risk into the same risk pool. As a result, the cost of accessing financial services increases for low-risk households, and some financial service providers are unable to serve this customer segment at all. In savings products, this information asymmetry exposes providers to potential risks of fraud. Last, financial service providers may know less about the needs of the financially excluded and may not offer products that cater to them.

**Access to digital payments serves as a gateway to other financial services such as savings, credit, and insurance.** Households with access to digital payments are able to send and receive funds from other digital financial service providers more efficiently. They are able to build a financial history that can be shared with financial service providers.<sup>10</sup> As a result, their access to a wide range of formal financial products and services could expand (all else equal and assuming that affordable and quality services are available), which could meet their specific needs and improve their overall financial wellness.

### **Most Recent Data on Financial Inclusion**

**According to the 2021 Global Findex survey, 1.4 billion people worldwide remain outside of the formal financial system.** Tackling this challenge is a top priority in many regions.

**Almost all adults who save and borrow in the formal sector also make digital payments.** Fifty-seven percent of adults in developing countries made digital payments in 2021 (Demirgüç-Kunt and others 2022). Twenty-four percent saved formally, and 22 percent borrowed formally. Only 2 percent of adults saved formally while not also making digital payments, and only 1 percent of adults borrowed formally while not making digital payments. Of the adults who make digital payments, 58 percent either borrowed or saved formally, whereas only 7 percent of adults who do not make digital payments did the same. This demonstrates a correlation between having a digital transaction account and using broader financial services.<sup>11</sup>

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<sup>10</sup> According to Ouyang (2021), adopting Alipay cashless payments in China increases the probability of getting credit access by 56 percent, and a 1 percent increase in cashless payment flow results in a 0.41 percent increase in the credit line. See also Sun and Rizaldy (2023) and Ghosh, Vallee, and Zeng (2022).

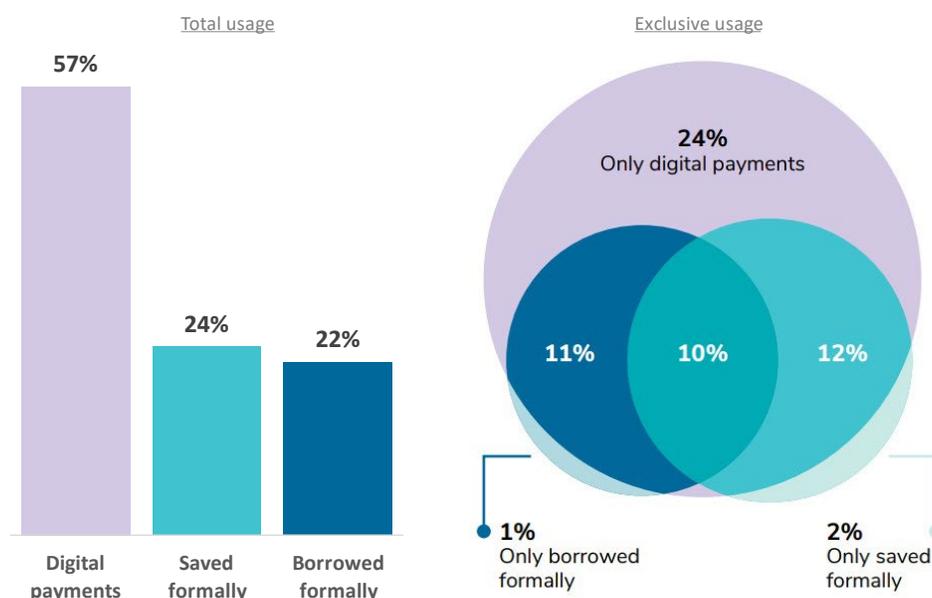
<sup>11</sup> Notably, someone's ability to borrow and save formally depends on the availability of quality and affordable products and services for them to do so, as well as on individual factors such as their risk profile. Access to a digital payment account itself does not indicate access to other products and services to meet financial needs if those products and services do not exist or if the user's risk profile is too high.

**Financial inclusion has been growing in developing countries:<sup>12</sup>**

- The share of adults making or receiving digital payments grew from 35 percent in 2014 to 57 percent in 2021.
- Mobile money has been an important enabler of financial inclusion in several regions, including sub-Saharan Africa.
- The share of adults borrowing formally grew from about 15 percent of adults in 2014 and 2017 to 22 percent in 2021.
- The share of adults saving formally has increased by 7 percentage points since 2011.

**Figure 2. Share of Adults Making Digital Payments, Saving, and Borrowing in 2021**

Adults using an account for financial services in developing economies (%), 2021



Source: Demirgüç-Kunt and others (2022).

**The pandemic has increased the use of digital payments.** For instance, in India, 80 million adults made their first digital merchant purchase after the start of the pandemic, as did more than 100 million adults in China.

**Gaps in access continue to exist.** Women, the poor, the young, rural residents, and those outside the workforce all continue to have lower account ownership rates on average. Women hold fewer deposits

<sup>12</sup> See Demirgüç-Kunt and others (2022) for these and other figures regarding global improvements to financial inclusion.

and take out fewer loans (IMF 2023). In 2021, the “gender gap” stood at 6 percentage points in emerging economies, where 74 percent of men globally have a financial account compared with 68 percent of women (Demirgüç-Kunt and others 2022). The gender gap varies substantially by region: Sub-Saharan Africa, the Middle East, and North Africa experience 12- to 13-percentage point gaps compared to East Asia and the Pacific at roughly 3 percentage points each.

## III. How Can CBDC Help?

**This section presents an analysis of the opportunities that CBDC provides to promote financial inclusion.** The key role that CBDC plays is in expanding access to a new form of digital payment; digital payments are a first step in the pathway to broader financial inclusion (Section II, Figure 1). CBDC, once adopted by the financially excluded, can then serve as an entry point to the broader formal financial system.

The section is structured according to its three key messages:

1. If properly designed to address the barriers to financial inclusion, with beneficial properties of “digital cash,” CBDC has the potential to gain acceptance among the financially excluded for digital payments.
2. CBDC should be designed to support further access to other financial services such as formal savings, credit, and insurance.
3. Complementary policies to address digital exclusion can help maximize the potential of a well-designed CBDC.

