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# The absorptive capacity of the institution in the link between remittances and financial development in Africa: an advance panel regression

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## Abstract

**Purpose** – The purpose of this study is to examine institutional quality's absorptive capacity in African countries' remittances-finance nexus.

**Design/methodology/approach** – A balanced panel data set of thirty African countries between 2000 and 2022 is used for the study. The study adopts an augmented mean group (AMG), method of moment quantile regression (MMQR) and two-step system generalized method of moment (2SGMM) as the estimation techniques due to the nature of the data set.

**Findings** – The findings of the direct effect reveal that remittances do not constitute the growth of financial development, while institutional quality promotes the growth of financial development in the long. The moderating effect of institutional quality in the linkages shows that the interactive term of institutional quality and remittances has a significant positive effect on financial development in the region. Hence, institutional quality moderates the impact of remittances. These results are robust to different proxies of financial development and estimates obtained from MMQR and 2SGMM.

**Practical implications** – This study, therefore, suggests that institutional quality is essential in the linkages between remittances and financial development. Hence, remittances should be seen as one of the instruments that can be used to develop the financial sector rather than survival mechanisms for households.

**Originality/value** – This study contributes to the literature by unearthing the absorptive capacity of institutional quality in the nexus between remittances and financial development in African countries, which extant studies have neglected.

**Keywords** Remittances, Financial development, Institutional quality, Africa

**Paper type** Research paper

**JEL classification** – G20

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## 1. Introduction

This study investigates the role of institutional quality in the remittance-financial development linkages in Africa. Issues in research and policy circles drive this research. Remittances have become a vital ingredient in the development process of nations, especially developing countries, as they serve as a primary contributor to foreign income for individuals, often surpassing other sources of foreign financial support (Giuliano and Ruiz-Arranz, 2009; Islam and Alhamad, 2022; Dada and Akinlo, 2023a, 2023b). In comparison to alternative sources of foreign funding, remittance is considered risk-free and does not require repayment (Ratha *et al.*, 2011; Huay and Bani, 2018; Akinlo and Dada, 2022). Personal remittances yield numerous positive side effects, including alleviating poverty and stimulating economic growth by increasing households' disposable income and consumption (Abduvaliev and Bustillo, 2020).

Remittances (hereafter, REM), as a potential income source for developing nations, possess a financial value nearly threefold greater than official aid and surpass the size of foreign direct investment, according to the World Bank in 2020. In the aftermath of the COVID-19 pandemic, characterized by slower economic growth and declining foreign direct investments, the significance of remittance inflows has escalated for countries and households. This is especially true for low- and middle-income countries (LMICs) burdened with high external debt, as REM demonstrates resilience as a stable source of external financing. The World Bank's 2022 Brief adjusts the growth projection for remittance flows, anticipating an 8% increase to reach $647bn, while LMICs are forecasted to increase by 1.4% and reach $656bn in 2023.

Beyond the sheer volume and stability of REM, scholars and policymakers have directed their attention to the flow of these financial transfers due to their impact on the macroeconomic performance of recipient nations, particularly in terms of economic growth. The effects of REM on recipient countries' economic growth, poverty reduction, consumption, financial development (henceforth, FD) and institutional quality have become focal points for researchers and policymakers. This focus is evident in the works of scholars like Gupta *et al.* (2009) and Williams (2018), who have explored and highlighted the intricate connections between REM and the broader economic landscape in recipient nations.

Similarly, the link between REM and the development of the financial sector has garnered significant attention in the scholarly literature (Aggarwal *et al.*, 2011a, 2011b; Karikari *et al.*, 2016; Fromentin, 2017; Bhattacharya *et al.*, 2018; Azizi, 2019), and the results in the extant studies remain mixed. For instance, some studies (Gupta *et al.*, 2009; Aggarwal *et al.*, 2011a, 2011b; Olowa and Olowa, 2013; Bhattacharya *et al.*, 2018) posit that the influx of REM has a propensity to stimulate demand for financial services, thereby contributing to the overall development of the financial sector. This assertion is grounded in the idea that REM motivates recipients to seek and access financial products and services that might otherwise be beyond their reach (Orozco and Fedewa, 2003; Olowa and Olowa, 2013). Consequently, REM plays a role in encouraging recipients to use formal banking services for fund transfers and other financial transactions.

However, scholars such as Brown *et al.* (2013), Balli and Rana (2015), Combes and Ebeke (2011) and Uchenna *et al.* (2015) found that remittance does not always spur the FD and could have a negative influence on the growth of financial sector if REM is used primarily for immediate consumption and not for saving and investment. Furthermore, REM may substitute formal financial institutions by offering an alternative source to borrowing by the household, thus reducing the demand for credit (Brown *et al.*, 2013).

Due to the conflicting results on the effect of REM on FD, researchers have begun to examine various absorptive capacities that can channel REM to financial development. One such absorptive capacity is institutional quality. The quality of institutions matters in the

REM financial linkages as it sets the rules of the game and disciplines the behavior of economic agents (Ahmad and Ahmed, 2014; Fromentin, 2017; Barajas *et al.*, 2009; Dada and Abanikanda, 2022). As North (1990) noted, strong institutions strengthen investors' confidence, promoting fairness and equitable distribution of resources.

The foundation of a robust incentive structure, essential for reducing uncertainty and fostering efficiency, lies in institutions' high quality, as Catrinescua *et al.* (2009) emphasized. This assertion is particularly evident in the institutions' capacity to streamline bureaucratic processes, minimizing documentation and paperwork while upholding client trust during remittance transactions. The quality of institutions plays a pivotal role in shaping individuals' decisions to access financial services offered by specific institutions. Consequently, the public may opt for more conservative alternatives if there is a general distrust in financial institutions and concerns about prolonged bureaucratic procedures in REM processes. This preference for conservative options can impede the expansion of the financial market as individuals may refrain from using the financial system as a conduit for their remittance transactions.

Research suggests that the quality of institutions, encompassing factors such as control of corruption, political stability and adherence to the rule of law, plays a pivotal role in shaping FD (Roe and Siegel, 2008). The World Bank has championed the importance of quality institutions via its 2002 report titled "Building Institutions for Markets," drawing attention to the indispensable role of institutions in enhancing financial market development. This underscores the notion that the specific impact of international remittance inflows on FD is closely tied to the quality of institutions within the economy in question.

Economies tend to operate more systematically in an environment characterized by superior institutional quality and enjoy overall prosperity. For example, high institutional quality can mitigate uncertainty, enhance economic efficiency and facilitate economic activities, leading to heightened FD and economic growth. Consequently, it becomes crucial to investigate whether the increase in REM to Africa influences FD and to comprehensively identify the role of institutional quality in mediating the impact of REM on FD. Nevertheless, only a few studies (Abdih *et al.*, 2012; Barajas *et al.*, 2009; Saydaliyev *et al.*, 2020; Kim, 2021; Odhiambo and Musakwa, 2024) have scrutinized the moderating role of institutional quality in the linkages. This study, thus, addresses this perceived gap in the literature by probing the absorptive capacity of institutional quality in the nexus between REM and FD in Africa.

