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THE EFFECT OF FINANCIAL DEVELOPMENT ON INCOME INEQUALITY

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Abstract: *The imperative goal of attaining sustainable development necessitates mitigating income inequality and bolstering access to financial institutions. This research explores the influence of an array of independent variables, namely credit demand, GDP per capita, inflation, government consumption expenditure, and education, on the Gini coefficient across the EU's 27 Member States from 2008 to 2019. The investigation procured secondary data from the esteemed international entity, the World Bank, with 324 observations belonging to the panel type. Because of the utilization of panel data, this study implemented various econometric models, commencing with the OLS model, followed by the fixed effects model (FE) and random effects model (RE). According to the outcomes of the econometric models, credit demand and education positively impact income inequality. At the same time, GDP per capita, inflation, and government consumption expenditures have a negative effect on income inequality. Additionally, the findings demonstrate the significant impact of credit demand, GDP per capita, inflation, and government consumption expenditures on income inequality.*

Keywords: *Gini Coefficient; Demand for Credit; GDP Per Capita; Inflation; Government Consumption Expenditure; Education*

INTRODUCTION

The relationship between financial development and income inequality in the European Union is a complex issue that has been the subject of much research in recent years. In the EU, studies have shown that income inequality tends to increase as financial systems become more developed. This suggests that while financial development may bring economic growth, it may also increase income inequality. Factors such as exchange rates, purchasing power, inflation rates, and national statistics should be considered when analyzing the effects of financial development on income inequality in the European Union (EU) (Kolluru 2021). As one of the most talked-about economic, social, and political concerns, the rise in income inequality is a global worry. The emergence of inequality and its detrimental effects on economic development and progress are concerns shared by academics and government officials.

The gap between the rich and poor has been at its highest level for decades in advanced economies. At the same time, inequality trends have been more mixed in emerging markets and developing countries (Dabla-Norris 2015). This trend is particularly true for candidates and potential EU countries, where despite rising *per capita* incomes, high levels of income inequality persist (Bucevska 2019).

This study aims to identify the main determinants of income inequality among the member countries of the European Union. The primary objective of this paper is to comprehend the leading causes and determinants of income inequality in the countries under study. It aims to provide a framework on which the government can rely to formulate appropriate policies for the development of the financial sector, the promotion of economic growth, and the reduction of income inequality. Furthermore, a secondary objective is to assess how the independent variables have impacted income inequality. To achieve this, the study focused on some of the most critical factors influencing income inequality, such as credit demand, GDP *per capita*, inflation, government spending on consumption, and education. The Gini coefficient was used as a dependent variable to measure income inequality in the 27 EU countries between 2008 and 2019. The study employed various statistical models, including OLS, OLSR, FE, and RE, to analyze the data, and the results were tested for linearity.

LITERATURE REVIEW

The literature on inequality and its consequences for society is vast and complex. Piketty's (2014) influential book, "Capital in the Twenty-First Century", presents a stark picture of wealth concentration and its implications for democracy. The author argues that progressive taxation is necessary to address inequality and prevent further erosion of the middle class. Atkinson (2015) proposes a range of policies to address inequality, including increased investment in education and social policies to reduce poverty.

Milanovic's (2016) new approach to the age of globalization takes a global perspective on inequality and its relationship with globalization. The author argues that while globalization has led to the rise of a global middle class, it has also created winners and losers and increased inequality within and between countries. Stiglitz's (2015) book, "The Great Divide: Unequal Societies and What We Can Do About Them", presents a detailed analysis of inequality in the United States and its implications for economic growth and stability. The author proposes a range of policies to address inequality, including progressive taxation and investment in education and infrastructure.

Alvaredo (2018) comprehensively analyses global inequality and the increasing concentration of wealth at the top. Alesina and Rodrik's (2019) article, "Distributive Politics and Economic Growth", explores the relationship between income distribution and economic growth. The authors argue that a more equal income distribution can lead to higher economic growth by reducing political instability and increasing investment.

Garbinti, Goupille-Lebret, and Piketty's (2017) paper provides a historical perspective on income inequality in France. The authors use new data sources to show that income inequality has risen in France since the 1980s. Milanovic (2019) examines the future of capitalism in a globalized world and challenges the traditional model of liberal capitalism, arguing that the rise of state capitalism in China and other countries threatens the current economic system.

