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DIGITAL MONEY, REAL IMPACT:

LESSONS FROM GLOBAL CBDC PIONEERS FOR RWANDA'S NEXT LEAP

REPORT BY

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RBA Research Center

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The Centre offers an array of research papers and commentaries, and promotes dialogues on critical policy issues by way of convening conferences and workshops. The pursuit of depth and clarity in our research is a testament of our commitment to the endeavour of transforming the Rwandan banking sector through being at the frontier of knowledge that grounds data-driven insights and forward-thinking solutions.

Our approach is motivated by the objective of embedding the attribute of the Rwandan banking industry being knowledge driven. In that regard, the Research Centre is positioned as a Pillar of Insight with data as the catalyst that shapes policies, decisions, and strategies. That necessitates that the Research Centre adopts a collocative approach of working closely with policy and regulatory agencies, market players as well as local and international stakeholders.

This Research Paper is published by the Rwanda Bankers' Association Research Centre with the objective of offering insights and promoting dialogue on critical policy issues that have an impact on the development of the financial sector. Through informed commentary such as Research Notes, Occasional Papers, Bulletins and Working Papers, the Rwanda Bankers' Association Research Centre provides a platform for constructive engagement among experts on financial markets, banking industry players and policy makers.

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Abstract

As the global monetary system enters the era of digital transformation, Central Bank Digital Currencies (CBDCs) are increasingly being explored as tools to enhance financial inclusion, strengthen monetary policy transmission, and modernize payments. This paper investigates the real-world impact of Central Bank Digital Currencies (CBDCs) on financial stability and key macroeconomic variables by examining the pioneering experiences of the Bahamas, Jamaica, and Nigeria. Employing a quantitative analysis of pre- and post-launch data, the study robustly counters theoretical fears of bank disintermediation, revealing significant growth in commercial bank deposits following CBDC introduction.

The analysis further shows that CBDC rollouts often coincided with broader macroeconomic shifts – marked by tighter monetary policy stances (higher policy rates) and economic rebounds (GDP growth) – while the direct effect on inflation remained statistically insignificant. Across all three cases, the primary challenge was not financial instability but rather the difficulty of achieving widespread public adoption. The key lessons for emerging economies such as Rwanda are that the success of a CBDC will depend less on mitigating theoretical risks and more on delivering a compelling value proposition, supported by strong public trust and a dynamic macroeconomic environment.

1. Introduction

The global monetary system stands at a defining moment. Rapid technological innovation and the rise of private digital currencies – such as cryptocurrencies not issued or backed by any central authority – are challenging the long-standing dominance of state-issued money (Jitaru, 2024). In response, central banks worldwide are accelerating research and experimentation with Central Bank Digital Currencies (CBDCs): sovereign backed digital forms of national currency that remain a direct liability of the central bank. With more than 100 countries exploring their potential, CBDCs have moved beyond theory to become a realistic policy tool for modernizing payment systems, strengthening monetary policy transmission, and safeguarding monetary sovereignty in an increasingly digital economy (Anthony, 2025).

At the heart of the global CBDC conversation lies a dual reality of promise and risk. A well-designed CBDC could enhance payment efficiency, build a more inclusive financial system, and stimulate innovation and competition in financial services. Yet, its introduction also represents a fundamental shift in the financial ecosystem, raising complex questions about systemic risk, privacy, and the role of banks. A CBDC should therefore not be seen merely as a technological innovation, but as a deep institutional and policy transformation tool that must be handled with care.

The first wave of CBDC pioneers – the Bahamas with its SandDollar (October 2020), Nigeria with the eNaira (October 2021), and Jamaica with JAM-DEX (July 2022) – provide invaluable real-world lessons (Al-Ansari & Aysan, 2024). Each country launched its CBDC to address specific national priorities such as promoting financial inclusion and facilitating low-cost digital payments. Yet, a common challenge has emerged: low public adoption. Despite technical readiness and strong policy intent, uptake among consumers and merchants has been limited. This highlights a critical insight – success depends less on technology itself and more on building public trust, improving digital literacy, and offering a clear value proposition that resonates with users' everyday financial needs.

Recognising these challenges, international institutions like the International Monetary Fund (IMF) have introduced structured frameworks to guide implementation. The IMF's 5P methodology – **Preparation, Proof-of-Concept , Prototypes, Pilots, and Production** – provides a phased and iterative roadmap, emphasising data-driven "Go/No-Go" decision points between stages (Tourpe, Lannquist, & Soderberg, 2023). This approach helps central banks manage uncertainty and adjust course without jeopardising entire projects.

Against this backdrop, the National Bank of Rwanda (BNR) launched its own CBDC journey in July 2025, entering the Proof-of-Concept (PoC) phase (Figure 1). The BNR's stated goals include strengthening financial system resilience, advancing the national cashless economy, and improving the efficiency and inclusivity of cross-border remittances. However, Rwanda must navigate important socio-economic realities (BNR, Ideathon Project: Central Bank Digital Currency (CBDC) Proof-of-Concept, 2025). According to recent national data (EICV7, 2023-2024), challenges such as low smartphone ownership (34.3%), limited household internet access (29.8%), present a formidable challenge to digital financial services (NISR, 2025). While BNR's plan to ensure access through non-smartphones and offline capabilities is a pragmatic step (BNR, 2022), broader digital and financial literacy initiatives ran in parallel to developing digital alternatives or complements to fiat-based payment services will be essential to ensure inclusivity.

CBDC Implementation Stages with Rwanda at Proof of Concept

Source: Central Bank of Rwanda (BNR)

This paper seeks to connect the theoretical promise of CBDCs with the practical realities emerging from early adopters. By examining the experiences of the Bahamas, Nigeria, and Jamaica, it analyses the macroeconomic and financial stability outcomes of their CBDC rollouts – including impacts on deposits, inflation, and growth – and distils lessons relevant for Rwanda. The findings aim to inform policy design and implementation strategies that align the development of a Rwandan digital franc with the country's long-term goals of financial inclusion, stability, and innovation.

A Global Overview of CBDC Development

The global exploration of Central Bank Digital Currencies (CBDCs) has rapidly transitioned from a theoretical exercise to a mainstream policy imperative. The sheer scale of this movement is staggering: 137 countries and currency unions, representing 98% of global GDP, are now exploring a CBDC – a nearly four-fold increase from only 35 in May 2020 (Atlantic Council, 2025). This momentum is maturing quickly, with 72 countries now in an advanced phase of development, pilot, or launch. This evolving landscape is divided into two primary tracks, defined by the purpose of the digital currency itself: retail CBDCs for the general public and wholesale CBDCs for interbank transactions (Atlantic Council, 2025).

The primary impetus for retail CBDC growth comes from emerging markets, which are pursuing domestic policy objectives such as enhancing financial inclusion, reducing reliance on physical cash, and countering the proliferation of privately-issued stablecoins. The scale of these retail pilots is immense. China's digital yuan (e-CNY) saw its transaction volume nearly quadruple in a single year to 7 trillion e-CNY ($986 billion) by June 2024. Following suit, India's e-rupee in circulation surged by 334% to ₹10.16 billion (over $122 million) by March 2025 as its central bank expands the pilot to include both retail and wholesale functionalities (Atlantic Council, 2025), such achievement partly made possible by a countrywide deployment of digital identity documents to the population.

