AN ANALYSIS OF THE RELATIONSHIP BETWEEN ECONOMIC GROWTH AND FINANCIAL DEVELOPMENT FOR BRICS COUNTRIES

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─**Abstract** ─

Many regions across the world are in dire need of financial development and economic growth. Tentatively, a relationship between the concepts exists. However, the direction of causality is of great interest, particularly in relation to the country's level of development. Financial development in developed countries tends to be more progressive than those of developing countries. This research studies the existence of a relationship between financial development and economic growth using a sample of BRICS countries for the period of 1996 to 2016. A balanced panel data analysis was used to analyse secondary data from five BRICS countries (Brazil, Russia, India, China and South Africa). Variables used include: GDP growth, foreign direct investment, population, real interest rates, gross fixed capital formation, and domestic credit to private sector, and were selected on the availability of data. To analyse relationships between economic growth and financial development, this study used time series data obtained from the World Bank and International Monetary Fund (IMF). Findings of the study suggest that there is a long-run and short-run relationship between economic growth and financial development to some degree. BRICS countries should focus on those variables that are more suitable to generate more growth within their economy as it may differ from one economy to another when referring to financial statistics and resources.

Keywords: Financial development, economic growth, BRICS, panel data

JEL classification: A12; B1; C33; G1; O4

1. INTRODUCTION

Many countries and more specifically developing regions across the world are in dire need of financial development and economic growth. Tentatively, a relationship between the concepts exists. However, the direction of causality is of great interest, particularly in relation to the country's level of development.

Financial development in developed countries tends to be more progressive than that of developing countries. Developed countries tend to have stronger financial and growth policies, and a more sophisticated financial structure than developing countries do. In most developing countries, there seems to be a lack of strong financial systems and policies to deliver the required economic results.

Financial development, as stated by Levine (2005), Lucas (1988) and Robinson (1952), consists of improvements in generating information about potential investments and capital allocation; knowing how to monitor firms and exerting corporate governance; trading, diversification, management of risk, utilisation and combining of savings; and, eventually, easing the exchange of goods and services. Financial development is measured by factors such as size, depth, access, and the efficiency and stability of a financial system, which includes markets, intermediaries and a range of assets, institutions and regulations (World Economic Forum, 2011:13).

Economic growth, as stated by Mohr (1998:45), is an increase in the capacity of an economy to produce goods and services, comparing one period of time to another. Economic growth can be measured in nominal terms, which include inflation, or in real terms, which are adjusted for inflation. Furthermore, economic growth can be used to compare one country's economic growth to another, through measurements such as GDP, or more commonly, GDP per capita as these take into account population differences between countries (International Monetary Fund, 2007; Schumpeter, 1932:1). Therefore, analysing the relationship between financial development and economic growth is important to note how emerging economies are reacting to this relationship and the impact it has on the countries' overall growth and development in later years. There have been several studies conducted on both time series and cross-sectional data to establish the relationship between financial development and economic growth. The focus of these studies is on the long-run equilibrium and the direction of causality of the various indicators of their countries for the time range 1996 to 2016.

The BRICS countries (Brazil, Russia, India, China and South Africa) are considered as innovative building blocks in the global economy and among the leading emerging economies. This acronym came into existence in 2001 to highlight the remarkable role and importance of emerging and developing economies and only included Brazil, Russia, India and China (BRIC). In that time, it showed a great amount of growth within their specific grouping economies.

According to the International Monetary Fund (2012:1), these four countries only began to meet up in 2006 due to their geographic and demographic dimensions. The group invited South Africa to join them in 2010 and, henceforth, became known as the BRICS countries. When comparing the BRICS nations, it was found that South Africa is by far the smallest with regard to economic output. Even though South Africa shows clear indications of slow economic growth, it makes up for its influence by accounting for a third of local production in sub-Saharan Africa, and allows them to supply BRICS members with better-quality access for Africa's 1.2 billion estimated population in 2018, in addition to minerals and other resources (Statistics South Africa, 2016).

The study makes use of a balanced panel data method using annual data from 1996 to 2016 for BRICS countries. The study includes variables to assess whether an improvement in these measures would lead to more sufficient economic growth, and whether financial development impacts growth when financial systems are of better quality. Furthermore, the study uses financial development indicators such as foreign direct investment and stock market capitalisation to assess the potential of a relationship with economic growth.

