



# Central Bank Digital Currency

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## ABSTRACT

The goal of competing against and replacing central bank fiat money and the banking system, digital currency developed by the private sector, like bitcoin, is intended to have a fixed supply and enable payments. Banks are innovating in response to central banks creating fiat central bank digital currency (CBDC). In order to prevent the disintermediation of banks, encourage optimal firm investment and risk sharing for consumers, and stop digital currency runs into CBDC, this paper demonstrates that central bank monetary policy interest rates paid on bank reserves must be set dynamically and relative to interest rates (even if zero rates) paid on CBDC. In nations with rapid inflation, private digital currency might be preferred to fiat money, although doing so decreases investment and risk sharing. In order to boost investment and risk-sharing and prevent fiat inflation, banks can remerge by accepting deposits and making loans in private digital currency. However, these banks run the risk of experiencing runs into the private digital currency. For investment, risk-sharing, and financial stability, private digital currency is better to conventional hard currencies, such as those based on a gold standard.

**KEYWORDS:** Digital currency, Fiat currency, Financial stability.

## INTRODUCTION:

India has come a long way in terms of innovation in digital payments. The payment eco-system in India has been able to expand in a controlled manner because to the country's adoption of a distinct law for payment and settlement systems. Modern, cutting-edge payment methods that are accessible, affordable, practical, effective, secure, and available 365 days a year are a source of national pride. The development of reliable, round-the-clock electronic payment systems like Real Time Gross Settlement (RTGS) and National Electronic

Funds Transfer (NEFT), which have made real-time or almost real-time fund transfers possible, is to blame for this startling shift in payment preferences.

Whatever its form, money serves three main purposes in every economy: as a means of exchange, a monetary unit, and a store of value. Any exchange in which products or services are bought or sold may employ money as the medium of exchange. The worth of commodities or services can be expressed in monetary terms using money as the unit of account. Money can also be saved or preserved for use in the future.

The fascinating and long history of money spans tens of thousands of years. It has always had a significant influence on how our society runs, starting with the early days of trading and progressing through the first metal coins and eventually the first paper money. The changes in monetary history go hand in hand with advancements in money and finance. Money has changed into many distinct forms over its history. Bartering gave way to precious metal coins made of bronze and copper, which ultimately developed into coins made of silver and gold.

## ABBREVIATIONS

CBDC-Central Bank Digital Currency

CBDC-R-CBDC Retail

CBDC-W-CBDC Wholesale

CTS-Cheque Truncation System

ECB-European Central Bank

FPS-Fast Payment Systems

IMF-International Monetary Fund

RTGS-Real Time Gross Settlement

CDD-Customer Due Diligence

BIS-Bank For International Settlements

## Functions Of a Central Bank

### 1. Currency Regulator Or Bank Of Issue

In an economy, central banks have the sole authority to print money. Every central bank in the globe participates in the issuance of currency to the economy.

The central bank is also referred to as the bank of issue because this is one of its most crucial roles in an economy.

An unorganised economy developed earlier when all banks were permitted to produce their own notes. To prevent this, governments all over the world gave central banks the authority to issue money, which led to uniform currency circulation and a steady flow of cash into the economy

## 2. Bank to the government

The central bank's role as the government's bank is one of its key responsibilities. The central bank receives deposits and provides the government with money. For the government, it also takes part in sending and receiving funds. In order for the government to recover from difficult economic times, central banks also provide short-term loans to the government.

In addition to serving as the government's bank, it also represents and advises the government by offering guidance on matters related to economic policy, the capital market, the money market, and government loans.

## 3. Custodian of Cash reserves

Commercial banks in a nation typically hold a portion of their cash balances as deposits with the central bank. The commercial banks can withdraw that balance when there is a high need for cash and repay it when there is a low need for cash.

Because of this, the central bank is known as the banker's bank. The central bank is crucial to the way that commercial banks create credit.

