

FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: A COMPARATIVE ANALYSIS BETWEEN EURO AREA AND EMERGING -DEVELOPING EUROPE

Finansal Gelişme ve Ekonomik Büyüme: Euro Bölgesi ve Gelişmekte Olan Avrupa Ülkeleri Arasında Karşılaştırmalı Bir Analiz

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ABSTRACT: This paper examines the causality between financial development and economic growth in Euro Area and Emerging-developing European countries. In this study, there is a comparative analysis to clarify the direction of the relationship and to understand which hypothesis are already accepted in the literature such as demand-following and supply-leading available for both group of countries. Panel data analysis has been used to test the empirical model; firstly the homogeneity of the variables is investigated by Delta test and then the cross section dependence is examined with the CDIm test. Also, the stationary of the series is tested with CADF which is called second-generation unit root test and consider heterogeneity and cross section dependence. After proving the existence of the cointegration relationship between the series, the long term regression parameters are estimated. According to the empirical results obtained from panel causality test, there is a feedback relationship between economic growth and financial development for both groups of the EU countries.

Keywords: Financial Development, Economic Growth, Panel Data Analysis, Panel Causality.

ÖZ: Bu çalışma finansal gelişme ve ekonomik büyüme arasındaki nedensellik ilişkisini Euro Bölgesi ve gelişmekte olan Avrupa ülkeleri kapsamında analiz etmektedir. Her iki ülke grubu için söz konusu ilişki literatürde var olan arz itişli ve talep çekişli hipotezler bağlamında hangisinin geçerli olduğunun belirlenmesi için karşılaştırmalı bir analiz yapılır.

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mıştır. Panel veri analizinin kullanıldığı ampirik modelde, öncelikle değişkenlerin homojenliği Delta testi yardımıyla araştırılmış, sonrasında değişkenlerin yatay kesit bağımlılığı CDIm testi aracılığı ile incelenmiştir. Ayrıca serilerin durağanlığı ikinci nesil birim kök testi olarak adlandırılan heterojenliği ve yatay kesit bağımlılığını dikkate alan CADF testi ile sınanmıştır. Seriler arası eşbütünleşik ilişkinin varlığı ispatlandıktan sonra, uzun dönem regresyon katsayıları tahminlenmiştir. Panel nedensellik testin elde edilen sonuçlara göre, söz konusu iki farklı Avrupa grubu ülkesi için finansal gelişme ve ekonomik büyüme arasında çift yönlü (feedback) bir nedensellik ilişkisi vardır.

Anahtar Kelimeler: Finansal Gelişme, Ekonomik Büyüme, Panel Veri Analizi, Panel Nedensellik.

INTRODUCTION

Does financial development promote economic growth or vice versa? That question has encouraged researchers to analyze the relationship between these two indicators for a long time. There is still not a consensus has been reached about the direction of the relationship. While mentioning about the relationship between financial development and economic growth, it is necessary to categorize the different views of researchers on this issue. Schumpeter (1912), indicates that financial development promotes economic growth and Robinson adds that (1952), financial development facilitates economic growth through various financial channels but Lucas (1988), believes that the role of financial sector has been exaggerated. The other supporters of the positive relationship between those indicators are Miller (1998) claims financial development leads to real internal economic growth thanks to different explanatory variables (proxies) and Levine (2003), who describes the financial development as an access to financial credits and financial services.

Financial development is a key factor of economic growth for all countries. Free market system based on commodity, labor, money and capital markets in macro level. The money and capital markets are called financial sector together and countries with more developed financial system (which means depth and efficiency of it) have bigger GDP output rates. Because of efficient financial sector has an important role on allocation mechanism with the mobilization of foreign capital and investments. If a country is lack of financial tools then it is not possible to obtain financial resources and support financial institutions to robust economic growth. It is necessary for two sectors (real and financial sector) to work together to have a balanced, sustainable economic growth (Mehrra and Ghatami, 2014:75-76).

There are two different views in the literature about the direction of the relationship between financial development and economic growth. These are as Patrick (1966) mentioned; supply-leading and demand-following hypotheses. The supply-leading hypothesis supports that financial markets and institutions increase the supply of financial services, thus leads to a real economic growth while demand-following hypothesis is drawing attention to the direction of the relationship from economic growth through financial development. A growing demand for financial services in the financial sector, can lead an expansion such as real economic growth (Bangake and Eggoh, 2009:2).

The formation of modern financial institutions spurs economic growth in real economy because their financial assets, liabilities and services respond to the demands of current investors and those who want to save. Then the evolution of the financial system is a result of sustainable economic development. According to the demand-following hypothesis any increases in GDP output rate will also accelerate demand for entrepreneurs' foreign funds. Supply-side hypothesis based on deep and sophisticated financial markets, which gives a chance to investors to eliminate the exchange risk via of rapid trade of assets or swap with other alternatives. Less risk and ease of access to capital, improves the allocation of capital and promotes the economic growth in the long term (Akıncı et al. 2014). Also there are some studies stressed that the relationship between variables are bidirectional (Lewis 1955; Pradhan 2011; Bangake and Eggoh 2011), or there is no relationship between them (Lucas 1988; Chandavarkar 1992; Eng and Habibullah 2011).

Emerging-developing economies have divergent features when it is compared with Euro area countries. First of all they are close to each other geographically and have similar culture and most of them are already a member of European Union but they are not in Eurozone yet. The common feature of some these countries that to have communism (Balkans and Central Eastern Europe) and centrally planned economies countries. After the collapse of Berlin Wall, transition economies preferred the market based system in 1990's except Turkey and Western Europe (Yıldırım et al., 2013:711).