Concurrently, a profound transformation is occurring in the wholesale CBDC space, driven increasingly by strategic geopolitics. Since the G7 sanctions response to Russia's invasion of Ukraine, the number of cross-border wholesale CBDC projects has more than doubled to 13. A leading example is Project mBridge (a.k.a. Multiple CBDC Bridge), a platform developed to support real-time, peer-to-peer, cross-border payments and foreign exchange transactions using CBDCs. Based on a blockchain called the mBridge Ledger, this is not a single CBDC itself, but the underlying infrastructure that enables multiple digital currencies to interact directly. Initially developed by a consortium including the central banking authorities of Hong Kong, Thailand, the UAE, and China's Digital Currency Research Institute, alongside the Bank for International Settlements (BIS) Innovation Hub, the project expanded significantly when the Saudi Central Bank joined as a full participant in June 2024. By design, this platform creates a direct, multicurrency corridor that can settle transactions without the intermediation of the US dollar, representing a significant step toward creating alternative international payment infrastructures.

This trend towards building alternative payment infrastructures is not limited to CBDC specific projects. A similar strategic development is the Pan-African Payment and Settlement System (PAPSS), an African alternative to SWIFT, a financial market platform designed to connect African banks and enable instant, secure cross-border payments directly in local currencies. By simplifying the historical complexities of intra-African trade, it is viewed as a foundational infrastructure that could become the "rails" for powering future pan-African stablecoins or CBDCs. This broader strategic competition is also reflected in the divergent paths of major economies. The ECB is advancing a "global Euro moment" with its digital Euro, while the PBoC (People's Bank of China) promotes the e-CNY as part of a multipolar currency strategy. In contrast, the United States has become a notable outlier, halting its retail CBDC work to focus exclusively on wholesale cross-border research (Atlantic Council, 2025).

This formal, state-led exploration of CBDCs is unfolding alongside a dynamic and often more organic landscape of non-CBDC digital currency initiatives. These parallel developments provide crucial insights into the real-world dynamics of public trust and adoption, revealing a spectrum of approaches from state-led crisis responses to locallydriven or citizen-led innovation.

One prominent approach involves sovereign, asset-backed digital currencies designed to combat severe economic instability. In response to hyperinflation, Zimbabwe introduced the gold-backed "ZiG" in April 2024 to restore confidence by anchoring the currency's value to a physical asset (Reuters, 2024). This strategy, however, is fraught with challenges, as illustrated by the cautionary tale of Venezuela's earlier oil-pegged digital currency, the Petro. The Petro, which launched in 2018, ultimately failed due to a fundamental lack of transparency and functional infrastructure, and was officially discontinued in January 2024 (CNBC, 2024).

Alternative models diverge significantly from these top-down mandates. El Salvador's adoption of Bitcoin as legal tender in September 2021 represents a radical attempt to integrate an existing decentralized asset into the national economy, driven by goals of financial inclusion and reducing remittance costs. However, analysis has shown its experience highlights significant volatility and educational barriers, with adoption remaining low (International Monetary Fund, 2023). Similarly, the Central African Republic's Sango Coin project, aimed at tokenizing the nation's mineral resources, has stalled amid considerable regulatory and infrastructural hurdles, as documented by international financial institutions (International Monetary Fund, 2023).

In stark contrast to these state-led projects are examples of bottom-up and locally driven integration. Switzerland presents a model of proactive innovation, where specific regions embed private digital assets into their economies. The canton of Zug has been a pioneer in this area since 2016, while the city of Lugano launched its "Plan B" initiative in March 2022, allowing citizens to use Bitcoin and the USD-backed stablecoin Tether (USDT) for municipal services (Tether, 2022).

These cases reveal a universal principle that directly informs the actions of central banks: whether a digital currency is a CBDC, state-issued and asset-backed, or a private decentralized asset, its success is fundamentally determined by public confidence, perceived stability, and its ability to solve tangible problems for its users.

While the strategic motivations for CBDCs are clear, their real-world implementation reveals a significant gap between state-led launches and genuine public adoption. An examination of key pilots and historical projects highlights a recurring set of barriers. Even the world's most advanced pilot, China's e-CNY, demonstrates this challenge. Despite achieving a staggering $986 billion in transaction volume across its 26 pilot cities, adoption is still only around 10% of pilot city residents, and it faces deep-seated privacy concerns and intense competition from established private payment apps like Alipay and WeChat Pay (Atlantic Council, 2025; Chainalysis, 2023).

In other emerging markets, the hurdles are even more pronounced. In Ghana, the e-Cedi pilot has seen minimal engagement, primarily because it must compete with a dominant mobile money ecosystem that already boasts 70% penetration (Groupe Speciale Mobile Association: GSMA). This is compounded by public mistrust of government oversight and significant infrastructure gaps, with 40% of rural areas lacking reliable internet needed for a digital currency to function (GSMA; MDPI). The challenge of technological reliability was starkly illustrated by the Eastern Caribbean's DCash, which suffered a catastrophic technical outage in 2022 that lasted for two months, severely eroding public and merchant confidence and keeping adoption below 1% of the population (Reuters; McKinsey).

Perhaps the most potent cautionary tale comes from Ecuador's early attempt at a state-run digital currency, the Dinero Electrónico (2014-2018). The project was an outright failure, peaking at just 400,000 users (0.025% of the population) before being shut down. Its demise was driven by overwhelming public mistrust, as citizens feared it was a government tool to replace their stable, adopted currency—the US dollar. This, combined with a poorly designed interface and low merchant uptake, ensured its rejection by the public.

These cases reveal a universal principle that directly informs the actions of central banks: whether a digital currency is a CBDC, state-issued and asset-backed, or a private decentralized asset, its success is fundamentally determined by public confidence, perceived stability, and its ability to solve tangible problems for its users.

It is this principle that explains why, despite the competitive pressures and divergent motivations within the CBDC space, a unifying methodology of caution prevails. The vast majority of central banks are employing a phased, progressive rollout. By utilizing controlled environments like regulatory sandboxes, they can rigorously assess technological resilience, address critical privacy and security concerns, and ensure interoperability before committing to a full-scale national launch, balancing the race for innovation with the paramount need for financial stability.

Objectives of the study

Primary Objective:

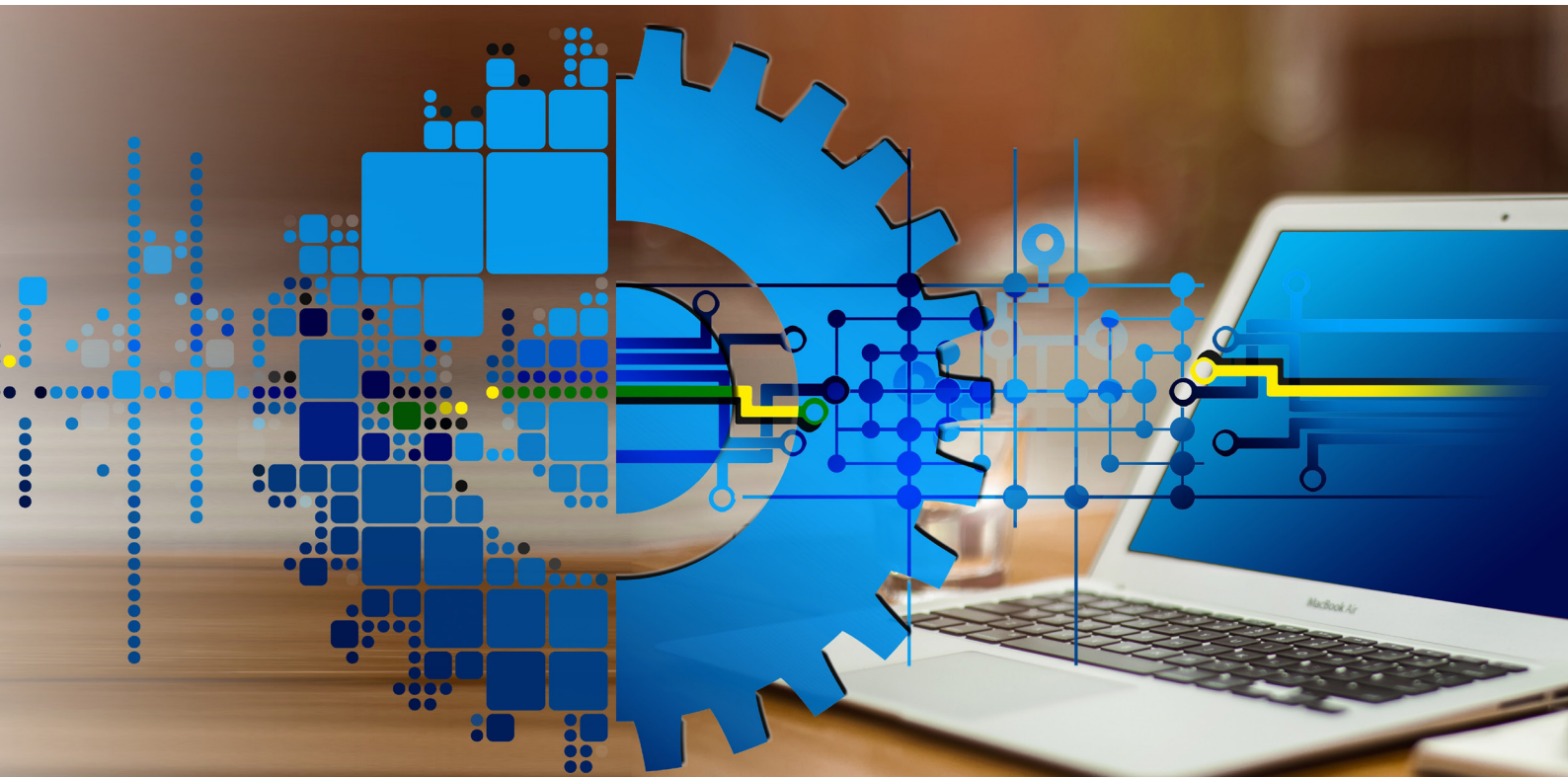
To analyse the impact of Central Bank Digital Currency (CBDC) implementation on financial stability in early-adopting countries and, based on these findings, develop actionable policy recommendations to inform Rwanda's CBDC design and rollout.

Specific Objectives:

- To critically review the motivations, design features, and implementation challenges of the CBDCs in the early adopted countries.
- To assess the effects of these CBDCs on key indicators of financial stability and public adoption in each country.
- To identify the specific opportunities and risks within Rwanda's financial and technological environment that may shake the success and resilience of a future digital franc.
- To develop evidence-based policy recommendations for the National Bank of Rwanda on optimal CBDC design, regulatory safeguards, and public education strategies to ensure the digital franc supports and complements financial stability.

Organization of the Study

- This paper is organized into four main sections that systematically address the research objectives:
- Section 1 presents the introduction and context of the study.
- Section 2 describes the research methodology, including case selection, data sources, and econometric models used in the analysis.
- Section 3 discusses the key findings and interprets their implications for financial stability and adoption.
- Section 4 presents the limitations of the study.
- Section 5 concludes the study and provides policy recommendations.



2. Methodology

This study employs a comparative case study analysis to evaluate the impact of Central Bank Digital Currency (CBDC) launches in The Bahamas, Jamaica, and Nigeria. A core methodological challenge stems from the significant differences in data availability, reporting frequencies, and economic variable definitions across the three jurisdictions. These discrepancies render the construction of a unified, balanced panel dataset unfeasible. Consequently, the empirical strategy involves conducting separate country specific analyses to ensure the integrity and contextual accuracy of the findings for each case.

For each country, a paired sample t-test is utilized to determine whether a statistically significant shift occurred in key macroeconomic and financial variables following the CBDC launch. This method is a standard parametric procedure for testing the null hypothesis that the true mean difference between two connected periods – in this case, pre- and post-intervention – is zero. The test is applied to indicators such as deposits, inflation, and policy rates. The resulting t-statistics and their associated p-values provide a rigorous basis for identifying significant changes, with a p-value below the conventional threshold of 0.05 leading to the rejection of the null hypothesis (Wooldridge, 2018). This approach is well-suited for event-type analyses in economics, allowing for a clear measurement of change attributable to the policy event within each distinct national context (Brooks, 2019).


CENTRAL BANK DIGITAL CURRENCY
CBDC

3. Data Analysis and Discussion of Findings

The Bahamas

In October 2020, the Bahamas became the first nation worldwide to officially introduce a Central Bank Digital Currency (CBDC), known as the Sand Dollar. This pioneering initiative marked a significant milestone in the evolution of digital finance, offering valuable insights for other countries currently exploring CBDC adoption. The primary impetus for this initiative was not a purely technological ambition but a direct response to long-standing challenges of financial exclusion. The nation's geographical fragmentation across 700 islands makes traditional banking infrastructure, such as physical branches and ATMs, commercially unviable and vulnerable to disruption from extreme weather events. As articulated by the Central Bank of The Bahamas, the core objective was to eliminate barriers to financial services for the unbanked and underbanked populations in remote areas. To achieve this, the Sand Dollar was designed as a digital token pegged one-to-one with the Bahamian dollar, issued and regulated by the central bank, and accessible via digital wallets without the prerequisite of a traditional bank account (Dorst, 2021).

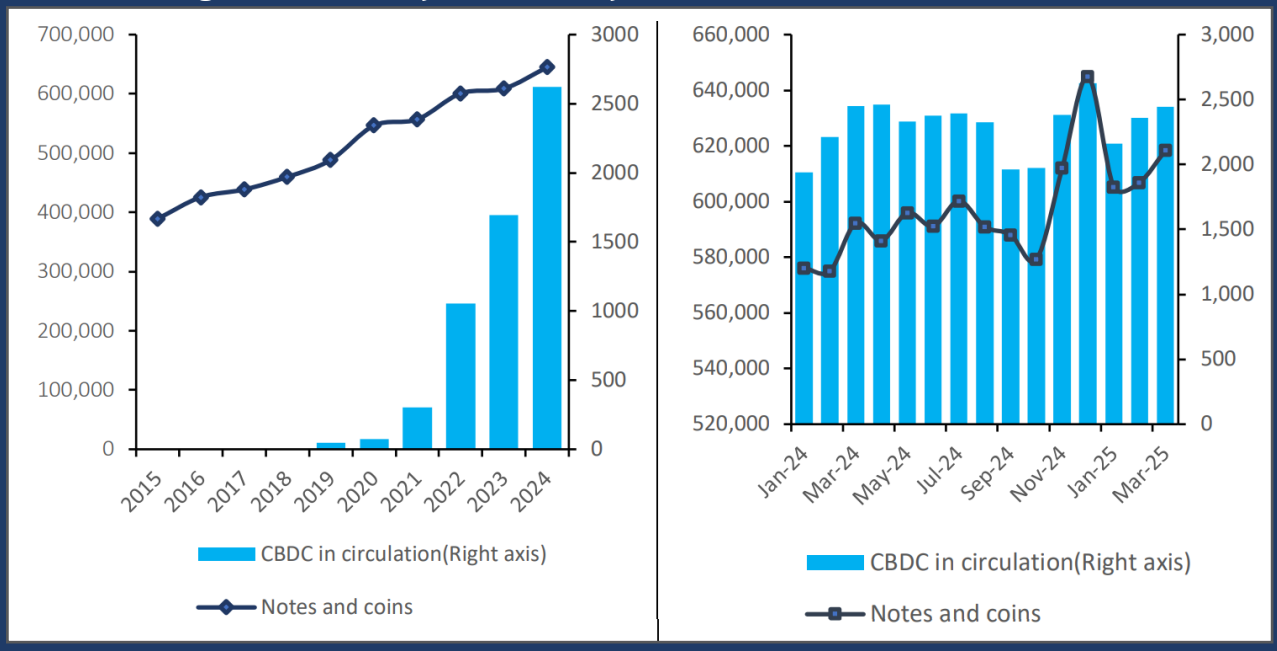
The rollout and early adoption of the Sand Dollar were significantly influenced by external crises. The devastation of Hurricane Dorian in 2019 underscored the need for a more resilient payment system, while the subsequent COVID-19 pandemic created an immediate demand for safe, contactless transactions. Despite these catalysts, initial adoption has been modest, indicating a significant implementation challenge. According to recent reports, only $130,000 (B$ 130,000) worth of Sand Dollars are in circulation, representing just 0.026% of the $500 million (B$ 500 million) in physical currency. However, among early adopters, the reported benefits are substantial and align with the CBDC's objectives. Users, particularly small business owners, have lauded the system for its ease of use, speed of settlement, and, most critically, the absence of transaction fees. These early findings from the Bahamas provide a crucial, real-world case study, highlighting that while a CBDC's design may successfully address a country's core challenges, achieving widespread public adoption remains a formidable and gradual process (Dorst, 2021).