## 4. Custodian of International currency

Maintaining a minimum balance of foreign currency is a crucial duty of the central bank. The goal of maintaining such a balance is to control any unforeseen or emergency needs for foreign reserves as well as to overcome any unfavourable balance of payments deficits

## 5. Lender of last resort

In times of cash shortage, the central bank serves as a lender of last resort by lending money to its member banks. It carries out this duty by offering loans secured by securities, treasury bills, as well as by rediscounting bills.

## 6. Clearing house for transfer and settlement

The central bank serves as a clearing house for commercial banks and aids in the resolution of their shared debt. The representatives of various banks gather at a clearing house to settle interbank transactions.

## 7. Controller of credit

The regulation of credit in the economy is another role played by central banks. Commercial banks occasionally produce a large amount of credit in the economy, which raises inflation. The CRR may also be altered by the central bank to govern how commercial banks create credit. The central bank regulates the process of credit generation by commercial banks through open market operations and CRR changes.

## 8. Protecting depositors interests

In order to safeguard depositor interests, the central bank must also monitor how commercial banks are operating.

# Advanced Of Central Bank in Modern Economy

## Issuing of Currency:

The fact that a central bank is the sole entity authorised by law to create banknotes and coins inside the economy is one of the benefits of having one. The central bank issues additional money if it needs to be circulated. When necessary, it also organises the withdrawal of old cash and replacement with new currency. The central bank creates Central Bank Digital Currency (CBDC), which, unlike cryptocurrencies, has legal backing and is issued by a sovereign state in the contemporary economy where the use of digital currencies is becoming accepted as a method of transaction.

preservation of financial stability. Commercial banks and other financial institutions are managed, supervised, helped, and coordinated by the central bank to ensure that monetary policies are followed.

Monetary policy is a tool used by central banks to manage inflation in an economy.

## Interbank settlement:

As the guardian of the commercial banks' cash reserves, the central bank serves as their clearing house and agent, making it simple for them to resolve disputes and counterclaims with one another. Without the central bank, it would be extraordinarily challenging for commercial banks and other financial institutions to settle the daily millions of transactions made by account holders. Interbank settlements managed by central banks enable the seamless use of fintech in financial transactions in this cashless era. As a result, it decreases the need for cash to settle bank claims and counterclaims and decreases cash withdrawals, enabling banks to build up sizable cash reserves.

Commercial banks report to the central bank on their reserves, transactions, and risk assessment, which instils trust in the financial sector of any country.

## Disadvantages Of Central Bank In Modern Economy

### Bank Rate:

The other interest rates in an economy are influenced by the bank rate. Increased interest rates result from higher bank rates. When the central bank raises the bank rate, other financial institutions are compelled to follow suit and raise their own interest rates. This will significantly affect firms by driving up borrowing costs.

### Use Of Directives and Moral Suasion:

The central bank's instructions to commercial banks and other financial institutions that lend money to increase, decrease, or restrict lending to specific sectors of the economy rarely serve the financial institutions' commercial interests, but rather the interests of the government's economic policies. The lending may need to be reduced or restricted in locations with higher bankable values and lower risks. Businesses working in these industries will lack access to financing facilities

### Cash-Deposit Ratio:

According to the central bank's instruction to boost the cash-deposit ratio, if commercial banks maintain a higher percentage of their total deposits as reserves, their ability to lend will be restricted, lowering their profitability, and companies in the real sectors of the economy.

### Independence:

As beneficial as it is that central banks are typically free from political intervention, a lack of political control is anti-democratic, and monetary policy should support fiscal policy. When managed separately, fiscal and monetary policies may operate in opposition to one another. There may also be evidence that monetary policy requires political intervention in order to coordinate with governmental initiatives and ensure that it benefits all members of society, not just a select few. Political intervention might have avoided more recent failures of monetary policy, which have occurred more recently than the Great Depression of the 1930s. Monetary policy has failed on numerous occasions. More recently, political intervention was required to mitigate COVID-19's effects on the economy and avert a recession.

