

# Assessing the viability of an Indian Central Bank Digital Currency (CBDC)

**D Priyadarshini**

**Sabyasachi Kar** \*<sup>1</sup>

---

## Abstract

A large number of Central Banks around the world are planning to introduce Central Bank Digital Currencies (CBDCs) as a legal tender in their countries. The Reserve Bank of India (RBI) has also revealed similar plans, with an Indian CBDC expected in the near future. Any evaluation of such a major change in the nature of money requires a broader understanding of the opportunities and challenges arising from the adoption of CBDCs. In this paper, we discuss these issues at the conceptual level and specifically in the Indian context. We show that the conceptual issues can be characterised in three ways – monetary sovereignty issues, issues from the point of view of national sovereignty, and developmental issues. In the Indian context, we analyse these issues from the perspective of the rapid digitalization taking place in the country. Finally, we discuss the steps that the RBI needs to take in order to introduce an Indian CBDC.

**Keywords:** CBDCs; Monetary Sovereignty; Disintermediation; Dollarization; Financial Inclusion; Cryptocurrencies

**JEL Codes:** E42, E51, E58, G21, G28, O33

**Publication Date:** 20 May 2022

---

---

\* D Priyadarshini is an Associate Fellow at the Carnegie Endowment for International Peace India. Views herein are personal and do not necessarily reflect the views of the institution.

Sabyasachi Kar is RBI Chair Professor at the Institute of Economic Growth.

## 1 Introduction

Interest around Central Bank Digital Currencies, or CBDCs, is now a global phenomenon. They have become an important part of the discussion on digitalisation of economies, including the rapid changes in the payments landscape, as well as in the nature of money itself. (Barontini & Holden, 2019) Increasingly, CBDCs are being seen as the next step in the evolutionary progression of (fiat) money - from cowries and shells, to coins and paper money, and now, to digital representations of fiat currencies. (Annual Economic Report, BIS, 2020)

Many central banks across the world are examining the feasibility of introducing CBDCs. Some have reached significant milestones. Sweden and China, representing a major advanced and a major emerging market and developing economy<sup>2</sup> (EMDE) respectively, began undertaking pilots of digital versions of their respective sovereign currency. In October 2020, The Bahamas became the first country in the world to issue a central bank digital currency – the ‘Sand Dollar’ - for retail use. More recently, in April this year, the Eastern Caribbean Currency Union became the first currency union central bank to issue DCash – a blockchain based digital version of the Eastern Caribbean Dollar. (Marsh, 2021)

In India, an Inter-Ministerial Committee (which included India’s central bank among its members) briefly examined the implications of CBDCs in general in its report. (Inter-ministerial Committee Report, 2019) Although it observed that *the advantages of introducing CBDCs in the context of India were unclear*, it recommended an open mind towards introducing one in the future. Further, the central bank i.e., the Reserve Bank of India (RBI) is reportedly working on a model for CBDCs (PTI, 2021) and a phased implementation (Sankar, 2021). The RBI is also expected to issue an Indian CBDC, or a “digital rupee”, in the financial year 2022-23. (Moneycontrol, 2022) However, there is relatively less information available in public domain about RBI’s detailed thinking on this subject.

It is in this context that we examine the prospect of introducing a CBDC in India. We start by discussing how to think about CBDCs, particularly in terms of various definitions and alternative institutional designs (Section 2). Next, we focus on the factors that either justify or caution against the introduction of such an institutional change in our monetary and financial system. These are analysed from three distinct perspectives: of monetary sovereignty (Section 3), of sovereign nations in general (Section 4), and from the point of view of developmental agenda of developing countries (Section 5) respectively. Next, we analyse the pros and cons of adopting CBDCs specifically from an Indian perspective and draw conclusions (Section 6). Finally, we identify some broad steps that the RBI may need to consider in the immediate to short term as it seeks to introduce a digital rupee this financial year (Section 7).

## 2. Definitions and Designs

What are CBDCs? The Bank for International Settlements (BIS), defines CBDCs by contrasting them with existing forms of central bank money viz. as a ‘*a digital form of central bank money that is different from balances in traditional reserve or settlement accounts*’. (CPMI-MC, 2018) This

definition distinguishes CBDCs from the other two forms of central bank money, namely physical cash (which, as opposed to CBDCs, is not digital in form) and reserve/settlement accounts (which, while digital in form, are accessible only to select financial institutions like banks, whereas CBDCs are intended for wider access or use). There is also another form of money which is indeed digital, namely the money created by the banking system; however, this is not central bank money.

