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Lessons from the first implemented Central Bank Digital Currency: The Sand Dollar

Lecciones de la primera Moneda Digital de Banco Central implementada: el Sand Dollar

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Abstract
The emergence of Central Bank Digital Currencies (CBDCs) has sparked considerable discussion within monetary policy circles, particularly as nations explore the potential benefits and challenges of implementing digital currencies. This paper focuses on the Bahamian Sand Dollar, the world's first fully operational CBDC, providing an in-depth analysis of the factors that drove its development, the structure of its implementation, and the obstacles it currently faces, especially regarding its relatively low adoption rates among the population. Through the lens of the Sand Dollar case study, the paper outlines four crucial lessons for the successful rollout of future CBDCs. These include the importance of making the digital currency attractive to users, setting broad and clear policy objectives, investing heavily in public education to foster understanding and trust, and embracing a long-term perspective that allows for gradual integration and adoption. The insights gained from this study offer valuable guidance for other countries considering the introduction of their own CBDCs.

Keywords:
Sand Dollar, Central Bank Digital Currency, monetary policy, financial inclusion, digital currency adoption, Bahamas

Resumen
La aparición de las monedas digitales de los bancos centrales (CBDC, por sus siglas en inglés) ha suscitado un considerable debate en los círculos de política monetaria, sobre todo a medida que las naciones exploran los posibles beneficios y retos de la implantación de las monedas digitales. Este documento se centra en el dólar de arena de Bahamas, la primera CBDC plenamente operativa del mundo, y ofrece un análisis en profundidad de los factores que impulsaron su desarrollo, la estructura de su implantación y los obstáculos a los que se enfrenta en la actualidad, especialmente en lo que respecta a sus tasas de adopción relativamente bajas entre la población. A través de la óptica del estudio de caso de Sand Dollar, el documento esboza cuatro lecciones cruciales para el éxito de la implantación de futuros CBDC. Entre ellas, la importancia de que la moneda digital resulte atractiva para los usuarios, el establecimiento de objetivos políticos amplios y claros, una fuerte inversión en educación pública para fomentar la comprensión y la confianza, y la adopción de una perspectiva a largo plazo que permita una integración y adopción graduales. Las conclusiones de este estudio ofrecen valiosas orientaciones a otros países que estén considerando la introducción de sus propios CBDC.

Palabras clave:
Sand Dollar, Moneda Digital de Banco Central, política monetaria, inclusión financiera, adopción de moneda digital, Bahamas

Introduction

In recent years, the debate about the design of the monetary system has become increasingly prevalent. A major topic within this debate is central bank digital currency or CBDC for short. A survey by the Bank of International Settlements (BIS) shows that in 2022, nine in ten central banks (CB) explored a digital variant of their own currency (Kosse & Mattei, 2022). In the euro area, the European Central Bank (ECB) is conducting a wide-ranging study of the pros and cons of a CBDC, in the form of a digital euro. Other CBs are at different stages of the research cycle. The Chinese central bank is experimenting extensively with its e-CNY and has been conducting research since 2014 (Luo, 2022; Prasad, 2021). The Swedish Riksbank published its first report on the possible designs and effects of the e-krona in September 2017 (Sveriges Riksbank, 2017).

Against all these various studies and experiments is the Bahamian Sand dollar, the world's first, by 2020, fully implemented CBDC. The Bahamas is not the only country; in 2022, Jamaica fully introduced the JAM-DEX (CBDC Tracker, 2023). Since CBDCs are a relatively new phenomenon, there is logically little empirical data to support the potential advantages and disadvantages. The fully implemented Sand dollar can confirm or refute some of the claimed theoretical advantages and disadvantages, and lessons can be distilled from this case for the introduction of other CBDCs.

This paper first discusses the (theoretical) motivations for implementing the Sand dollar, then discusses its operation and current low adaptation rates. Finally, it derives lessons that can be used in other CBDC cases.