### CBC Technologies: How Centralised Is a CBDC?

A second factor to take into account is the best technology to support the operational design, in addition to its architecture. In this setting, new forms of decentralisation made possible by distributed ledger technology have received a lot of attention (DLT). The latter is available in two variations: the permissioned type, in



which a network of known and vetted validators cooperatively enhance a ledger, and the permissionless technology used in Bitcoin, Ethereum, and other cryptocurrencies.

Theoretically, CBDCs could operate under a permissionless architecture similar to Bitcoin, however this would be ineffective and destructive to the environment. Although it is technically possible to utilise expensive computing-based technology (also known as "proof of work") in which unidentified validators update transactions, the economic cost is quite high. Every batch of transactions must be supported by evidence that a significant number of otherwise pointless computations have been completed. This can result in many equilibria, or "forks," as noted by Budish (2018), Chiu (2019), and Auer (2019), in addition to being inefficient. Permissionless DLT based on proof of work is not a CBDC-friendly technology for all these reasons.

Instead, a number of central banks are thinking about decentralisation in the form of "permissioned" DLT, where the updating is done by a network of preselected companies. 18 Importantly, traditional systems that store data numerous times and in different physical places can also achieve operational resilience. The difference is that DLT is updated; in many DLT-based systems, the ledger is shared across numerous entities that do not trust one another's data and independently verify each new transaction. The trade-off is that each ledger update necessitates coordination amongst all entity nodes (often referred to as "consensus procedures"), which takes time due to the several rounds of communication needed.

However, permissioned DLT is not a panacea and only makes sense economically in limited situations. Due to their increased resilience and perhaps reduced cost of achieving effective governance, such "permitted" architectures may have economic promise in financial markets and payments.

In the system devised by Auer, Monnet, and Shin (2021), selected validators at a cost derived from a supermajority voting rule validate transactions and update the ledger. However, without offering validators the right incentives, their records cannot be trusted since they are unable to commit to confirming trades, which creates a game of public good provision, and they are able to accept payments to erroneously certify history. The ledger's integrity is put at risk by these two frictions, and permissioned validation's ability to enable decentralised exchange as an equilibrium depends on how much rent validators are paid. According to this analysis, a decentralised operational architecture is usually preferable unless there are issues with contract enforcement and the rule of law.

## CBDC: The Digital Rupee

In a recent speech, Dr T. Rabi Sankar, Deputy Governor of the Reserve Bank of India, stated that "Cryptocurrencies are decentralised systems in which members collectively authenticate transactions. They are made to get around all of the financial system's controls. Governments cannot locate them, seize them, or freeze them. They are anonymous; only the transactional details, such as the counterparties, are validated."

One of the arguments being made in the tech community is that the digital rupee shouldn't use blockchain since it is a "permission-less network" with many nodes that authenticate transactions

The RBI would presumably wish to have authority over the digital rupee, in which case it would have to be the only entity validating transactions.

That would turn the idea of the digital rupee into one that is "permitted," which goes against blockchain theory.

## ANNUAL REPORT

The Reserve Bank's Payment and Settlement Systems Vision 2019–2021 paper served as a roadmap for the Department of Payment and Settlement Systems (DPSS) as it continued to work toward the projected development of payment systems throughout the year. In order to achieve the goal of a "less-cash" society, the Reserve Bank placed a high priority on (i) facilitating digital penetration, (ii) introducing novel payment options, (iii) ensuring smooth operations despite the disruptions brought on by the COVID-19 pandemic, and (iv) organising consumer education campaigns on digital payments.

The Reserve Bank's Payment and Settlement Systems Vision 2019-2021 document served as the Department of Payment and Settlement Systems' (DPSS) roadmap as it worked throughout the year to create payment systems as planned. The Reserve Bank's top priorities were to (i) promote digital penetration, (ii) introduce cutting-edge payment options, (iii) ensure smooth operations despite the COVID-19 pandemic's disruptions, and (iv) organise consumer awareness campaigns on digital payments, which are the cornerstones of the goal of a "less-cash" society.