Gill et al. (2012); Kolev and Zwart (2013), with transition it was obvious not only to restructure and rebuild the industrial sector with new institutions but also regaining the inactive human capital stock is a necessity. The finance and banking sector just played a significant role after the privatization process at the beginning of 1990's. But the financial development levels of each country had acquired a different character across emerging European economies. Until the beginning of 2000's, emerging countries had some problems to drive modern banking applications and access to the capital. This is why they have been

coped with some problems with the support of Western and foreigner banks. This made contributions to access credits easily, customer services, introducing new banking products and learn how to manage risks. According to Niemczak (2010), in this region the second source of the finance is stock markets just after banking sector but those markets are not deep enough or stable and sufficient however these markets continue to grow very fast with shock threapy.

This paper aims to investigate whether the relationship between financial development and economic growth. Mostly it has been argued about developed countries in the current literature but not especially for emerging countries. So there is an attempt to partially fill the gap of developing countries side in this paper with a comparison. So we studied with Euro area and emerging European countries which are represented by emerging countries of Europe (Bulgaria, Hungary, Romania, Poland, Croatia, Turkey, Serbia and Macedonia) and countries in Eurozone (Belgium, Italy, Spain, Austria, Lithuania, Latvia, Netherlands, France, Finland, Germany, Ireland, Malta, Portugal, Slovenia, and Slovakia). We also identify financial development with different aspects such as; banking sector development and stock market development etc. with a composite index of financial sector development. The lay out of the paper is the following. The second part of this paper provides a summary of financial developments in Europe. In the third part, the adaptation problems of the countries in eurozone are mentioned. The fourth part shows a review of recent researches on literature. The fifth part discusses selected data and methodology; econometric model, panel evidence on the nexus between variables via of causality and cointegration tests. The last part gives some concluding remarks.

FINANCIAL DEVELOPMENT IN EUROPE

The structural transformation started with the liberalization of financial markets and foreign trade (openness). It reduced the role of the state in the economy to a minimum level and caused the adoption of Neo-liberal policies. The relationship between financial development and economic growth in European countries is a different example. Among of those countries, some of are pre-communistic ones and some of them are the founders of European Union. Thats why till 1990, the financial system could not perform traditional market economy activities. After transition has started with Poland, the banking sector became a locomotive of the financial system in European developing countries.

The monolithic banking system for financial transformation has been abandoned. The Central Bank's role is limited with monetary policy and

exchange rate adjustments. With the decline of the state's role, economic transformation has shown a rapid development with the introduction of foreign banks into the financial sector. Caporale (2009), with the end of communism, the banks under the auspices of the state became exempt from the effects of the Central Bank and their current debts were eliminated. With the liberalization of privatization in 1998, developed countries such as; Austria, Belgium, Germany and Italy have dominated the EU banking sector. The source of stability and productivity rates in the financial sector is seen as foreign ownership. However, the entrepreneurship sector, led by large firms to which these banks have provided credit, has caused deterioration in the allocation of financial resources due to ineffective ownership. As international and local diversification in the financial system was not enough, economies were exposed to systemic shocks and many European countries experienced bank seizures. For these reasons, macroeconomic stability has not been achieved and sustained. Financial intermediation activities decreased and capital flight has started (Cojocar, 2011: 7-8).

ADAPTATION PROBLEM IN EUROZONE

After the eurozone was established, the monetary policy was carried out by the EU Central Bank, while the fiscal policy continued to be determined by national governments. Fiscal policy coordination problem which is one of the compatibility problems that have been experienced since 2009 and came up more important with financial crisis. The first objective of the Maastricht treaty is price stability and to be in progress for economic integration through monetary unification. Coordination problems in fiscal policy are due to determining it independently. From 1999 (establishment of the eurozone) till 2008, (budget deficits/GDP) ratios exceeded the upper limit specified in Maastricht criteria by many countries such as Greece, Germany and France. After some financial measures taken, except Greece, some other countries could fulfill the Maastricht criteria. GDP ratio of Greece is quite low in real but in the first years of membership Greece manipulated its data in order to be able to show statistics of their financial system positively for the membership. Therefore, it is very difficult to understand the problems in real and to determine the policy against these problems.

The fact that the Maastricht criterias are applied according to political priorities so it was very difficult for members to achieve financial coordination. Members could not performed the desired performance not only to control financial policies but also to apply other policies during the crisis. Because the fiscal policy has become a risk factor. In order to make a positive contribution

to the stabilization, expansionary fiscal policy should have sufficient ample scope in terms of expenditures. In addition, budget problems are affecting also other members in a negative way. For this reason, budgetary discipline must be ensured. In the long and medium-term, the sustainability of public finance must be guaranteed. Despite the dynamism it has, eurozone does not have enough tools to intervene fastly and effectively as a single national economy. This is why eurzone is open to external shocks and “one size fits all” slogan is obviously not working for Eurozone.

REVIEW OF LITERATURE

Researchers hold different views about the nexus between financial development and economic growth. The very first empirical study has been carried out by Goldsmith in 1969 and he implies that there is a positive relationship between financial development and income per capita ratio. In this section we present a sum of recent empirical studies on this topic and make some groups to see what kind of control variables or countries are chosen by researchers to evaluate impact of financial sector on economic growth in the long run.

