

IMPACT OF INCOME INEQUALITY ON ECONOMIC GROWTH *CASE STUDY OF 27 EU MEMBER STATES*

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Abstract

Income inequality is an essential factor in economic development, as it significantly affects the rate and sustainability of a country's economic growth. This research aims to examine the impact of independent variables (Gini coefficient, trade openness, unemployment rate, domestic credit to the private sector, and general government expenditure) on economic growth in 27 EU member states over the period 2008-2019. The study was based on secondary data, which were mainly obtained from the World Bank. The data used in the research are Panel data and include 324 observations. Due to the use of panel data, various kinds of econometric models have been implemented in this research. The analysis began with the OLS model, but due to the unbalanced panel, the fixed effects (FE) and random effects (RE) models were also used. According to the econometric model results, trade openness has a positive impact on economic growth. In contrast, income inequality, the unemployment rate, domestic credit to the private sector, and government consumption expenditure negatively affect economic growth.

Keywords: Economic growth, Gini coefficient, Trade Openness, Unemployment Rate, Domestic Credit to Private Sector, Government Consumption Expenditure, EU

Introduction

Income inequality is a critical issue in discussions on economic development, with significant impacts on economic growth and social stability. This issue is crucial in developing regions, where an unequal distribution of income can substantially affect the rate and quality of economic growth. While economic growth is often seen as the primary indicator of a nation's prosperity, the impact of income inequality on this growth remains complex and multifaceted. In many cases, income disparities can hinder economic performance by limiting access to resources, reducing social mobility, and creating political instability. On the other hand, a certain level of inequality may drive growth by incentivizing investment and innovation. Understanding the relationship between income inequality and economic growth is thus essential for analyzing the dynamics of development and for crafting effective policies that foster both growth and social welfare. Therefore, the primary purpose of this study is to examine the impact of income inequality on economic growth, focusing on key variables such as trade openness, the unemployment rate, domestic credit to the private sector, and general government expenditure.

The research questions posed in this study are:

1. *What is the trend of economic growth in EU member states?*
2. *How does income inequality impact economic growth in EU member states?*
3. *What is the effect of the variables considered in the study on economic growth in EU member states?*
4. *How have these variables changed in the context of the global financial crisis of 2008, compared to the period after it?*

Based on the existing literature and theoretical frameworks, the following hypotheses are proposed:

H0: Income inequality negatively affects economic growth in EU countries

HA: Income inequality positively affects economic growth in EU countries

Literature review

The relationship between income inequality and economic growth has been widely explored in the academic literature, with various theories and empirical studies offering different insights into how these dynamic influences economic outcomes across diverse regions and economic contexts. The authors (Mdingi & Ho, 2023) examined the relationship between income inequality and economic growth in South Africa from 1989 to 2018. Using the autoregressive distributed lag bounds testing technique, they found a long-run relationship between the two variables. The results showed that income inequality negatively affects economic growth in the long run, but has no effect in the short run. Also, the authors (Wolde et al., 2022) investigated the direction of causality and the long-run relationship between income inequality and economic growth in Ethiopia, using annual time series data from 1980 to 2017. They employed the Autoregressive Distributed Lag (ARDL) technique, including the ARDL bounds testing for cointegration and the error-correction method (ECM). The results showed a negative relationship between income inequality and economic growth in the long run.

Trade openness is another critical factor in economic growth, and many researchers have examined its relationship with economic growth. (Keho, 2017), examined the relationship between trade openness and economic growth in Côte d'Ivoire from 1965 to 2014. He employed a multivariate framework, including capital stock, labor, and trade openness as regressors, and used the Autoregressive Distributed Lag bounds test for cointegration and the Toda-Yamamoto Granger causality tests. The results indicate that trade openness positively affects economic growth in both the short- and long-run, revealing a strong complementary relationship. Also, Muhammad Adnan Hye et al. (2016) examined the long-run relationship between trade openness and economic growth in China using data from 1975 to 2009. They developed a trade openness index and applied an endogenous economic growth model, employing the Autoregressive Distributed Lag (ARDL) approach for cointegration and the rolling regression method. The results show that trade openness, both through individual trade indicators and the composite trade openness index, is positively related to economic growth in both the short and long run.

