

DOES FINANCIAL DEVELOPMENT LEAD TO POVERTY REDUCTION IN NIGERIA? EVIDENCE FROM A TODA YAMAMOTO CAUSALITY TEST

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ABSTRACT

The study employed the augmented Granger causality test approach developed by Toda and Yamamoto (1995) to investigate the causal link between financial development and poverty reduction in Nigeria between 1981 and 2020 using secondary data. Two different measures of financial development namely ratio of broad money supply and private sector credit to GDP were used to capture the different channels through which finance affects poverty reduction. The study found that when monetization variable i.e. ratio of broad money supply to GDP was used as proxy there was a unidirectional causality running from financial development to poverty reduction indicating that ratio of broad money supply to GDP granger caused reductions in poverty incidence in Nigeria. However, when ratio of private sector credit to GDP was used as proxy the result showed a no causality relationship between financial development and poverty reduction suggesting that private sector credit did not contribute to poverty reduction within the period under review. The study therefore recommended the need to further deepen the financial sector in Nigeria through innovations, improved financial instruments and infrastructures, adequate regulation and supervision that will encourage the expansion and improvement of financial services in the form of payment and saving vehicle affordable to the less privileged.

Key Words: Financial Development, Economic Growth and Poverty Reduction.

JEL Classification: C32, G12, O43, I30

1. INTRODUCTION

One of the challenges that face any modern economy is the ultimate need to enhance the welfare of its citizens through the achievement and sustenance of long-term economic growth and development. In trying to achieve this lofty objective, which involves the harnessing of resources of all economic units and directing them to productive use, most developing economies now attach great importance to financial sector development (Zhuang 2009). This is because as argued by Jalilian and Kirkpatrick (2002), a sound and efficient financial system is a necessary condition for long term growth as it enhances economic performance by providing the platform for an efficient transfer of funds and resources which in turn improves the overall welfare of the people. Even the United Nations Development Programme (UNDP) in recognition of this very fact now promote financial sector development alongside with other policies as some of the key strategies to achieving the Sustainable Development Goal (SDG) of ending extreme poverty in all forms by 2030.

However, despite a great deal of effort devoted empirically in untangling the relationship between financial development, economic growth and poverty reduction, it is still unclear

especially from empirical front whether financial sector development which results from financial sector reforms really trickle down to the poor in terms of poverty reduction (Odhiambo 2010). Earlier studies in this regard reported mixed findings especially in the direction of causality. While studies such as Jalilian and Kirkpatrick (2002), Beck et al (2004), Odhiambo (2009), Jeanneney and Kpodar (2011), Dhrif (2013), Aye (2013), Donou-Adonsou and Sylwester (2016), Rewilak (2017), Bayar (2017), Dewi et al (2018), Sehwat and Giri (2018) provided evidence of financial development contributing to poverty reduction. Others such as Jeanneney and Kpodar (2006), Fowowe and Abidoeye (2012), Uddin et al (2014), Dandume (2014), Dauda and Makinde (2014), Keho (2016), Hicham (2017), Kaidi and Mensi (2017) and Kaidi et al (2019) found that financial development does not contribute to poverty reduction thus questioning the claim by Cihak et al (2012) that “economies with higher levels of financial development grow faster and experience faster reductions in poverty levels”. A few other studies such as Ho and Iyke (2017), Kheir (2018) and Majid et al (2019) provided evidence of bidirectional causality thereby suggesting a mutual impact of finance and poverty.

It is against this background that investigating the causal relationship between financial development and poverty reduction becomes very imperative especially for Nigeria considering the steady progress the country has made over the years in its financial sector. According to the Central bank of Nigeria (CBN) statistical bulletin 2022, the depth of the financial sector showed some significant improvements as the ratio of broad money supply (M_2) to GDP which measures the systematic relevance of the financial sector increased from 10.39% in 1981 to 15.41% in 2001 then to 19.82% in 2011 with a further increase to 22.93% in 2021 and in 2022 it stood at 23.95%. The banking sector also showed stronger capacity to finance real sector activities with substantial credit flow to the core private sector thus ratio of private sector credit to GDP increased from 6.15% in 1981 to 9.29% in 2001 then to 15.07% in 2011 and 18.65% in 2021 and in 2022 it increased further to 19.25%. However, in spite of the phenomenal growth in Nigeria’s financial sector, the Nigeria’s economic growth performance has been dwindling and has still remained fragile not strong enough to significantly reduce the prevailing level of poverty ravaging the country.