The studies with a developed financial development index are as follows; Bangake and Eggoh (2009), this study includes 71 developed and developing countries for the period between 1960-2004. Panel co-integration, dynamic ordinary least squares (DOLS) and panel causality techniques were used to analyse the long-term relationship between economic growth and financial development. Financial development is measured through three different channels. These are; the ratio of liquid liabilities to GDP, the deposit money bank assets to GDP, private domestic credits as ratio to GDP. They also considered some control variables such as; the openness, government expenditure as ratio to GDP and inflation rate. The findings of the application indicated that there is a bidirectional causality between financial development and economic growth. Yildirim et al. (2013), focused on nexus between financial development and economic growth for Emerging European Economies such as; Bulgaria, Hungary, Latvia, Lithuania, Poland, Romania, Russia and Ukraine. They also used a new method which called asymmetric causality (Toda-Yamamoto, 1995) test to see the direction of the relationship between variables. Because of financial development has multi-dimensional nature. They used two different financial development indicators (M2 to GDP and Liquid liabilities to GDP) for the period 1990-2012. Their empirical findings support supply-leading hypothesis in Bulgaria, Croatia, Hungary and Latvia. Also the presence of negative and positive financial shocks do not affect the direction of the relationship strongly. The nexus between economic performance and financial



development is very weak in Russia (minimal) and Ukraine. Naik and Padhi (2015), have used second generation unit root, Hurlin-Dumitrescu panel causality tests and GMM estimator for 27 emerging economies for the 1995-2012 period. They determined a stock market development index with market capitalization ratio, total value of shares traded ratio and turnover ratio. The control variables are chosen as; investment rate, interest rate, rate of inflation, trade openness, foreign direct investment. A development that occurred in the stock market affects economic growth considerably. In addition, aspect of the relationship between variables is supporting supply-side hypothesis. Mhadbi (2014), re-examined the relationship between financial development and economic growth for some developed and developing countries during the period between 1973 and 2012 with GMM method. Financial development is represented by three different indicators. These are; depth (ratio of liquid assets to GDP), private (private credit to the total credit distributed) and the bank (the credit issued by deposit money banks to the private sector divided by GDP). The indicator of private has a negative impact on economic growth contrary to bank indicator. The depth indicator has a positive effect on economic growth for developed countries but has a negative effect on developing countries. Pradhan et al. (2013), emphasize that there is a feedback relationship between economic growth and financial development for BRICS (Brazil, Russia, India, China and South Africa) countries during the period between 1989 and 2011. They determined a financial composite index (FSD) which is a sum of banking sector development (BSD) and the stock market (SMD) development indicators. Panel causality test and FMOLS regression estimator approach were used in empirical part.

The papers studied with Europe are as follows; Caporale et al. (2009), examined the nexus for ten new members of EU, the period between 1994-2007 with dynamic panel data method. The contribution of the financial development to economic growth is limited for these countries because they are not only lack of financial depth but also stock and credit markets are under developed. Findings gained from application showed that the banking sector is most active and contributing one. The way of the relationship between variables is from financial development to economic growth an one way. Leitao (2010), this study analyze the impact of financial development on economic growth with GMM (generalized movements) method for 27 members of the European Union and the BRIC countries for the period 1980-2006. Financial development represented by two different indicators. These are CREDIT (ratio of total credit to GDP) and BANK (the logarithm of asstes of deposit money banks divided by asstes of deposit money banks plus central bank assets). In addition to this foreign trade, macroeconomic stability and efficiency were included in the

study as control variables. The results obtained from the study indicates that financial development and the control variables promote economic growth. George and Marianna (2010), detected a long run impact of finance and growth for 15 members of European Union for the period between 1975-2005. Real GDP per capita used as a proxy to indicate economic growth while the size of financial system by the ratio of domestic credit to GDP. Monetary policy is represented by inflation and deposit rates. In conclusion, an increase in the size of the banking sector can have a negative affect on economic growth.

The studies with different income levels are as follows; Hassan and Jung (2007), the high-income OECD countries and Sub-Saharan Africa and South Asia regions (a total of 208 countries) have been discussed for the 1960-2005 period. The relationship between financial development and economic growth was examined as an unbalanced panel regression with fixed effects model and Granger causality analysis. According to the findings of the study; there is a strong relationship between the variables in high-income OECD countries while the same thing can not be said for South Asian and African countries. Quayyum et al. (2012), in their empirical study they examined 9 countries from low-income group for different time intervals to observe direct and indirect effects of financial sector on the growth separately. They estimate following different models such as; general, basic, intermediate and final. They put an emphasis particularly on increases and decreases in interest rate to see how it navigates economic growth. Application findings show that the coefficients of financial development and the interest rate are negative but significant. Actually when the interest rate increased financial development is harmful for economic growth. In the panel causality test where they take into account the heterogeneity indicates that financial sector does not promote economic growth. Mehrara and Ghatami (2014), investigated the impact of financial development on economic growth for ten developed countries such as; Canada, England, Spain, Germany, USA, Netherlands, Switzerland, Italy and Russia during the period 1999-2007 with panel data analysis. They used the equation of Levine as an empirical model which has improved by Barro and Lee in 2012. According to their empirical results, it can be said that even if financial sector has limited development in terms of scale it has become more important for economic system. Akıncı et al. (2014), analyzed OECD countries with unbalanced panel data for the period 1980-2011. According to findings derived from Pedro-Kao Cointegration and Granger causality analysis it can be said that there is a long-term relationship between the variables. However, the direction of the causality from economic growth to financial development's three indicators (domestic credits by the private sector to GDP, the ration of broad measure of money, the ratio of total bank credits to GDP) is one way. In addition,

