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TRENDS AND DEVELOPMENTS IN THE USE OF DIGITAL CURRENCY

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Abstract
Money is a fundamental element of any economy, playing a crucial role in ensuring the smooth functioning of economic and commercial activities. Over time, money has undergone continuous evolution, adapting to the needs of society and technological advancements. The monetary system has constantly evolved, reaching its most recent stage of development the emergence of digital currencies. These represent an innovative category of financial instruments and include three main types: crypto-assets, stablecoins, and central bank digital currencies (CBDCs).
Crypto-assets were the first to emerge on the market as decentralized alternatives to traditional financial systems. One of their main characteristics is high volatility, which makes them difficult to use as a stable means of payment. For this reason, stablecoins were developed to provide a more predictable value, being backed by assets such as fiat currencies, gold, or other financial instruments. Since control over the money supply is essential for a country's economic policies, central authorities have initiated the development of central bank digital currencies (CBDCs). These are designed to combine the benefits of digitalization with the stability provided by national and international financial institutions. In some cases, CBDCs are developed exclusively by central banks, while other initiatives involve collaborations between multiple financial institutions to ensure an efficient and well-regulated implementation of these new forms of digital currency. Our paper discusses the evolution of crypto assets as well as some key aspects regarding central bank digital currency.
Keywords: *Crypto assets, Stablecoins, CBDC.*
JEL Classification: E42, E58, O30

1. INTRODUCTION

Over time, money has undergone significant transformations, evolving to meet the changing needs of trade and financial systems. From commodity-based currencies and metal coins to fiduciary and scriptural money, the development of global networks and digitalization has paved the way for the emergence of digital currencies. Today, digital money plays a crucial role in modernizing economies and enhancing payment efficiency, offering benefits such as faster transactions, reduced costs, and greater accessibility. However, challenges such

as fraud risks, storage concerns, cryptocurrency volatility, and regulatory uncertainties remain significant issues.

The evolution of money has also influenced payment methods, shifting from physical cash and bank deposits to electronic and digital forms. According to Ali *et al*. (2014), the significance of money is closely tied to its role in economic activity and transaction facilitation. Unlike traditional banknotes and deposits, whose value depends on central bank policies, digital currencies introduce new paradigms in financial systems.

Ahmetaj *et al*. (2022), Auer *et al*. (2022), Rodeck & Adams (2024) categorize digital currencies into three main types: crypto-assets; global stablecoins; Central Bank Digital Currencies (CBDCs).

This paper will explore these three categories in detail, dedicating a section to each. Additionally, the study includes conclusions, providing a comprehensive analysis of the evolving digital currency landscape and its implications for the global economy.

2. THE EMERGENCE AND EVOLUTION OF CRYPTO ASSETS

According to Cryptopedia (2021), crypto assets are native assets of a blockchain network and can be used as a medium of exchange, a store of value, and for paying transaction fees on the network. There are various types of crypto assets, but they all share three common characteristics (Andersen and Arnal, 2024): they are digital representations of rights; they utilize Distributed Ledger Technology (DLT), one version of which is blockchain technology; they operate on a decentralized spectrum and do not depend on central authorities.

Blockchain is a distributed database or ledger, also known as Distributed Ledger Technology (DLT), that operates on interconnected nodes within a computer network. A major innovation of blockchain is its ability to ensure data security without third-party intervention. Data is organized into blocks and linked in a chain, forming the so-called "blockchain." In most cases, blockchain is used in a decentralized manner, ensuring the immutability and transparency of information. Its use has facilitated efficient and instant value transfers by eliminating the need for intermediaries.

However, a known issue called the "*blockchain trilemma*" suggests that a blockchain network can not simultaneously achieve security, scalability, and decentralization. Another relevant concept is *blockchain bridges*, also known as *cross-chain bridges*, which enhance compatibility between different blockchain networks. However, they come with high risks, as they account for nearly half of all attacks on decentralized finance (DeFi).

An important factor is that crypto assets operating on blockchain rely on mechanisms essential for transaction validation and maintaining network trust, impacting both the environment and network security (Andersen & Arnal, 2024). These mechanisms are illustrated in Figure 1.

