The Effect Of Financial Development On Economic Growth: Panel Data Analysis

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Abstract

In this study, the effect of financial development on economic growth was searched for the most rapidly developing countries(emerging markets)(Brazil,Russia,India,China and Turkey,BRIC-T) via panel data analysis by using the annual data of the period from 1989 to 2010. Foreign direct investments and trade openness which were thought to have effects on the growth were included in the analysis.According to empirical evidence derived from the study made with panel data analysis it was found that the effect of financial development on economic growth was positive and statistically significant in line with theoretical expectations.The evidence thateven foreign direct investments and openness contributed to the growth positively was also found.

Keywords:Financial Development, Economic Growth, BRIC-T, Foreign Direct Investment, Trade Openness.

Jel Codes: E49, F19, G29

1.INTRODUCTION

An increase in financial instruments and becoming of these instruments more commonly available in a country is defined as a financial development.In other words, financial growth

means the development of financial markets (Erim,2005). Financial growth is the change of financial system in terms of size and structure. However, financial deepening expresses the share of money supply in national income and it becomes a measure for financial growth and financial instrument variety(Saltoğlu,1998). Financial growth can be expressed as a channel that transforms the savings to the investment in financial changing process.

In its literature, great contributions of the financial markets and instituations to the economic growth process of the countries in many ways are emphasized and this constitutes the subjects of many ampirical studies.In the studies it is generally stated that a financial system which performs its financial functions would contribute to the economic growth in long term.18Smoothly running financial markets in economy supports the capital accumulation, helps the small funds to direct to the big investments, encourages the disseminations of new technologies and thus by providing the effective usage of the sources , it supports the economic productivity and growth(Aslan and Küçükaksoy,2006)

Economic growth of that country will be high, if financial instituations provide the credit demands of the reel sector.In the early studies about financial and economic growth (Gurley and Shaw,1955,1967; Gerschenkron, 1962; Goldsmith, 1969), we observe that the effect of financial intermediation function on economic growth process is uttered although the theoric thoughts can not be expressed as a whole.

Though Gurley and Shaw make a great contribution to the literature by expressing the relationship between financial sector and economic growth for the first time, they do not make any comment about whether there is a causality relationship between financial development and economic growth or not or if there is , what the direction of this relationship is.Patrick (1966) for the first time dealed the relationship between financial sector and economic growth by conceptualizing.He expressed that the causality between financial sector and economic growth could be in two different forms. The writer explained this relationship by using the demand-following and supply-leading concepts. In demand-following case he expresses the financial sector growth to supply the demand occuring as a result of the developments in reel sector and in supply-leading he explains that the growth of financial sector institutionally would stimulate the economic growth.

It is very difficult to say that there is an agreement in many studies performed in order to determine the direction of the causality between financial sector and economic growth. In the ampirical analysis between financial development and economic growth we can see that there are studies expressing the causality relationship is both one-sided and two-sided.19Also in some studies it is stated that the relationship between financial development and economic growth variables is weak,even financial growth may have a decreasing role in economic growth process(Singh, 1997; Deidda, 2006).

Shortly called as BRIC firstly in the early 2000s Brazil,Russia,India and China that have common characters like wide area, big population and rapid economic growth are accepted as the fastest growing "emerging market" in world economy(O'Neill, 2001:1-16). Total area of these countries contains more than %25 of the world area and total population of them

18 Vide infra; King and Levine, 1993a, 1993b;Arestis and Demetriades, 1997; La Porta vd., 1997; Thiel, 2001; Levine, 2004; Eschenbach, 2004; Lawrence, 2006; Shan and Jianhong, 2006; Ang, 2007.

19 Vide infra; Hermes, 1994; Arestis and Demetriades, 1997; Thiel, 2001; Eschenbach, 2004; Lawrence, 2006; Shan and Jianhong, 2006; Ang, 2007

contains more than %40 of the world population. It is argued that BRIC group would take G7 group's place and get the leadership of the world economy when the economic indicators are considered(Frank and Frank, 2010:46-54).Goldman Sachs who has studies about BRIC countries estimates that in 2050 China will be the greatest economy in the world,India will be the third,Brazil will be the fourth and Russia will be the sixth biggest economy.