The contributions of this study to the body of knowledge are fourfold. First, the study explores the direct effect of REM and institutional quality on FD in Africa and the indirect impact of REM through institutional quality on FD. Second- two proxies are used to measure FD. One, the study used the conventional domestic credit to the private sector as a percentage of GDP, which is used primarily in the REM-FD literature (Adekunle *et al.*, 2020; Arcand *et al.*, 2015; Čihák *et al.*, 2013). However, this measure is limited as it measures only the depth of the financial system without considering financial access and efficiency. To overcome the shortcomings of domestic credit to the private sector, the FD index by the IMF is used. This measure captured both banking and non-banking financial institutions' depth, access and efficiency. Furthermore, a comprehensive institutional index is generated from six indicators- corruption control, law and order, government stability, bureaucracy quality and democratic accountability. This makes this work unique, unlike the study by Williams (2016), which only focused on the role of democratic institutions.

Third, this study focuses on Africa due to its exciting features regarding REM, institutional quality and financial development. Given that African countries ranked among the highest recipients of REM in the developing world, with over $42bn received in 2020

(World Bank, 2020), the quality of institutions becomes a crucial factor influencing the incentive to remit. This, in turn, can impact financial development, especially in scenarios where migrants aim to capitalize on investment opportunities to optimize savings allocation between their base and home countries. While the level of institutional quality varies across the African region, with some countries outperforming others in this regard (Ojapinwa, 2019), understanding the relationship between institutional quality, REM and FD can shed light on the conditional effects of institutions in the linkage between REM and financial development.

Fourth, the study used advanced econometric techniques to drive out the study's conclusion. Specifically, this study used second-generation estimation techniques to address the issues of cross-sectional dependency and slope heterogeneity in the panel data. Furthermore, an augmented mean group (AMG) provides long-term estimates. Also, the moment quantile regression (MMQR) method is used to address the issue of non-normality and the possibility of outliers in the series. Similarly, the MMQR provides the quantile distribution of the estimate across various scales. Finally, the study addresses the potential issue of endogeneity and reverse causality commonly found in the REM-FD nexus using the two-step system generalized method of moment (2SGMM). This is important since FD may also positively influence the inflow of REM (Demirgüc-Kunt *et al.*, 2010; Coulibaly, 2015; Olayungbo and Quadri, 2019).

The rest of the paper is structured thus: Section 2 presents the theoretical and empirical review of the interconnection between international REM, institutions and FD. Section 3 encompasses the methodology, model specifications and data description. Section 4 presents the results and facilitates discussion on the findings. Finally, the conclusion synthesizes the main discoveries of the paper and provides policy implications accompanied by suggestions for future research.

## 2. Literature review

### *2.1 Theoretical linkages*

Theoretical literature has posited a correlation between institutions and finance (Beck and Levine, 2004; Haber *et al.*, 2008). In the context of the "law and finance" theory, as Beck and Levine (2004) articulated, the nexus between legal institutions and FD is mutually supportive. This theory emphasizes the impact of robust law enforcement on the evolution of financial institutions, contending that the level of stakeholder involvement and confidence in financial markets hinges significantly on the efficacy of law enforcement in a given country. An effective private property system, for example, instills confidence in investors, encouraging them to invest in financial instruments like stocks and bonds (Beck and Levine, 2004). Also, the levels of institutional development within a nation have significantly impacted the availability and utilization of remitted funds. North (1990) demonstrated that institutions such as property rights and less distortionary policies play a role in influencing resource allocation by providing incentives for private individuals and entities to engage in viable and productive ventures.

### *2.2 Empirical literature*

*2.2.1 Remittances and financial development nexus.* A substantial body of literature has extensively delved into the ramifications of migrant workers' REM to the FD of their home countries. Aggarwal *et al.* (2011a, 2011b) investigated the connection between remittances and financial development. Using data from 109 countries from 1975 to 2007, the study revealed a positive association between REM and FD. The study by Motelle (2011) investigated the impact of REM on FD in Lesotho. The study outcome shows that REM does

not contribute to FD in the short run; however, a beneficial effect was found in the long run. Fromentin (2017) delved into the dynamic impact of REM on FD in a panel of emerging and developing nations. The conclusion from the study provides evidence supporting the notion that REM plays a role in promoting FD in emerging nations in the long term. However, the impact differs in the short term. Focusing on the fifty-seven highest REM-receiving countries, Bhattacharya *et al.* (2018) established a long-run equilibrium relationship between REM and three alternative FD indicators.

Furthermore, the study stressed the significance of institutional frameworks in augmenting the influx of REM and fostering FD. In a related context, Azizi (2019) investigated the effects of international REM on FD in developing countries and concluded that REM has a long-term beneficial impact on FD. Similarly, Qiang *et al.* (2019) examined REM's influence on financial institutions' development in 50 countries. The outcomes suggested that REM enhances financial depth. However, REM used for consumption has an adverse effect on financial expansion.

In Africa, Karikari *et al.* (2016) reveal that REM may foster FD in the short term, and the development of the financial sector can increase the likelihood of REM through formal channels. Recently, a study by Adekunle *et al.* (2020) on African countries shows that REM has both short and long-run positive impacts on FD. Furthermore, Bolarinwa and Akinbobola (2021) found a bidirectional causality between REM and FD in Africa's four most developed financial markets between 1999 and 2017. Kratou and Gazdar (2018) investigated the impact of REM on economic growth in a panel of 30 African nations spanning from 1988 to 2012. Using the GMM, the results demonstrated a positive relationship between FD and REM, thus contributing to economic growth. In a recent study conducted by Prempeh *et al.* (2023) for Ghana between 1980 and 2019, the authors submit that remittance positively impacts financial development in the short and long run.

*2.2.2 Institutional quality and financial development nexus.* In the traditional discourse, scant attention has been paid to exploring the influence of institutional quality on FD. Zingales (2003), for instance, uncovered indications linking institutional quality with FD, albeit suggesting a relatively modest impact. Similarly, Chinn and Ito (2006) factored in legal development in their examination across 108 nations. Their findings indicated that financial openness spurs equity and banking FD up to a certain threshold of legal development. Huang (2010), in a study encompassing both developed and developing nations, demonstrated that robust institutions foster FD. The results underscored a positive correlation between institutional quality and short-term FD, particularly in developing economies. Rathinam and Raja (2010) delved into the long-term causal nexus between institutional quality and FD, using rules, regulations and procedural laws as metrics for institutional efficacy. Their investigation unveiled a causal relationship between legal and institutional performance and the development of the financial sector in India.