two-way causality is observed between the definition of broad money and economic growth. So this study supports demand-following hypothesis which claims that an increase in real national income growth will support activities and entrepreneurship in financial sector. Menyah et al. (2014), for 21 Sub-Saharan African (SSA) countries, they prefer to work with Granger causality test and panel bootstrap method to analyse the relationship between financial development and economic growth. They determined an index with other explanatory variables of financial development. Also they added openness which represents the foreign trade to the application as a third variable for the period between 1965 and 2008. After examining the variables one by one it can be said that demand-following hypothesis is accepted for only one African country but supply-leading hypothesis is valid for 3 different African countries. And also it the relationship between trade and economic growth is limited. Naturally, for these countries the financial and trade-led growth hypotheses are rejected. Anderson et al. (2015), used Pesaran and Smith (POLS) technique for 103 SSA countries for the period 1975-2009. According to their findings, in these countries financial liberalization has not led to a financial development as expected. However, financial liberalization is seen as a very positive effect on output, including economic growth. There is a strong relationship between financial reform, price stability and increased foreign direct investment.

DATA SET AND METHODOLOGY

Many empirical studies have done for the relationship between financial development and economic growth. It is possible to divide two main groups, these studies according to their empirical method. Such as; first generation's studies have used time-series method but second generation's studies have analyzed the causality between variables with panel data. The purpose of this paper is to try to examine causality and cointegration relationship between financial development and economic growth with the consideration of cross sectional dependency and heterogeneity.

The basic regression for modeling can be written (Pradhan et al., 2013:311);

$GDP = f(FDI)$ or $FDI = f(GDP)$ while $FDI = BSD + SMD$ is a composite index of finance sector development which includes BSD (banking sector development indicators) and SMD (stock market development indicators).

$$GDP_{it} = \alpha + \beta_i FDI_{it} + e_{it} \quad (1)$$

$$FDI_{it} = \alpha + \beta_i GDP_{it} + e_{it} \quad (2)$$

Financial development index (FDI) have developed with PCA-Principal component analysis and control variables are chosen in the light of Pradhan et al. (2013) and literature readings. The PCA transforms the original set of variables into smaller set without information structure and size loss. Joliffe (2002), the PCA is a linear function of the original variables and it is converted apposite and independent variables into a new data set, this conversion is also linear.

The data [GDP per capita as a proxy of economic growth and the other indicators to compose FDI index; liquid liabilities to GDP (%), private credit by deposit money banks to GDP (%), bank deposits to GDP (%), credit to government and state owned enterprises to GDP (%), deposit money banks' assets to GDP (%), central bank assets to GDP (%), stock market capitalization to GDP (%), stock market total value traded to GDP (%)] had taken from World Bank Global Finance Indicators for Euro Area and Emerging-developing Europe for the period between 1995-2013. The reason of working only with given countries below that due to lack of data.

EMPIRICAL RESULTS AND THE EVALUATION

In this study, the effects of financial development on economic growth in Eurozone and Emerging-Developing Europe were examined. First, we started with descriptive tests to understand the attribute of dataset, because deciding homogeneity or heterogeneity of slopes and cross-section dependency of the variables are very important issue in panel data analysis.

Testing Slope Homogeneity

As a starting point, homogeneity of the variables were examined via Pesaran and Yamagata's (2008) Delta Test. Heterogeneity of the variables has an effect on the next step; i.e. choosing the types of unit root and cointegration tests. The delta test can be written as follow (Pesaran and Yamagata, 2008:57-58):

$$\tilde{\Delta} = \sqrt{N} \frac{N^{-1}\tilde{S} - k}{\sqrt{2k}} \quad (3)$$

$$\tilde{\Delta}_{adj} = \sqrt{N} \frac{N^{-1}\tilde{S} - k}{\sqrt{\text{Var}(T,k)}} \quad (4)$$

Equation 3 represents delta test statistics for small samples while equation 4 and shows adjusted delta test statistics for large ones.

Null and alternative hypotheses can also be stated as:

$$H_0: \beta_1 = \beta_2 = \dots = \beta_n = \beta \quad (\text{for all } \beta_i)$$

$$H_1: \beta_1 = \beta_2 = \dots \neq \beta_n \quad (\text{at least for one } i)$$

Table 1: Delta Test Results for Euro Area

Test	T-Statistics	Prob.
$\bar{\Delta}$	6.437	0.000
$\bar{\Delta}_{\alpha\beta j}$	6.982	0.000

Notes: According to table 1, the variables are heterogeneous for Euro Area countries. The given probability values are significant and H_0 null hypothesis is rejected.

Table 2: Delta Test Results for Developing-Emerging Europe

Test	T-Statistics	Prob.
$\bar{\Delta}$	-0.541	0.706
$\bar{\Delta}_{\alpha\beta j}$	-0.587	0.721

Notes: According to results on table 2, the variables are homogeneous, probability of given t-stats are not significant (over 0.05) and H_0 null hypothesis can not be rejected for Developing-Emerging Europe economies.

Testing Cross-Section Dependence

It is important to determine the Cross-section dependence (CD) before implementing unit root tests. If there is a certain shock (internal or external) which comes from one country may not affect the others (each cross section units) at the same level even if they have common EU economic policies (Hu et al., 2013:187).

