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MACROECONOMIC DETERMINANTS OF THE TAX BURDEN IN THE EUROPEAN UNION: A SYSTEM GMM APPROACH

MAKROEKONOMICKÉ DETERMINANTY DAŇOVÉHO ZAŤAŽENIA V EURÓPSKEJ ÚNII: METÓDA SYSTÉMOVÉHO GMM

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Abstract : *The issue of effective taxation remains a crucial economic and policy concern across the European Union. The aim of this paper is to explor the relationship between the tax burden and its key macroeconomic and structural determinants, emphasizing how economic development and market integration influence fiscal outcomes. The analysis employs annual panel data for 27 EU countries over the period 2000–2024 and applies the System Generalized Method of Moments (System GMM) to control for dynamics and potential endogeneity in the tax system. The results confirm a strong persistence of the tax burden, suggesting fiscal rigidity and gradual policy adjustment over time. Moreover, higher GDP per capita, greater trade openness, and a larger labor force are found to significantly increase the overall tax burden, reflecting the fiscal strength of advanced and integrated economies.*

Keywords: tax burden, taxation, European union, GMM
JEL Classification: H11, H20, H25

Introduction

The tax burden and its level are among the most significant factors influencing the functioning of economies and the behaviour of business entities. Especially in corporate taxation, it plays a key role in shaping the business environment, investment decisions, and competitiveness. The applied level and structure of taxes directly affect companies' profitability, their willingness to expand into new territories, and thus increase economic growth in the country. On the issue of optimal tax burden, economists lean towards options that yield more significant results for the economy. Under current conditions of globalization, the trend in tax burden is towards lowering tax burdens to attract new investors. Political aspects also enter this economic decision-making.

The tax burden represents a pivotal element within the socioeconomic framework. Given that it represents one of the main sources of revenue for the state budget, it directly affects public services and the functioning of the state. Excessive tax burden can hinder economic

growth, increase unemployment, and encourage the transfer of capital to countries with lower taxes. Finding a balance between the state's interest and the needs of companies in business is therefore one of the greatest challenges of tax policy.

This paper aims to determine how macroeconomic indicators, such as level of economic development, trade openness, employment capacity, the unemployment rate, and the size of the industry sector, affect the tax burden. To investigate these relationships, the study employs dynamic panel data estimators, specifically the system generalized method of moments (GMM) approach. This analysis uses data from 27 European union member countries covering the period from 2000 to 2024.

The structure of the paper is as follows: Section 1 examines the tax burden and its determinants within both theoretical and empirical frameworks. Section 2 presents the methodological approach of the study and outlines the theoretical foundations supporting the analysis. Section 3 summarizes and interprets the analytical results. Finally, Section 4 concludes the paper with key findings and implications.

1 LITERATURE REVIEW

Countries strive to adapt their applied tax policies to current economic conditions. A study focusing on the impact of the crisis on the tax environment showed that during the 2008 crisis, the structure of tax revenues in EU countries changed. However, this change in tax structure subsequently influences the behaviour of business entities. According to the authors, changes in the tax structure may include either the reduction or the increase of the tax burden. Excessively high taxation can discourage entrepreneurial activity within the economy, while taxes that are too low may not be sufficient to cover all public expenditures.

The literature examines the impact of the tax burden on a country's economic growth in a very complex way. Economists' views on this issue differ. From an economic point of view, a high tax burden can negatively affect economic growth. According to a study by Kotlán et al.(2011), high taxation may discourage investment and innovation in a country, leading to slower economic growth. Likewise, increasing the tax burden may negatively influence capital accumulation and technological progress. Another study by Harumová (2007) confirms this negative effect, stating that an unfavourable tax setting can lead to reduced economic activity and higher unemployment. The study by Lee and Gordon (2005) points to a negative correlation between corporate tax rates and the pace of economic growth. Similarly, Baranová and Janíčková (2012) confirmed an inverse relationship between the tax burden and long-term growth in the European Union.

From society's perspective, the tax burden is a significant component. Given that it represents one of the main sources of revenue for the state budget, it directly affects public services and the functioning of the state. Excessive tax burden can hinder economic growth, increase unemployment, and encourage the transfer of capital to countries with lower taxes. Finding a balance between the state's interest and the needs of companies in business is therefore one of the greatest challenges of tax policy.

The relationship between corporate taxes and unemployment is empirically ambiguous. Feldmann (2011) found that higher corporate taxes may correlate with lower unemployment rates, which he described as the "unemployment paradox" and attributed to secondary effects of fiscal policy. In contrast, Zirgulis and Šarapovas (2017), in a dynamic panel of 41 countries, confirmed that higher effective tax rates increase unemployment. Ruggieri and Cisneros-Acevedo (2023) further add that lowering corporate taxes promotes formal employment and strengthens the output of larger firms, but at the same time increases the duration of

unemployment and inequality. These findings highlight the need to examine transmission channels — for example, the impact of taxes on wages, capital, and fiscal balance.

