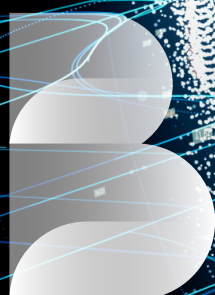


The Future of Payments

How stablecoins and tokenized deposits innovate the financial services industry



Roland
Berger

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Executive summary

Our study explores the evolving landscape of blockchain-based payment rails and their growing prominence within the payment ecosystem. While traditional payment methods continue to dominate, the emergence of blockchain-based solutions is gaining substantial traction. Currently, there are four distinct blockchain-based payment rails: Cryptocurrencies, stablecoins, tokenized deposits, and blockchain-based CBDCs¹. Out of these, stablecoins and tokenized deposit stand out and are expected to spearhead adoption due to their limited volatility and increasing regulatory clarity.

Stablecoins have seen remarkable adoption in recent years, drawing attention from both consumers and institutional players. Moreover, regulatory frameworks are beginning to take shape in various jurisdictions, underscoring the growing legitimacy of stablecoins in the financial landscape. Their stability and liquidity characteristics make them a compelling choice for a wide range of use cases, such as B2B cross-border payments, remittances, or more innovative applications such as treasury management. Meanwhile, tokenized deposits have witnessed a surge in attention in recent months, with several pilot projects making substantial progress. This innovative approach offers improved payment services, while preserving the fractional reserve banking system and protecting consumers.

This study explores the intricacies of these blockchain-based payment rails, compares stablecoins and tokenized deposits to understand their future roles, and provides a list of high-potential opportunities for banks, payment companies, and corporates to pursue.

1

Blockchain-based payment rails are being developed and gaining traction

Evolving payment landscape: While traditional payment methods continue to dominate, blockchain-based solutions are gaining momentum

2 Statista, Number of identity-verified cryptoasset users

3 I.e., the payment of goods and services using blockchain-based tokens

4 Juniper Research, "CBDCs & stablecoins: Key opportunities, regional analysis & market forecasts 2023-2030" report

5 Brevan Howard Digital's report "The Relentless Rise of Stablecoins"

6 Zippia.com, "How many businesses accept bitcoin?"

7 Current or planned initiatives within Crypto, Blockchain and Web3, as per a recent poll conducted by Coinbase.

8 Juniper Research, "CBDCs & stablecoins: Key opportunities, regional analysis & market forecasts 2023-2030" report

As of today, traditional payment methods such as conventional bank transfers and card-based transactions have a dominant position within the global payments landscape. From the very first blockchain transaction on January 12, 2009, to the emergence of stablecoins in 2014, a broader array of blockchain-based payment methods has emerged into the scene and experienced substantial momentum. This surge can be attributed to their advantages, such as cost-effectiveness and swift settlement, as well as advancements in technology and a significant increase in adoption. Notably, in December 2022, the number of identified digital assets users soared to 425 m, marking an impressive 400% increase from January 2021².

Blockchain-based payments³ currently hold a relatively modest share of the global payment arena. For instance, payments using stablecoins have been estimated at USD 53 bn in 2023⁴. In contrast, in 2022, major card payment networks processed dozens of trillions in transactions.

Nevertheless, the value of on-chain transactions, encompassing payments, speculative activities, and more, has seen an astounding increase and now rivals the scale of global payment networks. For instance, stablecoin transaction volume reached a staggering USD 11 tr in 2022⁵.

Furthermore, the acceptance of blockchain-based payments as a viable method continues to surge. By June 2022, more than 15,000 businesses worldwide were accepting Bitcoin, a significant increase from the approximately 5,000 businesses in June 2021⁶. Additionally, payments and settlement represent the third most common use case being explored by Fortune 500 companies⁷.

This robust growth is expected to persist, driven by the expanding adoption of digital assets, particularly among institutions, and the ongoing development of regulatory frameworks. As for the value of stablecoin payments, it is expected to grow at a compound annual growth rate (CAGR) of approximately 29% from 2023 to 2028⁸.

Overview of blockchain-based payment rails: Currently, four distinct blockchain-based payment rails exist

Four types of rails stand out in the world of blockchain-based payments, each with its unique characteristics: Cryptocurrencies, stablecoins, tokenized deposits, and blockchain-based CBDCs. ► **A**

Cryptocurrencies, like Bitcoin, are generally decentralized, permissionless systems, maintained by a network of independent nodes. While offering transparency and freedom from regulatory controls, they grapple with issues like price volatility.

Stablecoins, such as Tether or USDC, strive to mitigate this volatility by pegging their value to real-world assets (most often fiat currencies like the USD).

