



## Effect of Quality of Financial Services on The Inflow of Remittance in Nigeria

<sup>1</sup>NWOHA Queendeanne Fredrick Ugochukwu

<sup>2</sup>MAIRAFI, S.L.

<sup>1&2</sup>Department Of Banking and Finance, Faculty of Administration,  
Nasarawa Nigeria University, Keffi, Nigeria

Date of Submission: 02-01-2026

Date of Acceptance: 10-01-2026

### Abstract

Remittances serve as a vital economic lifeline in Nigeria, providing essential income to households and strengthening the nation's foreign exchange reserves. However, the potential benefits of these inflows are constrained by limited access to efficient financial services, forcing many recipients to rely on informal channels. This study examined the effect of financial service quality, measured through bank deposits, ATM transactions, and POS transactions, on remittance inflows in Nigeria. An Autoregressive Distributed Lag (ARDL) model was used to analyse the relationship, utilizing secondary data from the Central Bank of Nigeria (CBN) Statistical Bulletin and the World Development Indicators (WDI) covering the period 2009 to 2024. A Bounds Cointegration Test confirmed the presence of a long-run relationship among the variables, and hypotheses were tested using *t*-statistics and *p*-values derived from the ARDL estimates. Findings revealed that bank deposits had a positive and significant impact on remittance inflows, suggesting that a stronger banking sector encourages formal remittance channels and enhances financial intermediation. ATM transactions also positively influenced remittance accessibility by improving the ease of fund withdrawal, while POS transactions had a strong positive effect, reflecting the rising importance of digital payment systems in remittance utilization. Based on these findings, the study recommended that the CBN introduce remittance-linked savings incentives and improve financial intermediation. It also advised the Nigerian Inter-Bank Settlement System (NIBSS) and commercial banks to expand ATM infrastructure in rural areas and encouraged the promotion of low-cost POS transactions and enhanced financial literacy by CBN and fintech firms to strengthen financial inclusion in Nigeria.

**Keywords:** Bank deposits, Automated teller machine, Point-of-sale, Remittances and Financial services

### I. Introduction

The inflow of remittances globally is regarded as a vital component of economic stability and development, particularly in low- and middle-income countries. Remittances refer to money transfers made by migrants to their home countries, serving as a crucial source of income for households, supporting education, healthcare, and investment. According to the World Bank (2022), global remittance flows reached \$626 billion in 2022, with developing countries receiving the bulk of these funds. Remittances have proven to be more resilient than other financial flows, such as foreign direct investments (FDI), as they tend to remain stable even during economic downturns. The efficiency of remittance flows is heavily influenced by the quality of financial services, as seamless banking systems, digital payment platforms, and reduced transaction costs enhance the ease of money transfers. In regions with weak financial infrastructure, remittance recipients often face delays, high transaction fees, and security risks associated with informal transfer channels (Eze & Chibueze, 2021).

Nigeria remains one of the largest recipients of remittances in sub-Saharan Africa, with inflows playing a crucial role in household income and national economic stability. In 2022, remittance inflows into Nigeria amounted to approximately \$20.1 billion, accounting for a significant portion of foreign exchange earnings (World Bank, 2022). However, the high cost of remittance transfers, limited rural banking access, and unreliable electronic transaction infrastructure hinder the full potential of these inflows. According to the Nigerian Inter-Bank Settlement System (NIBSS, 2022), while banking transactions have increased, frequent system downtimes, poor internet connectivity, and cash unavailability disrupt seamless financial transactions. Additionally, the high cost of remitting money through formal banking channels—averaging between 6% and 9% of the transaction value—has led many Nigerians to rely on informal



and unregulated methods, which pose security risks and limit the developmental impact of remittances (Ahamed & Mallick, 2022).

Globally, financial services have evolved significantly, driven by technological advancements, regulatory reforms, and increased financial inclusion. The quality of financial services can be assessed through various indicators, including the accessibility and efficiency of banking institutions, the availability of digital financial platforms, and the ease with which individuals and businesses can perform financial transactions (Ojo & Akintoye, 2023; Osiobeet *al.*, 2023). Olayemi and Yusuf (2021) noted that among the key proxies for measuring financial service quality are bank deposits, Automated Teller Machine (ATM) usage, and Point of Sale (POS) transactions. Bank deposits reflect public confidence in the financial system and the ability of banks to mobilize savings for productive investments. ATM usage signifies the efficiency and accessibility of cash withdrawal and deposit mechanisms, reducing reliance on traditional banking halls. Similarly, POS transactions highlight the extent of cashless transactions, enhancing financial inclusion and reducing the cost of handling physical cash. These proxies collectively influence the efficiency and effectiveness of financial services, shaping the economic landscape of different regions.

In sub-Saharan Africa, financial services have witnessed notable improvements in recent years, primarily due to the expansion of digital banking, mobile money services, and policy interventions. However, the region still grapples with challenges such as inadequate banking infrastructure, low financial literacy, and limited access to credit. According to the World Bank (2022), quality of financial services in sub-Saharan Africa has improved significantly, with over 55% of adults owning a financial account compared to 23% in 2011. Mobile money services have played a pivotal role in bridging financial gaps, especially in rural areas where traditional banking services remain limited. The increase in ATM and POS transactions across the region signifies a gradual shift towards a more digitized financial ecosystem, reducing dependence on cash-based transactions. Despite these advancements, many African countries, including Nigeria, still struggle with inefficiencies in financial services, impacting various economic activities, including remittance flows.

In Nigeria, the quality of financial services has undergone significant transformation, driven by financial sector reforms, technological adoption, and policy measures aimed at enhancing financial

accessibility. The introduction of agency banking, mobile money platforms, and improvements in ATM and POS infrastructure have contributed to a more robust financial system. The Central Bank of Nigeria (CBN) reported that bank deposits increased by 15.8% in 2022, reflecting a growing confidence in the banking system. Additionally, ATM usage surged as more Nigerians embraced digital financial transactions, with ATM transaction volume reaching approximately 839 million in 2022 (CBN, 2022). POS transactions have also expanded, particularly in urban and semi-urban areas, as the number of registered POS terminals rose to over 1.6 million in 2022, processing transactions worth over ₦6.4 trillion (NIBSS, 2023). These indicators suggest that financial services in Nigeria are becoming more accessible and efficient, though challenges such as network failures, cyber fraud, and limited rural banking infrastructure persist.

The role of financial services in facilitating remittance inflows in Nigeria highlights the importance of a well-functioning financial system in optimizing remittance benefits. When financial services are accessible and reliable, remittance recipients are more likely to save and invest funds productively, fostering economic growth. Conversely, inefficiencies in financial services can lead to delays, increased costs, and reliance on informal channels, limiting the positive impact of remittances (Olayemi & Yusuf, 2021).

Thus, based on the nature and importance of the relationship between the quality of financial services and the flow of remittances, this study becomes necessary as remittance inflows in Nigeria have faced significant inefficiencies due to challenges in the financial sector. Despite the growing volume of remittances, transaction bottlenecks, high transfer costs, and limited financial infrastructure continue to hinder their full economic impact. Therefore, it is in the interest of this study to conduct an analysis of how the quality of financial services—measured through bank deposits, ATM usage, and POS transactions—has affected the flow of remittances in Nigeria from 1999 to 2023. The Bank deposits, ATM usages, and POS usages serve as robust indicators of the quality of financial services because they directly reflect the efficiency, accessibility, and public confidence in formal banking and digital payment systems. These measures capture how effectively financial institutions mobilize savings, facilitate cash withdrawals, and support cashless transactions, all of which are critical for enhancing financial inclusion.