Boushey (2019) explores the negative consequences of high levels of inequality on economic growth and proposes policies to address it, including increasing access to education and healthcare. Finally, Saez and Zucman's (2020) book, "The Triumph of Injustice: How the Rich Dodge Taxes and How to Make Them Pay", examines how the wealthy avoid paying taxes and proposes policies to increase tax progressivity to reduce inequality.

The relationship between financial development and income inequality has been a topic of considerable interest in academic research. Financial development can be understood as the growth and sophistication of financial markets and institutions, such as banking, stock, and insurance, and their impact on economic growth, income distribution, and poverty reduction. This literature review provides an overview of selected research studies examining the relationship between financial development, income inequality, and poverty. The paper examines the role of private credit/GDP, GDP *per capita*, inflation, government spending, and education in shaping the relationship between financial development, income inequality, and poverty.

Jauch et al. (2016) examined the relationship between financial development and income inequality using data from 138 industrialized and developing nations. Their findings contradict theoretical models asserting that financial development will negatively influence income inequality as measured by the Gini coefficient. They used credit to GDP as a measure of financial development. Similarly, Bolarinea et al. (2021) examined the connection between economic growth and inequality in 40 African nations. They found that inequality rises in high-, middle-, and low-income nations depending on the private loan to GDP ratio. Kappel (2012) also investigated how the banking sector's growth affects wealth disparity. Private credit to GDP has the greatest impact on inequality, and an increase in private credit to GDP reduces poverty by 0.2% to 0.5%, according to the estimated coefficient of private credit.

Seven et al. (2018) analyzed data from 30 developed and developing countries from 1995 to 2013 and concluded that private sector credit affects the reduction of income inequality.

Numerous scholars have examined the connection between GDP *per capita* and income inequality because it is one of the critical determinants of income disparity. Bucevska (2019) conducted an econometric study that examined the primary causes of income inequality in the EU candidate countries (North Macedonia, Serbia, and Turkey) for the period 2005-2017. Their findings show that growth in GDP *per capita* is statistically significant and causes a greater differentiation of income levels. Hartini (2015) investigated the effects of GDP *per capita*, investment, and the human development index on income inequality between areas in the Special Province of Yogyakarta between 2011 and 2015. The variable of GDP *per capita* is significant and positively affects the income disparity.

In contrast, Brueckner et al. (2015) calculated the impact of income inequality on real GDP *per capita* using panel data from 104 countries between 1970 and 2010. Their research concludes that income disparity considerably adversely impacts growth and long-term GDP *per capita*. The authors develop a panel data model in which the income of nations affects the relationship between inequality and growth in GDP *per capita*. According to model projections, the link between inequality and GDP growth *per capita* is notably deteriorating in first-income nations. The outcomes of the instrumental variable regressions demonstrate that increased income disparity propels transitory growth in low-income nations. In high-income countries, inequality has a significant negative impact on transitional growth. For the typical country on the planet, with a GDP *per capita* of around $10,000 in 2015, estimations show that a 1% increase in the Gini coefficient reduces GDP *per capita* growth over five years by more than 1% percentage point.

Inflation and income inequality are two phenomena that are related in different ways. Different authors have studied the connections between them and have reached different conclusions.

The studies do not give a clear answer to whether the inflation rate increases or decreases income inequality. Using panel data techniques, Narob (2015) examined the connection between income inequality and inflation in 46 developing nations from 2000-2012. The inflation rate was an independent variable, while the Gini coefficient was utilized to calculate income disparity. Thus, in contrast to earlier studies, a nonlinear impact of inflation on income disparity is tested. The econometric findings, which employ the GMM estimator, are consistent with the premise that there is a nonlinear relationship between inflation and income inequality and that inflation significantly reduces income disparity. Hence, greater income disparity is linked to higher inflation. On the other hand, research by Siami-Namini et al. (2019) on inflation and income inequality in developed and developing nations demonstrates a nonlinear relationship between the two, indicating that income inequality falls as inflation rises.

Additionally, some researchers have discovered that inflation lessens income inequality (Maestri et al. 2012; Coibion et al. 2012).

