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Finance-Growth Nexus: Evidence from Angola

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ABSTRACT: This study examines the relationship between financial development and economic growth in Angola for the period of Q12002 to Q42018. The results show that there is evidence of a long-run relationship between financial development and real GDP per capita, when using the Bound test approach for cointegration. Furthermore, the results of the Error Correction Model (ECM) indicate that financial development has a negative impact on GDP growth when considering credit to private and broad money as proxies for financial development. On the other hand, the degree of intermediation has a positive impact on GDP growth. The Toda–Yamamoto causality test was carried out, which indicates a unidirectional causality relationship, running from real GDP per capita to a purely financial development proxy, which shows demand-following responses. Consequently, policymakers should adopt policies that sustain the benefits of financial developments for economic growth.

KEYWORDS: Autoregressive-distributed Lag, Economic growth, financial development, Angola

***JEL: C32, E44,* O55**

1. INTRODUCTION

While the empirical relationship between financial development and economic growth has been analyzed in depth, the debate about the nexus between financial development – both bank-based and market-based – and economic growth has been underway for some time, albeit with little consensus. According to Nyasha and Odhiambo (2018), the literature contains four views regarding the causality of financial development-economic growth. The first and most notable of these views is the "leading offer hypothesis", which is also known as the "finance-led growth hypothesis". According to this hypothesis, this view states that financial development is important and leads to economic growth (see, for example, McKinnon, 1973; King and Levine, 1993). The second view is the “demand-following hypothesis”, or the “growth-led financial hypothesis”, which postulates a causal flow from economic growth to financial development. It is this view that considers bank-based and market-driven financial development, although it is older (e.g., Robinson, 1952; Jung, 1986; Odhiambo, 2010).

The third view is the "feedback hypothesis", or the "bidirectional view of causality", as it is also known, which is of more interest for this paper. The feedback hypothesis assumes a two-way causal relationship between financial development and growth and thus attributes equal importance to both the financial and economic sectors (see Patrick, 1966, Greenwood and Smith, 1997). The fourth, and unpopular view, suggests that financial development and economic growth are not causally related, and that neither sector has a significant effect on the other, as defended by Lucas, (1988) and Graff (1999). It is these conflicting arguments – which are supported by the above-mentioned varied views – that warrant further research on the topic of causality for the growth of finance.

For Benczúr et al. (2019), the impact channels vary from the availability of additional financial funds to finance investment projects due to higher savings volumes, through to the more efficient reallocation of funds, which in turn increases the chance of reaching the right entrepreneurs and leads to greater productivity (for example, Beck et al., 2000; Aghion et al. 2005; Levine, 2005).

The initial empirical literature (Panizza, 2014) suggested a positive association between financial development and economic growth, where the first is measured by the amount of domestic private credit or market capitalization in relation to the gross domestic product (GDP). The dominant positive attitude towards financial expansion encouraged a sharp increase in financial penetration and the average level of private bank credit. These high levels of financial penetration, together with the recent and contemporary financial crises, have begun to question the benefits of such a degree of financial penetration (Beck, 2012).

In the case of Africa, there has been a considerable increase in the number of studies on the relationship between financial development and economic growth (see Odhiambo, 2008 and 2007; Adusei, 2013; Akinlo and Egbetunde, 2010; Ghirmay, 2004; Abu-Bader and Abu-Qarn, 2008; Baliamoune-Lutz, 2008), however, no consensus exists regarding the direction of causality between variables. The immensity of reforms implemented in sub-Saharan African countries and especially in Angola during the period under study and the conflicting results regarding the direction of causality between finance and economic growth justify this paper. Given the fact that there are not many empirical studies in this field on Angola, the findings of this paper are the main and new contribution to the literature of the financial - economic growth nexus. Accordingly, the objective of this paper is to further the understanding of the relationship between financial development and economic growth, providing evidence from Angola.

The rest of this paper is organized as follows. In Section 2 we present a review of the literature on the relationship between financial development and economic growth. Section 3 highlights the key features of financial systems in Angola. Section 4 discusses the data and the empirical model. Section 5 reports empirical findings and a detailed discussion. Finally, concluding remarks are discussed in the last section.