Accordingly, it is appropriate and timely to empirically re-examine the causal link between finance, growth and poverty reduction. Very few studies to the best of my knowledge have attempted to examine this causal link as it relates to Nigeria. Second, almost all the studies that tested for causality in the case of Nigeria used either the Engel Granger, Johansen and ARDL bound testing methods which are vulnerable to pre testing bias that involves testing for the stationary and co integrating properties of the variables. Moreover, given the fact that most of the diagnostic test for non-stationary and co integration have low power against the alternative hypothesis, wrong conclusion on integration and stationary test could lead to biased causality result. The present study however employs the augmented granger causality test developed by Toda and Yamamoto (1995) which is not prone to pre testing bias and thereby contributes to knowledge to empirically determine the direction of causality between financial development and poverty reduction in Nigeria. The use of superior Toda Yamamoto (1995) non causality test procedure is a major point of departure between the present study and existing studies.

Thus, the importance of this study lies in the fact that it will provide an insight as to whether financial sector development is a necessary and sufficient condition for higher growth and poverty reduction in Nigeria. It will also help us to identify the major channels through which the poor benefit from financial development i.e. whether indirectly by stimulating economic growth or directly by facilitating transactions and providing better access to savings and credit opportunities.

The rest of this paper is structured as follows; Section II deals with the literature review while section III describes the methodology to be used followed by a discussion of major findings and result in section IV while section V concludes the study.

2. LITERATURE REVIEW

2.1 Theoretical Literature

The theory of how the poor benefit from finance can be traced back to McKinnon (1973) conduit effect who argued that increase in interest rate increases savings through financial intermediation which in turn increases investment. The conduit effect measures the ability of the financial sector to provide transactions services and savings opportunities. According to McKinnon (1973) there are several ways by which financial sector development contributes to poverty reduction and by extension help increase the incomes of the poor. First, a well-developed financial sector creates saving opportunities for the poor. McKinnon (1973) opined that financial intermediaries are useful to the poor because they offer profitable saving opportunities which enables the poor to build up capital by accumulating scattered savings. The provision of saving facilities enables the poor to accumulate funds in a secure place overtime in order to finance anticipated future expenditure or investment. Secondly, it helps the poor to smoothen consumption when there are unanticipated fluctuations in income and expenditure thus reduces their vulnerability and minimize the negative effect it has on their long run income prospects. (DFID 2004). The financial sector therefore allows the poor to draw down accumulated savings or borrow money to start small scale businesses which eventually leads to wider access to financial services, generates more employment resulting in higher income and thus reduce poverty. Following from McKinnon's argument, financial development directly affects poverty by allowing people to self-finance their economic activities.

Another major channel by which financial development induce poverty reduction is through economic growth. This is known as the indirect channel or trickledown theory in economic literature. The trickledown theory contends that financial development causes economic growth and the poor benefits from this through the many opportunities created by the growth process. According to Aghion and Bolton (1997) a well-developed financial sector trickle down to the poor by way of wealth redistribution from the rich to the poor. This theory is based on the implied positive association between financial development and economic growth. It is supported in literature by the studies of Dollar and Kray (2002) and Datt and Ravallion (1992). Consequently, the theory that links financial development and poverty can be seen from two major perspectives; the direct channel and the indirect channel. The direct channel works through the broadening of the poor's access to financial services while the indirect channel works through economic growth or the trickledown effect whereby financial sector development trickles down to the poor in the society through its positive influence on economic growth.

2.2 Empirical Literature

On empirical front, Jalilian and Kirkpatrick (2005) using a pooled data approach with both time series and cross section dimension and comprising of 26 developing countries and 16 developed countries tested for the causal process linking financial sector growth and poverty alleviation. The empirical result of the study provided evidence that up to a certain threshold level of economic development financial sector development contributes to poverty reduction by strengthening the productive assets of the poor.

Quartey (2005) empirically sought to determine the relationship between financial development, savings and poverty reduction in Ghana using descriptive statistical analysis

approach and time series data spanning from 1970-2001. The study found that financial development granger caused poverty reduction in Ghana without causing savings mobilization. Further, the long run relationship between financial development and poverty reduction is positive and not significant.

Employing a trivariate causality model, Odhiambo (2009) examined the direction of causality between financial development, economic growth and poverty reduction in South Africa from 1960 to 2006. The empirical results of the study showed that in South Africa, economic growth granger caused financial sector development and thus leads in the process of poverty reduction both in the short run and long run. The study also found that both financial development and economic growth granger cause poverty reduction in South Africa. Odhiambo (2010) in a study titled "is financial development a spur to poverty reduction in Kenya" found a distinct causal flow from financial development to poverty reduction in Kenya. Using a trivariate causality which incorporates savings as an intermediate variable and estimated within the framework of co integration and error correction mechanism, the study found a unidirectional causality from financial development to savings and a bidirectional causality between savings and poverty reduction during the period 1968-2006.

