Financial Development and Economic Growth in BRICS Countries and Turkey: A Panel Data Analysis

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Abstract

In the last few decades, although there have been many studies examined the relationship between financial development and economic growth, it seems that no consensus has been reached due to the diversity of variables and the methods used in the analyses. This article examines the relationship between financial development and economic growth (GDP) by using panel data analysis for BRICS Countries and Turkey. The analysis covers 21 years between 1996-2016. Variables used for financial development are Morgan Stanley Capital International Index (MSCI), Credits (CREDIT), money supply (BMONEY), foreign trade (TRADE).

According to the result of the analysis; MSCI is the only variable that statistically significant and so affects GDP positively both in the long-term and the short-term. BMONEY and TRADE variables are statistically significant in the short-term, but not in the long-term. While TRADE affects GDP positively, BMONEY affects growth negatively in the short-term. CREDIT is not statistically significant neither in the short-term nor in the long-term. There is unidirectional causality from MSCI to GDP, from GDP to MBROAD, from MSCI to TRADE and from MBROAD to TRADE. There is not a causality between MBROAD and MSCI, while there is a bidirectional causality between TRADE and GDP. Therefore, it is not certain if financial growth is the determinant of economic growth for selected variables and the countries in the period of 1996-2016.

Keywords: Economic Growth, Financial Development, Panel Data Analysis, BIRCS Countries, Turkey.

BRICS Ülkeleri ve Türkiye'de Finansal Gelişme ve İktisadi Büyüme: Bir Panel Veri Analizi

Öz

Son birkaç on yılda, finansal gelişme ile ekonomik büyüme arasındaki ilişkiyi inceleyen çok sayıda çalışma olmasına rağmen, kullanılan değişkenler ve yöntemlerdeki çeşitlilik nedeniyle tam bir fikir birliğine ulaşılamamıştır. Bu çalışmada, BRICS Ülkeleri ve Türkiye için finansal gelişme ve ekonomik büyüme (GDP) arasındaki ilişki incelenmiştir. Analiz, 1996-2016 yılları arasındaki 21 yıllık dönemi kapsamaktadır.

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Finansal gelişme için kullanılan değişkenler, Morgan Stanley Capital International Index (MSCI), krediler (CREDIT), para arzı (BMONEY), dış ticaret (TRADE)'tir.

Analiz sonucuna göre; MSCI istatistiksel olarak anlamalı olup hem uzun hem de kısa dönemde GDP'yi olumlu yönde etkileyen tek değişkendir. BMONEY ve TRADE değişkenleri uzun vadede istatistiksel olarak anlamlı değil iken, kısa dönemde anlamlı olduğu görülmüştür. TRADE, kısa dönemde GDP' yi pozitif yönde etkilerken, BMONEY negatif yönde etkilemektedir. CREDIT hem kısa vadede ve uzun vadede istatistiksel olarak anlamlı değildir. Nedenselliğin yönüne bakıldığında; MSCI'den GDP'ye, GDP''den MBROAD'a, MSCI'dan TRADE'e ve MBROAD'dan TRADE'e doğru tek yönlü ilişki bulgulanmıştır. MBROAD ve MSCI arasında herhangi bir nedensellik yokken, TRADE ve GDP arasında iki yönlü bir nedensellik olduğu bulgulanmıştır. Buna göre seçilmiş değişkenler ve ülkeler için 1996-2016 periyodunda; finansal gelişmenin, iktisadi büyümenin belirleyicisi olduğunu kesin olarak söyleyemeyiz.

Anahtar Kelimeler: İktisadi Büyüme, Finansal Gelişme, Panel Veri Analizi, BRICS Ülkeleri, Türkiye.

Introduction

The primary purpose of the researchers on economic growth is to discover the factors, which improve the level of the economic activity that enhance the wealth of the countries. Financial development as the most an important factor affecting economic growth has been the subject of many researchers within the last few decades. However, no definitive conclusion has been reached regarding the relationship between financial development and economic growth due to selected variables, the methodology used, development levels of countries, and timeframes chosen.

Research on relations of FD and EG originated from Schumpeter (1934), who illustrated the importance of implementation of new technologies by financial intermediaries and the effects of relations between financial institutions and private enterprises on economic activities. With this respect, a well-structured financial system leads to technical innovations and growth eventually.

Robinson (1952) called the attention to the direction of the causality between FD and EG. He argued that EG cause to FD. Empirically, Goldsmith (1969) revealed a significant correlation between FD and EG under the conditions of imperfect market situation and so asymmetric information and transaction costs. He stressed the importance of the innovative technologies that are used for the financial purpose to eliminate the side effects of asymmetric information that causes of inefficient allocation of savings or financial sources and tracking of investments.