The question of what the government can do to lessen income inequality and poverty has garnered much attention as they have emerged as significant worldwide challenges. According to several experts, government spending significantly lowers income disparity and the poverty rate (Anderson, 2017). According to research by authors Destek et al. (2020) on the connection between financial development and income disparity, the findings demonstrated that raising government spending lowers income inequality. On the other hand, a study examining the connections between private credit, stock market metrics, income inequality, and poverty analyzed annual data for nine African economies from 1992 to 2018. The findings imply that public funding is targeted toward areas that worsen inequality and poverty because it has a favorable impact on these issues (Serafim 2021).

The connection between education and income inequality continues to be a contentious topic in economic discussions. According to Shahabadi et al. (2018), the findings demonstrate that primary and secondary enrollment rates harm income disparity. Similarly, Omar et al. (2020) claim that education greatly reduces poverty because it gives people the skills they need to integrate into the labor market, generate cash, and, therefore, better their living situations. The impact of trade liberalization on income inequality in China and the nations of the South Asian Association for Regional Cooperation was empirically investigated in research by the authors Zakaria et al. (2016). According to the panel data research covering the years 1973 to 2012, education lowers income disparity. Also, the empirical findings from (Park et al. 2018; Le et al. 2020; and Sabir et al. 2018) and (Le et al. 2020) and (Sabir et al. 2018) strongly underscore the significance of increasing educational attainment as a weapon for reducing inequality.

METHODOLOGY

The methodology used in this research belongs to the quantitative methodology as it is based on secondary data. The focus was on the 27 EU Member States from 2008 to 2019. The data used for the analysis was in the form of Panel data and was sourced from the World Bank. A total of 307 observations were included in the analysis, given the existence of missing data on the Gini coefficient, credit demand, and education variable. Several econometric models were employed in this study to explore a wider range of models, leveraging the benefits of Panel data. Initially, the Ordinary Least Squares (OLS) model was used for the analysis.

However, the Fixed Effects (FE) and Random Effects (RE) models were also utilized due to unbalanced panels. The implementation of Panel data in this study provided an opportunity to use a larger number of models, thereby increasing the reliability and accuracy of the results obtained. The utilization of various econometric models was also crucial in establishing the impact of financial development on income inequality in the European Union countries under study.

The equation used for the empirical analysis is as follows:

$$GINI = \alpha + \beta(KPK) + \beta(GDPC) + \beta(INF) + \beta(SHQK) + \beta(EDU) + \varepsilon \quad (1)$$

The study has the Gini coefficient as its dependent variable and several independent variables, including credit demand (KPK), GDP *per capita* (GDPC), inflation (INF), government consumption expenditure (SHQK), and education (EDU). The coefficients of the independent variables and the regression constant are estimated as parameters β and α, respectively. Additionally, the error term (Ɛ) represents other variables that may potentially affect the Gini coefficient but are not included in this equation. The model variables are described in detail in Table 1.

Table 1: Description of Research Variables (Source: Authors' calculations)

Variable	Abbreviations	Unit	Source	Expected Impact
Gini coefficient	GINI	Coefficient 0-100	World Bank	
Credit Demand	KPK	% of GDP	World Bank	+
GDP *per Capita*	GDPC	$	World Bank	-
Inflation	INF	%	World Bank	+
Government Consumption Expenditure	SHQK	% of GDP	World Bank	-
Education	EDU	% of the increase in compulsory school attendance	World Bank	+

RESULTS

This section elucidates the study's empirical findings, which were evaluated through the STATA statistical software. The initial step entails presenting the descriptive statistics of the variables, followed by the correlation coefficient table, which sheds light on the nature of inter-variable relationships. Subsequently, the outcomes of the econometric models and the linearity tests will be presented to examine the possible effects of the independent variables on the dependent variable, i.e., the Gini coefficient. The statistical calculations were conducted with utmost precision, and the results obtained from the models are reliable and valid.

Table 2: Descriptive Statistics of the Variables (Source: Authors' calculations)

Variable	Obs	Mean	Std. Dev.	Min	Max
GINI	318	31.39	3.67	23.2	41.3
KPK	320	88.89	44.73	24.74	255.31
GDPC	324	33335.91	22726.57	4982.22	123678.7
INF	324	1.76	2.03	-4.48	15.4
SHQK	324	19.87	3.11	11.88	27.93
EDU	317	109.33	16.48	80.32	163.93

Table 2 provides a detailed analysis of the research variables, revealing that the model includes 324 observations over 12 years from 2008 to 2019, encompassing the 27 EU countries. Interestingly, only three variables exhibit missing data, namely the Gini coefficient, credit demand, and education variables, with 6 years, 4 years, and 7 years of missing data, respectively. This lack of data is notably attributed to the statistical entities collecting and publishing the data. Looking at the average Gini coefficient value of 31.39, it becomes apparent that income inequality has not been particularly high during the study period. This variable was measured using a 0-100 coefficient, where lower values signify lower inequality.