Unemployment is another factor that impacts economic growth, as it can have both direct and indirect effects on a country's overall economic performance. The authors (Nambie et al., 2023), investigated the impact of income inequality, financial inclusion, investment, and unemployment on economic growth in Africa using secondary data from 2001 to 2022. Using the two-step system generalized method of moments (GMM) estimator, they found that income inequality and unemployment negatively affect economic growth. (Rasheed, 2023) examined the relationship between unemployment and economic growth in Nigeria using secondary data from relevant institutions for the period 2010–2020. The ARDL bounds test methodology was employed to analyze the long-run dynamics between unemployment and economic growth. The empirical results derived from the ARDL model confirmed an inverse relationship between economic growth and unemployment. In a study by Makaringe, Sibusiso Clement, and Khobai (2018), the impact of unemployment on economic growth in South Africa was analyzed using quarterly data from 1994Q1 to 2016Q4. The ARDL bounds test approach was employed to assess the long-run relationship between the variables. The results indicated a negative relationship between unemployment and economic growth, both in the short and long run. The authors (Bala et al., 2020)

analyzed the impact of population growth, poverty, and unemployment on economic growth in Nigeria using the Autoregressive Distributed Lag model. The results showed that while population growth and FDI positively affect GDP, unemployment negatively affects economic growth. Also, other researchers (Karikari-Apau et al., 2019), (Xesibe & Nyasha, 2020), (Business & Research, 2021) empirically examined the impact of unemployment on economic growth, reaching the same conclusion.

Previous studies on the relationship between income inequality and economic growth have primarily focused on private credit/GDP. In recent years, the relationship between private credit and economic growth has been a widely discussed topic in economics, yet empirical studies have yet to reach a clear consensus. (Van Cuong, 2020), Examined the relationship between private sector credit, foreign direct investment (FDI), and economic growth in ASEAN countries from 1995 to 2017. He used fixed effect (FEM), random effect (REM), and generalized least squares (GLS) methods for panel data. The results show that private sector credit has a negative impact on economic growth. Also, the authors (Tahir et al., 2015), (Petkovski & Kjosevski, 2014) empirically examined the effect of credit to the private sector on economic growth, reaching the same conclusion. On the other hand, the authors (Amali et al., 2023), in their study, examined the moderating effect of digitalization on the relationship between banks' credit to the private sector and economic growth in Nigeria, focusing on the period from 2009 to 2021. Based on their findings, the study revealed that, in the short term, credit to the private sector has a negative and statistically significant impact on economic growth in Nigeria. Also, (Gaffar & Osman, 2014), (Akin et al., 2019), and (Kunanti & Adry, 2020) reached the same conclusions.

As regards government consumption expenditure, many authors have examined its relationship with economic growth, with findings mixed, showing both positive and negative effects. The authors (Roosmanita & Marbun, 2022), analyzed the impact of export, investment, household consumption, and government expenditure on Indonesia's economic growth from 2012 to 2021. They used secondary data from the National Statistics Agency, the Investment Coordinating Board, and the Ministry of Finance, and applied multiple regression analysis at the 5% significance level. The results show that government expenditure has a significant positive impact on economic growth. On the other hand, Widiaty & Nugroho (2020) analyzed the effects of inflation, government consumption expenditure, foreign debts, and Sharia finance on economic growth in Indonesia from 2011 to 2018. They used the Error Correction Model (ECM) for the analysis. The results indicated that government consumption expenditure was found to have a negative contribution to economic growth.

Methodology

The methodology used in this research belongs to the type of quantitative methodology as it is based on secondary data. The focus was on 27 EU Member States from 2008 to 2019. The data used in this research are of the Panel type, collected mainly from the World Bank database. Statistical data processing will be done using the STATA program. In addition to descriptive statistics and correlation analysis, several econometric models will be implemented in this research, as the use of Panel data allows us to explore a larger number of models. The analysis begins with an OLS model, but due to the unbalanced panel, Fixed Effects (FE) and Random Effects (RE) will also be used.

The equation used for the empirical analysis is as follows:

$$EG = \alpha + \beta_1(GINI) + \beta_2(TO) + \beta_3(UR) + \beta_4(DCP) + \beta_5(SGE) + u_i$$

α —constant coefficient (intercept)

β_1 is the parameter estimated by the explanatory variable "Gini Index"

β_2 —is the parameter estimated by the explanatory variable "Trade Openness"

β_3 is the parameter estimated by the explanatory variable "Unemployment rate "

β_4 —is the parameter estimated from the explanatory variable "Domestic credit to private sector "

β_5 —is the parameter estimated from the explanatory variable "General Government Expenditure on social protection "

u_i - error term

Table 1. Description of research variables

Variable	Abbreviations	Unit	Source	Expected impact
Economic Growth	EG	%	World Bank	
Gini Index	GINI	Coefficient 0-100	World Bank	-
Trade Openness	TO	% of GDP	World Bank	+
Unemployment rate	UR	%	World Bank	-
Domestic credit to the private sector	DCP	% of GDP	World Bank	+
Government Consumption Expenditure	GCE	% of GDP	World Bank	+

Research results

This part presents the empirical results of the research, which were analyzed using the statistical software STATA. First, we will present the descriptive statistics of the variables, then the correlation coefficient table to understand what relationship exists between the variables and the results of the econometric models.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
EG	324	1.54	3.742	-16.04	24.62
GINI	324	31.30	4.036	0	41.3
TO	324	122.37	58.485	32.53	382.35
UR	324	8.97	4.623	2	28
DCP	324	88.67	44.535	24.74	255.31
GGE	324	19.87	3.116	11.88	27.93

The table above presents the descriptive analysis of the research variables, according to which the model contains a total of 324 observations, including the 27 countries of the European Union over 11 years. The data show that out of a total of 324 observations, the model does not have missing data, as all variables are available for entities publishing statistics.

