Financial Deepening, Stock Market, Inequality and Poverty: Some African Evidence

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Abstract: This paper presents evidence about the relationship between private credit, stock market indicators, income inequality and poverty, using the annual data that ranges from 1992 to 2018 on nine African economies. We applied the estimation method of Autoregressive Distributed Lag (ARDL) to model the long-run effect. In Addition, we used Dumitrescu and Hurlin Panel causality to check the direction of causality. The results of long-run estimates show that the stock market indicators have a significant positive impact on income inequalities, but have a negative and significant impact on poverty. Further, our findings show that private credit adversely reduces income inequalities. Our results also establish significant short-run causalities among stock market indicators, private credit, income inequalities, and poverty.

Keywords: Private Credit, Stock market, Inequality, Poverty, ARDL.
JEL Classification: G10; G20; I30

1. INTRODUCTION

Income inequality in the majority of countries has increased over the past two decades (Christopoulos and McAdam, 2017; Liberati, 2015). Increasing income inequality can reduce global economic growth and accelerate the unemployment rate (Dabla-Norris *et al*., 2015); therefore, the fight against income inequality has been at the center of development policies in developed and developing countries, mainly in Africa. In order to form political measures, it is fundamental to fight for the improvement in income distribution, while understanding the determinants of income inequality (Paramati and Nguyen, 2019).

The benefit of financial development on economic growth has been well-argued. Nevertheless, the literature on the nexus of this financial development and income distribution is still quite modest. With regards to theories about the effect of financial development on income distribution offer fuzzy predictions, one point of view of the literature proposes a U-inverted relationship between finance and income inequality, while the other predicts a very linear relationship, (Naceur and Zhang, 2016).

Greenwood and Jovanovic (1990) followed Kuznets (1955) and designed the structure of growth inequality while being responsible for the financial structure. Their theory shows that, in principle, economic and financial development contributes to greater income inequality, whereas more developed countries, with mature financial structures, tend to have more stability in relation to inequality. This means that in the early stages of development, only the rich can access financial services due to the fixed cost of joining the financial coalition, which results in a higher income inequality. In the process of development of the economy, human capital replaces physical capital as the main growth driver, and the financial system becomes more accessible and available to the poor.

Yet, Becker and Tomes (1979, 1986) showed that, in contrast, the development of the financial system can influence the economic and financial opportunities of the poor and subsequently reduce inequality between generations. With a similar perspective, Galor and Moav (2004) found a linear relationship between financial development and income distribution. They suggest that financial deepening eases credit restrictions, that in turn benefits low-income groups through human capital and capital accumulation channels.

Concurrently, financial development can be a flexible tool to combat a uniform distribution of income, because access to financial services is fundamental to the analysis and well-being of individuals, (Claessens and Perotti, 2007), hence, the usefulness of studying financial development on income inequality and poverty in Africa.

Financial development has historically been seized by domestic credit provided by the banking sector, although there is consensus on the role of banking development as an engine of economic growth, (Hassan, Sanchez, and Yu, 2011; Barajas, Chami, and Yousefi, 2013; Ehrlich and Seidel, 2015; Gozgor, 2015; Boukhatem, 2016) and empirical studies clarify mixed findings about the effect of bank development on income inequality. This mixed impact may be due to the fact that the rich or the poor benefit more from the allocation of bank credit (Beck, Demirgüç-Kunt and Levine,

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2007; Hamori and Hashiguchi, 2012). In addition, the financial system has two main components: the stock market and the banking system. Several studies have explored the relationship between financial development and income inequality, but in these studies financial development is mostly captured by banking development, while stock market development is generally ignored, although stock market growth has been very impressive in recent years. In addition, rich countries show that their stock exchanges are large, stable, and liquid, (Choong *et al.*, 2010), which means that the development of the stock market in developed countries can widen the income gap between rich and poor. On the other hand, Singh, (2008) argued that stock exchanges in developing countries, despite having low liquidity and market capitalization, are a place for listed companies to raise financial capital to diversify or expand their businesses. Still, the development of the stock market in developing countries can narrow the income gap between rich and poor.

Taking into account this background and the gap in the existing literature, this study aims to investigate and compare the effect of financial development, including the stock market and banking development, on income inequality and poverty in Africa. The paper contributes to the existing literature on financial development, inequality, and poverty by examining this relationship in African countries from long-run perspectives.

The remainder of this paper is organized as follows. Section 2 presents a review of the literature on the effects of financial market development, including stock market development, on income inequality, and poverty. Section 3 discusses the data and research methodology. Section 4 reports empirical findings and a detailed discussion; and the concluding remarks are discussed in Section 5.

2. LITERATURE REVIEW

The tests of association between stock market liquidity and income inequality by Blau (2018) are closer related to a comprehensive literature that examines the role played by financial development in income distribution, notwithstanding the recent theoretical and empirical literature that discusses how financial liberalization influences economic inequality, (Agnello *et al*., 2012; Li and Yu, 2014; Bumann and Lensink, 2016; Ullah *et al*., 2021).

However, the results of these studies do not agree on this effect. For example, the empirical findings of Beck, Demirguc-Kunt and Peria (2007); Hamori and Hashiguchi (2012), and Johansson and Wang, (2014) reveal that financial development contributes to an equal distribution of income. More specifically, Beck, Demirguc-Kunt and Levine (2007) contended that financial development can positively and significantly increase the share of income received by the poorest group, which reduces income inequality in developing countries, Meniago and Asongu (2018) found the same results.

Conversely, Galor and Moav (2004) considered equivocal how financial development affects economic inequality; if credit restrictions are flexible, the poor must benefit and inequality must be reduced. On the other hand, according to Greenwood and Jovanovic (1990) if financial development only improves the quality of existing financial services, but does not improve access to credit markets, the wealthy, who are probably using these existing services, would benefit from it, and income distribution could increase.

Empirically, Li *et al.* (1998), showed that financial development as measured by the ratio of money supply (M2) to GDP, is negatively related to income inequality. Naceur and Zhang (2016) found that components for financial development, such as access, efficiency, and stability, are associated with narrower income distribution. Liu, Liu, and Zhang (2016) explored the effects of financial development and its structure on income inequality. They found a linear and inverse 'U-shape' relationship between financial development, income inequality, and increasing the relative importance of financial markets to banks helps reduce income inequality. Hou, Li, and Qing (2018) investigated the relationship between financial structure and income inequality in China and explores a channel for changes in financial structure to influence income inequality. With regard to the total bank credit, the results of their study suggest that an increase in the raised capital from the stock market reduces income inequality, whereas a rise of turnover in the stock market augments income inequality, and that financial structure affects income inequality by influencing the development of medium-sized enterprises.

Paramati and Nguyen, (2019) studied the effects of the stock market, banking sector, and foreign direct investment indicators on income inequalities in developed and emerging market economies around the world from 1981 to 2014. By applying models of lag distributed autoregressive on the panel to explore long-term estimates of income inequalities, they found that long-term estimates indicate that stock market indicators have a significant positive and negative impact on income inequalities in developed and emerging market economies, respectively. Besides, they also found that bank credit negatively affects income inequalities, both in developed and emerging economies. The results also established significant short-term causalities between stock market indicators and income inequalities. Taking this in account, they noticed that equity markets are playing an important role in reducing income inequalities in emerging economies while contributing to greater inequalities in developed economies.

