Central Bank Digital Currency: a new national economic sovereignty instrument : The case of Algeria

العملة الرقمية للبنك المركزي : أداة جديدة للسيادة الاقتصادية الوطنية :دراسة حالة الجزائر

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Abstract:

This research paper aims to present general concepts related to Central Bank Digital Currencies CBDCs, which refer to a virtual currency, similar to crypto currency, created and issued by a central bank. This study also involves analyzing the conditions and some of the consequences of such a financial innovation on Algerian economy. The study concluded that if successful, CBDCs could ensure that, as economies go digital, the general public would retain access to the safest form of money. This, could promote diversity in payment options, make cross-border payments faster and cheaper, increase financial inclusion and possibly facilitate fiscal transfers in times of economic crisis. As the research shows, In the Algerian case, the adoption of the Algerian Digital Dinar should allow greater financial inclusion, to avoid cash shortages in the long run, allow greater traceability of financial transactions and may gradually reduce the informal economy.

Key words: *Central Bank Digital Currency, CBDC, Financial Inclusion, Digital Payment system, Algeria, Algerian Digital Dinar.*

الملخص:

تهدف هذه الدراسة إلى تقديم المفاهيم العامة المتعلقة بالعملات الرقمية للبنك المركزي CBDC ، والتي تشير إلى عملة افتراضية ، تشبه العملة المشفرة ، تم إنشاؤها وإصدارها من قبل بنك مركزي .كما تتطرق هذه الدراسة الى تحليل الظروف وبعض نتائج هذا الابتكار المالي على الاقتصاد الجزائري .وخلصت الدراسة إلى أنه في حالة نجاحها ، يمكن أن تصبح عملات البنوك المركزية الرقمية أكثر أشكال النقود أمانًا . كما يمكن أن يعزز التعامل بعملات البنوك المركزية الرقمية التنوع في خيارات الدفع ، ويجعل المدفوعات الدولية أسرع وأرخص ، ويزيد من الشمول المالي و يسهل التحويلات المالية في أوقات الأزمات الاقتصادية .كما بينت هذه الدراسة ان اعتماد الدينار الرقمي الجزائري من قبل بنك الجزائر قد يسمح بتعزيز الشمول المالي ، ويساهم في تفادي نقص السيولة النقدية، وكما يساعد في تتبع المعاملات المالية وقد يقلل من التعامل في السوق الموازي.

الكلمات المفتاحية :العملات الرقمية للبنك المركزي، الشمول المالي، نظام الدفع الرقمي، الجزائر، الدينار الرقمي الجزائري.

1. INTRODUCTION

The Covid-19 pandemic and the resulting economic crisis, exacerbated by the conflict in Ukraine, have altered global trade and cross-border payments. In order to solve this problem, many countries made profound changes in their payment systems by the shift to digital payments and their use online. Interest in Central Bank Digital Currency (CBDC) has grown in response to changes in payments, finance and technology. Therefore, a CBDC would be a new form of currency issued by the central bank, in a dematerialized format and would be complementary to the forms of money that already exist.

CBDC is one of several trends that will improve cross-border payments. Central Bank Digital Currency refers to a virtual currency, similar to crypto currency, created and issued by a central bank. The difference between crypto and CBDC is that crypto currencies are decentralized, with linked to fiat currency like the U.S. dollar. However, CBDCs can be the fiat currency, potentially becoming a digital version of cash issued by the same central bank. That makes CBDCs drastically different from digital payment services and privately created coins (Raynor De Best, 2023). It can also have significant consequences, as some fiat currencies more common in foreign exchange reserves than others.

In 2021, according to the Bank of International Settlements –BIS- survey results, 86% of central banks were actively researching the potential for CBDCs, 60% were experimenting with the technology and 14% were deploying pilot projects (Bank of International Settlements, 2022). Nearly 120 countries are studying or adopting this new type of currency, the BRICS group (*Brazil, Russia, India, China, South Africa),* to which a dozen countries have applied, including Algeria, is generally very advanced in setting up CBDC (Ali Kahlanen, 2023).