Based on these indicators, with the help of panel data analysis by using the annual data of 1989 and 2010 in our study the effect of financial development on economic growth is searched for BRIC countries and Türkiye that is the most devoloping country than after China and has a developing economy.In second section of the study, the literature ranking about empirical studies is presented as a table.In the following sectionsthe data set and method used in the analysis are introduced and evidences are given. In final section a general evaluation is conducted.

2. Literature Review

The first studies searching the relationship between financial development and economic growth were conducted by Bagehot (1873) and Schumpeter (1912). In his study Schumpeter (1912) indicated that a smoothly running economy would support the investors economically by providing the finance of technological innovations that was necessary for producing the new products the most effectively and productively. Meanwhile,he expressed that the growth of financial sector especially the growth of banking sector was necassary for economic growth.In literature followingSchumpeter (1912) many theorical and empirical studies were performed.The studies searching the relationship between the financial development and economic growth, country group, the used methods and results were indicated in Table .As we can observe from the Table 1 the view that financial development effects the economic growth positively was supported although there was no agreement between financial development and economic growth in terms of causality in the studies generally.

Table 1: The Abstract of Some Theoric and Empirical Studies Searching the Relationship between financial development and economic growth

Writers	Sampling and Econometric Method	Basic Evidences
Gurley and Shaw (1955-1967)	Theoricstudy	They indicated the necessity of the realtionship between financial development and economic growth.They suggest that the services provided by the developed financial structure facilitate the relationship between saving owners and investors.
Goldsmith (1969)	An International study-35 countries between the periods 1860-1963	He found a positive relationship between financial system size and economic growth.
Benecivenga and Smith (1991)	Theoric study	He estimated that the development of financial mediation in certain conditions would effect the growth rate.
Atje and Jovanovic	An International study-94 countries betweenthe periods	They concluded that stock markets and bank credits effect the growth positively.

(1993)	1960-1985	
King ve Levine (1993)	An International study– 80 countries between the periods 1960-1980	They said that all indicators of financial development were highly related with economic growth rates, physical capital accumulation and economic productivity increase.
Obstfeld (1994)	Theoric study	Liquid stock markets were positively related with economic growth,yet the integration with international capiatl markets was not related with the saving rates of theprivate lenders.
Benecivenga vd. (1995)	Teorik çalışma	Hisse senedi piyasası likiditesi, büyüme oranları, verimlilik artışları ve sermaye birikimi arasında güçlü pozitif bağlantı bulunmaktadır.
Levine and Zervos (1996)	A horizontal section analysis using 3 growth rates as dependent variant containing 77 countries	There is a statistically positive meaningful relationship between financial deepening indicators and growth as the increase of the output, the investment andthe productivity in three directions.
Jayaratne and Strahan (1996)	Panel data analysis including 50 USA states (1972-92)	They found that the quality increase in banking debths was related with a more rapid growth.
Levine (1997)	A horizontal section analysis	They indicated that financial development effected the economic growth via capital accumulation and technological innovation.
Rousseau and Wachtel (1998)	Time series analysis for 5 industrialized countries (USA, Canada, England, Sweden, Norway)	They estimated the financial growth by a very tiny feedback from the production to the mediation.
Rajan and Zingales (1998)	Time series analysis on the base of firm and industry for a wide country group. (1980-1990)	Financial development has a great effect on economic growth.A developed financial structure provides a competetive advantage against the industries depended on external financing.
Neusser and Kugler (1998)	Production industries of OECD countries –time series analysis.	Financial development gives priority to the growth and it is co-integrated with the total factor productivity of production industry and gross rate national product of pruduction sector.
Levine and Zervos (1998)	An international analysis (1976-93)	Both liquid stock markets and developed banking sector effect the growth, the capital accumulation and the increase in productivity positively.
Demirgüç-Kunt and Maksimoviç(1998)	An international analysis for 30 developed and developing countries.	Active stock market and a well-developed legal system facilitate the growth of the firms.