Upon having checked a wide cross-sectional sample of countries, Blau (2018) tested whether the stock market's liquidity affects the level of income inequality. The study kept a variety of constant factors - including traditional measures of financial development, and the results showed that liquidity in a country's stock market is negatively related to various measures of inequality. Nevertheless, Blau (2018) found that this relationship does not exist in more developed countries. In fact, the results are stronger in underdeveloped and moderately developed countries. Besides, he found that stock market liquidity is negatively associated with poverty rates. Roine *et al.* (2009) explored the effect of financial development on income inequality in 16 countries from 1900 to 2000. They used three different measures of financial development: bank deposits to GDP, market capitalization (SMC) in relation to GDP and capitalization total market, and three income variables to capture income distribution: the rich, the upper-middle class, and the rest of the population. The re-

sults showed that financial development is positively associated with income inequality, but this association seems to depend on the degree of economic development. Jerzmanowski and Nabar (2013) reached the same results, when they examine the effect of financial development on income inequality, focusing on banking deregulation in the United States between 1977 and 2006.

Seven and Coskun (2016) developed three aggregate measures, such as bank development using five bank indicators, stock market development using three stock market indicators, and general financial development using both bank development indicators and stock markets. Upon examining 45 emerging countries, the authors stated that the development of the bank increases income inequality, but the development of the stock market is not significantly related to income inequality, thus leading to the negligible contribution of general financial development to income distribution. Nevertheless, Lo Prete (2013) did not established a significant association between financial development and income inequality in a sample of 30 countries.

Gimet and Lagoarde-Segot (2011) did not build a general index for financial development; instead, they assessed the effects of banking and stock market development separately. The study considers a group of 49 countries in the period from 1994 to 2002, and concludes that the rise in bank credit tends to increase income inequalities, but the increase in the size and liquidity of the stock market has a negative impact on income inequality. Bodea *et al*. (2021) using a general method of moments and error correction methods found a strong evidence that currency, banking, inflations and deb crises increase the inequality, particularly in the long run.

Regarding the effect on poverty, a recent study by Donou-Adonsou and Sylwester (2016) presented evidence that the development of the financial sector can reduce poverty using a multitude of poverty measures as variable dependents. Using in-depth measures of formal and informal financial sector variables, they found that while both contribute to poverty reduction, the impact of the informal sector is not as strong as the formal banking sector. Rewilak (2017) investigated whether financial development is conducive to poverty reduction. Separating financial development into four categories and using recently available data, they concluded that both financial deepening and greater physical access are beneficial in reducing the proportion of people below the poverty line. Using alternative measures of financial instability, the conclusion also encourages existing results that may increase the incidence of poverty. In addition, the results found remain robust, even when controlling mobile money.

Uddin *et al*. (2014) found that in Bangladesh, there is a long-term relationship between financial development, economic growth, and poverty reduction and that financial development helps to reduce poverty, but its effect is not linear. Shahbaz and Rehman (2014) discovered that financial development causes poverty reduction in Pakistan. With respect to African countries, Odhiambo, (2009) found similar results in South Africa.

The two latter studies capture the development of the financial market by looking exclusively at the banking credit to the private sector, which the results are supported by Haan *et al*. (2021). Conversely, Li and Yu (2014), Agnello *et al*. (2012), and Johansson and Wang (2014) analyzed financial development using financial reforms or financial repression in both banking and equity markets.

From a financial perspective, the stock market is the most important market in relation to corporate investment decisions (Paramati and Nguyen, 2019). In addition, going public allows companies to access more financial capital that can fuel innovation (Wies and Moorman, 2015). Investment and innovation decisions by companies can have a considerable influence on unemployment, which can affect income distribution. However, the empirical studies above- reviewed generally omit or place little weight on the development of the stock market, when measuring financial development. Indeed, the financial system has two main components: stock markets and banking system, but Beck, Demirguc-Kunt and Peria (2007); Hamori and Hashiguchi (2012); Lo Prete (2013); Jerzmanowski and Nabar (2013); Jauch and Watzka (2016) and Gravina and Lanzafame 2021) measured financial development using solely bank development indicators. Li and Yu (2014), Agnello *et al*. (2012), Johansson and Wang (2014) and Ullah *et al*., 2021 capture financial development by building aggregate financial development based on seven individual reforms, but six of them are indicators of bank reform, and the remaining indicator addresses the stock market reform. In addition, the development of the stock market in these studies is measured based on a combination of two aspects, that is, whether a country intends to develop its security market and the opening of the security market to foreign investors is taken into account. But the same development is measured by market capitalization and total value negotiated in the studies by Roine *et al.* (2009) Law and Tan (2009), Gimet and Lagoarde - Segot (2011), and Seven and Coskun (2016).

3. DATA AND RESEARCH METHODOLOGY

3.1. Data

This research paper makes use of annual data that ranges from 1992 to 2018 on 9 African economies. The research focuses on those African economies that have stock exchanges and presents consistent and sustainable data for what is the objective of the article. Given that, the selection of the sample period and countries are based on the availability of data. The selected economies are Botswana, Egypt, Ghana, Kenya, Mauritius, Namibia, Nigeria, South Africa and Tunisia. Using these annual data on considered emerging market economies, we construct unbalanced panel data sets. The idea is to investigate whether the relationship between financial development, income inequality, and poverty varies with the level of financial development. Rather than choose a geographical division, we believe that the level of countries in the database is an income criterion relevant to differentiation for analyzing the link between financial development, income inequality, and poverty. One of the reasons also used to choose these African countries lies in the fact even though they have a reasonable financial system have a high level of inequality and poverty.

The contribution of this study is twofold. First, it contributes to the debate by modeling the financial development-

inequality-poverty relationship as intrinsically dynamic, explicitly distinguishing between the short and the long run. We use a methodology that, to our knowledge, has is little used for this subject in the selected countries. We employ the Pooled Mean Group-Autoregressive Distributed Lags (PMG-ARDL) estimator to control for panel heterogeneity and to distinguish between long-run and short-run effects. We evaluate the long-run equilibrium relationship among the variables of interest, whether such variables are stationary or not. We believe that the relationship between financial development, income, inequality and poverty may be different in the short and long terms, especially given countries' level of development. Second, unlike the other articles we use two variables on poverty as the literature usually only uses one of them, we try to offer some financial and economic explanations for our findings related to the preliminary studies, and several explanations, such as formal banking, and investment system. We try to shed some light on the short-term and long-term differentiated effects.

We use measures of income inequality, poverty, and financial sector development that have previously been used in the literature. The variables of this study are measured as follows: The Gini index (Gini) measures the income inequalities, and a higher (lower) Gini index value indicates higher (lower) income inequalities[1]. To understand the role of financial development in combating poverty, we use the poverty gap[2] and poverty headcount ratio[3]. For access to financial services, we opted to use three indicators: banks' private credit to GDP (see Levine and Zervos, 1998; Uddin *et al*., 2014; Le Goff and Singh, 2014; Blau, 2018), refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, which establish a claim for repayment. The stock market's total value traded to GDP, which represents the total number of shares traded, both domestic and foreign, multiplied by their respective matching prices. At last, turnover ratio, which is the most widely used indicator for financial deepening (see Beck and Levine, 2002; Levine, 2002; Hsieh *et al*., 2019). Represents the value of domestic shares traded divided by their market capitalization[4], higher values suggest deeper financial institutions and stock markets, (Zang and Naceu, 2016). We also use the stock market turnover ratio as a measure of financial efficiency, a high turnover ratio reflects an efficient financial market.

