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Towards inclusive growth in Africa: Remittances, and financial development interactive effects and thresholds

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Abstract

The study employs macro data for 42 African countries to examine the interactive and threshold effects of financial development in the remittances-inclusive growth relationship. First, evidence based on the system GMM estimator shows that remittances are not statistically significant in promoting inclusive growth in Africa. Notably, across the economic growth and income inequality dimensions of inclusive growth, we find that although remittances are ineffective in boosting the former, they deepen the latter. Second, we find that Africa's underdeveloped financial sector dampens the marginal positive effect of remittances on inclusive growth. Third, our threshold analysis indicates that for financial development to interact with complementary policies to foster inclusive growth in Africa, a minimum threshold of 14.5% is required. We conclude by informing policy on the level of investments needed for financial development to promote fairer income growth and distribution in Africa.

1. Introduction

Since the adoption of the Millennium Development Goals and the ensuing Sustainable Development Goals (SDGs) in 2015, policymakers worldwide have renewed their efforts towards achieving shared prosperity (Sachs et al., 2021). Inclusive growth is cardinal to realising several SDGs, particularly, Goals 1, 5 and 10. These goals aim to alleviate poverty, gender inequality as well as inequalities within and among countries (United Nations [UN] 2019, 2015). In this regard, African governments are strengthening their industrial and institutional capacity to promote multidimensional sustainability (African Union, 2015).

Despite the concerted efforts by African governments and their development partners to this cause, Africa's progress towards inclusive growth remains largely elusive considering the persistence of income inequality in the continent (World Bank, 2020). While Africa's average growth rate of 5% over the last two decades has culminated in a significant reduction in extreme poverty levels, income inequality has worsened in the same period (Frankema & Waijenburg, 2018; Bhorat et al., 2016; United Nations Economic Commission for Africa [UNECA], Africa Development Bank [AfDB] & United Nations Development Plan [UNDP], 2015). This signifies a growth trajectory that is not inclusive and raises doubts about the possibility of achieving inclusive growth in the short to medium term, as envisaged in the UN Agenda 2030 (Asongu et al., 2020; Ofori &Asongu 2021).

Besides, the coronavirus pandemic has exacerbated the issue of non-inclusive growth in Africa (International Monetary Fund [IMF] & World Bank, 2020). In a continent where four countries (i.e., South Africa, Namibia, Swaziland, and Zambia) are among the top five most unequal countries[1] in the world in terms of income and wealth, inclusive growth is a major development objective of policymakers. Indeed, Sachs et al. (2021) warn that failure to achieve inclusive growth could result in countries or territories experiencing recurrent cases of social insecurity and political instability. It is in the remit of these concerns that this study examines the effect of remittances on inclusive growth in Africa.

Our focus on remittances is informed by some key developments. First, over the last decade, remittances inflow to Africa has surpassed foreign direct investment and official development assistance. Second, the inflow of remittances to Africa has remained resilient even amid the coronavirus pandemic. Third, it is expected that the inflow of remittances to Africa will continue to increase beyond 2023 (World Bank 2021a; Black 2021; IInternational

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[1] This figure rises to 8 if 20 countries are considered: South Africa (63%), Namibia (59.1%); Zambia (57.1%); Sao Tome and Principe (56.3%); Central African Republic (56.2%); Eswatini (54.6%); Mozambique (54.0%); Botswana (53.3%).

Monetary Fund [IMF], 2021; The Global Knowledge Partnership on Migration and Developmen [KNOMAD], 2019). Lastly, the United Nations has identified migration, and migration-related financial flows, as potential drivers of inclusive growth. Against this backdrop, SDG Targets 8.8, 10.7, and 10.c have been reserved explicitly for reducing the cost of sending remittances, and ensuring the safety and productivity of migrants.

Notwithstanding, some concerns have been raised that remittances can worsen income inequality if the majority of inflows benefit affluent households or are not invested in productive ventures (Prokhorova, 2017; Anyanwu, 2011). On the other hand, some studies show that remittances can foster economic growth, job creation, poverty alleviation and human capital development (World Bank, 2018, 2014; Peprah et al., 2019; Chowdhury 2016). This is particularly important in Africa where lack of access to financial products and services has been identified as a major impediment to private sector growth, decent job creation, and poverty alleviation. In such contexts, remittances can play a crucial role in easing liquidity constraints as well as stimulating entrepreneurship, innovation, and human capital investment (Nweke & Nyewusira, 2015).[2]

In this study, we argue that the possible shared growth effects of remittances may depend on the level of development of the financial sectors in receiving countries. Our main argument is that although external finance can contribute to economic growth, it is a well-developed financial sector that can channel remittances into productive investments for fairer income growth and distribution. For instance, a burgeoning financial system can allocate invested remittances efficiently to address financial inequalities, and consequently, support private sector performance (World Bank 2021a, 2019; Ratha et al., 2021; Nyamongo et al., 2012). Besides, a highly efficient[3] financial system in generating a significant rate of return on investments is vital for attracting more remittance inflows from investment-minded migrants (Giuliano & Ruiz-Arranz, 2009; Demirguc-Kunt & Levine, 2008; World Bank, 2013a; World Bank, 2013b).

Although several studies have explored the conditional and unconditional effects of remittances on development outcomes such as economic growth, poverty and income inequality in Africa (see e.g., (Akobeng, 2021; Anyanwu, 2011; Fayissa and Nsiah, 2010; Ofori et al., 2022a; Ofori and Grechyna, 2021; Peprah et al., 2019; Song et al., 2021; Acheampong et al., 2021), there remain some important research gaps in the literature. First,

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[2] Remittances have been a key source of finance for education and healthcare in vulnerable households (Black 2021)

[3] An efficient financial sector also incentivizes remittees to invest in home countries' financial system.

previous studies have not examined whether remittances interact with financial development to promote inclusive growth in Africa. Second, it remains unclear whether it is the access, depth, or efficiency of financial institutions that is most important for conditioning remittances to promote inclusive growth in Africa. Finally, previous empirical contributions have not informed policy on minimum thresholds required for financial development to condition complementary policies to promote inclusive growth in Africa. This study seeks to bridge these gaps. Accordingly, we set out to address the following objectives. First, the study estimates the unconditional effects of remittances and financial development (including the subcomponents of access, efficiency and depth) on inclusive growth in Africa. Second, we investigate whether financial development moderates remittances to stimulate inclusive growth in Africa. Third, we compute minimum thresholds necessary and sufficient for financial development to condition complementary policies to foster inclusive growth in Africa.

Using instrumental variable regression, we find that, unconditionally, remittances do not promote inclusive growth in Africa. However, at the disaggregated level of inclusive growth, the study reveals that while remittances are not effective in enhancing economic growth, they deepen income inequality in Africa. Further, the study finds that Africa's financial sector dampens the marginal positive effect of remittances on inclusive growth. Finally, compelling evidence from our threshold analysis indicates that, for financial development to interact with complementary policies to foster inclusive growth, a minimum threshold of 14.5% is required.

The rest of the paper is organised as follows: the next section provides a theoretical link between remittances, financial development and inclusive growth, while Section 3 outlines our methodology. We present our results and discussion in Section 4, and the conclusion and policy recommendations in Section 5.

2. Literature review

2.1 Theoretical linkages between remittances, financial development and inclusive growth

The study draws on the optimistic, pessimistic, and exogenous perspectives of economic development to explain the relationship between migration, remittances and inclusive growth. The optimistic view, pioneered by Kindleberger (1965), De Haan (2010), and Todaro (1969) highlights the role of migration in disseminating technology, innovation and skills. These authors argue that the diffusion of innovation, skills and technology can be

instrumental in promoting entrepreneurship, private sector performance and economic growth, especially in developing countries. This assertion aligns with the propositions of Beijer (1970) and Massey et al. (1993) that remittances can promote shared economic growth by providing the means to finance human capital development expenditures such as health, education and vocational training, which could prove crucial for long-term economic development. However, consistent with the exogenous and pessimistic views of economic development, theorists such as Lipton (1980), Russell (1992) and Binford (2003) have raised concerns that migration and remittances could impede the inclusive growth of origin countries by accelerating human capital flight, brain drain and income inequality.

The finance-led growth hypothesis, initially posited by Schumpeter (1911), establishes a theoretical relationship between financial development and economic growth. The import of this hypothesis is that a well-developed financial sector stimulates inclusive growth through (i) effective resource allocation, and (ii) reduction in transaction costs (McKinnon, 1973; Shaw, 1973; King & Levine, 1993; Levine et al., 2000). This proposition is consistent with the *Stage of Development* theory proposed by Patrick (1966), which highlights the role of financial development in stimulating real growth, innovation and poverty alleviation during the early stage of economic development. However, in the early stages of development, disparities in the access and depth of financial institutions exacerbate gaps in access to financial products and services, consequently worsening economic inequalities. Nonetheless, as development progresses, these inequalities are mitigated, providing more grounds for financial development to enhance inclusive growth.

2.2 Empirical literature survey on remittances, financial development and inclusive growth

There is a paucity of empirical findings on the relationship between remittances and inclusive growth. Whereas a section of the literature suggests that remittances affect economic growth and income inequality, a strand of the literature also reports no effects. Particularly, a number of recent empirical works raise red flags that remittances can hinder social progress if they mainly benefit high-income households. For example, Yadeta and Hunegnaw (2021) find that remittances retard economic growth in Ethiopia. The authors argue that remittance-induced inflation, which adversely affects the real income of the poor, could hamper economic growth and access to basic goods and services.

In a more comprehensive contribution, Song et al. (2021) investigate whether remittances promote fairer income distribution in 20 remittance-receiving developing economies. Their findings, based on panel cointegration techniques and macro data for the

time span 1980-2016, reveal that remittances reduce socioeconomic sustainability by intensifying income inequality. Similarly, Chowdhury (2016) examines the effect of remittances on the economic growth of 33 developing countries for the period 1979-2011. The author provides strong evidence from the GMM estimator to show that remittances play a significant role in promoting sustainable economic growth. This evidence is consistent with reports from the World Bank (2018) and African Development Bank (2014).

Kumar and Patel (2021) also confirm the shared growth-enhancing effect of remittances. By employing the threshold autoregressive distributive lag estimator, the authors show that remittances reduce income inequality only when the per-worker real gross domestic product (GDP) is above US$5891. The authors further argue that remittances can reduce growth through high imports if real income per capita is below this threshold. Similarly, Anyanwu and Erhijakpor (2010) investigate the effect of remittances on poverty in 33 African countries over the period 1990-2005. Compelling evidence from instrumental variable regression shows that remittances increase the depth and severity of poverty in Africa. Also, Anyanwu (2011) focuses on income distribution, using 5 eight-year non-overlapping data for the period 1960-2006. The study shows that remittances heighten income inequality in Africa.

Likewise, Fayissa and Nsiah (2010) investigate the effect of remittances on economic growth in 36 African countries from 2004-2010. Their result confirms that remittances improve growth by providing an alternative means to finance investments.

Also, a plethora of previous studies investigate the effect of financial development on economic development in Africa. For instance, using macro data on 44 African countries for the period 201-2019, Acheampong et al. (2021) find evidence based on the generalised method of moments estimator that financial development reduces both male and female poverty rates. Similar to our study, Akobeng (2021) explores the moderating of quality governance and financial institutions in the remittances-poverty nexus in sub-Saharan Africa over the period 1981-2010. The author finds that, although remittances directly contribute to poverty alleviation through entrepreneurship, innovation, and job creation, a robust financial sector and good governance amplify the poverty-reducing effects.

Dastidar (2017) also examines the effect of remittances on income growth in 62 developing countries over the period 1990–2014. According to the results, remittances drive shared prosperity in developing countries but only when domestic institutions and the macroeconomic environment are well-developed. Similarly, Fouejieu et al. (2020) show that by broadening financial access, poor households can create opportunities for themselves

through small-family businesses, job creation, and sustainable income growth. Tchamyou et al. (2019) also find that innovation in the finance sector reduces income inequality in Africa. It is a finding that provides optimism regarding the income inequality-reducing effect of Africa's financial sector considering the recent strides in mobile money and internet banking services in Africa.

