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| RESEARCH ARTICLE

Cashless Policy Transitions and Currency Substitution: Nigeria's 2012-2022 Evolution Compared with Sweden, China, South Korea, and US Instant Payments Via Fednow

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| ABSTRACT

The study assesses whether digital payments result in long-term declines in cash use or hybrid payment systems. The findings reveal that although digital payments have grown, cash has persisted, especially in segments characterised by informality, transaction costs, and trust issues. Comparative findings suggest that transition trajectories vary among countries, with policy-, market- and infrastructure-dominated transition processes leading to different outcomes. The results show that the transition is characterised by currency substitution, rather than replacement. Consumers distribute transactions across instruments based on the situation, leading to the co-existence of cash and digital systems. The benefits of financial inclusion are not shared, with digital infrastructure not always leading to digital use. The research suggests the success of cashless policies hinges on the interplay between institutional, user, and technological contexts, rather than the growth in digital payments.

| KEYWORDS

Cashless economy; currency substitution; digital payments; Nigeria; payment systems; financial inclusion; fintech; monetary systems; payment behavior; financial infrastructure.

| ARTICLE INFORMATION

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1. Introduction

Electronic payments are widely accepted in the global system and the developing world, but in an evolutionary process. Cashless shift is understood as an evolutionary process towards efficiency, but we demonstrate that cash substitution is not uniform and irreversible. Rather, payment shifts are dependent on economic institutional capacity, the informal sector and technological capacity, and policy (Marszałek & Szarzec, 2021; Boeschoten, 2012). An example is the payment-ecology in the cashless shift in Nigeria (2012-2022) where policy-driven cashless transactions have paralleled currency substitution and cash-on-hand transactions (Achor & Robert, 2013).

Theoretical perspectives on cashless shift are polarised. There is the positive side of digitalization linked to efficiency gains, greater inclusion and cost reduction (Barr et al., 2020; Allen et al., 2021). On the other hand, we have concerns about exclusion risks, circulation in the shadow economy and cash as a store of value and as a means of payment (Fabris, 2019; Marmora, Mason, 2021). The end of cash, despite high digitalization level in some countries, fails the "death of cash" theory. Rather, it seems related to multiple factors such as financial trust, regulatory and economic context.

Nigerian cashless policy, introduced in 2012, was designed to encourage payment system innovation, minimize the cost of maintaining cash (and the cost of holding cash) and enhance the transmission of monetary policy. But the

results are more nuanced. Electronic payments grew but there was no associated reduction in demand for cash, suggesting substitution but not substitution. This finding is in line with other emerging markets where cash is not replaced by electronic payments, even if there is a formal or informal payment system (Dzokoto & Imasiku, 2016, Gorshkov, 2022). This suggests cashless policies affect the payment mix but not cash demand.

Mature market evidence is conflicting. Sweden is an example of cashless policies because of trust and technologically advanced digital payments. In South Korea, the "coinless society" movement is a transitioning stage with digital payments in a world with constantly diminishing cash (Moon, 2017). China's very large-scale digital payment platforms are a broad-based approach to digital payments (with extensive integration across platforms). By contrast, in the US, the priority is an incremental strategy with greater emphasis on payment system improvements such as instant payments (Barr et al., 2020).

Instant payments (such as FedNow in the US) are also part of the story. The systems seek to achieve faster and more inclusive payments, but not off-line from cash, and therefore open to the possibilities for payment system evolution. This is different from more aggressive less cash where policy aims to accelerate the change. This brings out a question: Will payment system reforms be bound for cash lessness, or can hybrid systems coexist?

The next question relates to substitution. Consumers may choose to substitute cash, bank deposits, mobile money and new digital currencies to the use of new payment instruments, rather than removing cash. This demonstrates the ease, payment costs and trust transfer in payment systems (Boeschoten, 2012; Mu & Mu, 2022). In the case of Nigeria, we observe rather than a smooth transition, a co-existence of payment systems (mobile money, bank deposits and cash). The same applies elsewhere in the emerging markets, digital integration of payments systems co-exists.

These co-existences and/or transitions are also affected by institutional and regulatory views, as shown above. The right to operate for central banks, financial institutions and tech companies (especially multinational) are key to monetary reform (Arugula & Gade, 2020). And regulations need to consider issues of financial inclusion, privacy and money laundering (Frulli, 2020; Budnitz, 2022). They slow the uptake and ambivalence of systems.