2. LITERATURE REVIEW

The debate on the causal relationship between financial development and economic growth has been a constant topic of discussion in the field of economics (Ang, 2008; Murinde, 2012). This debate practically started with the research of Schumpeter (1934), who proposed that differences in the level of development

of financial systems affect the differentials of economic growth between countries, which was later supported by King and Levine (1993). The impact channels range from the availability of additional financial funds to finance investment projects due to higher savings volumes, through to the more efficient reallocation of funds which increases the ability to reach the right entrepreneurs and leads to greater productivity (see, for instance, Beck et al., 2000; Aghion et al., 2005; Levine, 2005).

While Africa's ambiguous economic growth can be attributed to various factors, it is impossible to deny the fact that past barriers to international free trade and a lack of financial development are among the most prominent factors that have contributed to economic performance (Beck et al., 2011). According to Menyah et al. (2014), Africa's financial systems have developed over the past 20 years, despite the fact that many African countries still demonstrate limited economic progress, even after recent political changes which include financial liberalization and development and fresh attempts to integrate into the world market (see also Beck and Cull, 2013 and KPMG, 2015).

Nevertheless, the promise of liberalization, privatization, and the stabilization efforts of the 1980s have only been partially achieved, and the benefits of more profound, broader, and cheaper financing have yet to be realized (Beck et al., 2011). In general, Africa's financial system is typically segmented, dominated by banking, government-led, and oligopolistic, whilst facing very weak competition (Honahan and Beck, 2008; Ncube, 2007). Therefore, according to Honahan and Beck (2008), government control can be a very negative impediment, as it implies that resource allocation decisions tend to be based more on political considerations, rather than on economic viability (Boone, 2005).

According to Menyah (2014), the central point of the debate is the following: (i) whether the financial sector drives economic growth, or (ii) whether it is economic growth that explains the growth of the financial sector. The first hypothesis, which is commonly known as "supply-leading", attests that financial development is a necessary precondition for economic growth and consequently, increased financing leads to economic growth and causality ranges from financial development to economic growth. Proponents of

this hypothesis believe that the quantity and composition of financial development variables induce economic growth and directly increase savings in the form of financial assets, and consequently generate capital formation, which in turn leads to economic growth (King and Ross, 1993; Beck, 2002; Odhiambo, 2009; Pradhan et al., 2017; Osuala et al., 2013; Bayar et al., 2014; Enisan and Egbetunde, 2010).

The second hypothesis, which is commonly referred to as "demand-following", states that financial development is a consequence of, rather than leads to economic growth, and that the financial sector plays only a minor role in economic growth. In this line of thought, financial development is simply a result of growth on the real side of the economy (Robinson, 1952; Odhiambo, 2004; Enisan and Egbetunde, 2010; Shan and Morris, 2002; Athanasios and Antonios, 2012; Arayssi and Fakih, 2017). It is therefore argued that when an economy grows, more financial institutions, financial products, and services emerge in the market in response to the increased demand for financial services and consequently, as the real sector of the economy grows, the financial system develops and thereby increasing opportunities to acquire liquidity to finance investments and reduce risk. According to proponents of the “demand-following” hypothesis, the lack of financial institutions in developing countries is an indication of the lack of demand for their services (Menyah, 2014).

There are still those who believe that economic growth and financial development can complement each other, enabling the strengthening of financing and mutually causal real economic growth, where a two-way causality exists between economic growth and financial development (De Gregorio and Guidotti, 1995; Blackburn and Hung, 1998; Blackburn et al., 2005; Greenwood and Smith, 1997; Arac and Ozcan, 2014); Nyasha and Odhiambo, 2018; Ehigiamusoe, 2021a).

In the case of Sub-Saharan Africa, the conflicting evidence is also unknown. For some authors, a long-term relationship exists between financial development and economic growth, however, the direction of causality is mixed and confusing. For example, using the vector error correction model (VECM), Akinlo and Egbetumde (2010) concluded that there is indeed a long-term relationship between financial development

and economic growth in selected Sub-Saharan African countries. Their results show that Granger's financial development causes economic growth in the Central African Republic, the Republic of Congo, Gabon, and Nigeria, while Granger's economic growth leads to financial development in Zambia. However, a bi-directional relationship between financial development and economic growth has been found in Kenya, Chad, South Africa, Sierra Leone, and Swaziland.

