

## **How Does Financial Development Effects on Economic Growth in BRICS Countries?\***<sup>1</sup>

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### **Abstract**

In the economy literature it is generally suggested that financial development leads economic growth for countries. This study analysis the financial development effects on economic growth for BRICS countries. Panel data analysis was used in the period of 2007-2014. According to the analysis results money and quasi money M2 as % of GDP and market capitalization of listed companies as % of GDP are effect on economic growth positively. However domestic credit to private sector as % of GDP effects on economic growth negatively for BRICS countries.

**Keywords:** BRICS countries, panel data, financial development, economic growth

**JEL Classification Codes:** C01, C23, G23, O47

### **INTRODUCTION**

Brazil, Russia, India, China and South Africa (BRICS) are classified as emerging countries. Four of these countries met as a group in 2006 but South Africa joined the group in 2010. These countries conditions such as high growth rates, economic potential and demographic structure lead to an influencing global economy. During the 2008 financial crisis, these countries maintained stability in investment and trade circumstances at the global context (Morazan et al., 2012). In this respect, sound economic conditions and economic growth of these countries is important in the global economic level.

The aim of this study is to investigate the effect of financial development on economic growth in BRICS countries by using panel data analysis in the period of 2007-2014. India and China are excluded from the analysis because of the inadequate data. This study departs from other studies which are investigated the effects of financial development on economic growth for BRICS countries in the respect of variables. For example Leitao (2010) was used ratio of total credit to GDP and deposit money banks variables. Pradhan et al. (2013) was used principal component analysis for ten financial variables. Then they obtain financial development index. Leitao (2010) and Pradhan et al. (2013) were found that financial development contributes economic growth for BRICS countries. In this study money and quasi money M2 as % of GDP, market capitalization of listed companies as % of GDP, domestic credit to private sector as % of GDP, real interest rate variables were used respectively. Also these variables were used other studies which are investigate the financial development effects on economic for European countries (Arıç, 2014; Arıç and Erkekoğlu, 2014)

### **1. Theory and Brief Literature**

There has been a wide literature in the context of linkage between financial development and economic growth. Many studies have investigated that the financial development effects on economic growth positively. This positive linkage has been generally explained by the case of developed countries which of them, without exception, have developed financial markets. Thus it has been seemed that developing financial sector lead to economic growth (Khan and Senhadji, 2000).

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Theoretically, Levine (1997) has modeled the structure of this linkage between financial development and economic growth. In this model financial markets and intermediaries reduced information and transaction costs. In this period, savings become mobilized, allocation of resources actualizes, managerial risks decrease, trade of goods and services and making contract becomes in an easily way. These opportunities of financial system bring capital accumulation and technological innovations which are effective on economic growth.

Financial development is generally measured by means of credit level and size of equity market. The reason of that the financial development has been accepted as an estimator of economic growth is that the when financial institutions predict the growth in sectors and give more credits equity markets capitalize the values of existing growth opportunities (Rajan and Zingales, 1996:2).

In the literature some studies find financial development effect on economic growth positively (King and Levine, 1993; Levine and Zervos, 1998; Khadraoui and Smida, 2012). However, Gantman and Dabos (2012) found that there is not a statistically significant relationship between financial development and economic growth in the study which they used 98 countries' variables. Al-Malkawi et al. (2012) analyzed the relationship financial development and economic growth for United Arab Emirates. According to the analysis results there is a negative and statistically significant relationship between financial development and economic growth. They explain this situation that financial system in United Arab Emirates did not still develop in the manner that it supports economic growth. Artan (2007) concluded that financial development in low-income countries affects economic growth negatively but financial developments in medium-income and high-income countries affect economic growth positively.