1.1. Research problematic:

Based on the foregoing, we conclude that CBDCs are digital currencies issued by central banks, their value is linked to the issuing country's official currency , and from here we raise the following main problem: Why are central banks investigating CBDCs? And what impacts will the adoption of a CBDC have on Algerian economy?

A number of secondary problems branch out from the main problem, as follows:

- What is a Central Bank Digital Currency ?
- Can Central Bank Digital Currency enable financial inclusion?
- What are the conditions and the consequences of implementing a CBDC in Algeria?

1.2. Research aims:

Through this research paper, we seek to achieve a set of objectives, which we summarize as follows:

- Presentation of the conceptual framework of CBDCs;
- Knwoledge relationship between Central Bank Digital Currency and financial inclusion;
- Knowledge of the benefits and challenges that impede the adoption of Algerian Digital Dinar on the Algerian economy.

1.3. Research Methodology:

Through the available data and information, this problem was addressed using the descriptive analytical approach to suit the nature of the research and study it in an analytical way based on statistics related to CBDCs obtained from official sources.

1.4. Research divisions:

Our study entitled "**Central Bank Digital Currency: a new national economic sovereignty instrument : The case of Algeria**" was presented in two axes, preceded by an introduction that includes the basic dimensions of the research paper, and followed by a conclusion containing the findings and recommendations. The first axe starts with the basics about the CBDC. In the second axe we dealt with the current status of financial inclusion in Algeria, and the initialization of a CBDC project in Algeria.

2. Theoretical framework of CBDCs

2.1 What is a CBDC?

Central bank digital currency (CBDC), also called sovereign digital currency (SDC), is the digital version of sovereign currency issued by an economy's monetary authority (H. Wang, 2021). The Committee of Payments and Market Infrastructures (CPMI) notes that, CBDC is not a well defined term. It is used to refer to a number of concepts. However, it is envisioned by the most to be a new form of central bank money. That is, a central bank liability, denominated in an existing unit of account, which serve both as medium of exchange and a store of value (Anneke Kosse and Ilaria Mattei, 2022). In turn, the International Monetary Fund (IMF) has defined CBDCs as a new form of money, issued digitally by the central bank and intended to serve as legal tender (M. Jelena , 2021). Hence, CBDC is kind of a legal digitally formed tender, and it must have four elementary functions of currency: medium of exchange, store of value, unit of account and standard of differed payments (R. Aneja, R. Dygas, 2022).

2.2. Why using CBDC?

The issuance of a CBDC is studied by several central banks, including the European Central Bank, mainly for two principal reasons (Banque de France, 2023):

- The digitalization of payments and the economy. In fact, the development of e-commerce and the use of dematerialized means of payment caused a decline in the use of fiat money (coins and banknotes);
- The "tokenization" of finance, which consists of issuing financial securities, such as a share or a bond, in the form of a digital token called cypto tokens through the use of technologies such as the blockchain.

2.3. Different CBDCs Models:

Generally, CBDC models fall into two categories: retail and wholesale (N. Anthony, N. Michel, 2023). *2.3.1 Retail CBDC:* As the name might suggest, retail CBDCs are meant for retail, or consumer use. These would be designed to be used just like the digital payments that already exist today where people could use them to purchase goods, pay salaries, or store wealth. Currently, there are three core variations of retail CBDCs: the direct CBDC, the intermediated or indirect CBDC, and the synthetic CBDC.

2.3.1.1 Direct CBDC: A "direct CBDC" would be a CBDC that is available to everyone and managed directly by the central bank. In this model, the CBDC represents a direct claim on the central bank, which keeps a record of all balances and updates it with every transaction. The advantage of a direct CBDC is that "the central bank has complete knowledge of retail account balances." However, a disadvantage is that a direct CBDC "marginalizes private sector involvement and hinders innovation in the payment system."

2.3.1.2 Intermediated or Indirect CBDC: An "intermediated CBDC" or "indirect CBDC" is probably best understood as an attempt to appease the private sector by lessening the risk of disrupting, or disintermediating, the current financial system. The idea is to provide a direct CBDC, but then enlist the private sector to provide and maintain the accounts or wallets used for CBDC holdings (D. Kesavan, N. Mari Anand, 2023).

