

## The Effects of Financial Development on Economic Growth in the European Union: A Panel Data Analysis

by

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*Abstract.* In this study, panel data method was used in order to analyze the relationship between financial development and economic growth in European Union. The analysis contains the period between 2004 and 2012. While Domestic Credit to Private Sector as % of GDP affects growth negatively, Capitalization Ratio and Money and Quasi Money M2 as % of GDP affect growth positively. As dummy variable, it was determined that the year of 2009 had a huge negative impact on growth of European Union countries.

*Key words:* financial development, economic growth, European Union, panel data

JEL Classification: C01, C23, G23, O47, O52, R11

### 1 Introduction

The role of financial markets is considered as an important factor in terms of growth process. The positive relationship between economic growth and financial depth which indicates development level of financial markets is explicitly determined. Developed countries unexceptionally have advanced financial markets, and so it can be expected that policies aiming to enhance financial sector improve economic growth. After all, financial development is described as the key of economic growth and development by many scholars (Khan and Senhadji, 2000:3).

Theoretically, financial instruments, markets and institutions have decreasing impact on the cost of information and transaction. So saving rates, investment decisions, innovation and economic growth rates are impressed by this process (Levine, 1997: 689). Levine (1997:691) modeled the theoretical structure between financial system and economic growth. According to Levine's model, the cost of information and transaction is decreased by means of financial markets and intermediaries. In this process, savings become mobilized, allocation of resources actualizes, management risks decrease, trade of goods and services gets easy and contracts can be made easily. These opportunities which arise thank to financial

system give rise to capital accumulation and technological innovation and so enable economic growth.

Patrick (1966:174) described the relationship between financial development and economic growth as two different interactions. One of these interactions is "demand-following". Accordingly, generation of modern financial institutions, their instruments and services will be demanded by investors and savers in the economy. So, developments in financial system affects economic growth process. According to "supply leading" entrepreneurs in modern sector will be prompted through transfer of resources from traditional sector to modern sector (Patrick, 1966:175-176).

It can be said that financial development, which is generally measured with respect to the credit level and size of equity market, is an estimator of economic growth. The reason is that when financial institutions predict the growth in sectors and give more credits equity markets capitalize the values of existing growth opportunities. Therefore, it can be said that financial development is main indicator in terms of economic growth (Rajan and Zingales, 1996:2).

According to main policy of McKinnon-Shaw School, restrictions of governments on banking sector (interest rate limits, high reserve ratios and direct credit programs) prevent financial

development and decrease economic growth. Similar results can be obtained from internal growth literature (which obviously modeled the services presented by financial intermediaries). These models assert that financial intermediation has positive impact on growth (Khan and Senhadji, 2000:4).

When seeing theoretical framework, it can be said that institutions and instruments which provide financial development make contribution to economic growth level through different ways. It is very important to determine which financial variables have impact on the growth of countries in order to provide economic growth. In this study, the relationship between financial development and economic growth was analyzed in terms of European Union.

## 2 Summary of Literature

King and Levine (1993) used the data of 80 countries for the period of 1960-1989 in their study. In this study real per capita GDP growth was used as the indicator of growth and liquid liabilities which consist of currency held outside the banking system plus demand and interest-bearing liabilities of banks and nonbank financial intermediaries (M3), the ratio of deposit money bank domestic assets to deposit money bank domestic assets plus central bank domestic assets, the ratio of claims on the nonfinancial private sector to total domestic credit (excluding credit to money banks), the ratio of claims on the nonfinancial private sector to GDP were used as independent variable. It was concluded that financial development makes contribution to economic growth (King and Levine, 1993: 717, 720, 721).

Levine and Zervos (1998) examined the relationship between financial development and economic growth by using the data of 47 countries for the period of 1976-1993. They concluded that liquidity of capital markets and improvements in banking sector have a positive and strong impact on economic growth, capital accumulation and productivity growth (Levine and Zervos, 1998: 543,554).

Beck et al. (2005) analyzed the impacts of problems which arise from financial factors,

legal factors and embezzlement on growth of firms in their study which was carried out in 54 countries at firm level. When financial and institutional development is achieved, problems of firms decrease. The impacts of problems which arise from financial factors, legal factors and embezzlement on growth of firms differ according to the scales of firms. Growth of small-scale firms is affected from this situation more (Beck et al., 2005: 137).

In panel data analysis, Artan (2007) used data of 79 countries which were separated into different income groups for the period of 1980-2002 and he used M2/GDP and M3/GDP variables as financial development indicator. According to the results of analysis, it was concluded that financial development in low-income countries affects economic growth negatively and financial developments in medium-income and high-income countries affect economic growth positively (Artan, 2007: 87).

In his study which is carried out on the factors which affect economic growth of 10 Central and Eastern European countries in the period of 1993-2009, Prochniak (2011) could not find any relationship between economic growth and M2/GDP ratio, domestic credit provided by banking sector (% of GDP) and domestic credit to private sector (% of GDP) variables. A positive relationship between stock market capitalization rate and growth was found (Prochniak, 2011: 453, 465).