In this study we used the Pesaran CDLM test in order to determine whether the cross sections are dependent:

$$\Delta Y_{it} = a_i + b_i Y_{i,t-1} + \sum_{j=1}^{p_i} c_{ij} \Delta Y_{i,t-j} + d_i t + h_i \bar{Y}_{t-1} + \sum_{j=0}^{p_i} \eta_{ij} \Delta Y_{i,t-j} + \varepsilon_{i,t} \quad (5)$$

The CD_{LM} test statistic is to be obtained by the equation above in order to examine the cross sectional independence. A contemporaneous correlation, low or high, is expected between the residuals. The statistical significance of these correlations' is tested with Breusch-Pagan LM test (Pesaran, 2004:4; Güloğlu and İspir, 2009:4). The CDLM test statistic can be calculated as follows:

$$CD_{LM} = T \sum_{i=j}^{N-1} \sum_{j=i+1}^N \hat{p}_{ij}^2 \sim \chi_{N(N-1)/2}^2 \quad (6)$$

In equation 6, P_{ij} are the simple correlation coefficients between the residuals of the ordinary least squares (OLS) estimation. Under the null hypothesis of there is no correlation between residuals; LM test statistic has a chi-squared

(χ^2) distribution while N is constant and T approaches to infinity (Pesaran, 2004:5; Pesaran et al., 2008:106).

$$CD_{LM2} = \sqrt{\frac{1}{N(N-1)} \sum_{i=j}^{N-1} \sum_{j=i+1}^N} \left(T \hat{\rho}_{ij}^2 - 1 \right) \sim N(0,1) \quad (7)$$

Null and alternative hypotheses about are as follows:

$$H_0: \rho_{ij} = \rho_{ji} = \text{cor}(u_{it}, u_{jt}) = 0, \quad i \neq j \text{ (cross sections are not dependent)}$$

$$H_1: \rho_{ij} = \rho_{ji} \neq 0, \quad i \neq j \text{ (cross sections are dependent)}$$

Table 3: Cross-section Dependency Test (G) for Euro Area

CD Test	Test Statistics	Prob
LM (Breusch, Pagan 1980)	253.662	0.000
CD LM 1 (Pesaran 2004)	10.259	0.000
CD LM 2 (Pesaran2004)	1.123	0.131
Bias-adjusted CD (Pesaran et al. 2008)	0.476	0.317

Notes: According to the results presented in table 3, the null hypothesis, cross sectional independence of variable G, is rejected. There is a dependency between the cross sections for Euro Area countries.

Table 4: Cross-section Dependency Test (G) for Developing-Emerging Europe

CD Test	Test Statistics	Prob
LM (Breusch, Pagan 1980)	53.735	0.002
CD LM 1(Pesaran 2004)	3.439	0.000
CD LM 2 (Pesaran2004)	-2.006	0.022
Bias-adjusted CD (Pesaran et al. 2008)	1.094	0.137

Notes: According to probability values of variables in table 4, the null hypothesis which claims that there is no cross section dependency is rejected. It's possible to say that there is a dependency between the cross sections composing G for Developing-Emerging Europe economies.

Table 5: Cross-section Dependency Test (FDI) for Euro Area

CD Test	Test Statistics	Prob
LM (Breusch, Pagan 1980)	193.914	0.000
CD LM 1 (Pesaran 2004)	6.136	0.000
CD LM 2 (Pesaran2004)	-2.404	0.008
Bias-adjusted CD (Pesaran et al. 2008)	1.363	0.087



Notes: As table 5 showed, the null hypothesis is rejected, because the given probabilities are less than 0.05 except the last CD test that there is a dependency between the cross sections composing FDI for Euro Area countries.

Table 6: Cross-section Dependency Test (FDI) for Developing-Emerging Europe

CD Test	Test Statistics	Prob
LM (Breusch, Pagan 1980)	121.174	0.000
CD LM 1 (Pesaran 2004)	12.523	0.000
CD LM 2 (Pesaran2004)	-2.192	0.014
Bias-adjusted CD (Pesaran et al. 2008)	-0.135	0.555

Notes: The results showed in table 6, the null hypothesis is rejected; because the given probabilities of values are significant. There is a dependency between the cross sections composing FDI for Developing-Emerging Europe economies.

Testing Stationary of Variables

Unit root tests which take into account the cross section dependency are called the second generation unit root tests. Pesaran (2007) developed a panel unit root test which takes into account the cross section dependency, instead of the factor structures of the residuals. This method is called Cross-Sectionally Augmented Dickey-Fuller (CADF) test and based on the estimation of the regression below (Pesaran, 2007:268):

$$\Delta Y_{it} = \alpha_i + b_i y_{i,t-1} + \sum_{j=1}^{p_i} c_{ij} \Delta Y_{i,t-j} + d_i t + h_i \bar{y}_{t-1} + \sum_{j=0}^{p_i} \eta_{ij} \Delta \bar{y}_{i,t-j} + \varepsilon_{i,t} \quad (8)$$

$$H_0 : b_i = 0 \text{ stationary}$$

$$H_1 : b_i < 0 \text{ non-stationary (for } i=1,2,\dots,N)$$

T-values which belong to b_i have been calculated by CADF test and critical values have been tabulated by Pesaran (2007). Also Monte Carlo simulations proved that CADF test is valid in both $N>T$ and $T>N$ conditions.

