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The Relationship between Financial Performance of Banking Sector and Economic Growth: A Research on EU Countries

Bankacılık Sektörünün Finansal Performansı ile Ekonomik Büyüme Arasındaki İlişki: AB Ülkeleri Üzerine Bir Araştırma

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Abstract

In this study, the effects of financial performance of banking sector on economic growth have been analyzed. The study covers the data for the period 1996-2017 of European Union countries. In the study in regard to economic growth, GDP growth (annual %); financial performance, bank ROA, bank ROE, bank cost to income ratio (%) and stock market capitalization to GDP (%) have been used. The relationship between financial performance and economic growth have been analyzed through panel data method. The results of the analysis suggest that the bank performance of European Union countries have positive effect on economic growth. A positive and significant relationship has been determined that the ROA, bank cost to income ratio and stock market capitalization and economic growth. EU countries will be able to expedite economic growth by increasing the financial performance of banks.

Keywords: *Financial Performance, Economic Growth, Panel Data Analysis*

JEL: C33, G21, L25, O10

Öz

Çalışmada, bankacılık sektörünün finansal performansının ekonomik büyüme üzerindeki etkisi incelenmiştir. Avrupa Birliği üye ülkelerinin 1996-2017 dönemi verileri çalışmanın kapsamını oluşturmaktadır. Ekonomik büyüme, GSYH'deki büyüme (yıllık %) ile bankacılık sektörü finansal performansı ise bankaların aktif karlılığı (ROA), bankaların özsermaye karlılığı (ROE) ve bankaların fiyat kazanç oranı değişkenleri ile ölçülmüştür. Finansal performans ve ekonomik büyüme arasındaki ilişki panel veri analizi yöntemiyle araştırılmış olup, analiz sonucunda finansal performans ile ekonomik büyüme arasında istatistiksel olarak anlamlı ve pozitif yönlü bir ilişki tespit edilmiştir. Avrupa Birliği ülkelerinin banka performansının ekonomik büyüme üzerinde olumlu etkisi olduğu söylenebilir. Bu kapsamda Avrupa Birliği üye ülkelerinin bankacılık sektörü finansal performansını artırarak ekonomik büyümeyi hızlandırabileceği söylenebilir.

Anahtar Kelime: *Finansal Performans, Ekonomik Büyüme, Panel Veri Analizi*

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Introduction

The different growth rates of the countries necessitated the investigation of factors such as resource efficiency, management quality, human capital, corporate development, legal factors and financial system affecting the growth rate. Especially in recent studies, the effect of financial system on economic growth has been examined. In the literature, different findings have been obtained in the relationship between financial system and economic growth. Economists focused on banks in the impact of the financial system on growth. Walter Bagehot (1873) and Joseph A. Schumpeter (1912) emphasized the critical importance of the banking system in economic growth. They have described situations where banks can actively promote innovation and future growth by identifying and financing efficient investments. In contrast, Joan Robinson (1952) argued that banks react passively to economic growth. Empirically, Robert G. King and Levine (1993) show that the level of financial intermediation is a good predictor of long-term economic growth, capital accumulation and productivity growth rates. They generally found that countries with a "better" financial system tend to grow faster (Levine and Zervos, 1996: 537).

The different levels of development of financial systems affect individuals' savings and investment decisions. Banks, which act as intermediaries between fund suppliers and demanders, can direct savings to investments. The relationship between equity markets and economic growth can be influenced by the relationship between equity markets and financial intermediaries. Assuming that banks and financial intermediaries are in a better position than the stock exchanges, it is assumed that addressing agency problems may hinder economic growth if stock exchange development occurs at the expense of improving the banking system. Therefore, it will be possible that the developments in the stock market will go hand in hand with the development of the banking system at total level (Arestis et al., 2001: 19).

The effect of banks on economic growth is realized in two ways. These are increasing capital accumulation and encouraging technological innovations. Banks play an important role in transforming savings into investments, enabling the emergence of new technologies and positively impacting economic growth by performing the intermediary function in a healthy way. Banks perform various functions based on improving temporary costs and thus capital accumulation and technological progress. These functions; (i) accumulation and mobility of savings, (ii) risk management, (iii) information generation and resource allocation, (iv) monitoring and management of managers (Petkovski and Kjosevski, 2014: 55).

