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Abstract

Central bank digital currency is non-physical money or the digital equivalent of physical money issued by a central bank. Nigeria is the first African country to issue a central bank digital currency, popularly known as the eNaira. This paper highlights the redesign features which the eNaira should possess for it to become very effective in offering payment solution and for macroeconomic stability. The eNaira should have an interest-bearing status, have enhanced security features and should offer zero transaction cost on eNaira transactions.

Keywords: eNaira, central bank digital currency, Nigeria, interest-bearing CBDC, cryptocurrency, blockchain, payment system.

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1. Introduction

The objective of this paper is to highlight the redesign features which the Nigeria CBDC 'eNaira' should possess for it to become very effective in offering payment solution and for macroeconomic stability.

A central bank digital currency is non-physical money or the digital equivalent of physical money issued by a central bank (Ozili, 2022a; Engert and Fung, 2017). Existing research show that some central banks have begun to conduct research on the potential benefits of issuing a central bank digital currency, even though most central banks may not receive full political support to undertake a CBDC project (Ozili, 2022b).

In Nigeria, the Central Bank received full political support to undertake the CBDC project. The Central Bank of Nigeria received presidential approval to undertake the CBDC project. The eNaira CBDC was launched on the 25th of October 2021. As at the date of launching, the eNaira possessed the following design features: (i) the eNaira is account-based – it is not token-based; (ii) eNaira money is held in a speed wallet which is similar to money held in mobile banking applications, (iii) the eNaira performs the same function as cash, and (iv) the eNaira has a non-interest-bearing status which means eNaira holdings do not bear interest for the holder (Ozili, 2022a).

The Central Bank of Nigeria subsequently announced that the eNaira is an innovation that will, from time to time, undergo continuous improvement when the need arises. Given the opportunity for continuous improvement in the design of the eNaira, this paper identifies some redesign features which the eNaira should possess in addition to its existing design features.

Generally, the need for CBDC redesign arises when the current CBDC design features fail to achieve the CBDC design objective or when the current CBDC design needs to be enhanced with additional features. The eNaira CBDC needs to be redesigned to enhance its capabilities or to expand its usefulness in addition to its legacy function as a payment alternative. This paper offers some suggestions on how to redesign the eNaira to expand its usefulness.

The study adds to the innovation literature that explore how product redesign can enhance the usefulness of products to users. The study also adds to the literature that explore how different forms of money affects monetary stability in the economy. This study adds to this literature by suggesting ways in which the eNaira may be redesigned to improve its function as money and as a monetary policy tool. Finally, this study adds to the growing CBDC literature. It contributes to this literature by focusing on CBDC redesign issues. To date, few studies have examined CBDC redesign issues. The present study adds to the CBDC literature by exploring eNaira redesign issues in Nigeria.

The subsequent sections of this paper is structured as follows. A review of related literature is reported in section 2. The current design features of the eNaira are highlighted in section 3. Section 4 offers some redesign suggestions for the eNaira. Section 5 presents the conclusion of the paper.

2. Literature review

There is a growing literature on CBDC. Bjerg (2017) argues that CBDC can only pursue two out of the following three policy objectives simultaneously, namely: (i) free convertibility between CBDC and bank money, (ii) parity between CBDC and bank money, and (iii) central bank monetary sovereignty. Lee et al (2021) show that there may be a need to modify central bank digital currency whenever international dynamics change the central bank digital currency landscape. Maniff (2020) argues that a central bank digital currency complements cash and will not replace cash. Garratt, Yu and Zhu (2022) show that CBDC can offer payment convenience and it interacts with the monetary benefits of interest payments. They also argue that increasing CBDC convenience value can strengthen the transmission of monetary policy. Khiaonarong and Humphrey (2022) show that the reduction in the use of cash in some countries may increase the use of digital money alternatives and encourage people to embrace CBDC. Also, younger adults prefer to use cash substitutes for payment while older adults prefer to use cash for payments. Söilen and Benhayoun (2021) show that the adoption of CBDC by households is driven partly by referrals from peers. Kshetri and Loukoianova (2022) suggest that data privacy issues may arise from the adoption of CBDC because the authorities can access CBDC transactional data and may abuse such power. They point out that user privacy rights and how government use CBDC transactional data will be a key issue in countries issuing a CBDC. Rizk (2022) states that there may be legal challenges in issuing a CBDC especially when central banks are not authorized by law to issue CBDC.

