

# The Relationship between Financial Development and Economic Growth in EU Member Countries: Sub-Group Estimation Based on the Countries' Level of Development

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**Abstract** The financial systems undergo changes as countries grow, self-financed capital investments being less frequent and being replaced by financing through banking intermediation and later through capital markets. The financial development has an increasing role in the context of globalisation and emergence of market economies, supporting the exchange of funds between participants. Previous research papers present different results regarding the impact of financial development on economic growth; however, their preponderance shows a positive relationship, the financial system stimulating economic growth. This paper investigates the impact of financial development on economic growth using panel regressions for the member countries of the European Union, for the period 1990-2021. The results show that financial development, both through the activity of the banking sector and through the capital market, has a positive impact on economic growth, as long as there is a correspondence between the funds invested and the output of the real sector.

**Keywords:** financial systems, economic growth, European Union, banking sector, capital market

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## I. Introduction

The development and interaction between financial systems has an increasing role in the context of globalisation and emergence of market economies, supporting the exchange of funds between participating institutions, investors and borrowers. A financial system refers to a complex group of financial institutions, agents, markets, transactions, procedures, receivables and liabilities closely related within an economy (Dragota et al, 2008).

Multiple research papers studying the link between financial development and economic growth have different opinions on the effect of one on the other, their causality and interdependence. However, the preponderance of theoretical reasoning and empirical evidence shows a first-order positive relation between financial development and economic growth (Levine, 1997), the development of the financial system stimulating economic growth (Demirgüç-Kunt & Levine, 1996).

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The financial systems and its structure undergo changes as countries grow (Demirgüç-Kunt & Levine, 1996). In order to obtain increased external funds, the use of the banking system and later on of the capital markets is more frequent, together with the gradual reduction in employing self-financed capital investments. However, total replacement of financing through financial institutions with securities is improbable even in developed countries. Capital markets have important roles even in economies with a well-developed banking sector, each individual or company choosing its optimal structure whereas financing by attracting new capital and financing through debt are not perfectly substitutable (Demirgüç-Kunt & Maksimovic, 1996).

Figure 1 presents the average growth rate of GDP per capita from 1990 to 2022 for the European Union member countries (including United Kingdom). At the same time, the EU countries have been grouped in two categories (above average and below average countries) based on their GDP per capita level in 2022 relative to the EU average GDP per capita. During good times, the group of countries with GDP per capita below average has a faster growth rate than the above average countries. However, the below average countries are more affected by hard times, having larger economic downturns.

**Figure 1.** The evolution of GDP per capita growth in European Union member countries (1990-2022, %)



(Source) World Development Indicators - World Bank

This paper investigates the impact of financial systems on economic growth using panel regressions for the member countries of the European Union, for the period 1990-2021. Further on, the paper synthesizes the relevant scientific literature regarding the relationship between the financial development and economic growth, and presents the database and methodology used in the empirical analysis, as well as the main findings of the research.

## II. The Relationship between Financial Development and Economic Growth

The link between financial development and economic growth has been intensely studied over the years. Goldsmith (1969), one of the first papers on the subject, attempts to assess if the financial sector, namely the mix between banks and capital markets, has causal influence on growth without reaching a clear conclusion on the matter. The methodology used is rather simple and as Levine (2004) highlights in a later study there is an insufficient link between theory and practice. Papers using cross-sectional methodologies have similar conclusions and the findings prove almost unanimous a positive relation between the level of financial development and economic growth (King&Levine, 1993; Levine&Zervos, 1996; Levine, 1997; Azman-Saini et al., 2010).

In time, more variables describing the financial development are included such as the credit size granted to private sector (King&Levine, 1993), public ownership of the banking sector (La Porta et al., 2001), bond market development (Levine, Demirguc-Kunt &Beck, 2001; Fink, Haiss & Hristoforova, 2003) or the financial services of non-bank institutions. These studies reach a similar conclusion of a positive relation, developed banking sector and capital markets facilitating economic growth.

Further on, research papers collect and analyze more data including multiple countries and periods as well as control factors to develop methodologies based on time series, panels or specific case studies in order to overcome the shortcuts of the cross-sectional methods. For these proposed methodologies, the research findings are significantly different depending on the time frame took into consideration, the development level of the countries and the structure of the financial system. However, the preponderance of studies supports the conclusion of a positive impact of financial development on economic growth in certain periods or countries (Arestis et al., 2001; Bumann et al., 2013; Demetriades, 1996; Levine, 1999; Caporale et al., 2015; Shahbaz et al., 2015).

Using time series methodologies Demetriades & Hussein (1996) find a bidirectional impact of financial development and economic growth, especially for developing countries, while Rousseau & Wachtel (1998) prove a causal dominant relation from financial development towards growth. Simultaneously, Arestis et al. (2001), using indicators related to capital markets and banking sector, argue that the financial sector stimulates economic growth but draw attention to the size of the considered relationship.

Levine, Loayza & Beck (2000) show a positive relation between the financial development and economic growth, productivity increase and capital accumulation using a panel data regression methodology. With a similar approach, Rousseau & Wachtel (1998) investigate the link between capital markets, banks and growth, while Beck & Levine (2004) explore the

long-term determinants of economic of economic growth. Both research papers indicate that the exogenous component of capital market and banking sector development help predict future growth rates. Moreover, Masoud & Hardaker (2012) provide an empirical analysis of the effect of stock market development on economic growth in emerging markets using an endogenous growth model; the findings indicate that the stock market plays an important role in emerging markets, impacting economic growth alongside banking sector development.