Similarly, Law and Azman-Saini (2012) conducted a panel study involving developed and developing countries to explore the impact of institutional quality on FD. Using the dynamic system GMM estimator, their findings underscored the paramount importance of a quality institutional environment in elucidating FD. Bhattacharya *et al.* (2018) scrutinized the impact of institutional quality at the nexus of natural resource revenue and FD. Their findings revealed weak institutions exacerbate contract enforcement issues, impeding overall financial growth and development. In a more recent study, Muhammad *et al.* (2024) investigated the role of institutions in fostering the development of Islamic financial institutions across 11 prominent economies in Islamic finance. Using a fixed effects model with the Driscoll and Kraay (1998) estimator, the study revealed a positive influence of

effective governance on the development of Islamic finance while indicating a significant negative impact of regulatory quality on its development.

*2.2.3 Remittance, institutional quality and financial development nexus.* Concerning the role of institutions, various studies have investigated its effect in influencing multiple macroeconomic variables. Aggarwal *et al.* (2011a, 2011b) observed that a solid institutional framework correlates with increased deposits and bank credits within the domestic banking system. Consequently, nations endowed with superior institutions and a stable political environment demonstrate greater efficacy in using REM to enhance FD. Catrinescua *et al.* (2009) conclude that REM are more likely to foster growth in environments with high-quality political and economic institutions. In contrast, an unstable political environment and weak institutions may hinder investment and discourage REM inflows. Furthermore, the study of Ajide and Raheem (2016) shows that the impact of REM in reducing growth volatility is more pronounced in the presence of well-functioning institutions. Similarly, the result further reveals that the interaction between REM and six institutional-quality indicators contributes to reduced growth volatility.

Focusing on 19 sub-Saharan African countries, Aggarwal *et al.* (2011a, 2011b) submit that an enhanced institutional framework has led to an uptick in overall deposits and bank credits within the domestic banking system, thereby fostering FD. Similarly, Coulibaly (2015) explored the causal relationship between REM and FD in sub-Saharan African (SSA) countries. The study outcome suggests insufficient evidence supporting the fact that REM significantly promotes FD in SSA countries. Also, the author concludes that FD is not a substantial determinant of REM received in SSA countries. Williams (2016) used panel data from 1970 to 2013 to investigate the impact of REM on FD in SSA while considering the role of democratic institutions. The results suggest a significant positive association between REM and FD, although democratic institutions did not significantly mediate this relationship in SSA. In another related study, Williams (2018) concludes that REM are more effective in enhancing growth in the presence of robust democratic institutions for a panel of 109 developing nations.

Moreover, REM was more effective in nations with a robust governance system. Issifu (2018) shows that the interaction effect of REM and political institutions serves as a channel through which REM impacts domestic investment in five sub–Saharan African countries.

Furthermore, Chitambara (2019) investigates the relationship between REM, institutions and economic growth in 26 African countries from 1980 to 2014. Interactive terms of REM and institutions demonstrate a favorable effect on economic growth, emphasizing that the growth impact of REM is amplified in the presence of strong institutions. Saydaliyev *et al.* (2020) show that REM's effects on financial inclusion are conditional on institutional factors. Kim (2021) delved into the effects of migrants' REM and institutional quality on FD in developing nations. The findings implied that both REM and institutional quality promote FD. Moreover, the study highlighted the significant role of institutional quality in boosting the influence of REM on FD, particularly at higher threshold levels.

Ngoma *et al.* (2021) investigated the influence of workers' REM and their moderating effects on FD and institutional quality, specifically concerning economic growth in Asian economies. The results indicate a positive impact of workers' REM on economic growth. However, the growth effect was more evident in countries with enhanced FD yet relatively weaker institutions. Furthermore, the marginal impact of workers' REM on economic growth increased with higher degrees of FD but decreased with improvements in the institutional environment. Dada and Akinlo (2023) investigate FD's absorptive role in Nigeria's remittance-growth nexus. The moderating role revealed that, in the short run, FD and REM act as substitutes influencing growth, while in the long run, they perform a

complementary role in shaping economic growth. In a recent study, Pal and Mahalik (2024) examined the impact of REM inflows, foreign direct investment inflows and institutional quality index on FD in the top and bottom recipients of remittance and FDI between 1984 and 2020. The study's outcome shows that REM and FDI strengthen FD in top recipient countries while it weakens FD in bottom recipient countries. The author concludes that institution quality reduces the weak effect of REM and FDI on FD. In SSA, Odhiambo and Musakwa (2024) investigate the role of governance in the link between REM inflow and bank-based financial development and conclude that good governance reinforces the impact of REM on bank-based FD.

Summarily, it is evident that only limited studies (e.g. Saydaliyev *et al.*, 2020; Kim, 2021; Odhiambo and Musakwa, 2024) have investigated the absorptive capacity of institutional quality in the connection between REM and FD. For instance, Kim (2021) considered a panel of 46 developing countries, Saydaliyev *et al.* (2020) focused on 70 high remittance-receiving countries from different regions in the world, while Odhiambo and Musakwa (2024) centered on 26 SSA countries. However, Kim (2021), Saydaliyev *et al.* (2020) and Odhiambo and Musakwa (2024) do not account for cross-sectional dependency, slope heterogeneity and quantile dependence, which could influence the conclusion of their study. Also, their study does not focus exclusively on the African continent. Consequently, this study extends the existing research by concentrating on the influence of REM and institutional quality on FD and examining the absorptive role of institutional quality in the remittance-FD nexus in Africa while addressing the econometric pitfalls that influence panel data.

## 3. Materials and methods

### *3.1 Data*

Annual data from 2000 to 2022 for thirty African countries are used to achieve the study's objectives. The list of the countries is reported in the Appendix 1. In this study, two proxies are used to measure financial development. First, domestic credit to the private sector (FD1) is used as a percentage of GDP. Studies (see Arcand *et al.*, 2015; Čihák *et al.*, 2013) have used private sector credit as a proxy for FD. Second, the IMF's financial development index (FD2) is used. This proxy provides a broad-based measure of FD by capturing the depth, access and efficiency of both the financial institutions and the financial markets. Previous studies have broadly used this index (Dada *et al.*, 2023a; Aluko and Ibrahim, 2020; Opoku *et al.*, 2019). Remittances (REM) are calculated as a percentage of GDP, which comprises personal transfers and employee compensation. For institutional quality (INS), an index is generated from five indicators (corruption control, law and order, government stability, bureaucracy quality and democratic accountability), which are rescaled on an ordinary scale of 0–10 in line with extant studies (Dada *et al.*, 2023a, 2023b; Olaniyi and Adedokun, 2020). These rescalings are done to provide a uniform interpretation of the indicators. Details of how the aggregate institutional quality is calculated are reported in Appendix 2.

Other control variables such as per capita income (GDP), inflation (INF) and trade openness are chosen based on the role they play in financial development literature (Baltagi *et al.*, 2009; Klein and Olivei, 2008; Bittencourt, 2011; Boyd *et al.*, 2001). The consumer price index is used to proxy inflation. Data on domestic credit to the private sector (FD1), remittances, per capita income, inflation and trade openness are obtained from the World Bank database. The Financial Development Index (FD2) is sourced from IMF data, while institutional quality indicators are received from the International Country Risk Guide.