Pradhan (2010) examined the causal relationship between financial sector development, economic growth and poverty reduction in India from 1995 to 2008 using co integration and causality econometric technique. The result of the granger causality test revealed that there is a unidirectional causality from poverty reduction to economic growth, economic growth to financial development, economic growth to poverty reduction and financial development to poverty reduction. The co integration test result on the other hand established the presence long run equilibrium relationship between financial development, economic growth and poverty reduction.

In a cross-country analysis that included Nigeria, Perez-Moreno (2011) examined the casual link between financial development and poverty reduction using a data which involved 35 developing countries. The study found a unidirectional causality which runs from financial development to poverty reduction. Aye (2013) tested for the causal relationship between financial deepening, economic growth and, poverty in Nigeria. The study found that poverty granger caused financial deepening in the case of Nigeria. Applying ARDL Bounds testing approach and vector error correction model (VECM) granger causality approach, Uddin et al (2014) examined the nexus between financial development and poverty in Bangladesh from 1975-2011. Unlike some earlier studies that found financial development contributing to poverty reduction. The study of Uddin et al (2014) found that in Bangladesh, financial sector development and economic growth does not contribute to poverty reduction. Poverty reduction was also found to be causing financial development while economic growth was weakly accelerated by financial development and poverty reduction.

Using annual times series data for a sample of six sub Saharan African countries which included Cameroon, Gabon, Ghana, Kenya, South Africa and Nigeria, Kebo (2016) re-examined the nexus between financial development and poverty reduction from 1970-2013. The result of the Toda Yamamoto causality test in the time domain indicated that financial development does not directly lead to poverty reduction rather poverty reduction leads to financial deepening especially in Nigeria and South Africa. Furthermore, the result of the causality test showed that there is a bidirectional causality between financial development and poverty reduction for Cameroon in the long run while a unidirectional causality was recorded in the case Gabon in the long run. The causality from poverty to financial development exist in the case of Nigeria both in the short and long run. The study therefore concluded that the general notion that economies with higher levels of financial development grow faster and

experience faster reduction in poverty levels does not hold for most sub-Saharan African countries.

Naceur and Zhang (2016) explored the relationship between financial development, inequality and poverty. Using a sample of 143 countries from 1961 to 2011 the study evaluated the effect of various dimensions of financial development such as financial depth, access, efficiency, stability and liberalization on poverty reduction. The result of the ordinary least squares and instrumental variable regressions performed for each of the financial variable showed that except for financial liberalization which worsened income inequality and poverty all the other dimensions of financial development reduced income inequality and poverty incidence. The empirical result further revealed that financial depth which was measured by banking sector development had a stronger significant effect on changing income distribution than when stock market development was used as proxy.

Applying instrumental variable method to a data set spanning from 2004 to 2015 to form average cross sections, Rewilak (2017) assessed the role of financial development in poverty reduction. Specifically, the study sought to determine whether financial development is a necessary condition for poverty reduction by decomposing financial development into four different categories namely; financial depth which is made up of private sector credit as a ratio of nominal GDP and ratio of broad money supply to GDP, financial access, financial instability and financial efficiency. The study found that both financial depth and financial access is a necessary ingredient to poverty reduction while financial instability and banking system inefficiency do not have any deleterious effect on poverty alleviation.

Using two different indicators of financial development, Hicham (2017) investigated the relationship between financial development and poverty reduction in 14 selected Arab countries from 1980-2014. The long run relationship between the variables was tested using Kao and Fisher panel test while the Toda Yamamoto Dolado Lutkepohl was used to test for the direction of causality. The Kao and fisher panel test established the presence of co-integration amongst the variables employed in the model while the causality test revealed that the poor people in the selected Arabic counties did not benefit from the financial sector liberalization and development and also economic growth. The finance led poverty hypothesis was rejected in all the selected countries leading the study to conclude that financial sector liberalization and developments in the Arabic countries is useless in reducing poverty rates nor improving the conditions of the poor.

Using data from 42 Sub-Saharan African countries and covering the period 1980-2012, Zahonogo (2017) studies how financial development affects poverty indicators in developing countries. Employing the system generalized method of moment suitable to control country specific effects and endogeneity, the study found that there is a financial development threshold below which financial development has deleterious effects on the poor and above which financial development alleviate poverty. The study there concluded that in Sub-Saharan African countries the relationship between financial development and poverty reduction is nonlinear thereby pointing to an inverted u curve type response.

Ho and Iyke (2017), examined the causal relationship between financial development and poverty reduction using time series data from 1985-2014. Employing Toda –Yamamoto causality test the study sought to determine whether financial development leads to poverty reduction in China. The study utilized two standard measures of financial development namely the ratio of domestic private credit by banks to GDP and the ratio of broad money supply to GDP. To measure poverty reduction the study used the household final consumption expenditure per capita growth which is also a standard proxy for poverty reduction. The

empirical findings of the study provided evidence of a bidirectional causality between financial development and poverty reduction implying that the variables are mutually exclusive. This result holds for the two proxies of financial development.