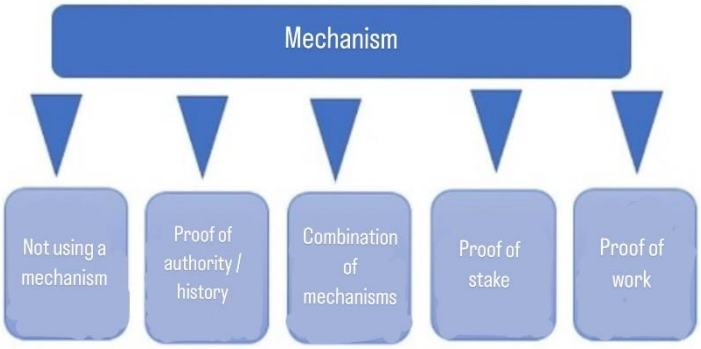


Figure 1. Types of Mechanisms for Crypto Assets Operating on Blockchain
Source: Own elaboration based on Andersen and Arnal (2024)

Figure 1 categorizes mechanisms into two groups: **Classic mechanisms,** which include *Proof of Work (PoW) and Proof of Stake (PoS)*. **Consensus mechanisms**, which include *Proof of Authority (PoA) or Proof of History (PoH), hybrid mechanisms, and even cases where no mechanism is used*. Additionally, consensus mechanisms are considered vulnerable to security attacks, threaten decentralization principles, and could have devastating effects on crypto asset networks. Proof of Work (PoW), used in Bitcoin and Ethereum until 2022, involves an energy-intensive computational competition, where nodes race to solve complex mathematical problems to validate transactions.Proof of Stake (PoS), adopted by Ethereum in 2022, selects validators based on the amount of crypto assets they hold and lock. This shift significantly reduced energy consumption and environmental impact, with Ethereum's transition cutting energy use by 99% compared to Bitcoin and Dogecoin, which still rely on PoW. Proof of Authority (PoA) or Proof of History (PoH) is used by Ripple XRP Ledger (XRPL), where a limited number of actors validate transactions. While some argue this system prevents centralized control over the ledger, critics claim it remains somewhat centralized. Solana uses a combination of Proof of Stake and Proof of History for its consensus mechanism. Tether, one of the most popular stablecoins, does not rely on any consensus mechanism. Key Considerations for Buying and Holding Crypto Assets.

According to HM Revenue & Customs (2021, updated in 2023), Andersen & Arnal (2024), two *important aspects* must be considered.

a) **Private Key** (Symmetric Cryptography)- used for encrypting and decrypting data with a single key that is kept private and exclusively used by the owner. It can be stored on a USB device, a digital storage medium, or a crypto wallet. Two types of crypto wallets exist: *Custodial wallets* managed by third-party platforms (e.g., exchanges) where users access funds through the provider.

Non-custodial wallets allow users to store their private key directly, without involving a third party.

b) **Public Key** (Asymmetric Cryptography)- uses two keys: a public key (available to anyone) and a private key (used for decryption). Transactions require the private key to decrypt data encrypted with the public key.

Crypto asset exchanges fall into two main categories (Andersen and Arnal, 2024):

- *Centralized Exchanges (CEX)* – Act as intermediaries between buyers and sellers, offering user-friendly trading experiences. However, they tend to be more expensive and prone to fraud due to their custodial nature.
- *Decentralized Exchanges (DEX)* – Facilitate direct peer-to-peer transactions, reducing exposure to external threats. However, they are often more complex to use compared to CEXs.

Using EU Regulation 2023, ASF (2022), Bank of England (2020), and Andersen & Arnal (2024), we have illustrated the characteristics of crypto assets in Figure 2.

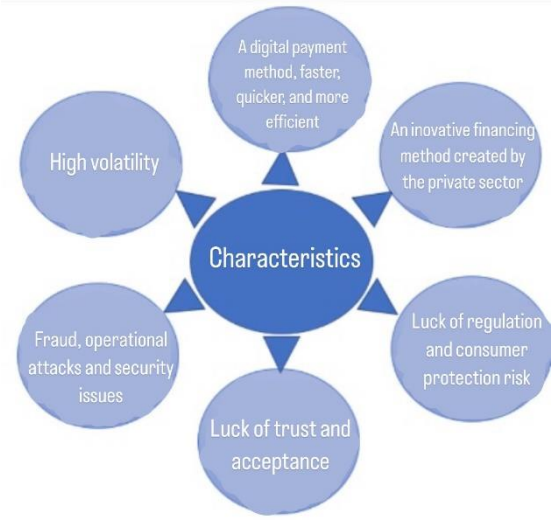


Figure 2. Characteristics of Crypto Assets
Source: own elaboration based on EU Regulation 2023, ASF (2022), Bank of England (2020), Andersen & Arnal (2024)

Examining Figure 2, we find that crypto assets represent an innovative form of financing used by market participants. They are issued by the private sector but remain unregulated by public authorities. Due to their lack of regulation and high volatility, crypto assets pose risks such as: consumer protection concerns, increase in fraud cases, operational attacks and security vulnerabilities and others. These factors contribute to decreasing trust and acceptance of crypto

assets as a means of payment. Furthermore, some crypto assets, such as Bitcoin, have a limited supply, which affects their use as a currency. Despite their risks, crypto assets offer several advantages, including: diversification of payment methods, fast transaction processing, lower costs and increased efficiency, global reach and elimination of intermediaries, connecting global markets.