Djalilov and Piesse (2011) analyzed the relationship between financial development and economic growth in their study which involves the period of 1992-2008 for 27 Eastern European and former Soviet Union countries which are described as transition economies. They used three different variables with regards to financial development. One of these variables is financial index which consist of composition of different financial arguments. Second variable is financial inclusion variable which highlights competition level in banking sector, includes the difference between interest rates on credit and deposit. Third variable is domestic credit to private sector (% of GDP) rate (Djalilov and Piesse, 2011: 14). If financial sector has impact on economic growth, it was concluded that these countries reached a certain

development level. Domestic credit to private sector (% of GDP) rate does not have statistically significant impact on growth (Djalilov and Piesse, 2011: 21).

Gantman and Dabos (2012) found that there is not a statistically significant relationship between financial development and economic growth in dynamic panel analysis which was carried out with data of 98 countries by using different control variables. Per capita GDP growth was used as growth indicator and credit to private sector by banks and other financial institutions (% of GDP) was used as financial development indicator (Gantman and Dabos, 2012: 521, 522, 530).

Olitan (2012) examined relationship between financial development and economic growth by using data of 31 African countries for the period of 1985-2005. Three variables were used as explanatory variables; Liquid facilities (M3) as % of GDP, domestic credit provided by banking sector to private sector rate and domestic credit to private sector (% of GDP) (2012: 56-57). According to the result of the study, intermediation of financial sector is important. Domestic credit to private sector makes contribution to economic growth. Credits provided by banking sector does not so much reflect in private sector. Hence, a long-term relationship between domestic credit to private sector and economic growth was not found.

Al-Malkawi et al. (2012) analyzed the relationship financial development and economic growth through cointegration method in their study on United Arab Emirates by using the data of the period of 1974-2008. Two variables were used as financial development indicators. One these variables is M2/GDP which represents financial depth or size of financial intermediation sector, and domestic credit provided by commercial banks to private sector (% of GDP) rate which represents financial intermediation rate. According to the results of analysis, there is a negative and statistically significant relationship between financial development (M2/GDP) and economic growth. The reason is that financial system in United Arab Emirates did not still develop in the manner that it supports economic growth. A significant relationship between financial

intermediaries and growth could not be found (Al-Malkawi et al., 2012: 111).

Khadraoui and Smida (2012) were used domestic credit to private sector as financial development variable in their study which was carried out by using data of 70 countries for the period of 1970-2009 and they analyzed the relationship between this variable and growth. According to the results of analysis, there is a positive relationship between financial development and economic growth (Khadraoui and Smida, 2012: 104).

In the literature, it is seen that different variables were used as financial development variable. Results obtained from applied studies, which were carried out on financial development and economic growth, differ in terms of country groups and used variables.

### 3 Data Set and Model

Data of 27 European Union countries<sup>1</sup> for the period of 2004-2012 were taken into account. Data were obtained from the website of World Bank. Within the context of the studies in literature, GDP Per Capital Growth Annual was used as dependent variable and Domestic Credit to Private Sector as % of GDP (*DCP*), Domestic credit to private sector refers to financial resources provided to the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable that establish a claim for repayment were used as independent variables in regard to the effect of financial development on economic growth. For some countries these claims include credit to public enterprises (Rashid, 2011:29). Market Capitalization of Listed Companies as % of GDP (*MCLC*), Market capitalization (also known as market value) is the share price times the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year (Rashid, 2011:29). Money and Quasi Money M2 as % of GDP (*M2*) was determined. Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the

<sup>1</sup> Except Slovakia because of deficient variable

central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. This definition of money supply is frequently called M2 (World Bank). According to the theoretical expectations, there is a positive relationship between dependent variables and independent variables. Accordingly, the model was generated as in Equation 1.

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

#### 4 Process of Analysis

If all observations are homogenous pooled OLS model can be used in panel data analysis. However if observations contain unit and/or time effects, it can be appropriate to use fixed effects or random effects models (Yerdelen Tatoğlu, 2012: 163-164). So, likelihood ratio (LR) test was used for the model in order to determine whether there are unit and time effects. In LR test, it is examined whether standard error of unit effects is equal to zero ( $H_0: \sigma_{\mu} = 0$ ). Additionally, LR test is also used to examine whether standard error of time effects is equal to zero ( $H_0: \sigma_{\lambda} = 0$ ) (Yerdelen Tatoğlu, 2012: 170). If unit and time effects are not determined in LR test, pooled OLS model can be used. However if unit and/or time effects are determined in test results, it can be concluded that the model is one sided or two sided.

#### LR Test

	Unit Effect	Time Effect
$\chi^2$	5.37	127.65
<i>prob.</i>	0.0102	0.0000

According to the results of LR test, there are both unit effects and time effects in the model. For this reason, the model is two sided. Hausman specification test is used to determine whether unit and time effects are fixed or random.