Overview of CBDC in The Bahamas

Objectives of sand dollar

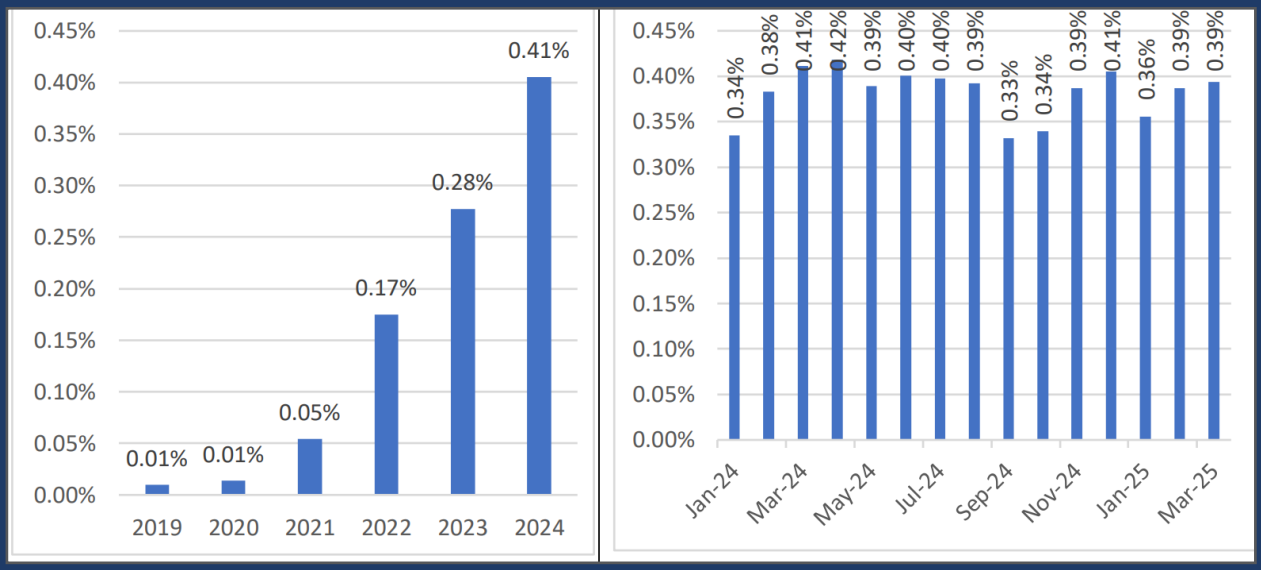
- Increase the efficiency of the Bahamian payments systems through more secure transactions and faster settlement speed.
- Provide non-discriminatory access to payment systems without regard for age, immigration or residency status.
- Achieve greater financial inclusion, cost-effectiveness, and provide greater access to financial services across all of The Bahamas.
- Strengthen the national defences against money laundering, counterfeiting, and other illicit ends by reducing the ill effects of cash usage (Central Bank of The Bahamas, 2025).

Figure 2: End-of-year currency in circulation in The Bahamas



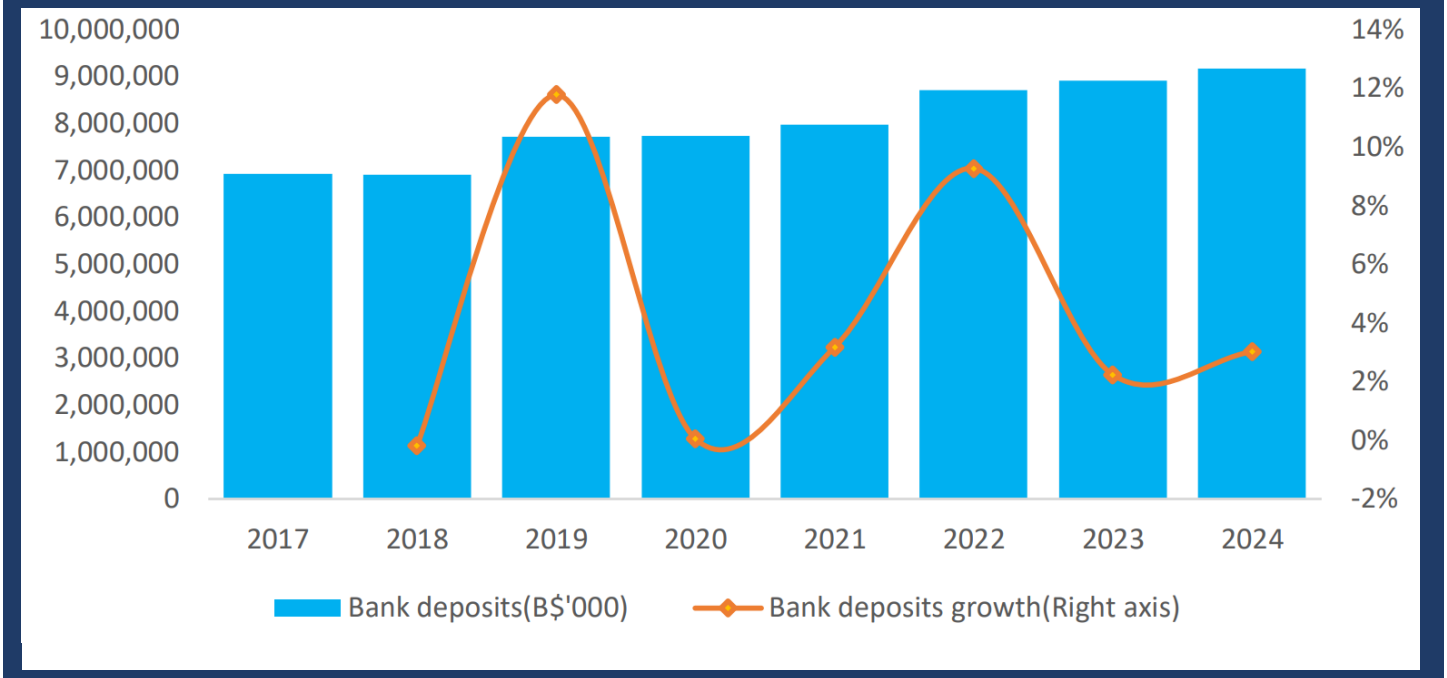
Source: Central Bank of Bahamas

Figure 3: Annual and recent monthly percentages of CBDC in total currency in circulation