Finally, to strengthen our empirical results, we control for several other variables that have been previously used as determinants of poverty and inequality, such as, real GDP per capita, government expenditures to GDP[5], trade openness which is the sum of exports and imports of goods and services measured as a share of GDP, and the inflation rate. Real GDP per capita is included to control for the economic growth effect, as the literature suggests a strong relationship between income distribution and economic development. The coefficient on real GDP per capita is expected to be negative because lower inequality and poverty are associated with a higher income level. Similarly, negative signs are expected on the coefficients of government expenditure to GDP and trade openness, which are included to capture the benefits of public spending and openness to foreign trade. The coefficient on the inflation rate is expected to be positive because inflation harms the poor more than it does the rich, (Easterly and Fischer, 2001). The data is available from the World Development Indicators and World Federation of Exchanges database for the stock market variables.

3.2. Research Methodology

We began by estimating the equation bellow, using pooled country-year observations in an unbalanced panel. We follow the basic specification from the income distribution and financial development literature:

$$Gini_{i,t}=\alpha+\beta FD_{i,t}+\gamma_0 Y_{i,t}+\gamma_1 infl_{i,t}+\gamma_2 trade_{i,t}+\gamma_3 gov_{i,t}+\varepsilon_{i,t} \quad (1)$$

$$Povgap_{i,t}=\alpha+\delta FD_{i,t}+\gamma_0 Y_{i,t}+\gamma_1 infl_{i,t}+\gamma_2 trade_{i,t}+\gamma_3 gov_{i,t}+\varepsilon_{i,t} \quad (2)$$

$$Povhead_{i,t}=\alpha+\theta FD_{i,t}+\gamma_0 Y_{i,t}+\gamma_1 infl_{i,t}+\gamma_2 trade_{i,t}+\gamma_3 gov_{i,t}+\varepsilon_{i,t} \quad (3)$$

In these equations, $Gini_{i,t}$, $Povgap_{i,t}$ and $povhead_{i,t}$[6] represents the Gini coefficient, poverty gap and the poverty headcount at the national poverty line, respectively. $FD_{i,t}$ is the key explanatory vector that we are interested in, as it covers the indicators of financial development that were previously described, which can be private credit to GDP (PC), turnover ratio (turnover), or value traded (VT). β, δ, and θ are expected to be negative, which implies that higher financial development can lower income inequality and poverty. The $Y_{i,t}$ is the log of real GDP per capita used to control for the wealth effect, and we expect γ_0 to be negative. $Infl_{i,t}$, $Trade_{i,t}$, and $Gov_{i,t}$ are also a set of control variables representing inflation, trade openness and government expenditure, respectively. Following the literature, γ_1 is expected to be positive, while γ_2 and γ_3 are expected to be negative.

[1] Measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. Thus, a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

[2] Poverty gap at $1.9 or $3.20 (2011 PPP) a day represents a mean shortfall in income or consumption from the poverty line $3.20 (or $1.9) a day (counting the nonpoor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.

[3] Although, the poverty gap index is a better indicator than the poverty headcount ratio because it counts all people with incomes below a poverty line and considers them equally poor (Sen, 1976). See also Donou-Adonsou and Sylwester (2016) and Rewilak (2017). Poverty headcount ratio at $1.90 a day is the percentage of the population living on less than $1.90 a day at 2011 international prices.

[4] The value is annualized by multiplying the monthly average by 12.

[5] Represents the entire stock of direct government fixed-term contractual obligations to others outstanding on a particular date. It includes domestic and foreign liabilities such as currency and money deposits, securities other than shares, and loans.

[6] This variable is preferred to the $1.90 or $3.10 poverty lines also available from the World Bank, as these variables have many values close to zero and their distributions are highly skewed, compared to the headcount variable at national, Rewilak (2017).

According to Zang and Naceur (2016) the relationship between financial development and income inequality, and poverty might be a case of reverse causation. That is to say that a lower level of poverty implies that financial services are already more affordable and accessible to the poor and, consequently, are stimulating the development of the financial sector. Likewise, a narrower poverty gap, or less income inequality, might also promote economic growth, according to the inverted-U pattern of the impact of income distribution on economic growth. Thus, controlling for the possible reverse causation and simultaneity bias is essential to studying the impact of finance on income inequality and poverty.

We use the dynamic panel models based on the Pooled Mean Group-Autoregressive Distributed Lags (PMG-ARDL) estimation model proposed by Pesaran *et al.*, (1999). It is appropriate to use the PMG estimator when the length of the "T" time series exceeds the size of the transverse enlarged "N". Also, according to Pesaran *et al*. (1999), one of the fundamental premises of the PMG-ARDL estimator is that it allows heterogeneity in short-term coefficients, although it does not allow homogeneity in long-term coefficients. The long-term coefficients are included to be equal to the error correction model, but long-term coefficients can change from error variances. For this reason, we apply the PMG-ARDL which has several advantages. Firstly, it can employ variables which are either I(0) or I(1), relaxing the statistical constraint that all data series should be stationary in levels. Secondly, its lagged specification is perfectly suited for our analysis because it allows studying the impact of past values of explanatory variables on the current level of the dependent variable. Thirdly, it allows to examine both the long and the short run relationships between the variables. Also, the choice of the method is informed by its ease of computation as well as its ability to produce consistent estimates in small samples (Tecel, 2020).

Our study employs two robust panel econometric techniques such as the PMG-ARDL model and heterogeneous panel non-causality test, Dumitrescu-Hurlin (2012) panel causality[7], to see the role of stock markets and private credit on income inequalities and poverty in these economies. The PMG-ARDL estimator allows only the short-run slope parameters to vary between countries, and the dynamic fixed effect estimator allows neither the long-run nor the short-run slope parameters to vary over countries. This estimator allows the short-run coefficients and error variances to differ freely across groups and the long-run coefficients are constrained to be the same. Therefore, the long-run adjustment seems to be given by conditions expected to be homogeneous across countries, while the short-run adjustment depends on country characteristics. Not imposing equality of short-run slope coefficients allows the dynamic specification to differ across countries. Thus, the long-run relationship between financial development, income inequality, and poverty is expected to be identical from country to country but the short-run coefficients are expected to be country-specific.