As of 2024, the crypto market included nearly 9,000 crypto assets. However, only two dominated market capitalization: Bitcoin and Ethereum. Together, they accounted for over 80% of the total market capitalization, as shown in Table 1.

Table 1. Top Crypto Assets by Market Share and Total Value (March 2024)

Crypto assets	**Total Value (mdl USD)**	**Market share (%)**
Bitcoin	*1368*	*61,8*
Ethereum	*43*	*19,4*
Thether	*104*	*4,7*
BNB	*88*	*4,0*
Solana	*85*	*3,8*
XRP	*35*	*1,6*
USDC	*32*	*1,4*
Dogecoin	*26*	*1,2*
Cardano	*24*	*1,1*
Avalanche	*22*	*1,0*

Source: CoinMarketCap, Live Cryptocurrency Charts & Market Data

Table1 highlights Bitcoin and Ethereum as the dominant crypto assets. Unlike Bitcoin, which offers a single token, Ethereum supports both tokens and smart contract functionality. Bitcoin relies on Proof-of-Work (PoW), while Ethereum has shifted to Proof-of-Stake (PoS). Bitcoin's supply is capped at 21 million coins, with over 18 million already in circulation, though the halving process slows issuance. A key milestone was Bitcoin's adoption as legal tender in El Salvador in 2021, bringing economic risks.

Beyond Bitcoin and Ethereum, some of the largest crypto assets by market capitalization we can mention in the following.

a. *Tether (USDT) and USDC* – Stablecoins pegged to the U.S. dollar.

b. *Dogecoin (DOGE)* – Initially created as a joke in 2013, Dogecoin gained massive popularity and is now one of the most well-known crypto assets, ranking 8th by market capitalization.

c. *Solana (SOL)* – Developed to promote Decentralized Finance (DeFi), Solana recorded a 1,000% increase in 2023, outperforming many major crypto assets. It enables fast, large-scale transactions, similar to traditional payment networks.

d. *Avalanche (AVAX)* – Designed to facilitate fast, low-cost transactions, Avalanche has seen a significant rise in popularity due to its low transaction fees, making it an attractive platform for DeFi transactions.

e. *XRP (Ripple)* – Developed in 2012 by Ripple Labs, XRP and its ledger system were created to provide fast and cost-effective solutions for business-to-business (B2B) payments, particularly improving cross-border transactions.

3. STABLECOINS AND THEIR CHARACTERISTICS

Several authors (Bullmann *et al*., 2019; Wang *et al*., 2020; Caramichael and Liao, 2022; Barthélémy *et al*., 2023; Andersen and Arnal, 2024) highlight stablecoins as a major topic due to their rapid growth, global adoption, and financial risks. As part of the crypto ecosystem, they were introduced to reduce volatility by pegging their value to assets like the US dollar, other fiat currencies, crypto assets, or commodities like gold. Recorded on distributed ledger technologies (DLT), stablecoins serve as both a store of value and a medium of exchange.

Despite stabilization mechanisms, they remain vulnerable to operational risks, issuer behavior, and regulatory uncertainty. Their stability depends on issuance, redemption processes, and reserve levels. While offering liquidity, stablecoins face risks such as peg failures or platform collapses. Effective regulation is crucial for investor protection and financial stability (D'Avernas *et al*., 2022).

According to Li and Mayer (2022), there are three regulatory approaches for stablecoins: *capital requirements*, which establish minimum reserve levels; *token pegging*, which restricts excess economic surplus by managing the risks of the underlying assets; *reserve asset risk restrictions*, which determine the level of risk associated with reserve assets the higher the risk, the larger the required reserves to maintain price stability.

Stablecoin issuers both centralized entities and decentralized organizations implement three main stabilization strategies (Barthélémy *et al*., 2023):

- *holding reserves in US* dollars for each token issued, with a promise of 1:1 redemption.
- *over-collateralizing crypto assets locked in a smart contract*, ensuring adequate reserves to maintain peg stability. If the collateral value falls, automatic liquidation mechanisms are triggered.
- *incentivizing arbitrageurs to maintain the peg*, similar to foreign exchange interventions.

As highlighted by Bullmann *et al*. (2019), D'Avernas *et al*. (2022), stablecoins can be categorized based on the type of reserves backing them a classification illustrated in Figure 3.

