Central Bank Digital Currency (CBDC) Adoption Challenges and Remittance Impacts: Empirical Evidence from Nigeria's eNaira Compared with Global Retail Pilots and US Federal Reserve Policy Stance

Awolowo Adenike
Independent Researcher
Email: nikeawolowo@gmail.com

Abstract

This paper evaluates adoption challenges and remittance potential of central bank digital currencies (CBDCs) by contrasting eNaira in Nigeria, cross-border retail pilots and also, US Federal Reserve Bank's view on CBDCs. The paper reviews the literature heralding the efficiency of the design, financial inclusion and payment system revolution but the results reveal a gap between the expected and realisation of adoption. The paper extends the current literature approaches by drawing on related studies to synthesise studies on CBDC design, adoption and institutional aspects. The findings indicate that user adoption is the bottleneck: although having access to the CBDC system infrastructure, financial users will not have an incentive to continue using CBDC for transactions without the right adoption conditions, such as user benefits, trust and network impacts. Remittance related impacts, in which impact is often the sought-after feature, depend on interoperability and coordination, which are yet immature. The effect on financial systems (such as disintermediation) is not extensively leveraged in absence of intensive adoption; implying that the impact on financial systems is dependent on critical mass adoption. Case studies across countries highlight these differences in policy, as operational constraints in value addition approach (via implementation) and a lag in exposure to and impact of defensive approach. The findings conclude that the effectiveness of CBDC is dependent on integration of design architecture, behavioural and institutional design concerns.

Keywords: Central bank digital currency; eNaira; adoption of CBDC; remittances; financial inclusion; payments; monetary policy; monetary system; digital currency; financial stability; cross-border payments.

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Introduction

The adoption of central bank digital currencies (CBDCs) from conceptualisation to experimentation has been mixed. The arguments of why we need to adopt them - to enhance payments, to enhance monetary policy and make financial inclusion possible - has been well documented (Engert & Fung 2017, Mancini-Griffoli et al. 2018). However, the issues that appear in the design and use has revealed a gap between the design and use. Indeed, Nigeria's eNaira is an example of this phenomenon: it is the first CBDC to be used for retail payments but the eNaira's adoption has not gone as planned and it should be reflective of the factors necessary for successful CBDCs (Chukwuere, 2021; Salihu et al., 2021).

The literature is not unanimous on the impact of CBDCs. Certain studies champion CBDCs as a new central bank business model that helps to maintain financial stability and payment system resilience (Kim & Kwon, 2019; Bindseil, 2019). Others emphasise potentially different impacts and consequences for banking and monetary policy (Chiu et al., 2019; Fernández-Villaverde et al., 2021). These perspectives highlight that CBDCs are not "innocent" and the effects depend on their design and policy settings, regulatory frameworks and user behaviours. While the recent designs of global CBDC pilots are emphasising the design and efficiency of the technology, the Nigerian case also raises our concerns of adoption and usage (Lee et al., 2021; Kiff et al., 2020).

Another key challenge highlighted by recent events is the 'access-usage' challenge. The foundation of CBDC designs is based on digital access translates to use, which is part of a regulatory dilemma that some of the recent reports claim it might not follow. This may be determined by trust, security, regulatory certainty and the perceived relative advantage of its use versus existing payment systems (Nkomo, 2021; Li et al., 2021). In the instance of eNaira, this becomes awareness that becomes interest, not necessarily transaction, suggesting that there might be more to the influence and role of technology than just behavioural and institutional consideration (Salihu et al, 2021). This is similar to the issue with much of the literature as the focus is on the design which has not been complemented with the power of customer incentives and network effects (Qian, 2019; Bjerg, 2017).

The implications for remittance systems, add to this intrigue. CBDC by its nature can be thought of as a technology which will reduce costs and enable faster remittance payments.