9 More details on use-cases and mechanisms are provided in section 2

Tokenized deposits⁹, a recent development, merge the benefits of blockchain technology with the reliability of commercial bank deposits. They function within the existing two-tiered monetary system, typically leveraging private blockchains, and prevent from price discrepancies.

Lastly, Central Bank Digital Currencies (CBDCs) are digital fiat currencies issued and managed by central banks, essentially representing the digital version of physical cash. In this paper, we will specifically explore CBDCs that leverage Distributed Ledger Technology (DLT).

A Blockchain-based payment rails and use-cases overview

Blockchain nature:		Public blockchain		Private blockchain	
Payment rails:		Cryptocurrencies ¹⁾ (excl. stablecoins)	Stablecoins	Tokenized deposits	CBDCs ³⁾
Use cases	B2B	Interbank settlement	- Cross-border payments²⁾ - Treasury management for multinationals	- Inter-bank settlement - Cross-border corporate payments	Wholesale CBDC
	C2B/B2C	Retail payments	- Retail international payments (e.g., gaming, marketplaces, travel) - Payroll for remote teams or freelancers		Retail CBDC
	C2C	Remittances	Remittances		
	M2M	IoT payments (e.g., supply chain finance)	IoT payments (e.g., highway toll, smart home)	Supply chain payment (e.g., ERP payments in the automotive)	Wholesale CBDC

1) Native and non-native blockchain tokens which don't aim to have their value pegged to fiat money;

2) B2B cross-border payments between non-native companies, and B2B payments between native companies; 3) Based on Distributed Ledger Technology

Source: Desk research, industry reports, expert interviews, Roland Berger

Most promising rails: Stablecoins and tokenized deposits are expected to lead the way

¹⁰ Slippage means the difference between the expected price of a transaction and the actual price when it is executed

¹¹ As of 3/10/2023, based on DefiLlama.com

¹² Stablecoins backed by assets denominated in fiat currencies

Cryptocurrencies, while offering many advantages such as accessibility, cost-effectiveness (especially when utilizing scaling solutions such as sidechains and Layer 2), and strong adoption, are not likely to emerge as the predominant blockchain-based rail. This is primarily due to their inherent volatility, which poses significant slippage risks¹⁰, and the tendency of crypto holders to expect value appreciation. This expectation makes them less inclined to use cryptocurrencies for everyday purchases and services.

CBDCs are unlikely to be DLT-based, as central banks predominantly prioritize scalability and security over decentralization. Additionally, the advantages of DLT in a centralized system are not well-defined.

Unlike cryptocurrencies and CBDCs, stablecoins and tokenized deposits exhibit minimal volatility and can benefit from DLT technology, making them more appealing to drive blockchain-based payments adoption.

2

Stablecoins and tokenized deposits are expected to have a different use-case focus

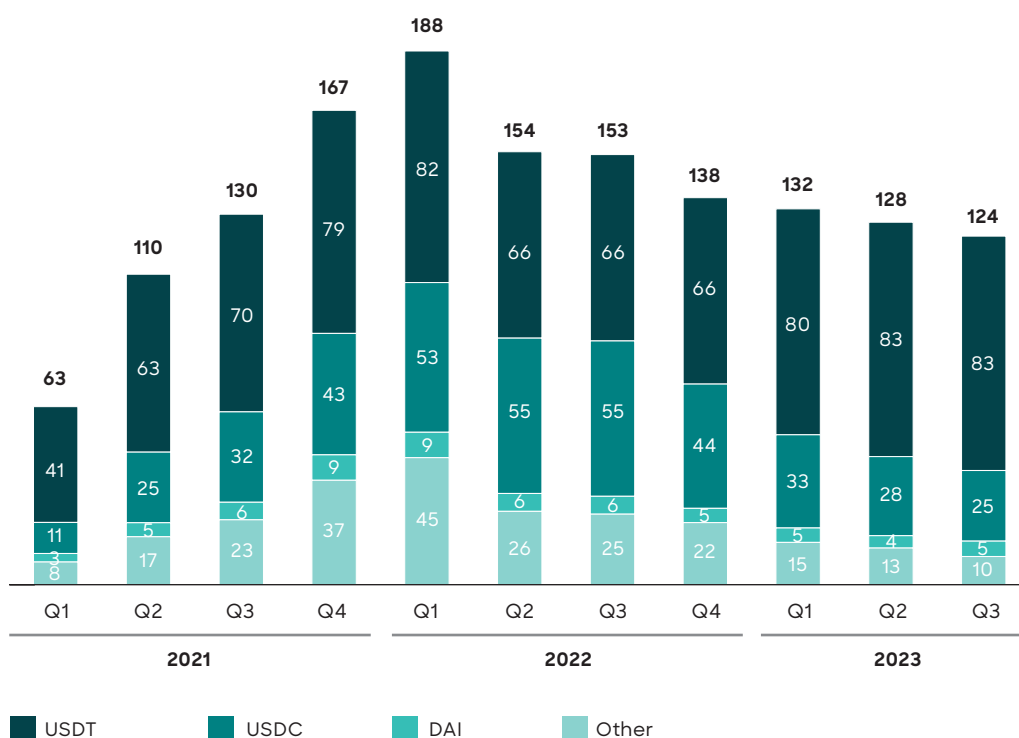
Stablecoins: Stablecoins have seen strong adoption in recent years, and regulations are being rolled out in some jurisdictions