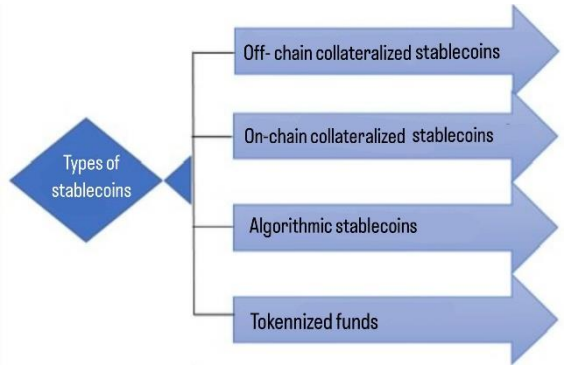


Figure 3. Types of Stablecoins Based on Their Reserve Structure
Source: Own elaboration based on Bullmann *et al*. (2019), D'Avernas *et al*. (2022)

Figure 3 highlights the classification of stablecoins into *on-chain and off-chain collateralized stablecoins, algorithmic stablecoins, and tokenized funds*. *Collateralized stablecoins* rely on backing assets that users can redeem, always requiring an entity responsible for managing the reserves. *On-chain collateralized* stablecoins are governed by smart contracts, and redemption may involve selling rights to future revenues. *Algorithmic stablecoins* are theoretical constructs designed to maintain price stability relative to a reference currency. They are managed by algorithms and not fully backed by the assets they represent. *Tokenized funds* are created on existing blockchain-based platforms and serve multiple purposes, including financing, decentralization, access to platform-specific services, and gaming. These tokens can also represent tangible or intangible assets and function as governance mechanisms for blockchain projects.

The composition of a stablecoin's reserves is crucial for understanding its impact on credit supply. Caramichael and Liao (2022) explore *three possible reserve frameworks* and their effects on credit intermediation, outlined below:

✓ **Narrow Banking Framework** - stablecoins are fully backed by commercial bank deposits, which are in turn entirely backed by central bank reserves. This method would ensure the stablecoin's security, as it effectively functions as a central bank digital currency (CBDC). However, it poses a risk of credit disintermediation during financial stress or panic, as commercial bank deposits could migrate massively to stablecoins, disrupting credit supply.

✓ **Two-Tier Intermediation Framework**- stablecoins would be backed by commercial bank deposits used for fractional reserve banking. Stablecoin issuers rely on bank deposits as reserve assets, while commercial banks engage in fractional reserve banking using stablecoins and/or stablecoin deposits. This framework preserves banking intermediation, as stablecoin deposits are treated similarly to non-stablecoin deposits in terms of regulatory oversight and risk limits.

✓ **Securities-Based Framework**- stablecoin issuers could hold cash-equivalent securities such as Treasury bills and high-quality commercial paper instead of depositing funds in commercial banks. These securities could be acquired directly or indirectly through market intermediaries.

To construct a scenario where fiat-backed stablecoins are widely adopted within a stylized version of the banking system, Carmichael and Liao (2022) consider several key elements:

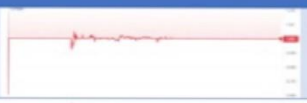
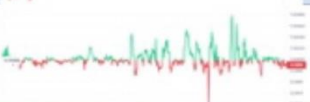
1. **Sources of entry** include both physical banknotes and commercial bank deposits. Households and businesses may choose to convert part of these liquidity sources into stablecoins.
2. **Reserve framework** are several reserve frameworks for stablecoins can be explored, including a *narrow framework*, where stablecoins are fully backed by commercial bank deposits, which are in turn fully supported by central bank reserves. Also, a *two-tier intermediation framework*, where stablecoins are backed by commercial bank deposits used for fractional reserve banking.
3. **Impact on balance sheets** includes evaluating how inflows and reserve allocations affect liquidity, lending, and financial stability.
4. **Interdependence and fund flows** involves visualizing the flow of commercial bank deposits and banknotes converted into stablecoins, as well as how these funds are allocated into reserves in the form of commercial bank deposits and securities.

In recent years, stablecoins have seen significant development, experiencing continuous growth in popularity. Thus, Table 2 further highlights the top 5 most used stablecoins as of May 2024, along with some essential details about them.

Table 2 highlights the top five stablecoins: Tether, USDC, DAI, First Digital USD, and USDD. Tether stands out with the highest trading volume and market dominance, followed by USDC and DAI.

Tether and USDC are the most popular, with market capitalization surging from $5 billion in 2020 to nearly $200 billion in two years. Launched in 2014, Tether is backed by US dollars, other fiat currencies, and gold, though it has faced occasional instability. USDC, introduced in 2018, is regulated, fully backed by US dollars, and undergoes regular audits for transparency. Despite being designed for stability, stablecoins remain sensitive to external factors. Financial institution bankruptcies can trigger temporary devaluations or even collapses, as seen with UST, which failed due to technical flaws (Barthélémy *et al*., 2023; Andersen and Arnal, 2024).

Table 2. Analysis of the Top 5 Stablecoins in the Market, May 2024

Stablecoins	Trading volume (mln USD)	Market position	Evolution
Tether (USDT)	43.346	3	
USDC	3.864	6	
DAI	188	24	
First Digital USD	3.812	37	
USDD	4.745	109	

Source: CoinMarketCap, Live Cryptocurrency Charts & Market Data

Caramichael and Liao (2022) emphasize that there is potential for growth in stablecoins across several *areas*, which are highlighted below.