Gurley and Shawn (1955) pointed out that capital accumulation stems from "dept accumulation". He argued that EG could be interrupted in case of auto-financing or another word direct financing in the absence of financial intermediaries. The primary function of financial intermediaries is to create

their debt by attracting loanable funds of economic units who have expenditure surplus and allocate them to the economic units who have expenditure deficit.

McKinnon (1973) and Shaw (1973) elicited financial liberalisation debates by arguing that the resources directed to investments can be expanded by removing the restrictions on savings imposed by the government, thus stimulating EG by increasing the investment. As a result, the increase in saving means that the financial system expands and "deepen" as named by Shaw in his researched in 1973 called "Financial Depth in Economic Development".

The research of Gurley and Shaw (1955), Goldsmith (1969), McKinnon (1973), Shaw (1973), and later the contributions of King and Levine (1997), Greenwood and Smith (1997) became sources of inspiration for researchers. All underlined the crucial role of financial system in strengthening intermediation which helps to improve FD cause of EG by lowering the financial costs stem from the transaction, asymmetric information and monitoring.

Today, among the theorists, there are those who think that FD has a passive role in the economic development process. For example, Lucas (1988) argues that the effects of FD on EG are exaggerated. In parallel with this, Levine (1997) pointed out that he did not find a clear consensus on the correlation between FD and EG in the literature survey and compilation studies conducted by researchers such as Gerald Meir, Dudley Seers and Nicholas Stern of the pioneering development economies.

Newly released empirical researchs put forward contrary results of strong relation concerning FD and EG. For instance, Nili and Rastad (2007) present that the FD has negligible, even negative, impact on growth. Loayza and Ranciere (2006) differentiated between the short-term and long-term effect of FD on EG. For instance in their study, it was shown that there is a remarkable positive long-term relationship between financial intermediaries and EG, but In contrast to that, it was revealed that there is a significant negative relation in the short-term.

Deidda and Fattouh (2002) argued that due to differences in income levels of countries, the way of the effecting of FD to EG would not be similar and so they suggested "a non-linear", and "possibly non-monotonic" relation for further investigation. Some of the researchers as Rioja and Valev (2004), put forward the similar findings as well. Moreover, as Arcand et al. (2012) argued that in high-income countries, the economy could be negatively affected as a result of "an excessive amount of finance" when FD surpasses a particular threshold point.

Various other efforts of the latest empirical study focus on the interactions of countries integrated into the global market to boost their growth. Financial integration has seen as a catalyst to share the risks internationally, reduce the volatility of business cycles and so affect EG. (Mishkin, 2007; Prasad et al., 2003; Kose et al., 2006)

As briefly mentioned there is no common consensus, between FD and EG, for the reasons such as differences in development levels of countries, selected financial variables and methodologies.

1. Literature Review

Numerous empirical studies have been conducted to test theoretical developments that contradict each other using different techniques. Literature is summarised in Table 1 below.

Researcher(s)	Method(s)	Results
Gurley and Shaw (1955)	Theoretical study	They emphasised the necessity of a relationship between FD and EG and argued that the services provided by the advanced financial system facilitate the relationship between investors and savings.
Goldsmith (1969)	Inter-country study for 35 countries. Correlation analysis	There is a positive relationship between the size of the financial system and EG.
Jung (1986)	VAR analysis for 56 developed and developing countries.	Uni-directional causality from FD to EG for the developing countries, but from EG to FD in developed countries.
Benecivenga and Smith (1991)	Inter-country study 35 countries	There is a positive relationship between the size of the financial system and EG..
King and Levine (1993)	Inter-country study for 80 countries	All indicators of FD are strongly linked to EG, physical capital accumulation and economic efficiency.
Obstfeld (1994)	Theoretical study	Liquid stock markets are positively associated with EG, but integration with international capital markets is not related to the savings rate of the private sector.
Benecivenga at al. (1995)	Theoretical study	There is a strong positive link between stock market liquidity and EG., productivity gains and capital accumulation.
Jayaratne and Strahan (1996)	Panel data analysis for 50 US states	The increase in the quality of the loans of the banks led to faster growth.
Levine (1997)	Cross-section test	FD affects EG through capital accumulation and technological innovations.
Rajan and Zingales (1998)	Time series analysis for a large country community on firm and industry basis.	FD has a considerable impact on EG. An enhanced financial structure strengthens the competitiveness of foreign-financed industries.
Levine and Zervos (1998)	Inter-country panel data analysis for 42 states.	Well-developed banking system and stock market liquidity positively correlated with Capital accumulation, productivity growth and EG.
Levine et al. (2000)	Cross section test and dynamic panel data analysis for 74 selected countries.	Development of financial intermediaries has a positive and significant effect on EG by total factor productivity growth.
Kang and Sawada (2000)	Time series analysis for selected 20 countries.	Based on Endogenous Growth Model; FD and commercial liberalisation accelerate EG by increasing the marginal utility of human capital investments.
Khan and Senhadji (2000)	Panel data analysis for 159 countries.	FD has a positive effect on EG, but the magnitude of the effect diverse according to indicators of FD; frequency of the figures and the structure of the relationship and the estimation technique.