According to Paramati and Nguyen (2019), the panel PMG-ARDL method provides results on long-run income inequality and poverty elasticities, whereas the noncausality test helps in identifying the direction of causality among the variables in the short-run. Given the significance of these models, the findings derived from these techniques will be more robust and reliable. This method assumes cross-sectional independence, implying that the disturbances are independently distributed across units and over time with zero mean and constant variances. Different from Paramati and Nguyen (2019) we include two variables regarding the poverty (Poverty gap and Poverty Headcount). The appropriate lag length for this test is selected based on the Akaike Information Criteria (AIC). The panel ARDL equation is represented as follows

$$Gini_{i,t}=\alpha_i+\sum_{j=1}^{p}\alpha_{1,ij}gini_{i,t-j}+\sum_{j=0}^{q_1}\beta_{ij}FD_{i,t-j}+\sum_{j=0}^{q_2}\gamma_{0,ij}Y_{i,t-j}$$

$$+\sum_{j=0}^{q_3}\gamma_{1,ij}infl_{i,t-j}+\sum_{j=0}^{q_4}\gamma_{2,ij}trade_{i,t-j}+\sum_{j=0}^{q_5}\gamma_{3,ij}gov_{i,t-j}+\varepsilon_{i,t} \quad (4)$$

$$Povgap_{i,t}=\alpha_i+\sum_{j=1}^{p}\alpha_{1,ij}Povgap_{i,t-j}+\sum_{j=0}^{q_1}\delta_{ij}FD_{i,t-j}+\sum_{j=0}^{q_2}\gamma_{0,ij}Y_{i,t-j}$$

$$+\sum_{j=0}^{q_3}\gamma_{1,ij}infl_{i,t-j}+\sum_{j=0}^{q_4}\gamma_{2,ij}trade_{i,t-j}+\sum_{j=0}^{q_5}\gamma_{3,ij}gov_{i,t-j}+\varepsilon_{i,t} \quad (5)$$

$$Povhead=\alpha_i+\sum_{j=1}^{p}\alpha_{1,ij}Povhead_{i,t-j}+\sum_{j=0}^{q_1}\theta_{ij}FD_{i,t-j}+\sum_{j=0}^{q_2}\gamma_{0,ij}Y_{i,t-j}$$

$$+\sum_{j=0}^{q_3}\gamma_{1,ij}infl_{i,t-j}+\sum_{j=0}^{q_4}\gamma_{2,ij}trade_{i,t-j}+\sum_{j=0}^{q_5}\gamma_{3,ij}gov_{i,t-j}+\varepsilon_{i,t} \quad (6)$$

Where i = 1,2, 3,...N and t = 1,2, 3,...T, α_i represents the fixed effects, $\gamma_0-\gamma_3$ is the lagged coefficients of the independent variables and the regressors and $\varepsilon_{i,t}$ is the error term that is assumed to be white noise and varies across countries and time. The first step in this type of empirical approach is to identify the order of integration in the data. This is important because, to estimate an ARDL model it is necessary to ensure that the variables in the regression are integrated with order zero I (0) or, at most, integrated into order one I (1). This is because in the presence of variables integrated in the order I (2) the ARDL limit test approach fails to provide robust results. Therefore, I (2) variables must be eliminated from the data set. To test the unit root in the panel series

[7] The authors considered heterogeneity in terms of two dimensions, which are the heterogeneity of the regression model used to test Granger causality and the heterogeneity of causality relationships. This method produces the strong results in the presence cross-sectional dependence and heterogeneity in a panel.

Table 1. Summary Statistics.

Variables	Obs.	Mean	Median	Std. Dev.	Minimum	Maximum
Real GDP per capita	243	3083,12	2602,48	2356,26	223,34	11238,69
Gini index	243	46,74	43,00	11,41	28,30	64,80
Government expenditure to GDP (%)	243	15,45	15,18	6,18	0,91	30,07
Poverty headcount	243	29,59	25,40	15,49	7,70	67,20
Inflation	243	10,16	7,54	9,79	-0,69	72,84
Private credit to GDP (%)	243	46,17	33,07	37,76	3,66	160,13
Poverty gap	243	7,93	6,30	7,15	0,00	21,90
Trade openness to GDP (%)	243	75,01	73,65	28,01	20,72	132,20
Turnover ratio (%)	243	13,91	7,60	16,62	1,06	108,11
Value traded to GDP (%)	243	7,70	1,09	18,53	0,03	123,15

group, IPS and LLC unit root tests are used. These tests were proposed by Im, Pesaran and Shin (2003) and Levin, Lin and Chu, 2002), respectively. The baseline structure of these two tests is an ADF regression for panel data and is specified as follows:

$$\Delta y_{it}=\gamma_i y_{i,t-1}+\sum_{j=1}^{p}\varphi_i \Delta y_{i,t-j}+\varepsilon_{it}, \text{ where } \gamma_i=\rho_i-1. \quad (7)$$

Both tests assess the null of unit root $H_0 : \gamma_i = 0$ ($\rho_i=1$) against the alternative of stationarity $H_1 : \gamma_i < 0$ ($\rho_i<1$). The LLC test assumes that the parameters tested are equal across all the panels and thus $\rho_i = \rho$ for all i countries in the panel. Meanwhile, the IPS test is less restrictive than the LLC test and is obtained as an average of the ADF statistic and allows the parameters to vary across panels. However, it has been pointed out in the literature that cross-section dependence arises from unobserved common factors, externalities, regional and macroeconomic linkages, and unaccounted residual interdependence. Moreover, because we suspect that the data are cross-sectionally correlated, we employ cross-section dependence tests to show if the variables exhibit some common dynamics among the countries.

Once verifying the order of integration, the second step of the analysis tests the confirmation of long-run cointegration between inequality and poverty with the independent variables using the Pedroni (1999, 2004) and Kao (1999) panel cointegration tests. Other panel cointegration tests include Westerlund (2007). However, this test is not valid for the purposes of this study, as Westerlund himself stated that such test is often subjected to misrepresentations when the T sample size is less than 100.

In the final step, this study makes use of the Dumitrescu–Hurlin (2012) panel causality test. That is a simple adaptation of the Granger non-causality test for constant-coefficient non-homogeneous panel data models. Dumitrescu and Hurlin (2012) used the following equation for panel causality test considering the linear heterogeneous model:

$$y_{it}=\alpha_i+\sum_{K=1}^{L}\gamma_i^k y_{it-k}+\sum_{K=1}^{L}\beta_{it}^k x_{it-k}+\varepsilon_{it}, \quad i=1,2,\ldots,N;\ t=1,2,\ldots,T$$

Where L denotes the lag length, which is identical for all cross-section units of the panel, α_i denotes individual effects, γ_i^k and β_{it}^k represents the lag and the slope parameters.

Table 1 provides the descriptive statistics of the variables employed in the study. The Gini coefficient, as a key variable with a mean of about 46,74, ranges from 28,3 to 64.8 percent. The contrast between the minimum and maximum in poverty gap observations—0.0 versus 21.90—is obvious, compared to the inequality data.

4. RESULTS AND DISCUSSION

Looking at the correlation coefficients presented in Table **2**, the results show that on the one hand, there is a positive correlation between inequality and financial development, and on the other hand, there is a negative correlation between poverty and financial development. It is important to emphasize that, the correlation matrix only indicates an association between any two pairs of variables, it does not establish a causal relationship.

Panel data are regularly overwhelmed with a common shock effect. This is generally known as a cross-sectional dependency (CSD). The CSD phenomenon indicates the existence of a common effect among the cross-sectional dimensions of the data series (Pesaran, 2007). The modeling of CSD on the fitted regression helps to prevent spurious regression traps and mistaken inference by an extension (Tecel, 2020). The Lagrange multiplier (LM) test proposed by Breusch and Pagan (1980) is frequently used to test for CSD. We present a cross-sectional dependency test in Table **3**. Our study estimates the Pesaran (2007) cross-sectional dependency test that confirms cross-sectional dependency, that is, the rejection of the null hypothesis of cross-sectional independence for all variables. Financial development, inequality, and poverty seem to exhibit some common dynamics to all countries.

Table 2. Correlation Matrix.