Additionally, the data show that EU countries exhibited a credit demand of 88.89% of the Gross Domestic Product, indicating a robust credit market. Moreover, the average GDP *per capita* throughout the studied period was $33,335.91, revealing that the EU countries had a relatively strong economy. Furthermore, education, expressed as the percentage of attending compulsory schooling, emerged as another influential factor in the Gini coefficient. The average attendance of compulsory schooling was 109.33%, suggesting that over twice the population attended this level of schooling. Regarding inflation rates, Latvia registered the highest value of 15.4% in 2008, highlighting the volatility of inflation rates in some EU countries. Finally, Luxembourg exhibited the highest *per capita* income among the study countries, with a value of $123,678.7 in 2014, indicating a high-income economy. Overall, the descriptive statistics of the variables provide valuable insights into the economic and social conditions of the EU countries during the study period.

Table 3: Correlation Analysis (Source: Authors' calculations)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) GINI	1.000					
(2) KPK	0.048	1.000				
(3) GDPC	-0.201	0.334	1.000			
(4) INF	-0.032	-0.168	-0.087	1.000		
(5) SHQK	-0.455	0.330	0.222	-0.069	1.000	
(6) EDU	-0.226	0.153	0.313	-0.179	0.492	1.000

The correlation coefficient results presented in Table 3 provide insight into the strength and direction of the relationships between variables in the study. The coefficient values range from -1 to 1, where -1 indicates a perfect negative correlation, 0 indicates no correlation, and 1 indicates a perfect positive correlation. This study found a weak positive correlation between the Gini coefficient variable and the demand for credit variable, with a correlation coefficient of r = 0.048. This means that an increase in the demand for credit is associated with a slight increase in the Gini coefficient. On the other hand, a modest negative correlation was observed between the Gini coefficient and GDP *per*

capita, with a correlation coefficient of r = -0.201. This result implies that the Gini coefficient declines as *per capita* income increases.

Moreover, a weak negative correlation was found between the Gini coefficient and inflation, with a correlation coefficient of r = -0.032. This suggests that as inflation rises, the Gini coefficient decreases. Furthermore, the correlation analysis reveals a weak negative association between the Gini coefficient and government spending on consumption, with a correlation coefficient of r = -0.455. This result indicates that increased government spending on consumption is associated with a decrease in the Gini coefficient. Finally, the education variable is also negatively correlated with the Gini coefficient, with a correlation coefficient of r = -0.226. This implies that an increase in education is associated with a decrease in the Gini coefficient. Overall, the correlation analysis shows that government spending on consumption and education, *per capita* income, and inflation can influence the level of income inequality measured by the Gini coefficient. However, the strength of the relationships between the variables is weak to modest, suggesting that other factors not included in the study may also affect income inequality.

Table 4: Analysis of Econometric Models (Source: Authors' calculations)

Variables/Model	OLS	OLSR	FE	RE
KPK	0.0265***	0.0265***	0.0106*	0.0124*
	-5.94	-5.99	-2.05	-2.53
GDPC_log	-1.775***	-1.775***	0.209	-0.225
	(-5.37)	(-6.19)	-0.48	(-0.57)
INF	-0.0811	-0.0811	-0.125**	-0.119*
	(-0.82)	(-0.92)	(-3.08)	(-2.95)
SHQK`	-0.576***	-0.576***	-0.0699	-0.152
	(-7.36)	(-8.49)	(-0.12)	(-1.38)
EDU	0.0184	0.0184	0.00634	0.00199
	-1.44	-1.71	-0.69	-0.22
_cons	56.65***	56.65***	29.16***	35.61***
	-18.96	-21.76	-5.77	-7.88
Mean VIF	1.36			
Hettest	0.2238			
N	307	307	307	307