Researcher(s)	Method(s)	Results
Kar and Pentecost (2000)	Co-integration, VECM, Granger Causality Tests A case of Turkey	The direction of causality changes according to the selected indicators. However, the general trend is from EG to FD.
Ünalmış (2002)	Co-integration, VECM, Granger Causality Tests. A case of Turkey	In the short run, there is unidirectional causality from FD to EG and a long-run bidirectional causality.
Shan and Morris (2002)	Causality tests for 19 OECD countries and China	FD affects EG.
Al-Yousif (2002)	Granger causality test and panel data analysis for 30 developing countries.	There is a bi-directional causality relationship between FD and EG.
Muslumov and Aras (2002)	Panel data analysis, Sims' causality test based on Granger for 22 OECD countries	The development of the stock market cause of EG through stock market capitalisation. There is no difference in the short-term and long-term.
Carlin and Mayer (2003)	Cross-section test for OECD Countries.	"There is a strong relation between the structure of countries' financial systems, the characteristics of industries, and the growth and investment of industries in different countries."
Beck and Levine (2004)	Panel data analysis for selected 40 countries	They emphasised the importance of FD in the course of EG.
Rioja and Valev (2004)	Dynamic panel data analysis for 74 countries.	In countries where FD is high, productivity growth increases EG. In countries where FD is low, EG is driven by capital accumulation.
Ndikumana (2005)	Panel data analysis for 99 Countries.	The development of financial intermediation affects EG by increasing investments.
Shan and Jianhong (2006)	VAR analysis. A case of China	There is a bi-directional causality relationship between FD and EG.
Artan (2007)	Panel data analysis for 79 Countries.	In underdeveloped countries, FD negatively affects EG.
Kandır et al. (2007)	Johansen co-integration and EC Test. A case of Turkey	FD does not affect EG. However EG has a positive effect on EG.
Abu-Bader and Abu-Qarn (2008)	VAR Analysis for selected countries located in the Middle East and North Africa	In Israel, there is a uni-directional causality from EG to FD, while in others from FD to EG.
Yücel (2009)	Co-integration analysis, Granger causality. The case of Turkey	There is bi-directional causality between FD and EG.
Akkay (2010)	Granger causality test for Turkey	There is a bidirectional causality between FD and EG from 1989 to 2001. However, there is unidirectional causality from EG to FD after the period 2001.
Kar et al. (2011)	Panel data analysis, Granger causality tests. MEAN Countries	The direction of causality between FD and EG is not clear.
Hassan et al. (2011)	Panel data analysis for 168 countries.	There is a positive relationship between FD and EG in developing countries. There is bi-directional causality in most of the countries.

Researcher(s)	Method(s)	Results
Soytaş and Kucukkaya (2011)	VAR analysis, Granger causality test. A case of Turkey	There is not causality in either direction between FD and EG in the long run.
Menyah et al. (2014)	Panel data analysis for 21 African countries	FD and trade liberalisation do not have a significant effect on EG.
Karamelikli and Kesingöz (2017)	VAR, Granger causality and Toda Yamamoto test. The case of Turkey	There is no clear relationship between FD and EG.
Moyo, et al. (2018)	Nonlinear Autoregressive Distributed Lag Model. The case of Brazil.	When the banking sector is taken as an indicator of FD, FD has adverse effect on EG; On the contrary, the stock market has a positive effect on EG.

Table 1: Literature Review

2. Data Sets, Variables and Modelling

When the literature is examined, it is seen as monetary and credit variables, and sometimes capital market variables are used as indicators of FD. Lynch (1996:7) recommends the use of monetary variables, credit-related variables and capital market variables together as the indicators of FD. Therefore, in this article, "Broad money (% of GDP)" as the monetary variable which is presented by MBROAD, "Domestic credit provided by the financial sector (% of GDP)" as the credit variable presented by CREDIT and "MSCI Indexes" as the capital markets variable presented by MSCI were used to measure the effect of FD. Foreign Trade presented as TRADE is used as a control variable.