### **CBDC as “Digital Cash” for Payments**

**Cash has properties that make it the most common mode of payment for the financially excluded,** who primarily make small transactions:

- **Cash is widely accessible.** Cash is accepted almost everywhere, is easy to use, and does not require any specific technology or infrastructure.
- **Small cash transactions are low or no cost.** Cash transactions generally do not incur additional fees or transaction charges.
- **Cash preserves privacy.** Cash transactions are not recorded and protect personal privacy.<sup>13</sup>
- **Cash is secure and trusted.** Cash has been used as a medium of exchange for centuries and has established a level of trust and familiarity among people. Cash, as a direct liability of the central bank, is safe and risk free from a credit-risk perspective.<sup>14</sup>

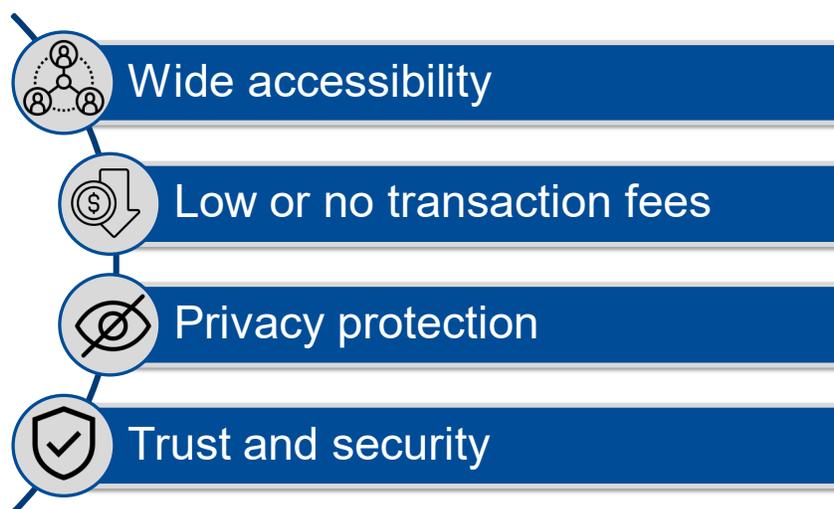
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<sup>13</sup> The predominance of cash use in an economy can pose risks to financial integrity because of its anonymity. The purpose of this section is to solely reflect on the beneficial aspects of physical cash that could be considered for designing CBDC for financial inclusion. However, the risks of cash, and financial integrity regulations, must also be considered and adhered to.

<sup>14</sup> Although cash is typically a safe store of value, the level of inflation could decrease its purchasing power.

**CBDC has the opportunity to gain acceptance among the financially excluded if it is designed to replicate some of the desirable properties of cash, as “digital cash.”** CBDC could even surpass these desirable properties in certain aspects and offer greater value to users. CBDC should be designed to address the access, cost, privacy, and trust barriers that prevent the financially excluded from shifting from cash to using existing digital payment services. That said, CBDC should be designed to allow for compliance with requirements for anti-money laundering and combatting the financing of terrorism (AML/CFT) in line with the Financial Action Task Force (FATF) standard.

**Figure 3. Desirable Properties of “Digital Cash”**



Source: Authors.

**Like cash, CBDC should be designed to be widely accessible.**

- **CBDC can be used without a bank account.** In many developing countries, a large share of the population does not have a bank account. Opening and maintaining a bank account can be a significant barrier for the financially excluded.<sup>15</sup> Unlike many traditional digital payment systems that typically require individuals to have a bank account to access digital transactions, CBDC transactions would not necessarily require one. Instead, access can be facilitated through digital wallets directly provided by the central bank or through service providers such as telecoms and social network or e-commerce platforms.<sup>16,17</sup>
- **CBDC should not require minimum balances.** A “lack of money” is the most cited barrier to financial inclusion in the 2021 Global Findex survey. Setting no minimum balance requirements is

<sup>15</sup> Tan (2023b) shows that there are greater gains to financial inclusion if CBDC does not require a bank account.

<sup>16</sup> The provision of digital wallets for CBDC by nonbanks may raise regulatory and business model issues that need to be addressed.

<sup>17</sup> Users can convert their cash directly to and from CBDC through a variety of cash-in/cash-out points and agents (as discussed in more detail in other parts of this note).

crucial for CBDC to reach the financially excluded with lower incomes who may struggle to meet them.

- **Formal identification could potentially not be required for small transactions.** Less stringent identification requirements can be applied to low-risk financially excluded populations. Documentation of formal identification is often needed because identifying the customer is an important part of due diligence and other preventive measures under the FATF's standards on AML/CFT. However, one of the main financial integrity challenges in the context of financial inclusion is that the potential customers lack reliable identity documentation and verifying their data is difficult. Documentation requirements are often cited as a barrier to financial inclusion because some populations face challenges obtaining formal documentation.<sup>18</sup> Even before the advent of CBDCs, countries have explored various “tiered” customer due diligence approaches aimed at lessening the identification requirements for specific populations, particularly those people who are unable to obtain formal government-issued documentation. This approach enables those who pose a low risk of money laundering and terrorism financing to access financial products and services.<sup>19</sup> Some countries have applied similar principles in their CBDC explorations.<sup>20</sup>
- **CBDC can offer offline functionality.** Some financially excluded populations rely on cash because they do not have reliable internet or mobile connectivity, especially in remote areas. Cash is also important in countries prone to natural disasters where regular network outages may occur. CBDC has the potential to support transactions in a fully offline environment with limited data service availability and mobile connectivity, typically through Radio Frequency Identification, Near Field Communication, or Bluetooth networking (Kiff 2023). Safe, secure, and low-cost offline payment functionality for CBDC is currently under development and is being designed to manage potential risks of fraud, money laundering, and terrorism financing.<sup>21</sup>
- **CBDC could be designed to operate on feature phones (non-smartphones) and even stored-value cards.** Although smartphone and internet penetration is on the rise, significant shares of the financially excluded population may still lack access. Less digitally literate populations and those without wide electricity access for charging smartphones may also be

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<sup>18</sup> Financially excluded populations are more likely to report lacking documentation as a key barrier across developing economies—Colombia (43 percent), Tanzania (50 percent), and Uganda (50 percent; Demirgüç-Kunt and others 2022). Globally, about 850 million people lack government-issued proof of identity (World Bank 2022b).

<sup>19</sup> See footnote 4.

<sup>20</sup> For instance, the eNaira CBDC in Nigeria has a “Tier 0” wallet for those without a bank account. It requires basic information such as a photo and telephone number. It has much lower daily transaction limits (Central Bank of Nigeria 2022). It should be noted that such systems have not yet been assessed or endorsed by the FATF.

<sup>21</sup> See BIS (2023a) for more detail on the risks with offline CBDC transactions.

more comfortable with feature phones and store-value cards.<sup>22,23</sup> Feature phones and store-value cards would also be lower cost to access.