The market capitalization of stablecoins has significantly increased in recent years, currently standing at around USD 124 billion¹¹. This market has been predominantly driven by USDT, USDC, and Dai, representing ~90% of total market capitalization¹². ► **B** Among the various types of stablecoins, the fiat-collateralized type has seen the widest adoption, capturing over 95% of the market share as of October 2023. This trend was influenced by the crash of a leading algorithmic stablecoin last year and the perceived risks associated with crypto-backed and algorithmic stablecoins.

13 Societe Generale
Forge, Coinvertible
Stablecoin whitepaper

14 Circle, Treasury
Management solution

B Stablecoins market capitalization [USD bn]



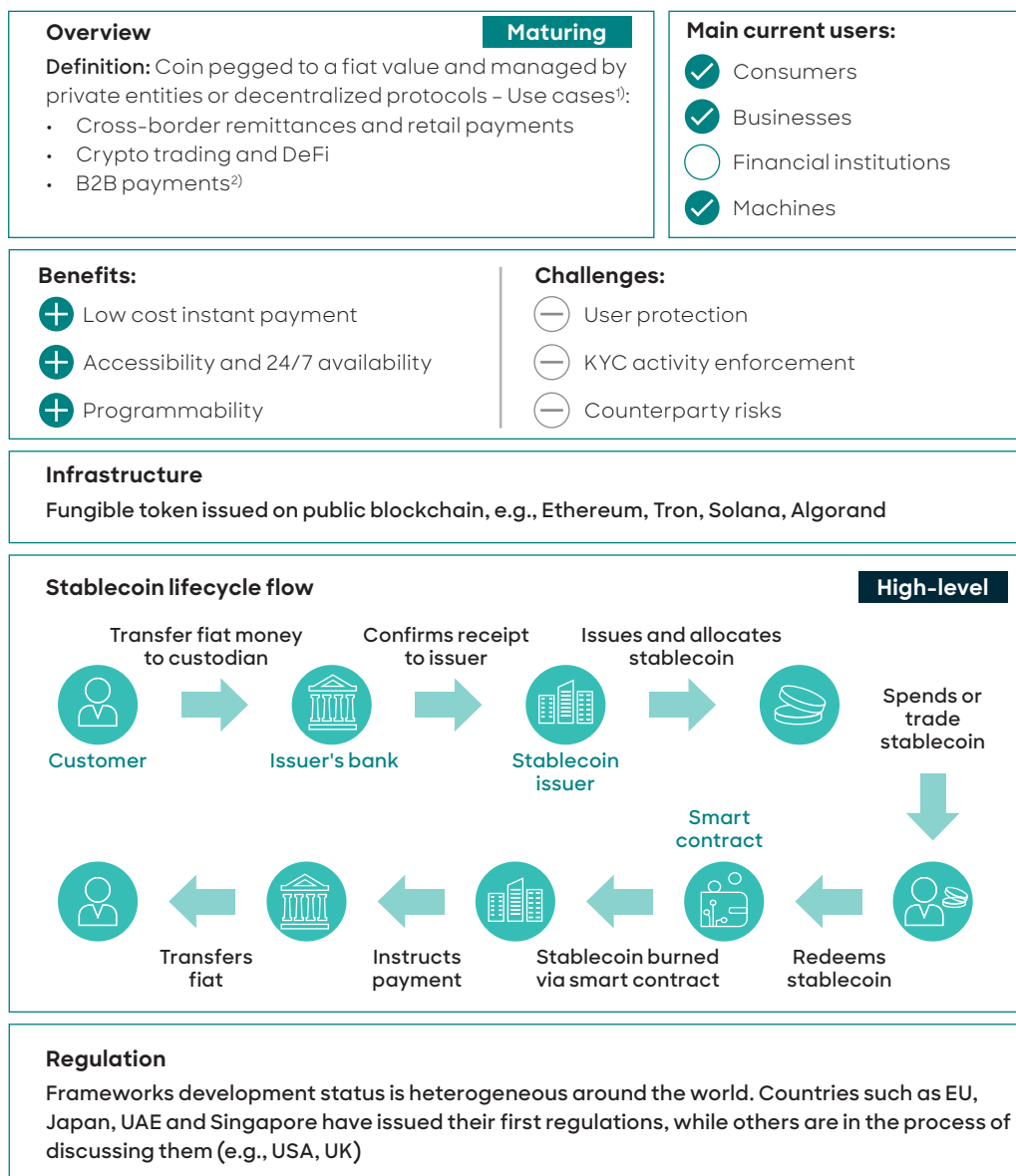
Note: The value showcased are the market capitalization at the end of the quarter (e.g., value in Q1 is the market capitalization on the 31st of March)