Numerous empirical studies consider the impact of different components of financial development and real economy in economic growth. Following on this, Bekaert, Harvey & Lundblad (2001, 2004) show that opening capital markets to foreign equity increases economic growth and countries with more open capital account have a greater reduction in consumption growth volatility, while Levine & Zervos (1998) and Bojanic (2011) show a positive effect of financial liberalization on economic growth. In addition, Ductor & Grechyna (2015) determine that the effect of financial development on economic growth depends on the growth of private credit relative to real output growth. Hence if there is a balance between the growth rate of the financial sector and the real sector there is a positive effect of financial development on economic growth. However, if the growth rates of the two sectors are disproportionate, the growth effect is reduced or may lead to a negative impact.

More recent the relationship between financial development and economy growth is studied using a non-linear approach considering other determinants. Findings show that the sign or size of the financial development impact on growth varies in countries with different levels of income or development (i.e. emerging or developed countries) (Rioja & Valev, 2004; Egert & Jawadi, 2018; Asteriou & Spanos, 2019; Nguyen et al., 2022), with different inflation levels (Rousseau & Wachtel, 2002) or considering short-term or long-term relations (Loayza & Ranciere, 2002; Prochniak & Wasiak, 2016).

### III. Data and Methodology

The dataset includes annual data for the member states of the European Union (including United Kingdom) for the period 1990-2021. The full list of countries included is in Table 1 below. The financial development variables (DMB, LLB, PRIV, FSD, CAP, TVT, SMT) were sourced from the Global Financial Development Database, while the macroeconomic variables (GDPG, GDPCG, INFL, FDI, OCOM, GOV) were gathered from the World Development Indicators Database, both provided by the World Bank. The full names of the variables used are included in Table 2 below.

Firstly, the empirical analysis focuses on a data panel comprising all European Union member states (including United Kingdom), whilst in the second part the study investigates the impact

of financial development on economic growth differentiated based on the countries' level of development using two separate panels. Thus, the first smaller panel contains the above average EU member countries while the second one includes the below average countries, categorized based on their GDP per capita level in 2022 relative to the EU average of GDP per capita. Table 1 below shows the countries included in each panel:

**Table 1.** *Panel Structure*

Panel A	EU-28 member countries	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom
Panel B	Above average EU member countries	Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, Netherlands, Sweden, United Kingdom
Panel C	Below average EU member countries	Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain

The variables considered in the empirical analysis are presented in the table below:

**Table 2.** *List of Variables*

Symbol	Name	Description
Dependent variables		
GDPG	Annual GDP growth rate (%)	Annual percentage growth rate of GDP at market prices based on constant local currency.
GDPCG	Annual GDP per capita growth rate (%)	Annual percentage growth rate of GDP per capita based on constant local currency.
Independent variables		
DMB	Deposit money bank assets to deposit money bank assets and central bank assets (%)	Captures the advantage of financial intermediaries in performing the functions of financial systems (i.e. channeling savings to investments, monitoring firms, influencing corporate governance, management of risks).
LLB	Liquid liabilities to GDP (%)	The primary indicator used to measure the size of financial intermediation relative to the economy, including three types of financial institutions: the central bank, deposit banks and other financial institutions.
PRIV	Private credit by deposit money banks to GDP (%)	Shows the directing of resource surpluses towards the financing of production, consumption and capital formation, which in turn affects economic activity.
FSD	Financial system deposits to GDP (%)	Demand, time and saving deposits in deposit money banks and other financial institutions as a share of GDP.
CAP	Stock market capitalization to GDP (%)	Captures the size of the economy's stock market
TVT	Stock market total value traded to GDP (%)	Total value of all traded shares in a stock market exchange as a percentage of GDP.
SMT	Stock market turnover ratio (%)	A measure of stock market liquidity.
INFL	Annual inflation rate (%)	Used as a proxy for macroeconomic stability

**Table 2.** *Continued*

Symbol	Name	Description
Independent variables		
FDI	Foreign direct investment, net inflows (% of GDP)	The main channel for transmitting financial development to economic growth
OCOM	Trade openness as a percentage of GDP (%)	Measures economic policies that restrict or encourage trade between countries.
GOV	General government final consumption expenditure (% of GDP)	General government final consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees).
EUROZONE_	Euro Zone member country	Dummy variables with the value of 1 for the years when a specific country is or becomes part of the Euro zone, or the value of 0 for the countries that are not part of the Euro zone.

(Source) Author's own research

In order to examine the impact of financial development on economic growth over the last three decades, the paper uses multiple panel regression models for the EU member states for the period 1990-2021. The empirical models are based on the methodology proposed by Asteriou and Spanos (2019) and were estimated using EViews software.

The econometric reference model is as follows:

$$EG_{it} = \alpha_0 + \beta FD_{it} + \gamma X_{it} + u_{it}$$

where EG is the dependent variable that measures the economic growth (GDPG, GDPCG),

$i=1, 2, \dots, 28$  countries

$t= 1990, 1991, \dots, 2021$

$FD_{it}$  is the matrix of variables that capture the level of financial development (DMB, LLB, PRIV, FSD, CAP, TVT, SMT) and

$X_{it}$  is the matrix of control variables (INFL, FDI, OCOM, GOV).