	Gini	Gov	Headpov	Infl	$LogGDP_{pc}$	PC	Turnover	VT	Trade	PovGap
Gini	1									
Gov	0.617	1								
Povhead	0.570	0.297	1							
Infl	-0.042	-0.384	0.042	1						
$LogGDP_{pc}$	0.250	0.483	-0.179	-0.556	1					
PC	0.236	0.363	0.367	-0.410	0.591	1				
Turnover	0.056	0.177	0.111	-0.167	0.242	0.318	1			
VT	0.285	0.149	0.511	-0.140	0.278	0.712	0.453	1		
Trade	0.061	0.483	-0.422	-0.256	0.427	0.121	-0.088	-0.209	1	
PovGap	0.377	-0.249	0.398	0.375	-0.490	-0.370	-0.227	-0.091	-0.534	1

Note: PC-Private credit to GDP, VT-Value traded to GDP, Gov-Government expenditure to GDP, Povhead- Poverty headcount, infl-Inflation, $LogGDP_{pc}$-Logarithm of real GDP per capita, Gini-Gini index, Turnover-Turnover ratio, Trade- Trade openness to GDP (%) and PovGap-Poverty gap.

Table 3. Cross-sectional Dependency Test.

Variable	CD-Test	*P-value*
Log GDP_{pc}	28.534***	0.000
Infl	7.256***	0.000
Trade	2.282**	0.022
Gov	-0.895**	0.037
PC	17.329***	0.000
Turnover	3.253***	0.001
VT	8.054***	0.000
Gini	-2.102**	0.036
PovGap	20.070***	0.000
Povhead	15.326***	0.000

Note 3: PC-Private credit to GDP, VT-Value traded to GDP, Gov-Government expenditure to GDP, Povhead- Poverty headcount, infl-Inflation, $LogGDP_{pc}$-Logarithm of real GDP per capita, Gini-Gini index, Turnover-Turnover ratio, Trade- Trade openness to GDP and PovGap-Poverty gap.

From this point forward, we first performed our empirical analysis of the unit root tests. Although the variables present cross-sectional dependency, stationarity tests are extremely important in this analysis, because the order of integration of all estimated variables must be I (0) or I (1). The first generation IPS and LLC unit root tests are used to test evidence of stationarity. Given the strong support of the stationarity of the first difference in all variables and in all panels, we proceed to analyze the cointegration between the dependent variable and the regressors. The results of these unit root tests are displayed in Table 4. The results of Levin, Lin, and Chu test (assumes common unit root process) and Im, Pesaran, and Shin test (assumes individual unit root process) show that Gini index, inflation, Headcount ratio, private credit, poverty gap, turnover ratio, and value traded are stationary at the levels, whereas government expenditure is nonstationary, and in the case of trade openness, we find mixed results. Furthermore, the results of the first difference data series imply that the null hypothesis of a unit root (non-stationary) is strongly rejected for all variables. On the basis of these findings, we can conclude that the considered variables have a mixed order of integration that is I (0) and I (1), so the variables are stationary. The Pedroni and Kao residual-based cointegration tests are used to test the hypothesis of no cointegration. When taking into account cross-sectional dependencies, is rejected the null hypothesis of no cointegration. Both cointegration tests, reject the null hypothesis of no cointegration[8]. Thus, there is evidence of a long-run relationship between financial development, inequality, and poverty. This suggests that an estimation of equations (1), (2), and (3) will provide reliable long-run results.

Table 4. Panel Unit Root Test.

Variable	Level		First Difference	
	LLC	*IPS*	*LLC*	*IPS*
Log GDP_{pc}	-2,14***	0,99	-3,85***	-5,65***
Gini	-12,88***	-11,68***	-8,03***	-9,22***
Gov	-0,01	-0,04	-8,44***	-8,51***
Povhead	-10,43***	-3,66***	-2,11**	-4,46***
Infl	-2,84***	-2,93***	-8,31***	-9,19***
PC	-2,55***	-1,39*	-3,61***	-5,61***
Povgap	-6,27***	2,22**	-3,73***	2,09**
Trade	-1,10	-1,84**	-7,37***	-7,54***
Turnover	-3,23***	-3,83***	-11,01***	-11,16***
VT	-4,61***	-5,38***	-11,04***	-11,34***

[8] See appendix A1 and A2.

Table 5. PMG-ARDL Estimation.

Variables	Gini			Poverty gap			Poverty Headcount		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Long Run									
Log GDP_{pc}	-18.008* (9.36)	-15.616* (8.13)	-8.468*** (0.02)	-6.163*** (1.101)	-5.77* (1.137)	-1.35*** (1.308)	4.82*** (0.49)	-4.67*** (1.14)	5.3*** (0,.9)
Infl	1.027* (1.027)	0.935* (0.49)	0.373*** (0.08)	0.476*** (1.133)	0.477*** (0.133)	-0.04*** (0.058)	0.38*** (0.09)	0.028 (0.03)	0.52*** (0.11)
Trade	-0.992* (0.992)	-1.078* (0.57)	-0.606*** (0.15)	-0.250*** (0.037)	-0.257*** (0.039)	-0.10*** (0.034)	-0.07** (0.04)	0.017 (0.04)	-0.03 (0.03)
Gov	8.852* (4.85)	7.664* (4.070)	3.665*** (1.004)	1.930* (0.428)	1.889*** (0.428)	0.977*** (1.004)	1.286*** (0.12)	1.78*** (0.24)	1.319*** (0.16)
PC	-0.168 (0.170)	-0.202** (0.175)	-0.285** (0.113)	-0.0004*** (0.022)	-0.006*** (0.022)	-0.06*** (0.022)	-0.01 (0.05)	-0.42*** (0.16)	0.04 (0.08)
Turnover		0.070 (0.086)			-0.001* (0.086)			-0.75*** (0.25)	
VT			0.374*** (0.099)			-0.13*** (0.029)			0.126 (0.12)

Notes: *** shows significance at the 1% level, ** shows significance at the 5% level and * shows significance at the 10% level. Parentheses report the standard error. Note 2: PC-Private credit to GDP, VT-Value traded to GDP, Gov-Government expenditure to GDP, Povhead- Poverty headcount, infl-Inflation, $LogGDP_{pc}$-Logarithm of real GDP per capita, Gini-Gini index, Turnover-Turnover ratio, Trade- Trade openness to GDP and PovGap-Poverty gap.

Notes: LLC, Levine–Lin–Chu statistics; IPS, Im, Pesaran and Shin statistics. *** shows significance at the 1% level, ** shows significance at the 5% level and * shows significance at the 10% level. PC-Private credit to GDP, VT-Value traded to GDP, Gov-Government expenditure to GDP, Povhead-Poverty headcount, infl-Inflation, $LogGDP_{pc}$-Logarithm of real GDP per capita, Gini-Gini index, Turnover-Turnover ratio, Trade- Trade openness to GDP and PovGap-Poverty gap.

After confirming that the variables are not integrated of order equal or greater than I (2), and that the series are cointegrated, the next step is to estimate the panel ARDL regression as specified by the equations. The presence of a long-run relationship between financial development, inequality, and poverty in the panel of African countries is economically meaningful, in that it suggests that these countries meet the long-run affluence condition. Having found that there is a cointegrating link between the two variables, it is convenient in this paper, we choose to employ the Pooled Mean Group estimator.