This research aims to bridge the gap between on one hand the policy rhetoric and aims of the cashless policy and on the other hand the realities, by examining the case of the cashless reform in Nigeria and comparing it to cases from Sweden, China, South Korea and the US. It addresses what aspects other than the feasibility of going cashless are relevant, but the consequences of cash substitution effects. It explores through theories of digitization, evolution of payment systems and institutional power the effects of cashless policy reforms, that is whether it drives structural change or the adaptation of the structure of the existing payment system.

2. Literature Review

2.1 Cashless Change and the Future

Cashless economies are considered part of the digitisation of the financial sector, but studies are not unanimous. It affects corporate behaviour, the efficiency of transaction and financial costs but has a partial effect on cash (Marszałek & Szarzec, 2021). History on payment systems shows that usually new technologies co-exist with the older ones in a hybrid monetary system (Boeschoten, 2012; Mitrofanova et al., 2020).

Fabris (2019) rejects the arguments advanced by those who find the future of cashless payments predictable by pointing to institutional players like trust, availability and systemic risk that restrict taking cash out of the payments system. Similarly, if cash is efficient, then Achord et al. (2017) say cashless (payments) comes with new risks, such as operational risks, and reliance on the internet. These views, therefore, argue cashless transitions are more fairly to say displacements.

2.2 Experiences of Cashless Policies

The nature of cashless transitions varies in developing countries. In Nigeria for instance, the journey towards less cashlessness was motivated by goals like cost, control of money supply and financial inclusion (Achor & Robert, 2013). The point being the evidence is that it is not policy driven.

Evidence from emerging markets indicate the shift from cash payments to electronic payments is not complemented by a decline in cash payments because of the level of informality and low trust (Gorshkov, 2022; Dzokoto & Imasiku, 2016). Cash is required for anonymity or convenience in these markets. Marmora and Mason (2021) also show the poor economy may trump the cashless policy; cash demand exists when there is an increase in e-payments.

This is further compounded when regulatory considerations add into the mix and Frulli (2020) confirms that while cashless payments may modify money laundering, do not eliminate it. They can even re-organize it. Once again this puts the success of the regulations down to compliance, not the technologies themselves.

2.3 Payment Circuits and Currency Substitution

A concept with cashless payments is currency substitution. Consumers select cash or other payments, depending on location, price and trust insights. Boeschoten (2012) demonstrates payment choice is based on frequency, value and choice, creating the complexity of the payments system.

Digital payment and financial technology (fintech) are part of this. If anything, according to Mu and Mu (2022), the new digital payment instruments (such as central bank digital currencies (CBDCS) are complementary. Neuby (2022) also implies the centralised and decentralised digital payment models disrupt financial intermediation, but not money.

Policy implications of multiple payment options. Rather than the death of cash, digital money may lead to various use cases that increase hybrid forms of money (cash and digital money) complemented with e-payments. This is in line with recent evidence from emerging countries where it is adopted in a disjointed manner across financial channels (Dzokoto & Imasiku, 2016).

2.4 Financial Inclusion, Inclusion and Access

Cashless concepts and policies fit with financial inclusion but with equity considerations. Barr et al. (2020) see new payment technologies potentially increasing inclusion (through lower cost, better service access). But it needs infrastructure and capabilities.

As Bundnitz (2022) notes, the marginalised have low levels of digital skills, financial inclusion and trust in the financial sector. These stand in the way of cashless payments, especially in an unregulated cash lending environment. Further, Allen et al. (2021) emphasized that fintech adoption is unequal across the population, contributing to inequality.

These observations suggest cashless payments may create a two-sided payments system: a group of individuals benefiting from integration of digital payments and using the codes in place of cashless payments. This is contrary to the idea that financial inclusion is associated with the increased use of digital payments.

2.5 International evidence: Developed economies and Transitions

Developed economies with cashless systems Why is Sweden not cashless and more? But cash still exists, which means that the community still relies on cash (Fabris, 2019).

But the "coinless society" in South Korea is a comprehensive plan to include digital payments to implement cashless (Moon, 2017). This is a more realistic approach, emphasising usability.

Conversely, the Chinese digital payment systems are based on a market economy, with the integration and innovation in financial technologies (Fintech) (Allen et al, 2021). New markets focus on policy, with a more active government.

But the experience of the US offers a different perspective with payment system reforms and not cashless. Policies are designed to increase the efficiency of payments (with technology upgrades) but not behaviour (Barr et al 2020). This implies cashless societies could be created without policy settings.