Source: defillama.com

Fiat reserve-backed stablecoins are fungible tokens issued on public blockchains such as Ethereum, Tron, and BNB Smart Chain, primarily by private entities like Tether and Circle. ► However, the digital assets arm of a leading French bank has recently made inroads into this space, issuing a white paper in April 2023 laying out the framework for permitted, institutional grade stablecoins, starting with the EURCV¹³. These stablecoins are backed by cash or cash-equivalent reserves, meaning that, for every stablecoin issued, there is an equivalent amount held in reserve to ensure stability. Also, a key characteristic of stablecoins is that they are bearer instruments, which means that whoever holds the coin in their wallet is the owner and has the right to exchange it with anyone with a compatible wallet. A direct consequence is that the settlement happens instantly in a stablecoin transaction (i.e., similarly to a physical cash exchange) and that stablecoins can be traded on exchanges.

While stablecoins initially served as a hedge against market volatility for crypto traders, they have now expanded their utility to encompass remittances, online payments, B2B payments, and other innovative use cases, such as treasury and cash management solutions¹⁴. Their bearer instrument nature and public blockchain infrastructure provide a viable alternative for individuals and businesses seeking prompt, cost-effective, and transparent options, with the pre-requisite of having an infrastructure in place (e.g., digital asset platform management) and the required expertise.

C Stablecoins overview (not exhaustive)



1) Not exhaustive – Includes payments and non-payments use-cases; 2) B2B cross-border payments between non-native companies, and B2B payments between native companies

xx Current stage of development

Source: Desk research, industry reports, CoinDesk, Roland Berger

¹⁵ Cointelegraph, "Stablecoin issuer PAXOS to face SEC lawsuit over binance USD report" article

Despite witnessing substantial growth in market capitalization in recent years, stablecoins' market cap has experienced a decline of approximately ~35% in the past 12 months. This decline is largely ascribed to the broader downturn in the digital assets market and the banking crisis that occurred earlier this year.

Despite regulatory scrutiny in the recent months, exemplified by the actions of US regulators against a prominent stablecoin issuer¹⁵, regulatory frameworks are being introduced and developed around the world. Organizations such as the EU and countries such as Japan, the UAE, and Singapore have issued their first regulations, while others are actively deliberating such measures (e.g., USA, UK). This growing regulatory clarity has been warmly welcomed by stablecoin issuers and the digital assets ecosystem.