- **CBDC should have a simple and intuitive user interface/user experience (UI/UX) and be easy to use.** Transacting in cash is straightforward and simple. An intuitive and user-friendly UI/UX design can make CBDC more accessible to individuals with low levels of digital literacy. UI/UX design should also consider the diverse needs of different user groups and accommodate marginalized populations such as those with disabilities.<sup>24</sup>
- **CBDC should be designed to achieve wide acceptance.** Like cash, CBDC should be accepted almost everywhere. Countries could consider encouraging adoption and potential legal tender status.
  - **The market for payments is two-sided, and there is a dynamic feedback loop where consumers benefit from increased merchant acceptance and vice versa (Box 1).** Incentivizing both households and merchants is important to achieve widespread acceptance of CBDC (Tan 2023a).
  - **Merchant acquisition costs to accept CBDC should be low.** For instance, the Central Bank of the Bahamas has partnered with a leading retail association to offer merchants discounts on point-of-sale terminals for accepting its CBDC, the Sand Dollar. QR code standards could be imposed to eliminate the need for expensive point-of-sale terminal infrastructure.<sup>25</sup>
  - **Financial incentives and value-add capabilities can also boost merchant adoption.**<sup>26</sup> The Bank of Jamaica launched the Small/Micro Merchant Incentive Program that rewards the first 10,000 merchants who sign up for the JAM-DEX CBDC platform with a one-time financial incentive (Ministry of Finance and the Public Service of Jamaica 2023, 57). CBDC could involve automated tax payments for merchants who otherwise find tax reporting and payments burdensome (Alliance for Financial Inclusion 2022).

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<sup>22</sup> For further information, see Miedema and others (2020). The report considers “populations to be served” by CBDC, such as people of all ages, people on low or fixed incomes, and all citizens during power and network coverage outages. It then discusses how offering a variety of hardware devices provides greater access to these populations.

<sup>23</sup> For example, the Bank of Ghana’s eCedi retail CBDC pilot is testing a stored-value card for offline transactions with the aim of serving people in rural areas with limited access to mobile data networks (Bank of Ghana 2022).

<sup>24</sup> Given its expertise and experience, the private sector may be better positioned than the central bank to design appropriate user interfaces. On the other hand, the central bank may want to oversee or develop user interfaces to ensure they are widely accessible and cater to the needs of underserved populations, since the private sector is not necessarily incentivized to serve these populations.

<sup>25</sup> The Bank of Thailand has launched a program to encourage merchants to accept digital payments, including CBDC if available, by offering subsidies for the installation of QR code payment systems. Indonesia’s QR code standard (QRIS) has also been successful with the value of QR transactions rising exponentially USD 6.5 billion in 2022 and with 22 million merchants currently accepting payment by QR code (Jiao and Sihombing 2023). There has also been rapid growth in QR-based payments through India’s unified payment interface (Alonso and others 2023).

<sup>26</sup> The size and scope of the financial incentives will be constrained by fiscal considerations.

There can also be a tax reduction or exemption for small transactions made with CBDC.<sup>27</sup>

- **On the user side, cashback rewards, discounts on purchases, or loyalty points can encourage the use of CBDC.** The government of Uruguay introduced a loyalty program that rewards users of its digital currency, e-Peso, for making purchases with it.<sup>28</sup> The Central Bank of the Bahamas has committed to a giveaway of \$1 million in Sand Dollars, their CBDC, to the first adopters through 2024.
- **As central bank money, CBDC could be given legal tender status and potentially require acceptance.** Legal tender status has different implications and legal treatment across countries. Therefore, its appropriateness for improving financial inclusion should be considered within the country's local context and legal concept of legal tender.

### Box 1. CBDC Adoption in a Two-Sided Market

The market for CBDC is two-sided, where consumers benefit from increased merchant acceptance and vice versa. Tan (2023a) develops a dynamic two-sided payments model showing that incentivizing both households and merchants is important to achieve higher levels of CBDC adoption.<sup>29</sup>

The model highlights that households adopt CBDC for access to a savings vehicle, reduced cost of remittances (via cross-border CBDC), more efficient government payments, and, if accepted by merchants, a valuable means of payment. On the other hand, merchants will only accept CBDC if there is sufficient demand from households to make payments with CBDC. Merchants also show greater uptake if CBDC fees are low and there are tax exemptions or subsidies for transactions made in CBDC.

Upon CBDC issuance, an economy can get stuck at a steady state with low CBDC adoption when the features of CBDC that do not rely on merchant acceptance (remuneration on savings, cost of remittances, and efficiency of government payments) are not sufficiently attractive. Temporary subsidies, tax exemptions, and/or using CBDC for government payments can spur initial take-up to transition an economy to a welfare-improving steady state with higher CBDC usage.

The model shows that greater adoption of CBDC can lead to greater financial inclusion but potentially to the disintermediation of banks. Thus, designing CBDC for greater adoption poses a trade-off. However, the gains from financial inclusion and formalization (reduction in the use of cash) are more likely to outweigh the risks in lower-income countries with larger unbanked populations.

- **CBDC should be easily convertible to and from cash.** Often, limited access points (on and off ramps) for people to convert between cash and digital money creates barriers to digital financial inclusion. Widely available agent access and onboarding points that allow conversion to and from cash, whether they be at post offices, grocery stores, other participating merchants, ATM machines, mobile or payment service provider agent offices, or elsewhere can help bridge this gap.<sup>30</sup>

**Like cash, CBDC should have no or low fees for small transactions.** Transaction fees associated with digital payments are a key barrier to usage, as the financially excluded can make small payments in cash at no cost. CBDC can offer transactions at zero or low fees, especially for small transactions.<sup>31</sup>

- As a public-sector offering, **CBDC does not need to generate profit for the issuer** (the central bank) and could thus potentially be cheaper than current digital payment offerings.
- The potential ability of a central bank to **recover costs of issuance through seigniorage** may also reduce the need for fees.
- If private sector payment service providers are involved with the operation of a CBDC, then the **central bank can regulate fees** and limit how much they can charge for their services.<sup>32</sup>
- **CBDC could reduce intermediation** in the existing retail payment transaction chain to lower costs.
  - Transactions could be settled by directly transferring claims on the central bank's balance sheet (between two parties who have CBDC). The circumvention of intermediary mark-ups and improvements to efficiency could lower prices for users.

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<sup>27</sup> In 2020, the Moroccan government introduced a five-year total exemption from taxes for transactions made by mobile payment with small merchants.

<sup>28</sup> Similarly, the People's Bank of China launched a pilot program offering cashback rewards to users of its digital yuan during the 2021 Lunar New Year holiday to encourage adoption and use.