Wolde-Rufael (2009) also found a bi-directional causality between economic growth and financial development in the case of Kenya. When analyzing the relationship in Kenya, the empirical results of Odhiambo (2008) reveals that although the causality between financial development and economic growth is sensitive to the choice of measure for financial development, the response tends to predominate when balancing demand. His study concludes that the argument that financial development leads unequivocally to economic growth can only be taken with a pinch of salt. Ghirmay (2004) found that financial development played a causal role in the economic growth of 8 of the 13 countries he invested in. ina study of Sub-Sahara African countries for the period of 1975 to 2006, Demetriades and James (2011) found that whereas bank liabilities in Sub-Saharan Africa are found to follow economic growth, the relationship between bank credit and growth is altogether absent.

There are not many empirical studies on Angola, however, according to Ferreira and Oliveira (2019), despite a profitable first decade (2002-2012), the impact of Angolan banks, which in affect represent almost the entire financial system, has been disappointing in terms of broader financial development, whether measured in terms of broad-based lending, or as a contribution to diversifying the economy away from oil. The former limitation concerns weak connections with the productive sectors and the limited contribution of banks to economic diversification or financial inclusion and strengthening. The banks in Angola do not provide much loan to agriculture or industry, although they stress the importance of lending to the real economy. In effect, these authors found that Angolan banks are net exporters of capital and that they maintain a large proportion of their assets abroad. Reis (2016) empirically analyzed the role of the banking system in the current context of Angolan development, based on the causality studies of Toda Yamamoto

(1995), using monthly data for the period of 2002 to 2013. The results obtained confirm the hypothesis which supports the existence of bidirectional causality between the banking system and economic growth. In other words, the banking system plays an important role in economic development in Angola, where the economic system "pulls" via the development of the banking system. Quixina and Almeida (2014) extend the existing literature by treating separately the oil and non-oil sectors of the economy in Angola and test for Granger causality between three variables – oil revenues, non-oil GDP and financial development for the period 1995-2012. The results show that the oil sector has been the great engine of Angolan economic growth and financial development does not seem to have a significant role in economic growth.

3. OVERVIEW OF THE FINANCIAL SYSTEM IN ANGOLA

We highlight the main resources of the financial system in Angola in this section. The financial system in Sub-Saharan Africa is generally believed to be relatively less developed and diversified when compared to other regions of the world (Akinlo and Egbetunde, 2010). As can be seen in Akinlo and Egbetunde (2010), all selected countries in Sub-Saharan Africa were lagging behind for all measures of financial development when compared to the various regions of the world. The interest rate spread that measures the efficiency of financial intermediation is also high when compared to other regions.

Up until reforms were implemented in most African countries in the mid-1980s, commercial banks dominated the banking system. These commercial banks were largely owned by the government. However, with the reforms in the 1980s, a new structure began to emerge – the emergence of non-commercial banking institutions (IMF, 2016). In the case of Angola, with the resumption of peace (after several years of civil war), in 2002, it was possible to create conditions that allowed the appearance and installation of banking institutions on the market, especially banks with foreign capital (Ferreira and Oliveira, 2019). The number of banks has grown considerably in Angola, doubling in just eight years of peace.

As an example, the increased in the number of commercial banks from 1991 to 2001 was 6, whereas 26 new banks entered the Angolan market from 2002 to 2017 (see, for instances, KPMG and Delloitte annual reports). At the same time, the number of banks owned by the government decreased significantly in Angola. Furthermore, non-banking financial institutions started to play an increasingly important role in mobilizing the economy, although the assets of these institutions are usually concentrated in government bonds or deposited in banking institutions, due to the limited range of financial instruments and investment opportunities available. Such assets were not mediated by productive investments, owing to the limited lending operation of banks and portfolio management (Ferreira and Oliveira, 2019).