The date sets of GDP, BMONEY, CREDIT, TRADE and MSCI which covers 21 years period between 1996 and 2016 for Brazil, India, Russia, China, South Africa and Turkey were obtained from the databases of World Bank and Morgan Stanley.

Functional expression of the model showing the relationship between financial development and economic growth is given as below. (Levine, 1997, Levine et al., 2000)

$$GDP = f(MSCI, CREDIT, BMONEY, TRADE) \quad (1)$$

GDP : Growth rate,
MSCI : Morgan Stanley Capital International Index,
CREDIT : Domestic credit provided by the financial sector,
BMONEY : Broad money supply,
TRADE : Foreign trade;

The model for testing the relationship between financial development and economic growth is given as in Equation (2).

$$GDP_{it} = a + \beta_1 MSCI_{it} + \beta_2 CREDIT_{it} + \beta_3 BMONEY_{it} + \beta_4 TRADE_{it} + u_{it} \quad (2)$$

Where a is the fixed term, and the β coefficients indicate the relationship between the dependent variable and the independent variables, i $(i = 1 \ldots . N)$ shows countries, and u_{it} is the error term.

3. Methodology and Findings

In the econometric analysis, it is investigated whether MSCI, CREDIT, BMONEY, TRADE which are the selected variables of FD, are the determinants of EG. For this purpose, firstly the cross-section dependence of the series is examined by Breusch-Pagan (1980), Pesaran (2004) CD_{LM} tests. Then, after analysing the stationarity of the series with the help of CADF the second-generation unit root test, Westerlund and Edgerton structural brakes co-integration test analysis reveals a long-run relationship between variables and also structural brakes stem from external macroeconomic shock. The long and short-term relationship and direction of variables are investigated with PMG estimator. Finally, Dumitrescu Hurlin Panel Causality Test was used to determine whether the relationship between the variables is unidirectional or bidirectional.

Unit root and co-integration analyses have gained considerable importance in the literature in recent years. However, the choice of unit root and co-integration tests required for panel data analysis is an essential factor to consider the existence of cross-section dependence and homogeneity. Ignoring cross-section dependence and homogeneity in the analysis can cause serious problems. For this reason, it is vital the cross-section dependence and homogeneity before the analysis (Pesaran et al., 2008). According to results of CD-Test and homogeneity; panel unit root test, co-integration test and causality test are selected. For this reason, the CD-Test and homogeneity test will be first completed in the study.

Pesaran (2004) CD_{LM}, Pesaran (2004) CD_{LM2} and Pesaran et al. (2007) CD_{LMadj} tests were developed for cross-sectional dependence. The Breusch-Pagan (1980) and Peseran (2004) CD_{LM} tests are preferred in case of the time dimension (T) is larger than the cross-sectional dimension (T>N); Peseran (2004) is used if both the time dimension and the cross-sectional dimension are large; Peseran et al. (2007) CD_{LMadj} is prefered if the cross-sectional dimension is larger. Therefore, Breusch-Pagan (1980), Peseran (2004) CD_{LM} and Peseran (2004) are suitable to determine the cross-sectional dependence for this analysis.

The zero hypothesis (H_0), which presents "cross-sectional dependence does not exist" is tested against the alternative hypothesis (H_A) which presents "cross-sectional dependence exists in the model". If the probability value is less than 5%, it means that the null hypothesis is rejected, which indicates the existence of cross-sectional dependence.

While investigating the homogeneity of the model; the zero hypothesis (H_0), which presents "the model is homogeneous" is tested against the

alternative hypothesis (H_A) which presents "the model is not homogeneous ". If the probability value is less than 5%, it means that the null hypothesis is rejected, which indicates the model is heterogeneous.

$GDP_{it} = a + \beta_1 MSCI_{it} + \beta_2 CREDIT_{it} + \beta_3 BMONEY_{it} + \beta_4 TRADE_{it} + u_{it}$	**Stat.**	**Prob.**
Delta_tilde	4.348	0.000***
Delta_tilde_adj	4.882	0.000***

*Notes: *** denote heterogeneity at 1% significance level.*

Table-2: Homogeneity (Delta) Test Result of the Model

According to the homogeneity test results, which is seen in Table 2, the basic hypothesis was rejected. This finding implies that the model contains heterogeneity. Therefore, this result requires the use of test methods that consider heterogeneity in subsequent tests.