T-statistic of CADF test can be calculated as follows (Pesaran, 2007:269):

$$t_i(N, T) = \frac{\Delta \hat{Y}_i \overline{M}_W Y_{i-1}}{\hat{\sigma}(Y_{i-1} \overline{M}_W Y_{i-1})^{1/2}} \quad (9)$$

Also another statistic called CIPS is the mean of the t statistics for each cross section (Pesaran 2007).

$$\bar{t} = N^{-1} \sum_{i=1}^N t_i(N, T) \quad (10)$$

Table 7: CADF Test Results for Euro Area

CADF t-statistic values (G)	and	(FDI)
-3.1773		-0.442
-2.0794		-1.2496
-2.4490		-3.9119
-3.2885		-3.4789
-1.5628		-4.2368
-4.0422		-0.8212
-0.3223		-1.1444
-0.7059		-1.8688
-2.2601		-2.3358
-1.6567		-3.3267
-1.8029		5.9247
-1.1257		-2.5338
-3.3085		0.6797
-1.2399		-1.6360
-2.2404		-0.0628
CIPS = -2.0841		CIPS=-1.2209

Notes: According to the findings which have presented in table 7, variables of G and FDI are not stationary. Calculated CADF statistics are bigger than the critical value of -4.98 (with intercept and trend) from Pesaran critical value table (Pesaran, 2007: 276), so H_0 is rejected. Both of the series have unit roots and variables are non-stationary on the level.

Table 8: CADF Test Results for Developing-Emerging Europe

CADF t-statistic values (G)	CADF t-statistic values (FDI)
-2.4748	-2.3389
-3.8629	-4.6904
-2.7730	-3.4659
-3.7953	-2.6002
-3.1522	-3.9792
-1.7057	-2.5630
-5.0658	-2.5499
-2.1209	-1.8679
CIPS = -3.1188	CIPS = 3.0069

Notes: According to table 8, variables of G and FDI are nonstationary. Calculated CIPS statistic (CIPS statistics are taken into account because variables are homogeneous) is bigger than the given critical value of -3.24 (with intercept and trend) at critical value tables (Pesaran, 2007: 281), so H_0 is rejected. Both of the series have unit roots and variables are stationary on their first difference I(1).

Testing Co-integration Relationship

The results obtained from the panel unit root tests indicate that it's crucial to use second generation co-integration test which takes into account cross sectional dependency. While setting up the assumptions for the panel cointegration tests, considering stationarity orders of the variables can change the type of the test.

Westerlund (2008) developed two panel cointegration tests depending on the Durbin H test. One of them DH_g are called group mean statistics (for heterogeneous variables), and the other one is DH_p called panel statistics (for homogenous variables). The Westerlund Durbin H test assumes that the series in the panel are at the same level and first differences I(1) are stationary (Westurlund, 2008:203).

Panel cointegration statistics are calculated as follows:

$$DH_g = \sum_{i=1}^n \hat{S}_i (\tilde{\phi}_i - \hat{\phi}_i)^2 \sum_{t=2}^T \hat{e}_{it-1}^2 \quad (11)$$

$$DH_p = \hat{S}_n (\tilde{\phi} - \hat{\phi})^2 \sum_{i=1}^n \sum_{t=1}^T \hat{e}_{it-1}^2 \quad (12)$$

Null and alternative hypotheses of Durbin H test are written as follows:

$H_0: \phi_i = 1$ there is no cointegration for all cross section units

$H_{1a}: \phi_i = \phi < 1$ there is a cointegration for all cross section units

$H_{1b}: \phi_i < 1$ there is a cointegration for all cross section units

Table 9: Durbin H Test Results for Euro Area

	Test Statistics	Bootstrap Prob.
DH_p	2.322	0.010
DH_g	7.029	0.000

Notes: According to the table 9, H_0 hypothesis is rejected (bootstrap values was taken into account because of the cross sectional dependency). The results show that there is a co-integration relationship among all the variables.

Table 10: Durbin H Test Results for Developing-Emerging Europe

	Test Statistics	Bootstrap Prob.
DH_p	5.217	0.000
DH_g	3.610	0.000

Notes: The results given in table 10 show that H_0 hypothesis is rejected according to DH_p bootstrap values. There is a co-integration relationship among all variables.

Estimate Long-Term Regression Coefficients

Common Correlated Effect (CCE) Model which has developed as a new prediction approach by Pesaran (2006), because of panel data models include unobserved common factors so it is necessary to consider this multifactorial error structure of given external individual regressors. The main idea is to filter the individual-specific regressors by means of cross-section averages such that asymptotically as the cross-section dimension tends to infinity, the differential effects of unobserved common factors are eliminated (Pesaran, 2006:967).

CCE approach, which consists of approximating the linear combinations of the infeasible factors by cross section averages of the dependent and explanatory variables and then running standard panel regressions augmented with these cross section averages. Both pooled and mean group estimations of CCE are proposed, depending on the assumption regarding the slope homogeneity (Pesaran, 2013:24).

The CCE mean group estimator is a simple average of the estimators of the individual slope coefficients (Pesaran, 2006:982):

$$\hat{b}_{MG} = N^{-1} \sum_{i=1}^N \hat{b}_i \hat{b}_{MG} = N^{-1} \sum_{i=1}^N \hat{b}_i \quad (13)$$

The CCE pooled estimator is below (Pesaran, 2006:986):

$$\hat{b}_p = \left(\sum_{i=1}^N \theta_i X_i' \bar{M}_w X_i \right)^{-1} \sum_{i=1}^N \theta_i X_i' \bar{M}_w y_i \quad (14)$$

After Monte Carlo experiments, (1a, 1b, 2a and 2b), it is seen that CCEMG and CCEP estimators are giving effective results even in small samples and CCEP estimator superior than the CCEMG in the condition of homogeneity vice versa (Pesaran, 2006:992). One of the advantages of this method is long-term coefficients for each cross section unit can be individually calculated and it is possible to see and evaluate results for each country separately. The following tables (11-12-13-14) give the long-term regression coefficients of the cross section units.