The Angolan government is currently working towards integrating into the world economy through the liberalization of the financial system as the main instrument to generate high growth performance. However, despite the massive liberalization program that has started in Angola, the expected fruits of liberalization have yet to be realized. This observation can be attributed to the lack of attaining the basic prerequisites of successful financial reforms, which in turn has led to not only high and increasing inflation, but also to a deterioration in economic performance during certain years.

The study by Egbetunde (2009) showed that in Sub-Saharan Africa, most financial development indicators have decreased from their peaks in the early 1990s. The figure below shows the performance of some of the indicators of Angola's financial system from 1990 to 2018. Whereas M3/GDP reached its peak in 2009, during the period under review it appears that credit conceded to the private sector/GDP has always been on the increase, apart from a small fluctuation between 2009 and 2015 (when if attained its peak), later to attain the minimum values of the last five years in 2018. Both interest rates and the degree of intermediary services have declined in recent years.

<<<< Insert Figure 1 around here >>>

4. DATA AND THE EMPIRICAL MODEL

4.1 Data description

The data collected are on a quarterly basis, for the period of Q12002 to Q42018, originating from the World Development Indicators of the World Bank. The study tests the financial development and economic growth nexus in Angola by utilizing several measures of financial development and the set of conditioning information. The choice of the data period is shaped by data availability. Three indicators are used to measure financial development, namely: domestic credit to private as a share of GDP (CP_t) (King and Levine, 1993a; Levine and Zervos, 1996; Beck *et al*., 2000; Levine *et al.*, 2000, Menyah et al, 2014; Adusei and Nkrumah, 2013; Swami and Dharani, 2019; Ehigiamusoe, 2021b); liquid liabilities or broad money as a share of GDP (BM_t)[i] (Rousseau and Wachtel, 2000; Rioja and Valev, 2004; Levine *et al.*, 2000; Menyah et al, 2014; Adusei and Nkrumah, 2013); and domestic credit as a share of GDP or degree of intermediary services (DI_t) (Demirguc-Kunt and Degatriache, 2000, Kaminsky and Reinhart, 1999; Menyah et al, 2014; Adusei and Nkrumah, 2013; Swami and Dharani, 2019). We use growth of GDP per capita (GDP_t) as a proxy for economic growth (Calderon and Liu, 2003; Yilmazkuday, 2011; Adu et al, 2013; Samargandi, 2015).

<<<< Insert Table 1 around here >>>

To assess the strength of the relationship between financial development and economic growth, we control two macroeconomic covariates in the regressions that are also widely employed in the related literature in order to capture the importance of international factors influencing economic activity, namely: real interest rate ($Rate_t$) and trade openness ($Trade_t$) which represents the total exports plus total imports in % of the GDP. Table 1 presents the descriptive statistics for the variables used in our empirical analysis, where considerable variations in our variables across time can be observed. The correlation matrix presented in Table 2 confirms the interrelations between the indicators and suggests that all the financial variables are

positively correlated with GDP, which in turn, can lead to multi-collinearity and over-parameterization problems.

<<<< Insert Table 2 around here >>>

4.2. Methodology

The purpose of our study is to develop an empirical strategy that enables us to estimate the effects of financial development on real GDP per capita. The basic regression model that we aim to estimate is expressed in Equation (1). Whereas in Equation (1) log GDP is the dependent variable, similar equations can be written with other variables taking turns to act as the dependent variable, which allows for the possibility that causality can follow in any direction:

$$logGDP_t = a_0 + a_1 BM_t + a_2 logCP_t + a_3 DI_t + a_4 logTrade_t + a_5 Rate_t + \varepsilon_t \quad (1)$$

where GDP_t is the real Gross Domestic Product per capita, BM_t is broad money supply as a share of GDP, CP_t is the credit to private as a share of GDP, DI_t is a degree of intermediary services, which represents the domestic credit provided by the banking sector as a share of GDP, $Rate_t$ represents the real interest rate, and $Trade_t$ represents the total exports plus total imports divided by GDP. Finally, ε_t is the usual error term. Log denotes the natural logarithm. In equation 1 some variables are in logarithmic values and others are not, taking logs usually narrows the range of the variable, and in some cases by a considerable amount. In turn, this makes estimates less sensitive to outlying observations on the dependent or independent variables (Wooldridge, 2009)[ii].

