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A Physical Store of Value for Digital Money as an Integral Stabilizing Part of the Digital Payment Network

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Abstract

Today, there is nothing more important for any central bank digital payment network (central bank digital currencies, tokenized deposits, stablecoins, etc.) than ensuring the quantum stability of encryption algorithms and the creation of an infinitely autonomous payment instrument — a physical store of value for the digital money of this payment network.

While efforts to develop post-quantum cryptography (PQC) are already inspiring cautious optimism, unfortunately, central banks are not yet even considering creating a physical store of value for their own digital currency.

Instead of creating a physical store of value that can address the physical challenges of implementing digital CBDCs, central banks are attempting to negate these challenges through overly restrictive cash policies.

Even more shocking is that central banks are willing not only to discredit the image of their future digital currencies, but also to significantly reduce their future potential by initially introducing draconian restrictions on their use, such as banning interest accrual or limiting the size of CBDC accounts – thereby seriously undermining public confidence in the new digital generation of central bank money.

The problem of instant liquidity outflow can be solved without daunting restrictions by introducing a "braking" mechanism for withdrawing funds from deposits exclusively through CBDC Cash. Cryptobanknotes will significantly slow down the outflow process itself, thanks to their inherent inertia.

Similarly, the inertia of trading operations carried out simultaneously by a large number of users of cryptobanknotes significantly affects the volatility of cryptocurrencies/stablecoins, as it reduces the likelihood of simultaneous sale/purchase of significant volumes of digital currency.

And if digital currencies achieve such a significant stabilizing effect simply due to the inherent inertia of cryptobanknotes, then what a fantastic impact will the many innovative features emerging from the symbiosis of CBDC Cash and digital CBDC have on digital currency and the financial system as a whole?

Introduction

Currently, the central bank's new digital currency is being marketed to the country's population as imaginary "digital banknotes", thereby intentionally or accidentally misleading the public into believing that "digital banknotes" will actually be a viable and infinitely autonomous replacement for physical banknotes.

In turn, CBDC developers are conceptually replacing the notion that the pseudo-autonomous payment solutions they are

actively developing, based on plastic cards, payment terminals, smartphones, hardware wallets, or gadgets, are infinitely autonomous payment instruments. In reality, if, during a prolonged power outage, the banking network is completely de-energized and the batteries of smartphones, payment terminals, and gadgets are drained, these pseudoautonomous payment solutions will cease to function entirely.

If payment terminals and essential banking infrastructure are unavailable or destroyed, and smartphone batteries are dead, the country's population will not only be unable to make payments in the CBDC digital payment network using pseudo-autonomous payment solutions, but also will not be able to carry out mutual settlements among themselves. This will undoubtedly lead to financial chaos during the war.

The Inability to Use a Hardware Wallet as a Physical Means of Storing Digital Money

A classic hardware wallet is a device whose architecture and functionality are designed from the ground up to protect private keys.

Hardware wallets are created as physical devices in various form factors that interact with the digital payment network via a USB connection or via Bluetooth/WiFi/NFC.

The CBDC offline payment device is also a hardware wallet, designed in the form factor of a plastic card with contactless payment functionality, which is used for the offline storage of a variable amount of digital CBDC, which is a unique feature of this hardware wallet.

Thanks to its built-in software, a hardware wallet interacts with the digital payment network via a bank payment terminal or smartphone. If the payment terminal or smartphone is physically missing, broken, or its battery is completely discharged, it will be impossible to make a payment or verify the availability of digital money in the e-wallet. Therefore, using a hardware wallet as a physical means of storing digital funds is a priori impossible.