The objective of the study is to investigate the relationship between the financial performance of banking sector and economic growth. For that purpose, the data of twenty-seven countries on European Union (EU) period of 1996-2017 were analyzed within the scope of the study. When the empirical studies are examined, the relationship between banks and economic growth is generally measured with the variables of lending rate, deposit interest rate and the loans provided by banks to the private sector. In most experimental studies, although the subject is still controversial, it is generally concluded that the development of the financial sector accelerates economic growth. There is no study that measures the relationship between banks' return on assets and return on equity and Cost to Income Ratio and Stock Market Capitalization and economic growth. In this direction, the study is original and contributes to the literature.

1. Literature Review

There are many studies in the literature related to the financial system and economic growth. The studies are generally on banking. The first studies on the relationship between financial development and economic growth were investigated by Bagehot (1878), Schumpeter (1912) and Hicks (1969). In the studies, it was found that there is a positive relationship between the development of financial sector and economic growth. Similar studies related to this subject are explained below in chronological order.

King and Levine (1993) tested the relationship between financial system and economic growth in 80 countries during the 1960-1989 period. Data on the banking sector were used for financial development and growth data on per capita income and physical capital were used to represent economic growth. As a result of the analysis, they found that financial development leads to economic growth.

Murinde and Eng (1994) explored the relationship between economic growth and financial development in Singapore during the period 1979-1990. They measured financial development with monetary aggregates, monetary ratios and monetary variables. Granger causality test showed that monetary variables positively affected real economic growth.

Levine and Zervos (1996) investigated the relationship between stock market development and growth. As a result of their studies, they found that stock market development and economic growth had a positive relationship.

Arestis and Demetriades (1997) investigated the effects of stock capitalization on economic growth for the USA and Germany. As a result of analysis, Equity market capitalization in Germany has an indirect impact on economic development. On the other hand, In the US, the stock market capitalization value has a direct and positive impact on economic growth. Another finding is that the banking sector positively affected growth in both countries.

Neusser and Kugler (1998) test production data obtained from thirteen OECD countries in the period 1970-1991, using co-integration tests to establish a long-term relationship between manufacturing sector GDP and financial sector GDP and between TFP manufacturing sector and financial sector GDP have analyzed. As a result of the study, the financial sector found a relationship between GDP and manufacturer TFP.

Christopoulos and Tsionas (2004) investigated the relationship between financial depth and economic growth for 10 developing countries. As a result of the study, they found one-way causality relationship from financial depth to economic growth.

Cole et al. (2008), with the data set consisting of 38 developed and developing countries, aimed to reveal the relationship between stock sector returns and future economic growth between 1973-2001. As a result of GMM panel data analysis, they found a positive and significant relationship between future GDP growth and bank stock returns, independent of the previously documented relationship between market index returns and economic growth.

Cheng and Degryse (2010), using the data of 27 Chinese provinces in the period 1995-2003, investigated whether the financial development of two different types of financial institutions and non-bank institutions had a (significantly different) effect on local economic growth. As a result of this study, it shows that banking development has a statistically significant and economic effect on local economic growth.

Kyophilavong et al. (2016), In their work, they explored the relationship between financial development and economic growth. As a result of their analysis with the autoregressive distributed delay (ARDL) test, they found that financial development encouraged economic growth and as a result, the development in economic growth led to financial development.

Thierry et al. (2016), investigated the relationship between bank loan and economic growth in Cameroon in the period 1969-2013. The Vector Error Correction Model (VECM) was used to analyze the relationship between bank credit and economic growth. According to the results of VECM, a one-way causality relationship from private sector loans and bank deposits to GDP was determined.

Ibrahim and Alagidede (2018), in the study, the relationship between real and financial sector growth and economic growth in 29 sub-Saharan African countries in 1980-2014 period was investigated by panel data analysis. Results from the panel data analysis, financial development supports economic growth.

Paun et al. (2019), In the study, they investigated the impact of financial sector development, development and performance on economic growth for 45 countries in the period 2006-2015, based on a panel regression methodology. As a result of the research, they found a positive relationship between financial development and economic growth.

Malarvizhi et al. (2019), In their study, they investigated the relationship between financial sector development and economic growth by using a sample from ASEAN-5 countries between 1980-2011 with panel data analysis. As a result of the analysis, a positive relationship was determined between financial development and economic growth.

Studies investigating the relationship between financial performance and economic growth are presented in Table 1 comparatively.