Kheir (2018) investigated the causal relationship between financial development and poverty reduction in Egypt using ARDL bounds testing and vector error correction model from 1980-2015. The result of the ARDL bounds test showed that there is a long run equilibrium relationship between financial development and poverty reduction. Testing for causality within the framework of vector error correction model, the study found a bi-directional or complimentary relationship between financial development and poverty reduction in Egypt. The study therefore recommended that government should remove policies that constrains the ability of commercial banks to grant loans and other credit facilities to borrowers.

Using time series data spanning from 1970-2015 and auto regressive distributed lag (ARDL) model, Sehrawat and Giri (2018) investigated the impact of financial development, economic growth, income inequality and poverty in India. The ARDL bounds testing procedure revealed there is a stable long run equilibrium relationship between financial development, economic growth, inequality and poverty. The result of the ARDL model also showed that financial development and economic growth helped to reduce poverty in India while income inequality and inflation worsened the poverty incidence. On the direction of causality, the empirical result showed that financial development and economic growth granger caused poverty reduction in India while a bidirectional causality existed between income inequality and poverty.

Majid et al (2018) assessed the relationship between financial development, economic growth and poverty reduction in Indonesia from 1980-2014. The study used Autoregressive distributed lag (ARDL) bounds testing procedure to test for co integration and granger causality test based on vector error correction model (VECM) to test for the direction of causality between financial development, economic growth and poverty reduction. The study utilized two standard proxies for financial development namely ratio of private sector credit and broad money supply to GDP. The ARDL bounds test revealed that there is long run equilibrium relationship between financial development and poverty while in the short run a bidirectional or complementary causal relationship exist between financial development and poverty alleviation.

Zhang and Naceur (2019) examined the link between financial development, inequality and poverty. Specifically, the study analyzed the effects of financial access, depth, efficiency, stability and liberalization on inequality and poverty using panel-data and regression. The empirical findings of the study showed that financial access, depth, efficiency and stability reduced inequality and poverty while financial liberalization increased inequality and poverty.

Using vector error correction model and time series data from 1986-2016, Onwuka and Nwadiubu (2019) examined the effect of financial development on poverty alleviation in Nigeria. The result of the study showed that financial development had a positive significant effect on poverty alleviation when credit to private sector and broad money supply were used as proxies however when interest rate spread was used as proxy the effect was negative and insignificant. In a related study Ioannou and Wojcik (2020) examined the link between finance and economic growth in the metropolitan areas of 75 countries from 2001-2015. The empirical result of their analysis provided evidence of an inverted U-shaped relationship between finance and growth.

For the period 1981 to 2018, Osuji (2020) looked at the relationship between financial development and savings in Nigeria. The study employed secondary data from the Statistical Bulletin of the Central Bank of Nigeria (CBN) that spanned 37 years and was analyzed using the Ordinary Least Square (OLS) econometric technique and the Granger Causality test. The

study found that in Nigeria, Financial Development had a positive significant link with savings while savings rate had a positive but insignificant effect on savings. Furthermore, the Granger causality test revealed that there is a unidirectional causality running from financial development and savings.

Bolarinwa et al (2021) examined whether there is a threshold between financial development and poverty in African economies using the innovative dynamic panel threshold model of Seo and Shin. The empirical results of the study showed that there exists a threshold level of financial development necessary for poverty reduction in Africa and policymakers, especially in African countries, must keep deepening their financial sector to achieve the threshold level necessary for achieving poverty reduction.

Ikubor et al (2022) investigated the impact of financial development on economic growth using OLS regression and some selected banking sector variables such as broad money supply, total bank credits, total bank liabilities and private sector credits in Nigeria from 1981 to 2021. The findings from the study agrees on the existence of a significant relationship between selected banking sector variables on economic growth.

Using fixed effects estimation technique in an unbalanced panel of 84 countries covering the period 1975 – 2014, de haan et al (2022) sought to determine whether financial development reduce the poverty gap. The result from the fixed effects estimation suggested that financial development does not have any direct effect on the poverty gap. The result further revealed that financial development leads to greater inequality which in turn worsened the incidence of poverty within period under review. Zungu et al (2022) examined the nonlinear dynamic impact of financial development on income inequality in an unconventional policy regime in a panel of 21 African countries from 1990 – 2019 using Panel Smooth Transition Regression. The study found evidence of a non-linear effect between financial development and income inequality, with the threshold found to be 21.90% of GDP, below which financial development reduces inequality in Africa. The empirical result confirms the U-shape in unconventional policy regimes and the G-J in conventional policy regimes.