Table 11: CCEMG Results for Euro Area

G	Coeff.	S.E. (NP)	T (NP)
FDI	-0.8608	0.7333	-1.6513

Notes: We reported CCE mean group coefficients, because the data of Euro Area is heterogeneous. The significance of standard deviation and non parametric (NP) type t-statistic (for $N \times T = 15 \times 19$, bias: -0.26, RMSE: 12.00, size: 6.25, power: 8.70 with rank deficiency) can be seen from table 3, experiment 1a in Pesaran (2006) page 996. According to the results which have presented on table 11, it's seen that there is a negative relationship

between economic growth and financial development. When the financial development index increases % 1, economic growth decreases % 0.86.

Table 12: CCEMG Results for Individual Cross-sections for Euro Area

ID	DFI	Se(NM)	inpt	Se(NM)	gdpbar	fdibar	se(NW)	Ti	Forum	To
Belgium	-0.188	0.593	0.184	0.531	0.543	0.049	-0.210	19	1995	2013
Austria	1.025	0.620	-0.502	0.366	0.707	0.039	0.002	19	1995	2013
France	-4.085	0.815	0.639	0.185	0.562	0.041	3.410	19	1995	2013
Finland	-0.083	0.453	-0.896	0.370	1.264	0.057	-0.194	19	1995	2013
Germany	-0.675	0.492	-0.096	0.474	0.939	0.065	2.155	19	1995	2013
Italy	-0.381	0.611	-1.407	0.233	0.715	0.066	-0.059	19	1995	2013
Ireland	-0.357	1.231	1.936	1.325	0.836	0.115	-2.572	19	1995	2013
Latvia	3.627	3.020	11.546	10.125	2.064	0.240	-2.098	19	1995	2013
Lithuania	4.058	2.439	14.324	8.056	2.011	0.302	-1.090	19	1995	2013
Malta	-3.980	0.865	8.395	1.681	0.750	0.100	3.101	19	1995	2013
Netherland	-1.201	0.720	2.753	1.681	0.741	0.089	1.781	19	1995	2013
Portugal	-0.919	0.637	0.957	0.855	0.433	0.064	0.037	19	1995	2013
Spain	-0.953	0.496	2.169	1.234	0.525	0.055	1.153	19	1995	2013
Slovakia	-2.183	3.144	-4.968	6.447	1.240	0.069	1.976	19	1995	2013
Slovenia	-6.618	1.201	-10.825	2.468	1.028	0.146	0.651	19	1995	2013

Notes: se(NW) coefficients represents standard deviation and Ti representst time. The results show that, except the Austria, Latvia and Lithuania all Eurozone countries have the same destiny for the same period. Financial devlopment has negative impact on economic growth for 12 Euro Area countries. Austria, Latvia and Lithuania have special and opposite situation to each others. Financial development increases economic growth only in these countries.

Table 13: CCEP Results for Developing-Emerging Europe

G					
	Coeff.	S.E.(NP)	T (NP)	S.E.(NW)	T(NW)
FDI	-0.8181	0.4369	-1.8726	0.3416	-2.3950

Notes: We reported CCE pooled coefficients because the dataset of Emerging-developing Europe is homogeneous. The significany of standart deviation and Newey west (NW) type t-statistic (for $N \times T = 8 \times 19$, bias: -0.11, RMSE: 9.55, size: 6.90, power: 10.95 with rank deficiency) can be seen from table 4, experiment 2b in Pesaran (2006) page 997. According to the results which have presented on table 13, it's seen that there is a negative relationship between economic growth and financial development. When the financial development index increases % 1, economic growth rate decreases % 0.81.

When the results which have been presented on table 11 and 13 are considered together, it's understood that estimated long term regression coefficients (both negative) are converged. This convergence is possibly coming from catching up process of precommunistic countries (their financial and structural transition with privatization process after the fall of Berlin Wall) and not only common monetary policy of EU members but also Maastricht Criteria with Stability

and Growth Pack. It means that they have already carried out the regulations of Maastricht Criteria such as; inflation, budget deficit and national debt. Economic and political stability have been achieved.

Table 14: CCEP Results for Individual Cross-sections for Developing-Emerging Europe

ID	DFI	Se(NM)	inpt	Se(NM)	gdpbar	fdibar	se(NW)	Ti	Forum	To
Bulgaria	-0.662	0.241	-0.479	0.549	1.432	1.198	0.494	19	1995	2013
Croatia	-0.746	0.922	-0.774	2.406	1.118	0.206	1.340	19	1995	2013
Hungary	-1.618	1.522	-0.937	1.132	0.433	-2.460	1.785	19	1995	2013
Macedonia	-2.202	1.215	-1.324	0.790	0.498	2.932	1.369	19	1995	2013
Romania	-4.415	2.858	-4.930	3.044	0.929	4.167	2.586	19	1995	2013
Poland	-3.327	0.743	4.424	0.400	0.377	2.177	0.731	19	1995	2013
Serbia	-.827	0.992	-0.472	1.291	1.551	-0.163	0.491	19	1995	2013
Turkey	-0.581	1.252	-0.825	0.911	1.246	1.110	1.119	19	1995	2013

Notes: Se(NW) coefficients represents standard deviation and Ti representst time. The results, which have presented on table 14, show that financial development has negative impact on economic growth for Bulgaria, Croatia, Macedonia, Romania, Poland and Turkey. Hungary and Serbia have special and opposite situation to each others. Financial development has positive effect on economic growth only in Hungary and Serbia.