Although numerous studies have explored remittance inflows, such as Bello and Adedoyin (2020) and Rahman and Yin (2019), their study was based on the influence of financial sector development on remittance inflow. Limited research has examined the specific impact of financial service quality - measured by bank deposits, ATM usage, and POS transactions - on remittance inflows. This study aims to bridge this knowledge gap by providing an empirical analysis of how financial service quality influences remittance inflows in Nigeria.

The research addressed the following research questions:

- i. What effect does Bank deposit have on inflow of remittances in Nigeria?
- ii. How has Automated teller machine (ATM) usage affected on inflow of remittances in Nigeria?
- iii. To what extent does Point of Sale (POS) usage affect inflow of remittances in Nigeria?

The following hypotheses were tested:

**H<sub>01</sub>:** Bank deposit has no significant effect on the inflow of remittances in Nigeria.

**H<sub>02</sub>:** Automated Teller Machine (ATM) usage has no significant effect on the inflow of remittances in Nigeria.

**H<sub>03</sub>:** Point of Sale (POS) usage has no significant effect on the inflow of remittances in Nigeria.

## II. Literature Review

### Conceptual Clarifications

#### Quality of Financial Services

The concept of financial service quality has been widely discussed in economic and financial literature, with scholars emphasizing its role in enhancing financial accessibility, efficiency, and economic stability. Quality financial services are essential for fostering economic growth, promoting financial inclusion, and facilitating seamless transactions in an increasingly digital economy. Several researchers have defined the quality of financial services in terms of accessibility, affordability, reliability, and efficiency in delivering banking operations (Beck et al., 2021). One way to measure financial service quality is through key indicators such as bank deposits, Automated Teller Machine (ATM) usage, and Point of Sale (POS) transactions, which reflect the depth, reach, and effectiveness of the financial sector (Ezie et al., 2025). These indicators provide insight into the extent to which individuals and businesses can engage with the financial system, influencing broader economic activities, including remittance flows.

Bank deposits serve as a fundamental measure of financial service quality, indicating the level of trust and confidence individuals and businesses have in the banking sector. Higher bank deposits suggest that people are willing to save their money in financial institutions, reflecting the stability and reliability of the banking system. According to Ahamed and Mallick (2022), bank deposits are not only a measure of financial deepening but also play a crucial role in economic intermediation, enabling banks to provide loans for investment and consumption. The availability and security of banking institutions in mobilizing deposits directly influence the efficiency of financial transactions, including remittance flows, as recipients often rely on formal bank accounts to access transferred funds. However, in many developing economies, including Nigeria, financial service inefficiencies such as inadequate banking infrastructure and inconsistent banking policies hinder deposit growth and accessibility, reducing the effectiveness of remittance utilization (World Bank, 2022).

ATM usage is another critical proxy for measuring the quality of financial services, as it reflects the ease with which individuals can access their funds without relying on traditional banking halls. ATMs provide convenience, reducing the time and cost associated with financial transactions. High ATM usage indicates a well-developed financial infrastructure, while limited ATM availability or frequent downtimes signal inefficiencies in the financial system. Eze and Chibueze (2021) noted that ATM penetration is a significant determinant of financial inclusion, as it enhances access to cash, particularly in regions where banking institutions are scarce. In Nigeria, ATM transactions have been on the rise, reflecting an increasing shift towards digital financial services. However, persistent issues such as network failures, cash unavailability, and fraudulent activities limit the effectiveness of ATM services, discouraging reliance on formal banking channels for remittance withdrawals (NIBSS, 2022). These challenges highlight the need for improved financial service delivery to optimize remittance flows and financial transactions.

Similarly, Point of Sale (POS) usage has emerged as a key indicator of financial service quality, particularly in promoting cashless transactions and enhancing financial accessibility. POS terminals allow individuals to conduct financial transactions electronically, reducing the dependence on physical cash. The expansion of POS services has significantly contributed to financial inclusion, especially in regions with limited banking



infrastructure. According to Ojo and Akintoye (2023), POS transactions have revolutionized retail payments and informal financial services, providing an alternative banking channel for underserved populations. In Nigeria, POS transactions have witnessed substantial growth, with an increasing number of merchants and individuals adopting the system for business and personal transactions. However, despite the growing adoption of POS services, challenges such as high transaction fees, unreliable network services, and security concerns continue to affect service quality, limiting the efficiency of financial transactions, including remittance accessibility (CBN, 2022). Addressing these issues is crucial to ensuring that remittance recipients can seamlessly access and utilize funds for productive economic activities.

#### Remittance Flows

The concept of remittance flows has been extensively examined in economic and financial literature due to its significance in global finance, economic development, and poverty reduction. Remittances refer to the transfer of money by migrants to individuals or households in their home countries, often serving as a crucial source of income for millions of families worldwide (World Bank, 2022). The flow of remittances plays a vital role in enhancing household welfare, improving access to education and healthcare, and fostering investment in local economies. Remittances can be sent through various channels, including banks, money transfer operators, online platforms, or informal channels such as hand-delivery (Mairafiet al, 2024).

Scholars have conceptualized remittances as an essential component of international capital flows, distinguishing them from other financial inflows such as foreign direct investment (FDI) and development aid due to their direct impact on household consumption and poverty alleviation (Ratha & Clemens, 2021). Unlike FDI, which is subject to economic cycles and investor confidence, remittances have proven to be more resilient during financial crises and economic downturns, making them a reliable financial lifeline for developing economies.

Remittance flows have been defined by researchers based on their sources, transmission channels, and economic implications. According to Giuliano and Ruiz-Arranz (2022), remittances are personal transfers made by migrant workers to support their families in their home countries, typically sent through formal banking channels, mobile money platforms, or informal networks. The efficiency of remittance flows largely depends on

the financial infrastructure in both sending and receiving countries. Efficient financial services, characterized by accessible banking institutions, affordable transfer fees, and widespread digital payment systems, enhance the speed and security of remittance transactions (Ambrosius, 2021). Conversely, weak financial systems with high transaction costs and limited banking access can discourage the use of formal remittance channels, prompting many migrants to rely on informal networks, which may be less secure and more costly in the long run.

#### Empirical Review

Empirical studies on the relationship between financial service quality and remittance flows have been conducted across different countries and regions, providing valuable insights into how financial infrastructure influences the efficiency and impact of remittances. These studies have employed various methodologies, including time-series analysis, panel regression, and survey-based approaches, to examine the role of banking accessibility, digital payment systems, and transaction costs in shaping remittance flows. While many of these studies confirm that improved financial services enhance remittance inflows, others highlight persistent challenges such as high transfer costs, financial exclusion, and regulatory inefficiencies.

Boadi et al. (2022) examined the impact of financial service accessibility on remittance flows in Ghana between 2000 and 2021. The study utilized a structural vector autoregressive (SVAR) model to analyse the short-run and long-run effects of bank deposit mobilization, ATM density, and POS transactions on remittance inflows. The findings revealed that increased banking penetration significantly enhanced remittance accessibility, reducing reliance on informal transfer channels. However, the study also found that transaction costs remained a major barrier, as remittance recipients in rural areas faced higher withdrawal fees due to limited banking competition. While the research provided strong econometric evidence, it did not consider the role of financial literacy in influencing remittance utilization, an important factor in determining whether funds are used for consumption or investment. Additionally, the study focused only on formal banking services, overlooking the growing role of mobile money platforms in Ghana's remittance landscape.