<sup>29</sup> Henry and others (2023) offers a similar discussion for the Canadian context. The paper finds that it may be challenging for a CBDC to address the payment needs of the financially excluded in Canada unless there is sufficient CBDC adoption by the general public. This is because merchants need substantial customer demand for CBDC payments for them to accept CBDC. Merchant CBDC acceptance is in turn necessary to encourage further adoption and usage. The paper concludes that for CBDC to serve a minority of users with unmet payment needs in Canada, it would therefore need to be adopted by the majority of users. Yet because most Canadians have their payment needs met by existing services, the latter is unlikely without substantial and sustained central bank investment. However, this challenge may be less severe in the emerging and developing-country context, where the financially excluded make up a larger share of the population. In these cases, more consumers stand to have unmet needs served by the CBDC, supporting broader adoption and therefore wider merchant acceptance.

<sup>30</sup> Auer and others (2022) states that among the nine central banks it surveyed for the report, "Leveraging existing cash-in and cash-out networks is a priority for those aiming to drive greater financial inclusion with CBDC. Central banks outlined plans to develop rural agent networks and distribute merchant acceptance tools to facilitate offline transactions. For China, this included using existing branch networks of financial institutions, including the extensive rural networks of the Post Savings Bank."

<sup>31</sup> The introduction of a CBDC can also promote competition in digital payments and lower overall prices.

<sup>32</sup> In Europe, there is regulation on the upper limit on inter-change fees. In China, merchant fees are capped at 0.6 percent for Alipay or Wechat pay.

- These gains are most prominent for cross-border transactions that are intermediated by counterparties in different jurisdictions that rely on costly trusted relationships (Adrian and others 2022).<sup>33</sup>

**CBDC could be designed to preserve privacy for small, low-risk transactions.** The financially excluded may be wary of payment tracking for data privacy<sup>34,35</sup> or tax purposes. CBDC can potentially strike a balance between preserving some privacy in transacting and the need to gather information for regulatory purposes.<sup>36</sup> Some models envision a tiered approach that would provide a degree of privacy for everyday low-value and low-risk transactions.

**Like cash, CBDC should be designed to be secure and trusted.** Distrust of the financial system is a key barrier to inclusion, cited by more than a third of financially excluded adults in Argentina, Bolivia, Bulgaria, Colombia, Jamaica, and Russia, among others (Demirgüç-Kunt and others 2022).

- **CBDC can offer greater trust as a central bank–backed product.** The financially excluded may be hesitant to use existing products and services offered by private sector providers. Trust in cash stems from its central bank backing. Similarly, users might trust CBDC more because of its backing by the central bank if the central bank is seen as credible and trustworthy.<sup>37</sup>
- **CBDC would be safe and risk free as a direct liability of the central bank.** Unlike bank deposits and other liabilities of private financial institutions, which are subject to credit and liquidity risk and the possibility of bank failures, CBDC would not carry such risks. As a direct liability of the central bank, CBDCs would be as safe and risk free as physical cash.
- **CBDC offers immediate settlement.** Cash transactions are final and irrevocable once the physical exchange takes place. This finality provides certainty and does not expose the user to the credit risk of financial intermediaries. Additionally, receiving cash allows immediate access to the funds; any delays would disproportionately affect the poor and financially excluded.<sup>38</sup> Likewise, CBDC offers finality of payments and immediate access to funds by providing direct

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<sup>33</sup> If CBDCs play a role in cross-border payments, challenges could arise with respect to capital flow management measures (see He and others 2023). It is also important to note that interoperability is important to support the convenience of remittances and other cross-border payments using CBDC.

<sup>34</sup> For example, according to a recent online survey by the European Central Bank (2021), the largest majority of respondents (41 percent) chose privacy protection as the most important characteristic to consider when issuing a CBDC.

<sup>35</sup> Research shows that low-income consumers in Kenya and India highly value their data protection and privacy and are even willing to pay more for financial services that come with stronger protections (Fernandez Vidal and Medine 2019). Moreover, “lack of trust” is cited as a reason for not having a financial account by more than 20 percent of global survey respondents, where concerns regarding privacy can be one aspect of trust (Demirgüç-Kunt and others 2022).

<sup>36</sup> See footnote 4.

<sup>37</sup> However, if people have low trust in government institutions, they may hesitate to use CBDC more than private sector services. For instance, even if CBDC is designed to preserve privacy, users may not trust the central bank to do so. Closely understanding the specific drivers of trust barriers in a country is crucial to understand whether CBDC might address them.

<sup>38</sup> See Massachusetts Institute of Technology Digital Currency Initiative (2023). Immediate settlement is especially important for microbusiness payments. On the other hand, in some cases, the ability to reverse or cancel erroneous or fraudulent transactions may be desirable. The success or failure in reversing payment can make a large difference for those in financial need.

access to the central bank balance sheet. CBDC transactions are settled directly in central bank money, on the central bank's balance sheet, and in real time.

- **CBDC should be designed to be secure.** The financially excluded can directly handle and protect their physical cash. On the other hand, digital assets face risks of unauthorized access or cyberattacks. Strong cybersecurity and protections are necessary for CBDC. Users should have confidence in the security of the CBDC and that their funds and data are protected.
- **Public communications, targeted education, and training initiatives can build trust and confidence in CBDC.** Public communications should aim to demystify CBDC and address any misconceptions or concerns that individuals may have. Workshops, seminars, and in-person assistance can also help individuals better understand CBDC and how to use it, which can encourage its adoption among those who may be hesitant or skeptical. These programs can be tailored to different target audiences, such as marginalized populations, and can address their specific needs and concerns.<sup>39</sup>

### **CBDC as a Gateway to Broader Financial Inclusion**

**CBDC, once adopted by the financially excluded, can serve as an entry point to the broader formal financial system**—the next step along the pathway to financial inclusion (Section II, Figure 1).

**CBDC should be designed to support further access to other financial services such as savings, credit, and insurance.** Although digital payments are an important aspect of financial inclusion, they are just the first step toward the larger goal. Access to a wide range of products and services, including formal savings, insurance, and credit, could help meet the needs and improve the financial wellness of the financially excluded.