Table 1. Comparative Table of Literature Review

Research	Scope of Research	Method of Research	Findings
King and Levine (1993)	1960-1989 period - 80 countries	Regression	They found that financial development leads to economic growth.
Murinde and Eng (1994)	1979-1990 period - Singapore	Granger Causality Test	Monetary variables positively affected real economic growth.
Levine and Zervos (1996)	The first observation 1976-1985 period - The second observation 1986-1993 period – 24 countries	Regression	Stock market development and economic growth had a positive relationship.
Arestis and Demetriades (1997)	USA and Germany	Regression	The banking sector positively affected growth in both countries.

Neusser and Kugler (1998)	1970-1991 period - OECD	Regression	The financial sector found a relationship between GDP and manufacturer TFP.
Christopoulos and Tsionas (2004)	10 developing countries	GMM panel	They found one-way causality relationship from financial depth to economic growth.
Cole et al. (2008)	1973-2001 period - 38 developed and developing countries	GMM panel	They found a positive and significant relationship between future GDP growth and bank stock returns.
Cheng and Degryse (2010)	1995-2003 period - 27 Chinese provinces	Regression	Banking development has a statistically significant and economic effect on local economic growth.
Kyophilavonget al. (2016)	1984-2012 period - Laos	ARDL Test	They found that financial development encouraged economic growth.
Thierry et al. (2016)	1969-2013 period - Cameroon	The Vector Error Correction Model	A one-way causality relationship from private sector loans and bank deposits to GDP was determined.
Ibrahim and Alagidede (2018)	1980-2014 period - 29 sub-Saharan African countries	Panel Data Analysis	Financial development supports economic growth.
Paun et al. (2019)	2006-2015 period - 45 countries	Panel Data Analysis	They found a positive relationship between financial development and economic growth.
Malarvizhi et al. (2019)	1980-2011 period - ASEAN-5	Panel Data Analysis	A positive relationship was determined between financial development and economic growth.

2. The Data Set and Model of the Study

The purpose of the study is to examine the relationship between the financial performance of banking sector and economic growth. The data of twenty-seven countries on European Union (EU) during the period of 1996-2017 were analyzed within the scope of the study. 2018 and 2019 were not included in the analysis due to the inaccessibility of the data. Secondary data concerning the use of financial performance and economic growth were obtained from the database https://databank.worldbank.org. As of 2019, there are 27 countries listed on EU whose full data could be obtained were included in the analysis. These countries were indicated in Table 2.

Table 2. EU Countries

1	Austria	**15**	Italy
2	Belgium	**16**	Latvia
3	Bulgaria	**17**	Lithuania
4	Croatia	**18**	Luxembourg
5	Republic of Cyprus	**19**	Malta
6	Czech Republic	**20**	Netherlands
7	Denmark	**21**	Poland
8	Estonia	**22**	Portugal
9	Finland	**23**	Romania
10	France	**24**	Slovakia
11	Germany	**25**	Slovenia
12	Greece	**26**	Spain
13	Hungary	**27**	Sweden
14	Ireland		

The information regarding the dependent and independent variables used in the study within to investigate the relationship between the financial performance of banking sector and economic growth is indicated in Table 3.

Table 3. Variables and Definitions

Dependent Variable	Economic Growth	GDP growth (annual %)
Independent Variables	ROA	(Net Income/Total Assets) Average Return on Assets
	ROE	(Net Income/Total Equity) Average Return on Equity
	Cost to Income Ratio (%)	Total costs as a share of total income of all commercial banks.
	Stock Market Capitalization to GDP (%)	Value of listed shares to GDP, calculated using the following deflation method: {(0.5)*[Ft/P_et + Ft-1/P_et-1]}/[GDPt/P_at] where F is stock market capitalization, P_e is end-of period CPI, and P_a is average annual CPI.

Economic growth represented by GDP growth (annual %) while financial performance of banking sector is represented by ROA, ROE, Cost to Income Ratio (%) and Stock Market Capitalization to GDP (%). The panel data model created within the scope of the study is as follows equation No. 1.

$$ECOGRW_{it} = \alpha_{it} + \beta_{2it} ROA_{it} + \beta_{3it} ROE_{it} + \beta_{3it} COSTINC_{it} + \beta_{3it} STMKTCAP_{it} + \varepsilon_{it} + \lambda_t \quad (1)$$

Where, $ECOGRW_{it}$ denotes the dependent variable while ROA_{it}, ROE_{it}, $COSTINC_{it}$ and $STMKTCAP_{it}$ denotes independent variables. ε_{it} error term, i represents each of the units in the model, t represents time. λ_t is added to the two-way fixed effects model to express the constant term which can vary from time to time (Gujarati, 2003: 642-644).