2.6 Payment Systems - Innovation and Coordination

Cashless reforms rely on techno-institutional environment. Coordination between central banks, banks and tech companies help to integrate the payment system (Arugula & Gade, 2020).

Gupta et al. (2022) highlights innovations by the private sector in the creation of digital payment systems, especially international payment systems. However, interactions between the private platforms and policy making leads to issues like governance and risks in the payment systems.

Mitrofanova et al. (2020) highlights the importance of technological and institutional changes for monetary systems in the development of monetary systems. The lack of alignment can enable the development of electronic payment systems without change. This explains the need for regulatory structures to reach desired outcomes in payment systems.

2.7 Risks, Limitations and Constraints

Cashless payment systems and frameworks bring new risks and constraints. Achord et al. (2017) mention technical risks regarding disruptions and cyber-attacks. Similarly, Franlli (2019) underscores the importance of the risk of using cashless payment systems for new types of frauds, which calls for new regulations.

Fabris (2019) highlights how vulnerabilities are contributing to the confirmation of the role of cash as a hedging instrument in crisis. This is a sign of the cash function of money as a means of payment but also as insurance in the payment system.

Marmora and Mason (2021) also show the persistence of cash in terms of demand in the case of a high degree of digitalisation because of structural factors (such as the presence of the shadow economy). This brings the limits to cashless transitions with economic constraints not only being circumvented by technological advances.

2.8 Summary and Gap

Resources on cashless transitions generally fall out into four streams: payments digitalising, financial inclusion, payments systems and payments institutions. These provide valuable insights but can be fragmented.

What we learn is that cashless policies don't eliminate cash but shift cash's uses in a payments mix. One main strategy is currency substitution, where consumers use multiple payments to make transactions, rather than using one form of money.

But learning across countries is in its infancy. Specifically, the issues of policy-led payments reform in developing countries and market-led payments reform in developed countries have not been fully discussed. The lessons from Nigeria and other countries (such as Sweden, China, Korea and US) can assist in this, through the lens of policy, institution and payment as a triad.

3. Methodology

3.1 Research Design and Strategy

The study adopts a comparative, multi-country analytical design to evaluate cashless policy transitions and currency substitution dynamics across five contexts: Nigeria (2012–2022), Sweden, China, South Korea, and the United States. This design enables the identification of structural differences in policy approach, payment behavior, and monetary outcomes. Comparative methods are particularly appropriate where institutional, technological, and economic conditions vary significantly across jurisdictions (Allen et al., 2021; Marszałek & Szarzec, 2021).

Rather than treating cashless transition as a uniform process, the methodology assumes heterogeneity in outcomes, driven by differences in financial infrastructure, regulatory frameworks, and user behavior. This aligns with evidence that digital payment adoption is context-dependent and influenced by both institutional and market forces (Gorshkov, 2022; Boeschoten, 2012).

3.2 Analytical Framework: Cashless Transition Currency Substitution Model

The analysis is structured around a three-layer framework capturing the interaction between policy, behavior, and monetary outcomes:

- **Policy Layer:** cashless initiatives, regulatory interventions, and payment system reforms
- **Adoption Layer:** user uptake, transaction preferences, and digital payment penetration

- **Substitution Layer:** shifts between cash, electronic payments, and alternative instruments

This framework reflects the literature's emphasis on currency coexistence rather than replacement, where multiple payment instruments operate simultaneously (Fabris, 2019; Mu & Mu, 2022). It also incorporates the role of the shadow economy and informal systems in sustaining cash demand (Marmora & Mason, 2021).

3.3 Variable Definition and Measurement Logic

Variables are defined based on their theoretical relevance and empirical observability within the provided literature.

Table 1: Core Variables and Analytical Roles

Dimension	Variable Description	Analytical Role	Supporting Literature
Policy Intensity	Degree of cashless enforcement and regulation	Captures strength of policy intervention	Achor & Robert (2013); Barr et al. (2020)
Digital Adoption	Usage of electronic and mobile payments	Measures behavioral response to policy	Allen et al. (2021); Dzokoto & Imasiku (2016)
Cash Demand	Persistence of physical currency usage	Indicates resistance to transition	Boeschoten (2012); Fabris (2019)
Shadow Economy	Informal economic activity	Explains continued reliance on cash	Marmora & Mason (2021)
Financial Inclusion	Access to digital financial services	Evaluates inclusiveness of transition	Budnitz (2022); Barr et al. (2020)
Payment Infrastructure	Availability of digital systems and platforms	Determines feasibility of cashless systems	Arugula & Gade (2020); Gupta et al. (2022)