Source: Central Bank of Bahamas

Figure 4: Bank Deposits and Deposit Growth



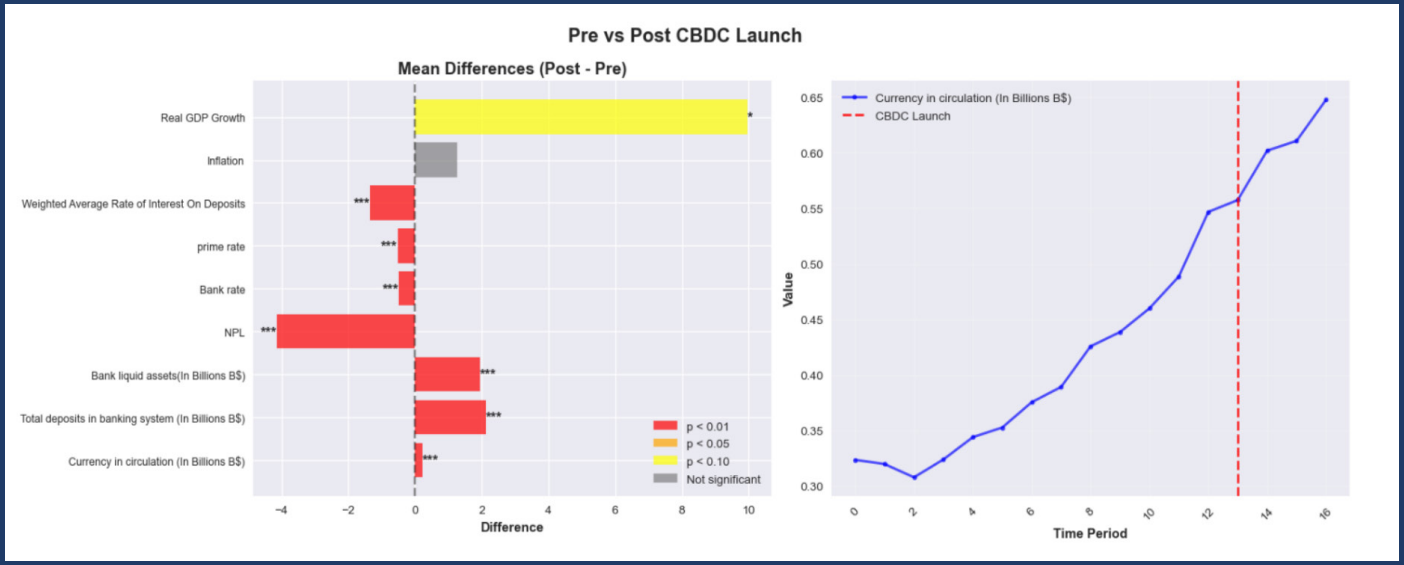
Source: Central Bank of The Bahamas

Table 1: Descriptive Statistics and t-Test Results for the Bahamas

Variables	N	Mean	SD	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Mean Difference	p-Value (Two-tailed)	t-Test (Two-tailed)
Currency in circulation	17	441,934.765	114,251.445	391,982.462	74,650.367	604,279.750	37,061.009	212,297.288	0.000	7.641***
Total Deposits	17	7,071,580.765	1,094,649.462	6,571,576.923	616,436.042	8,696,593.250	516,231.905	2,125,016.327	0.000	6.864***
Bank Liquid Assets	17	2,745,160.118	1,048,725.726	2,288,672.692	688,795.203	4,228,744.250	360,974.095	1,940,071.558	0.000	7.382***
NPL	17	10.518	3.415	11.492	3.227	7.350	1.748	-4.142	0.008	-3.311***
Bank Rate	17	4.368	0.477	4.481	0.494	4.000	0.000	-0.481	0.004	-3.506***
Prime Rate	17	4.647	0.468	4.769	0.473	4.250	0.000	-0.519	0.002	-3.959***
Weighted Avg Deposit Rate	17	1.559	1.197	1.878	1.202	0.525	0.019	-1.353	0.002	-4.057***
Inflation	17	2.027	1.587	1.730	1.350	2.992	2.124	1.262	0.328	1.121
Real GDP Growth	17	1.094	7.544	-1.254	6.201	8.725	6.943	9.979	0.054	2.576*

Source: Authors' computations (Total deposits and bank liquid assets (B$'000))

Figure 5: t-Test Results Visualization (The Bahamas)



Source: Central Bank of The Bahamas

The descriptive analysis of the Bahamian financial and macroeconomic landscape reveals a period of significant and positive transformation. This period coincided with the introduction of the Central Bank Digital Currency (CBDC), reflecting the favourable economic conditions prevailing at the point of its launch. A striking finding is the marked improvement in the banking sector's health, evidenced by a statistically significant decline in the average Non-Performing Loan (NPL) ratio from 11.5% to 7.4%. Crucially, this sign of improved stability was complemented by robust evidence countering the primary financial stability concern of bank disintermediation. Rather than a flight of capital from commercial banks, both Total Deposits and Bank Liquid Assets grew significantly, indicating that public confidence in traditional banking institutions remained strong and that the Sand Dollar has, thus far, functioned as a complement to the existing financial system. These positive financial sector trends occurred within a context of profound shifts in the broader economy, characterized by a statistically significant easing of monetary conditions and, most dramatically, a powerful macroeconomic rebound as average Real GDP Growth shifted from negative to strongly positive. In summary, while inflation did not exhibit a statistically significant change, the analysis paints a picture of a post-CBDC era characterized by a healthier banking sector and robust economic recovery, providing no initial evidence to support concerns of bank disintermediation.

To understand the influence of the USD on the SandDollar, it is crucial to recognize that the Sand Dollar is not a free-floating currency; it is a digital representation of the Bahamian dollar, which is legally pegged at a 1:1 ratio to the US dollar. This has a profound effect: the Sand Dollar does not experience price fluctuations against the USD, but it fully imports the US dollar's price fluctuations against other global currencies. For example, if the US dollar strengthens by 5% against the Euro, the Sand Dollar also automatically strengthens by 5% against the Euro. This design choice provides immense stability and trust for a tourism-dependent economy that heavily trades with the United States, eliminating exchange rate risk for the country's primary economic partners. However, it also means the Bahamas forfeits an independent monetary policy. The Central Bank of The Bahamas cannot devalue the Sand Dollar to boost exports or adjust interest rates without considering the primary mandate of defending the USD peg. This highlights a key insight: for many smaller nations, the goal of a CBDC like the Sand Dollar is not to reinvent the currency, but rather to modernize the payment infrastructure while cementing a long-standing strategic dependence on a larger anchor currency like the US dollar.

Jamaica

The Bank of Jamaica officially launched its Central Bank Digital Currency (CBDC), known as Jam-Dex (Jamaica Digital Exchange), in July 2022, following a pilot phase initiated in 2021. Initially, the central bank distributed J$1 million ($6,330) worth of Jam-Dex to its staff as part of the testing process. Public access became available through mobile applications in mid-2022. However, the requirement for users to hold accounts with National Commercial Bank (NCB) – the only wallet provider at that time – limited the intended financial inclusion objectives (Anthony, 2025).