	Breusch-Pagan 1980 LM		Pesaran 2004 CD_{LM}		Pesaran 2004 CD	
	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.
GDP	32.467	0.006***	3.189	0.001***	-2.240	0.013**
MSCI	33.726	0.004***	3.419	0.000***	-1.717	0.043**
Credit	33.863	0.004**	3.444	0.000***	-2.120	0.017**
BMoney	24.764	0.053*	1.783	0.037**	-2.368	0.009***
Trade	26.721	0.031**	2.140	0.016**	-2.316	0.010***

*Notes: ***, ** and * stand for cross-sectional dependence at the significance level of 1%, 5% and 10% respectively.*

Table-3: CD Test Results of the Variables

According to the results of the CD-Tests developed by Breusch, Pagan 1980, Pesaran 2004 CD_{LM} and Pesaran 2004, which is seen in Table 3, the probability values are less than 5%. These results show the existence of cross-section dependence for all of the variables in the scope of the research. For this reason, the stationary of the variables is examined by CADF (Cross-section Augmented Dickey-Fuller) the second-generation panel unit root test that provides more reliable results in the existence of cross-section dependence.

The hypothesis of the CADF panel unit root test;

H_0: Unit root exists.

H_1: Unit root does not exist.

	CIPS Stat.	**CIPS Stat.**
	I(0)	I(1)
GDP	-1.957	-3.131*
MSCI	-2.20	-3.549*
Credit	-1.317	-2.843*
Bmoney	-1.513	-2.724*
Trade	-2.185	-2.924*

Notes: CADF Panel Statistic Unit Root Critical Values, -2.57 (1%), -2.33 (5%) ve -2.21 (10%) (Pesaran 2007, table II(b), p:280)

Table 4: CADF Panel Unit Root Statistics

According to the results of CADF panel unit root test, which is seen in Table 4, the null hypothesis for variables at the **statistical significance level** has not been rejected. In other words, unit root exists for all variables. When the first order differences of the variables were calculated, the null hypothesis was rejected for all the series, and it is determined that the variables are stationary. Since the integration order of variables is I (1), the long-term relationship between variables can be examined. Therefore, Westerlund and Edgerton (2008) the structural brakes co-integration analysis is used in this research.

Westerlund and Edgerton (2008) test was developed by following the unit root tests of Schmidt and Phillips (1992), Ahn (1993) and Amsler and Lee (1995) based on Lagrange Multiplier (LM). At the same time, this test takes cross-section dependence and structural brakes, while permitting homoscedasticity (different scatter) and serial correlation (autocorrelation). For this reason, Westerlund and Edgerton (2008) test is an appropriate method for this research due to the time series covering 2007-2008 the years of crisis and consider the cross-section dependence. The Westerlund and Edgerton (2008) co-integration test also allows us to see structural breaks in different dates for each country in the fixed term and the slope, and the null hypothesis of the test is that there is no co-integration

Westerlund and Edgerton (2008) test has two statistics. Zφ (N) is used for cross-section dependence and heterogeneity, and Zτ (N) statistic is used for cross-sectional dependence and homogeneity.

Model	**Z_{φ}(N) Statistics**	**Prob.**	**Z_{τ}(N) Statistics**	**Prob.**
Regimeshift (slope)	-4.009	0.000***	-1.417	0.078*
Level shift (constant term)	-2.819	0.002***	-0.603	0.273
Dates of Structural Brakes	**Regimeshift**		**Level shift**	
Brazil	2004		2004	
Russia	2008		2008	
India	2007		2007	

China	2007	2007
South Africa	2009	2009
Turkey	2009	2009

*Notes: *** and * denote co-integration at the significance level of 1%, 10% respectively.*

Table 5: Westerlund and Edgerton Structural Brakes Co-integration Test Results

According to Westerlund and Edgerton (2008) co-integration test results which is seen in table 5; there is co-integration in constant term and slope. On the other hand, in view of the structural breaks in the countries, it is seen that the global crisis started in 2007, except for Brazil, was correctly estimated. The PMG estimator proposed by Pesaran, Shin and Smith (1999), which takes heterogeneity and cross-section dependence into consideration, is used to estimate co-integration coefficients that show long-term relationships. The PMG estimator allows error correction model coefficients, which integrate short-term/long-term relationships, to be differentiated between units. Unlike the FMOLS and DOLS estimators, the PMG estimator also provides dynamics of adaptability between short-term and long-term.