2.3.1.3 Synthetic CBDC: A *synthetic CBDC* really isn't a CBDC at all. Rather, "synthetic CBDC" describes a stablecoin (a stable coin is a crypto currency with its value pegged to government currencies, short- term securities, or commodities in an effort to stabilize its value) with the reserves backing its value held in a central bank master account. To achieve this peg, stablecoin issuers commonly hold reserves on a one- for- one basis.

2.3.2 Wholesale CBDCs: In contrast to the different retail CBDC models, wholesale CBDCs would be restricted to financial institutions for use during interbank settlement. In other words, a wholesale CBDC would serve as a way for banks to send money between themselves. As many have recognized, such a service would offer few if any benefits given the existing payments systems that are already widely available.

2.4 Advantages and disadvantages of CBDCs

The principal advantages of CBDCs are (H. Benedetti & al, 2023):

-Efficency: using a CBDC reduces friction within extant payment systems; lowers the cost of a transaction; Increases the speed and safety of transactions; Ensures the finality of transactions, and decreases the reliance of transactions.

-Taxation: Provides an effective tax base; reduces or limits evasion and increases tax revenues.

-Flexible monetary policy: Offers flexibility; provides optimal interest rates; minimize expansionary fiscal or monetary policies due to increase money supply and pays interest to the token itself.

-Payments: Offers a backdrop to privately managed payments and avoid a breakdown during a crisis.

-Financial inclusion: Using CBDCs enables underbanked and unbanked societies to access to financial products/services.

Disadvantages of CBDCs: Some of the consequences of using CBDCs are:

-Disintermediation: results in potential systemic destabilization;

-Government involvement: creates a potential difficulty in balancing central bank oversight and innovation;

-Regulatory compliance: creates additional complexity in developing regulatory and compliance tools and mechanisms; requires a need to up skill to rapidly address financial innovations and structural changes.

-Loss of privacy: creates potential ethical issues with managing private and sensitive information;

-Technological immaturity: involves a potential lack of expertise in developing complex technical solutions.

2.5. Financial Inclusion (FI)

2.5.1. Definition

The concept of financial inclusion grew out of the microcredit movement of the 1970s and became widely used in the early 2000s. Financial inclusion means that all people and businesses have access

to — and are empowered to use — affordable, responsible financial services that meet their needs. These services include payments, savings, credit, and insurance. Research has considered financial inclusion (FI) as a significant catalyst for economic development. FI refers to the availability of formal financial services to everyone, including deprived households and micro-enterprises (G. Rekha, K. Rajamani, and G. Resmi, 2021).
Financial inclusion is a broader concept than microfinance, which often refers to the provision of products to specific groups at the lower end of the market, using specific delivery techniques and institutions. Hence, FI is part of a broader financial deepening agenda that focuses on ensuring the efficient and sustainable provision of financial services to households, enterprises and governments, while minimizing the risk of fragility (Thorsten Beck, 2016).
Two critical types of factors that the literature has identified as driving FI across countries are structural factors and policy-related factors. While structural factors primarily decide the cost of delivering financial services to the population, policy-related factors are essential in creating a facilitating environment for financial inclusion. One of the primary structural factors is the information and communication technology (ICT) infrastructure. The diffusion of ICT has caused an intensive transformation of the world and allowed more access to finance (G. Rekha, K. Rajamani, and G. Resmi, 2021)

2.5.2. Financial Inclusion and CBDCs :

Boosting financial inclusion is one of the main motivations for issuing retail central bank digital currencies among emerging market and low income economies (Brandon Joel Tan, 2023). Specific benefits to financial inclusion through a CBDC have been identified, even if it may be too early to determine how well a CBDC will address the constraints limiting the reach and use of formal financial products and services among the unserved or underserved. These benefits include (Asian Development Bank, 2023) :
-Enhancing access to finance for micro, small, and medium-sized enterprises;
-Enabling greater consumer confidence or trust in digital financial services; ʔ streamlining the small-value digital transaction system;
-Reducing the cost of financial transactions;
-Enhancing the value of financial services through superior data collection and application of tailored services;
-Enhancing efficiency in financial transactions.