The synopsis of the data is reported in Table 1. The Table shows domestic credit to the private sector (FD1) has a mean value 25.008 with a standard deviation of 28.738. Similarly,

**Table 1.** Descriptive and correlation matrix

| | FD1 | FD2 | REM | INS | GDP | INF | TOP |
|---|---|---|---|---|---|---|---|
| Mean | 25.008 | 0.161 | 2.893 | 3.558 | 2181.310 | 108.313 | 69.430 |
| Median | 15.176 | 0.123 | 1.416 | 3.566 | 1191.944 | 100.000 | 64.850 |
| Maximum | 160.125 | 0.669 | 17.202 | 5.200 | 10160.340 | 473.037 | 176.275 |
| Minimum | −11.438 | 0.002 | 0.000 | 1.691 | 261.692 | 1.890 | −17.878 |
| std. Dev. | 28.738 | 0.114 | 3.204 | 0.612 | 2374.619 | 54.317 | 27.472 |
| Skewness | 2.735 | 1.920 | 1.417 | 0.084 | 1.650 | 2.171 | 0.862 |
| Kurtosis | 11.303 | 7.046 | 4.780 | 2.906 | 4.969 | 11.477 | 4.446 |
| Jarque-Bera | 2595.368 | 816.582 | 294.021 | 0.971 | 387.479 | 2302.042 | 132.943 |
| Probability | 0.000 | 0.000 | 0.000 | 0.615 | 0.000 | 0.000 | 0.000 |
| FD1 | 1.000 | 0.894 (0.000)[a] | −0.010 (0.002)[a] | 0.302 (0.000)[a] | 0.507 (0.000)[a] | 0.069 (0.087)[c] | 0.108 (0.008)[a] |
| FD 2 | | 1.000 | −0.009 (0.817) | 0.351 (0.000)[a] | 0.575 (0.000)[a] | 0.093 (0.022)[b] | 0.055 (0.175) |
| REM | | | 1.000 | 0.026 (0.528) | −0.311 (0.000)[a] | 0.101 (0.012)[b] | −0.246 (0.000)[a] |
| INS | | | | 1.000 | 0.251 (0.000)[a] | −0.279 (0.000)[a] | −0.027 (0.506) |
| GDP | | | | | 1.000 | 0.063 (0.119) | 0.320 (0.000)[a] |
| INF | | | | | | 1.000 | −0.086 (0.034)[b] |
| TOP | | | | | | | 1.000 |

**Notes:** FD1 is financial development proxy by domestic credit to the private sector, FD2 is financial development index by IMF, REM is remittances, INS is institutional quality, GDP is per capita income, INF is inflation and TOP is trade openness. "()" is the probability value. a, b and c are 1, 5 and 10% level of significant

**Source:** Authors' computation

the financial development index (FD2) averages 0.161 on an ordinary scale of 0–10. Remittances (REM), on the other hand, have a mean of 2.893 and fall within its minimum value of 0 and maximum value of 17.202 as a percentage of gross domestic product. This shows that some African countries received no remittances during the study period. Per capita has an average value of 2181.310 with a standard deviation of 2374.619, suggesting that GDP is widely dispersed during the study period. Inflation (INF) and trade openness (TOP) have an average value of 108.313 and 69.430, respectively. Regarding skewness, the results in Table 1 hint that all the series are positively skewed.

Similarly, following the kurtosis statistic, all the series are leptokurtic (value greater than 3) except institutional quality data, which is platykurtic (value less than 3). None of the variables is mesokurtic. In addition, all the variables except institutional quality data follow a non-normality path, suggesting that the variables are not symmetrically distributed across the cross-sectional units.

The correlation test in Table 1 hints that the variables are moderately correlated, suggesting the absence of correlation in the data. Furthermore, regarding the direction of the relationship, the correlation matrix indicates that REM is negatively correlated with all the measures of FD, while other variables are positively correlated with FD.

### *3.2 Model and technique of estimation*

In line with extant studies in the literature, this study specified the relationship between financial development, remittances and institutions as follows:

$$FD_{it} = \alpha + \beta REM_{it} + \gamma INS_{it} + \theta' X_{it} + \varepsilon_{it} \tag{1}$$

where *FD* represents financial development as measured by two proxies, *REM* is remittances, *INS* is institutional quality, *X* is the vector of other control variables as stated in the data description section, $\alpha$ is the intercept and $\varepsilon$ is the error term. The model's parameters are captured by $\beta$, $\gamma$ and $\theta$.

To account for the absorptive capacity of the institutional quality in the model, equation (1) is modified to reflect the interactive term as expressed thus:

$$FD_{it} = \alpha + \beta REM_{it} + \gamma INS_{it} + \pi(REM \times INS)_{it} + \theta' X_{it} + \varepsilon_{it} \tag{2}$$

From equation (2), *REM*INS* is the interactive term that captures the absorptive capacity of institutional quality in the link between *REM* and *FD*.

Because of the nature of the panel data used in this second-generation estimation, techniques are deployed to capture the study's objective. The study starts the estimation procedure by testing the presence of cross-sectional dependency (CD) in the data set. Testing CD in panel data has become necessary recently due to the fast-rising globalization, which has made nations closely connected, especially in finance, economics, social and politics. Thus, happenings, events or shocks in one nation easily filter into other nations due to the contagion effect (Akinlo and Dada, 2022). The CD equation is presented as:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left( \sum_{i=0}^{N-1} \sum_{j=i+1}^{N-1} \rho ij \right) N(0,1) \tag{3}$$

Furthermore, the Pesaran and Yamagata (2008) slope homogeneity test is used to evaluate slope homogeneity in panel data. The model for slope homogeneity following Pesaran and Yamagata approach is stated in models 4 and 5:

$$\widetilde{\Delta} = (N)^{\frac{1}{2}}(2K)^{-\frac{1}{2}}\left(\frac{1}{N}\widetilde{S} - k\right) \tag{4}$$

$$\widetilde{\Delta}_{adj} = (N)^{\frac{1}{2}}\left(\frac{2k(T-k-1)}{T+1}\right)^{-\frac{1}{2}}\left(\frac{1}{N}\widetilde{S} - k\right) \tag{5}$$

where $\widetilde{\Delta}$ and $\widetilde{\Delta}_{adj}$ are delta tilde and the adjusted delta tilde.