Co-integration Coefficients	
MSCI	0.004 (2.59) ***
CREDIT	-0.008 (-0.33)
BMONEY	-0.035 (-1.15)
TRADE	0.038 (1.51)
Error Correction Coefficients	
MSCI	0.030 (4.08)***
CREDIT	-0.150 (-1.52)
BMONEY	-0.095 (-1.95)**
TRADE	0.166 (3.93)***
Error Correction Term (EC)	-0.815 (-5.42)***
Fixed Term	4.396 (3.35)***

*Notes: ***, ** indicate that the variables are significant at the significance level of 1% and 5% respectively.*

Table 6: Co-integration Estimation Results

According to the results of the PMG estimator, which is seen in Table 6, MSCI is the only variable that statistically significant and affects the GDP positively in the long-term and short-term. Money supply (BMONEY) and foreign trade (TRADE) variables, which are statistically insignificant in the long-term, are statistically significant in the short-term. On the other hand,

MSCI and TRADE variables affect GDP positively, BMONEY variable affects GDP negatively. The CREDIT variable is statistically meaningless in the long-term as it is in the short-term. According to the error correction results; the long-term error coefficient (EC), as expected, has negative direction and is statistically significant. This finding shows that 81.5% of the imbalances in the GDP due to an external shock are disappeared in a year. In other words, the imbalances caused by shocks disappear entirely after 1.23 years and the system rebalances.

In this study, the causality relation among the variables will be examined by Dumitrescu and Hurlin (2012) analysis, which is considered heterogeneity. The most important advantages of this method are: it is implemented in case of unbalanced datasets; when the size of the time dimension (T) is larger than the cross-section dimension (N); in case of the existence and non-existence of the cross-sectional dependence (Dumitrescu and Hurlin, 2012: 1457). In this test, the causality relation between Y and X is analysed using the following linear model:

$$y_{it} = a_i + \sum_{k=1}^{K} \beta_0^{(k)} \, x_{it-1} + \sum_{k=1}^{K} \beta_1^{(k)} \, y_{it-1} + \varepsilon_{it} \qquad (14)$$

Where K is the optimal lag length and the most critical limitation of this model is that the series are stationary. In the Dumitrescu and Hurlin (2012) test, to test the null hypothesis based on the claim that there is no causality; individual Wald statistics $W_{N,T}$ are calculated for each cross section, then their arithmetic mean is taken to reach the Wald statistic ($W_{N,T}^{HNC}$) of the panel. Dumitrescu and Hurlin (2012) recommend using the asymptotic distributed test statistic when T>N, while using semi-asymptotically distributed (Z_N^{HNC}) test statistic when T<N.

$$Z_{N,T}^{HNC} = \sqrt{\frac{N}{2K}} \left(W_{N,T}^{HNC} - K \right) \qquad (15) \quad ;$$

$$Z_{N,T}^{H,N,C} = \frac{\sqrt{N}[W_{N,T}^{HNC} - N^{-1} \sum_{i=1}^{N} E(W_{i,T})]}{\sqrt{N^{-1} \sum_{i=1}^{N} Var(W_{i,T})}} \qquad (16)$$

Dumitrescu and Hurlin (2012) use the Monte-Carlo simulation to calculate test statistics and the probability values for these statistics.

Null Hypothesis:	**W-Stat.**	**Zbar-Stat.**	**Prob.**
MSCI does not homogeneously cause GDP	5.41575	2.63175	0.008***
GDP does not homogeneously cause MSCI	2.24431	-0.10289	0.918
MBROAD does not homogeneously cause GDP	2.69558	0.28623	0.774
GDP does not homogeneously cause MBROAD	5.55593	2.75262	0.005***
TRADE does not homogeneously cause GDP	4.38430	1.74236	0.081*
GDP does not homogeneously cause TRADE	8.22586	5.05484	0.000***
MBROAD does not homogeneously cause MSCI	2.24551	-0.10186	0.918
MSCI does not homogeneously cause MBROAD	2.64252	0.24047	0.810

Null Hypothesis:	**W-Stat.**	**Zbar-Stat.**	**Prob.**
TRADE does not homogeneously cause MSCI	1.64134	-0.62282	0.533
MSCI does not homogeneously cause TRADE	6.39014	3.47195	0.000***
TRADE does not homogeneously cause MBROAD	1.86874	-0.42673	0.669
MBROAD does not homogeneously cause TRADE	5.38346	2.60391	0.009***

*Notes: *** and * indicate casualty at the significance level of 1%, 10% respectively.*

Table 7: Dumitrescu Hurlin Panel Causality Test Results

Dumitrescu and Hurlin panel causality test result, which is seen in Table 7, reveals that there is unidirectional causality from Morgan Stanley Capital International Index (MSCI) to economic growth (GDP), from GDP to broad money supply (MBROAD); from MSCI to foreign trade (TRADE) and from MBROAD to TRADE. There is a bidirectional causality between TRADE and GDP. There is not a causality between MBROAD and MSCI.

