Treasury and Trade Solutions

citi

Digital Policy, Strategy and Advisory

The Regulated Internet of Value

Executive Summary

If the **'tokenization thesis'** is to be believed, then Distributed Ledger Technology (DLT) is a superior mechanism to represent and transact digital value. DLT may provide 'always on', resilient, global, programmable, multi-asset financial networks.

Assume for a moment that tokens triumph over accounts, then what types of tokens are desirable forms of money? Based upon current news flow, we might think that the future of money is a digital choice between 'stablecoins' and Central Bank Digital Currencies (CBDCs).

There may be a third way: the tokenization of all **'regulated liabilities'**. Regulated liabilities include central bank money, commercial bank money and Electronic Money. Bitcoin, for example, is not a regulated liability because it is neither regulated nor a liability. Stablecoins occupy a grey zone but may become regulated liabilities in due course.

A network that tokenizes regulated liabilities on the same chain may deliver a next generation digital money format without the downsides of more narrowly drawn proposals. Safe digital money needs to be: (a). regulated, (b). redeemable at par value on demand, (c). denominated in national currency units and, (d). an unambiguous legal claim on the regulated issuer.

As DLT has the potential to represent multiple forms of digital value, we might go further and envision the creation of networks that tokenize **regulated liabilities and regulated assets** on the same chain. Such a network would be significantly different from today's siloed financial architecture – **a regulated internet of value.** This system would embody tokenized currencies, bonds, equities, trade instruments and other regulated financial instruments in an 'always on', programmable and global network.

While the creation of such networks may seem a pipe dream, the 20th Century witnessed the creation of highly successful regulated, global, account-based networks, such as global card schemes. If the tokenization thesis holds true, then the 21st Century may see the creation of **regulated, global, token-based, multi-asset networks.** It would be undesirable for the functionality of unregulated multi-asset networks to pull too far ahead of regulated financial infrastructures. Financial transactions may migrate to the more capable platforms, even if they fall outside of the regulatory perimeter.

The Digital Money Format War

The battle between physical and digital money has entered the endgame. We are in the early stages of a contest between different forms of digital money. The digital money format war has begun.

Understanding the digital money contenders is easier if we adopt a 'back to basics' method of classification. We focus on the following simple distinguishing features:

Central Bank Money

Central bank money is a liability of the central bank. It exists in two forms:

- Reserves – held by commercial banks
- Cash in circulation

Central bank liabilities do not currently exist in digital format for widespread domestic or international usage

Dozens of central banks are in the CBDC exploration stage.

Commercial Bank Money

Commercial bank money is a liability of a commercial bank in favor of the depositor. It is stored in accounts and is the dominant form of digital money.

Commercial bank money is not generally available in tokenized format for retail or wholesale usage.

JP Morgan, DBS and Temasek have announced a multi-bank tokenization of commercial bank money.

Electronic Money

Electronic money (or Stored Value) is a liability of a regulated non-bank payment company. It is redeemable on demand at par value.

E-money operators have brought hundreds of millions of consumers/ businesses into digital payments.

Regulators are considering whether stablecoins are a new form of E-money or an entirely different class of instrument.

- **Nature of the liability:** Central bank money, commercial bank money and Electronic money are all **'regulated liabilities'** that live on the balance sheet of the relevant institution. Bitcoin, for example, is not a liability as there is no central issuer or intermediary. At present stableconis are in a grey zone – it is not always clear what legal claim the stablecoin holder might have on the issuer, or the stablecoin reserve. There is often no contractual or KYC relationship between the issuer and the end user.

- **Regulatory framework:** The first three categories above are legal instruments established in law. The regulatory framework for public cryptocurrencies and stablecoins is under construction. There is a risk of regulatory arbitrage. For example, stablecoin issuers offer interest while E-money issuers are prohibited from doing so.

- **Technological representation:** From the understanding that some forms of money are liabilities we can see why accounts are used to represent them. Accounts are artefacts of double-entry bookkeeping used to record the liabilities of institutions. Bitcoin does not need accounts because it is not a liability or a promise to pay. Stablecoins may or may not be contractual liabilities of the issuer, but none of them are represented as accounts.

