AN EMPIRICAL ANALYSIS ON THE INCIDENCE OF SOME CATEGORIES OF TAXES ON INCOME REDISTRIBUTION IN THE EUROPEAN UNION

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Abstract. *Studying the effect of taxation on income inequality is an increasingly pressing issue, as fiscal policies directly influence the distribution of resources in an economy, and the role of fiscal policies in the context of increasingly frequent crises has increased both from the perspective of their ability to adjust economic and social aspects, and from the perspective of research concerns regarding their efficiency. Fiscal policy instruments such as taxes and expenditures, but also a series of institutional aspects, play an important role in the redistribution of resources. Through an appropriate methodology and a wide range of economic and social variables, their influence on income inequality in the European Union countries was examined during the period 2000-2023. The results of the models used highlight a significant relationship between certain fiscal variables and income inequality, measured by the GINI coefficient.*

Keywords: *taxes, public spending, inequality, GINI coefficient.*
JEL Classification*: H30; H5; I38.*

1. Introduction

Fiscal policy can significantly influence the GINI coefficient, by using appropriate fiscal instruments, governments can reduce or, in some cases, increase income inequality.
The specialized literature describes general mechanisms by which fiscal policy influences the GINI coefficient, mechanisms that we briefly present below.

Through the mechanism of the fiscal regime, namely through progressive taxation, income inequality can be reduced, decreasing the value of the GINI coefficient, by the fact that incomes are taxed progressively, on income levels, thus resulting in a higher tax for higher incomes and vice versa. These fiscal systems that have progressive taxation regimes contribute to a redistribution of income from people with high incomes to those with low incomes, which can significantly reduce economic inequality.

Through the mechanism of social transfer policies, which can include poverty alleviation aids, pensions, child allowances, a direct impact on the GINI coefficient can be generated.

A fiscal policy that allocates funds for social assistance and education for low-income families will reduce income inequality and influence the GINI coefficient in the direction of its decrease.

Subsidies for basic consumption (energy, public transport, housing) and investments in infrastructure (education, health, public housing) can reduce costs for low-income people and thus help reduce economic inequalities. For example, providing subsidies for education can help people from low-income families access quality education, improving their long-term income prospects, which can contribute to reducing inequalities and the GINI coefficient. Tax cuts for vulnerable groups, namely by reducing indirect taxes (e.g. VAT) on essential consumer goods, can help low-income people keep a larger proportion of their income. Also, tax exemptions for low-income people or providing tax deductions can support households in this situation, contributing to reducing inequality and, implicitly, the GINI coefficient.

The mechanism of taxes on wealth and capital (such as property, inheritance, and capital taxes) can contribute to the redistribution of income, as people with high incomes usually also own valuable assets or properties. For example, imposing a progressive wealth tax (higher for those who own more capital) can reduce the concentration of wealth and help reduce economic inequality, influencing the GINI coefficient in a downward direction.
These fiscal policy guidelines highlight the important role that it plays in influencing the GINI coefficient by regulating the distribution of income and wealth. A progressive and well-designed fiscal policy, which includes progressive taxes, targeted social transfers, and investments in public services, can contribute significantly to reducing inequalities and, implicitly, to lowering the GINI coefficient. On the other hand, a regressive fiscal policy, which does not support the redistribution of resources or does not address the needs of the most vulnerable social groups, can lead to increased inequalities and a higher GINI coefficient.

2. Problem description

The literature provides arguments for and against the above. For example, Clifton et al. (2020) demonstrated that income taxes and social contributions marginally reduced inequality in Latin American countries, providing a model for progressive fiscal policy. Similarly, Salotti and Trecroci (2018) showed that income and property taxes in OECD countries had a positive effect on income equalization.