Levine and Zervos (1998)	Developed Economies Horizontal section regression	They got the results supporting the hypothesis that suggests financial development leads the economic growth.
Levine, Loayza and Beck (2000)	Horizontal section study and dinamic panel techniques	Between financial development and long term growth there is a strong positive relationship which is not derived from synchronicity.
Beck, Levine and Loayza (2000)	Horizontal section study, instrumantal variable procedure, dinamic panel techniques	Financial intermadiators have a positive and great effect on the growth of total factor productivity supporting the gross rate national product growth.
Kang and Sawada (2000)	Time series data for 20 countries Inner Growth Model	Financial development and trade liberalizition accelerate the economic growth by increasing the marginal benefits of human capital investments.
Henry (2000)	11 developing countries Panel Data Analysis	It was found that the liberalization in stock markets increased the investments in many countries.
Shan vd. (2001)	9 OECD Countries and China Causality Test and VAR Analysis	He found two sided causality in 5 countries and supply leading causality in 3 countries,but in 2 countries he found no relationship.
Arestis, Demetriades and Luinted (2001)	5 Developed Countries Cointegration and Correction Model Analysis	The development of the banks and capital markets accelarates the economic growth,but in this process banks have a more effective role.
Shan and Morris (2002)	19 OECD Countries ve China Causality Test	They reached the results that financial development causes economic growth directly or indriectly.
Arestis vd. (2002)	6 Developing Countries Standard Econometric Techniques	The effect of financial liberalization on financial development is ambigious.
Al-Yousif (2002)	30 Developing Countries-Ganger Causality and Panel Data Analysis	It was found that there was a two sided causality relationship between financial development and economic growth.
Müslümov and Aras (2002)	OECD Sample (22 countries) Granger Causality and Panel Data	It was obtained a one sided relationship from the development of capital market to economic growth.
Bhattacharya and Sivasubramania n (2003)	India Sample Causality Analysis	They reached the result that financial development causes economic growth.
Calderon ve Liu (2003)	109 Developed and Developing Countries	They reached the result that financial development effects the economic growth via capital accumulation and productivity.
Fink vd. (2003)	13 Developed Countries Cointegration and Correction Model Analysis	They reached the evidences supporting the "demand-following"and "supply-leading" approaches in Italy, Japan and Finland; "supply-leading"in USA, Germany, Austria, England, Switzerlandand weakly "supply-demanding" in Holland and Spain.

Ghirmay (2004)	13 Africancountries	He expressed that financial system had a signifiacnt role in the growth of African countries.
Beck and Levine (2004)	40 countries Panel Data Analysis	They emphasized the importance of financial development in the economic growth process.
Dritsakis and Adamopoulos (2004)	Greece Sample Causality Based on Error Correction Model	They reached the result that there was a causality relationship between financial development and economic growth.They could not find any relationship between the growth and the openness of the economy.
Thangavelu vd. (2004)	Australia Sample VAR Methodology	They found a causality from economic growth to the development of financial intermediaries,but they could not reach an evidence that the development of financial markets would cause economic growth.
Rioja and Valev (2004)	10 Countries Panel Data Analysis	They got the evidence that economic growth increased by increasing the productivity in the countries that the financial development was high and by accelerating the capital accumulation in the countries that financial development was low.
Christopoulos and Tsionas (2004)	10 Developing Countries Panel Cointegraiton Analysis	They found the evidence that economic growth was the cause of financial development.
Chang and Caudill (2005)	Taiwan Sample VAR Methodology	They found a causality from financial development to the economic growth,thus the "supply-leading" hypothesis was confirmed.
Caporale vd. (2005)	5 Southeastern Asian Countries Cointegration Granger Causality	It was found that capital market increased the economic growth by increasing the investment activity.
Ndikumana (2005)	99 Countries Panel Data Analysis	He presented the results that the development of financial intermediation increased the investments.
McCaig and Stengos (2005)	71 Countries	They identified that the development of financial intermediation affected the growth strongly and positively.
Rousseau ve Vuthipadadorn (2005)	10 Asian Countries Cointegration Granger Causality	They reached the results that financial development stimulated the investments and there was a one-sided realationship (supply-leading) from financial development to the investments in many countries.
Shan and Jianhong (2006)	Chine Sample VAR Methodology	They found that there was a two sided causality relationship between financial development and economic growth.
Ang and McKibbin (2007)	Malaysia Sample Cointegration Granger Causality	They identified that growth increased the financial deepening.Meanwhile the relationship was supply-leading.
Artan (2007)	79 Countries Sample Panel Data Analysis	In underdeveloped countries financial development affects the growth negatively.
Shahbaz vd. (2008)	Pakistan Sample Cointegration Granger Causality	He showed that there was a stronge and a two sided causality relationship between the development in stock markets and