However, in considering the moderating role of financial development in the remittances-income inequality relationship for 42 African countries, Ofori et al. (2022a) report that remittances are not effective in reducing income inequality in Africa. The study further indicates that Africa's underdeveloped financial sector is responsible for the ineffectiveness of remittances in reducing income inequality. In this regard, prior empirical studies leave a significant gap in the inclusive growth literature on Africa. To our knowledge, no study has examined the joint effects of remittances and financial development on inclusive growth in Africa.

2.3 In-country developments regarding remittances and financial development in Africa

In this section, we present recent developments regarding Africa's growth momentum, income inequality, remittance inflows, and financial development. Specifically, Figures 1 and 2 illustrate the in-country developments concerning income growth (proxied by Gross Domestic Product (GDP) per capita) and income inequality (proxied by the Palma ratio) over the study period.[4] Figure 1 shows the impressive growth gains made by countries such as Seychelles (US$21,432.1), Mauritius (US$15,850.1), Gabon (US$15,807.9), Botswana (US$14,010.6), South Africa (US$11,626.2), Namibia (US$8,522.1), and Angola (US$6,504.1).

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[4] The Palma ratio denotes the share of national income held by the top 10% richest people in the economy relative to the share of national income held by the poorest 40 per cent.
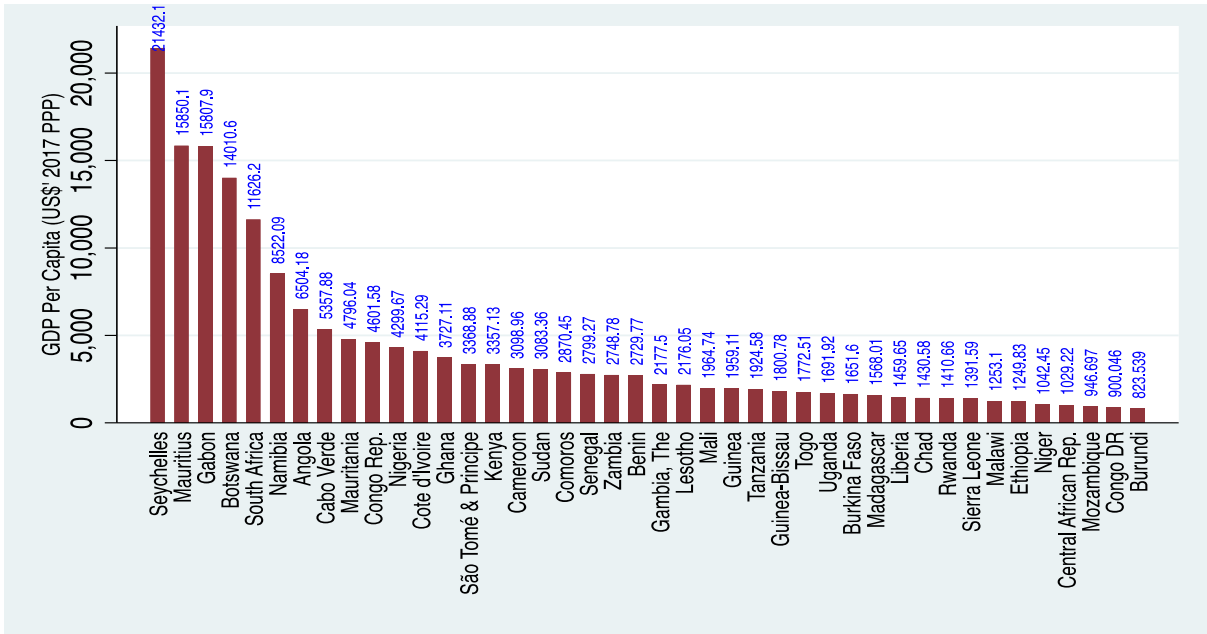
Figure 1: Average In-country GDP Per Capita in Africa, 1996 – 2020, based on data from the World Development Indicators.

Figure 2 also indicates that income inequality, measured by the Palma ratio, remains remarkably high in several countries, notably, Namibia, South Africa, Botswana, and Lesotho. Further, even in low-income countries like Chad, Malawi, Burundi, the Democratic Republic of Congo, and Mozambique, income inequality is visibly high.
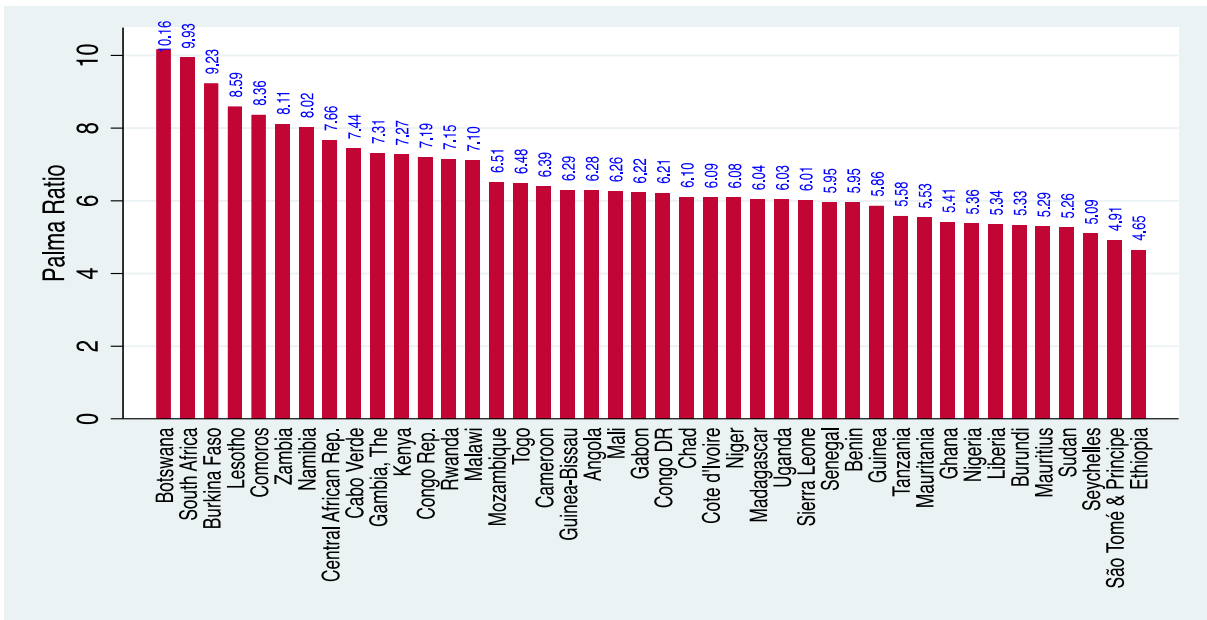

Figure 2: Average In-country Income Inequality in Africa, 1996 – 2020, based on data sourced from the Global Consumption and Income Project.

This shows that African countries are experiencing a kind of growth that is non-inclusive, which has triggered political unrest in North Africa and deepened political fragility in

countries such as Burkina Faso, Mali, Guinea, Nigeria, Chad and Niger. This trend is a major concern for African governments and their development partners as they make concerted efforts to achieve Goals 1, 5, 8, and 10 of the Agenda 2063 (UNECA, AfDB, & UNDP, 2015).

However, the current development in African countries coincides with a structural shift from an agrarian economy to a services-driven one (Losch et al., 2012). As Frankema and Waijenburg (2018) posit, this shift has led to resilient growth in the services sector in Africa, providing promising opportunities for economic growth, employment, and poverty alleviation. In developing countries where credit constraints pose a significant challenge to firm innovation and sustainability, a thriving financial sector can be a cornerstone to efficient resource allocation and investment in human capital development (Tchamyou, 2021). An efficient financial sector can also serve as an incentive to enhance the inflows of resources such as remittances and channel them into growth-enhancing projects (King & Levine, 1993).

The strong growth in the inflow of remittances to Africa since 2000 makes it particularly promising for promoting inclusive growth. The UNCTAD (2018) estimates that remittances have reached a remarkable 51% of capital flows to Africa in 2016, up from 42% in 2010. Additionally, KNOMAD (2019) and IMF (2021) report that remittances have emerged as the main source of external finance in the developing world, reaching US$550 billion in 2019 from US$520 in 2018— exceeding foreign direct investment (FDI) by US$5 billion and Official Development Assistance by over US$300 billion. As shown in Figure A1, remittances occupy a significant proportion of the GDP of most African countries, with Lesotho (15.5%), Cape Verde (12.4%), Liberia (8%), Comoros (7.5%), and Senegal (7.4%) leading the pace. Even during the coronavirus pandemic, inflows have remained resolute and are expected to increase in 2023. This suggests that complementary policies could be employed to channel these remarkable inflows of resources to promote inclusive growth.

Although the financial system of many African countries, especially, that of Chad, Niger, Central African Republic, Gabon, Sudan, and Congo D.R. is underdeveloped, they could play a critical role in turning remittances into significant socioeconomic successes (Tyson, 2021).[5]

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[5] Overall, Africa's financial development index of 0.16% falls short of that Asia (0.36%) and 0.34% for emerging markets (0.34%) (Tyson, 2021).
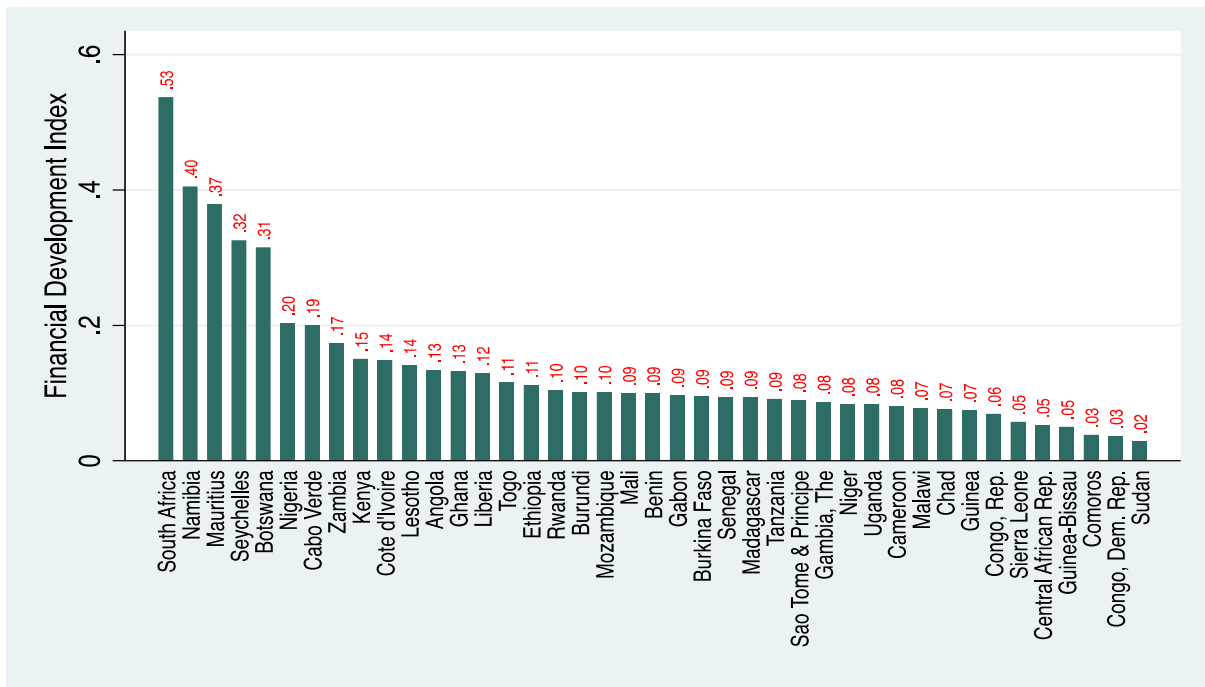
Figure 3: Average In-country Financial Development in Africa, 1996 – 2020, based on data taken from the IMF's Financial Development Index Database

Nevertheless, the potential interrelationship between remittances, financial development and inclusive growth has not been explored empirically in the case of Africa. As depicted in Figure A2 (Top-left Panel), although remittances seem to deepen non-inclusive growth in Africa, financial development and its major subcomponents of efficiency, access and depth have clear positive associations with inclusive growth. This study makes a significant contribution to the literature by providing a rigorous examination of how financial development (and its component of access, depth, and efficiency) interacts with remittances to affect inclusive growth in Africa. We conclude the empirical analysis by computing minimum thresholds essential for these financial development dynamics to cause complementary policies to foster inclusive growth.