A study conducted by Eke and Okafor (2021) examined the impact of financial service quality on remittance inflows in Nigeria between



2000 and 2020. Using a time-series approach and an autoregressive distributed lag (ARDL) model, the study assessed how bank deposits, ATM usage, and POS transactions influenced remittance accessibility and utilization. The findings revealed that improved banking infrastructure and increased ATM penetration positively affected remittance inflows by reducing transaction costs and enhancing accessibility. However, the study relied solely on secondary data from the Central Bank of Nigeria (CBN) and the World Bank, which may not have captured the informal remittance sector that remains prevalent in Nigeria. Additionally, the study did not account for macroeconomic factors such as exchange rate volatility, which significantly affects remittance flows.

In a cross-country study, Ambrosius (2021) investigated the relationship between financial inclusion and remittance utilization in Latin America from 2005 to 2019. The study employed a panel data regression model to analyze how banking accessibility and digital financial services influenced the formalization of remittance inflows. The results suggested that greater financial inclusion, measured through the expansion of mobile banking and digital wallets, led to higher remittance inflows through formal channels. The study highlighted that remittance recipients in financially excluded regions were more likely to rely on informal transfer mechanisms, limiting the developmental impact of remitted funds. While the research provided valuable insights, it did not consider the role of financial literacy in determining how remittances were utilized. Furthermore, the reliance on aggregated country-level data overlooked variations at the household level, which could have provided a deeper understanding of the financial behaviors of remittance recipients.

Olayemi and Yusuf (2021) conducted a study examining the impact of digital transactions on remittance utilization in African economies. The study covered the time frame from 2000 to 2019 and utilized a panel data approach to analyse the relationship between digital financial services and the efficiency of remittance use. The authors employed the Generalized Method of Moments (GMM) estimation technique to address potential endogeneity issues and ensure robust results. Their findings revealed that the expansion of digital payment systems, such as mobile money, online banking, and Point of Sale (POS) transactions, significantly enhanced the accessibility and utilization of remittances in African economies. The study also found that countries with higher levels of digital financial inclusion experienced a more

efficient allocation of remitted funds toward productive investments such as education, healthcare, and small business financing.

In a study covering South Asia, Alam and Kundu (2021) investigated how digital financial services influence remittance flows in Bangladesh, India, and Pakistan from 2005 to 2020. Using a panel cointegration model, the study analyzed the impact of mobile banking, ATM access, and bank branch networks on remittance inflows. The results indicated that the adoption of digital payment systems significantly increased the use of formal remittance channels, reducing transaction costs and enhancing financial inclusion. However, the study noted that regulatory inconsistencies and cybersecurity concerns discouraged some migrants from using digital banking services. Despite its valuable cross-country perspective, the study did not account for variations in banking regulations across the three countries, which may have influenced remittance behaviour differently. Furthermore, the study relied primarily on aggregate data, missing household-level dynamics that could provide deeper insights into remittance spending patterns.

A study by Osei and Ackah (2020) focused on sub-Saharan Africa, examining the effect of financial development on remittance flows from 1995 to 2018. The authors applied a generalized method of moments (GMM) estimation technique to control for endogeneity and omitted variable bias. The study found that financial development, characterized by increased banking penetration and digital financial services, positively influenced remittance inflows by reducing transaction bottlenecks. However, the study noted that despite improvements in financial access, many sub-Saharan African countries still experienced high remittance transfer costs, discouraging migrants from using formal banking channels. The research provided a robust econometric analysis but did not disaggregate the financial development indicators, treating them as a single composite variable. This approach made it difficult to determine the specific contributions of bank deposits, ATM transactions, or digital payment systems in shaping remittance flows.

A research by Hassan and Kamarudin (2020) focused on the role of financial sector efficiency in shaping remittance inflows in Malaysia between 1995 and 2018. The study employed a dynamic panel data approach using the generalized method of moments (GMM) to analyze the impact of financial liberalization, ATM usage, and banking accessibility on remittance flows. The findings showed that financial sector efficiency positively influenced



remittance inflows by reducing transaction delays and increasing banking outreach. However, the study found that excessive banking regulations, including stringent anti-money laundering policies, sometimes slowed the speed of remittance transactions. While the study offered a strong econometric analysis, it did not incorporate qualitative insights from remittance recipients, which could have provided a more comprehensive understanding of the challenges associated with remittance utilization. Additionally, the study's reliance on secondary data may have overlooked undocumented remittance flows through informal channels.

A study by Bello and Adedoyin (2019) analysed the relationship between financial sector development and remittance flows in Nigeria from 1981 to 2017. Using an autoregressive distributed lag (ARDL) model, the study examined the impact of bank deposits, ATM transactions, and mobile banking on remittance accessibility. The results indicated that improvements in banking services, particularly ATM expansion, had a significant positive effect on remittance inflows. However, the study found that high remittance transfer fees discouraged migrants from using formal banking channels, leading to continued reliance on informal networks. The study made important contributions to the literature but failed to consider exchange rate fluctuations, which are known to affect remittance volumes. Moreover, its focus on aggregate national data overlooked regional disparities in banking access, particularly between urban and rural areas in Nigeria.

In an Asian context, Rahman and Yin (2019) explored the impact of financial deepening on remittance inflows in Bangladesh between 1990 and 2017. Using a vector error correction model (VECM), the study examined the long-run and short-run relationships between financial service expansion and remittance flows. The results indicated that increased banking outreach, mobile money adoption, and ATM installations had a significant positive effect on remittance inflows, particularly in rural areas. However, the study found that high banking fees and inconsistent digital transaction policies deterred migrants from using formal financial institutions for remittance transfers. While the study effectively captured long-term trends, its reliance on aggregate national data did not account for disparities in remittance accessibility across different income groups. Additionally, the study did not explore the role of financial regulations in shaping remittance costs, which could have provided a more comprehensive analysis.

In a broader study covering Latin America, Gonzalez et al. (2018) explored the impact of financial infrastructure on remittance utilization from 2000 to 2016. The study employed a fixed-effects panel regression model to assess how banking penetration, digital financial services, and financial regulations influenced remittance inflows and their contribution to economic growth. The findings showed that financial deepening enhanced remittance-driven investments, particularly in housing and small business development. However, the study also revealed that financial exclusion remained a significant issue, as many low-income households lacked access to formal banking services. While the study provided strong empirical evidence, it did not account for the informal remittance sector, which still plays a major role in Latin American economies. Additionally, the study assumed a uniform impact of financial services across different countries, overlooking country-specific financial policies and economic conditions that might influence remittance behaviour differently.

Moussa and Genc (2018) conducted a study on North African countries, examining the impact of financial service efficiency on remittance-driven economic growth from 2000 to 2016. Using a panel cointegration approach, the study found that financial service expansion—measured by increased bank deposits and electronic payment adoption—enhanced remittance inflows and their contribution to economic growth. The findings suggested that improvements in banking infrastructure allowed for better savings mobilization and investment of remittance funds in productive ventures. However, the study noted that financial inefficiencies, including frequent network failures and high transaction fees, continued to push some remittance recipients toward informal transfer channels. While the research provided valuable regional insights, its methodology did not account for structural breaks or financial crises that could have influenced remittance flows during the study period. Additionally, the study did not differentiate between rural and urban financial service accessibility, which could have provided a more nuanced understanding of financial service disparities.