The above broad definition is based on the identity of the issuer (central bank vs. private entities) and form (digital vs. physical). Within this broad definition, the BIS also goes on to identify different types of CBDCs based on two other criteria of accessibility (restricted, like central bank reserves currently, or wide access like cash) and technology (account or token based) viz.,

- A *token-based 'general purpose' CBDC* that is available primarily for retail transactions, but may also be available for broader use.
- A *token-based 'wholesale' CBDC* whose availability is restricted and used for wholesale payment and settlement transactions.
- An *account-based 'general purpose' CBDC* that is widely accessible.

Apart from the BIS definition, there are other definitions of CBDCs in use; the criteria these highlight depend, *inter alia*, on the focus of their research and experimentation, or centrality of certain features to the definition of CBDCs. For example, the *Bank of England* defines CBDCs as 'an electronic form of central bank money that could be used by households and businesses to make payments and store value.' (Bank of England, 2020) That is, the focus is on retail access only. (Ibid)<sup>3</sup> The RBI defines CBDCs as "a legal tender and a central bank liability in digital form, denominated in sovereign currency and appearing on central bank balance sheet'. (RBI, 2021) According to them, CBDCs are a form of electronic currency that are exchangeable at par with similarly denominated cash and traditional central bank deposits.

The International Monetary Fund (IMF) offers another definition, or rather design, to help address concerns around potential disintermediation of the banking system due to CBDCs. The *synthetic CBDC*, or *sCBDC*, essentially replicates or preserves the current two-tier architecture of monetary and payments system by allowing private sector entities to issue the currency or payment instruments (such as stablecoins) which represent their liabilities, and then back the same with central bank reserves. In a report released last year, however, the BIS along with seven central banks -- including the European Central Bank and the Federal Reserve -- have rejected a sCBDC as a true CBDC. Instead, they define CBDCs strictly as a digital payment instrument, denominated in the national unit of account, that is a *direct liability of the central bank*. (Bank of Canada *et. al.*, 2020)

In terms of possibilities, CBDCs could be designed as:

- a *direct CBDC*, where the central bank is entirely in charge, from issuance to maintenance of ledger and compliance with laws.
- a *hybrid CBDC*, where the CBDC represents a direct claim on the central bank, like cash, and the private sector would continue to focus on offering customer-facing services such as onboarding, KYC, execution of payments etc. The central bank would retain a copy of all retail CBDC holdings and also have both the technical and legal ability to transfer customers from one PSP to another in cases of insolvency or other failures. (Annual Economic Report, BIS, 2020)

- an *intermediated CBDC*, which is a nuanced version of the hybrid model where the central bank would not have any access to the retail ledger, which would be fully retained by the private sector.

Further, CBDCs could either mimic cash by carrying no interest, or carry interest like stocks and bonds. Finally, most research at this point appears to be technology agnostic, in terms of whether the underlying technology is proposed to be blockchain-based or not.

Thus, there is no universal definition or design of CBDCs across jurisdictions as yet. Definitions, or descriptions, of CBDCs differ based on certain core features such as issuing authority, access, technology, or design elements, to either leverage potential innovations (such as interest-bearing CBDCs that can help transmit monetary policy transmission directly) or mitigate potential disruptions (such as indirect or synthetic CBDCs which replicate existing two-tier architecture).

It is clear from the discussions above that the CBDCs are really an institutional design. Moreover, depending on the specifics of the design, they will transform the nature of money, and not surprisingly, will affect the economy in many ways. Obviously, this raises serious concerns among policymakers about the advisability of adopting CBDCs. The next three sections discuss some of the major benefits and challenges associated with adopting CBDCs, that have been discussed in the published academic and policy documents on this issue. For a clearer appreciation of these issues, we look at them from a number of alternative perspectives.

### 3 Monetary Sovereignty Concerns

In this section, we discuss issues that are important from the point of view of a country's monetary sovereignty. The issues discussed here are those most relevant for the central bank of a country.

#### 3.1 Possible Benefits of CBDCs related to Monetary Sovereignty

##### 3.1.1 CBDCs could improve monetary policy transmission

Unlike bank deposits, cash cannot carry interest. CBDCs however provide the option of ascribing interest rates. Interest-bearing retail CBDCs issued directly to households potentially raises central bank's ability to improve and control monetary policy transmission. Greater visibility of transactions in turn could provide better feedback loops and improve policy decision-making. Interest-bearing CBDCs may also help address the 'zero lower bound' on policy rates (that is, where lowering interest rates does not boost demand and consumption) and enable central banks to charge negative interest rates to spur consumption and growth. Negative interest rates are constrained today due to the presence of cash, as negative rates simply incentivise a shift into cash. However, it is important to note that the same could also transpire if negative interest rates are charged on CBDCs as long as cash is present. Further, even if cash is replaced, the ability to charge negative interest rates is likely to only materialise as long as *CBDCs themselves do not replace cash*, by either not charging or charging more interest. (Mancini-Griffoli *et.al.*, 2018)