The unit root of the series is investigated using the cross-sectionally augmented Dicky–Fuller (CADF) and cross-sectionally augmented IPS (CIPS) tests. These tests are robust to CD and slope heterogeneity. The models for testing the panel unit root are:

$$\Delta X_{i,t} = \alpha_i + \alpha_i Y_{i,t-1} + \alpha_i \overline{Y}_{t-1} + \sum_{l=0}^{p} \alpha_{il}\Delta\overline{X}_{t-1} + \sum_{l=0}^{p} \alpha_{il}\Delta X_{i,t-1} + \mu_{it} \tag{6}$$

The mean of the cross-section is denoted by $\overline{X}$

Furthermore, the test statistics for CIPS are represented by:

$$\widehat{CIPS} = N^{-1}\sum_{i=0}^{n} CADF_i \tag{7}$$

The existence of long-run cointegration among the series is investigated using the Westerlund panel cointegration, which is based on four test statistics- group mean statistics ($G_\tau$, $G_\alpha$) and panel mean statistics ($P_\tau$, $P_\alpha$). The models for the test statistics are described in equations (8) and (9):

$$G_\tau = \frac{1}{N}\sum_{i=1}^{N}\frac{\widehat{\beta}_i}{SE\left(\widehat{\beta}_i\right)} \; and \; G_\alpha = \frac{1}{N}\sum_{i=1}^{N}\frac{T\widehat{\beta}_i}{\beta_i(1)} \tag{8}$$

$$P_\tau = \frac{\widehat{\beta}_i}{SE\left(\widehat{\beta}_i\right)} \; and \; P_\alpha = T\widehat{\alpha} \tag{9}$$

Moreover, given the nature of the data set, an augmented mean group (AMG) is used as the baseline estimation technique. This approach caters for the cointegration among the series and provides a long-run estimate in the presence of CD. Furthermore, the AMG does not require testing the stationarity properties of the variables and accounts for the slope heterogeneity in panel data (Alola *et al.*, 2023; Olaniyi *et al.*, 2023; Dada *et al.*, 2023a, 2023b). The model for testing the AMG follows a two-stage:

Stage 1:

$$\Delta y_{it} = \alpha_i + \beta_i\Delta x_{it} + \tau_i f_i + \sum_{t=2}^{T}\delta_i\Delta D_i + \varepsilon_{it} \tag{10}$$

Stage 2:

$$\widehat{\beta_{AMG}} = N^{-1}\sum_{i=1}^{N}\widehat{\beta}_i \tag{11}$$

From the above equations, y and x are the explained an explanatory variable, $\beta_i$, $f_{i\ and}$ $\delta_i$ are the coefficient of country-specific, unobserved common factor and the time dummy, respectively, while $\widehat{\beta_{AMG}}$ is the AMG estimate.

A series of estimation techniques such as two-step system generalized method of moments (2SGMM) and method of moments quantile regression (MMQR) are used as a form of robustness. The 2SGMM approach is used to address the issue of endogeneity in the panel data. In addition, this method is efficient when the number of cross-sections ($n$ = 30) is greater than the time (T = 21) (Dada, 2021). The system GMM proposed by Arellano and Bover (1995) makes the lagged value of the dependent variable as part of the explanatory variables. The 2SGMM of equation (2) is stated as:

$$FD_{it} = \alpha + \rho FD_{i,t-1} + \beta REM_{it} + \gamma INS_{it} + \pi(REM \times INS)_{it} + \theta' X_{it} + \varepsilon_{it} \quad (12)$$

$FD_{i,t-1}$ is the lag value of the dependent variable.

The 2SGMM involves the deployment of instrumental variables which uses a linear moment restriction as specified in equation (13):

$$E(FD_{i,t-s}, \Delta\varepsilon_t) = E(REM_{it-s}, \Delta\varepsilon_t) = E(INS_{i,t-s}, \Delta\varepsilon_t) = E\left([REM \times INS]_{i,t-s}, \Delta\varepsilon_t\right)$$
$$= E(X_{i,t-s}, \Delta\varepsilon_t) = 0 \quad (13)$$

For s ≥ 2, and $t$ =3, 4,…,T

These instruments are validated using the Hansen's J-test of over-identifying restriction.

Similarly, is worth noting that estimation techniques described previously do not take into consideration the non-normality in the distribution of the panel data as reported in Table 1, and also do not provide the conditional quantiles of financial development (Solarin *et al.*, 2022; Dada *et al.*, 2024). The MMQR proposed by Machado and Silva (2019) is used as part of the robustness analysis. The model of MMQR is specified as:

$$Q_y(\tau/X_{it}) = (\alpha_i + \delta_i(\tau)) + X_{it}^{'}\beta(\tau_i) + \varnothing_i(\tau_j) + U_t(\tau_j), \tau_j, \varepsilon(0,1) \quad (14)$$

$Q_y(\tau/X_{it})$ is the conditional quantile of the dependent variables. $X_{it}^{'}$ is the vector of explanatory series. The scalar factor is expressed as $\alpha_i + \delta_i q(\tau)$, and it is the corresponding quantile for the fixed effect of the individual related units. $\varnothing_i$ and $U_t$ are the unobserved country and time-fixed effects.

## 4. Results and discussion

### *4.1 Preliminary test*

The result of the CD test is reported in Table 2. Four different test statistics are used to verify the existence or otherwise of CD in the panel data. The four test statistics show that the null

**Table 2.** Cross-sectional dependence tests

| | FD1 | FD2 | REM | INS | GDP | INF | TOP |
|---|---|---|---|---|---|---|---|
| Breusch-Pagan LM | 5535.345[a] | 4099.781[a] | 1662.159[a] | 2916.064[a] | 6085.826[a] | 7428.128[a] | 2668.388[a] |
| Pesaran scaled L.M. | 171.901[a] | 123.231[a] | 40.587[a] | 83.098[a] | 190.564[a] | 245.411[a] | 74.702[a] |
| Bias-corrected scaled L.M. | 171.151[a] | 122.481[a] | 39.837[a] | 82.348[a] | 189.814[a] | 244.686[a] | 73.952[a] |
| Pesaran CD | 52.171[a] | 56.571[a] | 8.054[a] | 39.864[a] | 70.076[a] | 85.369[a] | 9.320[a] |

**Note:** Where a is 1% level of significant
**Source:** Authors' computation

hypothesis of cross-sectional independence is rejected at a 1% significant level for all the variables. In order words, the results established the presence of the CD among the cross-sectional units. This result is not surprising since African countries are closely connected; thus, shocks from any of the countries easily filter into other countries, which leads to action and reaction from the affected countries. Furthermore, the validation of CD in Africa hints that the region is not immune from happening in the global economies (Ajide *et al.*, 2023).

The finding of the slope homogeneity is reported in Table 3. The outcome rejects the assumption of slope homogeneity across the panel. Hence, this implies that the slope coefficients are heterogeneous and differ across countries. The establishment of CD and slope heterogeneity in the data set makes first-generation stationarity tests inappropriate for this study. To overcome this, second-generation unit root tests are used. The CADF and CIPS unit root test results are reported in Table 4. The results show that the variable has no unit root; hence, the variables are stationary. Specifically, only REM and trade openness are stationary at the level, while all other variables become stationary and different at first. The mixed order of integration among the series indicates that the variables could diverge in the short run; they tend to converge in the long run.

The convergence or otherwise of the long-run relationship is reinforced using the Westerlund (2007) panel cointegration test. This approach benefits this study due to its robustness to CD and heterogeneity. The result of the cointegration test is reported in Table 5. Three test statistics rejected the null hypothesis of no cointegration between the variables. Hence, a long-run relationship can be established among the variables.