Motivations

The Central Bank of The Bahamas (CBOB, 2023) mentions four motivations for the implementation of the Sand dollar:

1. Increase the efficiency of the Bahamian payments systems through more secure transactions and faster settlement speed;
2. Provide non-discriminatory access to payment systems without regard for age, immigration or residency status;

3. Achieve greater financial inclusion, cost-effectiveness, and provide greater access to financial services across all of The Bahamas;
4. Strengthen our national defenses against money laundering, counterfeiting, and other illicit ends by reducing the ill effects of cash usage.

The motivations for the Sand dollar are limited when considering the objectives cited in the literature. The implementation of a CBDC can potentially achieve systemic effects and contribute to solving systemic problems argue, among others, the Scientific Council for Government Policy (WRR, 2019), Prasad (2021) and van der Linden (2022). The WRR (2019)—emphasizes the disciplining effect a CBDC could have on banks. A safe alternative would force banks to finance themselves more responsibly (with more long-term debt and equity) and inhibit money and debt creation. Van der Linden (2022: 248-9) interviewed twenty-nine experts and identified eight objectives for introducing public digital money including achieving a disciplining effect on banks, more effective monetary policy, and a CBDC as a prerequisite for deregulating and/or liberalizing banks. Prasad (2021) argues that a CBDC can improve the monetary sovereignty of CBs and also believes that a CBDC leads to more effective monetary policy by making a more direct tool available in the toolbox of CBs. Compared to these objectives, the motivations cited by the CBOB are relatively limited.

The operation of the Sand dollar

The Bahamas is an island state consisting of over three thousand islands – thirty of which are inhabited – and has over four hundred thousand inhabitants (Bahamas, n.d.). The size of the economy is 13.7 billion U.S. dollars, and the per capita income is 35.5 thousand U.S. dollars per year (IMF, 2022). The Bahamian dollar (B$) is the official currency of the Bahamas and is pegged to the U.S. dollar (US$). Since the Sand dollar is the digital representation of the Bahamian dollar, the exchange rate of the Sand dollar is linked one-to-one to the value of the U.S. dollar.

94.3% of residents have access to a deposit facility (bank account or credit union) (CBOB, 2021). A persistent problem within the archipelago is that some remote groups have difficulty accessing financial services. The dispersion of the population across several islands makes managing the physical money supply a significant cost to the CBOB (IMF, 2022). The Sand dollar could significantly improve the efficiency of the payment system (objective 1).

After several pilots, the Sand dollar became the first CBDC legal tender in 2020. The first pilot took place on the island of Exuma in December 2019. The Bahamian central government expanded the pilot to the Abaco Islands in February 2020 when they were hit by Hurricane Dorian and regular payment traffic was severely hampered. The implementation of the Sand dollar was part of a support program for affected areas (IMF, 2020). The Sand dollar proved to be a useful and well-functioning alternative for financial transactions in the hurricane-disrupted area (Robards, 2020). After positive results from these pilots, the government decided to launch the Sand dollar nationwide (Prasad, 2021). Any Bahamian citizen or business can download a digital wallet (eWallet) since October 2020, allowing them to access a deposit account at the CBOB and payment services.

The Sand dollar is an "account-based" CBDC, meaning that the identity of the payer must be verified, as opposed to a "token-based" CBDC where the object used to pay must be verified (Garratt, Lee, Malone, & Martin, 2020) (van der Linden 2022: 51-61). An example of a tokens-based system is current physical money, here it is determined whether the object (banknote or coin) is authentic. In an account-based system, transactions can only be made from verified accounts, so there is a verification step built into the system where verification must be granted to a central party.

The CBOB does not charge a fee for holding an eWallet or for using the Sand dollar and no interest is paid. Because the Sand dollar is a legal tender, Bahamian citizens can pay their taxes through their eWallet (Knight, 2022).