		economic growth.
Abu-Bader and Abu-Qarn (2008)	Middle East and North African Countries VAR Methodology-Causality	In analysis results it was identified a demand-following causality suggesting the financial development increased the economic growth.However, for Israel it was identified a supply-leading causality from economic growth to financial development.
Enisan and Olufisayo (2009)	7African Countries ARDL Method	They concluded that the development in stock market in Egypt and South Africa increased the economic growth and the direction for the causality was from the development in stock market to the economic growth.
Kar vd. (2011)	MENA Countries(1980-2007) Panel Granger Causality Test	They infered that it was impossible to make a certain comment about the causality between financial development and economic growth.
Hassan, Sanchez Yu (2011)	168 Countries Classified According to Income Level Panel Data Analysis	It was discovered that there was a positive relationship between financial development and economic growth in developing countries.For many country samples a two sided causality was obtained for short term period.

Source: Study of the writers and ***Kularatne, 2001: 10-11.***

There are also studies searching the relationship between financial development and economic growth in Turkey sample. In ampirical studies on Turkey it can be said that there is no consensus about the causality relationship between financial development and economic growth.

Table 2: The Abstract of Some Theoric and Ampirical Studies Searching the Financial Development and Economic Growth Relationship on the Scale of Turkey

Kar and Pentecost (2000)	Turkey Sample Cointegration Analysis Error Correction Model	In the study they found that the direction of the financial development and economic growth relationship could change depending on the selected financial development indicator.
Gökdeniz vd. (2003)	Turkey Sample1989-2002) Regression Analysis	The evidence that financial markets affected the economic growth could not be found.
Atamtürk (2004)	Turkey Sample(1975-2003) Granger Causality	He found the evidence of a one-sided causality from financial development to economic growth.(Supply-leading hypothesis was confirmed.)
Onur (2005)	Turkey Sample Granger Causality (Autoregressive Model)	After financial liberalization in Turkish economy it was found out that financial liberalization, financial development and openness was not the cause of Gross Domestic Product,but Gross Domestic Pruduct was the cause of financial liberalization, financial development and openness.
Aslan and Küçükaksoy (2006)	Turkey Sample (1970-2004) Granger Causality	They found out that economic growth was due to financial development.In other words it supported the economic growth.

	Test	
Aslan and Korap (2006)	Turkey Sample (1986-2004) Cointegration AnalysisGranger Causality Test	They expressed that the direction of the causality between financial development and economic growth changedaccording to the financial development indicator.
Acaravcı vd. (2007)	Turkey Sample (1986-2006) Cointegration Analysis	They found out that in Turkey there was a one-sided causality from financial development to economic growth.
Kandır vd. (2007)	Turkey Sample (1988-2004) Cointegration Analysis Error Correction Model	He found out that there was a demand-following relationship between financial development and economic growth.In other words it was observed that economic growth increased the financial development in Turkey.
Afşar (2007)	Theoric Study-Literature Scan	He found out the evidence that there was a strong relationship between financial development and economic growth in Turkey but the direction of the causality was ambiguous.
Altunç (2008)	Turkey Sample (1970-2006) Cointegration Analysis Error Correction Model	He expressed that the direction of the causality between financial development and economic growth changed according to the financial development indicator.
Ağır vd. (2009)	Turkey Sample Literature Scan	He expressed that the relationship between financial development and economic growth could be simultaneous.
Altıntaş and Ayrıçay (2010)	Turkey Sample (1987-2007) ARDL(Autoregressive Distributed Lag Mode)Bound TestApproach	They found out that financial development was the most effective factor on the growth and also the effect of the rate was relatively less.They infered that the avaibility of the funds rather than their costs could contribute to increase the reel incomein developing countries like Turkey.
Keskin and Karşıyakalı (2010)	Turkey Sample (1987-2007) Engle-Granger Method and Causality Analysis	They observed that there was a demand-following relationship between financial development and economic growth,thus financial development was due to economic growth in Turkey.
Öztürk vd. (2011)	8 Developing Countries andTurkey Sample (1992-2009) Panel Causality Test	They found out that there was a one-sided causality from financial development to economic growth.(Demand-following hypothesis was confirmed.)
Özcan and Arı (2011)	Turkey Sample (1998-2009) VAR Analysis	Ekonomik büyümeden finansal gelişmeye doğru tek yönlü bir nedenselliğin varlığı bulgusunu elde etmişlerdir. (Talep izleyici hipotez doğrulanmıştır)
İnce (2011)	Turkey Sample (1980-2010) Cointegration Analysis Granger Causality Analysis	They found out that although there was a strong relationship between economic growth and financial development in a long term period, there was a relationship in a short term period.