3.4 Data and Evidence Base

The study relies on structured synthesis of empirical findings, policy analyses, and theoretical models drawn exclusively from the provided references. No external datasets are introduced. Instead, the methodology extracts:

- Policy outcomes from Nigeria's cashless transition (Achor & Robert, 2013)
- Behavioral patterns from emerging market payment systems (Dzokoto & Imasiku, 2016; Gorshkov, 2022)
- Comparative insights from advanced economies and fintech developments (Allen et al., 2021; Barr et al., 2020)
- Structural constraints such as shadow economy effects and regulatory challenges (Marmora & Mason, 2021; Frulli, 2020)

This approach ensures that all findings remain grounded in documented research while enabling cross-context comparison.

3.5 Comparative Case Structure

Each country is analyzed across three dimensions:

1. **Policy Approach**
    - Nigeria: policy-driven cashless transition
    - Sweden: institutional and trust-driven digitalization
    - China: market-driven fintech expansion
    - South Korea: phased transition (coinless strategy)
    - United States: infrastructure-led modernization
2. **Adoption Patterns**
    - Level and distribution of digital payment usage
    - Persistence of cash in different transaction contexts
3. **Currency Substitution Outcomes**
    - Degree of shift from cash to digital instruments
    - Coexistence of multiple payment systems

This structure reflects comparative institutional analysis, where differences in outcomes are explained by variation in policy and market conditions (Marszałek & Szarzec, 2021).

3.6 Scenario-Based Interpretation

To interpret observed patterns, three stylized scenarios are developed:

Scenario	Characteristics	Expected Outcome
Partial Transition	Digital payments expand but cash persists	Hybrid system equilibrium
Accelerated Cash Reduction	Strong policy enforcement and high adoption	Declining cash usage
Substitution without Displacement	Multiple payment systems coexist	Stable currency diversification

These scenarios reflect empirical findings that digital payment expansion does not necessarily eliminate cash but reshapes its role (Fabris, 2019; Mitrofanova et al., 2020).

3.7 Analytical Assumptions and Constraints

The methodology operates under three key assumptions:

- Cashless transitions are non-linear and context-dependent
- Currency substitution is driven by user behavior and structural conditions
- Policy effectiveness depends on institutional capacity and infrastructure

Limitations arise from the absence of unified cross-country quantitative datasets, requiring reliance on comparative synthesis. However, this approach allows deeper integration of theoretical and empirical insights across diverse contexts (Allen et al., 2021).

4. Results

4.1 Nigeria's Cashless Transition (2012–2022)

The evidence shows that Nigeria's cashless policy produced rapid growth in digital payment channels without a proportional decline in cash usage. Policy interventions increased electronic transactions and financial system participation, yet cash remained dominant in segments characterized by informality, low-value transactions, and limited trust in digital systems (Achor & Robert, 2013; Dzokoto & Imasiku, 2016).

This outcome reflects a partial transition equilibrium, where digital payments expand alongside persistent currency demand. The persistence of cash aligns with structural explanations emphasizing informal economic activity and transaction-specific preferences (Marmora & Mason, 2021; Boeschoten, 2012).

4.2 Comparative Adoption Patterns Across Economies

Cross-country comparison reveals distinct transition pathways rather than convergence toward a single cashless model. Sweden exhibits high digital penetration supported by institutional trust, while South Korea demonstrates gradual transition through phased reduction strategies. China's model reflects platform-driven adoption, and the United States prioritizes infrastructure modernization without direct cash displacement (Moon, 2017; Barr et al., 2020; Allen et al., 2021).