The Sand dollar can currently only be used within the Bahamas. However, member payment service providers are authorized to make foreign currency exchangeable for Sand dollars and vice versa (CBOB, 2023). The entire Sand dollar infrastructure is based on a blockchain structure, or 'distributed ledger technology' (DLT). This means maintaining a "real-time" digital ledger of Sand dollar assets and transactions. The ledger is managed and funded by the CBOB (IMF, 2022). Thus, through this system, the CBOB aims to reduce the overall cost of payment transactions (objective 1).

To prevent digital bank runs and guarantee privacy, the CBOB has developed a tiered system consisting of two tiers. Tier 1 has a $500 limit and a monthly transaction limit of $1,500, focusing on "banking the unbanked" (Objectives 2 and 3). There is no identification requirement and linking to a commercial bank account is not possible. This makes the threshold for joining the network low. The only step to be taken is to download the digital eWal-

let on a smartphone. The Tier 1 eWallet is also suitable for tourists visiting the Bahamas (CBOB, 2023). Tier 2 differs from Tier 1 in that the limits are higher: $8,000 holding limit and $10,000 transaction limit per month. This includes a legitimacy requirement and the ability to link to a bank account (CBOB, 2023). If an incoming transaction causes the total amount within the eWallet to exceed $8,000, the excess amount is transferred to the linked bank account. If the Tier 2 option is chosen, the user agrees to less privacy but greater payment and savings options.

There are currently nine "authorized financial institutions" (AFIs) commissioned by the CBOB to offer products and services affiliated with the Sand dollar. For example, these companies can offer an eWallet, facilitate online web store payments in Sand dollars, and may develop international payments in Sand dollars. By the end of 2020, there were 80,000 Sand dollars in circulation; by the end of 2021, this amount had increased to 304,000 Sand dollars (CBOB 2022). As of February 2023, 1,025,892 Sand dollars are in circulation, an increase of over 300 percent from the end of 2021 (CBOB, 2023). Looking at the number of Sand dollars in circulation relative to all Bahamian dollars in circulation (8.01 billion), it can be said that the role played by the Sand dollar is marginal. Only 0.013% of the money supply consists of Sand dollars.

Why is the adoption rate so low?

Recognizing the low adoption rate, the CBOB cites two reasons. First, priority was given to growing and improving the Sand dollar network by allowing new AFIs to join. They were given the space to develop new applications and add them to the Sand dollar. Thus, to date, less priority has been given to increasing adaptation rates among the Bahamian population (users). Second, the COVID-19 restrictions have hampered the rollout of the Sand dollar. There were simply hardly any opportunities to roll out the Sand dollar during events (CBOB, 2022).

The CBOB launched a campaign in 2021 to attract more users to the network (Robards, 2021). For example, at events, use is encouraged. During the International Culture, Wine and Food Festival in October 2022, the Sand dollar was even the only accepted means of payment. This caused an increase of 200,000 Sand dollars (Robards, 2022). The CBOB has announced more such initiatives to grow the network.

The relatively low rate of adaptation has other causes too. Any new form of money needs time to generate trust among the general public: the benefits of the Sand dollar will have to be experienced. In addition, well-functioning payment methods are already in place in The Bahamas, and in most other countries, so the need to switch is not felt by individuals. Also, a lack of trust in the public institutions behind the Sand dollar complicates adaptation. Some Bahamian residents are concerned about their privacy and the reliability and authenticity of the Sand dollar (IMF 2022). In several other countries, a lack of trust in institutions can also make adaptation to a CBDC difficult.

Lessons

Based on the Sand dollar case study, four lessons can be drawn to enhance the success of CBDCs.

1) Develop the most attractive CBDC possible for individual users.

Paradoxically, the benefits of a CBDC that CBs and other government agencies mention are sometimes actually reasons for individuals not to use a CBDC. Consider the possibility of introducing negative interest rates or making the unofficial economy visible to authorities (objective 4). The benefits of a CBDC are often argued from the perspective of the collective interest. However, the collective interest regularly clashes with the individual interest, and this clash negatively affects individual adoption.