4. Conclusion

In this study, the relationship between financial development and economic growth in the BRICS countries and Turkey was examined by using annual data for the 1996-2016 period. The indicators of financial development are "Broad money (% of GDP)" as the monetary variable, "Domestic credit provided by the financial sector (% of GDP)" as the credit variable and "MSCI Indexes" as the capital markets variable. Foreign Trade was used as a control variable.

Primarily, the cross-section dependence of the series was examined by the tests of Breusch-Pagan (1980), Pesaran (2004) CD_{LM}. These results showed the existence of cross-section dependence for all of the variables in the scope of the research. Therefore, the stationary of the variables was examined by CADF (Cross-section Augmented Dickey-Fuller) the second-generation panel unit root test that provides results that are more reliable in the existence of cross-section dependence. According to the CADF panel unit root test results, it was determined that unit root exist for all variables. When the first order differences of the variables were calculated, it is determined that the variables are stationary. Therefore, Westerlund and Edgerton (2008) the structural brakes co-integration analysis was used to examine the long-term relationship between variables. Accordingly, it was found co-integration in fixed term and slope. Moreover, given the structural brakes in the countries, it was seen that the global crisis started in 2007, except for Brazil, was correctly estimated by Westerlund and Edgerton (2008) co-integration test. Afterwards, The PMG estimator, which considers heterogeneity and cross-section dependence, was used to be estimated co-integration coefficients that show long-term relationships. According to the results of the PMG estimator, it was detected that;

(1) MSCI the capital market variable is the only variable that statistically significant and affects the GDP positively in both long-term and short-term.

(2) While money supply (BMONEY) and foreign trade (TRADE) variables are not statistically significant in the long-term, but significant in the short-term.

(3) In the short-term, while TRADE variable affects GDP positively, BMONEY variable affects GDP negatively.

(4) The CREDIT variable is not statistically significant neither in the long-term nor in the short-term.

(5) According to the error correction results; the long-term error coefficient (EC), as expected, has negative direction and is statistically significant. This finding shows that 81.5% of the imbalances in the GDP due to an external shock are disappeared in a year. In other words, the imbalances caused by shocks disappear completely after 1.23 years and the system rebalances.

The causality relations among the variables were examined by Dumitrescu and Hurlin (2012) analysis. According to the test result;

(6) There is uni-directional causality from Morgan Stanley Capital International Index (MSCI) to economic growth (GDP); from GDP to broad money supply (MBROAD); from MSCI to foreign trade (TRADE); from MBROAD to TRADE.

(7) There is not a causality between MBROAD and MSCI,

(8) There is a bidirectional causality between TRADE and GDP,

Therefore, it is not certain if financial growth is the determinant of economic growth for selected countries and variable in the period of 1996-2016.

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Özet

1980'li yılların ortalarından itibaren, uluslararası finansal ve ticari liberalizasyonun, birçok ülke için ekonomik büyümeyi teşvik eden önemli bir politika reçetesi haline geldiği görülmektedir. Finansal liberalizasyonun finansal gelişmeyi ve bunun da iktisadi büyümeyi teşvik edeceği postulatıyla, özellikle gelişmekte olan ülkelerde uluslararası finansal ve ticari serbestleşmeyi içeren politikalar uygulanmaya başlanmıştır. Bu bağlamda iktisadi büyümeyi etkileyen önemli faktörlerden birisi olan finansal gelişme, son otuz yılda birçok araştırmanın konusu olmuştur. Ancak iktisadi büyüme ile finansal gelişme arasındaki ilişki üzerine yapılan çalışmalarda; seçilen değişkenler, araştırmaya konu olan ülkeler, kullanılan analiz yöntemleri, seçilen zaman kesitindeki farklılıklar nedeniyle kesin bir ortak sonuca varılamadığı görülmektedir.