However, interoperability, regulatory harmonisation and market acceptance is needed to achieve all these objectives, which are not built into the technology (Carapella & Flemming, 2020; Tronnier et al., 2020). The availability of existing remittance channels implies a CBDC doesn't naturally replace the existing channels. This gives rise to questions on CBDCs' capacity to change the remittance system balance without addressing deeper problems.

Cross-border remittance case studies and analysis support this. CBDC pilots in the retail industries have been piloting CBDCs for their designs, governance structures and interfaces (Chaum et al 2021; Lee et al 2021). Now, the current U.S. Federal Reserve policy is conservative, considering issues of financial stability, privacy and institutional impact. It suggests a combination of innovation and policy risks, with innovation facing issues with experimentation and policy cannot afford to deploy CBDCs lest evidence should emerge.

This research gap is the "theory-practice gap". Much has been written about the designs, institutional goals and expected effects of CBDCs but little on the balance between user adoption, remittances and institutional issues. The eNaira, Nigeria's CBDC with the global pilot and the U.S. example can offer some insights to this effect. It is less a problem of CDBCs rather how they can complement existing systems in terms of remittances and end user issues.

Literature Review

2.1 CBDC Motivation and Objectives

The central bank digital currency (CBDC) literature starts with the conceptualisation of digital currency, issued by a sovereign authority, to supplement or replace physical cash, and improve payment system efficiency. Initial conceptual models focus on motivations grounded in cash decline, payments innovation, and the central bank in the monetary system of the future (Engert & Fung, 2017; Mancini-Griffoli et al., 2018). Overviews of CBDC literature combine these motivations into three broad priorities: payment system efficiency, financial inclusion and monetary policy effectiveness (Carapella & Flemming, 2020; Kiff et al., 2020).

Fernández-Villaverde et al. (2021) view CBDCs as a fundamental shift in the nature of central banking, given direct access to central bank liabilities, which could also affect monetary transmission. This differs from more gradual views which see CBDCs as enhancements of existing

payment systems rather than fundamental shifts (Tronnier et al., 2020). This highlights a debate in the literature over whether CBDCs are innovations or innovations in financial systems.

2.2 Architecture and Policy Considerations

CBDC design has been widely discussed in terms of alternative design options, which reflect trade-offs between efficiency, control, privacy and system stability. Qian (2019) focuses on design for optimisation of issuance, suggesting CBDCs need to combine liquidity with monetary policy. Likewise, Bindseil (2019) notes the impact of CBDC design on financial system stability, in particular with respect to banking disintermediation risk.

The design conundrum is compounded by what Bjerg (2017) refers to as a policy trilemma between financial stability, payment efficiency and privacy. It is impossible to do so optimally on all three elements. Li et al. (2021) build upon this trilemma and explain how best practices should take into account interoperability, scalability and user-friendliness - but these recommendations are highly technical and fall short of considering behavioural constraints.

Chiu et al. (2019) further add to the banking viewpoint, showing that the introduction of CBDC can impact deposit taking arrangements and loan capacity for banks, which in turn, affect financial intermediation. This gives rise to a structural trade-off between innovation and stability, in which design considerations impact the financial ecosystem. Although technical approaches have been proposed (such as more private designs, Chaum et al. 2021), there is no consensus on a single optimal design, further supporting a unique CBDC design for different institutions.

2.3 User Adoption: Cognitive and Institutional Struggles

Although issues in design have improved, adoption remains a pivotal yet under-acknowledged aspect. Theoretical literature often assumes that access to the CBDC infrastructure will translate to usage, but research shows that this is not necessarily the case. Nkomo (2021) shows the role of legal certainty and regulatory clarity in the acceptance of CBDC by users, suggesting that institutional factors play a pivotal role in the adoption process.

In Nigeria, Chukwuere (2021) highlights opportunities and risks of the introduction of the eNaira, suggesting that the introduction of the eNaira does not necessarily lead to wide adoption.

Salihu et al. (2021) further demonstrate that awareness of the CBDC is not sufficient for participation, particularly in markets like real estate where other forms of payment are favoured. This evidence contradicts the assumption in the CBDC literature that supply of the new technology leads to usage.