To check for estimates' robustness, beside GDP growth rate, the regression models also use GDP per capita growth rate as a dependent variable. The reasoning for adding more variables is based on previous research papers which employ indicators such as GDP per capita growth rate (King & Levine, 1993; Levine & Zervos, 1996; Rousseau & Wachtel, 1998), private credit by deposit money banks to GDP (King & Levine, 1993; Ductor & Grechyna, 2014), financial system deposits to GDP or the ratio of stock market total value traded to GDP (Nguyen et al., 2022).

Moreover, for the robustness check of the estimations, we performed additional regression

analysis of the models using the dummy variable EUROZONE\_ in order to verify if the establishment of the Euro Zone has an impact on the economic integration of the countries.

The variables' stationarity is tested using unit root tests specific to panel data such as the LLC, IPS, Fisher and Breitung test. Where the unit root is proven, the first difference is computed, and the variable is retested. Thus, Table 3 below summarizes the results of the stationarity tests and adjustments made:

**Table 3.** *Stationarity of the Variables and Adjustments*

Variable	Stationarity
GDPG	level
GDPCG	level
DMB	level
LLB	first difference
PRIV	first difference
FSD	level
CAP	first difference
TVT	level
SMT	level
INFL	level
FDI	level
OCOM	first difference
GOV	level

(Source) Author's own research

Variables' multicollinearity is checked using the correlation matrix, only the independent variables with none or small correlation coefficient are used for the model (maximum accepted correlation coefficient of 0.4). Previous research papers use simultaneously LLB (liquid liabilities to GDP) and PRIV (private credit by deposit money banks to GDP) as independent variables of panel regression models. However, based on the present dataset, there is a high correlation coefficient between the two variables; thus, each model has been estimated using either LLB or PRIV as independent variable, together with the other independent variables previously presented.

The correlation matrix for the dataset including 28 EU member countries is presented in Table 4 below (both the correlation matrix for the panel including more developed countries and the one including less developed countries have been checked and considering a maximum accepted correlation coefficient for the independent variables of 0.4, no additional changes had to be made in the estimated models and variables taken into consideration together):

**Table 4.** Correlation Matrix - Full Panel

	GDPG	GDPCG	DMB	D(LLB)	D(PRIV)	FSD	D(CAP)	TVT	SMT	INFL	FDI	D(OCOM)	GOV
GDPG	1.00	0.98	-0.23	-0.09	0.01	-0.02	0.02	-0.02	-0.01	-0.21	0.02	0.27	-0.24
GDPCG	0.98	1.00	-0.30	-0.08	0.01	-0.10	0.03	-0.05	0.00	-0.19	0.00	0.28	-0.23
DMB	-0.23	-0.30	1.00	0.14	0.22	0.31	-0.06	0.16	-0.01	-0.10	-0.01	-0.04	0.24
D(LLB)	-0.09	-0.08	0.14	1.00	0.58	0.03	-0.06	0.04	-0.01	-0.03	-0.05	0.01	0.04
D(PRIV)	0.01	0.01	0.22	0.58	1.00	0.08	-0.01	0.06	0.00	-0.05	-0.01	0.01	0.04
FSD	-0.02	-0.10	0.31	0.03	0.08	1.00	-0.06	-0.15	-0.02	-0.05	0.09	0.06	-0.17
D(CAP)	0.02	0.03	-0.06	-0.06	-0.01	-0.06	1.00	0.01	-0.05	0.00	0.02	-0.04	-0.02
TVT	-0.02	-0.05	0.16	0.04	0.06	-0.15	0.01	1.00	0.03	-0.06	-0.03	-0.02	0.09
SMT	-0.01	0.00	-0.01	-0.01	0.00	-0.02	-0.05	0.03	1.00	0.00	-0.01	-0.01	-0.03
INFL	-0.21	-0.19	-0.10	-0.03	-0.05	-0.05	0.00	-0.06	0.00	1.00	-0.02	0.01	-0.17
FDI	0.02	0.00	-0.01	-0.05	-0.01	0.09	0.02	-0.03	-0.01	-0.02	1.00	0.13	-0.09
D(OCOM)	0.27	0.28	-0.04	0.01	0.01	0.06	-0.04	-0.02	-0.01	0.01	0.13	1.00	-0.08
GOV	-0.24	-0.23	0.24	0.04	0.04	-0.17	-0.02	0.09	-0.03	-0.17	-0.09	-0.08	1.00

(Source) Author's own research

The countries analyzed are part of the European Union. Thus, research papers in the field of econometrics suggest the estimation of regression models with fixed effects. In order to verify the applicability of the theory to the present dataset, the models were tested by applying fixed effects tests and the Hausman test. Based on the tests' results, the estimation of panel regression models with individual and time fixed effects is the optimal option for this specific database.