### *3.1.2 CBDCs could improve the efficiency of monetary systems*

Central banks can harness CBDCs to better pursue their public policy objectives such as more efficient and safe payment systems, financial inclusion, and so on. (Annual Economic Report, BIS, 2020) Other benefits are seen in terms of fostering innovation and competition, and improving financial integrity by enhancing visibility and tracking of transactions, and reducing illegal activities such as money laundering. (Payments Canada, 2021) Excessive use of cash in an economy is another problem faced by some central banks. This gives rise to costs associated with the issue, storage and distribution of cash, as well as costs associated with losing economic activities to informalisation, where cash dominates. Introduction of CBDCs can reduce these outcomes significantly.

### *3.1.3 CBDCs could provide a safe alternative to private digital monies*

Private alternatives to traditional forms of money, such as cryptocurrencies and stablecoins, have become much more pervasive than before. One of the key reasons for intensifying research into CBDCs has been the proposed launch of Diem by Facebook. (Niepelt, 2019) The advantages offered by stablecoins like Diem (formerly Libra) comes from the efficiencies in costs, speed, and reach (driven by network effects offered by their large presence in social media). However, without the backing of any sovereign agency, these currencies remain vulnerable to risks. Central banks could retain monetary sovereignty against the rise of such private digital currencies by introducing risk-free CBDCs backed by them as legal tender.

### *3.1.4 CBDCs could mitigate the risks of alternative payment methods*

In some countries like China and Sweden, use of alternative payment services offered by private entities (for e.g., mobile payment systems such as Swish, Alipay, and WeChat) have become dominant among the public, with the payment services market concentrated among a few players. China, for example, has seen near-universal adoption of digital payments with nearly 94% of mobile transactions supported by Tencent or Alibaba. Both entities have also combined several other financial services with their social media apps. (Payments Canada, 2021. See also Niepelt, 2020.)

While there are benefits in terms of such players leveraging economies of scale and passing on the cost efficiencies to the consumer, they also pose risks – of monopolies, high entry barriers, potential misuse of data, and safety and security of technology. Depending on their size, these entities may also pose financial stability risks by becoming ‘too big to fail’. Another concern is that private payment service providers may not offer interoperable services, leading to fragmentation of markets and increased costs and complexities, ultimately impacting the consumer.

The diminishing use of cash and the rise in private payment systems raises concerns around safety and resilience of payments systems. CBDCs could address these concerns by ensuring continued retail access to central bank money, particularly when access to such private payments systems may suffer, for instance, due to technical failures or bankruptcy of the payment systems provider. China, for instance, has cited ‘redundancy’ in the event of unavailability or failure of private payments systems as one of the motivations for its digital fiat currency, the eCNY.

Diminishing use of cash also raises concerns around consumer protection viz., payments systems are naturally given to monopolies due to strong network effects, raising concerns around continued

quality of service or possible misuse of data. In such a scenario, CBDCs could replace cash as a competitor to these private payments systems.

## **3.2 Challenges in adopting CBDCs related to Monetary Sovereignty**

### *3.2.1 CBDCs will need central banks to redefine their role*

The advantages of introducing CBDCs are clear from the discussions above, but there are challenges as well. Direct access to central bank liabilities for households and businesses may lead to an enlarged role of central banks. In the case of a ‘Direct CBDC’ model, this would entail a significant change in the role of central banks – they would need to take over the functions hitherto performed by private commercial banks in the entire chain of payment services, including customer support and services, as also tracking illegal activities such as money laundering and data management. Central banks would need to rapidly build newer capabilities in order to do so. (Some of these responsibilities can be shifted to commercial banks etc., with a ‘Hybrid/Intermediated/Synthetic CBDC’ model.)

## **4. Concerns of a Sovereign Nation**

This section discusses issues that are of greater importance from the perspective of a sovereign nation. These issues are of as much importance to governments as it is to central banks, as the introduction of CBDCs would interact with other policies implemented by the former.

### **4.1. Possible Benefits of CBDCs for a Sovereign Nation**

#### *4.1.1 Efficiency of cross-border payments*

Relative to domestic payments, cross-border payments suffer from several market failures viz., of lack of speed, higher costs, and opacity. (Annual Economic Report, BIS, 2020) CBDCs could potentially lower transaction costs for these payments. Digital currencies inherently have the potential to be borderless. According to the BIS, more than fifty countries around the world have started looking into the possibility of introducing their own CBDCs. This gives rise to the possibility of multi-country CBDC networks. Given the considerable costs - in terms of both time and money – that the current international payments system based on SWIFT introduces, it is a matter of time before payments for international trade, investment and even remittances will look to shift to such multi-country CBDC networks.