In addition, government spending on education and health can influence inequality, being a way to support vulnerable populations. Odusola (2017) shows that in Africa, low levels of taxation and social spending reduce the redistributive impact of fiscal policy, highlighting the importance of health and education spending in reducing economic inequalities. However, Malla and Pathranarakul (2022) observed that in developed countries, increasing government size and public investment in education and health can, surprisingly, increase inequality. This contradictory effect can be explained by differences in the structure and efficiency of institutions, which cause the effective distribution of resources to vary significantly between developed and developing countries.

Institutional capacity also plays a very important role in how tax policies influence income inequality. Effective institutions can support equitable income distribution by properly implementing tax policies and allocating tax revenues to social programs targeting vulnerable groups. Albertus and Menaldo (2014) argue that a lack of institutional capacity can hinder the fair redistribution of resources, thereby amplifying inequality. Furthermore, Huynh (2021) notes that strong institutions moderate income inequality by ensuring a stable environment that favors investment and supports the equitable distribution of economic benefits.

Starting from the described mechanisms and the benchmarks in the specialized literature regarding the incidence of fiscal policy on income redistribution, in our approach we include a series of fiscal-budgetary variables, but also other economic-social variables, thus having the possibility of a more pronounced analysis, the possibility of not exclusively attributing the results of income redistribution to fiscal variables alone and of observing the contribution of other variables to income redistribution, so that the results obtained are consistent.

3. Methodology and data

The variables and sources used to study the impact of taxation on income inequality in European Union countries over the period 2000-2023 are listed in Table 1. The data include a wide range of economic and social indicators, which allow a detailed examination of the factors influencing income inequality. These indicators include the GINI coefficient, GDP per capita, inflation rate and unemployment rate, degree of openness of the economy, degree of urbanization. The variables come from internationally recognized sources, such as The Global Economy and Eurostat, thus ensuring the accuracy and comparability of the data across European Union member states.

Tabel 1. Dates description

Variable	Description	Variable
GINI	The GINI coefficient indicates the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households in an economy deviates from a perfectly equal distribution. The Lorenz curve plots the cumulative percentages of total income received by the cumulative number of beneficiaries, starting with the poorest individual or household. The GINI coefficient measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under this line. Thus, a GINI coefficient of 0 represents perfect equality, while a coefficient of 100 implies perfect inequality.	The Global Economy
L1. GINI	The lag of the GINI indicator to capture the persistence of inequality	The Global Economy
GDPpc	GDP per capita, a measure of economic prosperity	The Global Economy
INF	Inflation rate, impact on purchasing power and income distribution	The Global Economy
SOM	Unemployment rate, reflects the level of employment in the economy	The Global Economy
Opening	The degree of economic openness, defined by the volume of foreign trade	The Global Economy
Urban	Percentage of urban population, indicator of urbanization	The Global Economy
VAT	Value added tax, indicator of indirect taxation	Eurostat
Labor_Tax	Labor tax, which reflects contributions and taxes applied to wage income at the level of a single person, without children, who earns 50% of the average wage, who earns 127% of the average wage and for a couple with two children, in which one earns 100% of the average wage, and the second 67% of the average wage.	Eurostat
Profit_Tax	Corporate tax, which indicates the taxation of profits	Eurostat

The GINI coefficient values shown in Figure 1, which measure income inequality across European countries, vary considerably, illustrating important differences in income distribution. Countries with the lowest levels of inequality, such as Slovakia (21.6), Slovenia (23.4) and Belgium (24.2), indicate a more equitable income distribution, suggesting either effective redistribution through fiscal policies or a more pronounced balance of income between social segments.

At the opposite end, countries such as Bulgaria (37.2), Lithuania (35.7) and Latvia (34) have higher GINI coefficient values, indicating more pronounced income inequality. These differences reflect both variations in economic structure and social policies, as well as the impact of redistribution measures implemented in each country. In general, Western European countries tend to have lower inequalities, while in Eastern and Southeastern European states, inequality is more pronounced, highlighting the importance of economic interventions and policies tailored to the local context to reduce income disparities.