2.6. CBDCs in the world

As stated in the practical guide for Arab central banks(2022), just three (3) central banks have already moved to the implementation phase such as the Chinese Yuan, the Bahamas Sand Dollar, and e-Naira of the Central Bank of Nigeria.
As shown in both table 1 and figure 1, six (6) central banks have launched or piloted a CBDC, six (6) central banks are in advanced stages of research and developpement, thirty six (36) central banks central banks are still in the exploratory stages , and only ten (10) central banks are already engaged in proof of concepts projects or testing experiments.

Table 1: JURISDICTIONS WHERE RETAIL CBDC IS BEING EXPLORED (as of 01, 11, 2022)

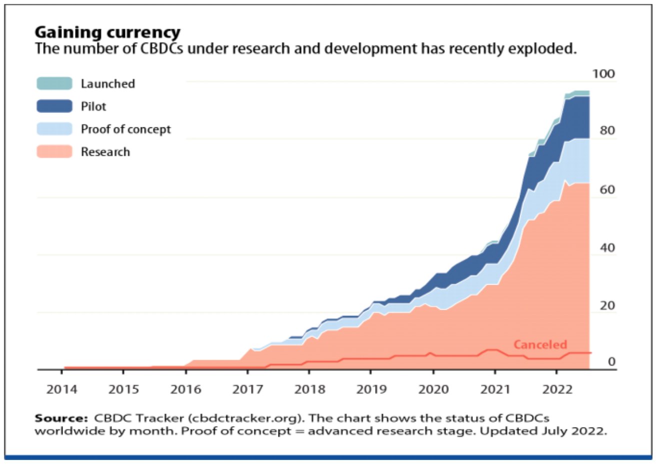
Where central banks have launched or piloted (or soon will)	
Bahamas (fully launched) Jamaica (pilot launch imminent) China (pilot launched) Nigeria (pilot launched in October 2021) Eastern Caribbean (pilot launched) Uruguay (pilot completed)	
Where central banks have done proofs of concepts (or soon will)	
Bhutan (proof of concept planned) Korea (proof of concept started) Japan (proof of concept started) Sweden (proof of concept underway) Ukraine (proof of concept done) Ghana (2021) (update; 2021) Hungary (2021) Kazakhstan (2021) Russia (2021) Thailand (2021) Turkey (2021)	
Where central banks are in advanced stages of research and development	
Canada (update) Norway United Kingdom	Euro Area Mauritius (update) United States
Where central banks are still in the exploratory stages (with year of last update)	
Australia (2021)- Kuwait (2019)- Chile (2021) -Singapore (2021)- Madagascar (2021)- Malaysia (2021) Czech Republic (2021)- Morocco (2019) (update; 2021)- Denmark (2017)- New Zealand (2021)- Eswatini (2020)- Pakistan (2021)- Georgia (2021) (update; 2021)- Peru (2019) (update; 2021) -Kenya (2020)- Brazil (2021) (update, 2021)- Bahrain (2021)- Haiti (Bitkòb) (2021)- Philippines (2020) -Hong Kong SAR (2021) -South Africa (2021) -Iceland (2018) -Switzerland (2019) -India (2021) -Taiwan (2020) -Egypt (2018) -Indonesia (2020)(update; 2021) -Trinidad and Tobago (2021) -Tunisia (2018)- Curaçao en Sint Maarten (2018)- Zimbabwe (2021)	

Source: *Arab Monetary Fund, Arab Regional Fintech Working Group, Central Bank Digital Currencies: A Practical Guide for Arab Central Banks, N178, 2022. Pp 35,36. -%%https://www.amf.org.ae/sites/default/files/publications/2022-02/CBDCs-A%20Practical%20Guide%20for%20Arab%20Central%20Banks-Feb-2022%20%28*