In order to investigate the relationship between financial development and growth, we first analyze the stationarity properties of the series by employing the Ng-Perron (2001) unit root test, which provides robust results over the other conventional unit root tests for small samples. After the stationarity test, we proceed to investigate the long-run cointegration relationship between the variables, by employing the ARDL

Bounds test approach proposed by Pesaran et al. (2001). The functional specification represents the cointegration between financial development and economic growth, as follows:

$$\Delta logGDP_t = a_{01} + b_{11} logGDP_{t-i} + b_{21} BM_{t-i} + b_{31} logCP_{t-i} + b_{41} DI_{t-i} + b_{51} logtrade_{t-i} + b_{61} rate_{t-i} + \sum_{i=1}^{p} a_{1j}\Delta$$

$$logGDP_{t-i} + \sum_{i=1}^{q} a_{2j}\Delta\, BM_{t-i} + \sum_{i=1}^{q} a_{3j}\Delta LogCP_{t-i} + \sum_{i=1}^{q} a_{4j}\Delta DI_{t-i} + \sum_{i=1}^{q} a_{5j}\Delta logtrade_{t-i} + \sum_{i=1}^{q} a_{6j}\Delta rate_{t-i} +$$

$$\varepsilon_{1t} \qquad (2)$$

where Δ stands for the first-order differential variable and ε_t is the error term. The null hypothesis of no cointegration between the variables is examined via the F-statistic. The estimated F-statistic is usually compared with the two critical values (upper-bound and lower-bound). Theoretically, the null hypothesis of no cointegration is rejected by the condition of the F-statistic being higher than the critical values. If the estimated statistic lies between the two bounds, then the decision is rendered inconclusive. Nevertheless, if the estimated statistic is below both bounds, the null hypothesis of no cointegration is thus accepted, leading to the conclusion that there is no cointegration.

In the ARDL Bound test developed by Pesaran et al., (2001) a mixed order of integration among the regressors is acceptable for estimating the necessary statistic to determine cointegration. This feature is generally advantageous for applying cointegration with I(0) and I(1) variables in the system of equations of the ARDL Bounds Test. Accordingly, we obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates, as follows:

$$\Delta logGDP_t = a_0 + \sum_{i=1}^{p} a_{1i}\Delta\, logGDP_{t-i} + \sum_{i=1}^{q} a_{2i}\Delta\, BM_{t-i} + \sum_{i=1}^{q} a_{ij}\Delta LogCP_{t-i} + \sum_{i=1}^{q} a_{4i}\Delta DI_{t-i} +$$

$$\sum_{i=1}^{q} a_{ij}\Delta logtrade_{t-i} + \sum_{i=1}^{q} a_{6i}\Delta rate_{t-i} + \lambda ECM_{t-1} + \varepsilon_{1t} \qquad (3)$$

where the parameter λ is the speed of adjustment parameter with a negative sign, and ECM_{t-1} is the error correction term.

Finally, we go on to analyze whether there is a causal relationship between the variables by employing the Toda–Yamamoto causality test approach. Next, we investigate the direction of causality between economic growth and the variables of financial development through the use of a more powerful Toda and Yamamoto (1995) non-causality test. The Granger causality test is conventionally conducted by estimating vector autoregressive (VAR) models. Based upon the Granger Representation Theorem, Granger (1986) proves that if a pair of I(1) series are cointegrated, there must be unidirectional causation in either way. If the series are not I(1), or are integrated with different orders, then usually no test for a long-run relationship is carried out. The Toda-Yamamoto test has more superior properties than the standard Granger causality test, due to the fact that it eliminates the need to pre-test for co-integration. The Toda-Yamamoto test is used irrespective of a stationary check, as it estimates the augmented VAR model with a maximum level of integration.