The average value of economic growth for the 27 countries of Europe during the period 2008-2019 is 1.54%. If we are based on the average data of GINI, they show that the countries of the European Union during the aforementioned period have an inequality of 31.3. Income inequality remained at a moderate level, consistent with the standards typically observed in developed economies. Then, the trade openness throughout the studied years resulted in an average of 122.37% of GDP. As for the following variables, the countries under study are characterized by an average unemployment rate of 8.97%, private credit with 88.67% of GDP, and general government final consumption expenditure with 19.87% of GDP.

Table 3. Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) EG	1.000						
(2) GINI	-0.100	1.000					
(3) TO	0.286	-0.254	1.000				
(4) UR	-0.274	0.381	-0.289	1.000			
(5) DCP	-0.244	0.062	-0.162	0.222	1.000		
(6) GGE	-0.321	-0.335	-0.349	-0.004	0.335	1.000	-0.321

After presenting the descriptive statistics of the study variables, in Table 3 we have given the results from the correlation coefficient, a statistical indicator that shows how strong the relationship is between two variables. This coefficient is used to detect multicollinearity, which occurs when the independent variables are strongly positively or negatively correlated (with a correlation coefficient greater than 0.8).

Based on the results of our study, the problem of multicollinearity has not been presented because the independent variables have a correlation of less than 0.8 among themselves.

In addition, the above table also shows the relationship between the dependent variable and the independent variables. Based on the results, it can be seen that between the variables of economic growth and income inequality, the coefficient is $r = -0.100$, which shows us that there is a negative correlation; therefore, the increase in income inequality results in economic decline and vice versa. On the other hand, between economic growth and trade openness, we observe a positive correlation, as reflected in the correlation coefficient $r = 0.286$, indicating that as trade openness increases, economic growth increases, and vice versa. Moreover, a weak positive correlation was found between economic growth and the unemployment rate, with a correlation coefficient of -0.274 . This suggests that as unemployment rises, it results in economic decline and vice versa. Also, this study found a negative relationship between economic growth and credit demand, with a correlation coefficient of $r = -0.244$. Finally, we examine the relationship between economic growth and government spending on consumption, with a correlation coefficient of $r = -0.321$. This result indicates that increased government spending on consumption is associated with lower economic growth.

Table 4. Multiple linear regression (OLS)

EG	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
GINI	-.07	.065	-1.07	.285	-.198	.058	
TO	.008	.005	1.71	.088	-.001	.017	*
UR	-.162	.052	-3.12	.002	-.264	-.06	***
DCP	-.013	.006	-2.15	.032	-.024	-.001	**
GGE	-.413	.095	-4.37	0	-.599	-.228	***

Constant	13.553	3.41	3.97	0	6.869	20.238	***
Mean dependent var	1.545		SD dependent var		3.742		
Overall r-squared	0.200		Number of obs		324.000		
Chi-square	81.322		Prob > chi2		0.000		
R-squared within	0.284		R-squared between		0.402		

*** $p < .01$, ** $p < .05$, * $p < .1$

To answer the research objectives, we used multiple linear regression analyses with OLS, FE, and RE. Through regressions and tests, we will see the explanatory power of the independent variables, the power or reliability of our model through the R-statistic, and the level of significance of the variables taken into consideration.

Table 4 presents the multiple linear regression analysis with the method of least squares (OLS). According to the results, the coefficient of determination is 0.200, a value which shows that the model selected for this analysis does not have an excellent explanatory ability of 20%. Based on the data presented above, trade openness has a statistically significant impact at the 10% significance level, while unemployment rate and government spending on consumption have a statistically significant impact at the 1% significance level, and private credit at the 5 % level. In addition to the OLS estimator, the model has been tested with two other Random Effect and Fixed Effect estimators. To select the final model for the study, we will use the Hausman test.

Fixed Effects

The data obtained using fixed effects are presented in **Table 5**. Based on the data, the model selected for this analysis has an explanation of 35.5 % of the changes that occur in economic growth through the independent variables that are included in our model. Based on the results, all variables have a statistically significant impact on economic growth.