Dan'asabe and Mustapha (2023) examined the effects of financial development (FD) and trade on economic growth in Nigeria using Auto-Regressive Distributed Lags (ARDL) Bound test approach. The empirical results from the study provided evidence that both FD and trade openness had positive significant effects on economic growth while the effect of FD was in the short run the effect of trade openness occurred in the long run. Mengesha and Berde (2023) examined the causal relationship between financial development and economic growth in Ethiopia from 1980 -2021 using Toda-Yamamoto causality test and the nonlinear autoregressive distributed lag (NARDL) modeling framework. The result of the Toda-Yamamoto causality test showed that there is no causal link between financial development and economic growth in Ethiopia. The result of the nonlinear autoregressive distributed lag model further revealed that economic growth drives financial development and the relationship between financial development and economic growth in Ethiopia is nonlinear and asymmetric.

Using the system Generalized Method of Moments estimator and the Pooled Mean Group estimator which was applied in a panel of 152 countries from 1980 to 2021, He and Yoo (2024) examined the impact of financial development on domestic investment across countries' income levels. The empirical findings provided evidence that financial development positively influences investment performance until a specific threshold over time and that the marginal effect of financial development on investment is more pronounced in low- and middle-income countries.

From the above empirical review, it could be seen that although a large number of empirical literatures find that financial development produces faster economic growth, it is still very unclear whether financial development alleviates poverty. This is because while theory provides conflicting postulations, earlier and existing studies in the area produced mixed and inconclusive findings thus leading the debate open for further research.

3. METHODOLOGY

3.1 Theoretical Framework

McKinnon (1973) conduit effect provide the theoretical ground for linking financial development to poverty reduction. This effect also referred to as the direct effect in literature argues that financial development positively influences poverty reduction. According to McKinnon conduit effect, financial development leads to increase in savings which is beneficial to the poor as it increases investment undertaken by the poor. This conduit effect as proposed by McKinnon can be represented thus

$$P_t = \mathcal{F}(FD_t, X_t) \text{ --- (1)}$$

Where P_t is poverty, FD_t is financial development and are other X_t control variables affecting poverty.

Jeanneney and Kpodar (2011) on the other hand introduced the indirect effect of financial development on poverty reduction through economic growth. In empirical literature, there are a number of studies on the importance of economic growth on poverty reduction (Nallari and Griffith 2011; Chhibber and Nayyar 2008 and Dollar and Kraay 2002). A general consensus among these studies is that growth has a positive and significant impact on poverty reduction. Thus, the indirect effect of financial development on poverty reduction can be represented by;

$$P_t = \mathcal{F}(Y_t) \text{ --- (2)}$$

Where P_t is poverty and Y_t is growth.

According to empirical literature, economic growth is a necessary but not sufficient condition for poverty reduction (DFID, 2004 and Dollar and Kraay, 2002). Consequently, equation (2) now becomes

$$P_t = \mathcal{F}(Y_t, X_t) \text{ --- (3)}$$

Where X represent other variables, which include financial development indicators that affect and complement economic growth in influencing poverty.

3.2 Model Specification

To determine the direction of causality between financial development, economic growth and poverty in Nigeria, a Toda and Yamamoto approach was employed and estimated within a VAR model framework. The Toda-Yamamoto causality test was favoured because it is not vulnerable to pretesting bias i.e. requiring us to test for unit root and co-integration. Besides given the fact that most diagnostic test for non-stationary have low power against the alternative hypothesis, wrong conclusions may be drawn thereby leading to biased causality result. In addition, while the popular granger causality test requires estimating a first difference VAR, augmented with an error correction term, the Toda and Yamamoto (1995) procedure requires estimating a level VAR where "d" is the maximum integration order of the variables. (Ho and Iyke 2017, He and Maekawa 2001). The model is specified first in its functional form following the theoretical framework spelt out in 3.1.