We first estimate the VAR(m) model in levels and the extended VAR(m) model with a maximum order of integration number (*dmax*). We then estimate the augmented VAR (m + *dmax*) model and by employing the VAR (m + *dmax*) model, we avoid information loss through differencing. Based on augmented VAR modeling, Toda and Yamamoto (1995) introduced a Wald test statistic which asymptotically has a chi-square (χ^2) distribution, irrespective of the order of integration or the cointegration properties of the variables. This approach can be applied regardless of whether a series is I(0), I(1), or I(2), non-cointegrated, or cointegrated of arbitrary order (Rambaldi and Doran, 1996; Clarke and Mirza, 2006; Zapata and Rambaldi, 1997). The innovation of this procedure is that it does not require pre-testing for the cointegrating properties of the system and thus it avoids the traditional potential bias associated with unit roots and cointegration tests.

5. EMPIRICAL FINDINGS AND DISCUSSION

We employ a static modeling tool in the empirical analysis to investigate the relationship between financial development and real GDP per capita, employing three main explanatory variables, namely: Broad money

(BM); Credit to the private sector (CP); and Degree of intermediation (DI). Accordingly, we investigate the stationarity properties of the variables by employing the Ng-Perron (2001) unit root test, whose results are presented in Table 3. The null hypothesis for MZ_a and MZ_t tests indicates unit root, and the null hypothesis for MSB and MPT tests indicates stationary. According to Table 3, BM, LogCP, and DI variables are found to be I(0), and LogGDP, Logtrade, and Rate are found to be I(1).

<<<< Insert Table 3 around here >>>

After carrying out the causality analysis, we investigate the long-run cointegration relationships between the variables by employing the Bounds test approach, as proposed by Pesaran et al. (2001). The Bounds test approach has three main advantages in comparison to the conventional cointegration models, as follows: (i) it can be used irrespective of the integration level of regressors; (ii) it is relatively more efficient in the case of small and finite sample data sizes (Narayan and Narayan, 2004); and (iii) by applying the Bounds test approach we obtain unbiased estimates of the long-run model (Harris and Sollis, 2003). The result of the cointegration test using the bounds test approach is presented in Table 4.

<<<< Insert Table 4 around here >>>

In Table 4, the calculated F-statistic (15.069) exceeds the upper critical bound value at all significance levels. The results thus provide evidence that a long-run relationship between economic growth and financial development does indeed exist. After defining the cointegration relationship between the variables, we go on to compute the static long-term coefficients between the variables by utilizing the ARDL model.

Defining the maximum number of lags as four, and by employing the Schwarz criterion to find the optimal lag number, the ARDL (2,1,1,1,1,1) model is selected as the best fit model. The estimated coefficients and

model diagnostics are presented in Table 5, where it can be seen that credit to the private sector has a negative non-significant effect on real GDP per capita, and that the degree of intermediation has a positive and statistically significant effect on real GDP per capita at 10%, and also that the liquid liabilities or broad money as a share of GDP has a negative and statistically significant effect on real GDP per capita at 10%. In addition, a one-point increase in the degree of intermediation causes a 0.003 point increase in real GDP. Both variables reflect the loans in the economy with different results – one being significant, whereas the other is not. This result shows that loans in Angola were directed to those sectors that have not experienced a major boost in economic growth, neither in areas that are not paramount. The control variables of trade openness and real interest rate both have a positive and negative impact on real GDP per capita respectively, with the latter being significant at 10%. The coefficient of the lagged error correction (ECM_{t-1}) is - 1.324 and is significant at the 1% level. The statistically significant estimate of ECM_{t-1} shows the optimal speed of adjustment towards a long-run equilibrium path.

<<<< Insert Table 5 around here >>>

Regarding the model diagnostic, in order to check the potential issues that may lead to invalid estimations of our model, we have performed a Breusch-Godfrey Serial Correlation LM test to analyze if our model evidenced serial correlation problems. The existence of heteroscedasticity makes the variance not remain stable, which suggests that the estimation outputs are inefficient and biased, so we set a Breusch-Pagan-Godfrey heteroscedasticity test to the model. At last, we also performed a RESET test on the model to verify whether there is any sort of misspecification in our model. The results in Table 5 also support the diagnostic test in the ARDL model, where no serial correlation, heteroscedasticity, or misspecification problems are present in our specification.