Chu et al (2022) considered the possibility of issuing a CBDC that has offline payment features. They argued that offline payment functions that extend the accessibility of central bank digital currency are becoming attractive. However, they pointed out that a central bank digital currency that has offline payment features is vulnerable to malicious behaviors in offline situations, such as blackouts and system shutdowns. Burlon et al (2022) tried to estimate the optimal quantity of CBDC that is needed in a bank-based European economy using a quantitative DSGE model. Their model showed that the welfare-maximizing amount of CBDC that should be in circulation in the Euro Area lies between 15% and 45% of quarterly real GDP in equilibrium. Ahnert et al (2022) identify the problems with the existing financial intermediation process, and make a case for adopting CBDC. They argued that (i) cash preserves anonymity but cannot be used for efficient online transactions, (ii) bank deposits can be used online but do not preserve anonymity, (iii) payment tokens issued by digital platforms allow merchants to hide from banks but enable platforms to stifle competition. They then recommend that a CBDC that allows agents to share their payment data with selected parties can overcome all frictions and achieve efficient intermediation.

Whited et al (2022) studied how a central bank digital currency might affect the banking system. They show that a CBDC can replace a significant fraction of bank deposits especially when it pays interest. They also show that CBDC has a smaller impact on bank lending because banks can replace a large fraction of any lost deposits with wholesale funding. Ozili (2022c) suggests that central banks should explore how the design features of CBDC can support economic goals including circular economy goals. Summers (2022) argued that the proposed USD CBDC design is centred around payment market access and efficiency, but it overlooks

questions about the implication on the nature, size and scope of the Federal Reserve's operations and services. Wang (2022) showed that China's approach to CBDC is quite different from the approach of other countries. He argued that the role of the State, the cross-border use of e-CNY, and China's pro-activeness in international governance are the core features of China's CBDC. He et al (2022) showed that CBDC can improve international payments without fundamentally changing underlying business processes, and it can lead to a fundamental redesign of the international payments architecture so that international payments can be made directly and efficiently. Adalid et al (2022) examined how CBDC affects bank intermediation. They point out that the potential of the digital euro to alter system-wide bank run dynamics will depend on CBDC remuneration and usage limits. Viviana Alfonso et al (2022) identified the difficult design choices faced by central banks in Latin American countries in designing a CBDC. They show that Central banks have to decide on (i) the CBDC architecture, (ii) the potential adverse impact on bank intermediation, (iii) how users will access the CBDC, (iv) whether the CBDC should be implemented using a conventional centrally controlled database or distributed ledger technology (DLT), and (v) whether the CBDC should be made available now or in the future.

Wenker (2022) examined the design features of the Bahamas Sand Dollar. He identified a scenario where the central bank becomes a deposit monopolist, leading to high funding risks, disintermediation risks, and solvency risks for the commercial banking sector. He then argued that the CBDC will have restrictions and caps if disintermediation in the banking sector is to be prevented. He also argued that the anonymity of the CBDC is a disadvantage that will affect its adoption in the Bahamas. Bindseil (2022) argued that the risks associated with CBDC can be

mitigated by an adequate CBDC design, and that central banks should issue CBDCs and use it to promote the digitalization of retail payments. Vuković (2022) suggests that central bank money will eventually exist in digital form, and it may bring a solution to bank the many unbanked people all over the world. Vuković argue that the issuance of a digital Bahamian Dollar can help to achieve this goal when people can use CBDC without being forced to own a transaction account. Assenmacher et al (2022) study how a CBDC affects the response of the economy to business cycle and financial shocks as well as shocks to the means-of-exchange function of money. They integrate a new monetarist-type decentralised market that provides a role for bank deposits and CBDC as means of exchange into a New Keynesian model with financial frictions. They find that the existence of CBDC allows the central bank to separately target the store-of-value and the means-of-exchange function of money and thereby opens up a new channel to stabilise the economy. Cesaratto and Febrero (2022) focused on the banking and monetary policy issues raised by stablecoins and CBDC based on endogenous money theory. They argue that the impact of CBDC depends on the degree of disintermediation they would bring about in the banking system. They point out that if CBDC represent an e–surrogate for banknotes, they do not entail any disturbance to existing banking and monetary policy. However, they stressed that the full conversion of deposits into CBDC would radically change the working of the central bank interest rate policy. They further argue that a limited migration of bank deposits into CBDC will not affect monetary policy. As a result, the endogenous money creation process by banks would not be affected in principle as long as the central bank automatically provides reserves when deposits are converted into CBDC. Kwon et al (2022) assessed whether introducing a central bank digital currency can improve social welfare by mitigating