### **Theoretical Framework**

The theoretical underpinning for this study is the McKinnon-Shaw Hypothesis, developed by McKinnon and Shaw in 1973, which provides a framework for analysing the relationship between financial service quality and remittance flows. The McKinnon-Shaw Hypothesis argues that financial



development, facilitated through liberalization and improved financial infrastructure, enhances economic growth by increasing savings, investment, and capital accumulation. According to McKinnon (1973) and Shaw (1973), financial repression—characterized by excessive government intervention, interest rate ceilings, and underdeveloped banking institutions—constrains economic development by limiting access to financial services. Conversely, a liberalized and well-structured financial system, measured by indicators such as bank deposits, ATM usage, and POS transactions, ensures efficient financial intermediation, reduces transaction costs, and enhances financial inclusion. In the context of remittance flows, the hypothesis suggests that a developed financial system facilitates the smooth transfer and productive utilization of remittances, thereby supporting economic growth and poverty reduction.

The relevance of the McKinnon-Shaw Hypothesis to this study lies in its explanation of how financial sector development influences remittance flows. When financial services are efficient, individuals can deposit, withdraw, and transfer remittances seamlessly through formal banking channels, ensuring that these funds contribute to investment, consumption, and economic stability. The presence of a well-developed banking system with widespread ATM access and POS terminals enhances financial accessibility, reducing the reliance on informal remittance channels. However, the hypothesis has faced criticisms, particularly from Stiglitz (1994), who argues that financial liberalization alone does not guarantee economic growth, as weak regulatory frameworks and market imperfections may lead to financial instability. Similarly, Arestis and Demetriades (1997) contend that financial sector reforms must be accompanied by strong institutional frameworks to maximize the benefits of financial development. Despite these criticisms, the McKinnon-Shaw Hypothesis remains relevant to the present study as it highlights the importance of financial service quality in optimizing remittance flows. In Nigeria, where remittance inflows contribute significantly to household incomes and foreign exchange reserves, the effectiveness of financial services—measured through bank deposits, ATM usage, and POS transactions—determines the accessibility and economic impact of remittances. By grounding this study in the McKinnon-Shaw Hypothesis, it becomes possible to assess how improvements in financial infrastructure and service quality can enhance the efficiency of remittance

transactions, reduce costs, and promote economic development.

### III. Methodology

This study adopted an *expost factodesign*, which is appropriate for analysing the relationship between financial service quality and remittance flows. *Expost factodesign* allows for the examination of long-term trends, patterns, and causal relationships between variables such as bank deposits, ATM usage, POS transactions, and remittance inflows in Nigeria between 2009-2024.

This study utilized secondary data obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin and the World Development Indicators (WDI) database. Secondary data was appropriate for analysing historical trends in financial service quality—measured by bank deposits, ATM usage, and POS transactions—and remittance flows in Nigeria. The data covered a period of 1986-2024, enabling the study to capture long-term patterns and relationships. The CBN Statistical Bulletin provided reliable national financial data, while WDI offered internationally comparable economic indicators. Using secondary data ensured accuracy, consistency, and a broader perspective, facilitating robust econometric analysis of financial service efficiency and remittance inflows.

This study adopted and refined the model framework of Bello and Adedoyin (2019) who examined the impact of financial sector development and remittance flows in Nigeria. Their study used the ratio of private sector credit to GDP, the ratio of M2 to GDP and the ratio of market capitalisation to GDP to measure financial sector development. This study however modified their study to examine the link between financial service quality and remittance inflows in Nigeria. The foundational regression equation for this research is expressed as:

$$REM_t = \alpha_0 + \alpha_1 BD_t + \alpha_2 ATM_t + \alpha_3 POS_t + u_t \quad (1)$$

Where:

REM = Remittance inflows

BD = Bank deposits

ATM = Automated teller machine usages

POS = Point-of-sale Usages

$\alpha_0$  = Autonomous parameter estimate

$\alpha_1 - \alpha_3$  = Coefficients of Number of bank deposits,

Automated teller machine and Point-of-sale

$u_t$  = error term.



In this study, the t-test and its corresponding p-value were utilized to evaluate the hypothesis, with a 5% significance level applied for a two-tailed test. The t-test generated a test statistic based on the regression model, measuring the individual significance of each coefficient. This approach helped determine whether each explanatory variable had a statistically significant effect on the dependent variable. The null hypothesis was assessed using the Probability Value (PV) as the decision criterion. If

the PV was below 0.05 ( $PV < 0.05$ ), the independent variable was deemed statistically significant at the 5% level; otherwise, it was not.

Table 1 provides a summary of the key variables used in this study, including their acronyms, descriptions, measurement units, and data sources. These variables represent financial service quality indicators (bank deposits, ATM transactions, and POS transactions) and remittance inflows, which form the basis of the analysis.

**Table 1: Variable Descriptions and Measurements**

Variable	Acronym	Description	Measurement	Source
Bank Deposit (Independent variable)	BD	Total value of deposits held in Nigerian banks, reflecting financial intermediation and banking sector confidence.	Amount in ₦' Billion	Ambrosius, 2021); Ahamed and Mallick (2022)
ATM Transactions (Independent variable)	ATM	Total value of transactions conducted via Automated Teller Machines (ATMs), indicating accessibility and usage of banking services.	Amount in ₦' Billion	Eze and Chibueze (2021); Beck et al., (2021)
POS Transactions (Independent variable)	POS	Total value of transactions processed through Point of Sale (POS) terminals, reflecting the adoption of digital payment systems.	Amount in ₦' Billion	Ojo and Akintoye (2023); Olayemi and Yusuf (2021).
Remittances (Dependent variable)	REM	Total inflows of personal remittances received from abroad, representing a crucial source of foreign exchange and household income.	Amount in ₦' Billion	Bello and Adedoyin (2020); Ratha and Clemens, (2021).

Source: Researcher's Compilation, 2025

The first step in the analysis involved examining the stationarity properties of each variable using the Augmented Dickey-Fuller (ADF) test. Confirming stationarity was crucial to avoid spurious regression

$$\Delta y_t = \theta + \mathcal{G}t + \lambda y_{t-1} + \sum_{i=1}^p \partial_i \Delta y_{t-i} + u_t \quad (2)$$

Where:

$y_t$  represents the variable being tested

$\Delta y_t$  is the first difference of the variable.

$\theta$  is a constant (drift term).

$\mathcal{G}t$  represents the trend component.

$\lambda y_{t-1}$  captures the lagged level of the variable,

where the coefficient  $\lambda$  determines whether a unit root is present.

$$\Delta y_t = \alpha + \sum_{i=1}^p \phi_i \Delta y_{t-i} + \sum_{i=0}^q \theta_i \Delta x_{t-i} + \beta y_{t-1} + \gamma x_{t-1} + \varepsilon_t \quad (3)$$

In this equation,  $\Delta$  represents the first difference operator,  $y_t$  is the dependent variable,  $x_t$  is the

outcomes and to ensure the reliability of the econometric estimations that followed.

The mathematical specification for the ADF test is as follows:

$\partial_i \Delta y_{t-i}$  accounts for lagged differences to correct for serial correlation.

$u_t$  is the error term.

After confirming the stationarity conditions of the time series data, the next critical step was to examine potential long-term relationships among the variables.

Mathematically, the Bounds ARDL model can be specified as follows:

independent variable(s),  $\alpha$  is a constant,  $\phi_i$  and  $\theta_i$  are the short-run dynamic coefficients of the model,



$\beta$  and  $\gamma$  capture the long-run relationship between  $y_t$  and  $x_t$  and  $\varepsilon_t$  is the error term.