- *More inclusive financial and payment systems* by enabling faster, cheaper, and more inclusive payments, reducing payment barriers for cross-border transfers, and allowing broader participation in financial systems.
- *Tokenized financial markets* that could bring benefits such as real-time settlement, increased liquidity, and enhanced transparency. Stablecoins would play a crucial role in facilitating transactions and supporting tokenized assets.
- *Supporting next-generation innovations* like Web 3, which involves a shift towards decentralized networks and efficient micro-payments. Such innovations could lead to the widespread use of stablecoins in online services and the digital economy.

4. CENTRAL BANK DIGITAL CURRENCY: RECENT DEVELOPMENTS, CREATION PROCESS STAGES, BENEFITS, AND RISKS

According to Rösl and Seitz (2022), Stanley (2022), Kiff *et al*. (2020), central bank digital currency (CBDC) represents a digital version of money, issued and monitored by central banks with enhanced security and inherent stability, as opposed to the volatility associated with crypto assets. In 1993, the *Bank of Finland* launched *Avant*, a smart card that represented an electronic form of cash. Although this system was abandoned in the early 2000s, *it can be*

considered the precursor to the world's first CBDC. However, CBDC research did not see significant global development until recently, spurred by technological advances and the decline in cash usage.

Figure 4 presents a taxonomy comparing cash with four types of digital money (CBDC, sCBDC, stablecoins, and crypto assets) based on criteria such as the issuer, legal status, central bank backing, attachment to a fiat currency, peer-to-peer transfer capability, and programmability.

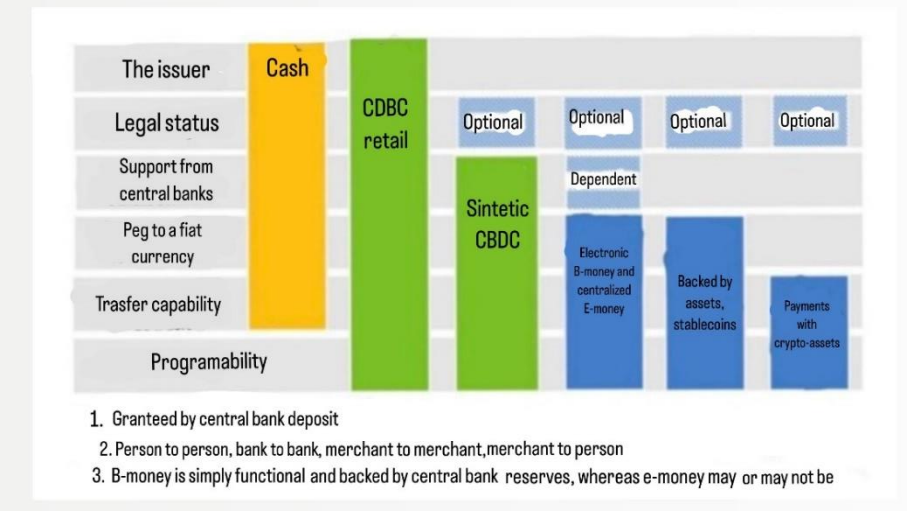


Figure 4. Types of money and their key attributes
Sourse: Kiff *et a*l. (2020)

Figure 4 highlights key differences among digital currencies. Central bank digital currencies (CBDCs) are the only ones meeting all six essential attributes: public issuance, legal status, central bank backing, fiat anchoring, transfer capability, and programmability. Cash lacks only programmability, while cryptocurrencies have just transfer capability and programmability. Stablecoins and centralized electronic money add fiat anchoring, while synthetic CBDCs also include central bank support but remain incomplete compared to full CBDCs. Other digital currencies, such as synthetic CBDCs, stablecoins, and crypto assets, lack at least one key attribute, particularly legal status, limiting their economic influence.

Figure 5 further categorizes central bank digital currencies into wholesale and retail types.

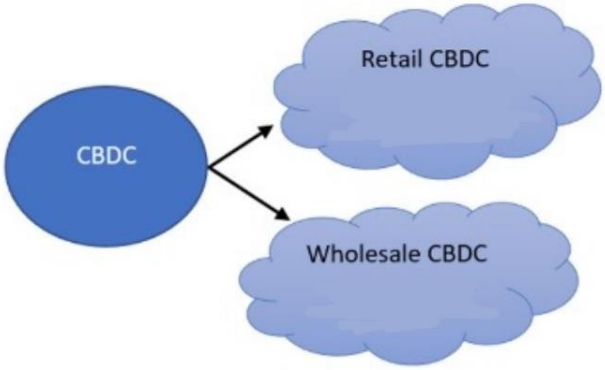


Figure 5. **Types of CBDCs from the perspective of the intended public**
Source: elaborated based on Rösl and Seitz (2022), PwC (2021), Li and Mayer (2021)

It is important to highlight that traditionally, money issued by central banks was only available to the public in the form of cash. Regarding the development of digital currency, it takes place from the perspective of two types: retail and wholesale. Retail CBDCs aim to create a digital form of money issued by central banks that is accessible to everyone. In contrast, wholesale CBDCs focus on facilitating digital transactions between banks, such as securities settlement and cross-border payments, in a safer and more efficient manner.