Problems of Implementing Digital CBDC

In developing countries, the second most significant challenge to the implementation of a central bank digital currency (after a lack of trust in the central bank with hyperinflation of the national currency) is a combination of factors that objectively demonstrate a lack of technical capabilities, economic and psychological problems, as well as the lack of necessary tools for the implementation and operation of digital CBDC:

- Problems of electrification, not only of remote settlements, but also of large cities;
- Insufficient Internet coverage of the country;
- Unstable mobile communications;
- Insufficiently developed banking network;
- The majority of the population does not have bank accounts and lacks access to banking services;
- The prevailing share of cash payments, leading to the population becoming dependent on cash;
- The low standard of living of the majority of the population, which does not allow for the ownership of a smartphone or electronic gadget for making digital payments;
- Insufficient financial literacy of the population, etc.

Undoubtedly, the combination of all these factors will lead to a reflexive disregard for digital CBDC in these countries. Moreover, active physical resistance from the population could spontaneously arise if, under these circumstances, the central bank attempts to introduce further restrictive measures against cash, which is the basis of people's financial relationships:

- Forced reduction of the amount of cash in circulation;
- Reducing cash withdrawal limits from ATMs;
- Reduction in the possibility of making cash payments, etc.

The only acceptable solution in the current situation is to ease the central bank's cash policy and, of course, issue CBDC Cash (Cryptobanknotes).

CBDC Cash (Cryptobanknotes)

Cryptobanknotes are traditional banknotes transformed using blockchain technology into a "paper wallet", protected by banknote printing technology and requiring no additional verification of the digital currency's presence. This modernization transforms cryptobanknotes into an infinitely autonomous physical store of value for digital money, offering unrivaled reliability and security. CBDC Cash is the emission of modernized central bank cash in all denominations. Payments using CBDC Cash do not require electricity, mobile communications, or internet access, nor do they require any additional equipment such as smartphones, payment terminals or gadgets.

It's a simple, affordable, and scalable solution that's accessible and familiar to everyone on earth: any age, any nationality, any religion, any level of education, any income, and any attitude toward digital financial innovation.

CBDC Cash is not only the only possible physical store of value for digital CBDC, but also an ideal tool for stimulating the

adoption and popularization of CBDCs not only in developing countries but also worldwide.

Cryptobanknotes. Assistance with the Transition to Digital CBDC

Cryptobanknotes will provide significant assistance to the population and the central bank during the transition to digital CBDC:

- Cryptobanknotes combine the concepts of physical and digital money, which will lead to greater public awareness and comfort with digital payments, thereby ensuring psychological compatibility and adaptation between centuries-old traditional banknotes and innovative digital financial technologies.
- People are accustomed to cash, and many prefer using it over existing electronic payment methods. Cryptobanknotes will leverage the popularity of cash to popularize the digital payment network.
- Cryptobanknotes will make the digital payment network accessible to all segments of the population who do not trust or are physically unable to use innovative digital financial technologies due to:
    a. very young or old;
    b. religion that does not allow the use of new technologies;
    c. education insufficient for involvement in digital technologies;
    d. technophobia - an outright fear of new technologies;
    e. low income, insufficient to purchase one's own smartphone or gadget necessary for using digital money, etc.
- Cryptobanknotes will expand the geographic reach of digital CBDC by reaching areas unserved by the banking network, where the necessary banking equipment, electricity, communications, and internet are lacking, and will significantly increase the number of new users of the digital payment network.
- Cryptobanknotes will allow people to continue to use a physical object (a store of value of digital CBDC) as a security measure during times of economic instability.

Cryptobanknotes. Reducing the Volatility of Decentralized Digital Currencies

Volatility characterizes the variability of the value of decentralized digital money on the financial market over a certain period of time.

Panicked actions by inexperienced users who try to "jump off the train" (i.e., sell their entire cryptocurrency) when the cryptocurrency price falls further aggravate the situation.

Similarly, when the price of cryptocurrency rises, the desire to "jump on the bandwagon" drives the already high price of cryptocurrency to astronomical heights.