In light of this, the following section reviews the year's progress in the field of payment and settlement systems and evaluates how well the agenda for 2020–21 is being implemented. Section 3 lists numerous actions made by the DIT throughout the year in relation to the 2020–21 agenda. A schedule for 2021–22 has also been established by these departments. At the conclusion, the chapter has been summarised.

The department launched a number of initiatives in the payments ecosystem during the year, guided by the Reserve Bank's Payment and Settlement Systems Vision 2019-2021 document, with a continuous focus on security, efficiency, innovation, competition, client protection, and financial inclusion.

By improving acceptance infrastructure nationwide and introducing cutting-edge payment solutions to broaden the reach of payment systems, the goal was to facilitate digital adoption. Additionally, efforts were made to ensure that all payment systems operated without any hiccups, despite the COVID-19 lockdown's varied intensity and length across the nation's different regions, which disrupted the movement of resources and access to infrastructure.

When making digital payments, a few initiatives were tailored to take into account the pandemic's demand for social distance and little touch. The Reserve Bank launched targeted initiatives to raise public awareness of digital payments and put policies in place to guarantee that customer complaints are handled smoothly and promptly. The transition to "less-cash" proceeded throughout the year, with a sharp increase in digital payments and a gradual easing of the COVID-19-related lockout.

In terms of volume, the payment systems experienced a strong rise of 26.2% in 2020–21, on top of the growth of 44.2% in the previous year. Value-wise, the contractionary trend that began in the prior year (-1.2%) was more pronounced and saw a decline of 13.4%, primarily because of slower growth seen in the large value payment system, i.e. decline in transactions using paper-based instruments and the Real Time Gross Settlement (RTGS) system. The slowdown in economic activity is largely to blame for the value of RTGS transactions falling. In 2020–21, the percentage of digital transactions in the overall volume of non–cash retail purchases climbed to 98.5% from 97.0% the previous year.





Table IX.1: Payment System Indicators – Annual Turnover (April-March)

Item	Volume (Lakh)			Value (₹ Crore)		
	2018-19	2019-20	2020-21	2018-19	2019-20	2020-21
1	2	3	4	5	6	7
<b>A. Settlement Systems</b>						
CCIL Operated Systems	36	36	28	11,65,51,038	13,41,50,192	16,19,43,141
<b>B. Payment Systems</b>						
<b>1. Large Value Credit Transfers – RTGS</b>						
<b>Retail Segment</b>						
2. Credit Transfers	1,18,481	2,06,506	3,17,852	2,60,90,471	2,85,62,857	3,35,22,150
<b>2.1 AePS (Fund Transfers)</b>						
2.1 AePS (Fund Transfers)	11	10	11	501	469	623
2.2 APBS	14,949	16,766	14,373	86,226	99,179	1,12,747
2.3 ECS Cr	54	18	0	13,235	5,145	0
2.4 IMPS	17,529	25,792	32,783	15,90,257	23,37,541	29,41,500
2.5 NACH Cr	8,834	11,290	16,450	7,29,673	10,43,212	12,32,714
2.6 NEFT	23,189	27,445	30,928	2,27,93,608	2,29,45,580	2,51,30,910
2.7 UPI	53,915	1,25,186	2,23,307	8,76,971	21,31,730	41,03,658
<b>3. Debit Transfers and Direct Debits</b>						
3.1 BHIM Aadhaar Pay	68	91	161	815	1,303	2,580
3.2 ECS Dr	9	1	0	1,260	39	0
3.3 NACH Dr	4,830	7,340	9,630	5,22,461	7,18,166	8,68,906
3.4 NETC (Linked to Bank Account)	6	93	650	20	200	913
<b>4. Card Payments</b>						
4.1 Credit Cards	17,626	21,773	17,641	6,03,413	7,30,895	6,30,414
4.2 Debit Cards	44,143	50,611	40,200	5,93,475	7,03,920	6,62,667
<b>5. Prepaid Payment Instruments</b>						
5. Prepaid Payment Instruments	46,072	53,318	49,392	2,13,323	2,15,558	1,97,695
<b>6. Paper-based Instruments</b>						
6. Paper-based Instruments	11,238	10,414	6,704	82,46,065	78,24,822	56,27,189
Total – Retail Payments (2+3+4+5+6)	2,42,473	3,50,147	4,42,229	3,62,71,303	3,87,57,759	4,15,12,514
Total Payments (1+2+3+4+5+6)	2,43,839	3,51,654	4,43,821	17,19,59,490	16,99,14,234	14,71,12,363
Total Digital Payments (1+2+3+4+5)	2,32,602	3,41,240	4,37,118	16,37,13,425	16,20,89,413	14,14,85,173