3. Methodology and data

3.1 Data

The empirical analysis in this study is based on macro data spanning the period 1996-2020 for 42 African countries. Table A1 reports the list of sampled countries. The choice of these countries is informed by data availability and similarities in their institutional fabric. For instance, data on income inequality for countries such as South Sudan, Eritrea, and Somalia are scanty and therefore could not be considered in this study.

Also, unlike data on variables such as remittances and financial development that are readily accessible in databases, inclusive growth is only obtained through sound econometric methods. In this study, we generate the inclusive growth series following the social welfare

function and income growth and distribution method proposed by Anand et al. (2013).[6] Compared to shared growth proxies such as GDP per capita, Obeng et al. (2022) argue that the Anand et al. (2013) approach is more comprehensive as it captures equality in socioeconomic opportunities in a given society. In this study, we compute the inclusive growth series by integrating economic growth (proxied by GDP per capita) and income inequality (Gini index) in a unified manner. It is imperative to point out that we use data from the Global Consumption and Income Project (Lahoti et al., 2016) to address missing observations in the World Bank (2021)'s Gini index.

Further, to inform policy on which aspect of inclusive growth (i.e., income growth or income distribution) is highly responsive to the remittances-financial development interaction, we rerun the models using GDP per capita growth and the Palma ratio as alternative outcome variables. The study captures remittances as total transfers and compensations received by residents of the sampled countries from non-residents as a percentage of GDP (World Bank, 2021b). Also, all our financial development indicators are indexes and range from 0 (lowest) to 1 (highest). We obtain data on these financial development indicators from the IMF's Financial Development Index Database (Svirydzenka, 2016).

The study also controls for several variables in line with econometric prudence. Specifically, we control for information and communications technology (ICT) diffusion, economic globalisation, corruption control, human capital and vulnerable employment to account for the: (i) informally-predominant real sector of the sampled countries (ii) rise in ICT diffusion in Africa (iii) implementation of the African Continental Free Trade Area (AfCFTA), and (iv) issue of omitted variable bias.

First, given that the poor generally lack socioeconomic opportunities, increasing vulnerability to employment is likely to have a higher negative incidence on their incomes relative to that of the rich. Vulnerable employment can, thus, reduce inclusive growth (Anand et al., 2013). Further, we consider human capital in the empirical model due to the critical role it plays in shared growth by enhancing the skills and dynamism of economic agents to create and/or take advantage of economic opportunities (Ogbeifun & Shobande, 2021). Also, ICT diffusion is expected to enhance inclusive growth by providing equal access to information, healthcare, education and socioeconomic opportunities (Adeleye et al., 2021; Asongu & Odhiambo, 2019; Ofori & Asongu, 2021). Financial development can also promote inclusive growth by providing financial products and services to existing and potential bank customers to realise their entrepreneurial and innovative ideas (De Haan et al., 2021; Tchamyou et al., 2019). For instance, financial deepening can stimulate private sector performance through innovation and

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[6] See a detailed description of the approach here: https://www.imf.org/external/pubs/ft/wp/2013/wp13135.pdf

competitiveness. Additionally, financial deepening can promote adaptation to the evolving open innovation landscape that is being driven by advances in ICTs (De Haan et al., 2021).

Furthermore, in line with the consensus among African governments to promote inclusive growth through trade, evidence of which is the implementation of the AfCFTA, we control for economic globalisation. Data on economic globalisation are obtained from the Konjunkturforschungsstelle (KOF) index[7]. of globalisation (Gygli et al., 2019). Finally, to take into account the role of institutions in resource allocation and poverty alleviation, we pay attention to corruption control (Acemoglu & Robinson, 2010). While variables such as human capital, economic globalisation, and vulnerable employment are drawn from the World Development Indicators (World Bank, 2021b), corruption control and ICT diffusion are obtained from the World Governance Indicators (Kaufmann et al., 2010) and the Africa Infrastructure Knowledge Program (Africa Development Bank, 2018b), respectively. Table 1 presents the descriptions of the variables.

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[7] The KOF Index of Globalisation is an index that measures the degree of globalisation of 122 countries. The overall index of globalisation provides statistics on three main dimensions of globalisation: economic, social, and political.

Table 1: Description of variables and data sources

Variables	Descriptions	Sources
Outcome variables		
Inclusive Growth	Income growth and distribution approach of Anand et al. (2013)	Authors
GDP per capita	Real GDP divided by population	WDI
Gini index	The extent to which the distribution of income among individuals deviates from perfect equality (0 denotes a case of perfect equality while 100 indicates a case of perfect inequality	WDI & GCIP
Palma ratio	Indicates the ratio of national income shares of the top 10 per cent of households to those of the bottom 40 per cent	GCIP
Independent variable		
Remittances	Personal remittances received (% of GDP)	WDI
Moderating variables		
Financial development	Financial development (overall) index	Findex
Financial institutions	Financial institutions development index	Findex
Financial institutions access	Financial institution access index	Findex
Financial institutions depth	Financial institution depth index	Findex
Financial institutions efficiency	Financial institution efficiency index	Findex
Control variables		
Human capital	Average secondary school duration in years	WDI
Vulnerable employment	Contributing family workers and own-account workers as a percentage of total employment	WDI
Economic globalisation	Captures trade in goods and services; customs duties, taxes, and trade restrictions; capital account openness and international investment agreements	KOF Index
ICT diffusion	Composite index for the construction, extension, improvement, operation, and maintenance of communication systems (postal, telephone, telegraph, wireless, and satellite communication systems).	AIKP
Control of corruption	Captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests	WGI

Note: WDI is World Development Indicators; Findex is IMF's Financial Development Index; GCIP is Global Consumption and Income Project; WGI is World Government Indicators; KOF is KOF; Globalisation Index and AIKP is Africa Infrastructure Knowledge Program

3.2 Estimation strategy

The empirical strategy is based on the exogenous and finance-led growth theories, which posit that financial development (Schumpeter, 1911; King & Levine, 1993; Levine et al., 2000) and remittances (Russell, 1992; Lipton, 1980) contribute to inclusive growth. We begin the empirical model specifications by first analysing the effects of our control variables on inclusive growth, as apparent in Equation 1.

$$ingrowth_{it} = \lambda_0 + \delta_1 ingrowth_{it-1} + \beta_1 corrupt_{it} + \beta_2 ict_{it} + \beta_3 hcap_{it} + \beta_4 ecoglob_{it} + \beta_5 vul_{it} + \mathfrak{I}_i + \mu_t + \varepsilon_{it} \qquad (1)$$

Next, to evaluate the unconditional and the conditional effects[8] of remittances on inclusive growth, we modify Equation (1) to obtain:

$$ingrowth_{it} = \lambda_0 + \delta_1 ingrowth_{it-1} + \beta_1 corrupt_{it} + \beta_2 ict_{it} + \beta_3 hcap_{it} + \beta_4 ecoglob_{it} + \beta_5 vul_{it} + \beta_6 remit_{it} + \beta_7 findev_{it} + \beta_8 ln(remit_{it} \times findev_{it}) + \mathfrak{I}_i + \mu_t + \varepsilon_{it} \qquad (2)$$

In estimating Equations (1) and (2), we use the Blundell and Bond (1998) system GMM estimator. The choice of this technique is motivated by several factors. First, the number of countries considered in our study (i.e., 42) is greater than the time period under consideration (i.e., N>T) (Blundell & Bond, 1998). Second, as noted in prior studies such as Obeng et al. (2022) and Ofori and Asongu (2021), it is crucial to address the problem of misspecification in growth models by incorporating the initial level of inclusive growth. We do this by introducing the lag of inclusive growth. This, however, raises endogeneity concerns as the previous level of inclusive growth ($ingrowth_{it-1}$) is influenced by ϵ_{it-1}, which in turn depends on the country-specific impact μ_i. This issue is highlighted by Roodman (2009) who explains that in the first difference estimation, the GMM estimator eliminates country-specific effects, resulting in a correlation between the lag of inclusive growth and the error terms.

To address the aforementioned econometric issues, Arellano and Bond (1991), Wooldridge (2010)[9] and Greene (2012) propose that the differenced lagged left-hand variable and the other endogenous covariates are instrumented with their past values. This approach involves the first-difference GMM estimator, which also has limitations. Particularly, Ahn

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[8] We also show additional pairwise interaction terms for remittances and financial institutions development, financial institutions(access), financial institutions(depth), and financial institutions(efficiency)
[9] See the page (i.e., p23): http://fmwww.bc.edu/EC-C/F2012/228/EC228.f2012.nn15.pdf

and Schmidt (1995) argue that the first-difference GMM estimator does not account for the possible information contained in the level relationship and the relations between the level and the first differences. This problem occurs, since in the presence of strong endogeneity, the level variables become weak instruments for their first differences.

To address the limitations of the first-difference estimator, Blundell and Bond (1998) proposed the system GMM estimator, which estimates the level and first-difference regressions as a system. Therefore, following the Blundell and Bond (1998) approach, we instrument the level equation with the lagged first-differenced covariates and the first-differenced estimation with the lagged level variables. As argued by Windmeijer (2005) and Bond et al. (2001), the system GMM estimation technique yields asymptotically consistent and reliable estimates compared to the first-difference GMM. Additionally, we follow Roodman (2009) by collapsing the instruments to take of possible overfitting of the endogenous variables, which if unresolved can result in wrong coefficients and confidence intervals. Doing so addresses instrument proliferation (Mehrhoff, 2009). [10]

Accordingly, we transform Equation (2) into Equations (3) and (4) to capture the level and first difference specifications, which encapsulate the dynamic system estimation method:

$$ingrowth_{it} = \lambda_0 + \delta_1 ingrowth_{it-1} + \beta_1 remit_{it} + \beta_2 findev_{it} + \sum_1^5 \theta_k V_{kit-\tau} + \mathcal{I}_i + \mu_t + \varepsilon_{it} \tag{3}$$

$$ingrowth_{it} - ingrowth_{it-\tau} = \delta_1(ingrowth_{it-\tau} - ingrowth_{it-2\tau}) + \beta_1(remit_{it} - remit_{it-\tau}) + \beta_2(findev_{it} - findev_{it-\tau}) + \sum_1^5 \theta_k(V_{kit-\tau} + V_{kit-2\tau}) + (\mu_t - \mu_{it-\tau}) + (\varepsilon_{it} - \varepsilon_{it-\tau}) \tag{4}$$

Now, to capture the joint effect of remittances and financial development on inclusive growth, we modify Equation (4) to obtain Equation (5).

$$ingrowth_{it} - growth_{it-\tau} = \delta_1(ingrowth_{it-\tau} - ingrowth_{it-2\tau}) + \beta_1(remit_{it} - findev_{it-\tau}) + \beta_2(findev_{it} - findev_{it-\tau}) + \beta_3((remit_{it} \times findev_{it}) - (remit_{it-\tau} \times findev_{it-\tau})) + \sum_1^5 \theta_k(V_{kit-\tau} + V_{kit-2\tau}) + (\mu_t - \mu_{it-\tau}) + (\varepsilon_{it} - \varepsilon_{it-\tau}) \tag{5}$$

The attendant net effect from the interaction between remittances and financial development in Equation (5) is computed following Equation (6):

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[10] A case where a single instrument is created for each time period and lag available, and the number of instruments exceeds the sample size.

$$\frac{\partial(ingrowth_{it} - growth_{it-\tau})}{\partial(remit_{it})} = \beta_1 + \beta_3 \overline{(findev_{it})}, \tag{6}$$

where $\overline{findev}$ is the average financial development; $ingrowth_{it} - growth_{it-\tau}$ is the log difference of inclusive growth in country i at time t; $findev_{it}$ is financial development index; $corrupt$ is control of corruption; $hacp$ is human capital; vul is vulnerable employment; $ecoglob_{it}$ is the economic globalisation index; $remit$ is remittances; and ict denotes ICT diffusion index. Also, $(remit_{it} \times findev_{it})$ is the interaction term for remittances and financial development; $\mathfrak{I}_i$ represents the country-specific effects; and ε_{it} is the idiosyncratic error term.