At present, 87 countries—representing more than 90 percent of global GDP—are exploring CBDCs, some examples are: Jamaica's JAM-DEX launched in June 2022 and is the first CBDC to be ratified formally as legal tender. It's a relatively simple offering, with no advanced use cases (such as cross-border payment for smart contracts). JAM-DEX isn't blockchain based, unlike the Bahamas' Sand Dollar and the Eastern Caribbean Central Bank's DCash. Sub-Saharan Africa is poised to adopt CBDCs. The widespread use of M-PESA, a mobile money transfer service, has established a strong social and financial infrastructure for the potential future use of CBDCs (Mckinsey,2023). Also, interest in wholesale CBDCs for cross-border payments is currently limited to only three projects: Dunbar project between South Africa, Australia, Malaysia, Singapore, and the BIS; Aber project between United Arab Emirates and Saudi Arabia that tested the use of a jointly issued digital currency as an instrument for domestic and cross-border settlements between the two countries ; and the m-Bridge project in which the Emirates joined China, Thailand and Hong Kong (Abdelouahab, 2023).

In light of this background, we notice the rate of CBDC adoption is greater in countries with higher digital penetration and remittances as well as weaker macroeconomic fundamentals—such as high inflation, informality, corruption and the degree of capital controls are also positively associated with higher crypto adoption. This, highlight the importance of implementing proper tracking of crypto activities and improving regulations (K. Srinivasan, 2022)

Figure 1: The number of CBDCs projects under research and development



Source: Andrew Stanneley, The ascent of CBDCs, Finance & Development, September 2022. /https://www.imf.org/en/Publications/fandd/issues/2022/09/Picture-this-The-ascent-of-CBDCs

3. Adoption of the Algerian Central Bank Digital Currency: Algerian Digital Dinar

3.1. Overview of the current status of financial inclusion in Algeria:

For many countries, financial inclusion represents a priority for their agenda of economic and financial reforms. The promotion of an inclusive financial system is seen as a political priority in many developing countries; particularly in Algeria which has set up an agency specializing in the deployment of microfinance (F. CHIAD & al, 2021). In 2015, the Central Bank of Algeria has defined financial inclusion as "the availability and use of all financial services by different segments of society including institutions and individuals especially marginalized and low income people inthrough official channels, including current and savings accounts, payment and transfer services, insurance services, financing and credit services with competitive and reasonable prices" (S. Tharouma, 2023), It also targets to protect the rights of financial services consumers so that they can properly manage their funds and savings and prevent them from using informal channels, which are not subjected to any supervision and which charge relatively high prices, inducing the non-satisfaction of the needs for financial and banking services (R. Benaini, S. Metair, 2022).

In 2021, the latest available Global Findex data, has explored key financial inclusion trends in Algeria , such as account ownership and usage, the gender disparity in financial inclusion and financial resilience. The statistics are as follows:

-Account Ownership: According to FinDev Gateway statistics, Percent of adults age 15+ with an account at a financial institution or through a mobile money provider (Regional data excludes high-income economie) was 44% in Algeria with a gender gap in account ownership of 31% female and 57% male, compared to 48% in MENA countries with a gender gap in account ownership of 42% female and 54% male and 76% in the world, with a gender gap in account ownership of 74% female and 78 % male.

-Use of Financial Services: the percent of adults (age 15+) which saved any money in the past year was 46% in Algeria comparing to 35% in MENA countries. But only 34% made or received digital payments in the last year compared to 40% in MENA region. Also, 38% of adults (age 15+) borrowed any money in the past year, and only 26% has sent or received domestic remittances in the past year (FinDevGateway, 2021).

-Credit card penetration rate: as of January 2023, the credit card penetration rate in Algeria was at 2.8 percent. Male adults in the country registered a rate of 4.1 percent, and they were significantly more likely to own a credit card than women. In the same period, only around 1.5 women out of 100 had access to a credit card in Algeria. The penetration rate of payment cards in the country is extremely low, especially when compared to the banking penetration. About 44 percent of the population had an account with a financial institution in 2023 (S. Galal, 2023).