According to Hausman test, if there is no correlation between error components ( $u_i$ ) and explanatory variables ( $x_{kit}$ ), both fixed effects and random effects estimators are appropriate. However, if there is correlation between error

components and explanatory variables, random effects estimator is inappropriate. In Hausman test, null hypothesis is set up in the way that there is no correlation between error components and explanatory variables (Hill et al., 2011: 559). It can be said that random effects are appropriate when there is not a correlation between  $u_i$  and  $x_{kit}$ , and fixed effects are appropriate when there is a correlation between  $u_i$  and  $x_{kit}$  (Gujarati, 2003: 650).

#### Hausman Test

$\chi^2$	54.87
<i>prob.</i>	0.0000

According to the results of Hausman test, it is decided that unit and time effects are fixed. Accordingly, analysis is made in accordance with two sided fixed effects model.

$$Y_{it} = \alpha + \beta X + \mu_i + \lambda_t + u_i \quad (2)$$

Equation 2 identifies two sided fixed effects model.  $\mu_i$  and  $\lambda_t$  are defined as parameters which should be estimated. Dummy variables are generated in the number of [(N-1)+(T-1)] (one minus unit number and one minus time dimension) and these variables are included in the model as independent variables. Then this model is estimated through pooled OLS model (Yerdelen Tatoğlu, 2012: 140).

Then, models were examined in terms of basic assumptions. One of these assumptions is constant variance (homoscedasticity) assumption. According to constant variance assumption, while unit values of explanatory variables change, variance of error term remains fixed. If this assumption does not occur, model includes heteroskedasticity (Wooldridge, 2012: 93). Modified Wald Test was used to examine this assumption. According to autocorrelation assumption, there is no correlation between error terms of independent variables (Wooldridge, 2012:353). If this assumption does not occur, it means that there is correlation between error terms of independent variables. Durbin-Watson test of Bhargava, Franzini and Narendranthan is used to examine this assumption. Another assumption is about

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

#### Tests of Deviation from Assumptions

Modified Wald test	Modified Bhargava et al. Durbin-Watson test	Breusch-Pagan LM test
$\chi^2$ 871.22	1.3270797	$\chi^2$ 966.723
prob. 0.0000		prob. 0.0000

According to the results of analysis, there are heteroscedasticity, autocorrelation and inter-unit correlation in the model. In order to solve these problems, standard errors which are resistant to deviations from assumptions were produced by using method of Driscoll and Kraay.

#### Results of Analysis

Explanatory Variables	Coef.	t-statistics	p-value
<i>DCP</i>	-0.0732	-2.44	0.022**
<i>MCLC</i>	0.01346	2.82	0.009*
<i>M2</i>	0.02705	2.41	0.023**
<i>Y<sub>2005</sub></i>	0.17949	0.76	0.452
<i>Y<sub>2006</sub></i>	1.44367	3.09	0.005*
<i>Y<sub>2007</sub></i>	1.67202	2.21	0.036**
<i>Y<sub>2008</sub></i>	-0.7053	-0.66	0.512
<i>Y<sub>2009</sub></i>	-7.4264	-6.05	0.000*
<i>Y<sub>2010</sub></i>	-0.2461	-0.21	0.838
<i>Y<sub>2011</sub></i>	0.8641	0.78	0.442
<i>Y<sub>2012</sub></i>	-1.9608	-1.96	0.06***
<i>Cons.</i>	6.33076	2.49	0.020**
<i>R<sup>2</sup></i>	0.6342		
<i>F</i>	10201.17		
	(0.0000)		

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

According to the results of analysis, coefficient of *DCP* (Domestic Credit to Private Sector as % of GDP) variable and its effect on economic growth is negative in contrast with the theory. 1% increase in *DCP* causes 0.7% decrease in growth. Effect of *MCLC* (Market Capitalization of Listed Companies as % of GDP) variable on

growth is positive in accordance with theoretical expectations. 1% increase in *MCLC* brings about 0.1% increase in growth. *M2* (Money and Quasi Money *M2* as % of GDP) variable affects growth positively as expected in theory. 1% increase in *M2* brings about 0.2% increase in growth. According to results of analysis in which effects of years are seen, years of 2006, 2007 and 2012, which are statistically significant, have positive impact on growth and year of 2009 has negative impact on growth.

#### 5 Conclusion

In this study in which the relationship financial development and economic growth was analyzed in terms of European Union, it can be seen that change in the rate of Domestic Credit to Private Sector as % of GDP affects economic growth negatively. From theoretical aspect, it is expected that increase in Domestic Credit to Private Sector as % of GDP affects growth positively. The reason of these unexpected results can be the fact that domestic credit to private sector is not used in growth-oriented areas. Additionally, Kichler and Haiss (2009) stated that when regression of domestic credit to private sector is set up as two-year-lag, a positive relationship will occur. A positive relationship was found between market capitalization rate (volume of stock exchange transaction/GDP) and economic growth in accordance with theory. Based on the findings of Rajan and Zingales (1996), it can be said that developments in equity markets capitalize values of available growth facilities and so it creates a positive impact on economic growth. There is a positive relationship between *M2/GDP* rate and economic growth. According to this result, when monetization and usage of financial system by units in the economy increases, economic growth also increases. Additionally, it can be said that while years of 2006, 2007 and 2012 affect growth positively, year of 2009, in which global financial crisis is experienced, considerably decreases growth in European Union.

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