Table 5. Multiple linear regression (Fixed effects)

EG	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
GINI	.146	.083	1.77	.078	-.016	.309	*
TO	.024	.009	2.85	.005	.008	.041	***
UR	-.115	.064	-1.81	.071	-.241	.01	*
DCP	-.046	.013	-3.50	.001	-.072	-.02	***
GGE	-1.069	.205	-5.23	0	-1.471	-.666	***
Constant	20.316	4.49	4.52	0	11.478	29.153	***
Mean dependent var	1.545		SD dependent var		3.742		
R-squared	0.355		Number of obs		324.000		
F-test	32.140		Prob > F		0.000		
Akaike crit. (AIC)	1591.726		Bayesian crit. (BIC)		1614.410		

*** $p < .01$, ** $p < .05$, * $p < .1$

Random Effects

Based on the results of the random-effects model, it is found that the unemployment rate, private credit, and government consumption expenditure have a statistically significant impact on

economic growth. Also, from Table 6, only trade openness has a positive effect on economic development, while all other variables included in the model hurt economic growth.

Table 6. Multiple linear regression (Random effects)

EG	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
GINI	-.07	.065	-1.07	.285	-.198	.058	
TO	.008	.005	1.71	.088	-.001	.017	*
UR	-.162	.052	-3.12	.002	-.264	-.06	***
DCP	-.013	.006	-2.15	.032	-.024	-.001	**
GGE	-.413	.095	-4.37	0	-.599	-.228	***
Constant	13.553	3.41	3.97	0	6.869	20.238	***
Mean dependent var	1.545		SD dependent var	3.742			
Overall r-squared	0.200		Number of obs	324.000			
Chi-square	81.322		Prob > chi2	0.000			
R-squared within	0.284		R-squared between	0.402			

*** $p < .01$, ** $p < .05$, * $p < .1$

The fixed and random effects models are compared to select the final study model using the Hausman test, which is presented in the table below.

Table 7. Hausman (1978) specification test

	Coef.
Chi-square test value	0
P-value	.

To select the final model for the study we will use the Hausman test, so based on the results presented above through the Hausman test, we have concluded that the preferred model for the data is the **Fixed Effects Model**, because the P value from the test has resulted to be 0, i.e. less than 0.05, thus the Fixed Effects Model is more stable and efficient for our data.

Conclusions

This study examines the relationship between economic growth and income inequality across European Union (EU) countries from 2008 to 2019. By analyzing secondary data and employing various econometric models (OLS, Fixed Effects, and Random Effects), this research aims to uncover the impact of income inequality and other economic factors on growth in the EU.

The findings offer insights into how these variables interact and shape economic performance within the region. The study also found unexpected results regarding the impact of certain variables. Private sector credit, which was anticipated to have a positive effect on economic growth, instead showed a negative correlation. This counterintuitive finding could be explained by several factors. One possible explanation is that increased private credit may not always lead to productive investment.

In some cases, excessive credit growth could lead to financial instability, a rise in non-performing loans, or misallocation of resources. In the context of EU countries, credit growth in the private

sector may have been directed towards unproductive or speculative investments rather than fostering long-term economic growth. Additionally, financial crises or banking sector weaknesses in some EU countries might have contributed to the negative impact of credit on growth.

Similarly, government consumption expenditure was also found to hurt economic growth, contrary to expectations. One possible explanation for this finding could be inefficiencies in public spending. While government expenditure can stimulate growth, particularly in sectors like infrastructure, education, and health, in some cases, it can also lead to fiscal imbalances, increased debt, or inefficient allocation of resources. This may be particularly the case in countries where public spending is not effectively targeted towards productive investments or where there is significant public-sector waste. Additionally, in the EU, austerity measures implemented in the aftermath of the financial crisis might have reduced the effectiveness of government spending in stimulating growth.

As for the hypothesis tested in this study, H_0 : Income inequality negatively affects economic growth in EU countries, is accepted, as the results show a negative correlation between income inequality and economic development in the EU. This suggests that higher income inequality tends to hinder economic growth, aligning with existing economic theories. Therefore, reducing inequality should be a key focus for EU policy to foster sustainable development.

In summary, the study's findings highlight the complexity of the relationship between economic growth and income inequality in the EU. While income inequality appears to have a less significant effect on development in the EU, other factors, such as private sector credit, government consumption, and unemployment, are more decisive in shaping economic outcomes. The negative impact of private sector credit and government consumption expenditure calls for further investigation into the efficiency of credit allocation and public spending in the EU. Policymakers should focus on improving the quality of public expenditure, ensuring that credit growth supports productive investment, and continuing to invest in education and labor market reforms to sustain economic growth in the region. The results of this study provide valuable insights for shaping future economic policies in the EU.

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