Testing Panel Causality Relationship

Dumitrescu and Hurlin (2012) test can be used not only to estimate for both dependent and independent cross section units but also whether or not co-integration among variables (Dumitrescu and Hurlin, 2012:1). This test has similarities to time series Granger causality test but it refers to the mean of Wald test statistics calculated for Granger causality test (Dumitrescu and Hurlin, 2012:1).

There are three different test statistics which are calculated in Dumitrescu and Hurlin (2012) panel causality test are written as follow (Dumitrescu and Hurlin, 2012:4-5):

$$W_{N,T}^{Hnc} = \frac{1}{N} \sum_{i=1}^N W_{i,T} \quad (15)$$

$$Z_{N,T}^{Hnc} = \sqrt{\frac{N}{2K}} (W_{N,T}^{Hnc} - K) \xrightarrow[N,T \rightarrow \infty]{d} N(0,1) \quad (16)$$

$$Z_{N,T}^{Hnc} = \frac{\sqrt{N} [W_{N,T}^{Hnc} - N^{-1} \sum_{i=1}^N E(W_{i,T})]}{\sqrt{N^{-1} \sum_{i=1}^N Var(W_{i,T})}} \xrightarrow[N,T \rightarrow \infty]{d} N(0,1) \quad (17)$$

Null and alternative hypotheses are below (Dumitrescu and Hurlin, 2012:4):

$$H_0: \beta_i = 0 \quad \forall_i = 1, 2, \dots, N$$

$$H_1: \beta_i = 0 \quad \forall_i = 1, 2, \dots, N_1 \text{ and } \beta_i \neq 0 \quad \forall_i = N_1 + 1, N_1 + 2, \dots, N$$

When the H_0 hypothesis is rejected, it shows that there is a causality relationship between the variables.

Table 15: Dumitrescu and Hurlin Causality Test Results for Euro Area

Null Hypothesis	Test	Statistic	Prob.
FD does not Granger cause G	W_{hmc}	1.924147	0.062655
	Z_{hmc}	2.530882	0.016218
	Z_{tild}	1.620599	0.107302
G does not Granger cause FD	W_{hmc}	4.592866	1.05E-05
	Z_{hmc}	9.839470	3.78E-22
	Z_{tild}	7.235187	1.71E-12

Notes: According to the findings which have presented table 15, it is possible to say that there is a two-way causality relationship between economic growth and financial development for the Euro Area countries during the period of 1995-2013.

Table 16: Dumitrescu and Hurlin Causality Test Results for Developing-Emerging Europe

Null Hypothesis	Test	Statistic	Prob.
FD does not Granger cause G	W_{hmc}	2.625988	0.012691
	Z_{hmc}	3.251977	0.002016
	Z_{tild}	2.261852	0.030902
G does not Granger cause FD	W_{hmc}	2.323666	0.026819
	Z_{hmc}	2.647333	0.011997
	Z_{tild}	1.797354	0.079327

Notes: Given results in table 16 show that there is a two-way causality relationship between economic growth and financial development for Developing-Emerging Europe economies during the period of 1995-2013.

CONCLUSION

This paper examined the causality between financial development and economic growth for 15 Euro Area members and eight Emerging-developing European countries ((By emerging countries of Europe (Bulgaria, Hungary, Romania, Poland, Croatia, Turkey, Serbia and Macedonia) and countries in Eurozone (Belgium, Italy, Spain, Austria, Lithuania, Latvia, Netherlands,

France, Finland, Germany, Ireland, Malta, Portugal, Slovenia, and Slovakia)) during the period 1995-2013 with panel causality analysis and long term coefficients are estimated with CCE Model. We excluded before 1995s due to lack of dataset. We composed a financial development index (FDI) from eight financial development indicators which belong to banking sector and stock market, with use the principal component analysis. The empirical results demonstrate the presence of feedback relationship, two-way causality between financial development and economic growth, imparting to the support of both demand following and supply-leading hypothesis. But the estimated long term coefficients show that there is a negative relationship between economic growth and financial development, when the financial development index increases economic growth decreases for both group of countries. This result is supporting the studies of George and Marianna (2010), who found that banking sector affects financial development in a negative way where in our study some transition economies had quick privatization process and only banking sector was dominant in their economies. Naik and Padhi (2015), the depth indicator has negative impact on economic growth in the long run for developing countries and our data set includes 15 of them. This can be one of the explanation that why financial development had negative impacts on economic growth and the another reason is the financial global crisis in 2008 which had long lasting impacts on all European economies and following contractionary regulations. Especially to fund Greece, Italy, Portugal Euro Area had to give and borrow a lot of money. Also Germany insisted to continue to their current economic growth policy which is dependent to export only and damaged the balance of general growth rates in EU. In addition, Euro area affected more than the other European countries in financial aspect. Because one of most important indicator of financial development is real exchange rate and it lost its value a lot during and after the financial economic crisis so firms and entrepreneurs suffered a lot and economic output has fell down.

This suggests that financial development can not be used as a policy implication alone to support economic growth in selected especially emerging European countries. Even if they have common monetary policy and regulations, they don't have common fiscal policy yet except Turkey because Turkey is not a member of European Union. It means that each country is independent to rule their own policy decisions, so national fiscal policies can no longer fulfill their role for stabilization. If there is an incoordination between monetary and fiscal policies, countries may encounter different interest rates. Therefore countries become vulnerable to demand shocks. Especially stock market indicators badly affected from it. Actually for specific occasions, the econometric analysis does not answer all the questions raised by the theory but still guides to test hypothesis.

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