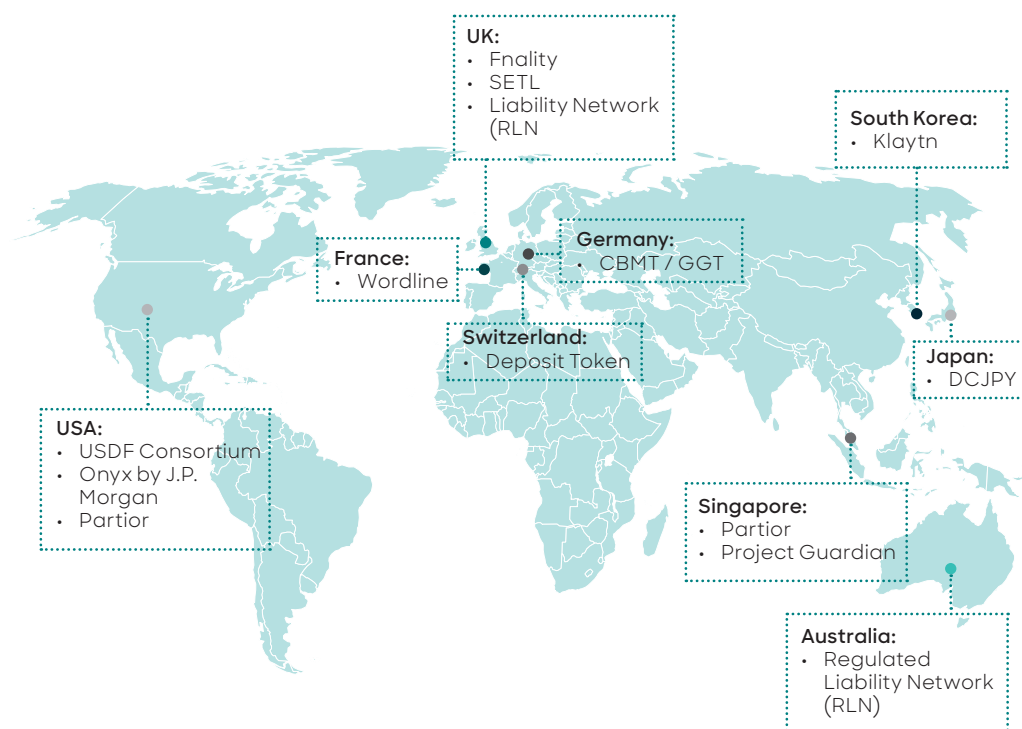
Tokenized deposits: In recent months, tokenized deposits have garnered significant attention and several pilot projects have made progress

Tokenized deposits are primarily in the early early stages of development, but have recently garnered significant attention, with several pilots being developed across countries. ▶ **D** They are a new form of bank money, as they are a token representing a liability from the issuing financial institution and cannot be exchanged directly to individuals outside the financial institution's KYC boundary. The main use cases currently being developed are inter-bank settlement, corporate payments, and M2M payments for supply chains.

Tokenized deposits can be issued by a single bank, enabling improved intra-bank corporate payments. Alternatively, they can be issued by a consortium of banks, enabling the transfer of value across participants from multiple banks, potentially even on public blockchains, with access restricted to participants who have undergone the KYC process.

The clearing and settlement of the token mimics the current two-tier monetary system. Initially, debits and credits are recorded on the payer's and payee's blockchain accounts. Then, a settlement occurs on conventional ledgers, such as those maintained by banks or on the central bank's balance sheet¹⁶.