3. Methods of the Study

Panel data analysis is the method of estimating economic relations by means of panel data models using cross-sectional data with time dimension. The panel data model is expressed by the following equation.

$$Y_{it} = \alpha_{it} + \beta_{kit} X_{kit} + u_{it} \quad (2)$$

Where i = 1, 2, 3,……N is cross sectional units, t = 1, 2, 3,……T is the time dimension, ε is the panel data error term. Panel regression analyses are carried out in order to determine the relationship between financial performance of banking sector and economic growth. In accordance with panel data analysis; Multicollinearity, cross sectional dependency, homogeneity, stationarity, model selection, heteroscedasticity and autocorrelation were investigated. The first assumption that should to be tested within the scope of panel data analyses is multicollinearity. In panel regression analysis, having strong relationships between all or some of the independent variables is called multicollinearity connection. Due to the estimation problems caused by multicollinearity among variable OLS cannot be used. Spearman correlation test and Variance Inflation Factors (VIF) are estimated for multicollinearity.

In panel data estimation, cross sectional dependency affects the validity of the results. In other words, any panel data analysis disregarding cross sectional dependency may cause biased and inconsistent results (Breusch- Pagan, 1980; Pesaran, 2004). Cross-sectional dependence between series was analyzed by use of Pesaran (2004) CD test due to the fact that time dimension of the study is greater than its cross-section dimension (N>T). The CD test is calculated by the following formula:

$$CD = \sqrt{\frac{2}{N(N-1)}} \left\{ \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \sqrt{T_{ij}} \rho_{ij} \right\} \quad (3)$$

where: N denotes number of country stock prices for the cross-country, T_{ij} denotes the number of observations for which the correlation coefficients for the cross- country are calculated, p_{ij} denotes the par-wise correlation coefficient involving the i and j.

Homogeneity tests enable us investigating whether constant and slope terms are homogenous across cross section units. In this study, Pesaran and Yamagata (2008) delta tests are used in order to investigate the homogeneity. The Delta test is calculated by the following formula:

$$\widetilde{\Delta}_{adj} = \sqrt{N}\,\frac{N^{-1}\ \widehat{S} - E(\widetilde{Z_{it}})}{\sqrt{VAR}\,(\widetilde{Z_{it}})} \qquad (4)$$

Stationarity is required for the validity of the results. Considering the cross-section dependence and homogeneity in the series, the assumption of stationarity was investigated using the second-generation unit root test Bai and Ng (2004) PANIC and the first generation unit root test Levin, Lin and Chu (2002) LLC. The PANIC and LLC tests are calculated by the following formula (5, 6) and (7).

$$P_{\hat{e}}^{\,c} = \frac{-2\sum_{i=1}^{N}\ln P_{\hat{e}}^{c}(i) - 2N}{\sqrt{4N}} \xrightarrow{d} N(0,1) \qquad (5)$$

$$P_{\hat{e}}^{\,T} = \frac{-2\sum_{i=1}^{N}\ln P_{\hat{e}}^{T}(i) - 2N}{\sqrt{4N}} \xrightarrow{d} N(0,1) \qquad (6)$$

$$\Delta y_{it} = \rho y_{i,t-1} + \sum_{L=1}^{p_i}\theta_{iL}\Delta y_{it-L} + \alpha_{mi}d_{mt} + \varepsilon_{it} \quad m = 1,2,3 \qquad (7)$$

In order to choose the most appropriate panel data model, F-test, Breuch-Pagan LM (1980) and Honda (1985) were applied. It is anticipated that using fixed effects model for the estimation of the model created based on F, LM and Honda test results would provide more accurate results. The F, LM and Honda tests are calculated by the following formula (8), (9), (10) and (11).

$$Y_i = X_i\beta_i + u_i \qquad i = 1,2,3,\ldots,N \qquad (8)$$

$$H_0 : \sigma_\mu^2 = 0\ ;\ H_1 : \sigma_\mu^2 \neq 0 \qquad (9)$$

$$LM = (\ LM_1 + LM_2\ ) \sim X^2 \qquad (10)$$

$$HONDA = \sqrt{(\ LM_1 + LM_2\ )} \sim N(0,1) \qquad (11)$$

Heteroscedasticity is investigated using Breusch-Pagan-Godfrey Heteroscedasticity LM test while autocorrelation is examined with Baltagi and Li (1991), Born and Bretuing (2016) and Durbin-Watson tests developed by Bhargava, Franzini and Narendranathan (1982).