#### *4.1.2 National CBDC to prevent Digital Dollarization by other country CBDCs*

A safe, convenient and scalable digital currency issued by some other country has the potential to result in ‘dollarization’, particularly if the home country institutions are relatively weaker. (Niepelt, 2020) Interest-bearing CBDCs i.e., hybrid instruments which function both as cash (safe and liquid means of payment) and as financial assets like bonds and securities (in terms of being remunerative) could also have significant international spill-over effects if permitted for use across borders, for example, by foreigners in the home country. This could not only restrict the ability of countries to

independently set their domestic monetary policy, but given the data embedded in CBDCs, could also be a data security risk. For any country in such circumstances, having a national CBDC as an alternative to these other currencies is a necessary strategy.

## **4.2 Challenges for a Sovereign Nation in adopting CBDCs**

### *4.2.1 Disintermediation of the Banking Sector*

CBDCs provide a direct channel for central banks to transmit interest rates to households and businesses. To that extent, CBDCs may in fact boost monetary policy transmission. However, if households and businesses find CBDCs more attractive than deposits (for instance, if the CBDCs bear interest and the interest rates are higher), this would result in disintermediation of the banking sector, with the attendant consequence on the availability and cost of funds, which banks depend on to provide credit in the economy. The banking sector may also become relatively less important as a transmission channel.

For the banks, a shift in deposits to CBDCs would require them to debit their own reserves (to credit the CBDC accounts), leading to implications on the quantum of reserves they may have at their disposal to meet their liabilities or regulatory requirements. Banks may need to borrow from the central banks, which could in turn raise questions around the sufficiency of reserves, lending rates offered by the central bank, and its impact on policy rates and availability of good quality collaterals with the banks. It has been suggested that central banks could pass-through the funds gained through CBDC deposits to banks, thereby potentially offsetting any negative impacts including disintermediation. However, this depends on whether central banks choose to do so or invest the funds elsewhere. (Niepelt, 2020)

### *4.2.2 Accessibility and privacy*

From the perspective of individual users and businesses, the principal features of CBDCs that are likely to be relevant are accessibility and privacy. Features such as complexity or sophistication of the technical design at the users' end (relative to cash and alternative payment methods) and levels of technological literacy and ease of use could create a 'digital divide' among populations. Design features of CBDCs would need to take into account various demographics including minors and the elderly, for instance.

Depending on design, alternative payment instruments such as commercial bank deposits and narrow finance may prove to be more competitive from users' perspective, especially in advanced countries, reducing role of CBDCs primarily as a substitution for cash and low value transactions. It may however prove to be more attractive in countries where such alternatives are underdeveloped. (Annual Economic Report, BIS, 2020)

Although falling short of full anonymity offered by cash, CBDCs can be designed to offer anonymity, or pseudonymity, in varying degrees, relative to alternative payment methods. In this context, privacy concerns could arise, especially in some jurisdictions. A recent survey conducted over three months on a 'digital euro' has found that a majority of respondents (albeit with significant differences among countries in the euro area) preferred an offline privacy-oriented solution over an online solution with implications for anonymity and privacy. (Ledger Insights, 2021)

#### *4.2.3 Balancing Financial Integrity and Privacy*

If CBDCs are designed to mimic cash, which is fully anonymous, they are likely to replicate concerns around financial integrity by lending themselves to illegal uses such as money laundering, tax evasion or financing illegal activities. They could however be designed so as to require verification of identities/ownership and recording of transactions. This would however raise questions around privacy of users and use of data. Balancing both these considerations is likely to be one of the key design choices for policy makers. Policy responses could include maintaining privacy of data and transactions, even from the central bank, except when required for law enforcement. Nonetheless, questions could arise around liability for failure to comply, or breach of data or privacy.

#### *4.2.4 Legal and regulatory considerations*

Having robust legal underpinnings will be essential to the credibility and acceptance of CBDCs, as will Central Bank reputations. Legal frameworks would need to address fundamental aspects, such as central bank authority to issue CBDCs, legal tender status, and the ability to combat money laundering and financing of illicit activities while balancing the same with privacy and data protection.

A recent IMF paper found that only 40 out of the 174 central banks surveyed were legally permitted to issue digital currencies. (Margulis & Rossi, 2021) Legal implications would also depend on design (Ibid), for example, token-based CBDCs may require a far more fundamental overhaul as opposed to account-based CBDCs. This is because digital tokens are a relatively new area, whereas account-based central bank money is already in use at the wholesale level. In addition to central bank and monetary policy laws, CBDCs could also give rise to legal issues in other areas such as tax, property, contracts, insolvency, and payments-related laws. In addition to laws, policy makers and regulators would also need to engage on establishing an appropriate regulatory environment, such as common standards to be followed by private sector in developing robust CBDC-based applications (where the institutional design involves private sector participation).