D Tokenized deposit projects across the world

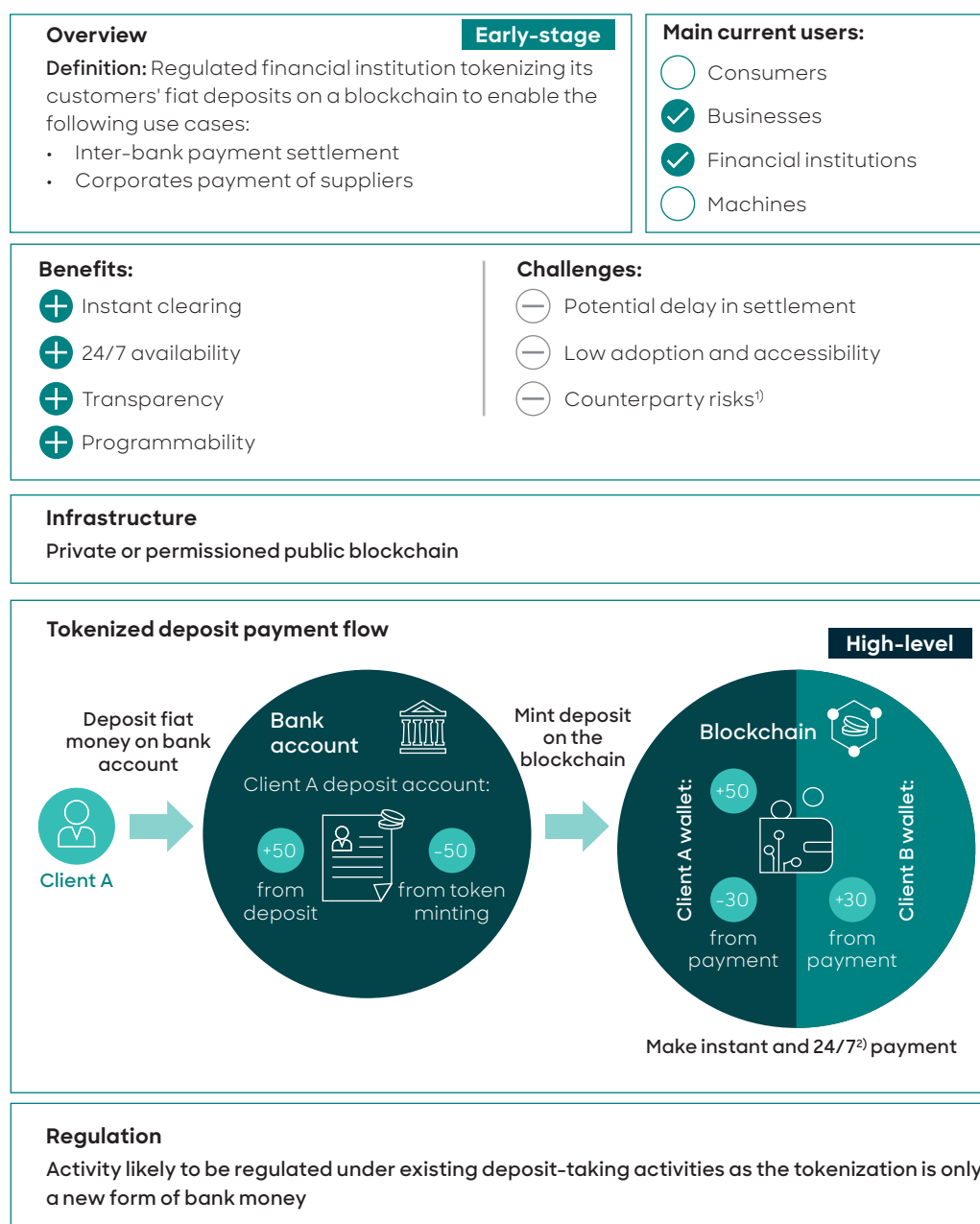


Source: Association of German Banks

17 The consortium setup dilutes the counter party risk, as it can mitigate the failure of one of the members

The underlying nature of the blockchain (public vs. private) and the structure of the issuing entity (single entity vs. consortium) are critical design decisions that have a significant impact on customer value and counterparty risk of the tokenized deposit system. The choice between a public or private blockchain determines the level of transparency, decentralization, and scalability of the system. Meanwhile, the decision to have a single entity or a consortium issuing the tokens affects the governance, counterparty risk¹⁷, and potential network effects of the platform.

E Tokenized deposit overview



1) I.e., in the case of the failure of the bank – Challenge mitigated in the case of a consortium; 2) Settlement on the traditional ledgers (e.g., banks or central bank balance sheet)

xx Current stage of development

Source: Desk research, industry reports, Roland Berger

18 The blockchain trilemma, coined by Vitalik Buterin, suggests that a blockchain must make trade-offs among three key dimensions: Decentralization, security, and scalability, necessitating compromises in one area to accommodate the other two.

19 The blockchain trilemma, coined by Vitalik Buterin, suggests that a blockchain must make trade-offs among three key dimensions: Decentralization, security, and scalability, necessitating compromises in one area to accommodate the other two.

20 Tokenized deposits are expected to fall under the traditional deposit-taking regulatory framework, hence protecting consumers, as stipulated in regulations

Multiple international organizations, financial institutions, and regulators view tokenized deposits as a highly promising application of blockchain technology in the payment space. This view mainly stems from the fact that the tokenized deposit represents a novel form of money in line with the existing deposit-taking regulations and enables the fractional reserve-banking system. Also, the stronger KYC framework it enables offers¹⁸ greater assurance to financial institutions for further development.

As tokenized deposit initiatives continue to evolve from their pilot stages into broader implementations, they are poised to encounter competition from stablecoins and other payment forms.

Stablecoins vs. tokenized deposit: Despite similarities, stablecoins and tokenized deposits have distinct areas of focus

Stablecoins and tokenized deposits operate on different types of blockchains, with stablecoins primarily using public blockchains and tokenized deposits mainly utilizing private blockchains. This fundamental distinction results in various key differences that are well-known within the blockchain community. Private blockchains offer improved scalability and cost-effectiveness, which are distinguishing features of tokenized deposits, whereas public blockchains provide better user accessibility, reach and sovereignty over tokens, which drives stablecoins benefits. Scalability is being improved with scaling solutions such as sidechains and Layer 2 chains, but the notorious blockchain trilemma still applies¹⁹.

In addition to blockchain types, stablecoins and tokenized deposits differ in terms of their issuing entity types and backing mechanisms. Stablecoins are typically issued by private entities and backed by cash and short-term, low risk securities. In contrast, tokenized deposits are issued by regulated financial institutions and backed by deposits, a liability on the issuer's balance sheet. These varying characteristics contribute to different perceived risk profiles, with stablecoins considered riskier than tokenized deposits.