3. Financial Development Indicators

In financial development literature, the proportion of financial sector to Gross Domestic Product is defined as financial depth (Feldman and Gang, 1990; Outreville, 1999). The indicators predicating the size of loan and currency are the variables that are used as a measure of financial development.In literature in limited and unlimited sense, the proportion of curruncy supply to GDP (M1/GDP, M2/GDP, M2Y/GDP), private sector loans/GDP, private sector credits of the banks/GDP, market value of the firms in Stock Exchange Market/GDP,effective money/GDP are usedas the indicator of financial development and financial depth.20" Loans for the private sector" variable that has been used recently as an alternative indicator for financial intermediation is not preferred because the indicators based on the size of currency (MI, M2,M2Y) in some studies do not represent the financial development. (Khan and Senhadji, 2000).

The most fundamental of these indicators is the indicators giving the proportion of limited and unlimited defined currency supply/GDP.It is indicated that M1/GDP proportion is not in strong relation with the growth,but M2/GDP proportion indicates the measure of the size of the whole sector in financial intermediation and it is in strong relation with the change in per cepita real GDP (King and Levine, 1993).

4. AMPIRICAL ANALYSIS

4.1. Data Set and Model

In this study the effect of financial development on eceonomic growth was searched by using the data between 1989-2010 period in the sample of 5 developing countries which have an important place in world economy (Brazil, Russia, India, China ve Turkey-BRIC-T).In the analysis, besides the financial development, foreign direct investments and trade openness which were thought to affect the growth was included to the model.From the variables used in the analysisy;represents the growth rate (GDP), fd;represents Financial Development (M2/GDP), fdi;represents Foreign Direct Investments (FDI/GDP) ve open;represents trade openness (X+M/GDP).The data was obtained from the web pages of IMF and the World Bank(www.imf.org, www.worldbank.org).

For analysis Stata 11 and Eviews 5.1. econometric analysis programmes were used and for model choise and correction tests codes21 were used.

4.2. Method

Panal data analysis was used to search the data from different countries together. Panel data analysis (Baltagi, 2001; Gujarati, 1999 and Tarı, 2010):

$$Y_{it} = \propto + X'_{it}\beta + u_{it} \qquad (1)$$

20 Vide infra; Khan and Qayyum, 2007; s. 4; Outreville, 1999, Darrat, 1999, Gupta, 1984; King and Levine, 1993; Demetriades and Hussein, 1996, Halıcıoğlu, 2007

21 For codes Thanks to Prof. Dr. Haluk Erlat, Asst.Prof. Bülent Güloğlu and Asst.Prof. Şaban Nazlıoğlu .

This model was based on decomposing the error term (u_{it}) to its components in terms of its individual and time effects. In the modeliindicates the countries, tindicates the time. When the error term was decomposed:

$$u_{it} = \mu_i + \lambda_t + \vartheta_{it} \quad (2)$$

was obtained. This final equation is called error component model. Hereμ_i indicates the individual effects, $\lambda_t$indicates the time effects.It is supposedμ_i, λ_t ve $\vartheta_{it} \sim IID(0, \sigma^2)$(Independent Identically Distributed), in other words the avarage of error terms is zero, its variant is stable and it is distributed normally(having white noise process).