Furthermore, the model stability is one major concern in ARDL analysis since the parameter's stability may change across the timespan considered. Thus, we have proceeded with the Brown et al. (1975) CUMSUM test which is based on the cumulative sum of the recursive residuals. We have also performed the CUSUM

squared test which is based on the recursive squared residuals[iii]. The cumulative sum (CUSUM) and the cumulative sum square (CUSUMsq) stability checks confirm the stability of CUSUM, albeit not for CUSUMsq (see Figures 2 and 3).

<<<< Insert Figure 2 around here >>>>

<<<< Insert Figure 3 around here >>>>

We also investigated the causal relationship between financial development and economic growth. Because some variables in the model (LogGDP, Logtrade and Rate) are not stationary in levels, it was necessary to carry out the Toda–Yamamoto (1995) non-causality test, which is valid even if the variables are not stationary. The results for Toda and Yamamoto (1995) non-causality tests are presented in Table 6. The results suggest that a unidirectional causality exists between all three proxies of financial development and economic growth, as represented by the real GDP per capita. Unidirectional causal relationship runs from real GDP per capita to all variables in the model, which is not the popular view from the empirical point-of-view regarding the finance-economic growth nexus that has been predominate in the supply-leading response (Odhiambo, 2008), although it implies demand-following responses in the finance-growth nexus in Angola, similar to those of Ono (2017), Arayssi and Fakih (2017), and Taivan and Nene (2016) for Angola.

<<<< Insert Table 6 around here >>>>

In summary, the results of the model presented above show that a relationship does indeed exist between financial development and real GDP per capita, that is to say that there is a financial development-growth nexus, which is unidirectional. To this extent, the Angolan government needs to pay attention to financial

development and should launch it to make it more efficient and use it as a tool to launch the economy at a level that is ideal for the non-financial sector, as the country is seeking financing in the financial markets.

6. CONCLUSION

This study examines the link between financial development and economic growth in the period of Q12002 to Q42018 in Angola. We employ a unit root test based on the Ng-Perron (2001) unit root test and the Bounds test approach of Pesaran et al. (2001) to investigate the long-run relationship among the variables. The ARDL test is used to investigate the short-run dynamics by applying the error correction method. The direction of causality in economic growth and financial development is examined through adopting the Toda and Yamamoto (1995) causality approach.

The results show that all series are not characterized by unit root, apart from real GDP per capita, trade openness, and real interest rate which have unit root. Our empirical evidence confirms that cointegration exists among the variables considered in this paper. More precisely, we find evidence of long-run and causal relationships between economic growth and financial development. In addition, with regards financial development, we find that the degree of intermediation increases economic growth in Angola, while credit to the private sector as a share of GDP and broad money as a share of GDP reduces economic growth – with the latter being significant. This implies that financial development is not playing a positive and significant impact on the economy in Angola. Concerning the other explanatory variables, the results indicate that a high real interest rate is significant and negatively affects economic growth and that trade openness has a positive impact on economic growth. In addition, the Toda and Yamamoto (1995) causality test indicates a unidirectional causal relationship between financial development and economic growth. The results show demand-leading responses for all the proxies of financial development.

The policy recommendation is therefore that the Angolan government should improve the country's financial development by expanding bond and securities markets, which in turn would strengthen financial

services and provide more funds for investment in research and development in modern and efficient market-related technologies. Financial markets, together with the banking sector, play a key role in economic development. This paper empirically supports the claim that Angolan banks fail to carry out the role of promoting economic growth and that Angola needs to establish a financial system to stimulate sustainable economic growth which is less dependent on natural resources.

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Table 1: Summary Statistics

	Observations	Mean	Std. Dev.	Maximum	Minimum
GDP	68	3,359.219	1419.163	5,568.799	779.730
CP	68	14.469	7.433	25.593	3.496
DI	68	14.674	10.948	33.0458	- 4.367
BM	68	28.365	10.442	46.590	12.891
Trade	68	91.099	22.817	125.072	51.639
Rate	68	33.425	30.131	98.535	11.582

Note: BM = broad money, CP = credit to private sector, DI = Degree of intermediation, Trade = Openness (all in % of GDP), GDP = Real GDP per capita in USD, Rate = real interest rate (percentual points)