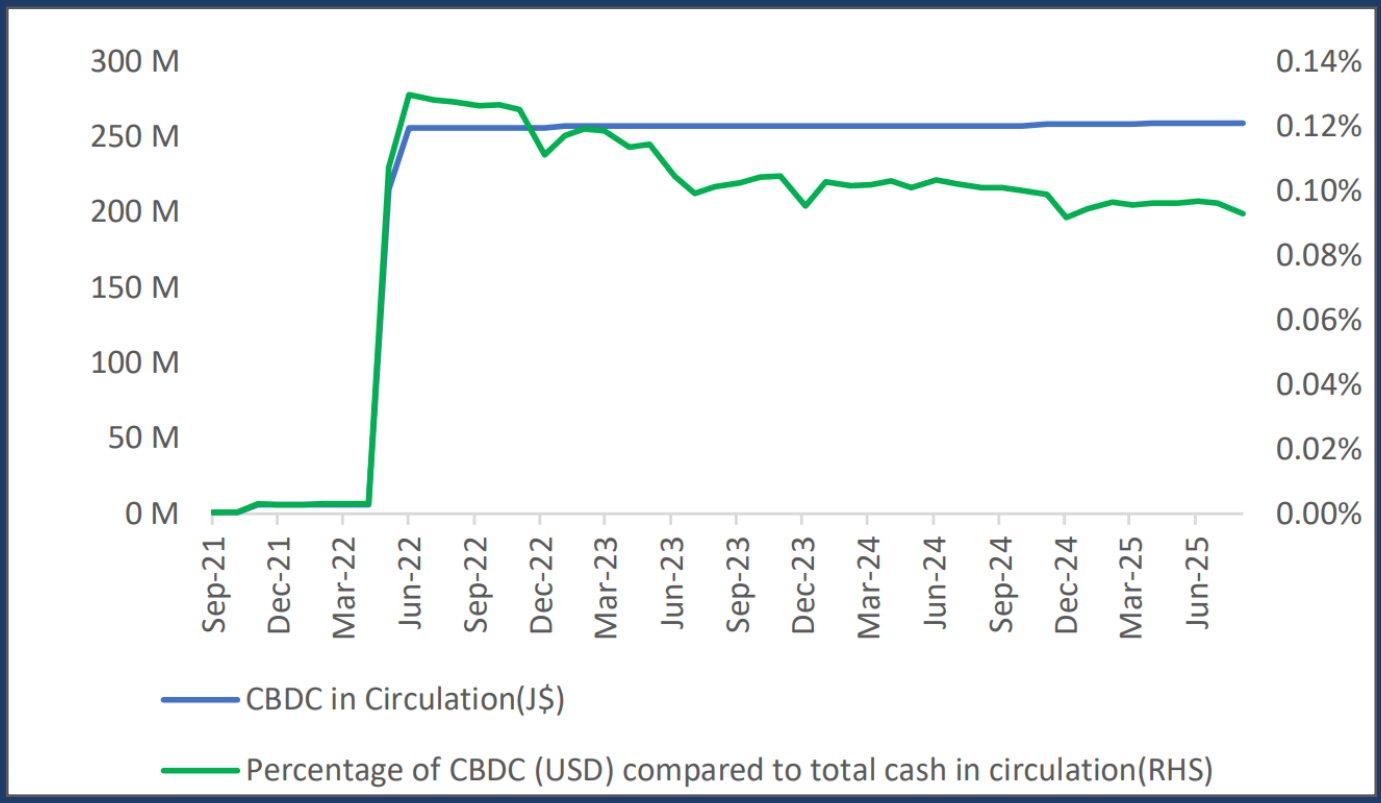
Data on Jam-Dex circulation indicate minimal consumer adoption. Between 2021 and 2024, changes in Jam-Dex supply were infrequent and primarily associated with government activities rather than organic market demand. For instance, the most significant increases were linked to government incentive programs such as offering J$2,500 to new users, providing employment payments, and merchant incentives. By 2024, the total Jam-Dex in circulation had reached J$258.5 million ($1.64 million), a figure still negligible compared to the J$286.1 billion in physical currency circulation. Of this amount, J$144.8 million was held by the public, while J$113.7 million remained in the digital vaults of wallet providers. The number of registered wallet users increased modestly to 282,274, representing a 7 percent rise compared to 2023. These figures suggest that despite its official status as legal tender, the CBDC has yet to achieve widespread use among Jamaicans (Anthony, 2025).

To promote greater acceptance, the Government of Jamaica and the Bank of Jamaica implemented various initiatives in 2024 aimed at expanding the usability of Jam-Dex. These included allowing citizens to make payments for property taxes, fitness fees, and traffic tickets at Tax Administration Jamaica (TAJ) using Jam-Dex, as well as integrating the CBDC into point-of-sale (POS) systems through pilot programs. Promotional campaigns were launched at tax offices, and the Bank undertook merchant strengthening initiatives to increase CBDC usage in everyday transactions. Additionally, the Bank installed a Jam-Dex Disaster Recovery (DR) site and continued preparations to integrate CBDC usage with government entities in 2025 (Bank of Jamaica, 2022).

Jam-Dex is recognized as legal tender under the Bank of Jamaica (Amendment) Act 2022, which established the Bank as the sole issuer. The initiative forms part of Jamaica's broader goal to strengthen financial inclusion, modernize payments infrastructure, and promote a digital economy. The Bank of Jamaica, in partnership with eCurrency (global leading provider of digital currency security systems for central banks), continues to oversee the minting, distribution, and redemption of the digital currency while maintaining strict anti-counterfeiting and security measures (Bank of Jamaica, 2022).

As of the end of 2024, the Bank completed the third year of its five-year national rollout plan. Key achievements include merchant-strengthening initiatives, installation of a disaster recovery site, and continued onboarding of additional wallet providers. Nonetheless, despite progress in technical and institutional readiness, widespread consumer adoption remains a significant challenge, with Jam-Dex usage largely driven by government incentives rather than voluntary uptake by the public.

Figure 6: CBDC in Circulation and Its Share of Total Cash in Circulation (USD)



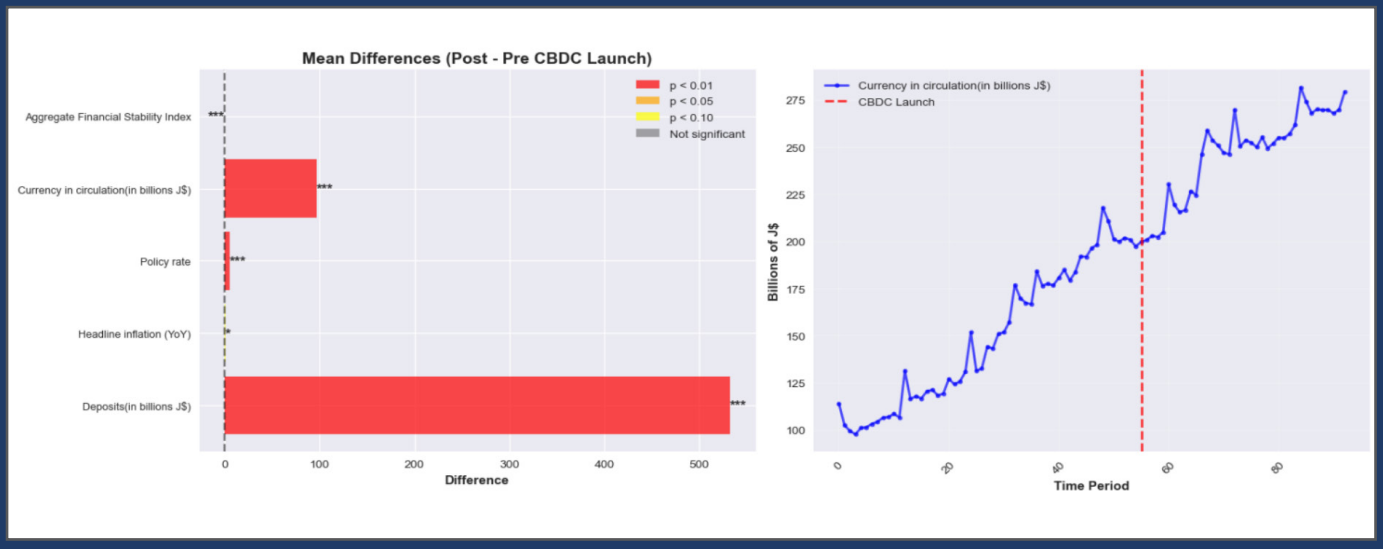
Source: Bank of Jamaica

Table 2: Descriptive Statistics and t-Test Results for Jamaica

Variables	N	Mean	SD	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Mean Difference	p-Value (Two-sided)	t-Test (Two-tailed)
Deposits (in billions J$)	92	1,387.344	310.755	1,173.155	184.811	1,705.733	136.360	532.573	0.000	15.889***
Headline Inflation (YoY)	93	5.715	2.251	5.367	2.356	6.219	2.016	0.851	0.065	1.867***
Policy rate	93	3.597	2.727	1.523	1.327	6.599	0.515	5.075	0.000	25.696***
Currency in circulation (in billions J$)	93	188.963	57.604	149.411	36.889	246.210	23.949	96.799	0.000	15.337***
Aggregate Financial Stability Index	30	0.524	0.050	0.545	0.052	0.488	0.011	-0.057	0.000	-4.543***