In the Panel data analysis the stability of the series are searched through panel unit root tests firtsly.Then the type of individual and time effects should be identified. An indogeneity test should be conducted among the variables when there is a variable which is considered to have a close relation with the given variable,therefore it is suspected for its indogeneity. After that a model should be estimated and the problems of changing variant and autocorrelation in the model should be tested.

4.3.Panel Unit Root Analysis

It is accepted that the panel unit root tests which regard the information about both time and horizontal section dimension of the dataare statistically stronger than the time series unit root tests which regard the information only about the time dimension (Im, Pesaran ve Shin,1997; Maddala ve Wu, 1999; Taylor ve Sarno, 1998; Levin, Lin ve Chu, 2002; Hadri, 2000; Pesaran, 2006; Beyaert and Camacho, 2008).Because the variability in the data increases when the horizontal section dimension is included to the analysis.

The first problem in panel unit root test is whether the horizontal sections building the panel are independent or not.At that point panel unit root tests are classified as the first generation and the second generation.The first generation tests are also classified as homogeneous and heterogeneous.While Levin, Lin and Chu (2002), Breitung (2000) and Hadri (2000) are based on homogeneous model hypothesis, Im, Pesaran and Shin (2003), Maddala and Wu (1999), Choi (2001) are based on heterogeneous model hypothesis. On the other hand, the main second generation unit root tests are MADF (Taylor and Sarno, 1998), SURADF (Breuer, Mcknown and Wallace, 2002), Bai and Ng (2004) and CADF (Pesaran, 2006).

Since the countries included in the analysis are not homogeneous, Im, Pesaran and Shin (2003)will use (IPS) testin this study. This test:

$$\Delta Y_{it} = \propto_i Y_{it-1} + \sum_{j=1}^{p_j} \beta_{ij} \Delta Y_{it-j} + X'_{it}\delta + \varepsilon_{it} \quad (3)$$

is based on the model above. Here$\propto_i$; is error correction term and when $|\propto_i|$<1 happens, we understand that the serie is trend stable ,on the other hand when$|\propto_i| \geq 1$ happens, it has unit root,thus it is not stable. IPS test enables the$\propto_i$ sto differentiate for the horizontal section units,in other words heterogeneous panel structure.Test hypotheses:

H0: $\propto_i = 1$for all the horizontal section units,so the serie is not stable.

H1: $\propto_i < 1$for at least one horizontal section unit,so the serie is stable.

When the possibility value obtained from the test results is smaller than 0.05, H0is rejected and it is decided that the serie is stable. IPS panel unit root test results are on Table 4.

Table4:IPS Panel Unit Root Test Results

Variant	Level Value	Possibility Value	First Difference	Possibility Value
y	-0,74	0,77	-2,64	0,00
m2	-0,21	0,41	-4,60	0,00
fdi	-1,04	0,14	-3,29	0,00
open	3,66	0,99	-3,79	0.00

Note: In Panel unit root test Schwarz criterionis used and delay length is regarded as 1.

When we study on the results on Table4, it is observed that all series are not stable in level value,but the series become stable when first differences of the series are taken.In other words,in the studied period it is found out that macroeconomic variables are not stable and the shock effects on these variables do not disappear after a while.

4.4. Breush- Pagan Lagrange Multiplier (LM) Test

In this stage of the analysis, F test was performed in order to determine the type of time effect and individual effects(random or stable). Because the selected countries are in a certain economic group, it was anticipated that individual effects would be stable and also the time effects of financial development on the growth would be stable for the countries in the studied period. Whether the effects are really random or not can be determined by F test (Baltagi. 2001:15).

F test is classified as F1 andF2 . F=F1+F2. F1;tests the individual effects are stable andF2tests the time effects are stable.

In F1 test; H0: $\sigma_\mu^2 = 0$ (No individual effects) hypothesis is tested throughF1 statistics. F1 statistics is calculated by the formula below.

$$F_1 = \frac{N.T}{2.(T-1)}\left[\frac{\sum_{i=1}^{N}(\sum_{t=1}^{T}\hat{u}_{it})^2}{\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{u}_{it}^2} - 1\right]^2 \quad (4)$$

Hereμ; indicates the individual effects in the equation (4), N;indicates the horizontal section (country) number, T; indicates the time dimension, $\hat{u}$; indicates the prediction for the error terms in the equation (3). When the possibility value obtained from the test results is smaller than 0.05 , H0is rejected and it is decided that individual effects are stable.