The suitable lag length is selected based on the AIC lag selection criteria and all insignificant variables are eliminated. Table 5 shows the empirical results on long-run elasticities of income inequalities and poverty conditioned on other explanatory variables for the full panel of nine countries. The long-run estimates indicate that private credit has a negative non-significant impact on income inequality (column 1), but when we put the stock market indicators in the same equation such as turnover and value traded (column 2 and 3), private credit continues to have a negative impact on income inequality and become significant. This means that the coefficient on private credit is negative, reflecting the beneficial effect of financial deepening (columns 2 and 3). A 1% growth in private credit tends to reduce income inequalities by more than 0.285%. It should be noted that this result shows that the banking sector is playing an important role in private credit for small businesses and families, which are helping these companies and, having to establish their business activities and provide job opportunities for the hand unskilled work. Therefore, private credit can be a key participant in reducing income inequalities in African economies. Our findings are consistent with Beck *et al*., (2007) and Zang and Naceur (2019) which support the inequality-reducing effect of financial deepening, implying that it plays a greater role in improving income distribution among individuals.

The coefficients of the stock market, such as turnover ratio which represents stock market efficiency measurements is not significant and have a positive impact on income inequalities, which implies that stock market efficiency does not help reduce inequality (column 2). Nevertheless, the value traded are positive and significant impact on income inequality. Some empirical literature shows that in a less developed stock market, which is the case in Africa, financial development has no significant impact on inequality unless a certain level of financial development is achieved, the development of the stock market accentuates the income inequality. This result shows that the expansion of the stock market is correlated with greater income inequality in African economies. Some people with higher incomes tend to get a higher return on invested capital, given their ability to bear more risk. The movement between stock prices and income inequality can be explained by the fact that gains in the stock market tend to be concentrated at the top and financial intermediaries tend to help more the rich. Consequently, the stock market widens the long-term income gap between rich and poor in Africa.

As regards poverty, we have two variables: the poverty gap that represents the shortfall from the poverty line expressed

Table 6. Short-run Heterogeneous Causality Test

Null hypothesis	W-stat.	Zbar-stat.	Prob.
Turnover does not homogeneously cause Gini	7.877***	6.828	0.000
Gini does not homogeneously cause Turnover	4.351***	2.571	0.010
Value traded does not homogeneously cause Gini	8.646***	7.756	0.000
Gini does not homogeneously cause Value Traded	3.124	1.089	0.276
Poverty gap does not homogeneously cause Gini	53.244***	61.608	0.000
Gini does not homogeneously cause Poverty gap	19.183***	20.481	0.000
Poverty headcount does not homogeneously cause Gini	44.215***	50.705	0.000
Gini does not homogeneously cause poverty Headcount	11.052***	10.662	0.000
Private credit does not homogeneously cause Gini	10.494***	9.988	0.000
Gini does not homogeneously cause Private credit	4.927***	3.266	0.001
Value traded does not homogeneously cause Turnover	5.577***	4.051	0.000
Turnover does not homogeneously cause Value traded	6.686***	5.390	0.000
Poverty gap does not homogeneously cause Turnover	8.511***	7.593	0.000
Turnover does not homogeneously cause Poverty gap	3.258	1.251	0.211
Poverty headcount does not homogeneously cause Turnover	4.101**	2.268	0.023
Turnover does not homogeneously cause Poverty headcount	5.026***	3.385	0.000
Private credit does not homogeneously cause Turnover	3.700*	1.784	0.074
Turnover does not homogeneously cause Private credit	2.637	0.501	0.616
Poverty gap does not homogeneously cause Value traded	8.767***	7.903 –	0.000
Value traded does not homogeneously cause Poverty gap	1.825	0.479	0.632
Poverty Headcount does not homogeneously cause Value traded	4.802***	3.115	0.002
Value traded does not homogeneously cause Poverty headcount	7.958***	0.926	0.000
Private credit does not homogeneously cause Value Traded	3.173	1.148 –	0.251
Value Traded does not homogeneously cause Private credit	2.073	0.181	0.857
Poverty headcount does not homogeneously cause Poverty gap	21.860***	23.712	0.000
Poverty gap does not homogeneously cause Poverty headcount	15.758***	16.344	0.000
Private credit does not homogeneously cause Poverty gap	4.326***	2.540	0.011
Poverty gap does not homogeneously cause Private credit	8.093***	7.089	0.000
Private credit does not homogeneously cause Poverty headcount	5.997***	4.577	0.000
Poverty headcount does not homogeneously cause Private credit	6.823***	5.556	0.000

Note: *** shows significance at the 1% level, ** shows significance at the 5% level and * shows significance at the 10% level

as a percentage of the poverty line, and the poverty headcount ratio that is the percentage of the population living on less than $1.25 a day. The results reported in table **5** show that controlling stock market efficiency (column 4 and 7), private credit has a negative and significant impact on the poverty gap and one percent growth in private credit tends to decrease poverty by more than 0.0004%, but the effect on poverty headcount is not significant, these results are the same those of Donou-Adonsou and Sylwester (2016). One possible explanation is that credit institutions, especially banks, have been successful in eliminating poverty. Some banks in recent years offer microcredit services and some small-scale companies with innovative ideas may find bank loans cheaper. Larger banks have embarked on various projects from building infrastructure to agriculture, areas that are very active in the employability of the poorest and become a channel for transmitting poverty reduction. In columns 5 and 8 we found that turnover reduces poverty which

means that a 1 percent increase in the turnover ratio can reduce the poverty by a percentage point of 0.001 and 0.75, respectively. However, the value traded (column 6 and 9) reduces poverty gap with the significant effect, but increase the poverty headcount. The fact that African countries rely mostly on the banking sector, in particular on the market of loans, is confirmed by our results, the estimated coefficient on private credit is significant in most cases. However, the results show that financial development beyond credit markets can lower poverty in Africa, too. All stock market measures turn out negative and significant except in the case of headcount ratio. It supports our view that financial development affects the poor not only through enhanced loan markets but also through stock markets.

Summing up, high expected return of investments requires large capital injections, and there are large information and transaction costs associated with mobilizing savings from many small investors to undertake such investments. In that case, this can lead to environments in that wealthier families have access to a higher expected return investment, which would magnify income disparities in Africa. Therefore, financial development improves access to savings, and transaction services reduce poverty.

Although we focus on the variables of interest, regarding the control variables we have some interesting results, the real GDP per capita has a negative and significant effect on both inequality and poverty except for columns 7 and 9. This result shows that economic growth has been a key element in reducing inequality and poverty, which can be through various mechanisms such as public or private investment creating jobs and social stability. Regarding inflation, we found that in all cases inequality and poverty tend to increase, the higher inflation, the lower the purchasing power and thus leaving people in worse situations. Trade has a negative and significant effect on inequality and poverty in most cases. Finally, we have government expenditure that has a positive and significant effect on inequality and poverty, which shows that public expenditure has been directed at areas that worsen poverty and inequality.

The short-term estimation is not shown because, in the short-term private credit, turnover, and value traded are not significant in all equations, showing that the financial development effect on poverty and inequality is more efficient in the long run. But the combined short-run causality test results are reported in Table **6**. The causality test results imply that the stock market and private credit indicators Granger causes income inequalities and Poverty. A pre-requisite of the Granger causality test is that the two-time series should have a long-run association between them, or, simply put, that they should be cointegrated. This shows that there must be at least a unidirectional cause between financial indicators and inequality and poverty.