**CBDC can facilitate greater connectivity to other financial services by enabling a seamless flow of transactions and data between the CBDC ecosystem and the wider digital financial services landscape.**

- **Households with access to CBDC should be able to make transactions with other digital financial service providers more efficiently.**
  - **CBDC should be seamlessly interoperable with other existing payment infrastructure and instruments used by financial service providers.** These include

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<sup>39</sup> The Reserve Bank of India in 2023 launched a “digital payments awareness week” to highlight available digital payment channels and stimulate adoption (Das 2023). Separately, targeted education campaigns have demonstrated some success in improving knowledge of personal finance and various product and service options. For example, Bruhn and others (2014) finds that educating high school students in Brazil about personal finance leads to improvements in financial behaviors for both the students and their parents (“trickle up” impacts). Doi, McKenzie, and Zia (2012) finds that for remittances, training both the migrant and the family member (remittance receiver) about financial knowledge, behaviors, and savings during the process of sending and receiving remittances (a teachable moment) has the strongest impacts.

credit transfers and ATMs, QR codes, point-of-sale devices, payment cards, and mobile money. Technical and infrastructural support in the form of development tools, application programming interfaces (APIs), common standards (protocols, messaging formats, and data structures) and documentation can also facilitate the integration process. CBDC can be directly integrated into third-party wallets and applications offering financial and other services.

- **A clear and supportive regulatory framework can outline the guidelines and requirements for digital financial service providers to integrate with and utilize CBDCs.** Clarity in regulations can help foster confidence and provide a conducive environment for financial service providers to adopt CBDCs.
- **As a result, a financial service provider that aims to serve households using CBDC will be able to do so more seamlessly and cheaply.**
- **CBDC should facilitate data sharing with financial service providers to address information asymmetry.** Appropriate privacy protections and safeguards, including attaining user consent and adhering to country-specific regulations and legal frameworks, should be put in place to protect user data.
  - **Using CBDCs allows households to establish a financial history.** CBDC transactions create a digital record of data that can offer valuable financial information about the user.<sup>40</sup>
  - **CBDC data can address information asymmetry barriers to access in credit, insurance, and savings.** Lenders and insurance companies can use CBDC transaction data as an alternative data source where a formal credit history is not available to evaluate an individual's financial behavior, payments patterns, and overall financial creditworthiness. This would reduce the cost of accessing financial services for low-risk households, who would otherwise be grouped into the same risk pool as higher-risk households (Tan 2023b). With greater access to the financial histories of their customers, financial service providers would be in a better position to identify the customer and verify their identity and to ensure that the transactions are consistent with the provider's knowledge of the customer, the customer's risk profile, and source of funds.
  - **CBDC design should allow for and facilitate data sharing, while preserving privacy and data protection.** Similar to open banking systems, secure APIs can be provided to enable third-party financial service providers to access customer CBDC data.<sup>41</sup> Standardized data formats can also ensure compatibility and interoperability. Users

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<sup>40</sup> CBDC transaction data may also facilitate accounting for informal firms.

<sup>41</sup> See Dinçkol, Ozcan, and Zachariadia (2023) for additional exploration of the potential benefits of open data standards in financial products.

should have control over the sharing of their data. CBDC systems should incorporate mechanisms that allow individuals to give informed consent for data sharing and specify the scope and purpose of such sharing.<sup>42</sup> Individuals should have the ability to revoke consent or modify their data sharing preferences at any time.

**This enhanced connectivity of transactions and data, underpinned by CBDC, can also potentially promote further innovation where there is a lack of interoperability and common standards.**

CBDCs can act as a catalyst for establishing interoperability and common standards in the financial ecosystem.<sup>43</sup> The increased connectivity of transactions and data can help foster the creation of new financial products and services that cater to the needs of the financially excluded.

**CBDC has the potential to serve as a foundation for the tokenization of financial markets.** The full benefits of tokenization rely on settlement finality that comes from central bank money in the form of a CBDC residing in the same venue as other claims (BIS 2023b). Tokenization could potentially bring benefits, such as improving credit intermediation with tokenized bank deposits, if it is more accessible to the financially excluded than existing bank deposits.<sup>44</sup>

### **Complementary Policies**

**It is important to identify complementary policies that could be beneficial to accompany the deployment of a CBDC seeking to improve financial inclusion.** Supportive policies can strengthen the benefits of CBDC for financial inclusion.

**A major obstacle is that the financially excluded are also often digitally excluded.** The digital nature of CBDC subjects it to barriers that exist for digital services, such as limited digital literacy, limited electricity infrastructure, limited access to digital hardware, and limited identifying information for compliance purposes. Policies that address these barriers could help enable greater access to CBDC.

- **Digital literacy programs:** The use of CBDC requires basic digital literacy. Implementing digital literacy programs is essential to equip individuals with the skills and knowledge necessary to navigate such a digital service effectively (Cooper, Esser, and Allen 2019). Limited digital literacy also creates challenges and risks with CBDC; for instance, users may hesitate to trust digital financial services. In regions where digital literacy and awareness of cybersecurity best practices are low, users may unintentionally perform actions that compromise their or the CBDC system's security, such as falling subject to a cyberattack that targets end users.
- **Digital and electricity infrastructure development:** CBDC requires electricity access and reliable digital infrastructure. About 700 million people worldwide lack access to electricity (World

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<sup>42</sup> Data sharing should be regulated by the central bank or other relevant regulatory authorities.

<sup>43</sup> See Section III "Domestic CBDC Platforms" in Adrian and Mancini-Griffoli (2023) for a more detailed discussion.

<sup>44</sup> Tokenized deposits are still in early stages of development, and their ability to lower barriers to financial inclusion warrants further research and investigation.

Bank 2023), and about 3 billion people lack access to the internet (United Nations International Telecommunication Union 2021). Investments in electricity infrastructure and digital infrastructure, such as broadband connectivity and mobile network coverage, would support access to CBDC, particularly in underserved areas.

- **Increasing access to mobile phones:** CBDC requires a means of access, typically a mobile phone.<sup>45</sup> Governments can consider providing subsidies for low-income individuals to purchase affordable devices and mobile data plans and implement policies that promote competition in the mobile phone market to lower prices. Community-based phone sharing programs can also provide access to mobile devices for individuals who cannot afford their own.
- **Digital identification:** National digital identification systems can streamline elements of the customer due diligence process for CBDCs by providing a trusted and efficient means of identity verification. Digital identification also reduces reliance on physical identification documents, which can be easily lost, stolen, or damaged (Alliance for Financial Inclusion 2022). Authorities could also consider automatically pairing an optional CBDC account with an individual's digital identification account.

**Financial literacy initiatives can support the adoption and usage of CBDC as well as existing financial products and services.** Limited financial literacy is a substantial challenge to financial inclusion globally.<sup>46</sup> Its impact ranges from limited trust and low sense of perceived value of available services to susceptibility to theft or fraud and economic exploitation. It can potentially be improved through educational policies that promote knowledge of basic financial concepts and products to households and businesses so they can choose services that best meet their needs.<sup>47</sup>

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<sup>45</sup> It is also possible for CBDC transactions to occur with stored-value cards, as discussed earlier in this paper.