4. Empirical Results

Panel regression analysis used to determine the relationship between financial performance of banking sector and economic growth. In accordance with panel data analysis; Multicollinearity, cross sectional dependency, homogeneity, stationarity, model selection, heteroscedasticity and autocorrelation were investigated. Then the model was estimated. Descriptive statistical data regarding the variables are given in Table 4.

Table 4. Descriptive Statistics Results

	ECOGRW	ROA	ROE	COSTINC	STMKTCAP
Mean	2.666384	0.620523	7.845922	59.95200	44.47274
Median	2.819680	0.632967	9.533182	59.25368	34.26782
Max	25.55727	7.402794	70.58665	150.0000	247.1704
Min	-14.81416	-8.522212	-117.6733	19.98810	0.025919
Std. Dev.	3.514200	1.208986	14.90192	12.72045	38.11175
Skew.	-0.425781	-1.642700	-3.054656	1.162754	1.610430
Kurt.	8.924457	15.71442	22.72489	10.82160	6.663637
J-B	886.6527	4268.143	10553.27	1647.988	588.9553
Prob.	0.000000	0.000000	0.000000	0.000000	0.000000
Obs.	594	594	594	594	594

When the mean values regarding explanatory and independent variables are analyzed. The mean value of the use of ECOGRW was 2.66. In addition, it is also seen that mean values for ROA, ROE, COSTINC and STMKTCAP are 0.62, 7.84, 59.95 and 44.47 respectively. Skewness, kurtosis and Jargue-Bera statistics show that series are not normally distributed.

In order to investigate for multicollinearity problem, Spearman correlation and variance inflation factors are estimated and results of which are reported in Table 5 respectively.

Table 5. Spearman Correlation and VIF Tests Results

Centered VIF	Coefficient Variance	Correlation t-Statistic Probability	ECOGRW	ROA	ROE	COSTINC	STMKTCAP
		ECOGRW	1.000000				

3.469976	0.040828	**ROA**	0.444296	1.000000			
			12.06655	-----			
			0.0000	-----			
3.312528	0.000257	**ROE**	0.433281	0.862074	1.000000		
			11.69717	41.38881	-----		
			0.0000	0.0000	-----		
1.106570	0.000118	**COSTINC**	0.076288	-0.282181	-0.231519	1.000000	
			1.861585	-7.156589	-5.790436	-----	
			0.0632	0.0000	0.0000	-----	
1.104953	1.31E-05	**STMKTCAP**	0.091922	-0.229933	0.024759	-0.046699	1.000000
			2.246057	-5.748533	0.602601	-1.137477	-----
			0.0251	0.0000	0.5470	0.2558	-----

The fact that the correlation coefficient between the variables is higher than 0.90 and the VIF values are higher than 10 indicates the existence of multicollinearity problem (Hair, et al. 1998; Tabachnick and Fidell, 2001). When the correlation and VIF test results are examined, the highest correlation coefficient among the independent variables used in the study was calculated as 0.86 and VIF value as 3.469. Because of this result, there is no multicollinearity problem between independent variables in the panel. Cross-sectional dependence between series was analyzed by Pesaran (2004) CD test. The results of Cross-Section Dependency Test are given in Table 6.

Table 6. Cross-Section Dependency Results

Variables	Pesaran CD (2004)	
	Stat.	Prob.
ECOGRW	0.018	0.493
ROA	-1.372	0.085
ROE	-1.591	0.056
COSTINC	-2.000	0.023
STMKTCAP	-0.701	0.242
Optimal lag length (m) is determined as 3 H_0: No cross-section dependency		

According to Pesaran (2004) CD test results, it is observed that the probability values for COSTINC are below the critical value of 0.05. Therefore, the null hypothesis is rejected. Result of test point out the existence of the problem of cross-sectional dependence in the COSTINC variable. Probability values for ECOGRW, ROA, ROE and STMKTCAP variables were above the critical value of 0.05. Therefore, the null hypothesis was not rejected. Accordingly, it was revealed that there is no cross-sectional independence in the series. Homogeneity tests enable us investigating whether constant and slope terms are homogenous across cross section units. Pesaran and Yamagata (2008) delta test results are given in Table 7.