Furthermore, stablecoins and tokenized deposits exhibit different relationships with the traditional financial system. Tokenized deposits are closely intertwined with the financial system: They are exclusively issued by regulated financial institutions, enabling the implementation of fractional reserve systems, and offering consumer protection²⁰. In contrast, stablecoins have historically had fewer ties, but their connections are anticipated to grow as new regulations are introduced and financial institutions become more involved.

Lastly, the bearer instrument nature of stablecoins enables instant settlement, while tokenized deposits require a settlement on traditional ledgers in the background, dampening their value proposition. Conversely, tokenized deposits allow for stronger KYC and AML checks, based on the issuing entity's capacity to control participants and their transactions.

Due to these differences, stablecoins and tokenized deposits are expected to have different areas of applications in the medium term, with some potential overlaps (e.g., cross-border payments for corporates). Stablecoins are expected to primarily be used on a wide range of use cases (e.g., retail payments, remittances), whereas tokenized deposits are expected to primarily be oriented towards banks' traditional activities, such as inter-bank settlements and cross-border corporate payments.

F Stablecoin and tokenized deposit comparison

	Stablecoin backed by fiat assets ¹⁾	Tokenized deposit
Overview		
Issuing entity	Mainly private companies, with recent inroads of financial institutions ²⁾	Regulated financial institutions
Infrastructure	Public blockchains (e.g., Ethereum)	Mainly private blockchains
Assets backing the tokens	Cash and short-term, low risk securities ³⁾	Fiat money on issuer's balance sheet
Type of instrument	Bearer	Non-bearer
Key use cases	• Cross-border remittances and retail payments • Crypto trading and DeFi • Cross border corporate payments • Digital asset native companies' payments	• Inter-bank settlement • Cross-border corporate payments
User's perspective:		
Value stability	 Potential depeg in case of problems/bankruptcy on the issuer or the issuer's bank side	 Backed by regulated financial institutions (single or consortium) assumed less likely to go bankrupt than private companies
Protection in case of failure	 Stablecoins mainly no subject to deposit insurance protection – Some players (e.g., Etherisc) are developing decentralized insurance protocols	 Covered by deposit insurance entities (e.g., Federal Deposit Insurance Corporation in the US, up to USD 250 k/account)
Cost-effectiveness	 Cost of transactions usually ranging between 0.2-0.8% ⁴⁾ , but depends on the blockchain, network congestion, and can be improved by scaling solutions	 Private blockchains usually with lower and more stable fees than public blockchains
Scalability	 Dependent on blockchain and scaling solutions, but blockchain trilemma applies	 Scalability usually higher with private blockchain due to compromise on decentralization
Accessibility	 Simple access via wallet	 Only for institution's clients that have passed the KYC
Adoption	 Current market capitalization at USD ~125 bn (as of September 2023)	 Early stage, with most projects in pilot phase (e.g., USDF consortium)
Revenue generation	 Potential yield generation from lending platforms, DeFi protocols, and liquidity pools	 n.a.
Regulatory clarity	 Heterogeneous depending on countries – EU, Japan, UAE and Singapore have issued their first regulations, and countries such as USA, and UK are discussing them	 Currently in discussion, with no clear view issued by regulators, however likely to fall under the deposit-taking activity framework
Regulators' perspective:		
KYC activities enforcement	 Users can hold stablecoins without doing KYC in some cases	 Strong KYC framework, implemented by regulated financial institutions
Transaction monitoring	 Transparency and immutability of public blockchains, however wallet address's owner potentially unknown	 All entities transacting KYC checked by the platform, and regulating node usually monitoring transactions live
Foster fiat's government financing	 Issuance usually triggering the purchase of government bonds denominated in the fiat currency	 Fiat deposit mainly used for the Financial institution's lending activities
Fractional reserve banking enablement	 Fiat deposited are invested in short-term, low risk securities	 Fiat deposit received can be used for lending activities

1) Stablecoin pegged to a fiat currency and backed by financial assets and cash denominated in this currency; 2) E.g., Paypal's PYSD (deployed), Societe Generale Forge's EURCV (announced); 3) E.g., USDC backed by ~20% cash and ~80% short-term US government bonds; 4) Based on a research paper that analyzed USDT, UDC and DAI

 Best rating
 Lowest rating

Source: "Stablecoins: Survivorship, Transactions Costs and Exchange Microstructure" (January 2022), BIS, USDF, Georgetown University Law Center, Digital Euro Association, Desk Research, Roland Berger

3

Banks, payments players, and corporates will be impacted and need to act now

Various opportunities exist, depending on the stakeholder type

Considering the diverse technological and commercial implications, it is very likely that stablecoins and tokenized bank deposits will be utilized in different ways, contingent upon the party involved. In the following, opportunities are described for the three most relevant parties: (1) Banks, (2) Corporates, (3) Payment companies.