Volatility is the main problem for any decentralized cryptocurrency, even stablecoins. A large volume of cryptobanknotes in circulation will significantly reduce the volatility of decentralized digital currencies. This is due to the increasing inertia of trading transactions conducted simultaneously by a large number of cryptobanknotes users, which significantly reduces the likelihood of simultaneous purchases or sales of a significant amount of cryptocurrency/stablecoins. This, in turn, will lead to a decrease in the change in the cryptocurrency/stablecoins exchange rate curve.

A sufficiently large supply of cryptobanknotes for any decentralized digital currency, distributed among tens of millions of users worldwide, will significantly strengthen these digital currencies and make them more attractive to investors.

Cryptobanknotes. Negating the Liquidity Drain of Digital CBDC

In an attempt to prevent a potential massive outflow of funds from deposits to CBDC accounts in the event of a banking panic, central banks are introducing restrictions that discredit their own digital currencies: limits on the size of CBDC accounts, bans on interest accrual, etc.

At the same time, central banks fail to consider that account size limits can easily be circumvented through the use of "front men", and that, in the event of increased demand for digital CBDC, such restrictions will lead to the emergence of a parallel exchange rate that will disrupt the 1:1 exchange parity for central bank money.

The emergence of a physical store of value for digital CBDC:

- On the One Hand, it will not only impart significant physical inertia to any mass outflows of CBDC funds in the event of a banking panic (provided that the withdrawal of funds from citizens' deposits will only be possible using CBDC Cash), but will also reduce the possible volume of each such operation, since it will divide all CBDC savings among the population into two parts: digital and physical;
- On the Other Hand, it will provide each citizen with individual physical financial protection from any crisis, commensurate with his personal income.

The introduction of CBDC Cash as a physical store of value will not only eliminate the need for CBDC account limits and fees for converting CBDC into fiat currencies, but will also enable interest to be earned on CBDC accounts. These are key factors that will facilitate the influx of funds from the public and the demand for the CBDC payment network itself.

Cryptobanknotes. Automatic Regulation of the National Currency's Inflation/Deflation Rate

In the future, after the transition to the use of the "Digital CBDC + CBDC Cash" tandem [1] and the complete withdrawal from circulation of the outdated "Non-cash + banknotes" tandem, the central bank will be able to exercise full control and automatic regulation of the inflation/deflation rate of the national currency in real time [2].

The blockchain-based monetary system will monitor the exchange rate of the national currency in real time against leading reserve currencies and, using smart contracts, maintain this exchange rate within a predetermined range.

To achieve this, if the national currency's value declines (inflationary processes begin), the required number of digital CBDC will be automatically burned. If the national currency's value rises (deflationary processes begin), the exchange rate will be balanced by automatically minting the required number of digital CBDC.

In addition to smart contracts directly increasing/decreasing the money supply, the central bank will be able to program any other necessary measures aimed at regulating the level of deflation/inflation of the national currency as smart contracts. For example, regulating interest rates, with the possibility of violating the lower zero bound.

It's important to understand that, in addition to smart contracts designed to automatically maintain a predetermined deflation/inflation rate for the national currency, the central bank will have a multitude of other programmable settings at its disposal. A wide range of digital instruments will not only open up incredible innovative possibilities for central bank money but also allow for automatic and flexible adjustment of global parameters of monetary system in real time.

Conclusion

Of course, cryptobanknotes cannot and should not compete with convenient banking apps and plastic cards in the electronic payment space.

The primary goal of cryptobanknotes is to stabilize the digital payment network and ensure its indefinite operation for cash payments anywhere and anytime, regardless of conditions and circumstances. Even in the event of a fatal failure or physical destruction of the central bank's digital payment network servers, cryptobanknotes will remain available for cash payments by the public indefinitely.

The issuance of CBDC Cash as a physical store of value will put an end to the discrediting of their own digital currencies by central banks, facilitate the implementation of digital CBDCs, significantly strengthen the digital currency itself, and, in the event of any crisis and/or banking panic, provide real financial protection not only for each citizen, but for the entire banking system as a whole.

All this makes CBDC Cash an integral stabilizing part of the central bank's digital payment network.

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