A first lesson is that a new CBDC should also, and possibly especially, be designed from the individual interest, where the character features should be made as attractive as possible to the individual user. If the CBDC is faster, safer, cheaper, easier to use, and offers more privacy than bank money, then the adoption rate will likely increase rapidly. The general public expects public institutions, like central banks, to make the most attractive services and products available.

2) Formulate objectives that are large enough

As explained, the CBOB has defined relatively small objectives. If a CB does not define larger systemic objectives, there is a danger that specialists and the public do not understand the benefits. Critics in several countries in recent years have called CBDC “a solution in search of

a problem." For example, the British Economic Affairs Committee (2022) published a report tellingly titled "Central bank digital currencies: a solution in search of a problem?" This lack of clarity complicates adaptation.

Lesson two for CBs is not to set objectives too small. A widely implemented CBDC can have positive effects on the entire system and help solve systemic problems. These positive effects must be explicitly stated, otherwise, there is a danger of not understanding what a CBDC is a solution for.

3) Increase knowledge among the general public through education

According to the CBOB, the Sand dollar offers advantages to individuals and businesses over the current system based on public cash and private bank money. However, the fundamental differences between public and private money are not clear to the general public. Most people do not know who creates which form of money. Private bank money is inherently fragile and can only function as money on a large scale thanks to public safety nets; something that has again become clear during the recent banking crisis in the U.S. and Switzerland. Only when the difference between forms of money is clear, individuals can make informed choices.

Moreover, if limits and thresholds are chosen, explaining them is essential. An example of a threshold in the case of the Sand dollar is the identification requirement at Tier 2. It must be explicitly explained why identification is required at Tier 2 and why it is not required at Tier 1. Only when this information is available to the general public, they can make targeted choices and understand the central bank's consideration. In a general sense, thresholds and limits make a CBDC less attractive and increase the need for information.

Information provision is always essential. The CBOB, meanwhile, intends to provide more and better information to the public about the perceived benefits of the Sand dollar (CBOB, 2022). A lesson for other CBs is to launch an information campaign in a timely manner to prepare the general public for the implementation of the CBDC. The general public's awareness of the fundamental differences between monetary forms affects the success of a CBDC. Crucial knowledge concerns the advantages of a CBDC over existing options (especially the inherent stability of a CBDC just like physical cash) and the positive system-level effects in the case of a large adaptation of a CBDC.

4) Adopt a broad time horizon.

Because the use of money is founded on agreement, habit and trust, broad adaptation of a CBDC will likely take a long time. Network effects are essential for any form of money and establishing a network around a new form of money takes time. The CBOB has now begun actively building the network by partnering with organizations that host events where the Sand dollar is the sole means of payment. With a "soft hand," residents are thus forced to participate in the network. The CBOB, in cooperation with the Bahamian government, could choose to further encourage the use of the Sand dollar, for example, by allowing payments to the government to be made only in Sand dollars. However, this "hard hand" route could also prove counterproductive.

In short, CBs will have to choose a long-time path and develop a long-term plan in addition to a short-term implementation plan. In the long term, larger goals can also be achieved. For example, when more stable CBDCs are in circulation, public protections for bank deposits can be phased out, and when almost everyone owns a CBDC account, it can be used as a monetary instrument.

Summary

For a CBDC to be successful, adaptation is essential. To date, this aspect is often missing from studies and the adaptation rate of the world's first fully implemented CBDC is low. Four lessons can be drawn from the Sand dollar case for the implementation of other CBDCs: 1) develop the most attractive CBDC possible for individual users; 2) formulate objectives for a CBDC that are large enough; 3) increase knowledge of the advantages of a CBDC over other forms of money among the general public through education, and; 4) adopt a broad time horizon.

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