## IV. Results and Discussions

### A. Results at European Union level

Following on the estimation of the regression models for the panel data of the 28 European Union member states for the period between 1990 and 2021, the results obtained are presented in Table 5 below:

**Table 5.** Econometric Estimates, EU Member States, 1990-2021

	Model 1	Model 2	Model 3	Model 4
	GDPG	GDPG	GDPCG	GDPCG
const	3.663*** [0.321]	10.574*** [1.216]	3.521*** [0.325]	9.835*** [1.240]
DMB	-0.015*** [0.004]	-0.016*** [0.004]	-0.015*** [0.004]	-0.016*** [0.004]
D(LLB)	-0.003 [0.003]	-0.015*** [0.006]	-0.003 [0.003]	-0.016*** [0.006]
FSD	0.001 [0.004]	0.009* [0.005]	-0.001 [0.004]	0.009 [0.007]



Table 5. Continued

	Model 1	Model 2	Model 3	Model 4
	GDPG	GDPG	GDPCG	GDPCG
D(CAP)	0.013** [0.006]	0.011** [0.005]	0.013** [0.006]	0.011** [0.005]
TVT	0.003 [0.005]	0.002 [0.004]	0.001 [0.005]	0.000 [0.004]
SMT	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
INFL		-0.023*** [0.002]		-0.024*** [0.002]
FDI		-0.007** [0.003]		-0.005 [0.003]
D(OCOM)		-0.001 [0.012]		0.007 [0.012]
GOV		-0.357*** [0.060]		-0.330*** [0.061]
R-squared	55.61%	64.17%	56.09%	63.85%
Adjusted R-squared	52.01%	60.98%	52.52%	60.64%
Observations	840	822	840	822

(Source) EViews output, Author's own research

Note. The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the LLB, CAP, OCOM variables that have been converted to become stationary.

The first two models estimate the impact of the financial development of the EU member countries on the real GDP growth rate, while the third and fourth model present the financial development impact on real GDP per capita growth rate. The ratio of deposit money banks' assets to GDP has a negative and statistically significant impact and the ratio of stock market capitalization to GDP has a positive and statistically significant impact on economic growth, while the other financial development variables are insignificant in model 1 and 3. To this extent, if financial intermediation is too large, without having a positive effect on the efficiency and the productivity of the real sector, the economic growth of a specific country will decrease, while a larger capital market leads to a better allocation of resources and economic growth.

In model two and four, the ratio of liquid liabilities to GDP has a negative and statistically significant impact on economic growth, supporting the negative effect of too large financial intermediation on economic growth if the real sector's productivity is not improved by having more participants and services on the financial market.

At the same time, excessive inflation and government spending create macroeconomic instability and have a statistically significant negative effect on economic growth while foreign direct investments that does not result in higher labor productivity and new technologies hampers the production level and leads to a decreasing GDP growth rate.

The fifth and sixth models estimate the impact of the financial development of the EU member countries on the real GDP growth rate, while the seventh and eighth model present the financial development impact on real GDP per capita growth rate (estimation results are presented in Table A1 in the Appendix). The results are similar to the ones from model 1-4, where the ratio of liquid liabilities to GDP was used instead of the ratio of private credit by deposit money banks to GDP. However, even if the significant variables and the sign of the impact are the same while comparing models 1-4 with models 5-8, the estimated value of the impact of financial development variables on economic growth is different (higher negative impact regarding the ratio of deposit money banks' assets to GDP and slightly lower positive impact in the case of stock market capitalization to GDP).

Additionally, for the regression analysis involving the EUROZONE\_ dummy variable the estimation results are presented in Tables A2 and A3 in the Appendix. The variable proves to be statistically significant in all models estimated. However, the significance and sign of the other variables involved doesn't change.

## B. Results at sub-group level

In order to see the differential impact of financial systems on economic growth in countries with different levels of development, the full panel comprising the 28 member countries of the European Union was divided into groups with more homogeneous characteristics, i.e. above average countries referring to the countries with GDP per capita above the mean of EU members in 2022 and below average countries.

The estimation results for the panel including above average countries (also referred as more developed countries) are shown in Table 6 below.

**Table 6.** *Econometric Estimates, above Average EU Member States, 1990-2021*

	Model 1	Model 2	Model 3	Model 4
	GDPG	GDPG	GDPCG	GDPCG
const	3.817*** [0.339]	19.346*** [1.893]	3.317*** [0.461]	18.307*** [1.925]
DMB	-0.001*** [0.004]	-0.009*** [0.003]	-0.014*** [0.004]	-0.011*** [0.004]
D(LLB)	-0.001 [0.002]	-0.004 [0.006]	0.000 [0.002]	-0.003 [0.006]
FSD	-0.006* [0.003]	0.003 [0.006]	-0.007*** [0.003]	0.003 [0.006]
D(CAP)	0.006 [0.005]	0.007 [0.004]	0.006 [0.005]	0.008* [0.004]
TVT	0.001 [0.005]	0.002 [0.005]	0.006 [0.005]	0.003 [0.005]

Table 6. Continued

	Model 1	Model 2	Model 3	Model 4
	GDPG	GDPG	GDPCG	GDPCG
SMT	0.000 [0.001]	0.000 [0.001]	0.001 [0.001]	0.000 [0.001]
INFL		-0.082 [0.117]		-0.234** [0.119]
FDI		0.015** [0.007]		0.017*** [0.007]
D(OCOM)		-0.014 [0.019]		-0.015 [0.019]
GOV		-0.772*** [0.089]		-0.731*** [0.091]
R-squared	66.80%	75.18%	64.41%	73.45%
Adjusted R-squared	61.61%	70.73%	58.84%	68.69%
Observations	341	330	341	330

(Source) EViews output, Author's own research

Note. The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the LLB, CAP, OCOM variables that have been converted to become stationary.