## **2. Data Set and Methodology**

The data of Brazil, Russia and South Africa were taken into account in the period of 2007-2014. India and China are excluded from the analysis because of insufficient data. All data were collected from the data bank of World Bank (World Bank, 2016). Within the context of studies in the literature, annual percentage growth rate of gross domestic product was determined as a dependent variable (GDP) which represents economic growth. Independent variables are determined in the respect of financial development which are real interest rate (INT), domestic credit to private sector as % of GDP (DCP), market capitalization of listed companies as % of GDP (MCLC), money and quasi money M2 as % of GDP (M2) respectively. Domestic credit to private sector represent the financial facilities provided to the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable that provide a claim for repayment. For some countries these claims include credit to public enterprises (Rashid, 2011: 29). Market capitalization also known as market value of companies is the share price time periods the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year (Rashid, 2011: 29). Money and quasi money imply the sum of currency outside banks, demand deposits other than those of the central government, and the time period, savings, and foreign currency deposits of resident sectors other than the central government. In this respect money supply is generally called M2 (World Bank). Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator. Theoretical expectations in the link of between financial development and growth, there is a positive correlation between independent variables (except interest rate) and dependent variable. A negative correlation is only expected between the interest rate and growth. Panel data analysis was used by using data of three countries for eight years including the period of 2007-2014. Accordingly the model used in the study is in Equation 1.

$$GDP_{it} = \beta_0 + \beta_1 DCP_{it} + \beta_2 MCLC_{it} + \beta_3 M2_{it} + \beta_4 INT_{it} + u_{it} \quad (1)$$

## **3. Analysis Process**

Pooled OLS model can be used if all observations are homogenous in panel data analysis. But if observations comprise unit and/or time effects, it can be convenient to use fixed effects or random effects models (Yerdelen Tatoğlu, 2012: 163-164). In this respect likelihood ratio (LR) test was used for the model in order to determine whether there are unit and time effects. In LR test, it is examined

whether standard error of unit effects is equal to zero ( $H_0: \sigma_u=0$ ). Also, LR test is used to examine whether standard error of time effects is equal to zero ( $H_0: \sigma_\lambda=0$ ) (Yerdelen Tatoğlu, 2012: 170). If unit and time effects are not determined in LR test, pooled OLS model can be used. Conversely if unit and/or time effects are determined in test results, it can be said that the model is one sided or two sided.

**Table 1: LR Test**

	Unit Effect	Time Effect
$\chi^2$	0.00	10.53
<b>prob.</b>	1.0000	0.0006

The results of LR test show that there is an only time effect in the model. For this reason, the model is one sided. Hausman specification test is used to determine whether time effect is fixed or random. Hausman test implies that if there is no correlation between error components ( $u_i$ ) and explanatory variables ( $x_{kit}$ ), both fixed effects and random effects estimators are appropriate. However, if there is correlation between error components and explanatory variables, random effects estimator is inappropriate. In Hausman test, null hypothesis is set up in the way that there is no correlation between error components and explanatory variables (Hill et al., 2011: 559). It can be said that random effects are appropriate when there is not a correlation between  $u_i$  and  $x_{kit}$ , and fixed effects are appropriate when there is a correlation between  $u_i$  and  $x_{kit}$  (Gujarati, 2003: 650).

**Table 2: Hausman Test**

$\chi^2$	9.72
<b>prob.</b>	0.0454

Hausman test results show that time effects are fixed. In this way, analysis is made in accordance with one sided fixed effects model.

After these findings, model was examined in the scope of variation from basic assumptions. One of these assumptions is constant variance (homoscedasticity) assumption. Constant variance assumption implies that while unit values of explanatory variables change, variance of error term remains fixed. If this assumption does not valid, model includes heteroscedasticity (Wooldridge, 2012: 93). Modified Wald Test was used to examine this assumption.

**Table 3: Test for Heteroscedasticity**

Modified Wald Test	
$\chi^2$	7.26
<b>prob.</b>	0.0641

Heteroscedasticity results imply that there is no heteroscedasticity. Constant variance assumption is valid. Other basic assumption is autocorrelation assumption; there is no correlation between error terms of independent variables (Wooldridge, 2012:353). If this assumption does not occur, it means that there is correlation between error terms of independent variables. Durbin-Watson test of Bhargava, Franzini and Narendranthan test and Baltagi-Wu LBI test was used to examine this assumption. Because values obtained for both tests are less than 2, it can be said that there was auto-correlation in the model of fixed effects.