Table 2: Comparative Cashless Transition Outcomes

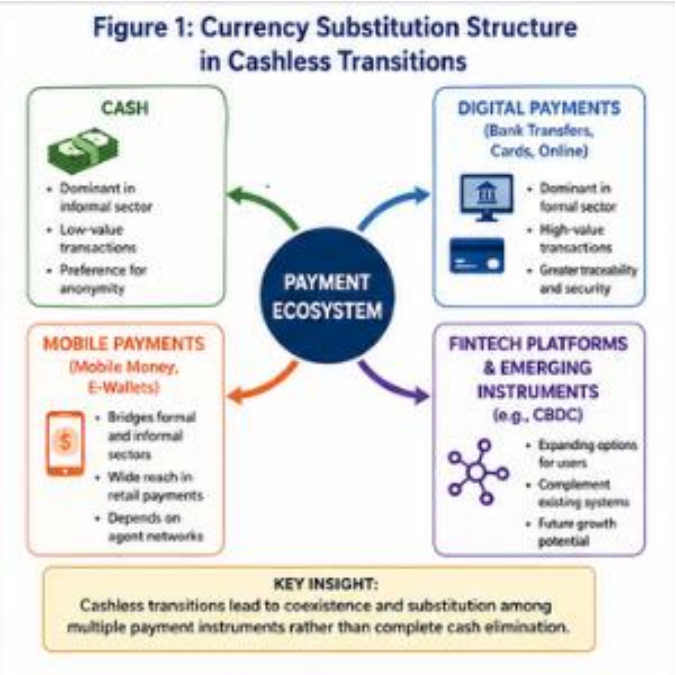
Country	Policy Approach	Adoption Level	Cash Persistence	Transition Type
Nigeria	Policy-driven	Moderate	High	Partial substitution
Sweden	Institution-driven	Very high	Low	Advanced digital transition
China	Market/platform-driven	High	Moderate	Hybrid ecosystem
South Korea	Phased (coinless strategy)	High	Declining	Gradual transition
United States	Infrastructure-led (FedNow)	Moderate	Moderate	Incremental modernization

4.3 Currency Substitution Dynamics

The results confirm that currency substitution dominates over currency elimination. Users allocate transactions across cash, bank transfers, mobile payments, and digital platforms depending on cost, accessibility, and reliability (Mu & Mu, 2022; Boeschoten, 2012).

In Nigeria, this manifests as a fragmented system where digital payments complement rather than replace cash. Similar patterns are observed in other emerging markets, where adoption is uneven and segmented across user groups (Gorshkov, 2022).

Figure 1: Currency Substitution Structure in Cashless Transitions



The figure illustrates a multi-layered payment ecosystem where:

- *Cash remains dominant in informal and low-value transactions*
- *Digital payments dominate formal and high-value transactions*
- *Mobile and fintech platforms bridge both segments*

This structure supports the argument that cashless transitions produce diversified payment systems rather than singular outcomes (Mitrofanova et al., 2020).

4.4 Financial Inclusion and Usage Gaps

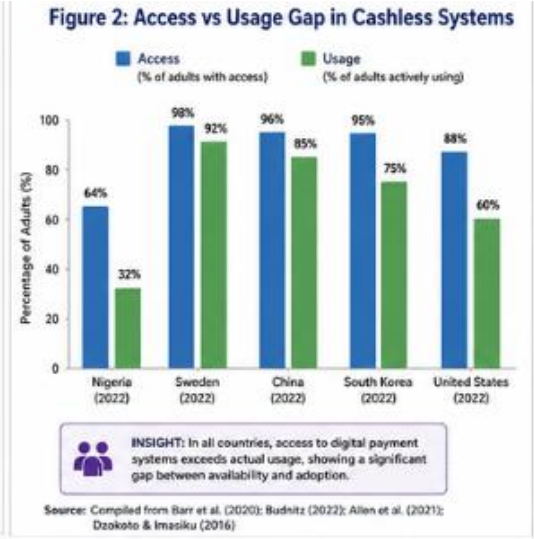
The expansion of digital payment systems has improved access but not uniformly increased usage. Evidence indicates that financial inclusion gains are constrained by digital literacy, infrastructure gaps, and trust deficits (Budnitz, 2022; Barr et al., 2020).

This produces a dual-system outcome:

- Digitally integrated users benefit from efficiency gains
- Marginalized groups remain reliant on cash

Such segmentation reinforces inequality in payment system participation, consistent with fintech adoption patterns observed across economies (Allen et al., 2021).

Figure 2: Access vs Usage Gap in Cashless Systems



Interpretation:
The figure shows divergence between:

- *Access (availability of digital systems)*
- *Usage (actual transaction behavior)*

The gap indicates that infrastructure expansion alone does not ensure behavioral adoption (Dzokoto & Imasiku, 2016).

4.5 Role of the Shadow Economy

The shadow economy emerges as a key factor sustaining cash demand. Even as digital payments expand, informal transactions continue to rely on cash due to anonymity, flexibility, and lower regulatory exposure (Marmora & Mason, 2021).