It is worth noting that the effectiveness of the system GMM estimator in yielding robust estimates depends on several post-estimation tests. Following Hansen (1982), we evaluate the validity of the instrument in all our models. Hansen's test is based on the null hypothesis that the set of identified instruments and the residuals are uncorrelated. Hence, the suitability of the instruments and robustness of our estimates depends on the failure to reject the null hypothesis. On the other hand, if the null hypothesis is rejected, then the instruments are not robust as the imposed restrictions are invalid. Finally, the study evaluates the reliability of our estimates based on the post-estimation tests of: (i) whether there is evidence of second-order serial correlation in the residuals or not; (ii) the significance of the interaction terms; and (iii) the Wald test for the overall model significance. The next section presents and discusses the empirical findings from this study.

4. Presentation and discussion of results

4.1 Summary Statistics

Table 2 displays the summary statistics of the variables over the research period. The mean of inclusive growth and GDP per capita over the study period are US$ 655.68 and US$ 4212.87, respectively. This suggests a growth trajectory that is not inclusive as shown in Panel C of Figure 1. The average financial development score is 0.125 (12.5%). While the overall financial institutions' index averages 0.216 (21%), the sub-indices of access, depth and efficiency average 0.089 (8.9%), 0.094 (9.4%) and 0.499 (49.9%), respectively. These average values highlight the underdeveloped state of Africa's financial system. Table A.2 reports the pairwise correlations between the variables.

Table 2: Summary statistics, 1996 – 2020

Variables	Obs	Mean	Std. Dev.	Minimum	Maximum
Inclusive growth (US$' 2017 PPP)	1050	655.683	894.056	138.729	7661.533
GDP per capita (US$' 2017 PPP)	1041	4212.87	4803.09	506.152	27521.17
Financial development index	967	0.125	0.075	0.000	0.503
Financial institutions index	967	0.216	0.117	0.000	0.700
Financial institutions (access) index	967	0.089	0.140	0.000	0.880
Financial institutions (depth) index	967	0.094	0.130	0.000	0.780
Financial institutions (efficiency) index	967	0.499	0.156	0.000	0.840
ICT diffusion index	756	49.174	26.59	0.000	99.793
Control of corruption	882	-0.582	0.619	-1.723	1.217
Vulnerable employment	984	70.698	21.914	8.830	94.980
Human capital	1048	6.260	0.762	4.000	7.000
GDP per capita growth	1050	1.575	4.403	-36.557	28.676
Economic globalisation index	945	37.494	12.103	9.581	81.490
Remittances	906	3.757	7.707	0.000	34.134
Palma ratio	816	6.574	1.782	2.484	21.790
Gini index (net)	812	0.510	0.096	0.031	0.719

Source: Authors' construct, 2022

4.2 Effects of remittances and financial development on inclusive growth

The analysis of our main findings begins with the presentation of our baseline results. The results in Column 1 of Table 3 show that the lag of inclusive growth is positive and statistically significant across all model specifications. This suggests that past inclusive growth gains have a favourable impact on current inclusive growth outcomes. Also, we find that corruption control has a negative and statistically significant effect on inclusive growth. This unexpected effect could be attributed to Africa's fragile institutional landscape as Ofori & Figari (2023) pointed out. However, our findings align with the theoretical expectations regarding the impact of human capital on inclusive growth. Specifically, a 1% increase in human capital is associated with a 0.018% increase in inclusive growth. This result is consistent with the long-held view in the human capital theory that investing in human development, namely, education and health can contribute to inclusive growth in Africa (Mutiiria et al., 2020; Raheem et al., 2018). Additionally, we find that economic globalisation does not promote inclusive growth. Moreover, in line with the results of Ofori and Asongu (2021), we observe a negative relationship between vulnerable employment and inclusive growth, albeit not statistically significant. This implies that an increase in precarious employment can be detrimental to Africa's shared growth pursuit. Unlike the evidence in Ofori and Asongu (2021), our study finds no significant relationship between ICT diffusion and inclusive growth.

Table 3. Effects of remittances and financial development on inclusive growth (Dependent variable: Inclusive growth)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Inclusive growth (-1)	0.8882***	0.8835***	0.8871***	0.8863***	0.8898***	0.8866***	0.8826***	0.8167***	0.8258***	0.8493***	0.8222***	0.8716***
	(0.0060)	(0.0063)	(0.0060)	(0.0061)	(0.0058)	(0.0061)	(0.0061)	(0.0177)	(0.0132)	(0.0088)	(0.0233)	(0.0099)
Corruption control	-0.0362**	-0.0285**	-0.0368**	-0.0361**	-0.0386*	-0.0433**	-0.0301**	0.0248	0.0591**	0.0294	0.2291**	-0.0063
	(0.0166)	(0.0137)	(0.0166)	(0.0158)	(0.0196)	(0.0163)	(0.0129)	(0.0220)	(0.0240)	(0.0200)	(0.0869)	(0.0175)
Human capital	0.0180***	0.0163**	0.0170**	0.0186***	0.0151**	0.0184**	0.0225***	0.0339**	0.0219*	0.0085	-0.0310	0.0215***
	(0.0066)	(0.0062)	(0.0071)	(0.0067)	(0.0066)	(0.0074)	(0.0066)	(0.0136)	(0.0121)	(0.0203)	(0.0715)	(0.0069)
ICT diffusion	-0.0002	-0.0004*	-0.0002	-0.0002	-0.0002	-0.0001	-0.0005**	-0.0030***	-0.0031***	-0.0022**	-0.0037***	-0.0013***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0006)	(0.0006)	(0.0009)	(0.0013)	(0.0004)
Economic globalisation	-0.0007	-0.0008*	-0.0008*	-0.0007	-0.0008	-0.0009	-0.0005	-0.0024*	-0.0025**	-0.0040	-0.0013	-0.0010*
	(0.0005)	(0.0004)	(0.0005)	(0.0005)	(0.0005)	(0.0006)	(0.0004)	(0.0013)	(0.0012)	(0.0024)	(0.0038)	(0.0006)
Vulnerable employment	-0.0007	-0.0011***	-0.0005	-0.0007	-0.0004	-0.0002	-0.0009**	-0.0031***	-0.0041***	-0.0023***	-0.0133***	-0.0017***
	(0.0004)	(0.0002)	(0.0004)	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.0007)	(0.0007)	(0.0004)	(0.0046)	(0.0003)
Remittances		**0.0008**						**0.1209*****	**0.1007*****	**0.0202***	**0.0734*****	**0.0542***
		(0.0008)						**(0.0291)**	**(0.0249)**	**(0.0115)**	**(0.0231)**	**(0.0302)**
FD			0.0300					0.9666**				
			(0.0794)					(0.3634)				
FI				-0.0205					0.0464			
				(0.0460)					(0.2517)			
FIA					0.0641					0.4531		
					(0.0496)					(0.7564)		
FID						**0.1169***					-2.8140***	
						(0.0669)					(0.9388)	
FIE							**-0.1874*****					-0.0479
							(0.0341)					(0.0662)
Remittances × FD								**-0.8331*****				
								(0.2084)				
Remittances × FI									**-0.3783*****			
									(0.0941)			
Remittances × FIA										**-0.2298***		
										(0.1204)		
Remittances × FID											**-0.3285****	
											(0.1217)	
Remittances × FIE												**-0.1035***
												(0.0575)
Constant	0.5372***	0.6179***	0.5398***	0.5497***	0.5236***	0.5004***	0.6593***	1.1101***	1.3308***	1.1621***	2.6660**	0.7823***
	(0.0579)	(0.0601)	(0.0631)	(0.0639)	(0.0724)	(0.0681)	(0.0404)	(0.2114)	(0.1836)	(0.1791)	(1.0018)	(0.0800)
Observations	641	578	639	639	639	639	639	576	576	576	576	576
Net effect	na	na	na	na	na	na	na	**0.017*****	**0.019*****	**-0.0002**	**0.043*****	**0.003**
Joint sig. test statistic [p-value]	na	na	na	na	na	na	na	**4.71[0.000]**	**3.98[0.000]**	**-0.06[0.949]**	**3.45[0.01]**	**1.17[0.250]**
Countries/Instruments	40/29	38/30	40/30	40/30	40/30	40/30	40/30	38/30	38/30	38/30	38/30	38/30
Wald Statistic	1.098e+06***	805910***	896244***	1.397e+06***	1.075e+06***	543111***	2.286e+06***	210916***	142822***	151478***	69587***	425647***
Wald P-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen P-Value	0.141	0.117	0.159	0.158	0.156	0.152	0.168	0.104	0.164	0.117	0.207	0.139
AR(1)	0.002	0.009	0.002	0.002	0.002	0.002	0.002	0.008	0.007	0.010	0.008	0.008
AR(2)	0.147	0.205	0.147	0.147	0.147	0.147	0.145	0.184	0.173	0.216	0.226	0.160

*na is Not Applicable; Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

For our first objective, we find that remittances have a positive effect on inclusive growth in Africa, albeit statistically in significant. The evidence suggests that remittances can be targeted to foster fairer income growth and distribution. Notably, with remittances inflows to Africa projected to rise per reports by Black (2021), IMF (2021) and KNOMAD (2021), this result provides optimism concerning the potential contribution of external finance to shared growth in Africa.

Concerning our first objective, we find that although remittances have a positive effect on inclusive growth in Africa, the result is not statistically significant. The evidence suggests that remittances can be targeted to foster fairer income growth and distribution in Africa. Notably, with remittances inflows to Africa projected to rise per reports by KNOMAD (2019), World Bank (2021a), and Black, (2021), this result provides optimism concerning the potential contribution of external finance to shared growth in Africa.

That said, we now focus on our second objective where we examine the indirect effects of remittances on inclusive growth (Columns 8-12). It is imperative to point out that the indirect effects of remittances on inclusive growth are computed based on the mean values of the various financial development indicators. First, for the remittances-financial development (overall) interaction in Column 8, we report a net effect of 0.017. This result is computed by taking into account the direct effect of remittances on inclusive growth (0.1209), the indirect effect (-0.8331), and the mean value of the financial development index (0.125). Similarly, for the remittances-financial institutions pathway, we compute a total effect of 0.019, which is computed by taking into account the direct effect of remittances (0.1007), the indirect effect of remittances (-0.3783), and the mean financial institutions' index of 0.216. Also, we calculate a net effect of 0.043 for the interaction between remittances and financial institutions' depth. We arrived at this net effect by engaging the unconditional effect of remittances on inclusive growth (0.0734), the indirect effect of remittances (-0.3285), and the mean value of financial institutions' depth (0.094). Following similar computations, we report partial effects of -0.0002 and 0.003 for the remittances-financial institutions' access, and remittances-financial institutions' efficiency pathways, respectively. Comparing the direct effects of remittances to these indirect effects (Columns 8-12), it is evident that Africa's underdeveloped financial sector dampens the positive effects of remittances on inclusive growth. A possible explanation is that, in the presence of a weak financial system, remittances may not be distributed efficiently to support private sector growth and economic development. Besides, an underdeveloped financial sector may fail to innovate and generate the optimum returns on invested remittances. This can hurt innovation

and investment in the sampled countries, ultimately reducing growth and economic opportunities.

4.3 Effects of remittances and financial development on income growth

This section presents the findings on the effects of remittances and financial development on the absolute definition of inclusive growth, which we proxy by GDP per capita growth. The findings are reported in Table 4. The evidence shows that corruption control, economic globalisation, ICT diffusion and vulnerable employment have a positive and statistically significant effect on economic growth. Specifically, we find that corruption control, digital infrastructure, and economic globalisation increase income growth by 1.19%, 0.01%, and 0.03%, respectively. Notably, the results suggest that corruption control is remarkable for promoting fairer income growth in Africa.