Table 2: Correlations

	GDP	CP	DI	BM	TRADE	RATE
GDP	1					
CP	0.8107	1				
DI	0.5296	0.8422	1			
BM	0.7353	0.9601	0.8733	1		
Trade	- 0.3373	- 0.3933	- 0.5490	- 0.3042	1	
Rate	- 0.8521	- 0.7687	- 0.5183	- 0.7519	0.3174	1

Note: For abbreviations, see Table 1

Table 3: Ng-Perron unit roots test results

Level				
	MZ_a	**MZ_t**	**MSB**	**MPT**
LogGDP	- 0.938	-0.599	0.638	21.594
LogCP	- 8.800**	-2.054**	0.233**	2.953**
DI	- 8.414**	- 2.007**	0.238*	3.082**
BM	-33.183***	- 4.020***	0.121***	3.045***
Logtrade	0.595	0.329	0.553	24.368
Rate	-3.115	-1.165	0.374	7.741
First Difference				

LogGDP	-13.985**	- 2.379**	0.170***	2.731**
LogCP				
DI				
BM				
Logtrade	-10.332***	-2.213***	0.214***	2.607***
Rate	-6.324**	-1.754*	0.274*	3.954*

Note: Ng-Perron critical values for LogGDP, LogPC, Logtrade, DI and RATE variables; MZa, MZt, MSB and MPT respectively; for 1% significance level -13.80, -2.58, 0.17, and 1.78; for 5% significance level -8.10, -1.98, 0.23, and 3.17; for 10% significance level -5.7, 1.62, 0.275, and 4.45. Ng-Perron critical values for BM variable; MZa, MZt, MSB, and MPT respectively; for 1% significance level -23.80, -3.42, 0.14, and 4.03; for 5% significance level -17.3, -2.91, 0.17, and 5.48, with Asymptotic Critical Values – (Ng -Perron, 2001, Table 1). *** denotes 1% significance level, ** denotes 5% significance level, and * denotes 10%.

Table 4: Cointegration test results

K	**F-statistic**	**Critical Value**	
5	15.069	**I0 Bound**	**I1 Bound**
	1%	3.41	4.68
	2.5%	2.96	4.18
	5%	2.62	3.79
	10%	2.26	3.35

Table 5: ARDL estimates

Dependent variable: *LogGDP*		
Variable	**Coefficient**	**t-statistic**
$LogGDP_{t-1}$	1.517	6.037***
$LogGDP_{t-2}$	- 0.590	- 3.153***
$LogCP_{t-1}$	- 0.035	- 0.273
DI_{t-1}	0.003	1.604*
BM_{t-1}	- 0.005	- 1.780*
$LogTrade_{t-1}$	0.067	0.274
$Rate_{t-1}$	- 0.002	- 2.021*
ECM_{t-1}	- 1.324	- 4.667***
C	- 0.001	- 0.396
R^2	0.631	
Adjusted-R^2	0.579	
Diagnostic Checks	**F-statistic**	**Prob.**
χ^2SERIAL	1.103	0.339
χ^2ARCH	0.039	0.844
χ^2RAMSEY	2.658	0.108

Note: *** denotes 1%, ** 5%, and * 10% significance level. χ^2SERIAL for the LM serial correlation test, χ^2ARCH for autoregressive conditional heteroskedasticity, and χ^2RAMSEY for the Ramsey Reset test.

Table 6: The Toda-Yamamoto Non-causality test

Null hypothesis	χ^2	df	Prob.
LogCP does not Cause LogGDP	6.857	6	0.334
LogGDP does not Cause LogCP	11.725	6	0.068*
DI does not Cause LogGDP	1.876	6	0.931
LogGDP does not Cause DI	12.936	6	0.044**

BM does not Cause LogGDP	10.279	6	0.113
LogGDP does not Cause BM	21.343	6	0.002***

Note: *** denotes 1%, ** 5%, and * 10% significance level

[i] Represents the sum of money outside the banks; demand deposits, except those of the central government; time, savings and foreign currency deposits from resident sectors other than the central government.

[ii] According to this author, a variable that is a proportion or a percent can appear in either original or logarithmic form, although there is a tendency to use them in level forms, which is the case of real interest rate.

[iii] This test is justified in order to obtained a more accuracy in the analysis of the stability of our models.