This discrepancy can be attributed to network dynamics and incentives. Qian (2019) proposes that adoption is driven by the perceived value compared to alternatives, but Bjerg (2017) also highlights the importance of trust and credibility. But they are not fully incorporated into conventional CBDC models, which focus primarily on technical issues. This reduces the frameworks' ability to explain real-world systems.

2.4 CBDCs and Financial Stability

CBDCs' impact on financial stability is debated. Kim and Kwon (2019) suggest that CBDCs can support financial stability by advancing payment efficiencies and decreasing systemic risk in payment systems. On the other hand, Chiu et al. (2019) point to destabilising risks, especially resulting from disintermediation and changes to deposits.

Bindseil (2019) adds complexity to the debate by highlighting the potential influence of CBDC designs on financial stability. An ill-designed CBDC might amplify liquidity issues in stressful times when users withdraw their deposits from commercial banks and transfer them directly to central bank accounts. Fernández-Villaverde et al. (2021) build on this insight, hypothesizing that ubiquitous access to central bank money may transform the banking system, giving rise to new risks.

These seemingly contradictory views suggest that CBDCs' impact on financial stability is not predetermined, but rather consequential on how they interact with other aspects of the financial system. As such, the literature is divided about CBDCs' stabilising or destabilising effects, mirroring uncertainties about their systemic implications.

2.5 CBDC Potential for Remittances

Many see potential in CBDCs to improve cross-border payments systems, with a particular focus on lower costs and delays. Carapella and Flemming (2020), for instance, credit remittance

efficiency to CBDCs, while Tronnier et al. (2020) highlight the significance of CBDCs in facilitating payment interoperability.

But these promises are subject to conditions. Current remittance systems reflect regulatory and correspondent banking relationships and market dynamics that are difficult to replace through digital channels. These ideas are not new, but their enduring nature is undervalued. The interoperability of CBDCs across countries and regulatory harmonisation across jurisdictions is essential for a CBDC to achieve the promised efficiency gains.

This is especially true for developing countries where remittance transactions are concentrated in informal systems and existing financial systems. CBDC issuance does not automatically overcome these challenges, implying that technology may not impart a fundamental shift to cross-border payments.

2.6 International CBDC Pilots, and Policy Diversity

The variety of CBDC pilot projects and policy assessments globally are diverse. Lee et al. (2021) offer insights by comparing the country experiences: jurisdictions differ in their goals, design considerations and strategies. Some emerging markets aim to achieve financial inclusion, whereas others are more focused on payment efficiency or sovereignty.

Kiff et al. (2020) outline the retail CBDC experiments and their differences in design, governance and participant engagement. This suggests that CBDC approaches are not converging but context-specific. Chaum et al. (2021) add to this conversation by outlining technical mechanisms to render the issue of CBDC secure and privacy-protecting, but these are often still theoretical proposals.

On the other hand, the United States Federal Reserve's policy response reflects the more conservative view, highlighting the importance of risk assessment before introducing CBDC. Such contrast between early movers and risk-averse institutions highlight issues with uncertainty on CBDC deployment and its impacts.

2.7 Integration and Research Gap

The body of research on CBDCs is widespread but there are gaps along four fronts of design architecture, financial stability, user behaviour and remittance efficiency. These streams offer rich perspectives, but have limited integration. Design-centered explorations highlight technical concerns but neglect behavioral considerations. User studies point to usage issues, but it does not completely link them to design and policy initiatives. Likewise, analyses of remittance efficiency are often decoupled from institutions and markets.

This leaves gaps in our understanding of CBDC effectiveness. The interplay of adoption issues and remittance benefits, especially within practical applications (such as Nigeria's eNaira), is under researched. Additionally, we have limited comparison between nascent examples, global pilots and pragmatic policy.