<sup>46</sup> For instance, about two-thirds of unbanked adults say they would need help opening an account at a financial institution, excluding mobile money (Demirgüç-Kunt and others 2022).

<sup>47</sup> Improving financial literacy can be challenging. According to a 2014 meta-analysis, interventions have limited to no success, because financial education decays over time rather than having lasting effects (Fernandes, Lynch, and Netemeyer 2014). Other research finds more cause for optimism, with improvements from financial education in cases such as targeting those with low education and financial literacy, targeting both the sender and receiver of remittances, targeting youth through school curricula, providing education at immediately teachable moments, and delivering education through innovative channels (Bruhn and others 2014; Carpena and others 2011; and Doi, McKenzie, and Zia 2012).

## IV. CBDC and Other Solutions

**Countries are considering many other policies and initiatives for financial inclusion in addition to, and possibly in the place of, CBDC.**

**This section makes two points.** First, other solutions should continue to be explored alongside CBDC. Second, CBDC has unique properties and may offer additional features that other payment solutions (such as fast payment systems and “e-money”) may not provide.

### **CBDC as One of Many Solutions**

**CBDC alone is not a panacea to financial inclusion.** CBDC and its supporting policies can address several barriers to financial inclusion, but other barriers remain. Such barriers include low financial literacy, cultural factors (for example, gender norms and religious beliefs), and low trust in formal financial institutions (for saving, credit, and insurance products).

**Countries should consider a wide range of policies and initiatives to support financial inclusion from different angles.**

- **Other solutions may tackle the barriers to financial inclusion that are not addressed by CBDC.** These solutions could be complementary to CBDC if they address different issues and challenges. Examples could include regulations to limit fees of existing financial services, policies requiring banks to offer basic deposit accounts without fees or minimum balance requirements,<sup>48</sup> open banking initiatives and open API standards to support competition and interoperability of existing financial services,<sup>49</sup> and regulations that increase the safety and trust of existing financial services.<sup>50</sup>

### **Comparing CBDC to Other Solutions**

**It is important to compare CBDC to other initiatives and solutions.** If CBDC offers a unique value proposition for financial inclusion, it should be pursued in parallel to other solutions. In the presence of budget or capacity constraints, countries may need to choose between alternatives and opt for the most efficient one. Efficiency should take into account both cost and the extent to which the solution effectively addresses the most significant barriers to financial inclusion in the country.

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<sup>48</sup> In several countries, commercial banks must offer basic deposit accounts without fees or minimum account balances to widen access to the public.

<sup>49</sup> Open banking initiatives, including open API standards, promote competition and data-driven innovation by allowing consumers to share their financial data across multiple institutions and access a wider range of financial products and services. See Dinçkol, Ozcan, and Zachariadis (2023) for additional exploration of the potential benefits of open data standards in financial products.

<sup>50</sup> This can include requirements for minimum capital levels, the safety and levels of reserves that back e-money, compliance with AML/CFT regulations, and regular audits and inspections. For additional discussion, see Dobler and others (2021) about e-money supervision, oversight, and user protection.

**CBDC is often discussed alongside other payment solutions aimed at expanding access to digital payments.**

- **Fast payment systems:** Fast payment systems, also known as real-time payment systems or instant payment systems, are payment infrastructures that enable immediate, round-the-clock electronic fund transfers between bank accounts or digital wallets (World Bank 2021). These systems are designed to provide instant and seamless payment processing, allowing individuals and businesses to send and receive funds in real-time, often within seconds. Similar to CBDC, fast payment systems offer efficient, real-time, and convenient payment capabilities. One prominent example is Brazil's Pix (Box 2).
- **"E-money" schemes:** The private sector can deliver low-cost and efficient payment services by offering settlement in commercial bank money on the balance sheet of the payment provider. The private sector has played a significant role in expanding access to digital payments in several countries, such as with M-Pesa in Kenya and AliPay in China (see Sun and Rizaldy 2023). With lower servicing costs, private firms are finding it increasingly profitable to target poorer and more rural communities.

### Box 2. Brazil's Pix

**Pix is a central bank–operated instant payment scheme that was launched by the Central Bank of Brazil in November 2020.**<sup>51</sup> The central bank fully developed the infrastructure and operates the system as a public good. The central bank sets the rules and technical specifications to create a standardized, competitive, inclusive, safe, and open environment. Unlike CBDC, the funds are commercial bank money. The central bank has expressed that a potential future CBDC could be compatible with Pix in terms of operations, policies, and technology.<sup>52</sup>

**Pix has been successful in onboarding a significant number of underbanked and unbanked households.** It has achieved rapid adoption and widespread usage with 70 percent of the Brazilian adult population having either made or received a Pix transaction.<sup>53</sup> Specifically, Pix allowed more than 50 million people (more than 20 percent of the population) who had not used a banking service to conduct a banking transfer for the first time within its first year of launch.

**CBDC has unique properties and may offer additional features for financial inclusion that other payment solutions may not provide.**

<sup>51</sup> For additional information about Pix, see Duarte et al. (2022) and BCB (2023a).

<sup>52</sup> For additional information, see the Central Bank of Brazil's FAQ on the digital real (Banco Central do Brasil 2023b).

<sup>53</sup> See Pix Statistics (bcb.gov.br) for the most updated figures.

- **CBDC has unique properties as central bank money.**
  - **CBDC provides direct access to central bank accounts for more efficient settlement.** Although fast payment systems can lower settlement costs and increase speed and efficiency, transaction costs can persist due to the reliance on intermediaries.<sup>54</sup> The potential gains in efficiency are generally most prominent for cross-border transactions (for example, remittances).
  - **CBDC provides the safety of central bank money.** Liabilities of private financial institutions are subject to credit and liquidity risk and the possibility of failures. On the other hand, as a direct liability of the central bank, CBDCs are as safe as cash and do not have these risks.
  - **CBDC could potentially be offered legal tender status.** Private forms of money are usually not offered legal tender status. CBDC could be offered legal tender status because it is (like cash) issued and backed by the central bank.<sup>55</sup> Legal tender status would widen acceptance and adoption.
- **CBDC is a public sector–led initiative that can be provided at lower cost, improve efficiency, and ensure interoperability and operational resilience.**<sup>56</sup> “E-money” schemes are run by the private sector, and fast payment systems (even if public sector operated) rely on the private sector players who connect to it to provide payment services.
  - **The private sector is profit seeking.** On the other hand, CBDC as a public offering does not need to generate profit for the central bank. Also, through CBDC, the central bank could use its convening and regulatory power to allow private payment service providers supporting CBDC to recover cost but not to make a profit (for example, by capping fees). Thus, CBDC could potentially be cheaper than private digital payment offerings.
  - **The private sector may not be sufficiently active and competitive.** If there are only a few private sector players in the market, there may be limited incentives to improve payment efficiency and lower costs even with a fast payments system or other services. In such a context, CBDC would provide a competitive public sector–led alternative.