tax evasion. They construct a dual currency model to study whether CBDC with a record-keeping technology can reduce the incentives for tax evasion in cash transactions and further achieve better allocations than a cash-only economy. They show that when there is inefficiency associated with tax evasion in cash transactions, introducing CBDC with strictly positive interest can remove the inefficiency that encourage tax evasion, and thus will improve welfare by discouraging tax evasion and rewarding tax payments. However, they point out that this beneficial effect of the CBDC depends on the central bank's fiscal role.

3. Current features of the Nigeria CBDC – the eNaira

Ozili (2022a) showed that the Nigeria CBDC or the eNaira, which was launched in October 2021, has the following design features.

i. The Central Bank is liable for losses that arise from using the eNaira. It bears a large part of the risk resulting from loss of CBDC. Users who lose their CBDC holdings due to no fault of their own can hold the central bank liable and accountable. They may be eligible to a receive a refund from the Central Bank.
ii. It is based on a two-tier retail CBDC model.
iii. It is an acceptable medium of exchange
iv. It does not bear any interest.
v. It has a value-based limit that can be transacted.
vi. It is offered in the eNaira speed wallet.
vii. The eNaira can be used offline to make payments.
viii. It can be used to pay bills.

4. Redesigning the Nigeria CBDC

4.1. Interest-bearing eNaira

An interest-bearing eNaira is one that pays interest on eNaira holdings in the eNaira speed wallet (Ozili, 2022a). Presently, the eNaira does not pay interest on eNaira holdings in the eNaira speed wallet.

The reason why the eNaira does not pay interest is to preserve financial stability, by avoiding a run on bank deposits in the banking sector. Arguably, an eNaira that does not pay interest will prevent people from holding eNaira units as an investment asset. It will also ensure that the eNaira does not compete with interest-bearing bank deposits which could lead to a sudden or gradual decline in bank deposits, thereby affecting banks' ability to increase lending from bank deposits. Basically, the central bank believes that an interest-bearing eNaira will increase competition with banks, reduce banking sector deposit, increase the cost of bank funding, increase interest rate, reduce the size of bank lending, and could lead to financial instability through abnormal cuts in credit supply.

While the above argument in support of a non-interest-bearing eNaira seems reasonable, a counter-argument in support of an interest-bearing eNaira is that an interest-bearing eNaira will not trigger financial instability when bank deposits decline due to deposit competition when the eNaira pays interest to holders. Rather, the presence of an interest-bearing eNaira will encourage banks to be innovative in attracting deposits. Banks will have to develop innovative ways to attract deposits. It will bring an end to the era of receiving cheap bank deposits, and will make banks value every new deposit they are able to attract.

Another benefit of an interest-bearing eNaira is that it will become a very effective monetary policy tool. During times of extraordinary expansion, a CBDC that pays interest can become a useful tool for contractionary monetary policy (Davoodalhosseini et al, 2020). The monetary authority can reduce money supply in the banking system by increasing the interest paid on CBDC or eNaira holdings. This will mop-out the excess money in circulation in the commercial banking system as more people and businesses will increase their holdings of eNaira and decrease their bank deposit balances. This will reduce the volume of bank lending and reduce money supply in circulation. Similarly, in times of sluggish growth, an interest-bearing eNaira can become a useful tool for expansionary monetary policy (Davoodalhosseini, 2021). The central bank can increase money supply by significantly decreasing the interest paid on eNaira holdings. This can lead to a run on the eNaira CBDC as people will convert their CBDC holdings back to commercial bank deposits. This will increase bank deposits, increase the size of bank lending and increase money supply in circulation through banks.