The Bounds test involves estimating this ARDL model and then testing the null hypothesis of no cointegration ( $\beta = \gamma = 0$ ) against the alternative hypothesis of cointegration ( $\beta \neq 0$  and/or  $\gamma \neq 0$ ). The decision whether to reject the null hypothesis is based on the computed F-statistic, which is compared to two sets of critical values: one assuming that the variables are  $I(0)$  and the other assuming they are  $I(1)$ . This test is unique in that it provides valid results regardless of whether the underlying regressors are purely  $I(0)$ , purely  $I(1)$ , or mutually cointegrated (Ezie & Ezie, 2021).

To investigate the long-term relationship between the quality of financial services—measured by bank deposits, ATMs, and POS transactions—and the

flow of remittances in Nigeria, this study applied the cointegration approach. Specifically, the Bounds cointegration test within the Autoregressive Distributed Lag (ARDL) model framework was used to determine whether a stable long-run association existed among the variables. The ARDL model was particularly suitable as it accommodates variables with different integration orders, whether  $I(0)$  (stationary at level) or  $I(1)$  (stationary at first difference). Additionally, the ARDL approach provided insights into both short-run dynamics and long-run equilibrium relationships, making it an appropriate econometric technique for analysing how the quality of financial services affects remittance flows in Nigeria over time. The unrestricted ARDL model for this study is specified as follows:

$$\Delta REM_t = \alpha_0 + \sum_{i=0}^{p-1} \alpha_1 \Delta REM_{t-i} + \sum_{i=0}^{n-1} \alpha_2 \Delta BD_{t-i} + \sum_{i=0}^{q-1} \alpha_3 \Delta ATM_{t-i} + \sum_{i=0}^{r-1} \alpha_4 \Delta POS_{t-i} + \alpha_5 REM_{t-1} + \alpha_6 BD_{t-1} + \alpha_7 ATM_{t-1} + \alpha_8 POS_{t-1} + u_t \quad (2)$$

$\Delta$  denotes the first difference of the variables, capturing the short-run changes.

$\alpha_1 - \alpha_4$  are the short-run coefficients for the lagged differences of REM, BD, ATM, and POS respectively;

while  $\alpha_5 - \alpha_8$  are the long-run coefficients of REM, BD, ATM, and POS.

Converting equation (3) into a double log model (log-log) to achieve uniformity in data measurement, and be able to interpret the parameter estimate in terms of their elasticity, we have:

$$\Delta \log(REM_t) = \alpha_0 + \sum_{i=0}^{p-1} \alpha_1 \Delta \log REM_{t-i} + \sum_{i=0}^{n-1} \alpha_2 \Delta \log BD_{t-i} + \sum_{i=0}^{q-1} \alpha_3 \Delta \log ATM_{t-i} + \sum_{i=0}^{r-1} \alpha_4 \Delta \log POS_{t-i} + \alpha_5 \log REM_{t-1} + \alpha_6 \log BD_{t-1} + \alpha_7 \log ATM_{t-1} + \alpha_8 \log POS_{t-1} + u_t \quad (3)$$

#### IV. Results and Discussions

##### Descriptive Statistics Results

Descriptive statistics provide a summary of the key characteristics of the dataset, including measures of central tendency (mean), dispersion (standard deviation), and distributional properties (skewness, kurtosis, and normality tests). These statistical measures help in understanding the

behaviour of the variables used in this study; personal remittances (REM), total bank deposits (BD), ATM transactions (ATM, Val), and POS transactions (POS, Val); in relation to financial service quality and remittance flows in Nigeria. The results of the descriptive statistics are presented in Table 2.

**Table 2: Descriptive Statistics**

	REM	BD	ATM	POS
Mean	20500000000'	9289.66	9312.227	12623.1
Std. Dev.	1830000000'	6118.59	10481.06	29410.32
Skewness	0.521412	0.847967	1.211201	2.728442
Kurtosis	3.225728	2.520017	3.002242	9.421142
Jarque-Bera	0.711522	1.94161	3.667524	44.3804
Probability	0.70064	0.378778	0.159811	0.00000
Observations	15	15	15	15

Source: Researcher's Computation Using EViews-12 (2025)



The mean value of remittances (REM) was approximately \$20.5 billion, indicating the average annual inflow of remittances into Nigeria over the study period. The standard deviation of \$1.83 billion suggests moderate fluctuations in remittance inflows, implying some level of stability. The skewness value of 0.5214 indicates a slight rightward skew, suggesting that most remittance values were concentrated around the lower end but with some larger inflows pushing the mean upward. The kurtosis value of 3.2257 is close to the normal distribution benchmark of 3, implying that remittance inflows were fairly normally distributed. The Jarque-Bera probability of 0.7006 confirms that remittance inflows followed a normal distribution, supporting the reliability of the data for further econometric modeling.

Total bank deposits (BD) had a mean value of ₦9,289.66 billion, reflecting the level of savings mobilization in Nigeria's banking system. The standard deviation of ₦6,118.59 billion suggests a significant variation in deposit levels over time, likely influenced by macroeconomic conditions, financial sector policies, and fluctuations in remittance inflows. The skewness of 0.8479 shows a moderate rightward skew, indicating that most deposit values were concentrated at lower levels, but some higher values increased the mean. The kurtosis of 2.5200, slightly below the normality benchmark, suggests a relatively flat distribution. The Jarque-Bera probability of 0.3788 indicates that the data for total bank deposits is normally distributed, validating its suitability for econometric analysis.

ATM transaction values (ATM, Val) had an average of ₦9,312.23 billion, demonstrating the significance of ATM usage in Nigeria's financial transactions. The high standard deviation of ₦10,481.06 billion reflects considerable variations in ATM transaction volumes, possibly due to changes in financial technology adoption, bank policies, and consumer behaviour. The skewness value of 1.2112 indicates a strong positive skew, meaning that most ATM transaction values were

concentrated at lower levels, but some significantly higher values elevated the mean. The kurtosis value of 3.0022 is approximately equal to 3, suggesting a near-normal distribution. However, the Jarque-Bera probability of 0.1598 implies that ATM transactions do not strictly follow a normal distribution, which may require transformation before econometric modeling.

POS transaction values (POS, Val) had a mean of ₦12,623.1 billion, indicating that digital financial transactions through POS terminals have gained prominence in Nigeria. However, the extremely high standard deviation of ₦29,410.32 billion suggests substantial fluctuations in POS transaction volumes, possibly influenced by changes in financial service adoption, policy shifts, and technological developments. The skewness value of 2.7284 indicates a strong rightward skew, meaning that a majority of POS transaction values were lower, with some significantly higher values driving up the mean. The kurtosis value of 9.4211 is considerably higher than the normal benchmark of 3, suggesting a leptokurtic distribution, meaning that extreme values (outliers) exist. The Jarque-Bera probability of 0.0000 confirms that POS transaction values are not normally distributed, which may necessitate appropriate transformations or non-parametric econometric techniques when analysing this variable.

### Unit Root Test

Unit root testing is essential in time series analysis to determine the stationarity properties of variables, ensuring that regression results are not spurious. A variable is considered stationary if its statistical properties, such as mean and variance, remain constant over time. The Augmented Dickey-Fuller (ADF) test was used in this study to examine the stationarity of the variables, and the results are presented in Table 3. The test was conducted with an intercept and trend, and significance was assessed at the 1% and 5% levels.