Figure 1. Income Inequality in 2023

Source: The Global Economy

A first step in data analysis is to examine the correlation matrix to identify potential multicollinearity issues between the explanatory variables. Multicollinearity occurs when independent variables are highly correlated with each other, which can negatively impact the precision and stability of coefficient estimates in regression models. This phenomenon can lead to increased standard errors and decreased statistical significance, making it difficult to interpret the individual effects of variables on the final result. Correlation analysis thus allows the detection of redundant or highly correlated variables, allowing for appropriate adjustments to reduce multicollinearity and obtain more robust models and more reliable conclusions.

As can be seen in Figure 2, the correlation coefficients between the explanatory variables are relatively low, suggesting that there is no strong correlation between the variables that could lead to multicollinearity issues. For example, the correlation between GDP per capita (GDPc) and the unemployment rate (SOM) is approximately -0.35, indicating a weak inverse relationship but not strong enough to cause concerns about multicollinearity. Another example is the correlation between the degree of urbanization (Urban) and labor taxation, which is only -0.02, demonstrating an almost non-existent relationship between these variables. These values suggest that the variables can be included together in the econometric model without generating distortions in the estimation of the coefficients, confirming the stability and interpretability of the results.

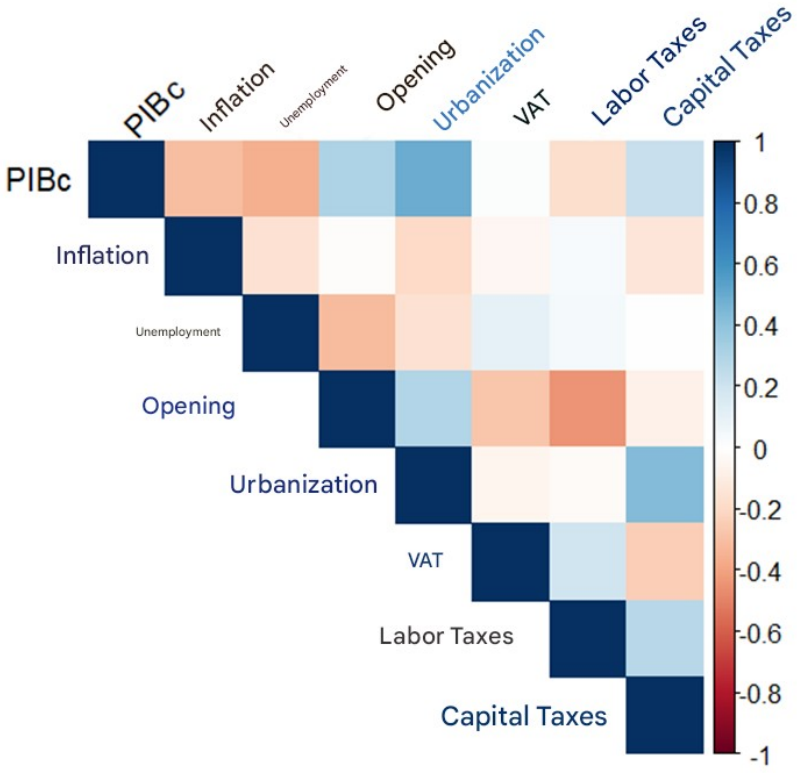

Figure 2. Correlation matrix of explanatory variables

Source: own processing in Python

The second step in our analysis is testing the stationarity of the time series in the context of panel data. This step is fundamental to avoid erroneous estimates and spurious relationships between variables, thus ensuring the robustness and relevance of statistical conclusions. In this sense, the use of the Levin-Lin-Chu (LLC) test is applicable and appropriate for the structure of panel data with a large number of units (countries) and periods, as it allows the estimation of a common AR parameter, adjusting for the specific characteristics of each unit. Through the LLC test, we evaluate the stationarity hypothesis in a way that takes into account the specific heterogeneity of the panel, providing a solid basis for further analyses.