The paper will consist of the following: a review of the existing literature, research methodology and empirical results, and discussions thereof. The paper is then concluded and recommendations for future research are provided.

2. LITERATURE REVIEW

2.1 Financial development and economic growth

The economic growth of an economy is not only thought of as an increase in productive capacity, but also as an improvement in the quality of life for the people of that economy. The endogenous growth theory suggested that financial intermediation has a positive effect on steady-state growth, but in addition, the government intervention in the financial system has a negative effect on economic growth (Adamopoulos, 2010:83). Economic growth can be defined as an increase in real gross domestic production (GDP), which is GDP adjusted for inflation. Economic growth is a complex problem because several factors contribute to the growth process. In the economic literature, several factors drive economic growth. These drivers include the investment ratio (Harrod-Domar model; Pagano, 1993), human capital (Romer, 1986), research and development, and trade openness (Rodrik, 1999), among others.

Although there is no single theory that combines all the drivers mentioned, there are a number of partial theories that discuss the role of various factors in determining economic growth and what can ultimately increase economic growth. In the early growth theories, a country's economic growth was determined by the rate of utilisation of the factors of production, capital and labour and the efficiency of their use (Tridico, 2010). A continued rise in per capita income therefore is attributed to continuing progress in techniques of production. As such, many theorists of economic and social development have asserted that investment in labour and equipment causes the long-term economic growth necessary for development.

The theories of Marx and Weber appear to be in opposition to one another. The theories rest upon the idea that the economic growth resulted from investment in labour and equipment. Modern theories of economic growth have been premised on the same assumption about investment and saving as sources of economic growth. One model of growth, in particular, by Domar (1946), formed the underlying principle of most economic growth strategies employed in Latin America, Africa and Asia after World War II. The Harrod-Domar model specified the level of savings and productivity of capital as the keys to promoting economic growth. The Harrod-Domar model has been heavily criticised and extended by Solow (1956), who introduced some new factors of production, which include labour, technological change and some other assumptions into the model. A growing number of empirical studies have accompanied theoretical developments (Smith, 1904). Adam Smith's growth model remained the principal model of classical growth theories and was further extended by David Ricardo (Domar, 1946).

Economists have different views regarding the importance of financial development for economic growth. According to Levine (1997), and Hicks (1969), it can be argued that financial development played an important role in forming industrialisation in England by means of facilitating the mobilisation of capital for immense works. Furthermore, Schumpeter (1934) opposed that some well-functioning banks tend to spur on technological modernisation through identifying and even funding some entrepreneurs with better opportunities for successfully applying those innovative products and production processors. This may make banks one of the most effective engines invented to spur on economic growth. As suggested by Adamopoulos (2009), financial development could be

defined as the policies, factors and institutions that lead to efficient intermediation and effective financial markets.

According to Levine (1997:688), the relationship between financial development and economic growth has become a subject of considerable empirical and theoretical research on a global scale. Commonly, countries need to improve or increase the efficiency of their current financial sectors. By doing this, it allows financial sectors to regulate and adjust the appropriate policy reforms, which will stimulate faster economic growth. As stated by Djoumessi (2009:3), an important fact of financial development is that it aims to improve the allocation of capital, by means of allocating funds to specific developments, which enables marginal productivity to be higher. Therefore, focusing the role of intermediaries on financial institutions may eventually increase the productivity of capital, which will contribute to growth by means of gathering information that places them in a position to evaluate alternative investment developments and encouraging individuals to invest in risky projects (Wurgler, 2000).

Furthermore, according to Djoumessi (2009:3), to establish a suitable financial sector policy is important for economic growth. Many organisations or financial intermediaries need to be in place to provide services such as risk management, monitoring borrowers, mobilisation of savings, exerting corporate control, acquiring information about investment opportunities, and facilitating the exchange of goods and services. It is important that economists and global economies discover factors that form part of the development of financial systems. This will lead to an improvement in the world's understanding of the differences in economic long-run growth rates, which can be observed all around the world. If those factors' underlying differences in financial development can be identified, the financial sectors can provide more effective public policy advice to those countries and potentially improve living standards (Levine, 2001:2).