Literatür tarandığında finansal gelişmenin göstergesi olarak para arzı, krediler ve bazen de sermaye piyasası değişkenlerinin kullanıldığı görülmektedir. Lynch (1996:7), finansal gelişmenin göstergeleri belirlenirken para piyasası ve sermaye piyasası değişkenlerinin birlikte alınmasının daha doğru sonuçlar üreteceği görüşündedir. Bu çalışmada parasal değişken olarak, M2Y para arzının GSYİH'ya oranı; kredi değişkeni olarak, finansal sektör tarafından üretilen yurt içi kredilerin GSYİH'ya oranı; sermaye piyasası değişkeni olarak ise "Morgan Stanley Capital International" (MSCI) endeksi kullanılmıştır. İthalat ve ihracat toplamının GSYİH'ya oranı ise kontrol değişkeni olarak modele alınmıştır. Çalışma, BRICS

(Analiz, Brezilya, Rusya, Hindistan, Çin, Güney Afrika) ve Türkiye ülkelerini ve 1996-2016 yılları arasındaki 21 yıllık dönemi kapsamaktadır.

Amprik analize homojenlik testi ile başlanmış ve modelin heterojen yapıda olduğu tespit edilmiştir. Sonrasında Breusch-Pagan (1980), Pesaran (2004)CD, Pesaran (2004) CD_{LM} testleri ile yatay kesit bağımlılığına bakılmış ve yata kesit bağımlılığının olduğu tespit edilmiştir. Yatay kesit bağımlılığında daha güvenilir sonuçlar veren CADF (Cross-sectionally Augmented Dickey Fuller) ikinci nesil panel birim kök testi ile tüm kesitlerin durağanlığı incelenmiş ve değişkenlerin seviyede birim köklü olduğu sonucuna varılarak, birinci sıra farkları alınmak suretiyle durağan hale getirilmiştir. Değişkenleri bütünleşme sıraları I(1) olduğundan, uzun dönem analizinde Westerlund ve Edgerton (2008) yapısal kırılmalı eş-bütünleşme testi kullanılmıştır. Westerlund ve Edgerton (2008) eş-bütünleşme testi sonuçlarına göre; sabit terimde ve eğimde eş-bütünleşme olduğu kabul edilmiştir. Diğer yandan ülkelerdeki kırılmalara bakıldığında Brezilya dışında 2007'de başlayan küresel krizinin doğru tahmin edildiği görülmüştür. Uzun dönem ilişkiyi gösteren eş-bütünleşme katsayılarının tahmin edilmesi için heterojenliği ve yatay kesit bağımlılığını dikkate alan, Pesaran, Shin ve Smith (1999) tarafından önerilen PMG tahmincisi kullanılmıştır. PMG tahmincisi sonuçlarına göre uzun dönemde sadece sermaye piyasası değişkeni (MSCI) istatistiki olarak anlamlı olup, GSYİH'yı pozitif yönlü etkilemektedir. Hata düzeltme modeli sonuçlarına göre ise; uzun dönem hata katsayısı (EC) beklenildiği üzere negatif yönlü ve istatistiki olarak anlamlıdır. Bu bulgu dışsal bir şok nedeniyle GSYİH'da meydana gelen dengesizliklerin %81.5'i bir yılda yok olmaktadır. Diğer bir ifadeyle şokların neden olduğu dengesizlik 1.23 yıl sonra tamamen ortadan kalkmakta ve sistem yeniden dengeye gelmektedir. Diğer yandan uzun dönemde istatistiki olarak anlamsız olan para arzı (BMONEY) ve dış ticaret (TRADE) değişkenleri kısa dönemde istatistiki olarak anlamlı olarak tespit edilmiştir. Buna göre sermaye piyasası ve dış ticaret değişkenleri iktisadi büyümeyi pozitif yönde, para arzı değişkeni ise negatif yönde etkilemektedir. Kredi değişkeni ise hem kısa dönemde hem de uzun dönemde istatistiki olarak anlamsız olduğundan aralarında ilişki olmadığı sonucuna varılmıştır. Panel nedensellik analizinde, heterojenliği dikkate alan Dumitrescu ve Hurlin (2012) testi kullanılmıştır. Dumitrescu ve Hurlin (2012) panel nedensellik testi sonuçlarına göre; MSCI sermaye piyasası değişkeninden iktisadi büyümeye doğru tek yönlü; büyümeden para arzına doğru tek yönlü; MSCI indeksinden dış ticarete doğru tek yönlü; para arzından dış ticarete doğru tek yönlü nedensellik tespit edilmiştir. Dış ticaret ile büyüme arasında ise çift yönlü bir nedensellik tespit edilirken, para arzı ile MSCI indeksi arasında ise herhangi bir nedensellik ilişkisi tespit edilememiştir. Buna göre, 1996-2016 döneminde, Brezilya, Rusya, Hindistan, Çin, Güney Afrika ve Türkiye için yapılan analizde, finansal büyümenin, iktisadi büyümenin belirleyicisi olduğu kesin olarak söylenememektedir.