The results of the Levin-Lin-Chu test presented in Table 2 indicate that all series used are stationary at the 99% significance level. Thus, the stationarity of the variables is ensured, allowing us to run the estimates without the risk of obtaining distorted results due to the presence of unit roots. This finding supports the validity of the econometric analysis, facilitating the obtaining of robust and consistent relationships between the variables included in the model.

Table 2. Stationarity testing

Variable	t-test value*	p-value
GINI	-3.2444	0.0006
GDP	-6.9724	0.0000
INF	-5.1817	0.0000
SOM	-4.3656	0.0000
Oppeness	-7.3255	0.0000
VAT	-4.6545	0.0000
Labor_tax	-4.1274	0.0000
Profit_tax	-4.0440	0.0000

4. Results

The results of the Arellano-Bond estimations are presented in Table 3. The choice of this dynamic model is justified by the need to control for endogeneity issues and individual fixed effects, given the panel structure of the data, which covers 27 countries over a 24-year period. The Arellano-Bond method is particularly appropriate in the context of data series that include lags of the dependent variable, as in the present case, where the lag term of the GINI (L1.GINI) is included to capture the persistence of inequality. Also, the tax variables (VAT, labor tax, corporate tax) are included separately in each of the models, to avoid the problems of multicollinearity that could arise if all were included simultaneously. Since these tax variables reflect different aspects of tax policy and have the potential to influence inequality and other economic factors in distinct ways, using them in separate models allows for a clearer understanding of the impact of each type of tax on income inequality.

Table 3. Regression results

Variable	Model 1	Model 2	Model 3
L1.GINI	0.2449***	0.2399***	0.2430***
GDPpc	-0.3990	-0.1592	-0.2769
INF	-0.0501**	-0.0538**	-0.0552**
SOM	0.1076***	0.1040***	0.1123***
Opening	-0.0139**	-0.0138**	-0.0122**
Urban	0.0053	0.0598	0.0232
VAT	0.0375		
Labor_tax		0.0949*	
Profit_tax			0.0223
Constanta	27.3338***	18.2293**	24.8926***

*Note: *,**,*** indicate statistical significance at the 10%, 5% and 1% thresholds, respectively*

The results of the regression models highlight a significant relationship between certain tax variables and income inequality, as measured by the GINI coefficient. First, the labor taxation in Model 2 presents a positive coefficient and is statistically significant ($p < 0.10$). This result suggests that higher labor taxation may contribute to increasing income inequality, by reducing the disposable income of middle and low-wage earners. From an economic point of view, this result suggests that a high tax burden on wage income may affect lower-income categories more, thus contributing to increasing inequality.

Second, the coefficient for corporate tax in Model 3 is not statistically significant, suggesting that corporate taxation does not have a clear effect on income inequality in this model. This result could indicate that the impact of profit taxation is either too small to influence income distribution, or that these revenues are concentrated in a narrow segment of the population, without significantly affecting the overall income distribution.

In addition to these fiscal variables, other economic variables included in the model – such as inflation (INF) and economic openness (Openness) – have significant effects and influence income inequality. The negative influence of inflation suggests that an increase in prices can reduce inequality, which can be explained by the implicit redistribution of income from higher income categories to the most vulnerable. Also, trade openness, with a negative and significant coefficient, emphasizes the importance of trade and global economic interaction in reducing income disparities, possibly due to increased access to economic opportunities for lower social categories.

5. Conclusions

Income redistribution and the reduction of social inequalities are important objectives of modern fiscal policies. The most effective policies are those that combine direct measures (such as progressive taxation and social transfers) with investments in social and economic infrastructure. Their implementation must be adapted to the specifics of each country, taking into account the socio-economic structure and level of development.

Regarding the relationship between labor taxation in Romania and the GINI coefficient, it is closely interconnected. By taxing labor, the state has the opportunity to redistribute income in society, reducing the discrepancies between different economic groups. However, the fiscal structure in Romania affects the efficiency of this process, by maintaining a flat-rate tax system on income since 2005, which led to a decrease in the tax burden for high incomes, but had a limited effect on low incomes. Social contributions remain among the highest in the EU, while European trends tend towards progressive taxation.