It is important to understand that the legal nature of an instrument is independent from its technological representation. For example, E-money might be currently represented on accounts but there is no reason why it could not be represented in tokenized form. In moving E-money from a traditional database to a DLT the legal instrument does not change.

Public Cryptocurrencies

The original bitcoin and hundreds of derivative instruments are not liabilities – they are intangible assets traded with exchanges and peer to peer.

Public cryptocurrencies have not become 'money' due to volatility.

There are financial crime risks associated with their nature as bearer instruments. They do not yet comply with FATF 'travel rules'.

Stablecoins

Stablecoins seek to deliver the benefits of tokenization while removing volatility. They may or may not be liabilities of an institution. The institution may or may not be regulated. There is uncertainty whether they are redeemable on demand at par value.

Stablecoins in national currency units are growing fast and may cross the rubicon to become a new rail for digital payments traffic.

If the tokenization thesis holds true, then the 21st Century may see the creation of regulated, global, token-based, multi-asset networks.

The digital money format war will be fought along these dimensions — between liability and non-liability formats, between regulated and quasi-regulated instruments... and between tokens and accounts. What is so special about tokens?

The Tokenization Thesis

The news flow around digital money and blockchain can be hard to parse. The spectrum of opinion ranges from those who compare bitcoin to tulip-mania to die-hard crypto-maximalists who believe in a world without central banks or financial intermediaries.

If we look through the debate we find a simple, testable hypothesis: it is the assertion that tokens are a superior representation technology for digital value. The purported benefits of tokenization include:

- **Operating hours:** DLTs are 'always on' but account-based banking systems are not
- **Shared gold copy:** Single sources of truth replace siloed ledgers across firms
- **Programmability:** 'Smart contracts' deliver new forms of automation
- **Atomic settlement:** Token exchange represents instant settlement, reducing counterparty risks
- **Multi-asset:** Any arbitrary asset might be 'tokenized' on a DLT: a derivative, a crypto-kitty, or a derivative on a crypto-kitty

Is the tokenization thesis true? While the DLT killer-app is yet to emerge, the wave of enthusiasm, interest and capital attracted to the technology is undeniable. As a thought experiment we can imagine a world in which tokens either find their niche or come to dominate. What kinds of tokens do we want to inhabit this world: regulated or unregulated? Liabilities or non-liabilities?

The Nature of Regulated Liabilities

Most people don't think about money as a liability but that is the nature of our medium of exchange, store of value and unit of account. Money is most commonly a liability of a regulated financial institution, i.e. 'commercial bank money'. However, there is a broader class of 'regulated liabilities' that represent the official side of the financial system. Regulated liabilities include central bank money, commercial bank money and E-money. They share the following desirable traits, but they don't yet exist in tokenized form.

- Regulated liabilities are denominated in national currency units and proceed from the sovereign right of nation states to decide what counts as money within their territories
- The end user has an unambiguous claim on a regulated institution, enforceable through the legal system
- The claim is redeemable at par value on demand in national currency units
- Institutions are regulated to ensure that they are able to meet those claims, e.g. capital rules for banks and collateral rules for E-money institutions
- The liabilities are fungible between regulated institutions, i.e. a dollar is a dollar irrespective of the regulated institution holding the liability

- Regulated liabilities are in favour of verified legal persons, they are not bearer instruments. This feature helps to combat financial crime

- Regulated liabilities are on one side of the balance sheet of institutions – on the other side of the balance sheet are assets deployed in an economy to stimulate economic growth

In the context of the looming digital money format war it is worth noting that regulated liabilities are **only available through account-based representations.** Tokenized regulated liabilities are yet to be developed for mass market usage. If the tokenization thesis is true then it may become necessary for the regulated sector to adopt the superior form factor.