One of the main compromises of CBDCs is anonymity, which is initially provided by crypto assets. Addressing this issue requires special attention from governments, focusing primarily on the security of the process as well as the proper design and architecture of CBDCs. Therefore, an appropriate architecture must be approached to ensure CBDCs meet their initial objectives and provide security and safety for transactions. Three main architectures identified by Auer *et al*. (2022), Li and Mayer (2021) can be seen in Figure 6.

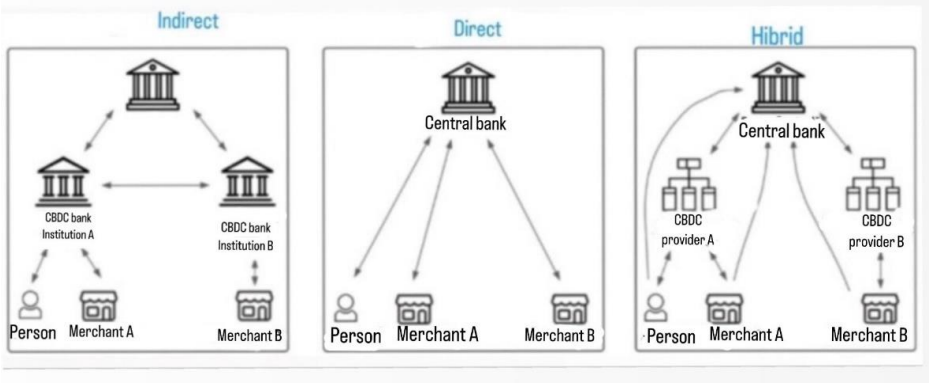


Figure 6. CBDC architecture: indirect vs direct vs hybrid
Source: Li and Mayer (2021)

Figure 6 presents three CBDC models. The direct model allows the central bank to process all payments and track transactions, similar to cash. The indirect (synthetic) model relies on banks as intermediaries, with the central bank holding claims but not processing transactions. The hybrid model combines both, enhancing resilience but requiring a more complex infrastructure.

Kiff *et al*. (2020) suggest that a flexible CBDC architecture can adapt to user needs and technologies, promoting competition and interoperability. As shown in Figure 7, CBDC systems can operate in single-tier or multi-tier structures.

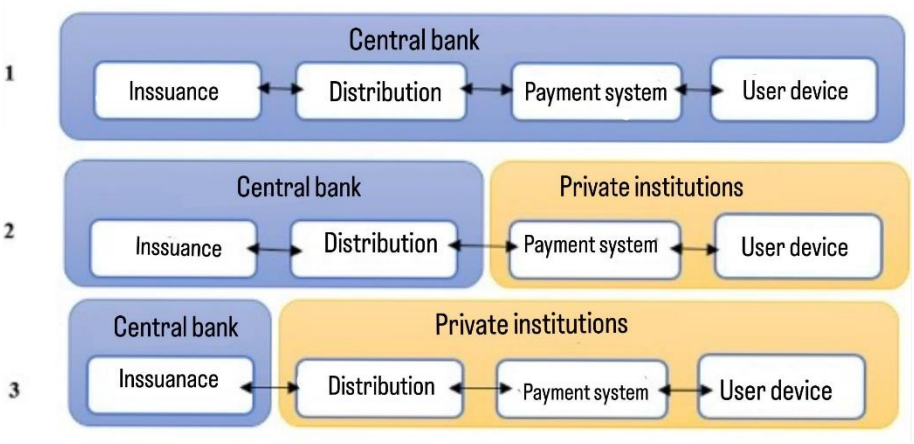


Figure 7. Levels of responsibilities assumed by the Central Bank
Sourse: Kiff *et al*. (2020)

In the *single-tier model*, the central bank manages all CBDC functions, including issuance and wallet management, providing full control but requiring significant resources and potentially competing with private payment providers. *The multi-tier model* (or platform model) allows the central bank to issue CBDC while outsourcing account management to private entities, reducing disruption, and easing integration with consumer technology. The choice depends on financial sector stability, infrastructure, and available resources.

For efficient CBDC operation, key considerations include:

✓ *Transaction Security*: The central bank issues CBDC, while payment service providers (PSPs) facilitate transactions, ensuring integrity and preventing reversals or block removal.