The impact of profit taxation in Romania on the GINI coefficient is limited by the low level of collection and the regressive structure of the tax system. Reforms that include progressivity, the elimination of inefficient exemptions and increased collection efficiency could contribute to reducing inequalities.

The relationship between VAT and the GINI coefficient can have a significant impact on income distribution. In Romania, the structure and level of VAT have a regressive effect on household income, which contributes to maintaining a high level of inequality. VAT contributes to financing the public budget, but has a regressive impact on household income, amplifying economic inequalities. Although the introduction of reduced rates and the use of collected revenues for social programs contribute to reducing this effect, a deeper reform of the VAT system, together with income redistribution measures, is necessary to reduce the negative impact on redistribution. In conclusion, the Romanian tax system favors

redistribution less compared to other states in the European Union, contributing to maintaining a relatively high level of inequality. A tax reform could reduce these discrepancies.

References:

1. Apergis, N., 2021. The role of fiscal policy in the link between income inequality and banking crises. *Applied Economics Letters*, 28, pp.1283–87.
2. World Bank, 2022. *World Inequality Report*.
3. Clifton, J., Díaz-Fuentes, D. and Revuelta, J., 2020. Falling inequality in Latin America: The role of fiscal policy. *Journal of Latin American Studies*, 52(2), pp.317–341.
4. Chancel, L., Piketty, T., Saez, E. And Zucman, G., 2021. *World Inequality Report 2022*.
5. European Commission, 2024. *Annual Report on Taxation 2024*. Directorate-General for Taxation and Customs Union, Publications Office of the European Union. Luxembourg.
6. Hammed Oluwaseyi, M., Abdulrasheed, Z. and Taghizadeh-Hesary, F., 2024. Exploring the Fiscal policy—income inequality relationship with Bayesian model averaging analysis. *Economic Change and Restructuring*, pp.57(21), pp.1-14.
7. Granger, H., Abramovsky, L. and Pudussery, J., 2022. *Fiscal policy and income inequality - The role of taxes and social spending.* [pdf] Available at: <https://media.odi.org/documents/ODI_Report_Fiscal_policy_and_income_inequality_the_role_of_taxes_and_social_sp_GwknCLd.pdf> [Accessed 3 April 2025].
8. Huynh, C.M., 2021. Foreign direct investment and income inequality: Does institutional quality matter? *The Journal of International Trade & Economic Development,* 30, pp.1231–43.
9. IMF, 2014. *Fiscal Policy and Income Inequality*. [pdf] Available at: <https://www.imf.org/external/np/pp/eng/2014/012314.pdf> [Accessed 3 April 2025].
10. Malla, M.H. and Pathranarakul, P., 2022. Fiscal Policy and Income Inequality: The Critical Role of Institutional Capacity. *Economics*, 10(5), 115.
11. Ministry of Public Finance, World Bank, 2023. *Report on the fiscal system in Romania.*
12. OECD, 2024. *Country-by-Country Reporting – Compilation of 2024*. Peer Review Reports: Inclusive Framework on BEPS: Action 13, OECD/G20 Base Erosion and Profit Shifting Project. Paris: OECD Publishing.
13. Odusola, A., 2017. Fiscal Policy, Redistribution and Inequality in Africa. In: *Income Inequality in Sub-Saharan Africa: Divergence, Determinants, and Consequences*. United Nations Development Programme, pp.155–77.
14. Salotti, S. and Trecroci, A., 2018. The impact of fiscal policy on income inequality: Panel data evidence from OECD countries. *European Journal of Political Economy,* 25.
15. Nguyen, Van Bon, 2024. *The Fiscal Policy - Inequality Nexus in Developing and Advanced Economies: Difference-Based Policy Insights*. [pdf] Available at: <https://journal.fsv.cuni.cz/storage/1535_attachment_a.pdf> [Accessed 3 April 2025].