Tokenizing Regulated Liabilities

The regulated sector is yet to organise around the vision of a network of tokenized regulated liabilities. Efforts are fragmented:

- **Central banks:** current efforts are focused around broader societal access to central bank liabilities in either token or account-based formats, i.e. Central Bank Digital Currencies (CBDC)

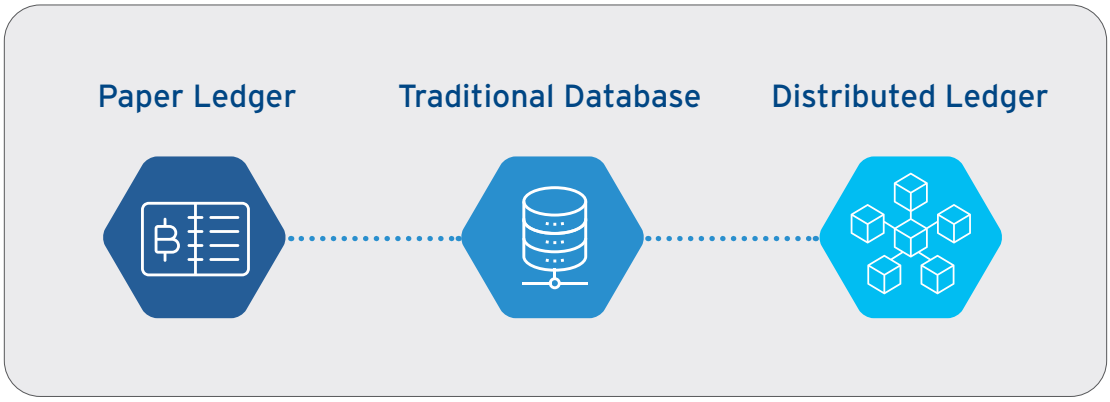
- **Commercial banks:** there has been limited experimentation by banks to tokenize commercial bank money on a single-bank or multi-bank basis

- **E-money institutions:** the regulated non-bank sector seems drawn more to the potential of 'stablecoins' which currently operate in a regulatory grey zone

It may be possible for central banks and regulators to create a new direction for the regulated sector through a slight pivot in existing CBDC projects and the nascent tokenization of commercial bank money. They may adopt a broader view of the task at hand – not the tokenization of central bank liabilities, but **the tokenization of all regulated liabilities on a common platform.** What might this broader vision look like?

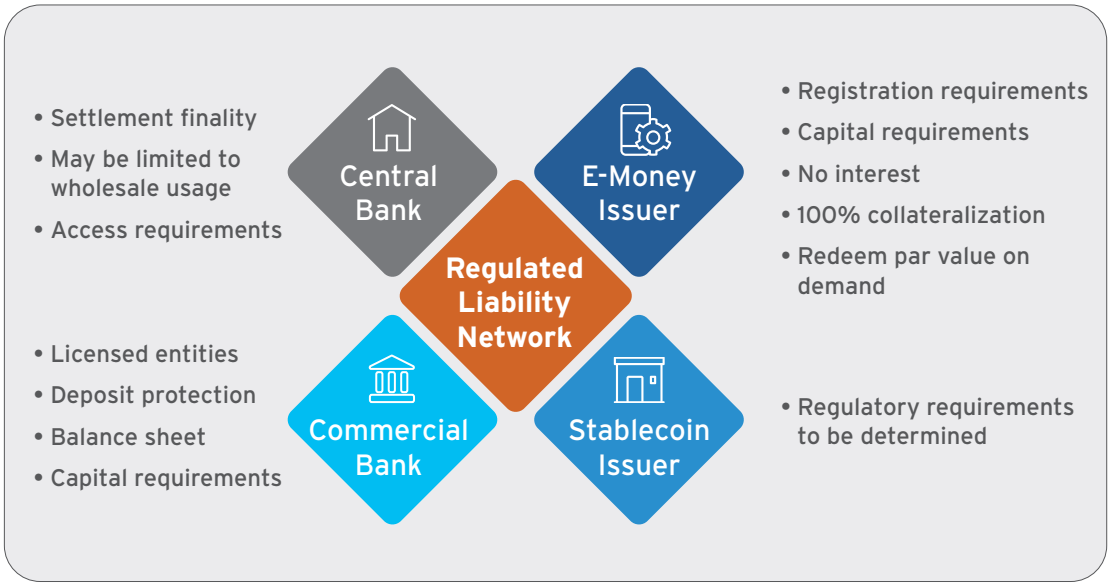
A Network of Regulated Liabilities

A DLT network can represent the liabilities of different institutions without changing the underlying legal instruments. The independence of legal instruments and technological representation can be understood in the following way. In pre-digital days, liabilities were stored in paper ledgers. When record keeping moved to databases the legal instrument did not change. Nor is there a need for legal instruments change if regulated liabilities are transitioned to a DLT platform.