Due to the importance of identifying the determinants and measures of financial development, there can be a notable increase in research into the fundamental determinants of functioning financial systems (Levine, 1999). Technology seems to be one of the central factors underlying divergence. Pagano (1993) suggests that there are three ways in which the development of the financial sector might affect economic growth under the basic endogenous growth model. Firstly, it can increase the productivity of investments. Secondly, an efficient financial sector reduces transaction costs and therefore increases the share of savings channelled

into productive investments. An efficient financial sector improves the liquidity of investments. Lastly, financial sector development can either promote or decline savings. It was also stated by Hassan (2011) that there is a positive relationship between financial development and economic growth in developing countries. For many of the countries, it showed a two-sided causality for the short term. Additionally, Ince (2011) also found that although there was a strong relationship between financial development and economic growth in the short term, there was no relationship in the long term.

Therefore, this study will measure both the short- and long term to be able to identify whether the relationship co-exists in both the short- and long term within BRICS countries.

3. METHODOLOGY

3.1 Data

For the study, a sample size of five countries consisting of BRICS countries (Brazil, Russia, India, China and South Africa) was used to analyse the relationship between financial development and economic growth. This study uses secondary panel data, which consists of time series of the variables of financial development and economic growth. The time series data are obtained from international financial statistics, the World Bank and the International Monetary Fund (IMF). The sample period consists of annual observations starting from 1996 to 2016, with a total number of 105 observations (20 years' multiplier by 5 BRICS countries). The sample period was selected based on the availability of data in all BRICS countries in order to maintain balanced panel data. The various changes in financial development and economic growth patterns will be noticed throughout this given period.

3.2 Model specification

The study used panel data models such as panel unit root test, Johansen-Fisher cointegration and vector error correction model/granger causality (Christopoulus & Tsionas, 2004; Im *et al*, 2003). Panel data, which is also known as longitudinal or cross-sectional time series data, is a dataset in which the behaviour of entities can be observed over time (Torres-Ryna, 2003:2). Generally, the link between financial development and economic growth is analysed by means of the following regression:

$$RGDP_{it} = \alpha_0 + \gamma\, FD_{it} + \beta X_{it} + e_{it} \qquad (1)$$

Where: $RGDP_{it}$ is growth in the GDP growth for country i at period t,

FD_{it} are financial development variables for country i at period t

X_{it} is a vector of control variables for country i at period t, and

α_0 and e_{it} represent the intercept and error term, respectively.

The description of all the variables used in Equation 1 is summarised in Table 1 below.

3.3 Description of variables

Table 1: Description of variables

Variable	Indicator or proxy	Description	Relationship with EG
Dependent variable:	**GDP growth (Annual %)**	Annual percentage growth rate of GDP at market prices based on constant local currency. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.	--
Explanatory and control variables:	**Foreign Direct Investment**	Foreign direct investment is the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments.	(+)
	Gross capital formation	Gross fixed capital formation (GFCF) refers to the net increase in physical assets (investment minus disposals) within the measurement period. It does not account for the consumption (depreciation) of fixed capital, and also does not include land purchases. It is a component of expenditure approach to calculating GDP.	**(+) or (-)**
	Domestic credit to private sector (% GDP)	Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, which establish a claim for repayment.	**(+) or (-)**
	Interest rate	A real interest rate is an interest rate that has been adjusted to remove the effects of inflation to reflect the real cost of funds to the borrower and the real yield to the lender or to an investor. The real interest rate of an investment is calculated as the amount by which the nominal interest rate is higher than the inflation rate	**(+) or (-)**
	Population growth	An increase in the number of people who reside in a country, state, county, or city. To determine whether there has been population growth, the following formula is used: (birth rate + immigration) - (death rate + emigration).	**(+) or (-)**

Source: World Bank (2013); Čihák, *et al*. (2013); International Monetary Fund (2012)

4. RESULTS

4.1 Results and discussion

The study found that real interest rates are positively related to economic growth in BRICS countries, while other variables such as foreign direct investment seem to have no significant effect on economic growth in the short run.