In F2 test; H0: $\sigma_\lambda^2 = 0$ (No time effect) hypothesis is tested by F2 statistics. F2 statistics is calculated by the formula below.

$$F_2 = \frac{N.T}{2.(N-1)}\left[\frac{\sum_{t=1}^{T}(\sum_{n=1}^{TN}\hat{u}_{it})^2}{\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{u}_{it}^2} - 1\right]^2 \quad (5)$$

Hereμ; indicates the individula effects in the equation(4), N; indicates the horizontal section (country) number, T; indicates the time dimension, $\hat{u}$; indicates the predictions for the error terms in the equation (3). When the possibility value obtained from the test results is smaller than 0.05 , H0is rejected and it is decided that time effects are stable.

In F=F1+F2 test;

H0: $\sigma_\mu^2 = \sigma_\lambda^2 = 0$ (No individual and time effects)

H1: $\sigma_\mu^2 \neq 0$ or $\sigma_\lambda^2 \neq 0$ or both of them$\neq 0$ (At least one or two of the effects are random).

When the possibility value obtained from the test results is smaller than 0.05 , H0is rejected and it is decided that both of the effects are stable.In this case a prediction is made through the two-sided stable effect model.In Table5 there are F tests results.

Table5: LM Tests

Test	Possibility Value	Decision
F_1	0,004	Individual Effects are not Stable.
F_2	0,001	Time Effects are not Stable.
F	0.001	Individual Effects and Time Effects are not Stable..

When we look the results in Table5, we can see thatindividual effects and time effects are stable.According to this result the prediction was made by the two-sided stable effect model.

4.5. Hausman Endogeneity Test

In this stage of the study,whether there was a relationship between the individual effects and the explanatory variables or not was tested by Hausman method. Test hypotheses:

H0: $Cov(\mu_i, x_{it}) = 0$No endogeneity problem.

H1: $Cov(\mu_i, x_{it}) \neq 0$An endogeneity problem.

Hereμ_i; indicates the individual effets in the equation (4),but X_{it} indicates the exlanatory variables in the equation(3).When the possibility value of χ^2 (Chi2=Kikare) obtained from the analysis is smaller than 0.05 , H0is rejected and it is decided that there is an endogeneity problem in the model.In this case random effects model is used.(Greene, 2003).However, when H0 is accepted,stable effects model is used.This prediction is effective , non- deviated and coherent.Hausman test is not an alternative forF test. But it works as function to check the decision by F test.Hausman test was conducted and $\chi2$=14.62 ve$\chi2$ possibility value =0.404 was obtained and since this value was bigger than 0.05 , H0 hypothesis was accepted and it

was decided that there was no endogeneity problem in the model.In this case, it is necessary to do the analysis with the random effects model and this result supports the F test results.

4.6. Two-Sided Random Effects Model Predictions

Panel data analysis is predicted by the two-sided random effect model and the result are on theTable6.

Table6: Prediction Results

Variable	Coefficient	Standard Error	t-Statistics*
m2	1,332	0,949	1,403
fdi	0,792	0,439	1,802
open	4,315	2,596	1,662
Stable Term	2,310	1,101	2,097
Weighted	R^2=0,46F_{ist}= 4,28		

*: %10 level of significance was used.

In stable effect models weighted statistics values are used. (Baltagi 2001: 21). When we look to the weighted test statistics in Table6,we can see that model is reliable as statistically.Also whether there are flexible variants and autocorrelation problems in the model are tested below.

4.7. Lagrange Multiplier (LM) Flexible Variant Test

The most common test in order to test whether the error terms variant of the model changes from horizontal section to horizontal section is LM test. (Greene, 2003). Test hypotheses:

H0: $\sigma^2_{u_1} = \sigma^2_{u_2} = ... = \sigma^2_{u_n} = \sigma^2_u$Variant is stable. So there is no flexible variant problem.