## **5. Developing Country Concerns**

While the section above discusses concerns relevant to sovereign nations in general, this section discusses issues that are of particular interest to developing countries. As with the last section, these issues are again of great importance to governments as they will have an impact on the overall developmental strategy.

### **5.1 Possible Benefits of CBDCs to a Developing Country**

#### *5.1.1 Possibility of better financial inclusion*

This is one of the top motivations among developing countries for researching CBDCs. (Boar & Wehrli, 2021) CBDCs could support financial inclusion by broadening access to money among the under- and un-banked segments of society. The barriers to financial inclusion, such as remoteness of territory, could however have a bearing on CBDCs' ability to do so, and would need to be evaluated.



For instance, CBDCs are unlikely to work where technology access is low. Moreover, there may be better alternatives such as subsidisation of bank branches or promoting alternative payment solutions.

### *5.1.2 Possibility of a Digital Safety Net*

CBDCs may enable direct, timely, and targeted transfers of aid or stimulus packages to the public or firms in times of crisis, such as the ongoing COVID-19 pandemic. Further, with the potential for programmability, they could also create a feedback loop on the use of such funds for better policy decisions. (Bossone & Natarajan, 2020) However, such transfers would depend on robust national digital identity schemes being in place, particularly if the objective is financial aid (as opposed to raising aggregate demand). There may also be concerns around whether such transfers would blur the distinction between monetary and fiscal policies, and diminish the former (Annual Economic Report, BIS, 2020) (as central banks would need to act as the agents of the government in order to accomplish this). Alternatives may also exist, for example, in the form of fast payments.<sup>4</sup>

## **5.2 Challenges to Developing Countries in adopting CBDCs**

### *5.2.1 Need for adequate digital infrastructure*

One of the necessary preconditions for issuance of CBDCs would be a supportive environment in terms of efficient internet connectivity and speed; safe, secure and affordable electronic devices; and technological literacy and ease of use. (Singh & Kant, 2019) This could be a challenge for developing countries where such infrastructure is relatively underdeveloped, but also an opportunity, depending on factors such as access to capital and private sector participation to develop such capabilities.

## **6. CBDCs from an Indian Perspective**

It is clear from the previous discussions that the introduction of a CBDC is an institutional change that will completely redesign the monetary and financial sector in a major way, and has implications for almost all parts of the economy. In this context, it is important to understand that such major institutional changes are gradual and continuous processes, rather than a one-time alteration in policies. Moreover, all successful cases of institutional changes have been based on experimentation using 'transitional institutions' as well as path-dependence. (Rodrik, 2005)

In the Indian context, gradualism and the use of transitional institutions and path dependence implies that rather than considering an abrupt institutional change from the current system to a CBDC-based system, we need to understand what are the current institutional arrangements – particularly in terms of digital payments systems – and whether there are strong arguments to move ahead to CBDCs, given the strengths and weaknesses of the current system.

Traditionally, the Indian monetary and financial systems were mainly bank-based, with money taking the form of cash and bank deposits. Digital transactions were based on money created by banks. This payments infrastructure changed significantly in the last decade or so, with India becoming a pioneer in developing digital payments systems. It was triggered by the setting up of the National Payments Corporation of India (NPCI), a not-for-profit company, promoted by a large number of private and public sector banks, in 2007. The NPCI understood the diverse needs of the economy

and came up with a number of products that help in making retail payment for different types of transactions.

The game-changer in this space has been the Universal Payment Interface (UPI), which acts as a real-time payments system that can enable the instantaneous transfer of funds between two banks, using a mobile device. Using this platform, apps like Google Pay, Paytm, and PhonePe have popularized digital payments tremendously. This rapid success in the digital payments space has also encouraged the RBI to move towards a more market-based 'for-profit' addition to the NCPI. Termed the New Umbrella Entity (NUE), this is expected to be a consortium of private companies that will bring more innovation in the payments space.

It is clear that even without the CBDCs, the Indian Central Bank has been actively encouraging the development of the digital payments space. One important feature of this initiative is that it is distinctly pro-market, hoping to grow through the dynamism of the private sector. This vision of the payments space poses a dilemma about the introduction of CBDCs, as -- in countries like China -- CBDCs are expected to provide the State with a mechanism to control the large private sector payments companies. To put it succinctly, the question for India is, if the private players in the payments space and the banking sector can work together to provide an efficient payments system, then why do we need a CBDC here?