✓ *Security & Confidentiality*: Distributed systems store data across multiple locations for real-time access, while decentralized ledgers distribute trust among entities.

✓ *Prevention of Double Spending & Counterfeiting:* Robust validation mechanisms protect user confidentiality and transaction legitimacy.

✓ *Availability & Design Limits:* Offline capabilities and holding limits, like the Bahamas' "Sand Dollar," help ensure stability and prevent financial disruptions.

✓ *Smart Contracts & Programmability:* Automating transactions via blockchain-based contracts enhances efficiency while maintaining security.

Bordo and Levin (2017) and Li and Mayer (2021) outline two CBDC issuance models:

- *Central Bank Token Issuance*- Similar to Bitcoin, this model allows direct transfers between parties without intermediaries, using Distributed Ledger Technology (DLT) for verification.
- *CBDC Account-Based Issuance*- Individuals and firms hold electronic funds in CBDC accounts at the central bank or supervised institutions. Payments are processed directly by the central bank, requiring authentication and validation, extending the current banking system.

In Figure 8, the key differences between token-based and account-based CBDC systems are illustrated, focusing on how transactions and authentication occur in each model.

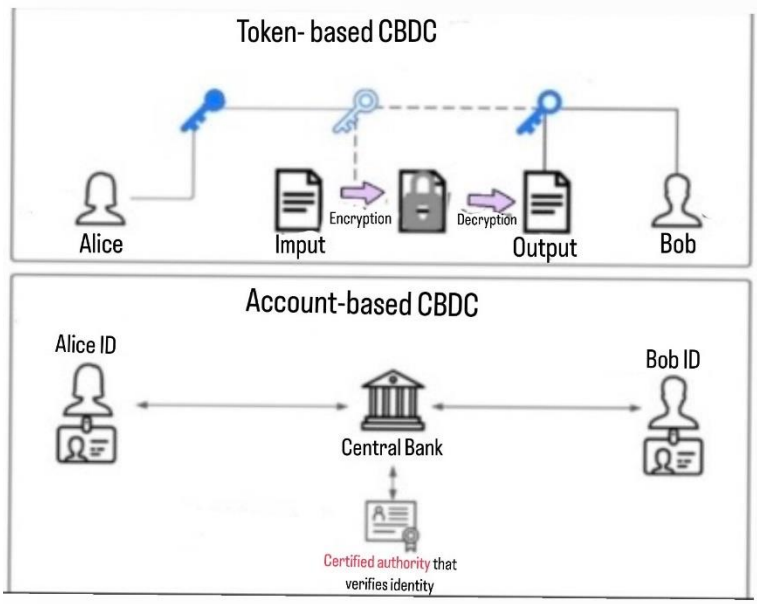


Figure 8. CBDC Access Models: Token-Based vs. Account-Based
Source: Li and Mayer (2021)

Both token-based and account-based CBDCs use digital ledger technology for transactions, but token-based systems are more vulnerable to counterfeiting

and require strong validation methods. Account-based systems offer instant, fee-free payments, while token-based ones are less efficient and more costly. Implementing an account based CBDC could boost GDP by 3%, but it should complement, not replace, private payment systems to maintain competition.

CBDC research is driven by global trends like the rise of cryptocurrencies, stablecoins, tech companies in payments, and digital payment growth post-COVID. Central banks see CBDCs as a way to improve payment efficiency, enhance financial stability, and promote inclusion, especially in emerging markets.

Thus, Figure 9 highlights the intensity of these motivations from the perspective of the two types of CBDCs: wholesale and retail, distinguishing how developed and emerging economies approach the issuance of CBDCs based on these factors.

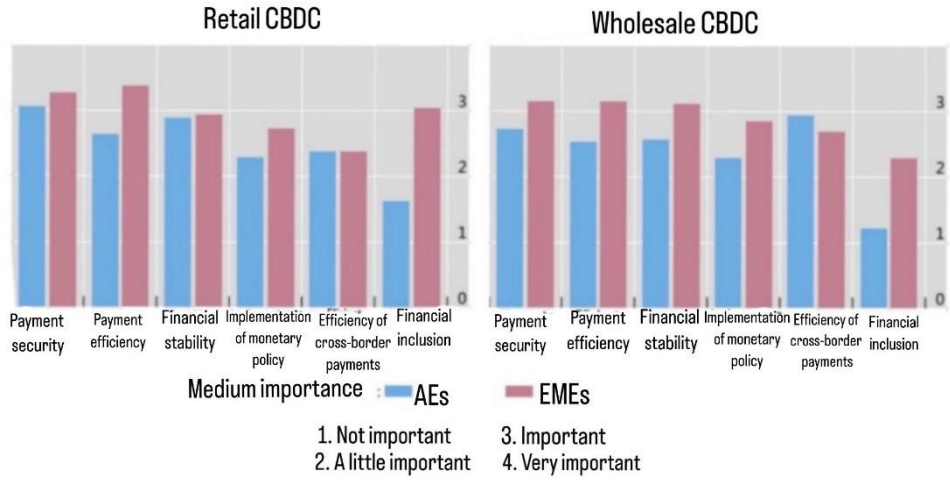


Figure 9. Motivations for issuing CBDC for central banks in developed (AEs) and emerging (EMEs) countries
Source: Auer *et al*. (2022)