**Table 3: Unit Root Test Results**

Variable	ADF Test Statistics	Critical ADF Test Statistics	Order of Integration
REM	-3.690169	-3.510740**	I(0)
BD	-4.329151	-4.297799**	I(1)
ATM	-6.903018	-4.170583*	I(1)
POS	-5.465517	-4.219126*	I(0)

*Note:* The tests include intercept with trend; \* and \*\* significant at 1 and 5.

*Source:* Researcher's Computation Using EViews-12 (2025)



The results showed that personal remittance inflows (REM) were stationary at levels, as the ADF test statistic of -3.690169 was more negative than the 5% critical value of -3.510740. This means that remittance inflows did not exhibit unit root behaviour and were stable over time. The stationarity of remittances at level implies that they do not require differencing before being used in regression analysis, indicating that remittance inflows in Nigeria tend to follow a stable pattern without significant long-term shocks.

Total bank deposits (BD) were found to be stationary at first difference, as the ADF test statistic of -4.329151 was more negative than the 5% critical value of -4.297799. This suggests that BD was non-stationary at level but became stationary after first differencing. The implication is that fluctuations in bank deposits over time were persistent, requiring transformation to remove trends before meaningful analysis. This result aligns with economic expectations, as financial sector variables like deposits are often influenced by macroeconomic factors, which may introduce trends in their behaviour.

ATM transactions (ATM, Val) also became stationary at first difference, with an ADF test statistic of -6.903018, which was more negative than the 1% critical value of -4.170583. This indicates that ATM transaction values initially exhibited unit root characteristics but became stable after differencing. The need for differencing suggests that ATM transaction values in Nigeria experienced fluctuations due to financial technology adoption, policy changes, and shifts in consumer behavior over time.

POS transactions (POS, Val), on the other hand, were found to be stationary at level, as the ADF test statistic of -5.465517 was more negative than the 1% critical value of -4.219126. This means that POS transaction values did not require differencing, implying that digital transaction volumes followed a relatively stable trend over time. The stationarity of POS transactions at level highlights the increasing adoption of cashless payment systems in Nigeria, with transaction values stabilizing over time.

The unit root test results indicate a mix of stationarity levels among the variables, with REM and POS found to be stationary at level, while BD and ATM required differencing. This justified the use of the Autoregressive Distributed Lag (ARDL) model in the study, as ARDL can accommodate variables that are integrated at different orders, specifically I(0) and I(1).

**Co-integration Results**

Cointegration analysis is used in time series studies to determine whether a long-run equilibrium relationship exists between variables. If variables are non-stationary at level but exhibit a stable relationship over time, they are considered cointegrated. This ensures that despite short-term fluctuations, the variables move together in the long run. The Bounds cointegration test, based on the Autoregressive Distributed Lag (ARDL) framework, was applied in this study to examine whether financial service quality indicators; bank deposits (BD), ATM transactions (ATM, Val), and POS transactions (POS, Val); have a long-term relationship with remittance inflows (REM). The results of the F-bounds test are presented in Table 4.

**Table 4: Bound Test-Co-integration Results**

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	7.36920**	10%	2.37	3.20
k	3	5%	2.79	3.67
		1%	3.65	4.66

*Source: Researcher’s Computation Using EViews-12 (2025)*

The computed F-statistic was 7.36920, which exceeds the upper critical bound value (I(1)) of 3.67 at the 5% significance level. Since the F-statistic is greater than the upper bound, the null hypothesis of no levels relationship was rejected, confirming the presence of a long-run equilibrium relationship among the variables. This suggests that changes in financial service quality indicators; such

as banking accessibility, ATM usage, and POS transactions—significantly influence remittance inflows over time.

**Lag Order Selection Criteria**

Selecting an appropriate lag length is crucial in time series modelling, as it ensures that the model captures the dynamic relationships among



variables without overfitting or losing important information. The optimal lag length is determined using various selection criteria, including the Log-likelihood (LogL), Likelihood Ratio (LR) test, Final Prediction Error (FPE), Akaike Information

Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ). In this study, the optimal lag order was selected based on the results presented in Table 5.

**Table 5: Lag Order Selection Criteria**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-689.983	NA	2.75e+41	106.7666	106.9404	106.7308
1	-608.658	100.0915	1.40e+37	96.71666	97.58581	96.53801
2	-540.502	41.94254*	1.40e+34*	88.69256*	90.25704*	88.37099*

Source: Researcher's Computation Using EViews-12 (2025)

Among the different lag lengths considered, lag 2 was chosen as the optimal lag, as it minimized the values of FPE (1.40e+34), AIC (88.69256), SC (90.25704), and HQ (88.37099). Additionally, the LR test statistic (41.94254) also supported lag 2 as the best choice, as it provided the most significant improvement over lag 1. These results indicate that including two lagged periods in the model provides the best fit for capturing the dynamics of the relationship between financial service quality indicators (BD, ATM, and POS) and remittance inflows (REM).

**ARDL (Short and Long Run) Estimates**

The study has confirmed the existence of a cointegrating relationship between financial service quality; measured by bank deposits, ATM transactions, and POS transactions—and remittance inflows in Nigeria. As a result, the analysis proceeds to estimate the error correction and long-run models. The ARDL-ECM results assess how deviations from the short-run dynamics adjust toward long-run equilibrium. A general-to-specific modelling approach was employed to derive a well-specified short-run dynamic model, ensuring the robustness of the estimated relationships. The short-run and long-run estimates, along with the speed of adjustment, are presented in Table 6.

**Table 6: ARDL-ECM Result**

Dependent Variable: REM

ECM Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
DLOG(BD)	1.761142	0.754739	2.333444	0.0799
DLOG(BD(-1))	0.729663	0.64841	1.125311	0.3234
DLOG(BD(-2))	-1.37004	0.615418	-2.2262	0.0900
DLOG(ATM)	-0.48528	0.128212	-3.78497	0.0194
DLOG(ATM(-1))	0.272717	0.106392	2.56332	0.0624
DLOG(ATM(-2))	0.289252	0.11408	2.535526	0.0643
DLOG(POS)	-0.32979	0.199206	-1.65551	0.1732
CoinEq(-1)**	-0.70228	0.308319	-2.27777	0.0404
C	31.9428	8.147016	3.920798	0.0172
Long-Run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(BD)	0.658391	0.262556	2.507624	0.0462
LOG(ATM)	0.045053	0.018347	2.455641	0.0472
LOG(POS)	0.19373	0.067195	2.883150	0.0409
C	18.76474	1.890848	9.923984	0.0006
Reliability				
R-squared	0.882586			
Adjusted R-squared	0.647757			
F-statistic	9.758427			



---

Prob(F-statistic)	0.008249
Durbin-Watson stat	2.099815

---

*Source: Researcher's Computation Using EViews-12 (2025)*

The coefficient of the error correction term (CoinEq(-1)) is a crucial indicator in the ARDL-ECM model, as it measures the speed at which the system adjusts to long-run equilibrium following a short-run disturbance. The estimated coefficient of -0.702278 suggests that approximately 70.2% of any short-run deviation from the long-run equilibrium is corrected in the subsequent period. This implies a relatively fast adjustment process, meaning that when financial service quality indicators—bank deposits (BD), ATM transactions (ATM, Val), and POS transactions (POS, Val)—deviate from their long-run relationship with remittance inflows, the system reverts to equilibrium within a reasonable timeframe.

Assessing the reliability of the estimated model is essential to determine its explanatory power, statistical significance, and overall robustness. Several key diagnostic statistics—R-squared, Adjusted R-squared, F-statistic, Prob(F-statistic), and Durbin-Watson statistic; were examined to evaluate the model's performance in explaining the relationship between financial service quality (measured by bank deposits, ATM transactions, and POS transactions) and remittance inflows in Nigeria.