To overcome this, a synthesis of design, adoption and institutional perspectives is needed. This allows for a more holistic assessment of whether CBDCs can meet their aims given current financial and market conditions.

Methodology

3.1 Research Design and Comparative Framework

The study adopts a comparative case-based analytical design to examine CBDC adoption challenges and remittance implications across three distinct contexts:

1. Nigeria’s eNaira (full-scale retail implementation)
2. Global retail CBDC pilot programs (experimental and controlled deployment)
3. The United States Federal Reserve policy stance (non-adoption with ongoing evaluation)

This structure allows the analysis to move beyond isolated case interpretation toward a comparative institutional assessment, where differences in adoption outcomes are explained through design features, policy choices, and user behavior. The approach is consistent with the

literature's emphasis on heterogeneity in CBDC development paths rather than convergence toward a single model (Lee et al., 2021; Kiff et al., 2020).

Table 1: Core Variables and Analytical Roles

Dimension	**Variable Description**	**Analytical Role**	**Literature Basis**
CBDC Design	Architecture, privacy, accessibility	Determines usability and systemic impact	Bindseil (2019); Li et al. (2021)
Adoption	Awareness, onboarding, user trust	Captures initial uptake dynamics	Nkomo (2021); Chukwuere (2021)
Usage	Transaction frequency, network participation	Measures effective engagement beyond access	Salihu et al. (2021); Qian (2019)
Financial Stability	Banking interaction, liquidity shifts	Assesses systemic implications	Kim & Kwon (2019); Chiu et al. (2019)
Remittance Impact	Cost efficiency, settlement speed, interoperability	Evaluates cross-border payment effects	Carapella & Flemming (2020); Tronnier et al. (2020)
Policy Stance	Regulatory position, institutional caution	Explains variation across jurisdictions	Engert & Fung (2017); Mancini-Griffoli et al. (2018)

3.2 Analytical Model: Adoption Usage Remittance Link

The methodology is built around a three-layer analytical model that captures the transition from CBDC availability to economic impact:

- **Adoption Layer:** awareness, access, and initial onboarding
- **Usage Layer:** transaction frequency, behavioral engagement, and network effects
- **Remittance Layer:** cross-border efficiency, cost structure, and settlement dynamics

This structure reflects the distinction between access and effective utilization identified in adoption studies (Nkomo, 2021; Salihu et al., 2021). It also aligns with the broader literature on payment systems, where functionality does not guarantee usage without sufficient incentives and trust (Qian, 2019; Bjerg, 2017).

3.3 Variable Definition and Theoretical Anchoring

Variables are defined based on their roles in the literature rather than generic proxies, ensuring conceptual consistency.

3.4 Data and Evidence Base

The study relies on a structured synthesis of empirical findings, policy reports, and theoretical models drawn exclusively from the provided references. Rather than introducing external datasets, the methodology extracts:

- Observed adoption patterns from Nigeria's eNaira context (Chukwuere, 2021; Salihu et al., 2021)
- Comparative insights from global CBDC pilots (Lee et al., 2021; Kiff et al., 2020)
- Policy positioning and conceptual frameworks from central banking literature (Engert & Fung, 2017; Mancini-Griffoli et al., 2018)

This approach ensures that all analytical claims remain grounded in documented research while allowing cross-context comparison.

3.5 Comparative Evaluation Procedure

The analysis proceeds in three stages:

Stage 1: Within-Case Assessment

Each case (eNaira, global pilots, U.S. stance) is evaluated independently across:

- Design structure
- Adoption dynamics
- Usage outcomes
- Remittance implications

Stage 2: Cross-Case Comparison

Findings are compared to identify:

- Structural differences in adoption outcomes
- Variations in policy objectives and constraints
- Divergence between theoretical expectations and empirical results

Stage 3: Integration

The results are synthesized into a unified framework explaining:

- Why adoption varies across contexts
- How design and policy interact with user behavior
- Why remittance improvements remain conditional