Interestingly, two important justifications for an Indian CBDC come from outside our domestic context. First, in most of the major economies in the world, the development of national CBDCs and their interoperability is being seen as a major driver of international trade and payments in the near future. The current system of cross-border payments, based on the SWIFT platform, is increasingly being thought of as costly and time consuming, and even the Bank for International Settlements (BIS) is taking an active interest in pursuing countries to consider the international aspect when they design their CBDCs. While the private sector-based payments system may work well enough within India, it is only a sovereign-backed digital currency that will be trusted in a global system, at least for some time to come.

The other external factor relevant for India is the strong push that is being given by China to establish the digital Yuan, not only as a domestic currency, but also to be used for cross-border payments to their trade and investment partner countries. Once the digital Yuan gains acceptability as a global currency, it is only a matter of time before these will start flowing into the Indian economy. This leads not only to the possibility of a dollarization-type problem in the conventional sense, but also involves grave implications of data vulnerability. Given India's contentious relationship with China, it is in India's interest to limit this possibility.

The best way to deal with this is to establish global protocols on the development of cross-border use of CBDCs. In order to have a say in the development of these international standards as well as collaborations to evolve cross border use cases for CBDCs, it will be very useful for India to have a credible and working CBDC.

An Indian CBDC can also help domestic digitalization. While the current UPI-based digitalization drive has been highly successful, it does not preclude the possibility of a digital divide. The current efforts at financial inclusion have entailed very limited participation by private sector banks, with the bulk of the burden being placed on public sector banks, at considerable loss to the latter. Since the

for-profit NUE mechanism is also bank-account-based, it might strengthen the divide. This will make inclusive digitalization of India a challenging project.

Here, CBDCs may provide an alternative to the NUE, by working outside the banking sector, e.g. through the postal system. RBI could directly regulate and pay for the logistics of these accounts, so the banks will not bear the losses on account of these activities. This will also enable our public sector banks to become more profitable. Of course, in order to avoid significant disintermediation of the banking sector, the volume of such activities need to be restricted by design.

While the arguments for an Indian CBDC are compelling, the challenges are not trivial either. As discussed earlier, if CBDCs are considered as better financial assets than bank deposits by savers, then the introduction of CBDCs has the possibility of disintermediation of the banking system (Kar & Priyadarshini, 2022) and the possibility of bank runs. There are, of course, certain design solutions that minimize such risk as long as there is a well-working banking system. In the Indian context, these design choices also need to keep in mind the major structural weaknesses in the Indian banking system, that manifests itself in terms of large volumes of non-performing assets (NPAs) and possibilities of insolvency. While liquidity and solvency are two distinct problems, it is well-known that they reinforce each other. A weak banking sector in India will imply that far more support will be needed by banks in case of systemic disintermediation or the possibility of a bank run due to CBDCs.

Further, while it is intended that a CBDC would provide a safer alternative to private virtual currencies, it is as yet unclear how this will be achieved. Would such private currencies be prohibited? Prohibiting such monies may prove to be difficult to enforce (particularly given their anonymous, decentralised and borderless framework), or even counterproductive. For instance, the IMC India Report, which recommends banning of private cryptocurrencies, also notes that there may be ways to circumvent the prohibitions through use of unauthorised VPNs or leveraging the fragmented regulatory landscape to shift to friendlier jurisdictions. It has also been argued that banning would move the activities underground, making them difficult to monitor, particularly for use in illegal activities. (Nishith Desai Associates, 2018)

Furthermore, while China, the only major economy to prohibit cryptocurrency-related activities like trading and initial coin offerings, has arguably been relatively successful in enforcing them, it is worth noting that such activities have continued to exist, prompting yet another crackdown recently, several years after the initial regulatory actions in 2013 and 2017. (Ma, 2021. See also Wenhao, 2020)

Clearly, any decision to introduce CBDCs in India will have to take into account all of these considerations. In order to remain internationally competitive and to ensure digital and financial security, we may have to adopt and develop CBDCs sooner rather than later. There are, however, genuine concerns over disintermediation and financial instability, and all precautions need to be taken to minimize and control these problems.

## 7. Next Steps

According to the latest BIS Survey on CBDCs – the fourth in the series – 9 out of 10 central banks around the world are researching CBDCs, with more than half of them involved in concrete experiments. Moreover, the survey reports that as many as 40 CBDCs are expected to be in circulation

in the next 6 years. (Kosse & Mattei, 2022) With the budget announcement earlier this year, India too will join the ranks of those who will soon move from research and experimentation to undertaking pilots.

The RBI is expected to introduce a “digital rupee” by FY 2022-23. It may use blockchain or other technologies. The motivations for issuing, as stated in the Honorable Finance Minister’s budget speech, are boosting the digital economy and creating a more efficient and cheaper currency management system. Now that the RBI is on a firm path to introduce a CBDC in the next 12 months, what are the key aspects on which it will need to take a decision?