Table 7. Homogenity

Variables	$\tilde{\Delta}$	Prob.	$\tilde{\Delta}_{adj}$	Prob.
ECOGRW	-0.109	0.543	-0.117	0.547
ROA	1.264	0.103	1.360	0.087
ROE	1.342	0.090	1.444	0.074
COSTINC	3.638	0.000	3.915	0.000
STMKTCAP	2.518	0.006	2.709	0.003
H_0: Homogenity				

The results of homogeneity test for variables suggested that probability values for ECOGRW, ROA and ROE variables the probability values for both tests were observed to be over the critical level of 0.05. According to the results of the tests, the slope coefficients for the three variables were determined to be homogeneous. According to Cross-sectional dependency and homogeneity test results, Bai and Ng (2004) PANIC Unit Root Test second generation unit root test was used to investigate the stationarity of CONSTINC variable, Levin, Lin and Chu (2002) LLC and Im, Pesaran ve Shin (2003) first generation unit root tests were used to investigate the stationarity of ECOGRW, ROA and ROE variables. The results regarding the unit root tests are given in Table 8.

Table 8. Unit Root Test Results

PANIC				
	Constant		Constant and Trend	
	Stat	Prob.	Stat	Prob.
COSTINC				
$Z_{\hat{e}}^{c}$	3.7330	0.0001	2.0243	0.0215
$P_{\hat{e}}^{c}$	92.794	0.0008	75.037	0.0307

Maximum lag length (m) is determined as 3.
* indicates statistical significance at 10% level and ** indicates statistical significance at 5% level. *** indicates statistical significance at 1% level.
H_0: Unit Root

Levin, Lin and Chu (2002) LLC							
	Variable	Stat	Prob		Variable	Stat	Prob
Constant	ECOGRW	-10.509	0.000	Constant and Trend	ECOGRW	-9.042	0.000
	ROA	-10.990	0.000		ROA	-8.232	0.000
	ROE	-9.530	0.000		ROE	-8.294	0.000
Im, Pesaran ve Shin (2003) IPS							
	Variable	Stat	Prob		Variable	Stat	Prob
Constant	STMKTCAP	-5.046	0.000	Constant and Trend	STMKTCAP	-3.118	0.000

Bai and Ng (2004) PANIC, LLC and IPS unit root tests results indicate that probability values for CONSTINC, ECOGRW, ROA, ROE and STMKTCAP were below the critical value. Therefore, the null hypothesis was rejected. These variables are stationary at levels. F-test, Breuch-Pagan LM (1980) and Honda (1985) are applied to choose the most appropriate panel data model. The results regarding the F, LM, Honda Tests are given in Table 9.

Table 9. Model Selection for Panel Data

Test	Stat.	P-value	Null Hypothesis	Decision
F Tests				
Individual effect (F.E)	6.069989	0.000000	H_0: Individual effect but no time effect	2
Time Effect (F.E)	15.36861	0.000000	H_0: Time effect but no individual effect	2
Individual and time Effect (F.E.)	11.76709	0.000000	H_0: No individual and time effect.	2
Breuch-Pagan LM Tests				
Individual effect (R.E)	78.57968	0.000000	H_0: Individual effect but no time effect	2
Time Effect (R.E)	655.2087	0.000000	H_0: Time effect but no individual effect	2
Individual and time Effect (R.E.)	733.7884	0.000000	H_0: No individual and time effect.	2
Honda (1985) Test				
Individual effect (R.E)	8.864518	0.000000	H_0: Individual effect but no time effect	2
Time Effect (R.E)	25.59704	0.000000	H_0: Time effect but no individual effect	2
Individual and time Effect (R.E.)	24.36800	0.000000	H_0: No individual and time effect.	2
Hausman Test			Decision 1: Cannot Reject, Decision 2: Reject, F.E: Fixed Effect, R.E: Random Effect	
Hausman	60.29889	0.000000		

If the data used in any study was formed from a specific group and based on a certain period, the fixed effects model should be used in the final estimation of the models (Baltagi, 2005). F-test statistics indicate that the appropriate model is the two-way fixed effect model with time and Individual effects. Hence, considering the characteristics of the data set and model tests, fixed effect model is estimated using OLS regressions.