Note: 1. RTGS system includes customer and inter-bank transactions only.

2. Settlements of CBLO, government securities and forex transactions are through the Clearing Corporation of India Ltd. (CCIL). Government Securities include outright trades and both legs of repo transactions and triparty repo transactions. With effect from November 5, 2018, CCIL discontinued CBLO and operationalised triparty repo under securities segment.

3. The figures for cards are for payment transactions at point of sale (PoS) terminals and online.

4. Figures in the columns might not add up to the total due to rounding off of numbers.

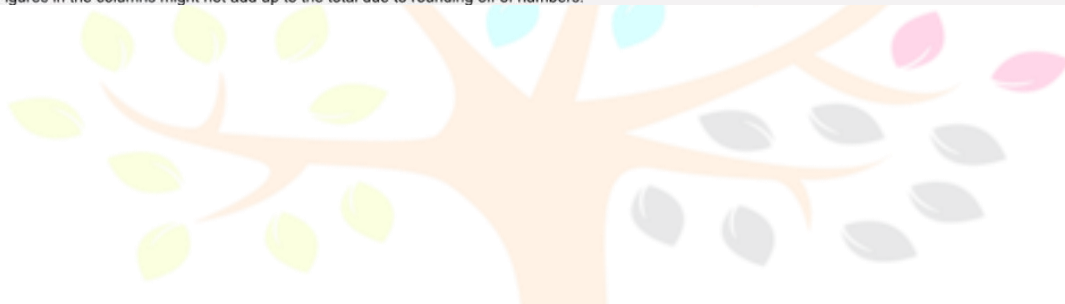
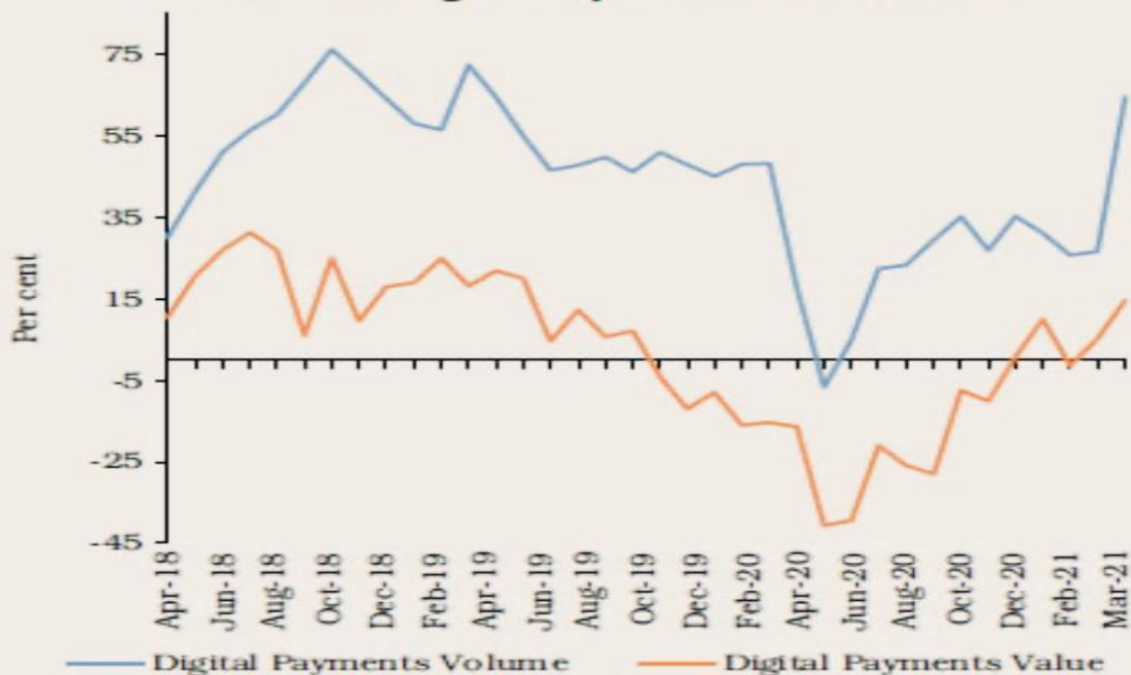