The results rather show the importance of the banking system in the more developed countries as opposed to the capital markets, where the variables associated are usually statistically insignificant, excepting the fourth model where the ratio of stock market capitalization to GDP has a positive and statistically significant impact on economic growth. At the same time, the ratio of deposit money banks to GDP preserves the negative impact on growth, the very large size of financial intermediation hindering productivity and growth.

Large government expenditure without visible and beneficial effects in society (for example: infrastructure, education, healthcare etc.) has a negative and statistically significant impact on economic growth.

Simultaneously, the increase of foreign direct investments has a positive impact on economic growth, because as more countries adopt measures that encourage international trade, the companies become more competitive, the production processes become more efficient and consumer needs are better met, leading to an improvement in the living conditions and economic growth.

The models 5-8 show a higher and more significant impact of the banking system compared to capital markets in the more developed countries, similar to models 1-4 from above (estimation results are presented in Table A4 in the Appendix).

However, even if the significant variables and the sign of the impact are the same while comparing models 1-4 with model 5-8, the estimated value of the impact of financial development variables on economic growth is different (lower negative impact of the ratio of deposit money banks' assets to GDP and higher impact of foreign direct investments and government expenditure).

The estimation results for the panel including below average countries (also referred as less developed countries) are shown in Table 7 below.

**Table 7.** *Econometric Estimates, below Average EU Member States, 1990-2021*

	Model 1	Model 2	Model 3	Model 4
	GDPG	GDPG	GDPCG	GDPCG
const	3.183*** [0.414]	9.037*** [1.557]	3.277*** [0.420]	8.403*** [1.597]
DMB	-0.041*** [0.010]	-0.028*** [0.009]	-0.036*** [0.010]	-0.023** [0.009]
D(LLB)	-0.008 [0.012]	-0.012 [0.011]	-0.007 [0.013]	-0.012 [0.011]
FSD	0.041*** [0.012]	0.020* [0.011]	0.034*** [0.012]	0.015 [0.011]
D(CAP)	0.017 [0.013]	0.011 [0.012]	0.016 [0.014]	0.009 [0.012]
TVT	0.006 [0.008]	0.007 [0.007]	0.001 [0.008]	0.002 [0.007]
SMT	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
INFL		-0.023*** [0.002]		-0.023*** [0.003]
FDI		-0.010*** [0.003]		-0.008** [0.004]
D(OCOM)		0.005 [0.016]		0.015 [0.016]
GOV		-0.277*** [0.081]		-0.245*** [0.083]
R-squared	57.53%	65.82%	58.17%	65.73%
Adjusted R-squared	52.58%	61.42%	53.29%	61.32%
Observations	499	492	499	492

(Source) EViews output, Author's own research

*Note.* The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the LLB, CAP, OCOM variables that have been converted to become stationary.

For the group of less developed countries, similar variables of the panel regressions are statistically significant, while also having the same direction of the impact. However, for the majority of variables the size of the impact is higher in the case of the panel comprising less developed countries than in the full panel or the panel of more developed countries.

The results show a higher influence of the banking sector; thus, its further development has a greater negative impact because the need for resources and financial intermediation services in an easier way and without high costs are more stringent in these countries. If the increasing resources granted by the banks are not accompanied by a similar growth of the real sector

and production, then financial intermediation leads to decreasing economic growth. The ratio of financial system deposit to GDP has a positive and statistically significant impact in the case of less developed countries, financial intermediation (through banks and other financial institutions) contributing to economic growth.

Furthermore, excessive inflation and government expenditure has a negative and statistically significant impact on economic growth, but to a lesser degree than in the case of more developed countries, while large FDI levels directed to unproductive activities lead to a greater negative and statistically significant impact for the less developed countries.

In model 5-8 (estimation results are presented in Table A7 in the Appendix), similarly to models 1-4, for the group of less developed countries the negative and statistically significant impact of too large financial intermediation resulting in the allocation of resources to inefficient projects hinders the economic growth, to a greater extent compared to the general panel or the more developed countries, while the efficient financial intermediation of banking sector and other financial institutions captured by the positive impact of FSD variables facilitates economic growth.

For certain models estimated above, the ratio of private credit by deposit money banks to GDP has a positive and statistically significant impact on economic growth. In the case of countries with lower levels of income, additional improvement of the process of obtaining funds for the private sector leads to a more efficient allocation of resources for investments or consumption, which in turn contributes to carrying out activities that generate economic growth.

As for the macroeconomic variables, excessive inflation and government expenditure has a statistically significant impact on economic growth, with a lower negative size than in the case of more developed countries, while large foreign direct investment directed to unproductive activities lead to a negative and statistically significant impact for the less developed countries.

Moreover, for the regression analysis involving the EUROZONE\_ dummy variable the estimation results are presented in Tables A5 and A6 for the above average countries' panel and in Tables A8 and A9 for the below average countries' panel in the Appendix. The EUROZONE\_ variable proves to be statistically significant in most of the models estimated, while having a negative coefficient. However, the significance and sign of the other variables involved doesn't change.