4.1.1 Descriptive statistics

Table 2 depicts a summary of the descriptive statistics for all variables used in the study for BRICS countries over a time period of 20 years. A one-unit change in GDP_GROWTH will result into an expected probability change of 0.067880 growth. Both the dependent and independent variables are a mixture of log-transformed variables; the relationship is commonly known as an elasticity in econometrics. The average GDP_GROWTH is 4.94 per cent, with a minimum of -18.05019 for interest rates and a maximum of 156.69 for domestic credit to private sector (% GDP).

VARIABLES	Mean	Median	Max	Min	Std. dev.	Skewness	Kurtosis	Jarque-Bera	Probability
TABLE 2: DESCRIPTIVE STATISTICS									
GDP_Growth (%)	4.942822	5.091984	14.23139	-7.820885	3.948845	-0.511750	3.426808	5.380020	0.067880
L_FDI	23.57469	23.90114	26.39634	20.12604	1.581017	-0.261291	2.215939	3.884320	0.143394
L_GCF	9.141161	8.916232	13.36925	5.071000	2.385790	0.282955	2.202202	4.185720	0.123334
L_POP	19.48133	19.05732	21.04438	17.57435	1.271683	0.013693	1.492784	9.941968	0.006936
INTR_RATE	11.76235	5.196634	77.61726	-18.95163	18.05019	1.713304	5.593574	80.79868	0.000000
DCTPS (% GDP)	60.46287	52.38571	156.6952	8.330000	34.35511	0.892693	3.090456	13.98155	0.000920

Source: Compiled by the authors

It is a well-known fact that time series data are subjected to a high rate of skewness. This is due to the existence of many outliers along the trend line. The shape of the distribution is discussed as follows. For all BRICS countries, the skewness is depicted as follows: GDP (-0.511750) and L_FDI (-0.261291) have negative values, which give an indication that the shape of the distribution is skewed to the left. In addition, the other four variables are positively skewed, but with very small values – the largest being 1.713304 for interest rates. The kurtosis

depicts positive sharp curves for all variables from the period 1996 to 2016 in BRICS countries.

4.1.2 Panel unit root test

The study made use of a panel unit root test in order to avoid making assumptions and conclusions that are based on statistically unauthentic relationships; therefore, the study then ensures that a stationarity test is conducted. By means of a panel unit root test, we analyse the pattern of individual time series through Figure 3 below. All series appeared to be non-stationary at level. Therefore, the study proceeded with a formal panel unit root test. The results are presented in Table 3.

TABLE 3: PANEL UNIT ROOT TEST					
VARIABLES	**LLC**	**IPS**	**ADF_FCs**	**PP_FCs**	**SIGNIFICANCE LEVEL**
GDP_GROWTH (%)					
Statistic	-7.55137	-6.90207	59.5880	197.643	
Probability	0.0000	0.0000	0.0000	0.0000	I(1)
L_FDI					
Statistic	-2.36454	-4.10256	35.3726	263.667	
Probability	0.0090	0.0000	0.0001	0.0000	I(1)
L_GCF					
Statistic	-5.36905	-3.76836	57.5440	81.3124	
Probability	0.0000	0.0001	0.0000	0.0000	I(1)
L_POP					
Statistic	-4.57909	-2.74071	25.6801	30.0937	
Probability	0.0000	0.0031	0.0042	0.0008	I(1)
DCTPS (% GDP)					
Statistics	-3.17392	-2.87180	26.8898	41.6933	
Probability	0.0008	0.0020	0.0027	0.0000	I(1)
INTR_RATE					
Statistics	-1.70165	-5.96753	51.5396	112.791	
Probability	0.0444	0.0000	0.0000	0.0000	I(1)

Source: Compiled by the authors

Table 3 shows that the null hypothesis of no unit roots for all variables can be rejected at the 5% significance level; however, the results presented show that all the time series variables that are used in the study have unit roots. It found that the variables are stationary at the first difference level. This indicates that the variables are integrated of order one at I (1). It has been confirmed that there is an

existence of a unit root for all data. The following step involves observing the possibility of a long-run relationship between economic growth and financial development making use of explanatory and control variables. Table 4 depicts the results of the Johansen cointegration test.