### *4.2 Baseline result: long-run relationship*

As a sequel to the finding from the preliminary tests, which affirms the existence of CD and long-run relationships among the variables, an augmented mean group is used to investigate

**Table 3.** Slope homogeneity test

| T-statistics | Delta value | *p*-value |
|---|---|---|
| $\Delta$ | −6.231[a] | 0.000 |
| $\Delta_{adj}$ | −8.483[a] | 0.000 |

**Note:** Where a is 1% level of significance
**Source:** Authors' computation

**Table 4.** Panel stationarity test

| | CADF | | CIPS | |
|---|---|---|---|---|
| | Level | 1st difference | Level | 1st difference |
| FD1 | −1.345 | −5.966[a] | −1.794 | −5.187[a] |
| FD 2 | −1.009 | −3.798[a] | −1.100 | −4.154[a] |
| REM | −3.320[a] | −5.638[a] | −4.987[a] | −6.190[a] |
| INS | −1.791 | −4.618[a] | −1.226 | −4.190[a] |
| GDP | −1.300 | −3.955[a] | −1.035 | −4.190[a] |
| INF | −1.445 | −3.161[a] | −1.134 | −3.718[a] |
| TOP | −3.655[a] | −5.534[a] | −4.770[a] | −5.180[a] |

**Note:** Where a is 1% level of significant
**Source:** Authors' computation

**Table 5.** Westerlund cointegration test

| H0: No Cointegration | Value | Robust *p*-value |
|---|---|---|
| $G_t$ | −3.746[a] | 0.000 |
| $G_a$ | −2.413 | 0.692 |
| $P_t$ | −9.461[a] | 0.000 |
| $P_a$ | −7.572[b] | 0.012 |

**Note:** Where a and b are 1 and 5% level of significant
**Source:** Authors' computation

the long-run relationship between FD, REM and institutional quality in Africa. The long-run estimates are essential in making reliable policy recommendations and directions. The result of the long-run estimate is reported in Table 6. Two proxies are used to measure FD. In models 1 and 2, domestic credit to the private sector is used as the dependent variable, while in models 3 and 4, the financial development index by IMF is used.

The result of the direct effect of REM on FD in models 1 and 3 shows that REM has a negative and significant impact on FD in the region. Specifically, the result indicates that a percentage increase in REM lowers FD by 0.568 and 0.003 in models 1 and 3, respectively. These results further validate that most remittances in developing countries, especially in Africa, are not used to developing the financial sector. This result hints that REM recipients do not trust the financial sector and, thus, prefer to invest in other assets or small businesses (Kakhkharov, 2018), which limits the extent of credit creation in the financial system. It is also possible that households use funds received through REM instead of borrowing from financial institutions, thereby limiting their expansion.

**Table 6.** Augmented mean group

| | Dependent variable: domestic credit to private sector (FD1) | | Dependent variable: financial development index by IMF (FD2) | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| REM | −0.568[a] (−3.68) | −0.175[b] (−2.57) | −0.003[a] (−4.19) | 0.002 (0.58) |
| INS | 0.745[a] (7.58) | 0.669[a] (8.02) | 0.014[a] (12.28) | 0.052[a] (11.19) |
| REM*INS | | 0.425[a] (2.91) | | 0.002[c] (1.82) |
| GDP | 0.002[a] (7.09) | 0.005[a] (15.55) | 0.001[a] (33.33) | 0.001[a] (17.77) |
| INF | −0.044 (−1.41) | 0.009 (0.18) | −0.001[a] (−4.08) | −0.001[a] (−2.35) |
| TOP | −0.036 (−1.10) | 0.080[b] (2.55) | 0.001[a] (5.27) | 0.001[a] (6.07) |
| Constant | 3.992 | −17.289[b] | 0.034[a] (2.86) | −0.020 (−0.85) |
| RMSE | 14.026 | 22.507 | 0.041 | 0.083 |
| Net effect | na | 1.337 | na | na |
| No of countries | 30 | 30 | 30 | 30 |
| No of observation | 630 | 630 | 630 | 630 |

**Notes:** 1. a, b and c are at 1, 5 and 10% significance levels; 2. The net effect of 1.337 in model 2 is calculated as [(0.425 * 3.558) + (−0.175)], where 0.425 is the conditional coefficient of the interaction between the primary variable (remittance) and the modulating variable (institutional quality). 3.558 is the average value of the modulating policy variable (institutional quality), which is constant. −0.175 is the unconditional coefficient of the primary variable- remittance; 3. The coefficients of both the primary variable and the interactive term must be significant to calculate the net effect. Thus, the net effect can only be calculated for model 2; 4. na is not available
**Source:** Authors' computation

Furthermore, the result could probably indicate that REM is used to complement consumption rather than for financial investment purposes, which has long-run positive multipliers in the financial sector. This result aligns with studies on developing countries, which conclude that REM reduces FD. For instance, studies by Motelle (2011) for Lesotho and Fromentin (2017) for low-income countries show that REM does not translate to FD. In addition, Pal (2023) found that REM reduces FD in India. However, Chowdhury (2011) and Cooray (2012) for 94 non-OECD countries and Pal (2023) for China concluded that REM spur FD.

On the other hand, the effect of institutional quality on FD is significantly positive across the model. Specifically, an increase in institutional quality spurs FD by 0.745% and 0.014%. This result shows the significance of institutional quality in developing the financial sector. Institutional quality provides the essential ingredients for the financial sector to strive. Strong institutional quality reduces the loopholes and lapses in the financial sector. On the moderating role (indirect effect) of institutional quality in the linkages between REM and FD, the result is reported in Models 2 and 4 of Table 6. The result shows that the interactive coefficients are particularly positive and significant, with coefficients of 0.425 and 0.002 in Models 1 and 2, respectively. When the net effect of the interactive is considered, it also reveals a positive value of 1.33 for Model 2. However, the net effect cannot be obtained for Model 4 because it does not satisfy the condition for obtaining it. The positive value of the net effect hints that the interactive variable would have a combined beneficial impact on the financial sector in Africa in the long run. Institutional quality indicators such as corruption control, law and order, government stability, bureaucracy quality and democratic accountability put a check and balance on the financial sector's activities, thereby ensuring smooth and effective functioning.

Strong institutional quality reduces the sharp practices and rent-seeking, among others, in transferring diaspora remittances, hereby allowing the remittances to be channeled through the financial sector. Apart from this, the advent of strong institutions could instill a level of trust in remittance receivers, which makes them invest or save some of these funds for later consumption by buying financial products, which then enhance the financial sector (Aggarwal *et al.*, 2011a, 2011b; Gupta *et al.*, 2009). This result corroborates the submission of Catrinescua *et al.* (2009), who found that strong institutions are an impetus for REM to transmit to FD. Furthermore, the study by Kim (2021) shows that with strong institutions, REM effectively and efficiently promotes FD in 46 developing countries. Similar conclusions were also reached by Pal and Mahalik (2024) for 15 European and Central Asian countries and 29 sub-Saharan African countries. Also, Odhiambo and Musakwa (2024) established that good governance strengthens the positive effect of REM on bank-based FD. However, it contradicts the findings of Williams (2016), who found that democratic institutions do not mediate the linkages between REM and FD in Africa.