To test for the direction of causality, the pairwise Dumitrescu and Hurlin (2012) Panel causality test is used. The test examines the null hypothesis of no homogenous Granger causality against an alternative indicating causality, for at least one cross-sectional unit of the panel. The results reveal that there is bidirectional causality between turnover and inequality, turnover and poverty headcount, private credit and inequality, value traded and headcount ratio, private credit and Poverty gap, private credit and headcount ratio, which is rejected by the null hypothesis of no causality. Moreover, there is evidence of unidirectional causality between value traded and inequality, turnover and poverty gap, value trade, and poverty gap. In fact, there is evidence of a one-way causality that runs in those variables but not the other way round.

5. CONCLUSION

The aim of this article is to study the relationship in the long-term and short-term causality between private credit, stock market, inequality, and poverty across the panels of nine African countries. The robust panel PMG-ARDL method and heterogeneous non-causality test are employed for the empirical investigation.

The results of the PMG-ARDL test on long-term estimates indicate that stock market indicators, such as turnover ratio and value traded increase income inequality which the value traded affects significantly, whereas private credit reduces. As regards the impact on poverty we use two variables, poverty gap and poverty headcount, and the results show that stock markets indicators significantly reduce the poverty gap. However, the impact of sock markets indicators on poverty headcount is mixed, in which the turnover ratio significantly reduces the poverty but the value traded increases the poverty, and is not significant. The results find that financial deepening has the greatest poverty reducing effect, namely when we include it in the same equation with the stock market. Furthermore, the results of short-run causalities indicated that the stock market indicator and private credit Granger cause inequalities and poverty.

The policy implications derived from this analysis are two-fold. At first, the policymakers of the African countries should continue to use the policies that were aimed to expand the stock market development, as they have been effectively working in favor of reducing inequalities and poverty. Secondly, private credit is one of the important financial indicators that continues to contribute to African countries to fighting growth inequality and poverty disparity. Consequently, the policymakers pursue the liberalize the banking regulations that enable the people with less income, and small firms, to continue to make use of private credit, which helps them to increase their earning opportunities and create additional employment for the local community. Therefore, the banking sector can play an important role to reduce income disparities and poverty.

The crucial role that the financial development plays in reducing poverty, whether directly, through the expansion of access and financial inclusion of the portion of the population with lower income levels, or, indirectly, through the promotion of economic growth, constitutes a resilient appeal to the achievement and implementation of policies capable of guaranteeing the effective insertion of the poor in the financial system in Africa. Therefore, it is essential to develop future studies that elucidate, among other aspects, the actions and programs that should be adopted by the financial system as effective and efficient mechanisms for poverty reduction, as well as the correlation between specific financial sector policies, increasing income and reducing poverty.

Finally, future studies may look at the effect of stock market indicators and private credit on inequality and poverty at the regional level, and may also consider incorporating other potential determinants of inequality and poverty such as financial institutional quality, corruption and globalization in the model. This will therefore add further value to the body of knowledge.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interest.

APPENDIX

Table A1. Pedroni Residual Cointegration Result.

Panel (within Dimension Tests)			Group (Between Dimension Tests)		
Statistic	**Value**	**Prob.**	**Statistic**	**Value**	**Prob.**
v-statistic	- 6.782	0.000***	v-statistic	3.001	0.091*
rho-statistic	1.265	0.897	rho-statistic	- 9.807	0.000***
PP-statistic	- 4.418	0.000***	PP-statistic	5.134	0.000***
ADF statistic	-9.143	0.000***			

Note: Pedroni (2004) residual cointegration test is reported and assumes null of no cointegration. *** shows significance at the 1% level, ** shows significance at the 5% level and * shows significance at the 10% level.

Table A2. Kao Cointegration Result

	t-statistic	**Prob.**
ADF	-1.688	0.046
Residual variance	1.427	
HAC variance	0.907	

Note: *** shows significance at the 1% level, ** shows significance at the 5% level and * shows significance at the 10% level.

REFERENCES

Agnello, L., S.K. Mallick, and R.M. Sousa. 2012. "Financial reforms and income inequality." *Economics Letters* 116(3): 583-587 .

Barajas, M. A., M. R. Chami, and M. R Yousefi. 2013. "The finance and growth nexus re-examined: Do all countries benefit equally?" *International Monetary Fund Working Paper* 13(130).

Beck, T., A. Demirgüç-Kunt, and R. (2007) Levine. 2007. "Finance, inequality and the poor." *Journal of Economic Growth* 12(1): 27–49.

Beck, Thorsten, and Ross Levine. 2002. "Industry growth and capital allocation: does having a market- or bank-based system matter?" *Journal of Financial Economics* 64(2): 147-180.

Beck, Thorsten, Asli Demirguc-Kunt, and M. Martinez Peria. 2007. "Reaching out: Access to and use of banking services across countries." *Journal of Financial Economics* 85: 234-266.

Becker, G.S., and N Tomes. 1986. "Human capital and the rise and fall of families." *Journal of Labor economy* 4: 1-39.

Becker, G.S., and N. Tomes. 1979. "An equalibrium theory of the distribution of income and intergenerational mobility." *Journal of Political Economy* 87: 1153–1189.

Blau, Benjamin M. 2018. "Income inequality, poverty, and the liquidity of stock markets." *Journal of Development Economics* 130: 113–126.

Bodea, C., C. Houle, and H. Kim. 2021. "Do financial crises increase income inequality?" *World Development* 147: 105635.

Boukhatem, J. 2016. "Assessing the direct effect of financial development on poverty reduction in a panel of low-and middle- income countries." *Research in International Business and Finance* 37: 214–230.

Breusch, T. S, and A. R. Pagan. 1980. "The Lagrange Multiplier Test and its Applications to Model Specification in Econometrics." *Econometric Issue* 47(1): 239-253.

Bumann, Silke, and Lensink Robert. 2016. "Capital account liberalization and income inequality." *Journal of International Money and Finance* 61: 143–162.

Choong, C.-K., A. Z. Baharumshah, Z. Yusop, and M. S Habibullah. 2010. "Private capital flows, stock market and economic growth in developed and developing countries: A comparative analysis." *Japan and the World Economy* 22(2): 107–117.

Christopoulos, D., and P McAdam. 2017. "Do financial reforms help stabilize inequality?" *Journal of International Money and Finance* 70: 45–61.

Claessens, S., and E Perotti. 2007. "Finance and Inequality: channels and evidence." *J. Comp. Econ.* 35: 748-773.

Dabla-Norris, M. E., M. K., Suphaphiphat, M. N. Kochhar, M. F. Ricka, and E Tsounta. 2015. "Causes and consequences of income inequality: A global perspective." *International Monetary Fund staff discussion notes.*

Donou-Adonsou, F., and K. Sylwester. 2016. "Financial development and poverty reduction in developing countries: New evidence from banks and microfinance institutions." *Review of Development Finance* 6(1): 82–90.

Dumitrescu, Elena-Ivona, and Christophe Hurlin. 2012. "Testing for Granger non-causality in heterogeneous panels." *Economic Modelling* 29: 1450-1460.

Easterly, William, and Stanley Fischer. 2001. "Inflation and the Poor." *Journal of Money, Credit and Banking* 33(2): 160-178.

Ehrlich, v. M., and T. Seidel. 2015. "Regional implications of financial market development: Industry location and income inequality." *European Economic Review* 73: 85–102.

Fromentin, Vincent. 2017. "The long-run and short-run impacts of remittances on financial development in developing countries." *The Quarterly Review of Economics and Finance* 66: 196-201.