What will change is that the books and records that were previously held at the level of an individual firm will now be held across a network of regulated institutions. This will deliver the significant benefits suggested by the tokenization thesis: 'always on', programmable and instant settlement. There is an additional tantalizing possibility of a broader vision, one that will be revealed at the end of this article.

A 'Regulated Liability Network' would store the liabilities of multiple types of institution as shown in the diagram.



The network would operate on the following principle:

• A token in a central bank wallet is a liability of the central bank

• A token in a commercial bank wallet is a liability of the commercial bank

• A token in an E-money wallet is a liability of the E-money issuer

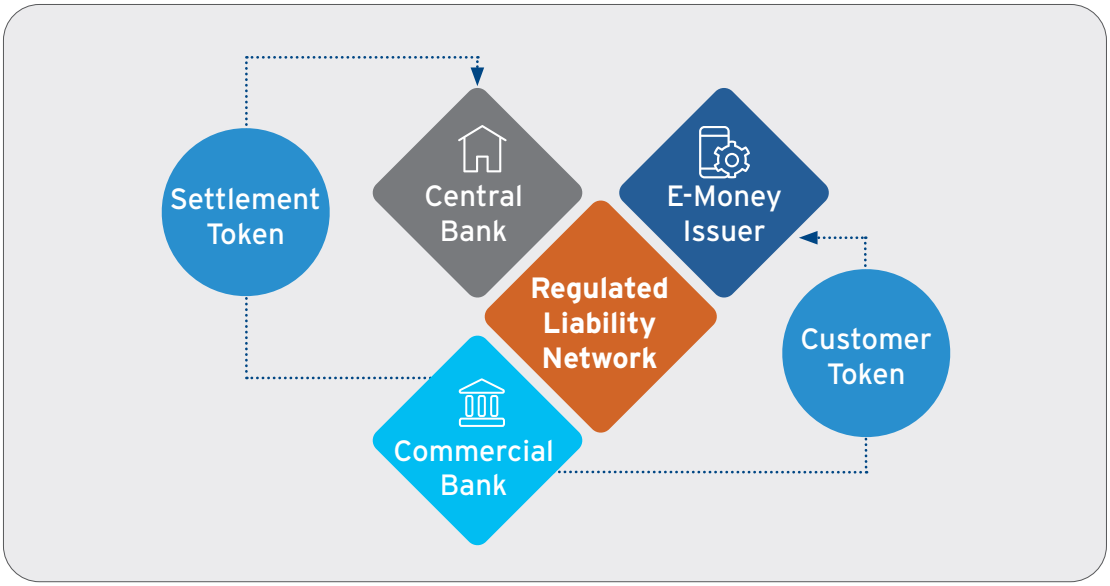
The legal meaning of the token is given by its location of the wallet in which it resides. When a token is at rest in a wallet controlled by an institution, then it is on the balance sheet of that institution as a liability in favour of the token holder.

At this point it is worth noting a significant divergence with existing stablecoin designs. Stablecoins are 'backed' by centralised reserves held by the issuer. The network of regulated liabilities is not backed by a centralised reserve but by the balance sheets of the individual institutions. The end user has the same claim on their regulated institution that they have today through account-based record keeping.

Can stablecoins participate in the network of regulated liabilities? Yes, once they become regulated liabilities. This means a well-developed regulatory framework for licensing stablecoin issuers, redeemability at par value on demand in national currency units and an unambiguous claim on the issuer, among other requirements. No instrument deserves special treatment as a result of the digital technology used to represent it.

Payments on the Regulated Liability Network

In the world of public crypto-currencies the transfer of the token is the final transfer of value. Bitcoin, for example, achieves this as a digital bearer instrument. Payments on the Regulated Liability Network are not conducted through bearer instruments, but the transfer of a liability from one institution to another. Clearly, the receiving institution will only accept the new liability if they receive a corresponding asset, so the transfer works in the following way:

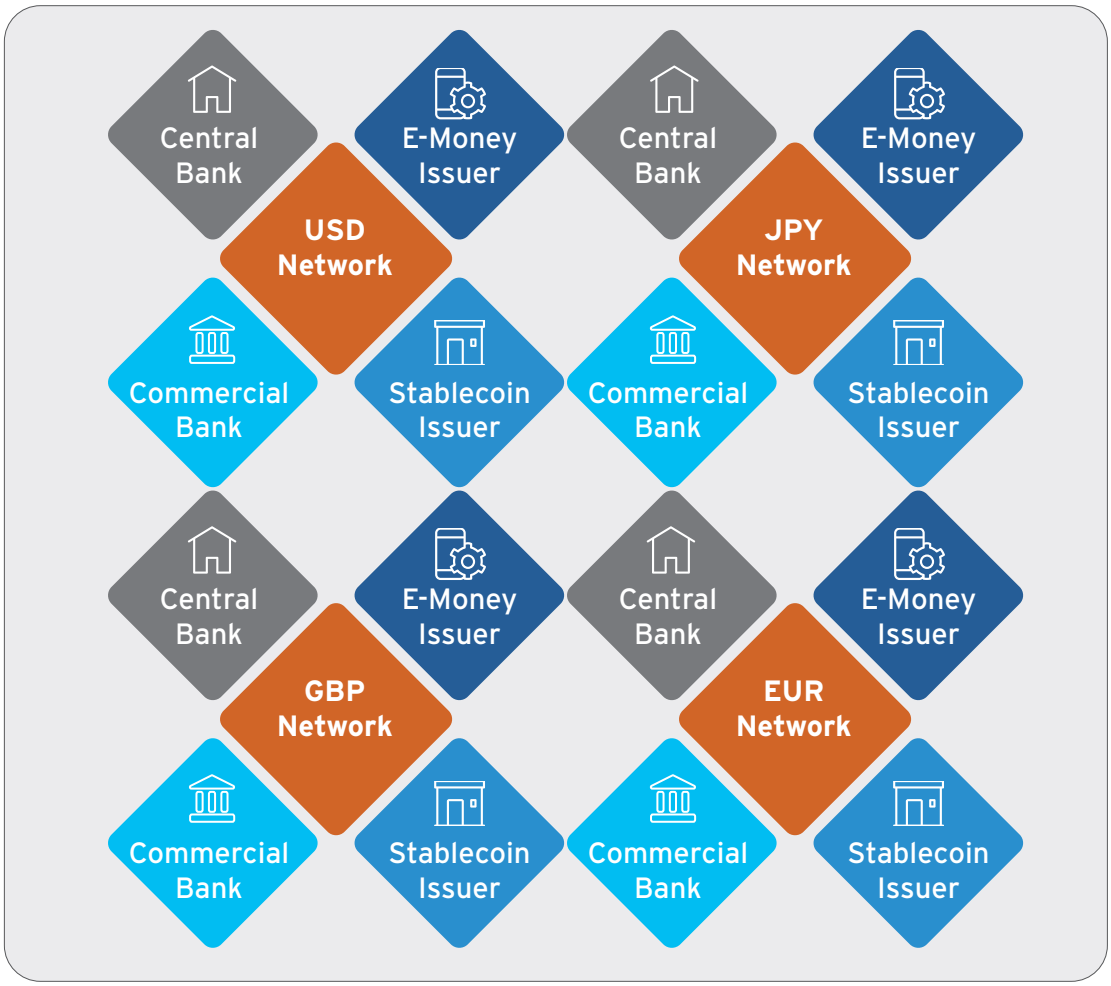


In this example a wallet holder in a commercial bank wishes to make a payment to a wallet holder in an E-money institution. A token is passed from the commercial bank to the E-money institution and becomes their liability in favour of their customer. A matching token is passed across wallets held by the commercial bank and E-money institution at the central bank. The commercial bank 'settles' with the E-money institution in tokenized central bank liabilities. In effect, we have a 'wholesale' CBDC supporting the transfer of tokenized private liabilities on the same DLT. This achieves the benefits of tokenization without forcing everyone to transact in central bank liabilities. This is a true 'two-tier' design unlike CBDC proposals that bypass private balance sheets.

The fact that transfers on the Regulated Liability Network are not conducted with bearer instruments is an intentional design feature of the scheme, not a bug. Bearer instruments present financial crime risk. Regulated liabilities are always in favour of verified legal persons to reduce this risk.

Global Regulated Liabilities

Tomorrow's money needs to be global, so we may envision a constellation of interoperable Regulated Liability Networks each founded on national currencies and supervised by local regulators.