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<sup>54</sup> These transactions could be subsidized as part of a fast payments system solution.

<sup>55</sup> Legal tender status has different implications and legal treatment across countries. Its appropriateness for improving financial inclusion should be considered within the country's local context. For example, even though the Nigeria's CBDC (eNaira) is a legal tender, its universal acceptance cannot be imposed on the public. eNaira's legal tender status means that it relinquishes debt if tendered. This, however, does not imply a legal obligation to accept eNaira under any circumstances given the technical limitation on acceptability by the counterpart (for example, direct or indirect access to eNaira network). See Ree (2023) for more details on Nigeria's eNaira where there has been limited adoption in its first year of operation.

<sup>56</sup> A non-CBDC, public sector–operated fast payments scheme, such as Pix, could offer similar benefits.

- **There may be closed-loop systems across different private sector payment providers.** This fragmentation can occur due to a lack of coordination across a diverse set of private players developing systems tailored for specific use cases. These private players may also opt to set up closed-loop systems in certain cases to keep customers, revenue streams, and data within their networks. This lack of interoperability restricts user choice, limits access, and stifles innovation. CBDC could offer an open-loop system as a form of public infrastructure that is widely interoperable.
- **A public sector product can help ensure operational resilience in payments.** Payments play a critical role in the functioning of the economy. There may be gaps in the regulation of private payment services, which can pose operational risks. Additionally, the monitoring costs associated with overseeing private payment services can be substantial.
- **CBDC may offer additional features that other solutions may not provide, such as offline payments and programmability,** as reported by central banks in the 2022 BIS survey (Kosse and Mattei 2023). More than 80 percent of central banks responded that there may be value in having both a fast payment system and a CBDC. Although CBDCs may not have the unique ability to provide these operations, the central bank may be more willing to offer them than other providers that may not be incentivized to do so. Moreover, fast payment systems may require users to have a bank account, unlike CBDC.

**CBDC can be designed to complement and be interoperable with existing solutions, such as fast payment systems.** For example, in Nigeria, the eNaira, which aims to support financial inclusion, is integrated with the existing fast payment system.<sup>57</sup> The Reserve Bank of India is also developing interoperability between its retail CBDC pilot and the country's Unified Payment Interface (UPI) fast payment system to boost adoption.<sup>58</sup>

**However, CBDC is still exploratory.** Although CBDC offers unique features, its adoption rate, associated costs, and the ability of central banks to deliver it successfully are yet to be determined. Further evidence and experience are necessary to gain a comprehensive understanding of the potential limitations of CBDC as well as its potential to meaningfully improve financial inclusion.

**CBDC also entails noteworthy risks.** Although deeper discussion of the risks of CBDC from a technological, legal, or economic perspective are outside the scope of this paper, policymakers should keep them in mind as part of the decision-making process.

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<sup>57</sup> Nigeria's fast payment system is the Nigeria Inter-Bank Settlement System. Users can transfer funds from their eNaira wallet to any bank account of the user's choice in Nigeria using the Nigeria Inter-Bank Settlement System Instant Payment feature on the eNaira platform.

<sup>58</sup> See Reserve Bank of India Deputy Governor T. Rabi Sankar's remarks at the July 2023 Indian Banks' Association conference (Sankar 2023).

- **Depending on the country's existing market environments for banking and payments, CBDC may have unintended effects on the private sector.** The disintermediation of the banking sector is a commonly discussed risk of issuing CBDC.<sup>59</sup> That said, if the country has a large unbanked population with a low level of deposits, then the gains to financial inclusion are more likely to outweigh the more limited disintermediation risks (Tan 2023a; 2023b).
- **If not well designed, a CBDC could also inadvertently worsen financial exclusion.** Failure to design CBDC to address the barriers and gaps to financial inclusion in the country would be particularly problematic if CBDC eventually replaces cash (whether de facto or de jure). In such a case, the financially excluded may face severe problems where they are unable to use either the CBDC or cash. CBDCs and cash should not be considered as mutually exclusive. The coexistence of well-designed CBDCs and cash can serve the objective of expanding financial inclusion.
- **CBDCs could also pose risks to financial integrity.** Depending on their design and the issuing country's particular circumstances, money laundering and terrorism financing risks could persist or be exacerbated by CBDCs. A well-designed CBDC arrangement should be able to promote financial inclusion objectives while allowing for proper implementation of AML/CFT measures to safeguard financial integrity.

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<sup>59</sup> The introduction of a nonremunerated CBDC may not necessarily lead to a significant reduction in deposit supply. For instance, demand for existing unremunerated "e-money" (for example, in the UK and the European Union) has been low. Although some literature provides an estimate of the magnitude of disintermediation, quantifying the potential impact is, in general, difficult, and the uncertainty is high. Chang and others 2023 show that it is possible for CBDC to even increase deposit quantities under imperfect competition in the banking sector. Caps on individual holdings of CBDC can also limit disintermediation.

## V. Country-Specific Assessment

This section presents a step-by-step framework to help assess CBDC's value proposition for improving financial inclusion in a country. The suitability of CBDC as a tool for improving financial inclusion must be carefully assessed on a country-specific basis. Each country's conditions and drivers of exclusion must first be thoroughly understood. CBDC's value proposition then relies on the extent to which CBDC can be designed and supported by complementary policies to address the country-specific barriers where significant gaps exist.

A complete cost-benefit analysis will be constrained by the newness and rapid evolution of CBDC, the limited track record of implementations for this goal, and the need for deeper understanding of the opportunities it creates.

While this framework focuses on financial inclusion, decisions related to the overall suitability of CBDC, its design, and complementary policies must consider the broader set of issues (legal, technological, economic) and policy objectives at stake.<sup>60</sup>

**Figure 4. Framework for Country-Specific Assessment**



Source: Authors.

### 1. Specification of the Problem and Goals

**The financial inclusion challenges and gaps that the country aims to address with CBDC should be clearly defined.** The following questions should be answered:

- **Where along the pathway to financial inclusion (Section II, Figure 1) are there gaps?**

<sup>60</sup> For example, the disintermediation of the banking sector is a commonly discussed risk of issuing CBDC that may be considered in CBDC design (Chang and others 2023). Caps on individual holdings of CBDC can limit disintermediation.