More importantly, a relatively low interest paid on CBDC holdings will allow banks to increase their deposit interest rate above the interest paid on CBDC deposits, thereby making it an effective monetary policy tool (Garratt and Zhu, 2021). The implication is that an interest-bearing eNaira will enhance monetary policy by increasing (or decreasing) the interest rate on CBDC deposits. This will attract CBDC deposits and reduce (or increase) the volume of lending in the Nigerian banking system. Thus, there is a need to make the eNaira CBDC have an interest-bearing status.

4.2. No transaction costs

A benefit of a general purpose CBDC is that it incurs a relatively low transaction cost when it is used as a payment solution compared to other payment alternatives (Engert and Fung, 2017; Ozili, 2022b). The eNaira offers a low transaction cost for transfers and payments. The low transaction cost may not provide enough incentive for people to abandon other payment alternatives and use the eNaira CBDC. Given the peculiarity of Nigerians, that is, their strong desire to hold cash for impulse spending purposes and their frequent use of digital bank transfer and debit cards for payment, it is highly possible that the imposition of transaction cost on eNaira payments and transfers – no matter how little – might make the eNaira very unattractive to a lot of people.

There is the argument that the eNaira would receive greater patronage if it has zero transaction cost. This perspective is based on the argument that existing payment alternatives in Nigeria are working very well and they have low transaction cost. There is no strong reason to abandon existing payment alternatives that are working well and begin to use the eNaira CBDC. It is not easy to convince people to use the eNaira for payments when other existing payment methods they are familiar with are working very well. There has to be an extraordinary incentive that will motivate people to abandon existing payment alternatives that are working well, and use the eNaira for payments.

This leads to the argument that a CBDC should have zero transaction cost. This can motivate more people to use the eNaira to make payments. The eNaira should be a cost-free payment alternative with zero transaction cost. Also, there should be free convertibility of the Naira to eNaira, and eNaira back to Naira. By eliminating

convertibility costs, more people will be encouraged to use the eNaira CBDC. It can lead to a significant increase in the volume of eNaira holdings, and increase people's confidence in using the eNaira central bank digital currency to perform basic economic transactions.

4.3. Security

Regarding security, the eNaira should have a multi-layer defense system that make use of well-established cyber security techniques, processes and standards. The critical components of the eNaira should undergo continuous testing, periodic external audit and safeguard authentication assurance to ensure that the eNaira security measures adhere to best practices on digital security. The eNaira should be deployed on a permissioned distributed ledger technology system. Using a permissioned distributed ledger technology system will ensure that only the central bank can create the eNaira and redesign the eNaira. The eNaira should have safeguards to protect against counterfeiting by using digital signatures to authenticate transactions. The eNaira should have in place a system that prevent against double-spending. The eNaira should also ensure transaction correctness as well as the finality of all transactions. The user-facing eNaira website and the mobile app, also known as the eNaira speed wallet, should be available for use at all times and should be connected to a remote back-end system that is secure and resilient to withstand heavy traffic and unusual data request in the data storage system. The eNaira is likely to be a target for organized cyber-criminal networks.

5. Conclusion

This paper identified some redesign features of the eNaira. It argued that the eNaira should pay interest, have enhanced security features, and should offer zero transaction cost on eNaira transactions. The eNaira should offer an attractive way to make payment. Generally, the use of e-Naira CBDC can affect the lives of Nigerians in remarkable ways if it is well received by Nigerians. The ability of the eNaira to transform the way Nigerians make payments will depend on whether everyone is able to access the eNaira and willing to use the eNaira. Policy makers need to do a lot to encourage and persuade people to use the eNaira regularly by offering incentives. The question of incentives will arise if people do not use the eNaira as much as they use cash. Households in Nigeria will use the eNaira if merchants accept eNaira as a medium of exchange. Merchants want to be convinced that consumers will use the eNaira to make payment, and that the benefits of using eNaira will outweigh the cost. This again points to the need to redesign and re-invent the eNaira as an effective payment solution and as a tool for monetary or macroeconomic stability. Future research can examine whether the use of eNaira can increase economic growth in Nigeria. It is also interesting to assess the role of eNaira in increasing remittance inflow into Nigeria.

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