Galor, O., and O Moav. 2004. "From physical to human capital accumulation: inequality and the process of development." *Rev. Econ. Stud* 71: 1001–1026.

Gimet, C., and T. Lagoarde-Segot. 2011. "A closer look at financial development and income distribution." *Journal of Banking & Finance* 35(7): 1698–1713.

Gozgor, G. 2015. "Causal relation between economic growth and domestic credit in the economic globalization: Evidence from the Hatemi-J's test." *The Journal of International Trade and Economic Development* 24(3): 395–408.

Gravina, A. F., and M. Lanzafame. 2021. "Finance, globalisation, technology and inequality: Do nonlinearities matter?" *Economic Modelling* 96: 96-110.

Greenwood, J., and B. Jovanovic. 1990. "Financial Development, Growth, and the Distribution of Income." *Journal of Political Economy* 98(5): 1076-1107.

Haan, J., R. Pleninger, and J. Sturm. 2021. "Does Financial Development Reduce the Poverty Gap." *Social Indicators Research.*

Hamori, S., and Y. Hashiguchi. 2012. "The effect of financial deepen- ing on inequality: Some international evidence." *Journal of Asian Economics* 23(4): 353–359.

Hassan, M. K., B. Sanchez, and J.-S. Yu. 2011. "Financial development and economic growth: New evidence from panel data." *The Quarterly Review of Economics and Finance* 51(1): 88–104.

Hou, Xiaohui, Shuo Li, and Wang Qing. 2018. "Financial Structure and Income Inequality: Evidence from China." *Emerging Markets Finance and Trade* 54(2): 359-376.

Hsieh, Joyce, Ting-Cih Chen, and Shu-Chin Lin. 2019. "Financial structure, bank competition and income inequality." *North American Journal of Economics and Finance* 48: 450-466.

Im, K. S., M. H. Pesaran, and Y. Shin. 2003. "Testing for unit roots in heterogeneous panels." *Journal of econometrics* 115(1): 53-74.

Jauch, Sebastian, and Sebastian Watzka. 2016. "Financial development and income inequality: a panel data approach." *Empirical Economics* 51: 291-314.

Jerzmanowski, M., and M Nabar. 2013. "Financial development and wage inequality: Theory and evidence." *Economic Inquiry* 51(1): 211–234.

Johansson, Anders C., and Xun Wang. 2014. "Financial sector policies and income inequality." *China Economic Review* 31: 367–378.

Kao, C. 1999. "Spurious regression and residual-based tests for cointegration in panel data." *Journal of econometrics* 90(1): 1–44.

Kuznets, S. 1955. "Economic Growth and Income Inequality." *Am. Econ. Rev.* 45,: 1–28.

Law, S. H., and H. B Tan. 2009. "The role of financial development on income inequality in Malaysia." *Journal of Economic Development* 34(2): 153.

Le Goff, Maëlan, and Raju Jan Singh. 2014. "Does trade reduce poverty? A view from Africa." *Journal of African Trade* 1(2): 5-14.

Levin, A., C.-F. Lin, and C.-S. J. Chu. 2002. "Unit root tests in panel data: asymptotic and finite-sample properties." *Journal of econometrics* 108(1): 1-24.

Levine, Ross. 2002. "Bank-Based or Market-Based Financial Systems: Which Is Better?" *Journal of Financial Intermediation* 11: 398–428.

Levine, Ross, and Sara Zervos. 1998. "Stock Markets, Banks, and Economic Growth." *The American Economic Review* 88(3): 537-558.

Li, H., L. Squire, and H. Zou. 1998. "Explaining international and intertemporal variations in income distribution." *The Economic Journal* 108(446): 26-43.

Li, J., and H. Yu. 2014. "Income inequality and financial reform in Asia: the role of human capital." *Applied Economics* 46 (24): 2920–2935.

Liberati, P. 2015. "The world distribution of income and its inequal- ity, 1970–2009." *Review of Income and Wealth* 61(2): 248–273.

Liu, G., Y. Liu, and C. Zhang. 2016. "Financial development, financial structure and income inequality in China." *The World Economy*.

Lo Prete, A. 2013. "Economic literacy, inequality, and financial development." *Economics Letters* 118(1): 74–76.

Meniago, C., and S. A. Asongu. 2018. "Revisiting the finance-inequality nexus in a panel of African countries." *Research in International Business and Finance* 46: 399-419.

Naceur, Sami Ben, and RuiXin Zhang. 2016. "Financial Development, Inequality and Poverty: Some International Evidence." *IMF Working Paper* 16/32.

Odhiambo, N. M. 2009. "Finance-growth-poverty nexus in South Africa: A dynamic causality linkage." *Journal of Socio-Economics* 38: 320-325.

Paramati, Sudharshan R., and Thanh P. Thien Nguyen. 2019. "Does financial market growth improve income distribution? A comparison of developed and emerging market economies of the global sample." *Int J Fin Econ* 24: 629–646.

Pedroni, P. 1999. "Critical values for cointegration tests in heterogeneous panels with multiple regressors." *Oxford Bulletin of Economics and statistics* 61(S1): 653–670.

Pedroni, P. 2004. "Panel cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the ppp hypothesis." *Econometric theory* 20(3): 597–625.

Pesaran, HASHEM. 2007. "A Simple Panel Unit Root Test in The Presence of Cross-Section Dependence." *Journal Of Applied Econometrics* 22: 265–312.

Pesaran, M. Hashem, Yongcheol Shin, and Smith Ron P. 1999. "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels." *Journal of the American Statistical Association* 94(446): 621-634.

Rewilak, Johan. 2017. "The role of financial development in poverty reduction." *Review of Development Finance* 7: 169–176.

Roine, J., J. Vlachos, and D. Waldenström. 2009. "The long-run determinants of inequality: What can we learn from top income data?" *Journal of Public Economics* 93(7): 974–988.

Sen, A. 1976. "An ordinal approach to measurement." *Econometrica* 44(2): 219–223.

Seven, U., and Y. Coskun. 2016. "Does financial development reduce income inequality and poverty? Evidence from emerging countries." *Emerging Markets Review* 26: 34–63.

Shahbaz, M., and I. U Rehman. 2013. "Multivariate-based Granger causality between financial development and poverty: The case of Pakistan." *MPRA paper* No. 50834.

Singh, A. 2008. "Stock markets in low and middle income countries." *Centre for Business Research* (University of Cambridge).

Tecel, Ayhan, Salih Katircioğlu, Elham Taheri, and Festus Victor Bekun. 2020. "Causal interactions among tourism, foreign direct investment, domestic credits, and economic growth: evidence from selected Mediterranean countries." *Portuguese Economic Journal*.

Uddin, G. S., M. Shahbaz, M. Arouri, and F. Teulon. 2014. "Financial development and poverty reduction nexus: A cointegration and causality analysis in Bangladesh." *Economic Modelling* 36: 405-412.

Ullah, A., Kui Z., S. Ullah, C. Pinglu, and S. Khan. 2021. "Sustainable Utilization of Financial and Institutional Resources in Reducing Income Inequality and Poverty." *sustainability* 13: 1083.

Westerlund, J. 2007. "Testing for error correction in panel data." *Oxford Bulletin of Economics and statistics* 69(6): 709–748.

Wies, Simone, and Christine Moorman. 2015. "Going Public: How Stock Market Listing Changes Firm Innovation Behavior." *Journal of Marketing Research* LII: 694-709.

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