Source: Authors 'computations

Figure 7: t-Test Results Visualization (Jamaica)



Source: Bank of Jamaica

The analysis of Jamaica's financial indicators before and after the July 2022 launch of the Central Bank Digital Currency (CBDC), JAM-DEX, indicates that the banking sector remained stable in the period following the currency's introduction. Total deposits rose significantly by J$532.6 billion, demonstrating that JAM-DEX did not lead to a flight of capital from commercial banks. Although the Aggregate Financial Stability Index declined by 0.057 points, this decrease is better explained by a deliberate tightening of monetary policy, marked by a 5.1 percentage point rise in the policy rate, implemented in response to global inflationary pressures rather than by the launch of the CBDC itself.

Moreover, the data contradicts the assumption that CBDC would replace physical cash. Currency in circulation increased significantly by J$96.8 billion, indicating that JAM-DEX complemented rather than substituted traditional money, possibly reflecting overall economic expansion. While headline inflation rose slightly after the CBDC's introduction, the change was not statistically significant, suggesting that the CBDC had no immediate effect on price stability.

Nigeria

The main motivations for issuing Central Bank Digital Currencies (CBDCs) in Africa are to provide a digital alternative to cash and promote financial inclusion. Other objectives include enhancing the effectiveness of monetary policy, improving competition within the financial sector, and reducing the costs associated with distributing physical money. These goals collectively aim to modernize the continent's financial systems and expand access to formal financial services.

Nigeria's eNaira, launched in October 2021 by the Central Bank of Nigeria (CBN), was the second CBDC introduced globally. Its primary objectives are to advance financial inclusion, ensure broader access to central bank money, improve the efficiency and resilience of payment systems, and support cheaper and faster cross-border payments and remittances. The CBN also aims to use the eNaira to strengthen domestic monetary policy and promote economic integration (Central Bank of Nigeria, 2021).

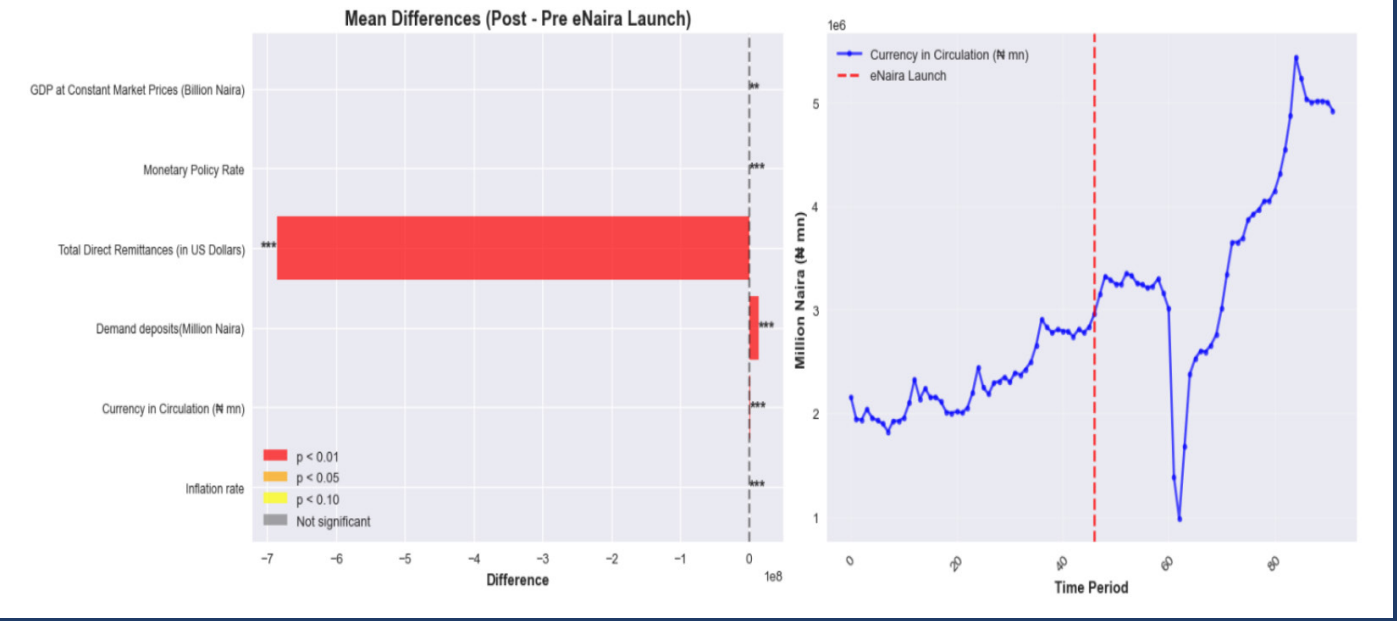
To avoid competing with commercial banks, the eNaira carries a 0% interest rate and is mainly designed for small retail payments. It is also structured to comply with financial regulations, ensuring transparency and accountability in all transactions. Additionally, the CBN envisions the eNaira as a tool to enhance cross-border financial connectivity, reduce remittance costs, and support Nigeria's transition toward a more inclusive and digital economy.

Table 3: Descriptive Statistics and t-Test Results for Nigeria

Variables	N	Mean	SD	Pre-Mean	Pre-SD	Post-Mean	Post-SD	Mean Difference	p-Value (Two-sided)	t-Test (Two-tailed)
Inflation rate	93	18.722	7.071	13.329	2.392	24.001	6.069	10.672	0.000	11.199***
Currency in Circulation (₦mn)	92	2,927,007.406	981,248.649	2,295,962.782	325,667.232	3,558,052.030	1,013,361.799	1,262,089.247	0.000	8.042***
Demand deposits (Million Naira)	92	17,568,565.384	8,716,520.787	10,564,899.393	1,909,164.148	24,572,231.375	7,050,973.093	14,007,331.982	0.000	13.005***
Total Direct Remittances (in US Dollars)	93	493,173,984.737	568,962,776.690	839,762,852.316	637,835,418.476	153,959,348.383	108,423,334.640	-685,803,503.933	0.000	-7.191***
Monetary Policy Rate	93	16.597	5.593	13.011	1.041	20.106	6.004	7.096	0.000	7.980***
GDP at Constant Market Prices (Billion Naira)	25	18,373.538	1,616.303	17,810.206	1,269.031	19,375.018	1,747.775	1,564.811	0.000	2.359**

Source: Authors 'computations

Figure 8: t-Test Results Visualization (Nigeria)



Source: Bank of Jamaica

A statistical analysis of Nigeria's key economic indicators reveals a period of profound macroeconomic deterioration concurrent with the early implementation phase of the eNaira. The post-launch period was characterized by a substantial monetary policy tightening, evidenced by a significant 7.1 percentage point increase in the Monetary Policy Rate ($p < 0.001$). This policy shift coincided with a dramatic deterioration in macroeconomic conditions, most notably a sharp and significant increase of 10.67 percentage points in the inflation rate ($p < 0.001$) and a severe, significant decline of over US$685 million in total direct remittances ($p < 0.001$). Despite this challenging environment, the data indicates a significant expansion in domestic monetary aggregates, with substantial growth in both Currency in Circulation and Demand Deposits ($p < 0.001$ for both), suggesting the eNaira's launch did not trigger bank disintermediation. Furthermore, a modest but statistically significant increase in GDP ($p = 0.035$) was observed. Consequently, while the eNaira was introduced during a period of significant economic headwinds – including soaring inflation and plummeting remittances – its coexistence with growing traditional monetary aggregates and a rising GDP suggests potential resilience or neutral direct effects, though its specific impact must be disentangled from the overwhelming influence of concurrent macroeconomic volatility.