4.1.3 Johansen cointegration test

By making use of the Johansen cointegration test model, it allows the study to test whether the variables are cointegrated or whether the variables have a long-run relationship or not. Table 4 shows the results of the Johansen-Fisher cointegration test, with a P-value smaller than the 5% significance level; therefore, it will reject the null hypothesis, meaning that there is cointegration among the variables. It is evident that there is at least more than one cointegration vector equation as tested by the Johansen technique. A trace test indicates one cointegration equation at the 0.05 level and it denotes rejection of the hypothesis at the 0.05 level (None*). The Max-eigenvalue test indicates two cointegrating eqn(s) at the 0.05 level and denotes rejection of the hypothesis at the 0.05 level (None* and At most 1*). These results then show that there is an existence of a long-run relationship and in addition a movement in a similar direction. Since the results confirmed a long-run relationship, the study will then follow a suitable estimation technique that is the VECM (vector error correction model), which will adjust to both short-run changes in variables and deviations from equilibrium. Table 5 will depict the VECM results.

TABLE 4: JOHANSEN-FISHER COINTEGRATION TEST				
Unrestricted Cointegration Rank Test (Trace Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.577405	145.2618	95.75366	0.0000
At most 1	0.373190	67.74115	69.81889	0.0724
At most 2	0.192449	25.70103	47.85613	0.8986
At most 3	0.050760	6.463600	29.79707	0.9997
At most 4	0.019284	1.775210	15.49471	0.9974
At most 5	0.000252	0.022671	3.841466	0.8802
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.577405	77.52062	40.07757	0.0000
At most 1 *	0.373190	42.04012	33.87687	0.0043
At most 2	0.192449	19.23743	27.58434	0.3964
At most 3	0.050760	4.688391	21.13162	0.9975
At most 4	0.019284	1.752538	14.26460	0.9953
At most 5	0.000252	0.022671	3.841466	0.8802

Source: Compiled by the authors

4.1.4 Vector error correction model

The results in Table 4 confirmed a long-run relationship; the dynamic model is estimated to estimate the correction of the short-run relationship to long-run equilibrium from one period to the next. VECM granger causality estimates this correction and is presented below in Table 5. The appropriate lag length is two lags. Probability statistics show that the independent variable (L_FDI) does not primarily lead to short-run GDP growth and *vice versa*; the dependent variable GDP growth might not lead to a greater FDI growth. In addition, the other remaining variables tend to have an influence on GDP growth in the short run, so the null hypothesis cannot be rejected; rather accept the null hypothesis in the short-run statistics, concluding that there is short-run causality running from four of five independent variables with only one exclusion of a non-significant causality that flows from L_FDI to GDP_growth.

TABLE 5: VEC Granger causality/block exogeneity Wald tests			
Dependent variable: GDP_GROWTH (Annual %)			
Excluded	Chi-sq	df	Prob.
L_FDI	9.352162	2	0.0093
L_GCF	0.018711	2	0.9907
L_POPULATION	4.850039	2	0.0885
INTEREST_RATE	0.146610	2	0.9293
DCTPS	1.813678	2	0.4038

Source: Compiled by the authors

5. CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, the following are recommended: subsequently, financial development is an imperative element for economic growth; additional support and research should be dedicated towards the precise instrument by which it impacts economic growth, and countries should be able to share that among one another for global economic growth to adhere; data should be regularly updated by countries and need to ensure that the values published are accurate, so that future studies can be able to produce relevant results; positive relations between financial development and economic growth frameworks in countries' focus points should be whichever one a country lacks.

GDP growth and the financial development indicators were growing in the same direction on an aggregate basis. However, when statistically significant tests were run, it could not be concluded that differences between countries' economic growth rates could be explained by differences in their financial development indicators. The long-run and short-run statistics also gave an indication that GDP growth in the short run is not primarily influenced by FDI, but is an important factor for GDP growth in the long run.

To conclude, there is a relationship between financial indicators and growth, and that financial development is cointegrated with subsequent rates of the various variables used in the study. In addition, it was found that this is a standard implication of models of endogenous growth with financial intermediation. Lastly, governments need to regulate the domestic credit to private sector to increase the balance of payments within these BRICS countries.

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