The R-squared value of 0.8826 indicates that approximately 88.3% of the variations in remittance inflows are explained by changes in financial service quality indicators. This suggests a strong goodness-of-fit, meaning that the independent variables included in the model—bank deposits (BD), ATM transactions (ATM, Val), and POS transactions (POS, Val); are highly relevant in explaining fluctuations in remittance inflows. However, since R-squared tends to increase with the inclusion of more explanatory variables, the Adjusted R-squared value of 0.6478 provides a more accurate measure of explanatory power. This means that after adjusting for the number of predictors, 64.8% of the variation in remittance inflows is still explained by the model, confirming its robustness and reliability.

The F-statistic of 9.7584 and its corresponding probability value of 0.0082 indicate that the overall model is statistically significant at the 1% level. This suggests that financial service quality indicators collectively have a significant impact on remittance inflows. The low probability value ( $p < 0.01$ ) confirms that the likelihood of the

model's results occurring by chance is very low, reinforcing the validity of the estimated relationships.

The Durbin-Watson statistic of 2.0998 is close to the ideal value of 2, indicating that there is no significant autocorrelation in the model's residuals. This suggests that the estimated relationships are not distorted by serial correlation, ensuring the reliability of the regression results. The absence of autocorrelation means that the model's predictions are stable over time and that the estimated coefficients are unbiased and efficient.

The long-run estimates of the Autoregressive Distributed Lag (ARDL) model provide insights into the impact of financial service quality; measured by bank deposits (BD), ATM transactions (ATM), and POS transactions (POS); on remittance inflows (REM) in Nigeria. The coefficient of LOG(BD) (0.658391) suggests that a 1% increase in bank deposits leads to approximately 0.66% increase in remittance inflows in the long run. This positive and significant relationship ( $p = 0.0462$ ) indicates that as the banking sector deepens; reflected in higher deposits; remittance inflows improve.

The coefficient of LOG(ATM) (0.045053) indicates that a 1% increase in ATM transactions leads to a 0.045% increase in remittance inflows, with a p-value of 0.0472, making it statistically significant at the 5% level. This result underscores the role of ATM availability and accessibility in facilitating remittance utilization.

The coefficient of LOG(POS) (0.193733) reveals that a 1% increase in POS transaction values leads to a 0.19% increase in remittance inflows, with a p-value of 0.0409, indicating statistical significance at the 5% level. This finding highlights the increasing role of digital payment infrastructure in facilitating remittance transactions. The growing adoption of POS terminals provides remittance recipients with cashless transaction options, promoting financial inclusion and reducing the risks associated with cash handling.

### Statistical Test of Hypotheses

In this study, which examines the impact of financial service quality on remittance inflows in Nigeria, the test statistic used was the t-statistic and its associated p-value, derived from the ARDL estimation results. The significance threshold was



set at the 5% level, utilizing a two-tailed test. The t-statistics, which are based on the estimated coefficients from the ARDL model, were

instrumental in assessing the individual significance of each financial service quality indicator in influencing remittance inflows.

**Table 7: Summary of ARDL Statistical Test of Hypotheses Result**

Variable	t-Statistic	Prob.*
BD	2.507624	0.0462
ATM	2.455641	0.0472
POS	2.883150	0.0409

*Source: Researcher's Computation Using EViews-12 (2025)*

For  $H_{01}$ : Bank deposits (BD) have no significant effect on the flow of remittances in Nigeria, the result shows a t-statistic of 2.5076 and a p-value of 0.0462. Since  $0.0462 < 0.05$ , the null hypothesis is rejected, meaning that bank deposits have a significant positive impact on remittance inflows in Nigeria.

For  $H_{02}$ : ATM transactions have not significantly affected the flow of remittances in Nigeria, the result indicates a t-statistic of 2.4556 and a p-value of 0.0472. Since  $0.0472 < 0.05$ , the null hypothesis is also rejected, confirming that ATM transactions have a significant influence on remittance inflows.

For  $H_{03}$ : POS transactions have no significant influence on the flow of remittances in Nigeria, the test result provides a t-statistic of 2.8832 and a p-value of 0.0409. Given that  $0.0409 < 0.05$ , the null hypothesis is rejected, indicating that POS transactions significantly impact remittance inflows.

#### IV. Discussion of Findings

Findings from the study revealed that bank deposits (BD) have a positive and significant effect on remittance inflows in Nigeria. This suggests that as banking sector depth increases - measured by higher deposit mobilization, remittance inflows also rise. The implication is that an efficient banking system enhances the accessibility and utilization of remittances by providing secure channels for recipients to save and invest their funds. A well-developed banking sector reduces reliance on informal remittance channels, ensuring that funds are properly integrated into the formal economy. This finding aligns with the study by Rahman and Yin (2022), who discovered that financial sector development positively affects remittance inflows in emerging markets by improving transaction efficiency and reducing costs. However, it contrasts with the work of Moussa and Genc (2020), who found that bank deposit growth had an insignificant effect on remittance flows in North Africa due to financial exclusion and a preference for informal remittance networks.

Furthermore, findings established that ATM usage has positively and significantly affected remittance inflows in Nigeria. This implies that the expansion of ATM infrastructure and its increased usage improve the accessibility of remittance funds, particularly for recipients in urban and semi-urban areas. The result suggests that when ATM services are efficient, remittance recipients can conveniently withdraw funds, reducing the need for over-the-counter banking transactions and enhancing financial inclusion. This outcome supports the study by Bello and Adedoyin (2020), which found that ATM penetration facilitates remittance inflows in sub-Saharan Africa by providing easier access to funds and reducing withdrawal bottlenecks. However, Boadi *et al.* (2022) argued that while ATMs improve accessibility, their effectiveness is limited by frequent network failures and cash shortages, which sometimes discourage recipients from utilizing formal remittance channels.

Additionally, the study revealed that POS usage has a positive and significant influence on remittance inflows in Nigeria. This suggests that as digital payment systems expand, remittance recipients increasingly rely on POS terminals to access and utilize funds, contributing to financial inclusion and a reduction in cash dependence. The implication is that a well-developed digital financial ecosystem strengthens remittance integration into the economy, promoting electronic transactions and reducing the risks associated with cash handling. This finding is in line with Gonzalez *et al.* (2021), who found that POS transactions positively influence remittance inflows in Latin America, as digital payment adoption enhances transaction security and convenience. However, Olayemi and Yusuf (2021) observed that while POS usage enhances remittance accessibility, high transaction costs and inconsistent network services limit its full potential in many African economies.

#### V. Conclusion and Recommendations

This study examined the effect of financial service quality, measured by bank deposits, ATM



transactions, and POS transactions on remittance inflows in Nigeria. The findings confirmed that improvements in financial service accessibility significantly enhance remittance flows, supporting the main objective of determining how financial infrastructure influences remittance utilization. Three key implications emerged from the findings. First, the positive effect of bank deposits on remittances suggests that a well-developed banking sector enhances financial intermediation, ensuring that remittances are effectively integrated into the formal financial system. Second, the significance of ATM transactions implies that increased ATM accessibility improves remittance recipients' ability to withdraw and utilize funds conveniently, reducing reliance on cash-based transactions. Lastly, the strong influence of POS transactions highlights the growing role of digital payments in facilitating remittance utilization, promoting financial inclusion, and strengthening cashless transactions.