Interoperability may be achieved in a number of ways, including through the agency of institutions that participate in multiple currency networks acting as a bridge between them and providing foreign exchange services.

Pivot 1: Beyond CBDC

If tokens are a superior technology for storing and transferring digital value – if the 'tokenization thesis' is true – then the regulated sector may wish to pursue the tokenization project in a coherent way. Current efforts are fragmented and may not deliver a next generation monetary system. If the regulated sector lags the functionality of the unregulated sector then transactional activity may migrate in the wrong direction.

Current CBDC projects may be pivoted to encompass an expanded scope: **the tokenization of all regulated liabilities.** This may help CBDC projects overcome a potential downside, which is the disintermediation of private regulated entities. A broader focus on regulated liabilities brings the benefits of tokenization without the adverse consequences. It upgrades regulated money, which today only exists in account-based format. The regulated sector must consider the consequences of a potential paradigm shift to tokens.

If the regulated sector wishes to compete in a digital money format war between tokens and accounts, then it should seek to tokenize its existing instruments: central bank money, commercial bank money and E-money. DLT has the potential to express these liabilities on the same shared ledger, making money 'always on', instant and programmable. This vision must be global in scope because public blockchains are global in scope.

The Regulated Liability Network may present a route by which stablecoins can be incorporated into the formal financial system by bringing them within the regulatory perimeter as **regulated liabilities**.

The vision of a global network of regulated liabilities may seem like an impossibly ambitious dream, but the 20th Century witnessed the creation of regulated, global, account-based infrastructures. If the tokenization thesis is true, then it may be reasonable to expect the emergence of token-based equivalents. Indeed, this may be a necessity to counter further development of unregulated, global, token-based payment systems.

Pivot 2: The Regulated Internet of Value

Ambitious as it may seem, a network of regulated liabilities is not the end state. The reason that central bank money, commercial bank money and E-money can all be represented on the same network is down to the inherent 'multi-asset' nature of DLT.

It is possible to envision networks of tokenized regulated liabilities and regulated assets on the same chains.

'Tokenization' is another word for 'representation' and DLTs can represent an infinitude of instruments through 'colored coins' that stand in for bonds, equities, trade instruments or any other regulated asset. The tantalizing possibility is for all of these instruments to co-exist on the same 'always on', programmable, global networks. The benefits of programmability and instant settlement are greatest when all of the assets are on the same chains.

Hence there is the potential for the official sector to make not one but two meaningful pivots:

- **Expand the scope of CBDC work to encompass all regulated liabilities and bring stablecoins into the fold**
- **Develop a broader vision around the tokenization of regulated liabilities and assets on the same chains**

Developments in public blockchains point in the direction of 'always on', programmable, global, multi-asset infrastructures. Much of the activity taking place on these networks is on the edges of the regulatory perimeter.

If the regulated sector pursues tokenization in a fragmented manner then unregulated networks may gain in relative significance. There is the potential and perhaps the imperative for the official sector to come together around a common vision of the regulated internet of value. ■

This article is brought to you by Citi's Digital Policy, Strategy and Advisory practice where we draw on Citi's global institutional experience, our content and intellectual capital and our wide range of banking solutions to enable clients and other constituencies to use digitization to create value, achieve sustainable growth and productivity, and mitigate the risk of disruption.

Tony McLaughlin

Emerging Payments and Business Development, Treasury and Trade Solutions

TONY MCLAUGHLIN **BIO**

Tony McLaughlin is responsible for Emerging Payments and Business Development in Citi's Treasury and Trade Solutions (TTS) business. Tony works on Citi's '*Future of Money*' strategy, is responsible for the TTS E-commerce proposition and is deeply involved in new methods of payment, Distributed Ledger and Fintech engagements. He provides advice on the future of payments to Governments, Regulators, Fintechs, Big Techs, Corporates and Financial Institutions.

The vision of a global network of regulated liabilities may seem like an impossibly ambitious dream, but the 20th Century witnessed the creation of regulated, global account-based infrastructures. If the tokenization thesis is true, then it may be reasonable to expect the emergence of token-based equivalents.

Treasury and Trade Solutions
citi.com/treasuryandtradesolutions

2031240 06/21