## V. Conclusion

Generally, financial development, through the activity of the banking sector, through the capital market or through the interaction of both, would improve the mobilization of savings and the allocation of resources, directing funds towards productive projects, establishing better corporate governance and more efficient management of risks, leading to economic growth. If there is a correspondence between the growth rate of financial intermediation and the growth rate of

production, respectively between the funds invested and the output of the real sector, the results show economic growth. Otherwise, the effect of financial development on economic growth becomes negative if there is a faster growth of private credit, unaccompanied by the growth of production at the same pace, as it is the case for the most analyzed panels.

To some extent, the findings are in line with previous research papers (Seven and Yetkiner, 2015; Asteriou & Spanos, 2019), showing a greater contribution of capital markets to economic performance compared to the banking sector in more developed countries. At the same time, the banking sector has a greater impact on economic growth in less developed countries, the capital adequacy of the sector influencing stability of the financial system. The results adhere to the conclusion of conditional effect of financial development on economic growth, depending on the balancing growth rate of the financial development with the growth rate of production and real sector (Loayza & Ranciere, 2002; Ductor & Grechyna, 2015).

Therefore, based on the findings above, public policies targeting economic growth should focus on the development of the banking sector and its correlation with the productivity of the real sector, ensuring that the funds are allocated for productive activities, mostly in the case of less developed countries. At the same time, policies should be oriented towards the development of capital markets, increasing their size, efficiency and role in the allocation of resources, particularly in more developed countries.

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## Appendix

**Table A1.** *Econometric Estimates, EU Member States, 1990-2021*

	Model 5	Model 6	Model 7	Model 8
	GDPG	GDPG	GDPCG	GDPCG
const	3.793*** [0.334]	10.851*** [1.220]	3.630*** [0.339]	10.106*** [1.244]
DMB	-0.016*** [0.004]	-0.017*** [0.004]	-0.015*** [0.004]	-0.017*** [0.004]
D(PRIV)	0.004 [0.005]	0.001 [0.005]	0.003 [0.006]	0.000 [0.005]
FSD	-0.001 [0.004]	0.007 [0.005]	-0.002 [0.004]	0.006 [0.006]
D(CAP)	0.013** [0.006]	0.011** [0.005]	0.013** [0.013]	0.011** [0.005]
TVT	0.002 [0.005]	0.001 [0.004]	0.001 [0.005]	0.000 [0.004]
SMT	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
INFL		-0.023*** [0.002]		-0.023*** [0.002]
FDI		-0.007** [0.003]		-0.005 [0.003]
D(OCOM)		-0.004 [0.012]		0.004 [0.012]
GOV		-0.361*** [0.061]		-0.336*** [0.062]
R-squared	55.56%	63.85%	56.04%	63.97%
Adjusted R-squared	51.95%	60.64%	52.47%	60.77%
Observations	840	822	840	822

(Source) EViews output, Author's own research

*Note.* The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the PRIV, CAP, OCOM variables that have been converted to become stationary.

**Table A2.** *Econometric Estimates, EU Member States, 1990-2021*

	Model 1	Model 2	Model 3	Model 4
	GDPG	GDPG	GDPCG	GDPCG
const	4.747*** [0.378]	10.729*** [1.211]	4.764*** [0.382]	10.032*** [1.232]
EUROZONE_	-1.847*** [0.356]	-0.968*** [0.340]	-2.117*** [0.359]	-1.225*** [0.346]
DMB	-0.020*** [0.004]	-0.019*** [0.004]	-0.021*** [0.004]	-0.020*** [0.004]
D(LLB)	-0.002 [0.003]	-0.012** [0.006]	-0.001 [0.003]	-0.013** [0.006]
FSD	0.001 [0.004]	0.009* [0.005]	0.000 [0.004]	0.009 [0.006]
D(CAP)	0.012** [0.006]	0.011** [0.005]	0.012** [0.006]	0.011** [0.005]
TVT	0.007 [0.005]	0.004 [0.004]	0.006 [0.005]	0.003 [0.004]
SMT	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
INFL		-0.022*** [0.002]		-0.022*** [0.002]
FDI		-0.007** [0.003]		-0.005* [0.003]
D(OCOM)		-0.003 [0.012]		0.006 [0.012]
GOV		-0.334*** [0.061]		-0.302*** [0.062]
R-squared	57.10%	65%	57.98%	64.90%
Adjusted R-squared	53.56%	61%	54.51%	61.73%
Observations	840	822	840	822

(Source) EViews output, Author's own research

Note. The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the PRIV, CAP, OCOM variables that have been converted to become stationary.

**Table A3.** *Econometric Estimates, EU Member States, 1990-2021*

	Model 5	Model 6	Model 7	Model 8
	GDPG	GDPG	GDPCG	GDPCG
const	4.964*** [0.393]	11.008*** [1.213]	4.959*** [0.397]	10.299*** [1.233]
EUROZONE_	-1.927*** [0.356]	-1.113*** [0.339]	-2.187*** [0.359]	-1.364*** [0.345]
DMB	-0.021*** [0.004]	-0.021*** [0.004]	-0.022*** [0.004]	-0.021*** [0.004]
D(PRIV)	0.007 [0.005]	0.003 [0.005]	0.007 [0.005]	0.002 [0.005]
FSD	0.000 [0.004]	0.007 [0.005]	-0.001 [0.004]	0.007 [0.005]
D(CAP)	0.012** [0.006]	0.011** [0.005]	0.012** [0.006]	0.011** [0.005]
TVT	0.007 [0.005]	0.004 [0.004]	0.006 [0.005]	0.003 [0.004]
SMT	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
INFL		-0.022*** [0.002]		-0.022*** [0.002]
FDI		-0.007** [0.003]		-0.005* [0.003]
D(OCOM)		-0.005 [0.012]		0.003 [0.012]
GOV		-0.334*** [0.061]		-0.302*** [0.062]
R-squared	57.18%	64.36%	58.05%	64.70%
Adjusted R-squared	53.64%	61.14%	54.58%	61.52%
Observations	840	822	840	822

(Source) EViews output, Author's own research

Note. The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the PRIV, CAP, OCOM variables that have been converted to become stationary.