- Do households have access to digital payments—the first step toward broader financial inclusion?
- Do households that have access to digital payments use other financial products and services such as savings, credit, and insurance? If not, this may indicate that existing digital payment services may not serve as effective entry points to the broader formal economy.
- **What are the characteristics of the financially excluded?** Gaps often exist in access across population groups. Globally, women, the poor, the young, rural residents, minorities, immigrants and refugees, and those outside the workforce are more likely to be financially excluded.
- **What are the central bank's goals for financial inclusion?** These goals may be informed by the nature of the financial inclusion gaps identified. Policymakers should have a clear understanding of why improving financial inclusion for certain populations or the country as a whole serves their mandate and policy objectives.
- **What are the current trends?** Has financial inclusion been improving or stagnant over time? Are new fintech and mobile money providers expected to boost financial inclusion from current levels in the near future?<sup>61</sup> Slower-than-desired gains in inclusion may warrant government action.

## 2. Investigation of the Barriers to Inclusion

**The specific nature and barriers to financial inclusion in the country should be closely investigated.** A wide array of data should be drawn from to confirm and investigate the drivers of exclusion from multiple angles and for various populations in the country. The Appendix provides a list of relevant data sets and resources. Attention should also be given to the domestic payment infrastructure landscape and context.

**The barriers may differ in each step of the pathway to financial inclusion.** The following two questions should be investigated in turn. More focus should be given to the step with larger gaps (as assessed previously). Financial exclusion could be driven by factors related to costs, infrastructure, financial or digital literacy, trust, and so on (see Demirgüç-Kunt and others 2022; Auer and others 2022).

- What are the barriers to the access and use of digital payments in the country? This question should seek to understand the specific barriers for the various excluded populations.

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<sup>61</sup> Trends in fintech and digitization should not be disregarded. They may already be creating an environment in which financial inclusion is improving over time without the need for new policies or technologies. It is important for policymakers to understand the existing trends and forces that are already contributing to financial inclusion, as well as the limitations of these trends and forces.

- Given access to digital payments, what are the barriers to access and use of other financial services such as savings, credit, and insurance?

### 3. CBDC Design

**Country-specific CBDC design must be considered.** Where possible, design should seek to address the major barriers to financial inclusion in the country to have the greatest impact (as identified by Step 2). Country-specific constraints and other considerations may affect the design of CBDC. Some examples include:

- **Regulatory environment.** Compliance with existing regulations, including AML/CFT requirements, consumer protection laws, and data protection, will need to be accounted for in the design of a CBDC.
- **Legal framework.** Legal tender status has different implications and legal treatment across countries, which may affect its appropriateness for improving financial inclusion.
- **Privacy preferences.** Although some countries may prioritize privacy and data protection in their financial transactions, others may value convenience and efficiency over privacy. This decision affects the extent to which data can be recorded and shared with financial service providers.
- **Willingness to absorb costs.** Countries may have different financial objectives when it comes to CBDC. While some countries may be willing to operate CBDC at a loss, others may aim to break even or even generate profits. This could limit CBDC's ability to offer low fees and incentives to users, merchants, and financial service providers.
- **Central bank credibility.** CBDC may not offer greater trust to users, relative to private sector offerings, if the central bank is not seen as credible and trustworthy.
- **Technological readiness and infrastructure resiliency.** A country may not have the right level of technological readiness or infrastructure resiliency to implement certain design elements, including ongoing system availability and accessibility, offline functionality, and robust cybersecurity measures. Technical infrastructure, such as data centers, servers, and network capacity, if outdated or limited, can adversely affect the scalability and performance of CBDC systems and can create vulnerabilities to cyberattacks.

### 4. Complementary Policies

**Complementary policies to support CBDC should be considered.** As a digital product, a CBDC would be more effective if it is supported by complementary policies that address digital exclusion.

- What are the relevant complementary policies for addressing the country's specific context (as listed in Section III)?
- Are they already in place? If so, are they effective?
- If not, is the central bank able and willing to implement them alongside a CBDC?

## 5. **Assessment of Relative Value Proposition**

**The value proposition of CBDC depends on whether the CBDC design and its complementary policies effectively address the barriers where there are key gaps along the pathway to financial inclusion.** The following questions should be answered:

- Which of the barriers to inclusion (in Step 2) are addressed by the CBDC design (in Step 3) and complementary policies (in Step 4)?
- Are the barriers to inclusion that are addressed (in the previous question) linked to where large or small gaps exist (in Step 1)?

**CBDC does not have to address all the barriers to offer value.** Countries should consider a wide range of policies and initiatives to support financial inclusion, with other solutions addressing the other remaining barriers.

**CBDC's relative value proposition is greater if it offers unique properties and features for financial inclusion that others do not.** Even if not, CBDC may potentially provide an opportunity to offer them more cheaply, more efficiently, and in a coordinated way.

- Can other solutions improve financial inclusion and address the same barriers more effectively and/or at a lower cost than CBDC?
- If there are budget and capacity constraints, can alternative solutions address more important barriers (as identified in Step 2)? What are the associated costs compared to CBDC?

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# Appendix

## Reports and resources about CBDC and financial inclusion for further reading

- Alliance for Financial Inclusion (2022)—[Central bank digital currency – an opportunity for financial inclusion in developing and emerging economies?](#)
- Asian Development Bank (2023)—[The role of central bank digital currencies in financial inclusion: Asia-Pacific Financial Inclusion Forum 2022](#)
- BIS and World Bank (2020)—[Central bank digital currencies: A new tool in the financial inclusion toolkit?](#)
- BIS (2022)—[CBDCs in emerging market economies](#)
- Cenfri (2019)—[The use cases of central bank digital currency for financial inclusion: A case for mobile money](#)
- CPMI and World Bank (2020)—[Payment aspects of financial inclusion in the fintech era](#)
- MIT Digital Currency Initiative (2023)—[CBDC: Expanding financial inclusion or deepening the divide?](#)
- World Bank (2021)—[Central bank digital currency: A payments perspective](#)

## Data sets and sources to understand financial inclusion conditions in a country

- CIA World Factbook
- G20 Financial Inclusion Indicators
- GSMA State of the Industry Report on Mobile Money
- GSMA Mobile Money Regulatory Index
- IMF Financial Access Survey
- World Bank Enterprise Surveys
- World Bank Global Findex Database
- World Bank Global Financial Development Database
- World Bank National Financial Inclusion Strategies Resource Center
- World Bank Quality of Electricity Supply Database
- World Bank Remittance Prices Worldwide



## PUBLICATIONS

**Central Bank Digital Currency's Role in Promoting Financial Inclusion**  
NOTE/2023/011