At the outset, RBI will need to determine the design and architecture of a “digital rupee”, and the technology or infrastructure that will be employed. Design considerations will need to be examined along the following principal dimensions:

- Whether the digital rupee will be issued for wholesale or retail purposes, or if it will be a general purpose CBDC that will encompass both aspects.
- Whether the digital rupee system will follow a direct model, wherein the entire chain of activities from issuance to administration and settlement of transactions will be undertaken by the RBI. Or, whether the existing two-tier architecture of monetary and payments system will be preserved, in order to address the challenges (such as enlarged mandates and capabilities of central banks, and disintermediation of the banking system) associated with the direct model.
- Whether the digital rupee will be token- or account-based, as both are likely to have different technological as well as legal considerations.

The budget announcement states that the digital rupee may be based on “blockchain or other technologies”. Thus, the question on what technology and infrastructure will be employed to issue digital rupees and how will the settlement of transactions be undertaken, remains open. A public permissionless blockchain technology of the type that underlies cryptocurrencies like Bitcoin will fall short on considerations like security, financial integrity, speed, and scale, as well as environmental footprint – considerations that would become critical for a digital public good like CBDCs, especially, if it were sought to be widely adopted. A permissioned blockchain or distributed ledger technology (DLT) may be preferable instead. Most research and experimentation on CBDCs using DLT or Blockchain technology appear to be concentrated in the wholesale segment of interbank settlements or cross-border transactions (with one of the notable exceptions being the Swedish e-krona being piloted for retail purposes).

Another critical aspect that will need to be considered is whether the RBI has the necessary legal power to issue a digital rupee. Few details are available at this stage on these aspects, although a concrete step has been taken with the passage of the Finance Act, 2022 this year, which aims to empower the RBI to issue a digital rupee by proposing to amend the Reserve Bank of India Act, 1934 (RBI Act). The amendments will come into force on a date to be notified subsequently (The Finance Act, 2022). A digital rupee issued by the RBI would constitute legal tender, pursuant to Section 26 of the RBI Act read with the proposed amendments.

The RBI has recently stated that it will in all likelihood begin by examining the wholesale aspects of the digital rupee first (Moneycontrol, 2022). There are also indications that the architecture will most likely be two-tier. On most other aspects, however, including whether the digital rupee will be based on decentralised or centralised technology and infrastructure, the picture remains unclear.

Further, while the above foundational considerations are important, there will also be other important questions that the RBI will need to confront. For instance, as referred to in the previous section, what would be the domestic value proposition for a retail CBDC in India, given the high reliance on cash and the active encouragement to online digital payments in recent years? Lack of sufficient demand and uptake for the digital rupee will not only endanger the achievement of the objectives for which it may have been introduced, but also highlight the lack of justification for using public resources to introduce a CBDC and carry reputational risks for the central bank. The digital rupee for domestic retail use would therefore need to be designed in a “user-centric” manner that will take into account the user requirements, attitudes, preferences, and behaviour. (Priyadarshini, 2021)

Moreover, in designing the digital rupee, relatively quicker success will be achieved if CBDCs are designed to work in tandem with the current and planned future payments infrastructure, rather than substitute them. If the designs work well, CBDCs can be of help in many ways, including the possibility of minimizing the digital divide.

There is a long journey ahead for this institutional reform in India and we must ensure that it contributes to our development process, rather than destabilise it. The RBI expects to take a “calibrated and nuanced” approach towards a digital rupee. This is welcome. Perhaps, a white paper or a discussion paper organising the government and the RBI’s thinking on the digital rupee thus far could be useful, to begin with.

## References

- Adrian, T., Mancini-Griffoli, T. (2019). “The Rise of Digital Money”. *Fintech Notes*, International Monetary Fund.
- Banerjee, B. (2020). “Digital Currencies and Cross-Border Policy Cooperation and Coordination”. *G20 Digest*.
- Bank for International Settlements. (2020). “Central banks and payments in the digital era”. *BIS Annual Economic Report*, Bank for International Settlements.
- Bank of Canada., European Central Bank., Bank of Japan., Sveriges Riksbank., Swiss National Bank., Bank of England., Board of Governors Federal Reserve System., Bank for International Settlements. (2020). “Central Bank Digital Currencies: foundational principles and core features”. *Report No. 1*, Bank for International Settlements.
- Bank of England. (2020). “Central Bank Digital Currency: Opportunities, challenges and design”.
- Barontini, C., Holden, H. (2019). “Proceeding with caution – a survey on central bank digital currency”. *BIS Papers No. 101*.
- Boar, C., Wehrli, A. (2021). “Ready, steady, go? – Results of the third BIS survey on central bank digital currency”. *BIS Papers No. 114*.
- Bossone. B., Natarajan, H. (2020). “Getting funds to those in need and enabling access to money during COVID-19, part 3: Central bank digital currencies and other instruments”. *VoxEU.org*, Center for Economic Policy Research.
- Committee on Payments and Market Infrastructure., Markets Committee Papers. (2018). “Central Bank Digital Currencies”. Bank for International Settlements.
- Committee on Payments and Market Infrastructures. (2016). “Fast payments – Enhancing the speed and availability of retail payments”. Bank for International Settlements
- Ferrari, M.M., Mehl, A., Stracca, L. “The international dimension of a central bank digital currency”. *VoxEU.Org*, Center for Economic Policy Research.
- Moneycontrol News. “In a position to start testing, running pilot CBDC projects: RBI Deputy Governor” Moneycontrol.com. (April 8, 2022)
- Inter-ministerial Committee. (2019). “Report of the Committee to propose specific actions to be taken in relation to Virtual Currencies”. Ministry of Finance, Government of India.