**Table A4.** *Econometric Estimates, above Average EU Member States, 1990-2021*

	Model 5	Model 6	Model 7	Model 8
	GDPG	GDPG	GDPCG	GDPCG
const	3.831*** [0.477]	19.425*** [1.885]	3.292*** [0.483]	18.370*** [1.917]
DMB	-0.013*** [0.004]	-0.009** [0.004]	-0.013*** [0.004]	-0.010*** [0.004]
D(PRIV)	0.000 [0.007]	-0.004 [0.007]	-0.001 [0.007]	-0.004 [0.007]
FSD	-0.006** [0.003]	0.003 [0.006]	-0.007** [0.003]	0.002 [0.006]
D(CAP)	0.006 [0.005]	0.007 [0.004]	0.006 [0.005]	0.008* [0.004]
TVT	0.005 [0.005]	0.002 [0.005]	0.006 [0.005]	0.003 [0.005]
SMT	0.001 [0.001]	0.000 [0.001]	0.001 [0.001]	0.000 [0.001]
INFL		-0.077 [0.117]		-0.229* [0.119]
FDI		0.016** [0.007]		0.018** [0.007]
D(OCOM)		-0.016 [0.019]		-0.017 [0.019]
GOV		-0.776*** [0.090]		-0.735*** [0.091]
R-squared	66.79%	75.17%	64.41%	73.45%
Adjusted R-squared	61.60%	70.72%	58.84%	68.70%
Observations	341	330	341	330

(Source) EViews output, Author's own research

*Note.* The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the PRIV, CAP, OCOM variables that have been converted to become stationary.

**Table A5.** *Econometric Estimates, above Average EU Member States, 1990-2021*

	Model 1	Model 2	Model 3	Model 4
	GDPG	GDPG	GDPCG	GDPCG
const	5.832*** [0.740]	20.674*** [1.890]	5.276*** [0.751]	19.528*** [1.930]
EUROZONE_	-2.231*** [0.653]	-2.139*** [0.595]	-2.169*** [0.663]	-1.967*** [0.608]
DMB	-0.022*** [0.005]	-0.019*** [0.004]	-0.023*** [0.005]	-0.019*** [0.004]
D(LLB)	0.000 [0.002]	0.000 [0.006]	0.001 [0.002]	0.000 [0.006]
FSD	-0.004 [0.003]	0.005 [0.006]	-0.005* [0.003]	0.004 [0.006]
D(CAP)	0.006 [0.005]	0.007* [0.004]	0.006 [0.005]	0.008* [0.004]
TVT	0.006 [0.005]	0.004 [0.005]	0.007 [0.005]	0.004 [0.005]
SMT	0.001 [0.001]	0.000 [0.001]	0.001 [0.001]	0.000 [0.001]
INFL		-0.026 [0.115]		-0.183 [0.118]
FDI		0.018*** [0.007]		0.020*** [0.007]
D(OCOM)		-0.015 [0.018]		-0.015 [0.019]
GOV		-0.747*** [0.088]		-0.708*** [0.090]
R-squared	68.07%	76.28%	65.66%	74.42%
Adjusted R-squared	62.95%	71.93%	60.15%	69.72%
Observations	341	330	341	330

(Source) EViews output, Author's own research

Note. The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the PRIV, CAP, OCOM variables that have been converted to become stationary.

**Table A6.** *Econometric Estimates, above Average EU Member States, 1990-2021*

	Model 5	Model 6	Model 7	Model 8
	GDPG	GDPG	GDPCG	GDPCG
const	6.070*** [0.790]	20.712*** [1.880]	5.435*** [0.801]	19.546*** [1.919]
EUROZONE_	-2.356*** [0.669]	-2.174*** [0.601]	-2.254*** [0.679]	-1.986*** [0.614]
DMB	-0.023*** [0.005]	-0.019*** [0.004]	-0.024*** [0.005]	-0.019*** [0.005]
D(PRIV)	0.005 [0.007]	0.002 [0.007]	0.004 [0.007]	0.001 [0.007]
FSD	-0.005 [0.003]	0.005 [0.006]	-0.006* [0.003]	0.004 [0.006]
D(CAP)	0.006 [0.005]	0.007* [0.004]	0.006 [0.005]	0.008* [0.004]
TVT	0.006 [0.005]	0.004 [0.005]	0.007 [0.005]	0.004 [0.005]
SMT	0.001 [0.001]	0.000 [0.001]	0.001 [0.001]	0.000 [0.001]
INFL		-0.029 [0.116]		-0.185 [0.118]
FDI		0.018*** [0.007]		0.020*** [0.007]
D(OCOM)		-0.015 [0.018]		-0.015 [0.019]
GOV		-0.745*** [0.088]		-0.707*** [0.090]
R-squared	68.14%	76.29%	65.70%	74.42%
Adjusted R-squared	63.03%	71.94%	60.20%	69.72%
Observations	341	330	341	330

(Source) EViews output, Author's own research

Note. The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the PRIV, CAP, OCOM variables that have been converted to become stationary.