3.6 Scenario-Based Interpretation

To clarify the interaction between adoption and remittance outcomes, three stylized scenarios are evaluated:

Scenario	**Characteristics**	**Expected Outcome**
High Access / Low Usage	Widespread availability but weak engagement	Limited economic impact
Moderate Adoption / Network Growth	Gradual increase in usage with network effects	Incremental efficiency gains
Integrated Adoption / Interoperability	Strong usage with cross-border integration	Significant remittance improvement

These scenarios reflect patterns observed in CBDC research, where adoption intensity determines the extent of economic impact (Carapella & Flemming, 2020; Fernández-Villaverde et al., 2021).

3.7 Analytical Assumptions and Constraints

The methodology assumes that:

- CBDC effectiveness depends on both design and behavioral factors
- Institutional context shapes adoption outcomes
- Remittance efficiency is conditional on interoperability and network participation

Limitations arise from the absence of unified cross-country datasets, requiring reliance on comparative synthesis rather than econometric estimation. However, this approach allows for deeper integration of theoretical and empirical insights across diverse contexts.

3.8 Methodological Contribution

The methodology advances existing approaches by linking CBDC design, user adoption, and remittance outcomes within a single analytical framework. It shifts the focus from isolated evaluation toward interaction effects, providing a basis for understanding why technically functional CBDCs may fail to achieve expected economic outcomes.

Results

4.1 Adoption Outcomes: eNaira Versus Global Patterns

The evidence indicates a clear divergence between CBDC availability and effective adoption. In the case of Nigeria's eNaira, implementation achieved rapid system deployment but did not translate into sustained transactional usage. Awareness levels and initial onboarding were present, yet user engagement remained limited, particularly in routine payment activities (Chukwuere, 2021; Salihu et al., 2021). This pattern corresponds to a high access low usage outcome, where infrastructure exists without sufficient network participation.

By contrast, global retail CBDC pilots have largely avoided this disconnect by limiting scale and focusing on controlled experimentation. These pilots prioritize testing of design features such as user interface, transaction limits, and privacy configurations rather than immediate mass adoption (Lee et al., 2021; Kiff et al., 2020). As a result, adoption metrics in these contexts are not directly comparable to the eNaira, since they are not designed for full market penetration. The divergence suggests that early large-scale deployment exposes adoption constraints more clearly than phased pilot approaches.

4.2 Design Versus Usage Disconnect

The results show that design functionality does not guarantee user engagement. The eNaira incorporates core CBDC features digital wallets, transaction capabilities, and central bank backing yet these attributes have not been sufficient to generate consistent usage. This outcome reflects a broader limitation in CBDC design frameworks, which emphasize technical efficiency but do not fully account for user incentives and behavioral adoption (Li et al., 2021; Qian, 2019).

Table 2: Comparative Adoption Outcomes

Dimension	**eNaira (Nigeria)**	**Global CBDC Pilots**	**U.S. Federal Reserve Stance**
Deployment Scale	Full retail implementation	Controlled pilot programs	No retail deployment
Adoption Pattern	High awareness, low sustained usage	Limited but structured participation	No adoption (policy evaluation)
Policy Approach	Implementation-led	Experimentation-led	Caution-led
User Engagement	Weak transaction frequency	Targeted testing	Not applicable

In global pilot environments, design adjustments are continuously tested against user responses, allowing iterative refinement. This contrasts with the Nigerian case, where deployment preceded extensive behavioral validation. The difference highlights a sequencing issue: design optimization without behavioral integration produces limited adoption outcomes.

4.3 Financial System Interaction

The introduction of the eNaira has not produced significant observable shifts in financial intermediation. Concerns in the literature regarding bank disintermediation and liquidity migration have not materialized at scale, largely due to low usage levels (Chiu et al., 2019; Bindseil, 2019). This suggests that systemic impact is conditional on adoption intensity rather than mere availability.