$$POV = F(M2, PSC, GDPG, INT, INF, TO) \text{ ----- (4)}$$

$$\begin{aligned}
 POV_t &= \alpha_1 + \beta_{11} \sum_{i=1}^n POV_{t-i} + \beta_{12} \sum_{i=1}^n M2_{t-i} + \beta_{13} \sum_{i=1}^n PSC_{t-i} + \beta_{14} \sum_{i=1}^n GDPG_{t-i} + \beta_{15} \sum_{i=1}^n INT_{t-i} + \beta_{16} \sum_{i=1}^n INF_{t-i} + \beta_{17} \sum_{i=1}^n TO_{t-i} + U_1 \\
 M2_t &= \alpha_2 + \beta_{21} \sum_{i=1}^n POV_{t-i} + \beta_{22} \sum_{i=1}^n M2_{t-i} + \beta_{23} \sum_{i=1}^n PSC_{t-i} + \beta_{24} \sum_{i=1}^n GDPG_{t-i} + \beta_{25} \sum_{i=1}^n INT_{t-i} + \beta_{26} \sum_{i=1}^n INF_{t-i} + \beta_{27} \sum_{i=1}^n TO_{t-i} + U_2 \\
 PSC_t &= \alpha_3 + \beta_{31} \sum_{i=1}^n POV_{t-i} + \beta_{32} \sum_{i=1}^n M2_{t-i} + \beta_{33} \sum_{i=1}^n PSC_{t-i} + \beta_{34} \sum_{i=1}^n GDPG_{t-i} + \beta_{35} \sum_{i=1}^n INT_{t-i} + \beta_{36} \sum_{i=1}^n INF_{t-i} + \beta_{37} \sum_{i=1}^n TO_{t-i} + U_3 \\
 GDPG_t &= \alpha_4 + \beta_{41} \sum_{i=1}^n POV_{t-i} + \beta_{42} \sum_{i=1}^n M2_{t-i} + \beta_{43} \sum_{i=1}^n PSC_{t-i} + \beta_{44} \sum_{i=1}^n GDPG_{t-i} + \beta_{45} \sum_{i=1}^n INT_{t-i} + \beta_{46} \sum_{i=1}^n INF_{t-i} + \beta_{47} \sum_{i=1}^n TO_{t-i} + U_4 \\
 INT_t &= \alpha_5 + \beta_{51} \sum_{i=1}^n POV_{t-i} + \beta_{52} \sum_{i=1}^n M2_{t-i} + \beta_{53} \sum_{i=1}^n PSC_{t-i} + \beta_{54} \sum_{i=1}^n GDPG_{t-i} + \beta_{55} \sum_{i=1}^n INT_{t-i} + \beta_{56} \sum_{i=1}^n INF_{t-i} + \beta_{57} \sum_{i=1}^n TO_{t-i} + U_5 \\
 INF_t &= \alpha_6 + \beta_{61} \sum_{i=1}^n POV_{t-i} + \beta_{62} \sum_{i=1}^n M2_{t-i} + \beta_{63} \sum_{i=1}^n PSC_{t-i} + \beta_{64} \sum_{i=1}^n GDPG_{t-i} + \beta_{65} \sum_{i=1}^n INT_{t-i} + \beta_{66} \sum_{i=1}^n INF_{t-i} + \beta_{67} \sum_{i=1}^n TO_{t-i} + U_6 \\
 TO_t &= \alpha_7 + \beta_{71} \sum_{i=1}^n POV_{t-i} + \beta_{72} \sum_{i=1}^n M2_{t-i} + \beta_{73} \sum_{i=1}^n PSC_{t-i} + \beta_{74} \sum_{i=1}^n GDPG_{t-i} + \beta_{75} \sum_{i=1}^n INT_{t-i} + \beta_{76} \sum_{i=1}^n INF_{t-i} + \beta_{77} \sum_{i=1}^n TO_{t-i} + U_7
 \end{aligned}$$

Where: K= lag order/length; $\alpha_1 - \alpha_7 =$ parameters; $u_t =$ Structural innovations (error term). All other variables are as defined below

Poverty (POV)

POV captures the size of poverty in a given year such that if we compare the present value of poverty to its previous values it tells us whether poverty has increased or reduced. A number of proxies for measuring poverty has been suggested in the literature such as income, headcount data for the poor as well as the Gini coefficient however in the present research study, household final consumption expenditure will be used. This is because empirical studies have shown that consumption expenditure is usually more reliably documented and quite stable when compared to income of the poor (Datt and Ravallion, 1992). Furthermore, this measure of poverty is now being widely used in empirical studies (Quartey 2005, Odhiambo 2009, Uddin *et al.*, 2014, Dewi et al 2018, Kheir 2018).

Financial Development (M₂ and PSC)

Financial development is a multidimensional concept which comprises of financial depth, access, efficiency and stability (World Bank 2014). In the present study we use the two major proxies that are often used in literature i.e. ratio of broad money supply to GDP (M₂) and ratio of private sector credit to GDP (PSC). The ratio of broad money supply to GDP (M₂) measures the depth of the financial sector. It measures the real size of the financial sector of a developing economy. The ratio of broad money supply to GDP (M₂) also called monetization variable was used in McKinnon (1973), Shaw (1973, Dauda and Makinde (2014) Ho and Iyke (2017), Dewi *et al.*, (2018), Ishaq and Marafa (2020).

Private sector credit on the other hand comprises the value of credit by financial intermediaries to the private sector. It excludes credit to the public sector but simply represent the credit channeled from savers through financial intermediaries to private businesses which may include the poor and a comparatively comprehensive measure of a credit (Beck *et al.*, 2004). It best captures the intermediation ability of the financial sector which is most times referred to as the credit channel. The credit to private sector as a proxy for financial development has been used in studies such as Beck *et al.*, (2004), Uddin *et al.*, (2014), Zahonogo (2017), Ho and Iyke (2017) and Ishaq and Marafa (2020).