Figure 9 highlights key priorities for retail CBDCs in emerging countries, focusing on payment security, transaction efficiency, and financial inclusion, while also considering financial stability and cross-border payments. In developed countries, financial inclusion is less critical, but payment security remains a top priority alongside other motivations. For wholesale CBDCs, priorities align with retail CBDCs but with a stronger emphasis on payment security in developed markets. In emerging markets, financial inclusion plays a smaller role, while other factors remain significant.

As CBDC projects evolve, a structured methodology for project management becomes essential, especially in research and development.

According to Tourpe (2023), the "5 P methodology" provides a structured approach tailored to different development strategies. Large-scale projects, including digital currencies, require a flexible yet systematic framework to assess feasibility, risks, and benefits, as illustrated in Figure 10.

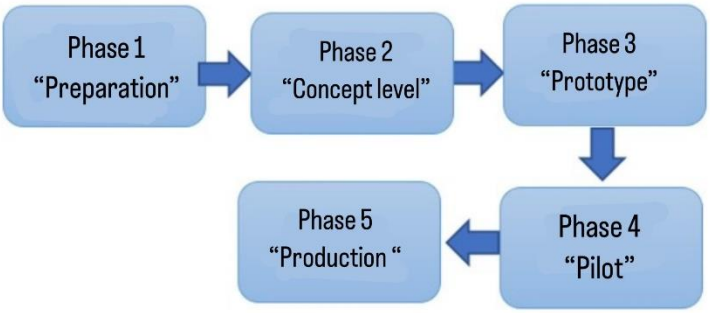


Figure 10. Phases of creating a central bank digital currency
Source: Own elaboration based on Tourpe (2023)

Figure 10 outlines the five stages of CBDC development: Preparation, Concept, Prototype, Pilot, and Production. Each stage helps the team manage the process efficiently, with key decisions on whether to advance, pause, partially transition, or stop the project.

1. *Preparation* - Establishes foundations, evaluates risks (technological, legal, monetary), and explores potential use cases.
2. *Concept* - Tests initial hypotheses, defines success conditions (policy goals, user needs, legal/financial aspects), and conducts market research before deciding on further development.
3. *Prototype* - Develops and tests a prototype in a controlled environment with stakeholders, assessing feasibility before moving forward.
4. *Pilot* - A near-final stage involving real-world testing, scalability, and user experience analysis to determine readiness for launch.
5. *Production* - Focuses on maintaining and improving the CBDC system, ensuring resilience, flexibility, and long-term innovation.

5. CONCLUSIONS

Over time, money has evolved significantly, driven by the need to enhance trade efficiency. From commodity money and metal coins to fiduciary and scriptural forms, digitalization and global network expansion have enabled the emergence of digital currencies. Today, digital money is becoming increasingly relevant, supporting economic modernization and payment optimization. Its advantages include fast transactions, lower costs, and global accessibility. However, risks such as fraud, storage challenges, cryptocurrency volatility, transaction irreversibility, and public distrust remain. The introduction of digital

currencies aims not only to improve payment efficiency but also to fulfill money's three essential functions: medium of exchange, store of value, and unit of account.

Cryptocurrencies initiated the digitalization of money, providing alternatives to traditional currencies but facing regulatory challenges. Due to their high volatility, they are not considered true money, as they only partially fulfill monetary functions. Bitcoin continues to dominate the cryptocurrency market, followed by Ethereum and Tether.

Stablecoins were developed to address cryptocurrency volatility by implementing stabilization mechanisms. Their stability depends on the management of issuance, redemption, and reserve backing, while proper regulation is essential for investor protection and financial market stability. Tether and USD Coin are among the most popular stablecoins, experiencing significant growth in recent years.

Initially, central bank-issued money was available to the public only as cash. The rise of cryptocurrencies and stablecoins in the private sector has prompted central banks to explore digital currencies (CBDCs). CBDCs are digital versions of central bank money, offering enhanced security and stability. Their introduction could bring significant changes to the financial system, making it crucial for governments to design effective models that prevent economic disruptions.

While the widespread adoption of alternative payment methods beyond the national currency remains unlikely in the near future, CBDCs are not the only way central banks can modernize the economy.

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