**Table 4: Test for Autocorrelation**

Modified Bhargava et al. Durbin-Watson Test	Baltagi-Wu LBI Test
1.1346279	1.6327019

Another assumption is about correlation between units. In studies such as domestic and regional economies, neighborhood effects can show spill-over in themselves. In such cases, correlations have spatial view rather than temporal view (Greene, 2012: 389). This assumption is tested through

Pesaran's Test. According to the Pesaran test statistics and probability values, there is no correlation among units.

**Table 5: Test for Correlation Between Units**

Pesaran's Test of Cross Sectional Independence	
<i>prob.</i> 1.9542	

According to the results of analysis, there is only autocorrelation problem in the model. In order to solve this problem, standard errors which are resistant to deviations from assumptions were produced by using method of Parks-Kmenta.

**Table 6: Analysis Results**

Explanatory Variables	Coef.	z-statistics	p-value
<i>INT</i>	-0.0703	-1.08	0.282
<i>M2</i>	0.1449	1.69	0.091***
<i>MCLC</i>	0.0436	2.17	0.030**
<i>DCP</i>	-0.1238	-2.06	0.039**
<i>Y<sub>2008</sub></i>	1.0569	0.59	0.557
<i>Y<sub>2009</sub></i>	-8.6491	-7.23	0.000*
<i>Y<sub>2010</sub></i>	0.1176	0.09	0.926
<i>Y<sub>2011</sub></i>	0.2754	0.18	0.854
<i>Y<sub>2012</sub></i>	-1.0036	-0.67	0.504
<i>Y<sub>2013</sub></i>	-1.5612	-1.07	0.286
<i>Y<sub>2014</sub></i>	-2.6928	-1.74	0.082***
<i>Cons.</i>	1.2490	0.44	0.658
<b>Wald chi2: 102.06</b>			
<b>Prob. 0.0000</b>			

**Not:** (\*) significant at %1 level, (\*\*) significant at %5 level, (\*\*\*) significant at %10 level.

According to the results of analysis, the impact of INT variable on growth is negative but it is statistically insignificant. Coefficient of M2 has a positive impact on economic growth as expected with the theory and this effect is statistically significant. According to this coefficient, 1 unit increase in M2 gives rise to 0.14% increase in growth. MCLC variable has a positive and statistically significant effect on growth. This result is coherent with the theory. 1 unit increase in MCLC leads growth rising to 0.04%. Coefficient of DCP variable has a negative and statistically significant effect on economic growth in contrast with the theory. 1 unit increase in DCP decreases economic growth to 0.12%. According to the results of the analysis in which the impacts of years are seen, 2009 and 2014 years have negative and statistically significant effect on economic growth. Other years have statistically insignificant effect on economic growth.

## CONCLUSION

Economic conditions of BRICS countries are investigated in many studies in different economic respects. This study is analyzed the financial development effects on economic growth for BRICS countries in the period of 2007-2014 by using panel data analysis. According to analysis results, Domestic Credit to Private Sector as % of GDP effects economic growth negatively. This result is adverse to the theoretical expectations. The reason of this unexpected result can be explain that domestic credit to private sector is not used in growth-based areas. Market Capitalization Rate of Listed Companies effect on economic growth positively but this effect has a low degree. This result is coherent with the theory. This result can be explain by Rajan and Zingales (1996) findings that developments in equity markets capitalize values of available growth facilities and so it creates a positive impact on economic growth. Money and Quasi Money, M2 has a positive effect on economic

growth in BRICS countries. It can be said that increase in monetization level and usage level of financial systems by individuals in the economy increase economic growth.

In this respect leading domestic credit to productive fields which are provide economic growth is important for BRICS countries. Also equity markets can be improved for increasing of market capitalization rate of listed companies effect on economic growth for BRICS countries.

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