*Note: t statistics in parentheses, *10%, ** 5% ***1%*

Table 4 presents the results of four econometric models, with the OLSR model chosen as the basis for analysis due to its advanced features of minimizing error terms. The OLSR model was run with a total of 307 observations. The results show that credit demand positively impacts the Gini coefficient, with a coefficient of 0.0265. This means that for every 1% increase in GDP in demand for credit, the Gini coefficient decreases by an average of 0.0265 units. This coefficient is statistically significant at the 1% level, indicating a strong relationship between credit demand and the Gini coefficient. The GDP *per capita*, on the other hand, has a negative impact on the Gini coefficient, with a coefficient of -1.77. This means that for every 1% increase in GDP *per capita*, the Gini coefficient decreases by an average of 1.77 units. This coefficient is also statistically significant at the 1% level, indicating a strong relationship between GDP *per capita* and the Gini coefficient. The impact of inflation on the Gini coefficient is negative, with a coefficient of -0.0811. This means that for every 1% increase in inflation, the Gini coefficient decreases by an average of 0.0811 units. Government spending on consumption has a negative impact on the Gini coefficient, with a coefficient of -0.576. This means that for every 1% increase in GDP in government spending on consumption, the Gini coefficient decreases by an average of 0.576 units. This coefficient is statistically significant at the 1%

level, indicating a strong relationship between government spending on consumption and the Gini coefficient.

On the other hand, education has a positive impact on the Gini coefficient, with a coefficient of 0.0184. This means that for every 1% increase in the population following compulsory schooling, the Gini coefficient increases by an average of 0.0184 units. The average of the test for multicollinearity (mean VIF = 1.36) indicates that the data model does not suffer from the multicollinearity problem. This is because the average of this test does not exceed the value of 5, which is the threshold for multicollinearity. The Breusch Pagan test also shows that the data do not suffer from the problem of heteroskedasticity, with a P-value of 0.0238 (22.38%). These results suggest that policies targeting increased GDP *per capita* and reduced inflation and government spending on consumption can help decrease income inequality as measured by the Gini coefficient, while policies targeting increased education.

CONCLUSION

Financial development and income inequality are closely related to each other in the countries of the European Union. Research has shown that as financial systems in EU countries become more developed, income inequality tends to increase. This highlights the need for policymakers to take a balanced approach when promoting financial development to avoid worsening income inequality.

While financial development can bring economic growth, it is important to consider its potential negative impact on income distribution. This can be achieved by implementing policies such as progressive taxation, social safety nets, and targeted investments in education and training programs that can help mitigate the negative effects of income inequality and promote more inclusive growth.

Furthermore, it is essential to continue monitoring the relationship between financial development and income inequality in the EU and to take action to ensure an equal distribution of wealth and opportunity. This study aimed to find the primary causes of income inequality among the European Union's member states. The effect of credit needs, GDP *per capita*, inflation, government consumer spending, and education in determining income disparity is discussed in the study with a particular focus on the years 2008 through 2019.

The results of the analysis of the econometric models essentially complement the results of the literature and are consistent with the expected impact, except for inflation. According to the results of the econometric models and the reviewed literature, credit demand and education positively affect income inequality. The results also show a negative correlation between GDP *per capita*, inflation, government consumption expenditure, and income inequality. As for the importance of the variables, the results show that credit demand, GDP *per capita*, inflation, and government consumption expenditures significantly impact income inequality, while education results in a lower impact on income inequality.

This study has several limitations that need to be considered.

First, the study only focuses on the European Union. It may not be generalizable to other regions or countries, making it difficult to draw broader conclusions about the relationship between financial development and income inequality.

Additionally, the study only considers a limited number of variables, and other important factors, such as demographic trends, political factors, and cultural differences, were not analyzed. Another limitation of this study is that it only analyzes data from 2008 to 2019, and there may have been significant changes in the relationship between financial development and income inequality outside of this time frame.

Despite these limitations, this study provides valuable insights into the relationship between financial development and income inequality in the European Union, highlighting important policy implications for promoting inclusive economic growth. To overcome these limitations, future research could expand the scope of the study to include data from other regions of the world, consider a broader range of variables, and use alternative data sources to validate the findings.

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CRediT AUTHOR STATEMENT

Vesë Qehaja-Keka: Conceptualization, writing - review and editing, formal analysis.
Atdhetar Gara: Methodology, conceptualization, formal analysis, software, investigation.
Erblina Hajdari: Data curation, visualization.
Arber Hoti: Software, writing - review and editing, visualization.

All authors have read and agreed to the published version of the article.

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