Table 4. Effects of remittances and financial development on income growth (Dependent variable: GDP per capita growth)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Income growth (-1)	0.2488***	0.2428***	0.2475***	0.2463***	0.2413***	0.2391***	0.2483***	0.1334***	0.1386***	0.1177***	0.1310***	0.1862***
	(0.0142)	(0.0137)	(0.0166)	(0.0165)	(0.0168)	(0.0157)	(0.0169)	(0.0217)	(0.0235)	(0.0278)	(0.0335)	(0.0309)
Corruption control	1.1900***	1.0536***	1.1553***	1.2168***	1.3611***	1.2015***	1.0993***	1.9124*	3.6125***	3.0799***	7.6187***	2.1598***
	(0.1681)	(0.1525)	(0.1699)	(0.1706)	(0.1815)	(0.1730)	(0.1570)	(1.1146)	(0.8013)	(1.0676)	(2.3592)	(0.3920)
Human capital	-0.1188	-0.0509	-0.2013	0.1666	-0.1571	-0.1934	-0.2038	3.3132***	1.4285**	1.0745	-0.0973	0.6143*
	(0.139)	(0.1316)	(0.1483)	(0.1584)	(0.1741)	(0.1680)	(0.1622)	(1.2182)	(0.6957)	(0.8883)	(1.9324)	(0.3085)
ICT diffusion	0.0113***	-0.0133***	-0.0095**	-0.0101**	-0.0107**	-0.0122***	-0.0095**	-0.0325*	-0.0337***	-0.0147	-0.0749**	0.0439***
	(0.0035)	(0.0032)	(0.0041)	(0.0040)	(0.0045)	(0.0042)	(0.0040)	(0.0183)	(0.0110)	(0.0213)	(0.0313)	(0.0089)
Economic globalisation	0.0362***	0.0398***	0.0310**	0.0322**	0.0308**	0.0395***	0.0339***	0.2238***	0.1262***	0.1059*	0.1737**	0.0517**
	(0.0076)	(0.0066)	(0.0123)	(0.0128)	(0.0138)	(0.0121)	(0.0105)	(0.0753)	(0.0455)	(0.0576)	(0.0851)	(0.0204)
Vulnerable employment	0.0235***	0.0202***	0.0232***	0.0212***	0.0184**	0.0163**	0.0232***	0.0112	-0.0312	-0.0193	-0.2001**	0.0185
	(0.0055)	(0.0049)	(0.0068)	(0.0072)	(0.0089)	(0.0070)	(0.0056)	(0.0854)	(0.0422)	(0.0647)	(0.0881)	(0.0133)
Remittances		-0.0154						-0.5852	**-0.5336***	-0.1482	0.2685	0.0155
		(0.0102)						(0.3891)	**(0.2747)**	(0.1324)	(0.3428)	(0.4427)
FD			-0.3767					-82.5062**				
			(0.3315)					(32.3243)				
FI				-0.8849					-42.0700***			
				(0.5287)					(10.9154)			
FIA					**-2.0995****					-44.0430***		
					(0.9947)					(15.9039)		
FID						-1.3693					-93.4004***	
						(0.8376)					(25.7039)	
FIE							**1.2778****					-14.2605***
							(0.5571)					(4.5606)
Remittances × FD								5.5135**				
								(2.6644)				
Remittances × FI									**2.2239****			
									(1.0414)			
Remittances × FIA										2.6200*		
										(1.4845)		
Remittances × FID											-0.8408	
											(1.8389)	
Remittances × FIE												-0.0798
												(0.7968)
Constant	0.5644	0.3061	1.2295	1.3483	1.6532	1.5884	0.3867	-16.0313	3.4083	-1.7996	26.6164	5.4397*
	(1.0900)	(1.0677)	(1.2352)	(1.3829)	(1.5761)	(1.4589)	(1.1165)	(12.6957)	(8.3283)	(10.0897)	(21.7419)	(3.0359)
Observations	641	578	639	639	639	639	639	576	576	576	576	576
Net effect	na	na	na	na	na	na	na	**0.104**	**-0.053**	**0.085**	**0.189**	**-0.024**
Joint sig. test statistic [p-value]	na	na	na	na	na	na	na	**0.99 [0.331]**	**-0.75[0.461]**	**1.08 [0.285]**	**1.02 [0.315]**	**-0.45 [0.652]**
Countries/Instruments	40/29	38/30	40/30	40/30	40/30	40/30	40/30	38/30	38/30	38/30	38/30	38/30
Wald Statistic	136.8***	198.7***	294.9***	174.2***	198.3***	108.3***	132.7***	31.06***	37.53***	26.71***	9.618***	110.5***
Wald P-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen P-Value	0.130	0.178	0.110	0.122	0.125	0.0969	0.117	0.301	0.374	0.397	0.506	0.302
AR(1)	0.002	0.000	0.002	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000
AR(2)	0.542	0.423	0.539	0.535	0.511	0.508	0.533	0.219	0.259	0.231	0.176	0.290

*na is Not Applicable; Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Concerning our first objective, our results show that remittances do not have a significant effect on economic growth. Also, for our financial sector variables, we find strong evidence that only financial institutions' efficiency plays a crucial role in stimulating equitable income growth. Specifically, the results indicate that a 1% improvement in the efficiency of financial institutions leads to a 1.27% increase in income growth. However, in Column 5, we find that financial access impedes shared income growth by 2.09%. This outcome can be attributed to the unequal access to financial products and services across Africa (see, Ofori et al., 2022a).

For the second objective, we find that financial development is not statistically significant in conditioning remittances to boost economic growth in Africa (see Column 8). The total effect is positive (0.104) as expected and is obtained by engaging the direct effect of remittances on economic growth (-0.5852), the indirect effect of remittances on economic growth (5.5135), and the average financial development index of 0.125. Albeit statistically insignificant, the positive effect concurs with the arguments of Peprah et al. (2019) and Kadozi (2019) that a burgeoning financial sector can provide a fertile ground for remittances to promote resilient and fairer income growth.

4.4 Effects of remittances and financial development on income inequality

In this section, we present the results on the effects of remittances and financial development on income inequality. The negative coefficient of corruption control suggests that a 1% improvement in the fight against corruption leads to a modest 0.03% improvement in income equality (Column 1). Our result supports empirical evidence by Ofori and Figari (2023) and Doumbia (2020) that addressing issues relating to bribery, nepotism, and corruption can enable governments in Africa to broaden access to social overhead capital, transfers and opportunities. Further, we find that ICT diffusion reduces income inequality by 0.0005%. This result is consistent with Asongu and Odhiambo (2019) who argue that digital infrastructure is instrumental in enhancing inclusive growth in Africa.

Regarding our first objective, the results reveal that remittances have a positive and statistically significant effect on income inequality in Africa (Column 2). Precisely, the evidence shows that for every 1% increase in remittance inflow, income inequality increases by 0.003% in Africa. This income inequality-inducing effect of remittances is possibly due to the low level of financial development and mostly unfree economic architecture of Africa. In settings like this, remittances might not be significant enough to support the entrepreneurial activities of recipient households. This, in effect, can deepen income inequality.

Table 5. Effects of remittances and financial development on income inequality in Africa (Dependent variable: Palma ratio)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Palma ratio (-1)	0.9920***	0.9848***	0.9712***	0.9690***	0.9836***	0.9841***	0.9797***	0.7936***	0.7413***	0.8632***	0.9604***	0.9369***
	(0.0053)	(0.0060)	(0.0078)	(0.0082)	(0.0059)	(0.0069)	(0.0070)	(0.0185)	(0.0308)	(0.0116)	(0.0214)	(0.0152)
Corruption control	-0.0346**	-0.0443**	0.0119	0.0327	-0.0052	-0.0132	-0.0046	0.3302***	0.3610***	0.0842	0.0047	0.1027*
	(0.0134)	(0.0172)	(0.0206)	(0.0205)	(0.0164)	(0.0181)	(0.0181)	(0.0829)	(0.1195)	(0.0637)	(0.0759)	(0.0554)
Human capital	0.0071	0.0064	0.0144	0.0013	0.0146	0.0075	-0.0045	0.0303	-0.1521	-0.0227	-0.0089	0.0098
	(0.0154)	(0.0125)	(0.0198)	(0.0181)	(0.0152)	(0.0166)	(0.0173)	(0.0895)	(0.0905)	(0.0529)	(0.0314)	(0.0358)
ICT diffusion	-0.0005**	-0.0001	-0.0010***	-0.0012***	-0.0006**	-0.0007**	-0.0012***	0.0004	0.0104***	0.0008	-0.0003	-0.0013
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0002)	(0.0003)	(0.0003)	(0.0024)	(0.0034)	(0.0014)	(0.0015)	(0.0014)
Economic globalisation	0.0015**	0.0008	0.0031***	0.0023**	0.0020**	0.0018**	0.0020**	0.0159***	0.0161***	0.0089***	0.0024	0.0059***
	(0.0007)	(0.0007)	(0.0010)	(0.0009)	(0.0008)	(0.0007)	(0.0008)	(0.0040)	(0.0035)	(0.0031)	(0.0017)	(0.0018)
Vulnerable employment	0.0002	0.0001	-0.0008*	-0.0011**	-0.0004	-0.0004	0.0000	-0.0112***	-0.0025	-0.0052***	-0.0021	0.0004
	(0.0004)	(0.0003)	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.0005)	(0.0038)	(0.0054)	(0.0018)	(0.0024)	(0.0015)
Remittances		0.0036***						-0.0876	-0.4147***	-0.0196	0.0188	-0.1456**
		(0.0007)						(0.0794)	(0.0988)	(0.0128)	(0.0365)	(0.0656)
FD			-0.9007***					-8.2917***				
			(0.1072)					(1.1957)				
FI				-0.7293***					-8.3525***			
				(0.0600)					(0.7825)			
FIA					-0.3108**					-3.3615***		
					(0.1196)					(0.7760)		
FID						-0.2615***					-0.6149	
						(0.0460)					(0.6385)	
FIE							-0.3783***					-1.8978***
							(0.0537)					(0.1835)
Remittances × FD								0.6405				
								(0.5546)				
Remittances × FI									1.5928***			
									(0.3775)			
Remittances × FIA										0.4429**		
										(0.1794)		
Remittances × FID											-0.0292	
											(0.1783)	
Remittances × FIE												0.2711**
												(0.1225)
Constant	-0.0876	0.0452	0.1742	0.3942**	-0.0042	0.0464	0.3064**	2.5327***	3.8521***	1.2288***	0.3802	1.1679***
	(0.0849)	(0.0694)	(0.1483)	(0.1466)	(0.1039)	(0.1136)	(0.1347)	(0.6009)	(0.8351)	(0.3663)	(0.4760)	(0.2649)
Observations	497	446	497	497	497	497	497	446	446	446	446	446
Net effect	na	na	na	na	na	na	na	**-0.007**	**-0.071*****	**0.019*****	**0.016**	**-0.010***
Joint sig. test statistic [p-value]	na	na	na	na	na	na	na	**-0.68 [0.501]**	**-3.82[0.001]**	**3.45 [0.001]**	**0.79 [0.434]**	**-1.85[0.072]**
Countries/Instruments	40/25	37/26	40/26	40/26	40/26	40/26	40/26	37/26	37/26	37/26	37/26	37/26
Wald Statistic	494340***	660037***	167140***	123809***	584516***	249525***	117222***	3411***	2435***	9602***	33984***	19184***
Wald P-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen P-Value	0.234	0.439	0.176	0.182	0.254	0.264	0.124	0.201	0.514	0.237	0.818	0.112
AR(1)	0.0942	0.0920	0.0967	0.0918	0.0942	0.0934	0.0913	0.141	0.0707	0.0942	0.0890	0.0863
AR(2)	0.301	0.298	0.304	0.304	0.309	0.306	0.289	0.227	0.135	0.253	0.297	0.230

*na is Not Applicable; Standard errors in parenthesis; *** p<0.01, ** p<0.05, * p<0.1*

With all that said, we turn attention to the direct effects of financial development on income inequality. Compelling evidence from Columns 3-7 indicates that all the financial development indicators reduce income inequality in Africa. Notably, we find that financial development (overall) reduces income inequality by 0.9% (Column 3). Also, across the various sub-components of financial development, we find that financial institutions' efficiency is the most effective channel for reducing income inequality in Africa. Specifically, the evidence shows that whereas financial institutions' access and depth reduce income inequality by 0.31% and 0.26%, respectively, financial institutions' efficiency shows a 0.37% effect.

Regarding the conditional effects of remittances, we find that the development of financial institutions in general and the efficiency of financial institutions are effective channels for conditioning remittances to reduce income inequality (see Column 9 and Column 12). In respective terms, we report total effects of -0.07% and -0.01% for the financial institutions-remittances, and financial institutions' efficiency-remittances interaction terms, respectively. Our results suggest that although the development of financial institutions fosters shared income distribution, it is the efficiency of institutions that is critical for channelling remittances towards fairer income distribution. For the control variables, we find that corruption control reduces income inequality in Africa. This result corroborates the finding by Ofori et al. (2022a). We also find evidence in line with the claim made by Tchamyou et al. (2019) that ICT diffusion reduces income inequality in Africa.