**Table A7.** *Econometric Estimates, below Average EU Member States, 1990-2021*

	Model 5	Model 6	Model 7	Model 8
	GDPG	GDPG	GDPCG	GDPCG
const	3.409*** [0.426]	9.243*** [1.557]	3.498*** [0.433]	8.601*** [1.598]
DMB	-0.045*** [0.010]	-0.030*** [0.009]	-0.039*** [0.010]	-0.025*** [0.009]
D(PRIV)	0.015* [0.008]	0.009 [0.008]	0.015* [0.009]	0.008 [0.008]
FSD	0.042*** [0.012]	0.020* [0.011]	0.034*** [0.012]	0.015 [0.011]
D(CAP)	0.018 [0.013]	0.011 [0.012]	0.016 [0.014]	0.010 [0.012]
TVT	0.004 [0.008]	0.005 [0.007]	-0.001 [0.008]	0.000 [0.007]
SMT	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
INFL		-0.023*** [0.002]		-0.023*** [0.003]
FDI		-0.010*** [0.003]		-0.008** [0.004]
D(OCOM)		0.002 [0.015]		0.013 [0.016]
GOV		-0.279*** [0.081]		-0.247*** [0.083]
R-squared	57.81%	65.85%	58.43%	65.73%
Adjusted R-squared	52.89%	61.45%	53.59%	61.32%
Observations	499	492	499	492

(Source) EViews output, Author's own research

Note. The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the PRIV, CAP, OCOM variables that have been converted to become stationary.

**Table A8.** *Econometric Estimates, below Average EU Member States, 1990-2021*

	Model 1	Model 2	Model 3	Model 4
	GDPG	GDPG	GDPCG	GDPCG
const	3.803*** [0.466]	8.975*** [1.558]	4.081*** [0.471]	8.279*** [1.594]
EUROZONE_	-1.363*** [0.485]	-0.436 [0.454]	-1.769*** [0.489]	-0.876* [0.465]
DMB	-0.040*** [0.010]	-0.028*** [0.009]	-0.034*** [0.010]	-0.023** [0.009]
D(LLB)	-0.003 [0.012]	-0.010 [0.011]	-0.001 [0.013]	-0.009 [0.012]
FSD	0.036*** [0.012]	0.019* [0.011]	0.028** [0.012]	0.013 [0.011]
D(CAP)	0.017 [0.013]	0.011 [0.012]	0.015 [0.013]	0.009 [0.012]
TVT	0.010 [0.008]	0.008 [0.007]	0.006 [0.008]	0.004 [0.007]
SMT	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
INFL		-0.023*** [0.003]		-0.022*** [0.003]
FDI		-0.010*** [0.003]		-0.008** [0.004]
D(OCOM)		0.004 [0.016]		0.014 [0.016]
GOV		-0.263*** [0.082]		-0.216** [0.084]
R-squared	58.27%	65.90%	59.36%	66.01%
Adjusted R-squared	53.30%	61.42%	54.52%	61.54%
Observations	499	492	499	492

(Source) EViews output, Author's own research

Note. The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the PRIV, CAP, OCOM variables that have been converted to become stationary.



**Table A9.** *Econometric Estimates, below Average EU Member States, 1990-2021*

	Model 5	Model 6	Model 7	Model 8
	GDPG	GDPG	GDPCG	GDPCG
const	4.019*** [0.473]	9.159*** [1.558]	4.284*** [0.478]	8.445*** [1.594]
EUROZONE_	-1.375*** [0.478]	-0.512 [0.448]	-1.769*** [0.483]	-0.943** [0.459]
DMB	-0.044*** [0.010]	-0.030*** [0.009]	-0.038*** [0.010]	-0.026*** [0.009]
D(PRIV)	0.015* [0.008]	0.009 [0.008]	0.015 [0.008]	0.009 [0.008]
FSD	0.037*** [0.012]	0.019* [0.011]	0.028** [0.012]	0.013 [0.011]
D(CAP)	0.017 [0.013]	0.011 [0.012]	0.015 [0.013]	0.010 [0.012]
TVT	0.009 [0.008]	0.007 [0.007]	0.004 [0.008]	0.003 [0.007]
SMT	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
INFL		-0.022*** [0.003]		-0.022*** [0.003]
FDI		-0.011*** [0.003]		-0.009** [0.004]
D(OCOM)		0.002 [0.015]		0.012 [0.016]
GOV		-0.262*** [0.082]		-0.215** [0.084]
R-squared	58.58%	65.95%	59.65%	66.06%
Adjusted R-squared	53.65%	61.48%	54.84%	61.60%
Observations	499	492	499	492

(Source) EViews output, Author's own research

Note. The numbers in parentheses [...] indicate the standard error of each variable in the model; (\*\*\*), (\*\*), (\*) reflects the significance level of 1%, 5% and 10%; D shows the first difference for the PRIV, CAP, OCOM variables that have been converted to become stationary.