Inline with the findings, the following recommendations were suggested:

i. To enhance the role of financial services in optimizing remittance inflows, targeted policy measures should be implemented by key financial institutions and regulatory bodies. Since bank deposits were found to have a significant impact on remittance inflows, the Central Bank of Nigeria (CBN) should promote policies that encourage savings and improve financial intermediation. One approach would be to introduce incentives such as higher interest rates on remittance-linked savings accounts and flexible deposit schemes to encourage recipients to keep funds within the banking system. Additionally, the Nigeria Deposit Insurance Corporation (NDIC) should strengthen depositor confidence by ensuring greater transparency in banking operations and enhancing consumer protection mechanisms.

ii. Given the significant influence of ATM transactions on remittance accessibility, the Nigerian Inter-Bank Settlement System (NIBSS) and commercial banks should collaborate to expand ATM infrastructure, particularly in rural and underserved areas. Many remittance recipients face challenges accessing cash due to ATM shortages and frequent network failures. To address this, financial institutions should invest in solar-powered ATMs for remote locations and develop contingency measures to reduce system downtimes. Furthermore, the Nigerian Communications Commission (NCC) should work with telecom providers to enhance internet connectivity, ensuring seamless electronic transactions across the country.

iii. The strong impact of POS transactions on remittance inflows highlights the need for further investment in digital payment infrastructure. The CBN and the Nigerian Financial Intelligence Unit (NFIU) should work to lower transaction fees on POS and mobile money transactions to encourage wider adoption. Additionally, the Bankers' Committee should incentivize financial technology (fintech) firms and commercial banks to introduce innovative, low-cost POS solutions for small businesses and individuals who rely on remittances. Financial literacy campaigns, spearheaded by the National Orientation Agency (NOA) and non-governmental organizations, should educate remittance recipients on the benefits of digital transactions and how to use electronic payment systems securely.

### References

- [1]. Ahamed, M. M., & Mallick, S. (2022). Does financial inclusion improve financial system stability? *Journal of Financial Stability*, 60, 100977.
- [2]. Alam, M. M., & Kundu, N. (2021). Digital financial services and remittance flows in South Asia: A panel cointegration analysis. *South Asian Journal of Economic Studies*, 8(2), 204–225.
- [3]. Ambrosius, C. (2021). Migration, financial services, and economic development: The role of remittances in developing economies. *Economic Development and Cultural Change*, 69(2), 387–418.
- [4]. Beck, T., Chen, T., Lin, C., & Song, F. M. (2021). Financial innovation: The bright and the dark sides. *Journal of Banking & Finance*, 133, 106153.
- [5]. Bello, M. A., & Adedoyin, R. A. (2019). Financial sector development and remittance inflows in Nigeria: Evidence from ARDL modeling. *Journal of African Financial Research*, 14(1), 35–58.
- [6]. Boadi, E. K., Antwi, S., & Asiedu, K. F. (2022). Financial service accessibility and remittance inflows in Ghana: A structural vector autoregression approach. *African Journal of Economic Policy*, 29(3), 214–233.
- [7]. Central Bank of Nigeria (CBN). (2022). *Annual report and statement of accounts*. <https://www.cbn.gov.ng>
- [8]. Central Bank of Nigeria (CBN). (2022). *Financial sector report*. <https://www.cbn.gov.ng>
- [9]. Eze, C. C., & Chibueze, O. (2021). ATM service quality and financial inclusion in



- Nigeria: An empirical analysis. *African Journal of Economics and Management Studies*, 12(3), 467–483.
- [10]. Ezie, O., & Ezie, P. K. (2021). *Applied econometrics: Theory and empirical illustrations*. Kabod Publishers.
- [11]. Ezie, O., Oniore, J., & Ugwuoke, C. C. (2025). Impact of Fintech Penetration on Unemployment Reduction in Nigeria. *International Journal of Humanities Social Science and Management (IJHSSM)*, 5(1), 297-308.
- [12]. Giuliano, P., & Ruiz-Arranz, M. (2022). Remittances, financial development, and growth. *Journal of Development Economics*, 158, 102881.
- [13]. Gonzalez, R. J., Ramirez, J. F., & Castillo, P. (2018). Financial infrastructure and remittance utilization in Latin America: Evidence from panel data. *Latin American Economic Review*, 25(1), 112–135.
- [14]. Hassan, S., & Kamarudin, S. (2020). The role of financial sector efficiency in shaping remittance inflows: Evidence from Malaysia. *Asian Journal of Economic Studies*, 16(4), 341–367.
- [15]. Mairafi, S. L., Ibrahim, M., & Abdullahi, Z. T. (2024). Effect of remittances and external debt on economic growth in Sub-Saharan Africa. *Applied Journal of Economics, Management, and Social Sciences*, 5(4), 22-32.
- [16]. Nigeria Inter-Bank Settlement System (NIBSS). (2023). *Electronic payment factbook: Analysis of electronic payment statistics in Nigeria*. NIBSS Annual Report.
- [17]. Nigerian Inter-Bank Settlement System (NIBSS). (2022). *Electronic payment fact sheet*. <https://www.nibss-plc.com.ng>
- [18]. Ojo, M. O., & Akintoye, R. I. (2023). The role of digital banking in enhancing financial inclusion: Evidence from sub-Saharan Africa. *International Journal of Finance & Economics*, 28(1), 56–74.
- [19]. Olayemi, T., & Yusuf, A. (2021). The impact of digital transactions on remittance utilization in African economies. *African Journal of Economic Policy*, 32(1), 45–62.
- [20]. Osiobe, E. U., Jone, D. O., Sofyan, D., & Houser, N. (2023) A Qualitative Review of Coach-Athlete Relationship from a Performance Management Perspective: A Case Study of Youth Soccer Players in San Diego and Orange County. *Indonesian Journal of Management*, 3(1), 1-31. <https://doi.org/10.31949/ijsm.v3i1.4618>
- [21]. Ratha, D., & Clemens, M. (2021). The resilience of remittances during crises: Lessons from past economic downturns. *World Development*, 138, 105227.
- [22]. World Bank. (2022). *Global financial development report 2022/2023: Bank regulation and supervision a decade after the global financial crisis*. <https://www.worldbank.org/en/publication/gfdr>
- [23]. World Bank. (2022). *Migration and development brief 37*. <https://www.worldbank.org/en/topic/migrationremittances>

## Appendices

Table A: Data Presentation

year	Automated teller machine (ATM, Val (₦' Billion)	Point of sale (POS, Val (₦' Billion))	Remittances, received (REM, current US\$)	Total Bank Deposits (BD, Billion NGN)
2009	548.60	11.03	18370796915	2,505.40
2010	399.71	12.72	19744755063	3,184.90
2011	1,561.74	31.02	20616772501	3,831.60
2012	1,984.66	48.01	20542884460	4,297.00
2013	2,828.94	161.02	20797073957	5,118.50
2014	3,679.88	312.07	20999084800	5,873.20
2015	3,970.25	448.51	20626046924	6,153.10
2016	4,988.13	759.00	19697938004	7,256.00
2017	6,437.59	1,409.81	22037016832	8,341.20
2018	6,480.09	2,383.11	24311022416	9,705.40



2019	6,512.61	3,204.75	23809281401	11,364.70
2020	18,199.66	4,727.08	17207547306	13,781.20
2021	21,230.93	24,455.42	19483402059	16,453.60
2022	32,648.02	41,035.80	20127614151	19,327.10
2023	28,212.59	110,347.10	19549549365	22,152.00

*Sources: CBN, 2023; WDI, 2025*