Chart IX.1: Digital Payments Y-o-Y Growth



Source: RBI.

**Table IX.2: Authorisation of Payment System Operators (as at end-March)**

Entities	(Number)	
	2020	2021
1	2	3
<b>A. Non-Banks – Authorised</b>		
PPI Issuers	43	36
WLA Operators	8	4
Instant Money Transfer Service Providers	1	1
BBPOUs	9	8
TReDS Platform Operators	3	3
Cross-border Money Transfer Service Scheme Operators	9	9
Card Networks	5	5
ATM Networks	2	2
<b>B. Banks – Approved</b>		
PPI Issuers	62	56
BBPOUs	39	42
Mobile Banking Providers	540	566
ATM Networks	3	3

Note: Validity period of Certificate of Authorisation (CoA) granted to three non-bank PPI issuers was not extended. One PPI issuer voluntarily surrendered while three non-bank PPI issuers are under the process of voluntarily surrendering their CoA. The CoAs of two WLAOs were revoked, one WLAO ceased operation and one WLAO is under the process of voluntarily surrendering the CoA along with one BBPOU. Consequent upon amalgamation of six public sector banks, the number of bank PPIs have reduced.

## Conclusion

The time has arrived for CDCs as a notion. If correctly created, they offer a chance to enhance payments through a modernised version of central bank money that maintains the essential qualities of finality, liquidity, and integrity that only a central bank can offer. By facilitating widespread access, they might serve as the foundation of a brand-new, highly effective digital payment system. They could also contribute to the establishment of robust data governance and privacy norms

However, more research on CDC design decisions and their macro-financial ramifications is required in order to reach the potential benefits for the welfare of the public while maintaining financial stability and public-private sector cooperation. According to Adam Smith, money has three basic functions in society: it serves as a unit of account, the benchmark for economic activity; a means of exchange for payments; and a store of value for the gradual transfer of purchasing power. The basic objective of CBDCs is to offer a common medium of exchange for the digital economy. By providing a global store of value, they do not, however, want to disintermediate the banking industry

Research is assisting in understanding how to maximise the effectiveness of CBCs as a payment method while minimising the overall inflows to central bank balance sheets in this environment. Beyond that, a number of significant and complicated issues need to be further examined, such as the interoperability between new and existing infrastructures, access to and control of central bank funds, the distinction between wholesale and retail CBCs, and particularly the effects of CBDCs on international trade.

Researchers will need to work through the details of cross-border payments in order to advance the cross-border dimension's frontier. Even though CDCs have special features, cross-border CDC use will also require improvements to current payment systems and arrangements, such as coordinating regulatory, supervisory, and oversight frameworks for cross-border payments, AML/FT consistency, PvP uptake, and payment system access. Additionally, the eventual global adoption of CBCs is probably going to happen at various rates in various countries, necessitating interoperability with traditional payment systems. As a result, more research is needed to complete the examination of interoperability with non-CBDC payment options. For CDCs to be properly designed as a new form of money in the digital age, the answers to these open questions will be essential.

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