Heteroscedasticity in model was investigated by use of Breusch-Pagan-Godfrey Heteroscedasticity LM test. On the other hand, Baltagi and Li (1991), Born and Bretuing (2016) and Bhargava, Franzini and Narendranathan (1982) in Durbin-Watson test were adopted to investigate if there was a problem of autocorrelation in the models. The results regarding the heteroscedasticity and autocorrelation tests are given in Table 10.

Table 10. Heteroscedasticity and Autocorrelation for Two-Way Fixed Effect Model

Heteroscedasticity	**Stat.**	**P-value**
Breusch-Pagan-Godfrey LM H_0: No Heteroscedasticity	317.1474	0.000000
Autocorrelation		
Baltagi and Li (1991) LM-stat H_0: No Autocorrelation	51.60618	0.000000
Born and Bretuing (2016) LM*-stat H_0: No Autocorrelation	69.64181	0.000000
Durbin-Watson Bhargava, Franzini and Narendranathan (1982) H_0: No Autocorrelation	1.374873	

Results indicate that error term variances are not constant, and covariance do not equal to zero indicating heteroscedasticity in the model. Results for autocorrelation tests show that error terms are serially correlated which means that autocorrelation problem exist in the series. White period standard errors & covariance method which accounts for the heteroscedasticity and autocorrelation problem in series is used in examining the relation between financial performance of banking sector and economic growth in EU countries. The results regarding the panel data analysis are given in Table 11.

Table 11. Panel Data Analysis Results

Dependent Variable	**Approach**			**Time Period**
GDP growth (annual %)	Least Squares White Period Standard Errors & Covariance			1996-2017
Independent Variables	**Coefficient**	**Std. Error.**	**t-stat**	**P-value**
ROA	0.6548	0.2217	2.9527	0.0033
ROE	0.0164	0.0151	1.0886	0.2768
COSTINC	0.0487	0.0133	3.6482	0.0003
STMKTCAP	0.0145	0.0061	2.3846	0.0174
C	-1.4380	0.9200	-1.5629	0.1186
R-squared	Adjusted R-squared	S.E. of regression	Sum squared resid	Log likelihood
0.5940	0.5558	2.3420	2973.0	-1321.1
F-statistic	Mean dependent var	S.D. dependent var	Schwarz criterion	Prob(F-statistic)
15.550	2.6663	3.5142	5.0074	0.0000
***,** and * indicates %1, %5 and %10 significance respectively.				

The results in Table 11 indicate that estimated model is significant at 1% and financial performance variables explain 59.4 percent of the changes in economic growth. A positive and significant relationship was found between the ROA, bank cost to income ratio and stock market capitalization and economic growth. In this context, economic growth is influenced by ROA (0.654), bank cost to income ratio (0.048) and stock market capitalization (0.014). EU countries will be able to expedite economic growth by increasing the financial performance of banks.

Conclusion

The aim of the study is to determine the relationship between the financial performance of banking sector and economic growth on European Union (EU) countries. Economic growth is represented by GDP growth, financial performance is represented by bank ROA, bank ROE, bank cost to income ratio (%) and stock market capitalization to GDP. The relationship between financial performance and economic growth was analyzed by panel data method. As a result of panel data analysis, financial performance of the banking sector positively affected economic growth in EU countries. Financial performance of banking sector variables explains 59.4 percent of the changes in economic growth. A positive and significant relationship was found between the ROA, bank cost to income ratio and stock market capitalization and economic growth. The results of the study are similar to the finding reported by Bagehot (1878), Schumpeter (1912) and Hicks (1969). King and Levine (1993), Levine and Zervos (1996), Arestis and Demetriades (1997), Cole et al. (2008), Ibrahim and Alagidede (2018).

According to the findings of the study, countries should increase the financial performance of banking sectors in order to economic growth. EU countries can increase their economic growth by 65% by increasing the return on assets of the banking sector. In addition, the increase in the bank cost to income ratio increases economic growth by 4.87%. The increase in market value of equity markets leads to 1.45% economic growth.

The financial sector is crucial for the economic growth and stability of countries. A crisis in the financial sector adversely affects the economy and these crises can collapse the countries. In addition, the financial sector meets the funding needs of the real sector. In this context, the financial performance of the banking sector is critical for countries. Countries can grow economically as increase asset quality and profitability of banking sector. The increase in the market values of all the shares traded in the share markets also provides economic growth. Therefore, EU countries can grow more economically if they develop the banking sector and give the necessary importance.

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