4.5 Computation and analysis of financial development thresholds

In this section, we present a major finding from this study, which has to do with informing policy on minimum thresholds essential for the various financial development indicators to cause complementary policies to promote inclusive growth. The computation of these thresholds is necessary considering the dampening effect of our financial development on remittances. Specifically, we employ this technique to determine the levels of financial development (and its components of access, depth, and efficiency) necessary to form synergies with complementary policies to boost inclusive growth in Africa. We do this following previous research that recommends computing critical masses based on interaction terms (see Achuo et al., 2022). This approach is also consistent with existing research on identifying initial conditions and inflexion points to determine the effectiveness of complementary policies (Asongu et al., 2019).

Based on our main regression analysis in Table 3, we find a critical mass of 0.145 for overall financial development based on the absolute direct (0.1209) and indirect (0.8331)

effects of remittances (Column 8). The computed threshold value of 0.145 (14.5%), is higher than the existing average financial development value of 0.125 (12.5%), as apparent in Table 2. At this level of financial development, complementary policy measures are necessary to foster inclusive growth. Following similar computations, the thresholds for financial institutions and their subcomponents of access, depth and efficiency are also computed. For the financial institution index, policymakers should target a minimum index of 0.266 (26.6%) (Column 9). Moreover, for financial institutions' depth and efficiency, critical masses of 0.223 (22.3%) (Column 11) and 0.523 (52.3%) (Column 12), respectively, are recommended. The thresholds are computed as:

Threshold for overall financial institutions $=\dfrac{0.1007}{0.3783} = 0.266$ (index)

Threshold for financial institutions access $=\dfrac{0.0202}{0.2298} = 0.087$ (index)

Threshold for financial institutions depth $=\dfrac{0.0734}{0.3285} = 0.223$ (index)

Threshold for financial institutions efficiency $=\dfrac{0.0542}{0.1035} = 0.523$ (index)

From both the economic and policy perspectives, these critical thresholds are achievable since they fall within the respective statistical range (see Table 2). Consequently, policymakers in Africa can target these thresholds in policy formulations and implementation to spur fairer income growth and distribution in Africa.

The validity and reliability of our estimates are evidenced in the several post-estimation tests, which we have satisfied. Firstly, our estimates are free from second-order serial autocorrelation in the residuals, as evident in the AR2 statistics and Figures A3-A5. Secondly, our instrumental variables pass all the Hansen tests, thereby attesting to their robustness, validity, and reliability. Thirdly, our models and the associated net effects are statistically significant, as evidenced by the Wald p-values and the joint significance test statistics.

5. Concluding remarks and policy recommendations

Despite the United Nations' recognition of remittances as a potential contributor to sustainable development, empirical evidence informing policy on the extent of their effect, particularly in Africa, remains limited. Accordingly, this study examines whether financial development interacts with remittances to foster equitable income growth and distribution in

Africa. The findings are based on macro data for 42 African countries and the dynamic system GMM estimator.

Our findings indicate that, unconditionally, remittances do not foster inclusive growth in Africa. However, at the disaggregated level of inclusive growth, we find that although remittances are ineffective in promoting income growth, they deepen income inequality in Africa. Further, we find that Africa's underdeveloped financial sector dampens the marginal positive effect of remittances on inclusive growth in Africa. Finally, our threshold analysis shows that Africa's financial sector has the potential to form relevant synergies with other complementary policies to promote inclusive growth. For this to occur, the study reveals a minimum threshold of 0.145 (14.5%) for financial development (overall). For the sub-components of access, depth, and efficiency, minimum thresholds of 0.087 (8.7%), 0.223 (22.3%), and 0.523 (52.3%) respectively, are required.

In line with the favourable effect of remittances on income equality, we recommend that African governments work with financial institutions to develop systems and procedures that make receiving remittances less expensive, simple, and safe. This will require policymakers to liaise with financial institutions, and telecommunication service providers to offer incentives in the form of lower rates or discounts to ensure that receiving remittances through formal channels is cheaper than through informal channels.[11] Moreover, with the implementation of the AfCFTA, financial integration and illicit financial flows are expected to intensify. To sustain and enhance the reliability of remittance inflow via formal channels, we recommend an improvement in regulatory and supervisory institutions to promote information flow, consumer protection and financial system confidence. This can be improved if institutions like the World Bank and the African Development Bank help channel technical expertise and financial resources to assist African leaders build robust/secure transactions and structures to guard against possible systemic financial sector failure. In accordance with the crucial moderating roles of financial institutions, we recommend that financial inclusion modules such as mobile and internet banking, rural banking as well as attractive investment packages are introduced. Also, the relevance of corruption control for shared growth means that policymakers should strengthen institutions, systems and policies that address bribery and corruption.

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[11] Sub-Saharan Africa remains the most expensive region to send money to, with an average sending cost of more than 8 per cent in 2020. Recent information indicate that the costs of remittance tend to be even higher when remittances are sent through banks than through digital channels or through money transmitters offering cash-to-cash services (Ratha et al., 2021)

The study leaves room for future research, particularly in terms of undertaking country-specific studies to provide more country-specific policies that are better suited to individual countries' shared growth conditions. Also, examining the inclusive growth impact of diaspora investment through other pathways such as governance, and gender equality will offer valuable insights for policymakers and scholars seeking to foster social progress in Africa.

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Table A1: List of countries

Angola	Gabon	Namibia
Benin	The Gambia	Niger
Botswana	Ghana	Nigeria
Burkina Faso	Guinea	Rwanda
Burundi	Guinea-Bissau	Senegal
Cabo Verde	Kenya	Seychelles
Cameroon	Lesotho	Sierra Leone
Central African Republic	Liberia	South Africa
Chad	Madagascar	Sudan
Comoros	Malawi	Sao Tomè & Principe
Congo DR	Mali	Tanzania
Congo Rep.	Mauritania	Togo
Cote d'Ivoire	Mauritius	Uganda
Ethiopia	Mozambique	Zambia

Table A1: Pairwise Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Inclusive growth	1														
(2) Financial development index	-0.0913	1													
(3) Financial institutions index	-0.107*	0.931***	1												
(4) Financial institutions (depth) index	-0.0589	0.829***	0.866***	1											
(5) Financial institutions (access) index	-0.0866	0.723***	0.759***	0.515***	1										
(6) Financial institutions (efficiency) index	-0.114*	0.564***	0.655***	0.389***	0.211***	1									
(7) ICT diffusion index	-0.0485	0.267***	0.178***	0.255***	0.237***	-0.140**	1								
(8) Control of corruption	-0.106*	0.490***	0.580***	0.511***	0.578***	0.209***	0.303***	1							
(9) Vulnerable employment	0.0580	-0.498***	-0.517***	-0.534***	-0.562***	-0.0265	-0.518***	-0.607***	1						
(10) Human capital	0.0783	-0.106*	-0.168***	-0.250***	-0.155**	0.0649	-0.0852	-0.257***	0.339***	1					
(11) GDP per capita	-0.280***	0.119*	0.108*	0.0968*	0.0590	0.0926	-0.0881	0.148**	-0.0383	-0.204***	1				
(12) Economic globalisation index	-0.104*	0.410***	0.299***	0.345***	0.297***	0.00133	0.542***	0.408***	-0.519***	-0.399***	0.140**	1			
(13) Remittances	-0.0042	0.0381	0.0933	0.101*	0.0413	0.0657	-0.0160	0.150**	-0.0251	-0.162***	0.0153	-0.0429	1		
(14) Palma ratio	-0.0061	0.0121	0.0706	0.232***	-0.0250	-0.102*	0.216***	0.449***	-0.504***	-0.400***	-0.0211	0.364***	0.106*	1	
(15) Gini index (net)	-0.0964*	0.178***	0.238***	0.348***	0.157***	-0.0208	0.283***	0.353***	-0.410***	-0.229***	-0.0369	0.249***	0.0632	0.587***	1

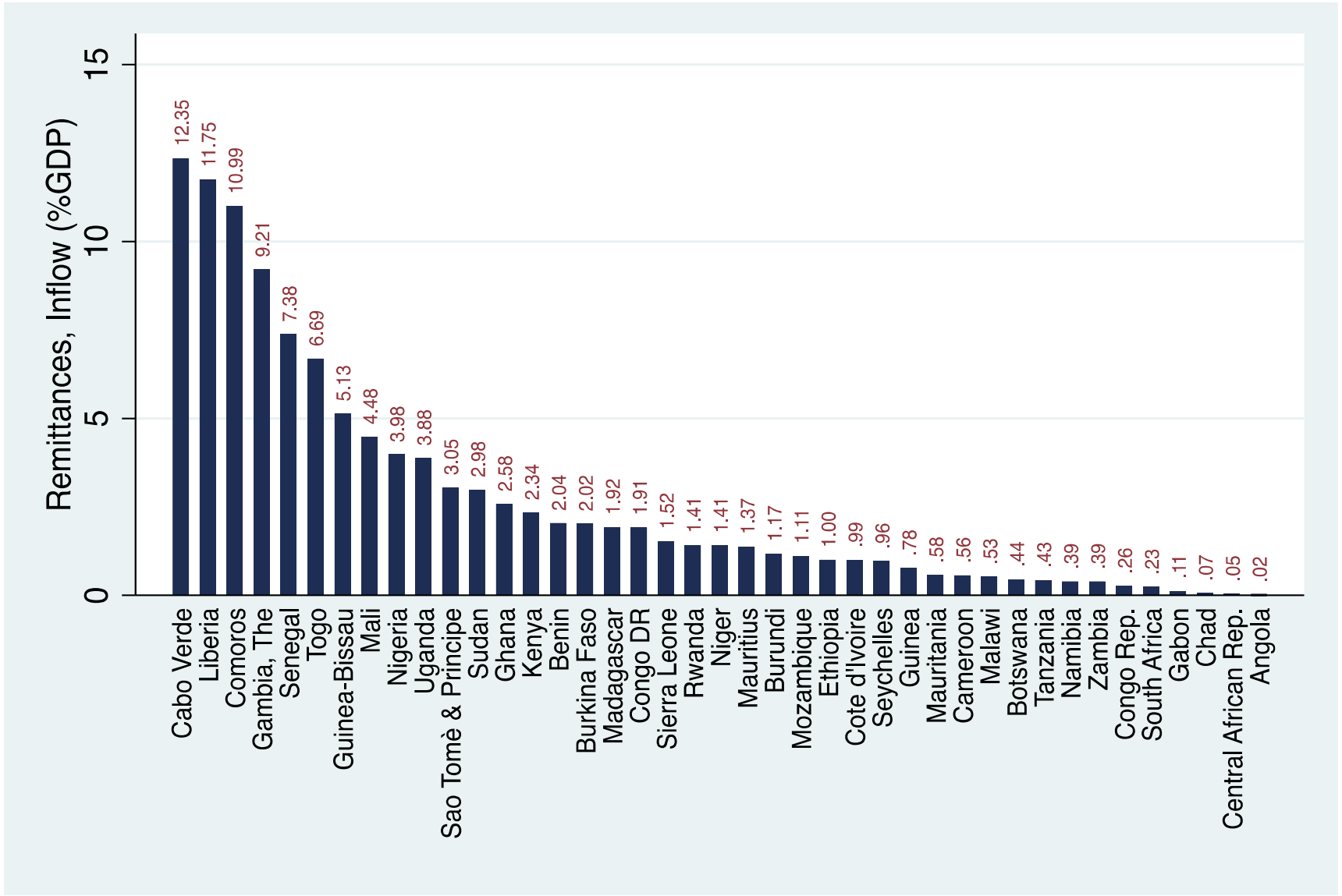*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Figure A1: Average In-country Remittances Inflow in Africa, 1996 – 2020, based on data taken from the World Development Indicators