Banks

Banks have a significant role to play in the evolving blockchain-payment landscape. A particularly promising opportunity for banks at present lies in the creation of a consortium-based, tokenized deposit solution. This is especially useful for cross-border corporate payments in rapidly developing regions such as Africa and the Middle East, given the elevated transaction costs in those markets. Banks have a choice to make: They can either join an existing program or initiate their own, a decision often influenced by the ability to generate enough momentum.

A consortium-based tokenized deposit solution could attract significant capital flows due to the efficient, low-cost solution provided across participating banks. It would also benefit corporate payment solutions through the programmability of money, e.g., in supply chain finance, which in turn could enable customer acquisition for banks.

Despite the challenges around shared responsibility for anti-money laundering (AML) and know your customer (KYC) processes, and technological issues like selecting the appropriate blockchain and governance mechanisms, such solutions can align with existing regulatory frameworks and current market infrastructure.

Regarding stablecoins, banks could explore the issuance of a fully backed stablecoin, similarly to Société Générale's SG-Forge. This could provide a new revenue stream through interest-earning assets backing the token and bolstering the bank's brand within the digital asset ecosystem. However, this full-reserve system might limit banks' flexibility for credit expansion, as each token needs to be fully backed by reserves.

Banks could also consider developing niche offerings for the stablecoin ecosystem. This might include providing secure custody solutions for stablecoin holders and issuers, facilitating fiat-to-stablecoin conversions (on-/off-ramp services), and offering advisory services for stablecoin issuers to optimize asset allocation.

Corporates

Corporations also have an important role to play. They need to collaborate with banks to implement the infrastructure to accept tokenized deposits and conceptualize key use cases, such as how programmable money can automate payments within supply chain management.

In addition, corporations might consider building out their infrastructure to accept stablecoins as payment, which could lead to substantial cost savings due to lower transaction fees (depending on their currently accepted payment mix). At the same time, it may broaden customer reach by appealing to foreign customers with limited access to the local currency. However, this also introduces larger AML/KYC risks, requiring strong measures for risk management. Corporations need to carefully analyze whether their customer base

would potentially embrace stablecoin payments. This analysis is essential for making economically sound decisions.

Payment players

Payment companies need to define their place within this new paradigm. One opportunity is to expand the service offerings by introducing analytic services specifically designed for tokenized deposits. This can include specialized AML/KYC services, addressing challenges of financial compliance in the digital assets realm.

Furthermore, payment players can integrate stablecoin payments into their infrastructure (e.g., in the POS terminal) and by that expand the options for merchants and consumers.

Lastly, they might also consider issuing their own stablecoins (for example, a Visa or Mastercard Dollar). However, this strategy could potentially disrupt their existing value proposition and revenue structures, so the benefits and risks must be carefully compared. The recent news of PayPal issuing its own stablecoin on the Ethereum blockchain illustrates that, depending on your market position, extending your current payment rails can offer potential.

Key recommendations going forward

Navigating the ever-evolving landscape of blockchain-based payments, and in particular stablecoins and tokenized deposits, requires strategic foresight and an adaptive mindset. In a nutshell, our three key recommendations are:

1. Understand the technology: Knowledge about the underlying technology is a key requirement for banks, corporates, and payment players. As the space evolves quickly, observing trends and staying informed becomes a key priority.
2. Know the regulatory environment: Stay ahead of current regulations and anticipate possible changes. Market participants need to be proactive in discussions with regulators to address specific needs and concerns.
3. Adjust and expand your business model: Players have to identify opportunities and assess them against their long-term commercial potential, technical feasibility, and regulatory requirements. Once key opportunities are identified, players need to choose the optimal implementation option (e.g., organic, partnership) based on their strategic objectives.

G Potential opportunities for relevant players

	Stablecoins	Tokenized deposits
Banks	• Issue fully backed stablecoin • Provide niche offerings (e.g., custody, analytics, KYC, advisory solutions)	• Build consortium-based tokenized deposits solutions
Corporates	• Build out their infrastructure to use/accept stablecoins	• Collaborate with banks to build tokenized deposits solutions (i.e., bring in need, e.g., regarding programmability)
Payment players	• Issue own stablecoin • Integrate stablecoin acceptance into their solutions (e.g., acquirers in the POS terminal)	• Provide value added services for banks and corporates regarding tokenized deposits (e.g., analytics solutions)

Source: Roland Berger

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