In contrast, theoretical models predicting broader financial system effects assume high participation rates (Fernández-Villaverde et al., 2021). The results therefore indicate that current CBDC deployments operate below the threshold required to generate systemic change. Financial stability implications remain largely latent rather than active.

4.4 Remittance Impact: Potential Versus Realization

The findings reveal a gap between the expected and actual impact of CBDCs on remittance systems. While CBDCs are positioned as tools for reducing cross-border transaction costs and improving settlement efficiency, the eNaira has not significantly altered existing remittance channels. Traditional systems continue to dominate, reflecting entrenched network structures and regulatory constraints.

This outcome aligns with the conditional nature of remittance improvements identified in the literature. Efficiency gains depend on interoperability, cross-border coordination, and user adoption, none of which are fully developed in current implementations (Carapella & Flemming, 2020; Tronnier et al., 2020). The absence of these conditions limits the ability of CBDCs to displace established remittance mechanisms.

Table 3: Remittance Impact Assessment

Factor	**Expected CBDC Effect**	**Observed Outcome (eNaira Context)**
Transaction Cost	Reduction through direct settlement	No significant change
Settlement Speed	Faster cross-border transactions	Limited observable improvement
Interoperability	Integration with global systems	Constrained
User Adoption	Increased usage for remittances	Low utilization

4.5 Policy Divergence and Strategic Positioning

The comparison highlights a clear divergence in policy strategies. Nigeria adopted an implementation-first approach, prioritizing early deployment. Global pilots emphasize controlled experimentation, while the United States Federal Reserve maintains a cautious stance, focusing on risk evaluation before adoption (Engert & Fung, 2017; Mancini-Griffoli et al., 2018).

This divergence produces different outcome profiles. Early deployment reveals practical constraints but accelerates learning, while cautious approaches delay both risks and potential benefits. The results suggest that policy sequencing influences not only adoption outcomes but also the visibility of structural challenges.

4.6 Adoption Constraints as Structural Factors

Across all cases, adoption constraints emerge as the dominant factor limiting CBDC effectiveness. These constraints include:

- Limited perceived advantage over existing payment systems
- Insufficient network effects to sustain usage
- Institutional and trust-related barriers

These findings are consistent with legal and behavioral analyses that emphasize the role of trust and regulatory clarity in shaping adoption (Nkomo, 2021). They also reinforce the argument that CBDC success depends on user incentives rather than technological capability alone.

4.7 Synthesis of Findings

The results establish three central outcomes:

1. **Adoption is the binding constraint:** Availability does not translate into usage without sufficient incentives and trust.
2. **Design is necessary but insufficient:** Technical functionality must be aligned with behavioral dynamics.

3. **Remittance impact is conditional:** Efficiency gains require interoperability and network participation beyond domestic systems.

Taken together, these findings indicate that CBDC effectiveness is determined by the interaction between design, adoption, and institutional context, rather than by technological deployment alone.

Discussion

Our findings suggest that the efficacy of CBDC is constrained by adoption patterns, rather than design elements. This insight conflicts with a major strand of the literature that focuses on design optimisation. Design principles focus on efficiency, security and scalability (Li et al, 2021; Qian, 2019) but the eNaira suggests that capability does not translate into usage. This suggests that the design-oriented framework overrates the importance of incentives and network effects. By contrast, Bjerg (2017) foreshadows this challenge when designing CBDC as a balance between multiple goals, including adoption. Our findings build on this perspective by showing user behavior is not just an important consideration but indeed a constraint on technology effectiveness.

The access-usage dichotomy complicates the adoption story. Within current frameworks financial inclusion is often equated to digital access, but from the perspective of this research, access does not translate into usage. This echoes the institutional view of Nkomo (2021) where trust and legal certainty are important factors. But the findings show that although institutional mechanisms are in place, adoption may not be extensive if the benefits are not sufficient. This rings true in the finding by Salihu et al. (2021) in Nigeria, where knowledge of the CBDC is not translating to actual use. This suggests CBDC adoption is within a network effect situation, where participation is dependent on others' participation.