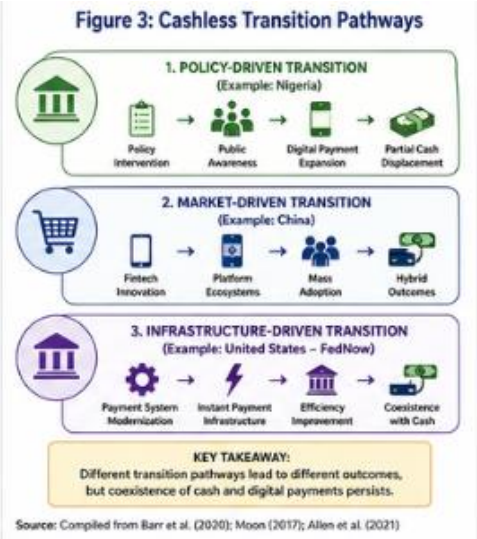
This dynamic limits the effectiveness of cashless policies, particularly in emerging markets where informal sectors represent a significant share of economic activity. It also explains why cash demand remains resilient despite technological progress.

4.6 Payment Infrastructure and System Efficiency

Payment system improvements, including instant payment frameworks, enhance transaction speed and accessibility but do not necessarily reduce cash usage. In the United States, infrastructure developments focus on efficiency rather than behavioral change, resulting in coexistence between digital and cash systems (Barr et al., 2020).

Similarly, cross-border payment integration remains constrained by regulatory and technical barriers, limiting the ability of digital systems to fully replace traditional mechanisms (Arugula & Gade, 2020).

Figure 3: Cashless Transition Pathways



Interpretation:

The figure outlines three pathways:

1. *Policy-driven transition (Nigeria)*
2. *Market-driven transition (China)*
3. *Infrastructure-driven transition (U.S.)*

Each pathway produces different outcomes in terms of adoption and cash persistence.

4.7 Synthesis of Findings

The results converge on three core insights:

1. Cashless policies increase digital transactions but do not eliminate cash (Achor & Robert, 2013; Fabris, 2019).
2. Currency substitution dominates transition dynamics, producing hybrid payment systems (Mu & Mu, 2022; Mitrofanova et al., 2020).
3. Institutional and structural factors particularly the shadow economy and inclusion gaps limit full digital adoption (Marmora & Mason, 2021; Budnitz, 2022).

These findings indicate that cashless transitions reshape payment systems without fundamentally displacing currency, resulting in persistent coexistence between cash and digital instruments.

5. Discussion

The findings debunk linear cash displacement. In Nigeria, cash is preserved by policy-induced growth in digital payments through more diverse transactions, in line with substitution effects in emerging markets (Achor & Robert, 2013; Dzokoto & Imasiku, 2016). The survival of cash is not a step-back but a structural reality driven by informality and transactional needs (Marmora & Mason, 2021; Boeschoten, 2012).

This view is supported by cases elsewhere. Sweden's digital prowess is a function of trust not compulsion, while China's platform economy illustrates the role of private sector ecosystems in driving usage (Allen et al., 2021). South

Korea's pace shows adaptation takes time (Moon, 2017). By contrast, the US focuses on efficiency in payment, not cash reduction, suggesting that modernization need not displace (Barr et al., 2020).

The key takeout is that cashless change results in mixed equilibria. Substitution prevails, with users balancing instruments based on price, convenience and security (Mu & Mu, 2022). Policy is therefore effective subject to institutional fits and incentives, rather than technology.

6. Conclusion

Cashless policy reforms do not result in a uniform transition from physical cash to a cashless payment system; they result in a change in the interaction between payment instruments. The case of Nigeria between 2012 and 2022 reveals that the introduction of new payment instruments creates more diverse transactions, but not cashless ones. Rather, cash persists in areas where informal transactions, accessibility and trust play a crucial role. This suggests that cash persistence is an endemic rather than transitory characteristic of the economy.

This finding is corroborated by the evidence of other countries. Digital economies with high trust and infrastructure attain high levels of digitalisation, while in other cases transitions occur gradually or through markets. But even in the most advanced economies, cash is not eliminated. The payment system adapts to a hybrid mode with several instruments coexisting to meet distinct payment needs. This implies that innovation does not necessarily involve cash's disappearance, but rather its integration into a wider payment system.

The key message here is that cashless initiatives are most likely to succeed when they are in line with consumer incentives, institutional capability and economic conditions. Otherwise, digital systems grow in supply but not in demand. Thus, the result is not a cashless world but a balance between cash and digital payments determined by the circumstances that allow each instrument to be used effectively.

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