CBDC

Insights from Early-Adopting Countries: A Synthesis of Key Findings

The experiences of the Bahamas, Jamaica, and Nigeria in launching the world's first Central Bank Digital Currencies (CBDCs) provide valuable and consistent lessons for countries currently in the exploratory phase of CBDC implementation. The key insights from these early adopters are summarized below:

1. No Evidence of Bank Disintermediation: The most significant and reassuring finding is that the primary financial stability concern surrounding CBDCs did not materialize. In all cases, the data shows that Total Deposits in banking sector continued to grow significantly post-launch. This robustly demonstrates that the CBDC did not trigger a "flight of capital" or disintermediate the banking sector. Instead, the evidence suggests that public confidence in traditional banking institutions remained strong, with the CBDC acting as a complement to the existing financial system.

2. Coexistence with Physical Cash: The analysis consistently refutes the hypothesis that a CBDC would immediately substitute for and reduce the demand for physical cash. The data shows a statistically significant increase in Currency in Circulation (CIC) in the postlaunch period. This indicates that in their initial, low-adoption phase, CBDCs coexist with rather than displace physical currency.

3. No Significant Impact on Price Stability: Although headline inflation showed a slight increase after the introduction of CBDCs, this change was not statistically significant. This indicates that CBDC implementation did not have a direct effect on price stability. The observed fluctuations in inflation during the post-launch period were mainly influenced by broader global and domestic macroeconomic conditions rather than by the CBDC itself.

4. Dominance of Monetary Policy: A key contextual finding is that the post-CBDC launch period was often characterized by significant monetary policy tightening. Central banks in these countries were actively raising their policy rates to combat inflation. This deliberate policy action was the dominant force shaping financial conditions, far outweighing any potential impact from the nascent and sparsely adopted CBDC.

Rationale for Introducing CBDC in Rwanda

The rationale for introducing a CBDC in Rwanda focuses on four key priorities: enhancing payment system resilience, promoting financial innovation and competition, advancing the cashless economy agenda, and improving cross-border remittances. These priorities demonstrate Rwanda's dedication to developing a more efficient, inclusive, and digitally driven financial system

One of the main motivations for adopting a Central Bank Digital Currency (CBDC) in Rwanda is to enhance the resilience of the national payment system against network interruptions, power failures, and other operational disruptions. Although digital payments have grown rapidly – with retail e-payments reaching 211% of GDP (BNR Annual Report, 2023/2024) and mobile money transactions increasing significantly – heavy reliance on telecom providers introduces risks to the stability of digital transactions. Rwanda continues to face occasional power and network challenges, especially in rural areas, which can interrupt cashless payments. A well-designed CBDC could help address these issues by enabling secure offline transactions that can continue even without internet or electricity. This would not only strengthen the resilience of the payment system but also support financial inclusion by providing affordable and accessible digital payment solutions for all citizens (BNR, 2022).

Another important reason for adopting a Central Bank Digital Currency (CBDC) in Rwanda is to promote innovation and strengthen competition in the digital payment ecosystem. The current system is dominated by MTN and Airtel, resulting in limited competition and high transaction fees. A CBDC would provide a low-cost, secure, and accessible alternative, promoting a more competitive market while supporting innovation through open platforms that enable programmable payments and efficient government transfers.

Besides, with the implementation of CBDC, Rwanda aims to advance the country's long-term objective of a cashless economy while reducing the substantial costs linked to managing physical cash. Although monthly figures for currency in circulation have fluctuated, for instance, declining by 5.9% in January 2025 and rising by 5.4% in August 2025, physical money still represents a significant portion of the economy. This ongoing demand for cash incurs high costs related to printing, transportation, and processing. Introducing a CBDC could gradually lessen reliance on physical cash, reduce operational expenses for both the Central Bank and commercial banks, and enhance overall efficiency in the payment system.

Table 4: Currency in circulation growth

	Jan 25	Feb 25	Mar 25	Apr 25	May 25	Jun 25	Jul 25	Aug 25
Currency	-8.4%	0.4%	3.0%	4.0%	1.7%	8.1%	-3.1%	-2.6%
Currency in circulation	-5.9%	1.2%	0.9%	5.4%	2.9%	2.9%	-1.8%	-5.4%
Currency held in banks	-17.4%	-2.9%	11.7%	-1.2%	-3.1%	30.6%	-7.8%	7.5%

Source: BNR

Cross-border payments, widely used for remittances and trade, remain costly in subSaharan Africa despite growing volumes. In Rwanda, nearly half of adults participate in sending or receiving money, mostly through formal channels. A retail cross-border CBDC could reduce costs and improve efficiency, especially if interoperable within the East African Monetary Union. International projects have shown that CBDCs can cut transaction costs by up to 50% and enable seamless cross-currency payments, positioning Rwanda for future regional and global collaboration in remittances.

Potential Risks of CBDC and Recommended Mitigation Measure

Table 5: Key Risks of Introducing a CBDC in Rwanda and Suggested Mitigation Measures

Potential risk	Description	Recommended Mitigation Measures
Disintermediation	Risk that commercial banks may lose deposits or lending capacity if users move funds directly to CBDC accounts	Design the CBDC to complement bank deposits, set limits on CBDC holdings, and encourage banks to offer additional digital services
Money laundering	Risk that CBDC could be exploited to conceal illicit funds	Introduce strong measures to verify users' identities, monitor transactions for suspicious activity, and report unusual transactions to authorities
Data privacy and protection	Risk of unauthorized access or misuse of user information	Risk of unauthorized access or misuse of user information
Slow take-up	Risk that the public may adopt the CBDC more slowly than expected	Run awareness campaigns, provide incentives for usage, make the platform easy to use, and involve financial institutions in outreach efforts
Cybersecurity	Risk of hacking, fraud, or disruption of the CBDC system	Build strong cybersecurity protections, continuously monitor systems, have an incident response plan, and perform regular security testing

Limitations of the study

- The rollout of CBDCs in the case study countries coincided with the COVID-19 pandemic, making it difficult to isolate the independent economic effects of CBDC introduction from pandemic-related impacts.
- Data availability varied across the three countries, as not all indicators were consistently reported. This prevented the construction of a unified dataset and necessitated separate analyses for the Bahamas, Jamaica, Zimbabwe, Central African Republic (CAR), El Salvador, Switzerland, and Nigeria.
- Financial inclusion data were missing for some countries, despite inclusion being a major objective of CBDC initiatives globally.

Conclusion

The evidence from the world's first CBDC implementations consistently shows that the primary theoretical risks to financial stability, notably bank disintermediation, have not materialized. The most significant and universal challenge revealed is not instability, but the immense difficulty of achieving meaningful public adoption. Therefore, the immediate risk of a CBDC is not that it will be too disruptive, but that it will be too irrelevant.

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