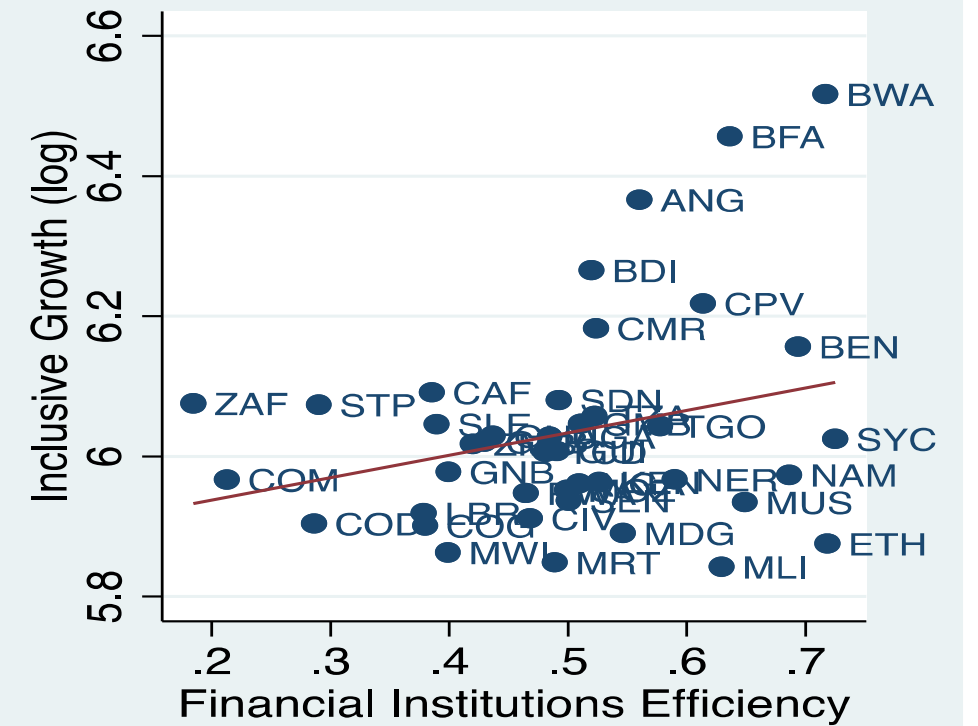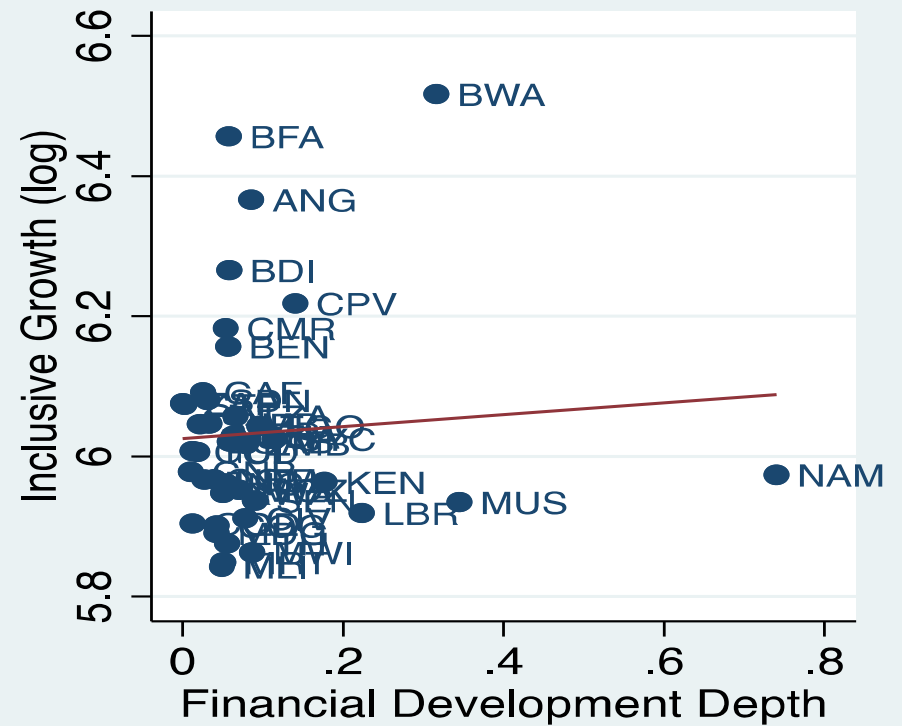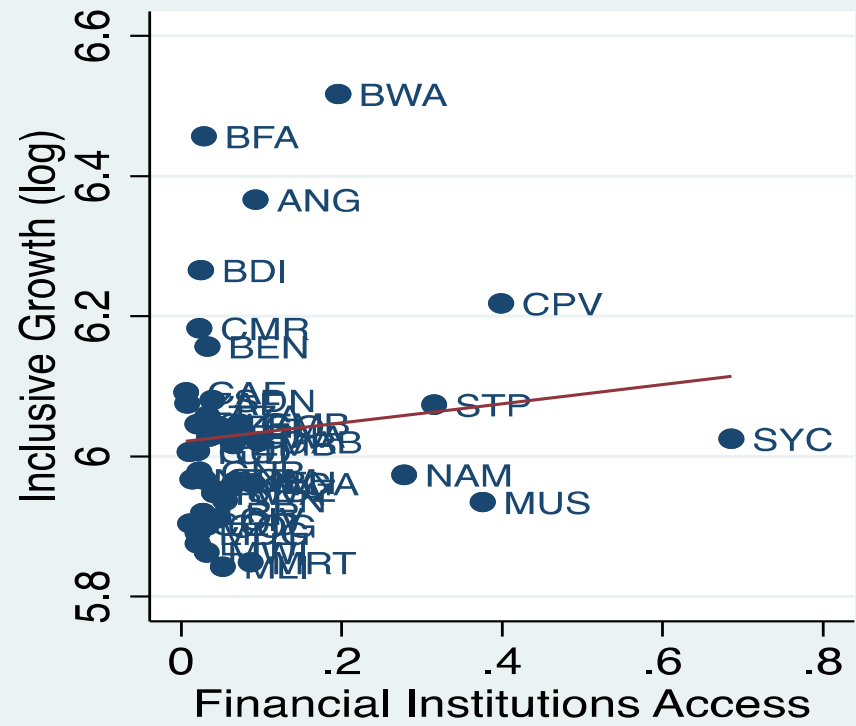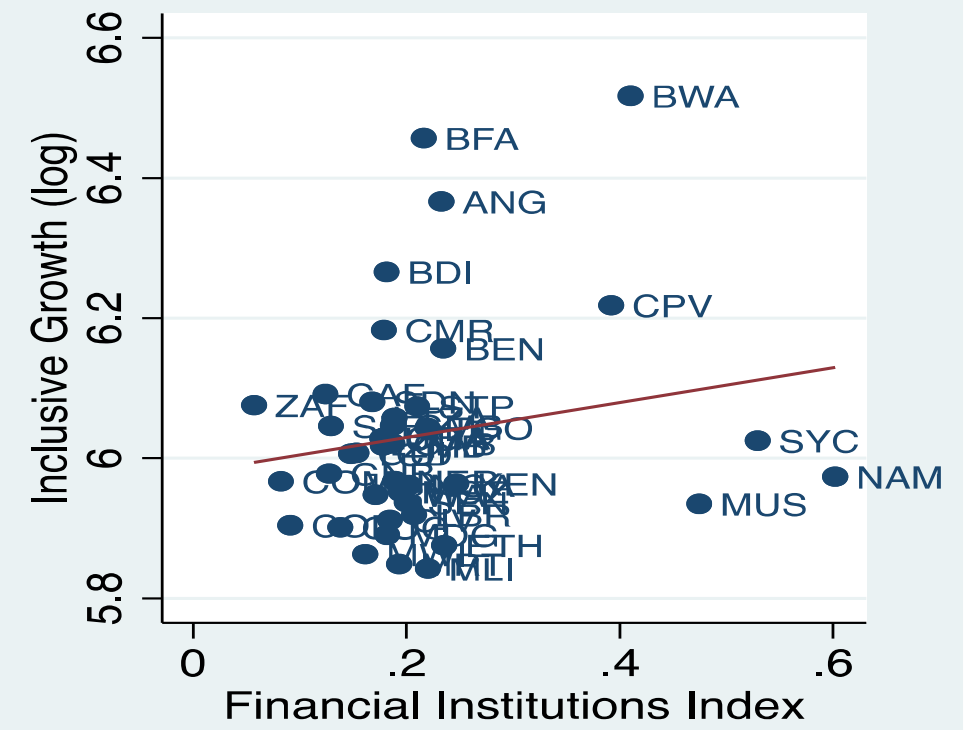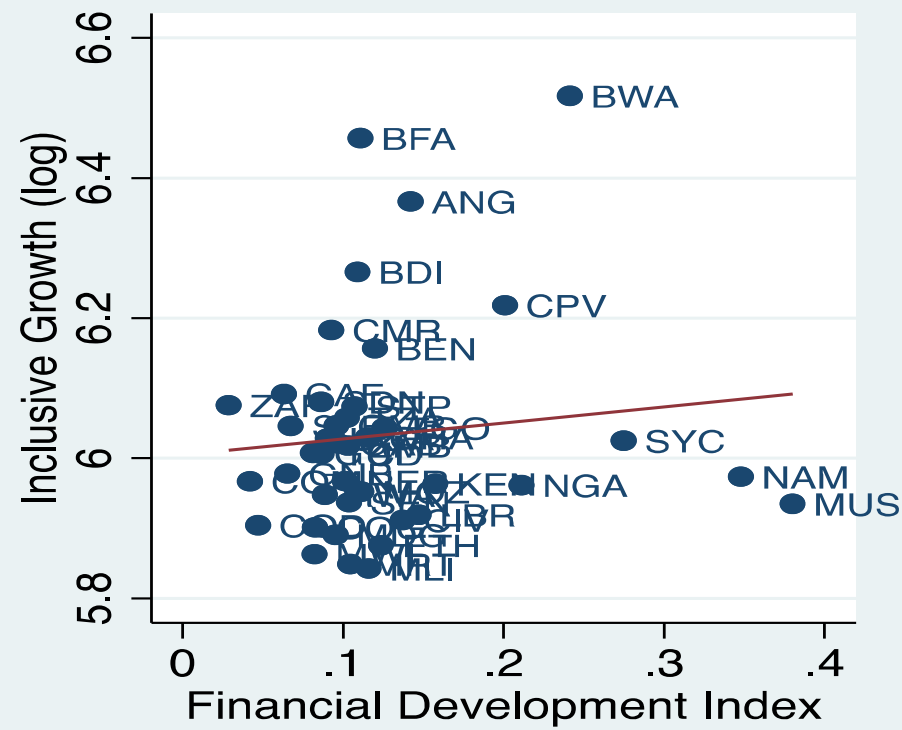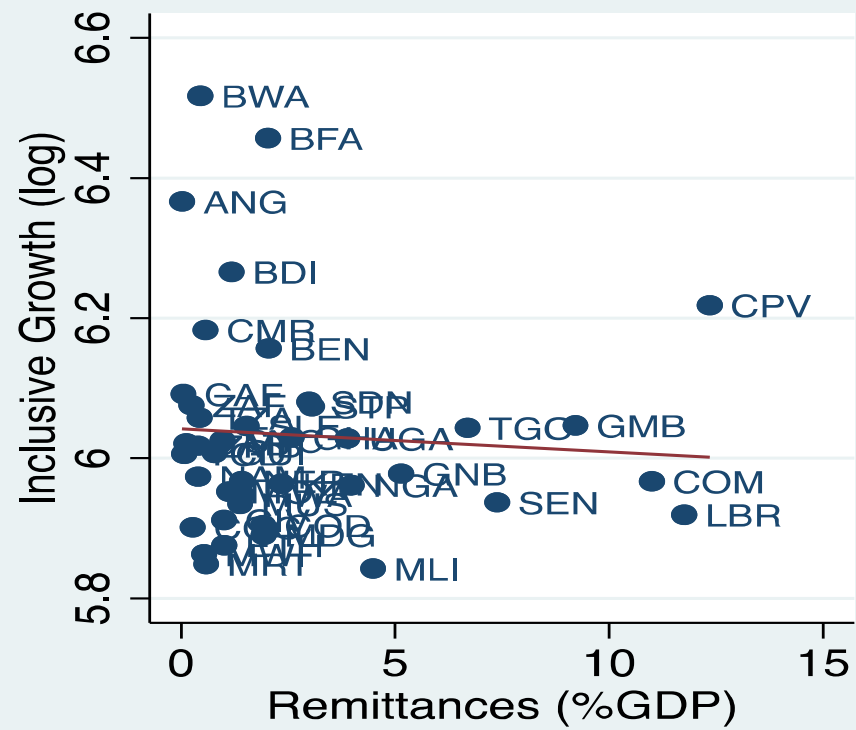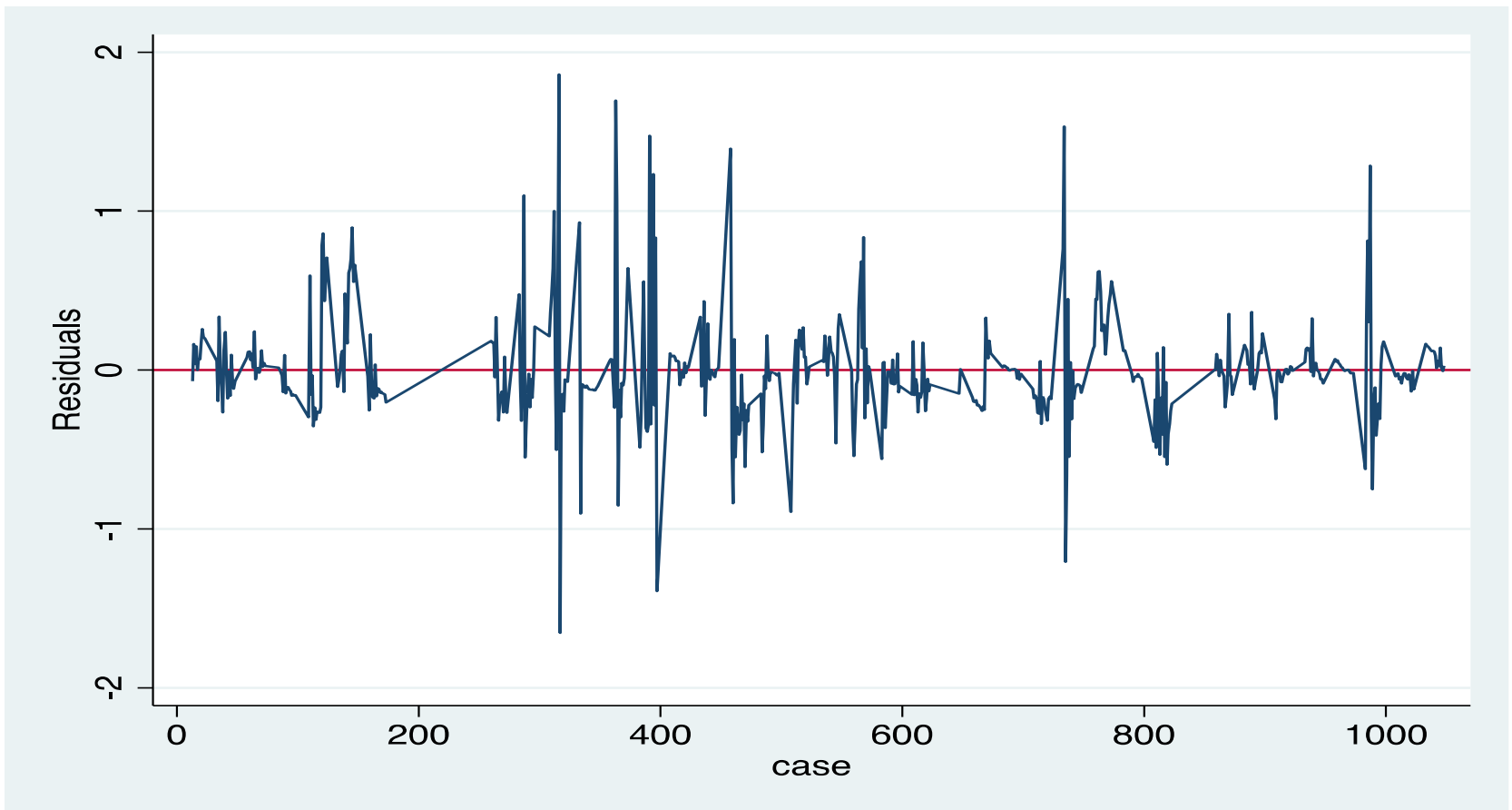*Figure A2: Relationships Between Inclusive Growth, Remittances, and Financial Development in Africa, 1996 – 2020*