3.2. Benefits and consequences of using a CBDC in Algeria:

Central banks around the world have tried to explore the possibility of using the CBDC to improve financial inclusion and increase the effectiveness of monetary and payment systems. Digital transformation is one of Algeria's main development goals, and a key element of the country's recovery. The digital transformation strategy could be achieved by the digitalization of means of payment, through the establishment of a national payment committee, as well as the expansion of the mission of the Bank of Algeria in the field of securing and monitoring payment systems and the delivery of financial instruments, the establishment of digital banks and organizations called "payment service providers", in addition to the introduction of a Central Bank Digital Currency (Algeria Invest, 2023). As a developing country, Algeria intends to adopt a national digital currency under the name of " Algerian Digital Dinar" as a part of the process of digitalization of payments (Algeria Press Service, 2022). Its adoption will integrate the second kind of Central Bank Digital Currency as retail CBDC, which would be intended for the use of the general public. By adopting Algerian Digital Dinar, an employee will be able to withdraw part of his salary in cash on one side and have a digital endowment on the other side. It should then be the digital equivalent of cash(Ali Kahlen, 2022).

Despite the number of accounts with a financial institution which exceeds 38 million, 80% of electronic transactions in Algeria are money withdrawals exceeding 1,000 billion dinars per year. The issuance of the Algerian Digital Dinar will reduce cash withdrawals and increase the number of online and credit card payment transactions, the latter currently not exceeding 6% (Imen H, 2023). To solve this problem, which is a real challenge, the Central Bank of Algeria declares that the objective of its digital currency is not to replace all coins and banknotes but rather to offer an alternative and to follow the evolution of the payment behavior of Algerians. Indeed, it would then be possible to introduce a gradual digitization of the national currency.

In its latest report, the Regulatory Authority of Post and Electronic Communications (ARPCE) said that the number of mobile phone subscribers reached 49 million on 31 December 2022 in Algeria, up by 4.26% to 47 million in the same period in 2021(Algeria Press Service, 2023); the Algerian Digital Dinar could be stored on a mobile phone to constitute an electronic purse. Completely secure, it can be accessed on a server remotely, by means of a mobile application or a website or quite simply on an account opened in central digital currency.

With a financial inclusion index of 9.62% in 2014, Algeria ranked 14 in the Arab world and 141 globally (N. Lemerini, A .Habi 2022). This low rate of financial inclusion in Algeria can be related to several reasons such, poor level of financial culture, lack of confidence in financial institutions, slow implementation of financial services and transactions, and weak use of electronic payment systems and means (F. Benyoub, S. Boufelfel, 2023). Indeed, Algeria hopes to use the Algerian Digital Dinar to improve financial inclusion, enable banks to provide their services in a more efficient way, and to facilitate relevant authorities in formulating and implementing regulatory policies. It is not fully clear, however, that the CBDC race will be better explained by the first-mover or the late-mover advantage theory (R. Hui Huang, S. Xiyuan Li, 2023).

4. Conclusion:

CBDC experiments so far can inspire authorities with diverse policies and procedures to mitigate the risks associated with CBDCs initiatives, which all depend on countries' specific conditions. Tests and trials can turn the interest into knowledge and provide authorities with the necessary tools for a path forward based on deep analysis of cost and benefits and in relation to other alternatives. The introduction of CBDC in Algeria "Algerian Digital Dinar" is a golden opportunity to modernize the Algerian financial system and banks operations where the customer would be truly central. It is the best alternative to fiduciary money and the logical sequel to electronic money. The transformation of this adoption into success on the ground will depend on the determination of the financial authorities and the confidence of the operators and citizens. Well prepared and understood by financial and business spheres and especially by the general public, the adoption of CBDC is a challenge and an opportunity for Algerian economy. This should allow greater financial inclusion, to avoid cash shortages in the long term, allow greater traceability of transactions and may gradually reduce the informal economy. As with any innovation, the challenge is to find the right balance between fostering innovation and maintaining stability and protection for consumers and investors.

Recommendations:

For a succefull implementation of the Algerian Digital Dinar, some actions shoud be taken:

-Establish an effective legal regime for CBDC, the law needs to be revised to clarify and reflect the legal status of CBCD.

-The role and responsibility of the central bank need to be re-examined as it will be directly involved in the CBDC account opening and monitoring process.

-A CBDC may face increased exposure to cyber-attacks, attention also needs to be paid to the legal remedies available for the losses suffered by the CBDC users from cybersecurity and operational problems.

-Establish lows to deal with the issue of data privacy and personnal informations protection.

-Strengthening and securing internet infrastructure.

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