The benefits for financial stability also differ from expectations. Models of disintermediation and liquidity shifts rely on high adoption (Chiu et al., 2019; Fernández-Villaverde et al., 2021). Our findings do not support these conclusions at current levels, implying that systemic implications are not immediate. Bindseil (2019) highlights design factors in reducing stability risks, but the results show that low adoption renders these ineffectual. This creates a

threshold effect: CBDCs must be adopted to a critical threshold before systemic effects become pertinent in practice. Until then, they remain quasi-money rather than systemic financial instruments.

The impacts for remittances reinforce the need to temper expectations. The literature often cites CBDCs as a way to lower the costs and increase efficiency of international transactions (Carapella & Flemming, 2020; Tronnier et al., 2020). Our results temper this view by demonstrating that these benefits apply under conditions of interoperability and integration. Without these, CBDCs do not crowd out existing remittance systems. This implies that the remittance implications of CBDCs are contingent on across-border institutional technological co-ordination. The continued use of traditional remittance channels suggests that institutional frictions (regulatory, infrastructural, and behavioural) prevail.

Cross-country lessons disclose policy strategy's importance. The readiness-first model in Nigeria underscores constraints in adoption not evident in the pilots. International pilots, as per Lee et al. (2021) and Kiff et al. (2020), focus on experimentation, enabling gradual refinement of design and user behaviour. By contrast, the cautious approach of the Federal Reserve Bank of the US reflects doubts about potential risks, involving financial stability and privacy (Engert & Fung, 2017; Mancini-Griffoli et al., 2018). These contrasting positions reflect an innovation versus risk trade-off. Pioneers face operational challenges, with the latter deferring benefits and risks.

The interplay of design, adoption and policy points to an uphill task for CBDC research. Current research generally disconnects them, rendering them discrete studies of design, system impacts and usage. The findings suggest CBDC effectiveness relies on their integration. The design of CBDC affects the incentive to adopt, which affects the systemic impact. This is partly overlooked by existing models that imply linear causality between adoption and outcomes.

Good governance also moderates these factors. Effective coordination, regulatory certainty, and trust in system security determine the success of CBDCs in attaining their goals. This results in ad-hoc adoption and missed remittance benefits. This softens the view that CBDCs are not just a technological innovation but an institutional innovation dependent on policy and market factors.

The significance of theanalysis is that it casts adoption as the key variable integrating CBDC design and economic outcomes. It shows that CBDC adoption does not necessarily lead to efficiency gains or economic change. Rather, it is constrained by behavioral, institutional and network factors. It reframes the question from CBDC feasibility to the ability to integrate with the financial ecosystem.

Conclusion

CBDCs are not effective because their effectiveness is determined by a technology platform; it is because of their design, adoption and institutional factors. The results with the eNaira in Nigeria demonstrate that creating a new currency implies it is alive but if it's on a network it results in low economic impact. The gap in this reveals a shift in CBDC interpretation from being a design problem, to limiting a mediation approach between policy and effects by adoption.

The findings also support that the assumptions on the benefits on remittance efficacy are conditional. In the absence of interoperability, coordination on providing cross-border remittances and user interaction, CBDCs are not connected to remittances and therefore, there is no cost effect. Likewise, financial stability consequences may not be realisable at low levels of adoption suggesting that the financial consequences of CBDCs become realisable at a critical mass in adoption. This research has highlighted a sequencing issue in the design of CBDCs in which implementation has taken place before behavioural and institutional (institutional) issues.

Across regions, the focus is on the policy approach. The consequences of "doing first" are to bring technology implementation into view and provide opportunity for learning and trialing roll-outs of limited size and scope deferring risk and potential return. Across the globe, there is the general understanding that CBDCs are part of a system (that is, the financial system). Designing the link between regulations and incentives are central to its ability to impact in payments, remittances, and financial stability. Otherwise there is a separation between pseudocolour and reality.

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