Concerning the control variables, per capita income (GDP) has a significant positive effect across the model. This shows that economic prosperity is an essential factor for FD to strive. This supports the theoretical proposition that economic growth is essential for the development of the financial sector (Levine, 2005). This result aligns with the works of Kakhkharov and Rohde (2020), Hermes and Lensink (2003) and Calderón and Liu (2002), which opined that the size of the economy is a vital factor contributing to the growth of the financial sector. Inflation has a negative impact on FD. However, the effect of the inflation rate is only significant when the financial development index is used. This result indicates that inflation, used to measure the macroeconomic impact, could increase risk and discourage financial intermediation, lowering FD. The result of the negative impact of the inflation rate on FD does not stand alone but aligns with the works of Karikari *et al.* (2016).

Trade openness has a positive impact on the financial sector. This supports the openness hypothesis of Rajan and Zingales (2003), who stressed that openness to trade and liberalization of capital accounts spur FD. However, studies by Fromentin (2017) and Cooray (2012) support the positive relationship between remittances and FD.

### *4.3 Sensitivity analysis*

*4.3.1 Accounting for endogeneity issue.* To address the endogeneity and heteroskedasticity issue in the regression, which mitigates reverse causality, a two-step system GMM is further used to validate the result obtained from the long-run AMG. The Hansen's J-test of over-identification restriction is used to test the validity of the instruments. The result of the J-test probability in Table 7 validates the instruments used in the study. Similarly, the result shows the existence of first-order autocorrelation-AR(1), which is expected in a GMM estimate. However, there is an absence of second-order autocorrelation-AR(2) in the model. One lag of financial development is used as part of the explanatory variables to examine the persistence and dynamism of the model. The finding of the 2SGMM in Table 7 reveals that the lag value of financial development (FD(−1) has a significant positive effect on financial development. This result hints that the historical value of FD is important in determining the present financial state. This proposition is equally supported by the works of Williams (2016) and Arezki and Brückner (2012), who submit that the past level of FD is a catalyst for the present level.

Concerning the findings of the other estimates, the results show that REM negatively impacts FD; however, the result is only significant in Model 2. The influence of institutional quality is positive and significant across all the models, thus supporting the result obtained from the long-run analysis. Similarly, the result from the moderating coefficient positively influences FD. Nevertheless, the coefficient is only significant when domestic credit to the private sector is used as the dependent variable.

The signs of the coefficients of the control variables also align with the long-run coefficient obtained from the AMG. Overall, the result shows that per capita income and trade openness significantly influence FD, while the inflation rate slows the rate of FD.

**Table 7.** Two-step system generalized method of moment

| | Dependent variable: domestic credit to private sector | | Dependent variable: financial development index by IMF | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| FD(−1) | 0.836[a] (76.141) | 0.832[a] (53.513) | 0.706[a] (47.822) | 0.704[a] (48.332) |
| REM | −0.014 (−0.195) | −0.084[a] (2.848) | −0.001 (−0.125) | −0.002 (−0.379) |
| INS | 0.601[a] (19.182) | 0.363[a] (12.631) | 0.014[a] (3.497) | 0.01[c] (1.921) |
| REM*INS | | 0.338[a] (3.408) | | 0.001 (0.436) |
| GDP | 0.003[a] (8.227) | 0.003[a] (6.781) | 0.002[a] (2.978) | 0.002[a] (2.727) |
| INF | 0.005 (1.004) | 0.005 (0.676) | 0.005 (0.564) | 0.004 (0.430) |
| TOP | 0.036[a] (5.453) | 0.042[a] (4.081) | 0.002[b] (0.029) | 0.001 (1.617) |
| Net effect | na | 1.118 | na | na |
| AR(1)/prob value | 0.031[b] | 0.031[b] | 0.002[a] | 0.001[a] |
| AR(2)/prob value | 0.485 | 0.477 | 0.892 | 0.991 |
| J-statistic prob | 0.453 | 0.417 | 0.55 | 0.514 |
| No of countries | 30 | 30 | 30 | 30 |
| No of observation | 630 | 630 | 630 | 630 |

**Note:** Where a, b and c are 1, 5 and 10% level of significant
**Source:** Authors' computation

*4.3.2 Accounting for the conditional distribution.* Since the descriptive statistic reported in Table 1 hints that the series is not normally distributed, the method of moments quantile regression (MMQR) addresses this econometric shortcoming and many others. For instance, MMQR is robust to outliers and provides the conditional distribution of the estimate across various quantiles. The results of the MMQR are presented in Tables 8 and 9. The MMQR are inspected across 10%, 25%, 50%, 75% and 90% quantiles.

The results in Tables 8 and 9 reveal that REM negatively impacts FD in both scale and location shifts, while institutional quality positively influences FD. The results from the MMQR show that REM has a significant negative effect on FD at the upper quantiles in Table 8, while it has a significant negative impact at the lower quantiles in Table 9. The difference in these results could be due to the proxy used to measure financial development. However, institutional quality positively affects FD across the quantiles. Similarly, the interactive terms' coefficients positively influence FD across all the quantiles in Tables 8 and 9. The results of other control variables also align with the results from the long-run estimates.

## 5. Conclusion and implication of the study

### *5.1 Conclusion*

Various studies have explored the impact of REM on FD, and various conclusions have been reached. This study extended the finance-remittances literature by investigating the absorptive role of institutional quality in the linkages. Specifically, the study examines the moderating effect of institutional quality in the link between REM and FD in thirty African countries between 2000 and 2020. Two proxies, domestic credit to the private sector and the financial development index from the IMF, are used to measure FD, while an index is generated for institutional quality. To achieve the study's objective and the robustness of the results, augmented mean group (AMG), two-step system generalized method moments (2SGMM) and method of moments quantile regression are used to drive the study's outcome.

The long-run research outcomes are as follows: REM significantly negatively influences Africa's financial sector development. However, institutional quality has a significant positive impact on the development of the financial sector. Meanwhile, the interaction between REM and institutional quality in driving financial sector development is significantly positive. This implies that the more robust institutional quality facilitates remittance transmission to African financial development. The results of other control variables indicate that per capita income and trade openness significantly positively affect FD, while inflation negatively influences FD. These results are robust to other estimation techniques that account for endogeneity and conditional distribution across quantiles.

This study has contributed to and expanded the frontier of knowledge on the influence of remittance and institutional quality on FD of African countries. Furthermore, the study assesses the moderating impact of institutional quality in the REM-FD nexus, which gives regional policymakers direction and guidance about the importance of institutional quality in moderating the effect of remittance.

### *5.2 Practical/policy implications*

From the policy perspective, these results have important policy implications. First, the net effect of remittance and institutional quality is beneficial to growth in the region; thus, institutional mechanisms should be reinforced. Institutional development is critical to boost the remittance receivers' confidence in the financial market. Solid institutions will reduce the informal channel of receiving remittances and transaction costs. Further, there is necessary to strengthen institutional setups to ensure financial security and increase the inflows of remittances, which will enhance financial development across African Countries.