Economic Growth (GDPG)

Economic growth is the increase in the total quantity of goods and services produced per person in an economy over a period of time (Ho and Iyke, 2018). Economic growth is measured by

the percentage change or the growth rate of nominal GDP measured at current basic prices. This indicator has been widely used in other studies such as Jalilian and Kirkpatrick (2002), Hicham (2017), Rewilak (2017), Dewi et al (2018).

Interest Rate Spread (INT)

Interest rate spread is the difference between borrowing and lending rates by financial institutions. The rate influences the amount of savings channeled to investment. It therefore captures the transactions cost of financial intermediation. The expected sign of (INT) should be negative. This variable was used in Onwuka and Nwadiuba (2019).

Inflation Rate (INF)

This represent the increase in the level of prices of goods and services that households consume. It is calculated from the consumer price index which measures the percentage change in prices of goods and services that household consume. It was added as a control variable since empirical evidence from literature shows that it negatively affects the well-being of the poor (Easterly and Fisher 2001). It was used in Beck *et al.*, (2004), Makinde and Dauda (2014), Rewilak (2017), and Zahonogo (2017)

Trade Openness (TO)

Trade openness is the sum of exports and imports as a share of GDP. It captures the degree of international openness. According to Makinde and Dauda (2014), trade openness (TO) is expected to benefit the poor by giving them better access to goods and services, thereby enhancing their well-being. Other studies such as Athukorala and Sen (2004) and Christaensen *et al.*, (2003) found that poverty is affected by trade openness as it affects the savings ratio of the population. Trade openness was used in the following studies. Beck *et al.*, (2004), Rewilak (2017) and Ishaq and Marafa (2020).

3.3 Data Sources

The study utilized annual time series data covering the period 1981-2020. The data was obtained from different secondary sources which includes Central Bank of Nigeria Statistical Bulletin for various years, Central Bank of Nigeria Annual Reports for various years and National Bureau of Statistics reports and publications.

4. RESULTS AND DISCUSSION OF FINDINGS

4.1 Toda Yamamoto Granger Non-Causality Test Result

Presented in the tables below is the result of the Toda-Yamamoto granger causality test which addresses the main objective of our study which is to determine the direction of causality between financial development, economic growth and poverty reduction in Nigeria.

Table 1: VEC Granger Causality/Block Exogeneity Wald Tests

Dependent variable: D(POVG)			
EXCLUDED	Chi-sq	df	Prob.
D(GDPG)	5.348315	2	0.0690
D(M2)	7.601570	2	0.0224
D(PSC)	1.128199	2	0.5689
D(INT)	0.641881	2	0.7255
D(TO)	1.128317	2	0.5688
D(INF)	2.049436	2	0.3589

Source: Author's computation using E-Views 9, 2022

In Table 1, it is observed that the coefficient of GDPG and M₂ are statistically significant at 10% and 5% respectively while the coefficient of PSC, INT, TO and INF are not statistically significant. This shows that economic growth (GDPG) granger causes household consumption expenditure which is our proxy for poverty reduction i.e there is a unidirectional causality running from growth to poverty reduction. We arrived at this conclusion based on the fact that the Chi-squares was statistically significant at less than 10% indicated by their P-values. This finding in sharp contrast to Uddin et al, (2014) who found a weak causal relationship between growth and poverty and Dewi et al, (2018) who found a bi-directional causality but agrees with the findings of Odhiambo (2009), Pradhan (2010) and Dandume (2014).

On, the causal relationship between financial development (proxied by two major indicators M₂ and PSC) and poverty reduction, the empirical result showed that the direction of causality was depended on the choice of financial development indicators. The causality test result reported in table 1 above revealed that financial development caused poverty reduction when proxied by the ratio of broad money supply to GDP (M₂) as its p-value was less than 5%. This evidence of a unidirectional causality from financial development to poverty reduction contradicts the finding of Ho and Iyke (2017) and Kheir (2018) who found a bi-directional causality between the two variables. It however supports the findings of Quartey (2005), Perez-Moreno (2011) and Sehrawat and Giri (2016).

On the other hand, when financial development was proxied by ratio of private sector credit to GDP (PSC) the test result showed a no causal relationship between financial development and poverty reduction. This indicates that credit to the private sector does not have any significant impact on household consumption expenditure (proxy for poverty reduction). This is in line with the earlier findings of Fowowe and Abidoye (2012) and Dandume (2014).

Furthermore, the estimated coefficient of the other variables (INT, TO, INF) were not significant suggesting that the null hypothesis of no causality cannot be rejected.