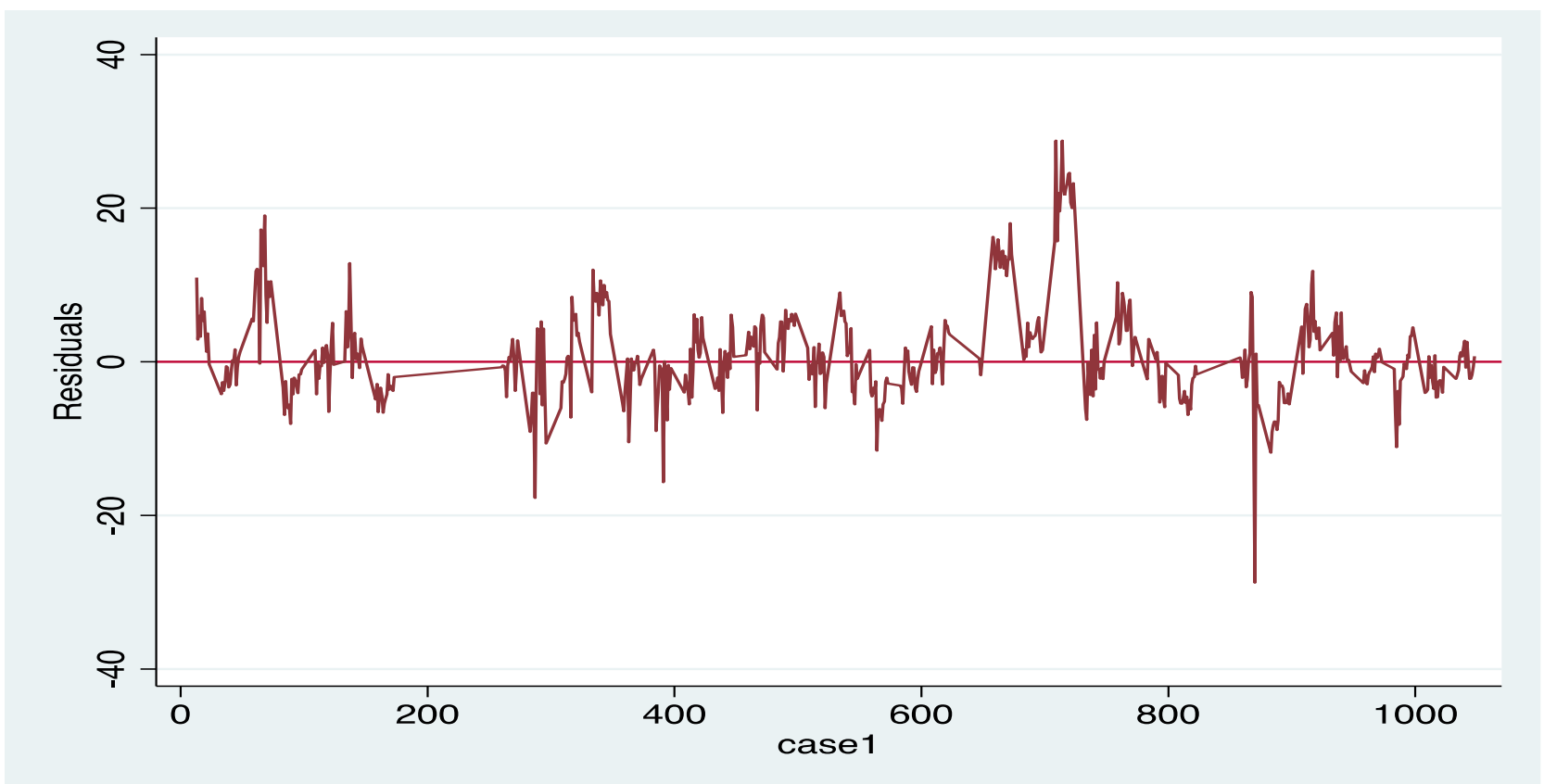**Figure A3: ACF Plot of Residuals for Inclusive Growth Model 8, Table 3**

Figure A3: ACF Plot of Residuals for Economic Growth Model 8, Table 4
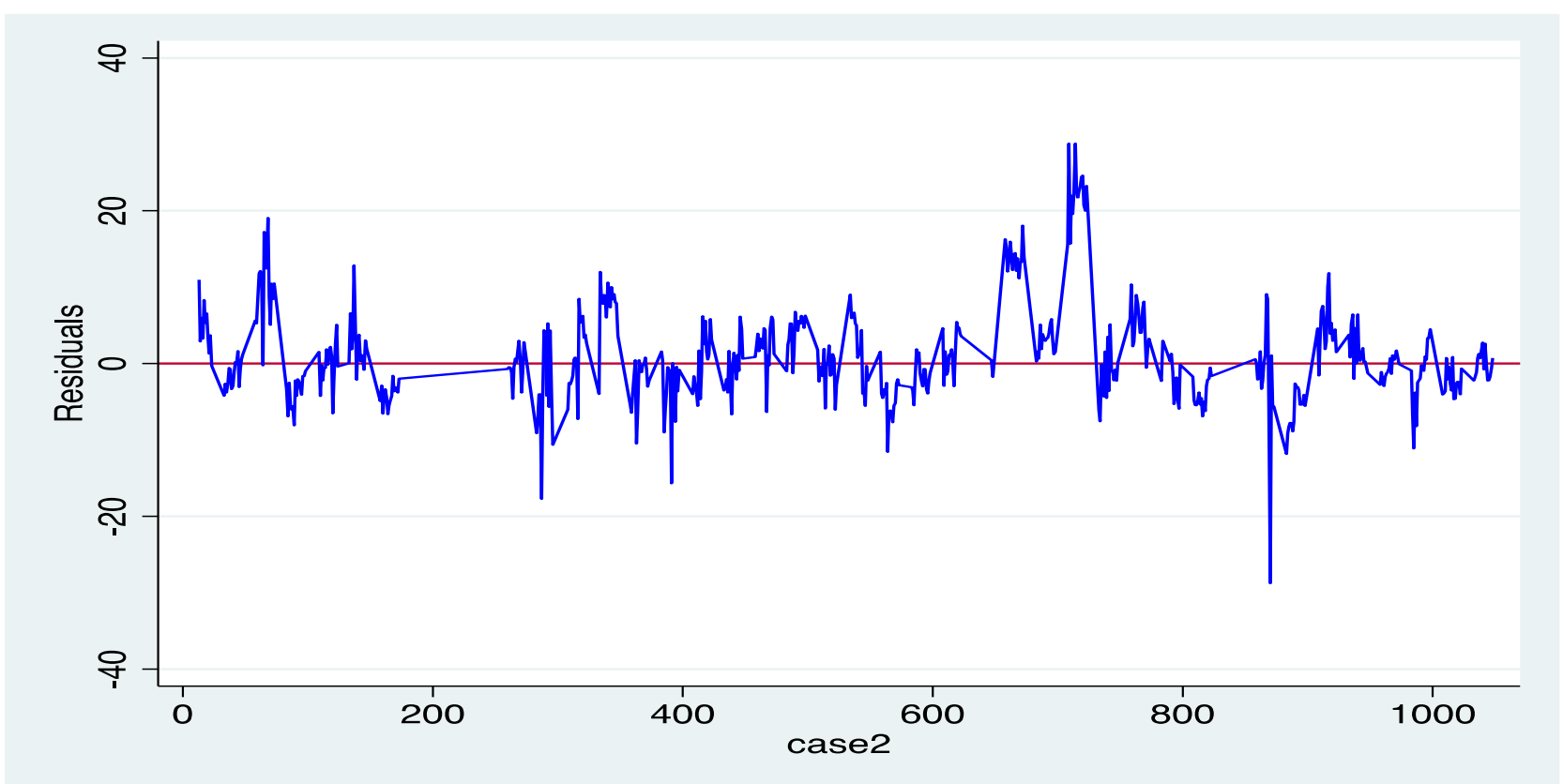

Figure A3: ACF Plot of Residuals for Income Inequality Model 8, Table 5