**Table 8.** MMQR dependent variable-domestic credit to the private sector (FD1)

| Variable | Location | Scale | Q (0.10) | Q (0.25) | Q (0.50) | Q (0.75) | Q (0.90) |
|---|---|---|---|---|---|---|---|
| REM | −0.043[b] (−2.14) | 0.466 (0.06) | 0.311 (0.03) | 0.597 (0.08) | −0.924 (−0.14) | −0.472[b] (−2.12) | −0.902[c] (−3.10) |
| INS | 0.105[a] (2.70) | 0.092[b] (2.16) | 0.390 (0.65) | 0.104[c] (1.81) | 0.637[a] (2.81) | 0.182[b] (2.34) | 0.251[b] (2.16) |
| REM*INS | 0.033[b] (2.02) | 0.145[b] (2.07) | 0.195[b] (2.06) | 0.106[b] (2.05) | 0.004[b] (2.00) | 0.166[b] (2.05) | 0.301[b] (2.06) |
| GDP | 0.006[a] (3.34) | 0.006[a] (2.36) | 0.004 (0.74) | 0.001[b] (2.01) | 0.004[b] (2.39) | 0.012[b] (2.07) | 0.017[b] (2.08) |
| INF | 0.042 (0.53) | −0.030 (−0.37) | 0.089 (0.76) | 0.071 (0.85) | 0.049 (0.69) | 0.014 (0.11) | −0.013[c] (−1.97) |
| TOP | 0.008 (0.04) | 0.107 (0.53) | 0.161[b] (2.07) | 0.095[b] (2.01) | 0.019 (0.11) | 0.107 (0.34) | 0.201[b] (2.03) |
| Constant | −2.270 (−0.50) | 1.357 (0.28) | −3.948 (−0.65) | −3.893 (−0.74) | −2.426 (−0.63) | −1.232 (−0.14) | 1.863 (0.01) |
| Net effect | 0.074 | na | na | na | na | 0.175 | 0.168 |
| No of countries | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| No of observation | 630 | 630 | 630 | 630 | 630 | 630 | 630 |

**Note:** Where a, b and c are 1, 5 and 10% level of significant
**Source:** Authors' computation

**Table 9.** MMQR dependent variable-financial development index (FD2)

| Variable | Location | Scale | Q (0.10) | Q (0.25) | Q (0.50) | Q (0.75) | Q (0.90) |
|---|---|---|---|---|---|---|---|
| REM | −0.009[b] (3.29) | −0.005[a] (−3.18) | −0.017[b] (−2.23) | −0.013[b] (2.24) | −0.010[b] (−2.26) | 0.006 (0.34) | 0.002 (0.10) |
| INS | 0.045[a] (2.79) | 0.021[a] (2.46) | 0.078[a] (2.63) | 0.065[a] (2.67) | 0.051[a] (2.76) | 0.029[b] (2.07) | 0.012 (1.45) |
| REM*INS | 0.001 (0.11) | 0.002 (0.29) | 0.005 (0.22) | 0.003 (0.19) | 0.002[c] (1.95) | 0.001[b] (2.15) | 0.003 (1.53) |
| GDP | 0.001[a] (2.43) | 0.001[a] (2.34) | 0.001 (0.17) | 0.001 (0.27) | 0.001[b] (2.13) | 0.001[a] (5.26) | 0.001[a] (6.93) |
| INF | 0.001 (0.56) | −0.001 (−0.67) | 0.001 (0.065) | 0.001 (0.64) | 0.001 (0.61) | 0.001 (0.31) | −0.001 (−0.58) |
| TOP | 0.001 (0.37) | 0.001 (0.82) | 0.001 (0.33) | 0.001 (0.17) | 0.001 (0.14) | 0.001[c] (1.85) | 0.002[a] (2.90) |
| Constant | −0.077 (−0.31) | 0.140 (0.71) | −0.302 (−0.57) | −0.212 (−0.51) | −0.119 (−0.41) | 0.029 (0.25) | 0.142 (1.17) |
| Net effect | na | na | na | na | −0.003 | na | na |
| No of countries | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| No of observation | 630 | 630 | 630 | 630 | 630 | 630 | 630 |

**Note:** Where a, b and c are 1, 5 and 10% level of significant
**Source:** Authors' computation

Institutional quality, such as reducing bureaucratic processes, higher transparency and prudential regulation, can boost the public's confidence in transferring remittance, especially through the official channel. Remittance should be seen as an instrument that can be leveraged to develop the financial sector. Policies that could reduce or eliminate various transaction costs imposed on financial institutions' remittances should be formulated. For instance, accounts can be opened for the recipients of remittances at no cost to boost and expand credit availability in the financial sector.

Policymakers should consider various strategies to enhance the financial sector's capacity to stabilize economies and attract remittances to countries. Additionally, introducing remittance bonds could effectively increase the mobilization of remittances and use them as significant financial assets in the financial markets. Further, financial literacy from stakeholders (government, non-government and private) should be conducted so that the household can know how to use their remittance, from immediate consumption to investment, that will maximize their long-term welfare.

### *5.3 Limitations and direction for future research*

Despite the contribution of this research to the remittance-institution-financial development literature, this study has some limitations. One- the outcome of this study can only be applied to the scope of the study, while other regions or countries outside the scope should take the study's implications with caution. Two- the effect of remittance and institutions on financial development is only studied at the macro level. Three- aggregate institutional quality is used in the nexus. However, these limitations do not undermine this study's uniqueness and policy contribution. Future research can extend this work by investigating the effect at a microeconomic level. Also, individual dimensions of institutional quality can be used separately to assess the differential impact on the relationship. Similarly, the scope of the study can be expanded as data on institutional quality in those countries not covered are available. Finally, future studies can replicate this study in other regions not covered, and country-specific evidence can also be provided.

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**Further reading**

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**Appendix 1. List of countries**

Algeria, Angola, Botswana, Burkina Faso, Cameroon, Congo Democratic Republic, Congo Republic, Coite d'Ivoire, Egypt, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Madagascar, Malawi, Mali, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Togo, Tunisia, Uganda and Zambia.

**Appendix 2. Institutional quality data**

The five indicators of institutional quality are rescaled on an ordinal scale of 0–10 as follows:

- Democratic accountability, corruption control and law and order are on a scale of 0–6 from ICRG. These indicators are rescaled to 0–10 as $\frac{x}{6} \times 10$.
- Bureaucratic quality is on a scale of 0–4, and it is rescaled as $\frac{x}{4} \times 10$.
- Government stability is originally 0–12 from ICRG database. This is rescaled as $\frac{x}{12} \times 10$.

Where x is the score, each country obtained from the indicators, out of the maximum point. Afterward, the five indicators are average to generate an index of institutional quality as:

$$INS_t = \frac{1}{n}\sum_{i=1}^{n} INS_{j,t}$$

INS is the aggregate institutional quality index, $n$ is the number of institutional quality measures, $j$ denotes each individual institutional quality index and $t$ is the time series observations.

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