Table 2: VEC Granger Causality/Block Exogeneity Wald Tests

Dependent variable: D(GDPG)			
EXCLUDED	Chi-sq	df	Prob.
D(POVG)	0.466387	2	0.7920
D(M2)	5.625766	2	0.0600
D(PSC)	1.533190	2	0.4646
D(INT)	1.709204	2	0.4255
D(TO)	0.127267	2	0.9383
D(INF)	2.894938	2	0.2352

Source: Author’s computation using E-Views 9, 2022

The result in the above economic growth equation (GDPG) shows that the estimated coefficient of POV, PSC, INT, TO and INF are not statistically significant since the P-value of their chi-square are greater than 5%. This suggest that poverty reduction (POV), private sector credit (PSC), interest rate (INT), trade openness (TO) and inflation rate (INF) do not granger cause economic growth (GDPG). However, it is observed that the co-efficient of M₂ is statistically significant thereby suggesting that there is a unidirectional causality running from ratio of broad money supply to GDP (M₂) to economic growth. This is consistent with the study of Ho and Iyke (2018) who found that in Ghana financial development (proxied by ratio of money supply to GDP) granger caused economic growth which in turn caused poverty reduction.

Table 3: VEC Granger Causality/Block Exogeneity Wald Tests

Dependent variable: D(M ₂)			
EXCLUDED	Chi-sq	df	Prob.
D(POVG)	0.987181	2	0.6104
D(GDPG)	1.347193	2	0.5099
D(PSC)	3.356934	2	0.1867
D(INT)	1.197951	2	0.5494
D(TO)	2.990775	2	0.2242
D(INF)	3.301868	2	0.1919

Source: Author’s computation using E-Views 9, 2022

In the money supply equation with ratio of broad money supply to GDP (M₂) as the dependent. It is observed that the coefficients of all the variables (POV, GDPG, PSC, INT, TO, and INF) are not statistically significant indicating that the null hypothesis of no causality cannot be rejected.

Table 4: VEC Granger Causality/Block Exogeneity Wald Tests

Dependent variable: D(PSC)			
EXCLUDED	Chi-sq	df	Prob.
D(POVG)	0.611190	2	0.7367
D(GDPG)	0.097090	2	0.9526
D(M ₂)	1.546264	2	0.4616
D(INT)	0.663028	2	0.7178
D(TO)	0.367672	2	0.8321
D(INF)	0.113692	2	0.9447

Source: Author’s computation using E-Views 9, 2022

In the credit to private sector equation with dependent variable as PSC, it is observed that the coefficient of POV, GDPG, PSC, INT, TO and INF are not statistically significant implying that the null hypothesis of no causality cannot be rejected.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The study examined the causal relationship between financial development and poverty reduction in the case of Nigeria using annual time series data from 1981 to 2020 and Toda-Yamamoto causality test.

In order to capture the different aspects of financial development, two major indicators of financial development commonly used in the literature were utilized namely ratio of broad money supply to GDP which measures the ability of the financial sector to provide transaction services and saving opportunities and ratio of private sector credit to GDP which measures the ability of the financial system to channel funds from savers to productive agents and possibly the poor.

On the question of causality, the result of the Toda-Yamamoto causality test revealed that economic growth granger caused poverty reduction within the period under review thereby suggesting that financial development indirectly reduced poverty by promoting economic growth hence providing a strong empirical backing to the trickle-down hypothesis in Nigeria.

The result further revealed that the direction of causality between financial development and poverty reduction in Nigeria depended on the choice of proxy used to measure financial

development. When monetization variable i.e. ratio of broad money supply to GDP was used as proxy there was a unidirectional causality running from financial development to poverty reduction indicating that ratio of broad money supply to GDP granger caused reductions in poverty incidence in Nigeria. However, when ratio of private sector credit to GDP was used as proxy the result showed a no causality relationship between financial development and poverty reduction suggesting that ratio of private sector credit to GDP did not contribute to poverty reduction within the period under review. In essence, the study found that while the poor benefited from the financial sector's ability to facilitate transactions and provide savings opportunities, they however did not profit from increased loans and credit availability. The implication of this finding is that in Nigeria the main channel through which financial development affects poverty reduction is through the monetization variable which provides better transactions and savings opportunities to the poor.

Based on the findings above, the study recommends the need for government through the monetary authorities to further deepen the financial sector in Nigeria by fostering financial inclusion policies and implementation to a reasonable level. This will go a long way to encourage the expansion and improvement in financial services in the form of convenient payment system and saving vehicle affordable to the less privileged. This will also ameliorate access and funding impediment, improve quality, efficiency and competitiveness of the sector which will in turn lead to the increase in the range of financial services provided by the sector to the poor.

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