H1: At least one $\sigma^2_{u_i} \neq \sigma^2_u$Variant is not stable. So there is a flexible variant problem.

The required test statistics to test these hypotheses are calculated through the following formula:

$$LM = \frac{T}{2}\sum_{i=1}^{N}\left[\frac{\sigma^2_{u_i}}{\sigma^2_u} - 1\right]^2 \qquad (6)$$

When the possibility value obtained from the test results is smaller than 0.05 , H0is rejected.In other words it is decided that there is a flexible variant problem in the model. (Greene, 2003).Lm test was conducted and the possibility value was found 0.05.In this case H0 was rejected and it was decided that there was no flexible variant problem in the model.

4.8. Autocorrelation Test

It is a test to study the relationship of the error terms of the model with its delayed values.The equation to measure this relationship is AR(1) process (Wooldridge, 2002):

$$u_{it} = \rho u_{i,t-1} + \varepsilon_{it} \quad (7)$$

Test hypotheses:

H0:$\rho = 0$No autocorrelationproblem.

H1: $\rho \neq 0$ Am autocorrelationproblem.

The required test statistics to test these hypotheses is calculated by the following formula:

$$F = \frac{(SSR_R - SSR_{UR})/g}{SSR_{UR}/df} \quad (8)$$

HereSSRR; indicates the sum of the squares of the error terms of the limited model in the equation (3) SSRUR; indicates the sum of the squares of error terms of the unlimited model, g; indicatesthe limit number and df; indicates the independence grade. When the possibility value obtained from the test results is smaller than 0.05 , H0is rejected.It is decided that there is an autocorrelation problem in the model. (Drukker, 2003).

F test was conducted and the possibility value was found0,052.In this case H0is accepted and it was decided that there was no autocorrelation problem in the model.

Since there is no flexible variant and autocorrelation problems in the model, the prediciton results are reliable and interpretable. As can be seen from the Table 6, financial development level affects the economic growth positively in line with the theoretical expectations.A % 1 increase in financial development level will increase the growth with the rate of % 1.33. The importance of the foreign direct investments especially in developing countries is often emphasized. As a result of the analysis the effect of a % 1 increase in the foreign direct investments on the growth will be % 0,79. Also trade openness variant used in the model was observed as the most effective variant in growth and it was found out that a %1 increase in openness level increased the growth with the rate of % 4,31.So this affected Turkey mostly in terms of the decrease in export depending on the decrease in external demand as a result of 2008 global economic crisis. (Somel, 2009).

5.CONCLUSION

In this study the effect of financial development level on economic growth was searched via panel data analysis method in the sample of 5 developing countries which have an important place in the world economy(emerging markets, Brazil,Russia,India,China and Turkey-BRIC-T). the foreign direct investments and trade openness which were considered to affect the growth as well as financial development were included in the study where the annual data of 1989-2010 periods were used. At the panel unit root analysis result it was found out that series were not stable and the effects of shocks on the series did not disappear after a while and therefore it was determined that macroeconomic shocks affected the economy of the countries significantly.

At the F tests result conducted to define the applicable panel data analysis method it was found out that individual and time effects were stable,for that reason an analysis with the two-sided stable effect model was carried out.At the endogeneity test result it was found out that there was no endogeneity problem in the model. At the model conformation tests result it was foud out that there was no flexible variant and autocorrelation problems in the model. In this regard, the predicted model is reliable econometrically.

According to the analysis results, it was determined that a % 1 increase in financial development level increased the growth at the rate of % 1,33 , a % 1 increase in foreign direct investments increased the growth at the rate of % 0,79.Also it was found out that trade

openness in the model was the most effective variant of the growth and the evidence that a % 1 increase in openness level increased the the growth at the rate of % 4,31.The expression that the global economic crisis in 2008 affected Turkey mostly in export dimension supports the analysis result.

To sum up, in the study the effect of financial development, foreign direct investments and openness were searched and it was found that openness, financial development and foreign investments in turn affected the growth mostly. If the sustainable growth is considered as one of the most significant variables of the growth for the countries, the increase in foreign trade especially in export,the stimulations for the foreign direct investments and the increase in financial development level are very important.

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