- Kar, S., Priyadarshini, D. (2022) “Correct design can ensure CBDCs don’t destabilise banks”., Hindustan Times. (February 14, 2022) <https://www.hindustantimes.com/opinion/correct-design-can-ensure-cbdcs-don-t-destabilise-banks-101644846670390.html>
- Kosse, A., Mattei, I. (2022). “Gaining momentum – Results of the 2021 BIS survey on central bank digital currencies”. *BIS Papers No. 125*.
- Ledger Insights. (2021). “ECB digital euro survey: Privacy is a dealbreaker”. Ledger Insights. (April 14, 2021)
- Ma, Winston. (2021). “China’s cryptocurrency regulations will propel similar regulations globally”. *International Financial Law Review*. (July 28, 2021)
- Mancini-Griffoli, T., Martinez Peria, M.S., Agur, I., Ari, A., Kiff, J., Popescu, A., Rochon, C. (2018). “Casting Light on Central Bank Digital Currencies”, *IMF Staff Discussion Note*, International Monetary Fund.
- Margulis, C., Rossi, A. (2021). “Legally Speaking, is Digital Money Really Money?”. *IMF Blog*, International Monetary Fund. (January 14, 2021)
- Marsh, Sarah. (2021) “Eastern Caribbean blazes a trail as first currency union to launch central bank digital cash”., Reuters. (April 1, 2021)
- Niepelt, D. (2019). “Libra paves the way for central bank digital currency”. *VoxEU.org*, Center for Economic Policy Research.
- Niepelt, D. (2020). “Digital money and central bank digital currency: An executive summary for policymakers”. *VoxEU.org*, Center for Economic Policy Research.
- Nishith Desai Associates (2018). “Building a Successful Blockchain Ecosystem for India: Regulatory Approaches to Crypto-Assets”. *An independent submission to the Government of India*.
- Payments Canada. (2021). “Central Bank Digital Currency (CBDC): Retail CBDC Global Developments”. *Central Bank Digital Currencies: The Series, Vol.3*
- Press Trust of India. (2021). “RBI internal panel working on model of central bank’s digital currency, decision very soon: Deputy Governor B P Kanungo”. *Economic Times*. (February 5, 2021)
- Priyadarshini, D. (2021) “User-Centric Design Will Be Key to the Success of a Digital Rupee”., Carnegie Endowment for International Peace India. <https://carnegieindia.org/2021/12/09/user-centric-design-will-be-key-to-success-of-digital-rupee-pub-85939>
- Reserve Bank of India. (2021). “Payment and Settlement Systems in India: Journey in the second decade of the Millennium 2010-20”.

- Rodrik, D., (2005). "Growth strategies". *Handbook of economic growth*, 1, pp.967-1014.
- Saran, S. (2020). "China's digital currency moves". Business Standard. (May 13, 2020)
- Singh, B., Kant, S. (2019). "Crypto Currencies/Blockchain and the Banking System". *The Journal of Indian Institute of Banking and Finance*.
- T Rabi Sankar. (2021). "Central Bank Digital Currency – Is This the Future of Money". Reserve Bank of India. (July 22, 2021)
- Wenhao, Shen. (2020). "Regulation Of Cryptocurrency in China". Mondaq. (June 12, 2020)

## Notes

---

<sup>1</sup> The authors are grateful to an anonymous referee for very useful comments.

<sup>2</sup> As per the country classification under the *World Economic Outlook*, published by the International Monetary Fund.

<sup>3</sup> It may be noted however that the Bank of England is pursuing research into wholesale CBDCs in a cross-border context separately.

<sup>4</sup> Fast payments have been defined in the context of retail payments as "payments in which the transmission of the payment message and the availability of final funds to the payee occur in real time or near-real time and on as near to a 24-hour and 7-day (24/7) basis as possible". (Committee on Payments and Market Infrastructures, BIS, 2016).