From a business perspective, according to a study by Djankov et al. (2009), effective corporate taxes have a significantly negative impact on aggregate investment, FDI, and entrepreneurship, with the effect being most pronounced in capital-intensive industries. Ohrn (2018), based on a quasi-experiment in the United States, showed that a one-percentage-point reduction in the tax rate increases investment by 4.7% of existing capital — strong evidence of the causal effect of tax changes. An OECD study (Hanappi, Millot, Turban, 2023) confirms the heterogeneity of responses depending on sector and time period, showing that investments remain sensitive to tax-determined capital costs. This implies that tax policy has a significant, albeit variably strong, impact on corporate investment decisions.

The key question remains who bears the burden of corporate taxes. Auerbach (2006) theoretically shows that over time, part of the burden may shift from capital to labour through a decline in investment. However, Clausing (2012) found no robust empirical evidence that corporate taxes significantly suppress wages in OECD countries. Smith (2017) adds that the degree of competition within an industry determines the extent to which firms pass on or absorb tax changes. Overall, it is therefore not possible to clearly determine whether most of the burden is borne by shareholders, workers, or consumers.

Research by Djankov et al. (2009) and Feldmann (2011) confirms that higher corporate taxes reduce foreign investment inflows and increase the share of the informal economy. The effect is stronger in countries with high capital mobility, where FDI represent an important transmission channel between tax policy and growth. This means that the competitiveness of a tax system depends on the openness of the economy and the elasticity of capital in response to tax changes.

While the existing literature provides extensive insights into the link between taxation and macroeconomic performance, the findings remain largely inconclusive and context dependent. Differences in methodology, country coverage, and time periods lead to divergent interpretations of how taxation influences growth, employment, and investment. Moreover, the European context—characterized by fiscal heterogeneity, integration, and policy coordination within the EU—has not been comprehensively examined in recent years, particularly regarding the overall tax burden rather than specific tax categories.

For this reason, the present study seeks to empirically reassess the relationship between the tax burden and its macroeconomic determinants within the European Union, with a focus on how structural factors such as trade openness, labor market dynamics, and industrial development shape fiscal outcomes. By applying the System GMM approach to recent panel data, this analysis aims to fill the identified research gap and provide robust, policy-relevant evidence on the persistence and drivers of taxation across EU economies.

2 DATA AND METHODOLOGY

This section introduces the key variables used in economic testing, which is carried out using the Generalized Method of Moments (GMM) technique. The objective is to provide a comprehensive overview of the data structure, delineate their respective sources, and establish the economic meaning of every variable included in the estimated model.

To facilitate a better understanding of the characteristics of the analysed dataset, a descriptive statistical analysis was performed. This analysis summarizes the main properties of the data using key indicators such as the mean, standard deviation, minimum, and maximum. These statistics offer initial insight into the value distribution, aid in identifying potential outliers or deviations, and consequently contribute significantly to the interpretation of the model's subsequent findings.

The following subchapter then proceeds to discuss the GMM method in greater detail. This discussion encompasses the estimated equations, the necessary diagnostic tests (such as tests for exogeneity and autocorrelation), and the specific software employed for the estimation process. This structured approach ensures a coherent link between the theoretical framework and its empirical implementation, thus providing a comprehensive view of the modelling process and the verification of econometric relationships.

1.1 Variables and data description

The empirical analysis relies on annual panel data covering 27 EU countries across 25 years (2000 - 2024), resulting in a balanced panel of 621 observations. The structure allows us to analyse both cross-country differences and temporal dynamics in variables such as tax revenue, GDP measures, and labour market indicators. All data came directly from the World Bank database. Table I summarizes the description of variables and their calculating.

Table 1: Summary description of variables

Variable name	Definition	Label
Tax burden	Total tax revenue/GDP	TB
GDPpc	Gross domestic product per capita	GDP
Openness	(Export spending+ import spending)/GDP	EXIM
Labour force	Annual statistics of the labor force	LF
Unemployment	Annual statistics of the unemployment rate	UNEMP
Factory	The share of industrial sector on GDP	INDUSTRY

Source: own processing

Table 2 presents the descriptive statistics of the variables used in the analysis. All variables were transformed into natural logarithms to stabilize the variance, reduce potential heteroskedasticity, and allow for interpretation of the estimated coefficients in terms of elasticities.

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max	N	n	t
ln(TB)	3.047	0.227	2.349	3.599	621	27	23
ln(GDP)	10.082	0.794	7.391	11.813	621	27	23
ln(EXIM)	4.646	0.449	3.898	6.013	621	27	23
ln(LF)	15.137	1.374	11.954	17.599	621	27	23
ln(UNEMP)	2.012	0.472	0.593	3.321	621	27	23
ln(INDUSTRY**)**	3.106	0.268	2.209	3.706	621	27	23

Source: own calculating (Gretl)

The mean value of the logarithm of the tax burden is 3.05 with a relatively low standard deviation (0.23), indicating moderate variation in the tax-to-GDP ratio among the analysed countries. The logarithm of GDP per capita shows higher variability (SD = 0.79), which reflects substantial differences in the level of economic development across the sample. The trade openness variable has a mean of 4.65 and exhibits less dispersion (SD = 0.45), suggesting a relatively similar degree of trade integration among the observed economies.

The labour force variable shows a mean of 15.14 and a relatively high standard deviation (1.37), capturing the differences in population size and labour market scale. The unemployment variable displays a mean of 2.01 with moderate variability (SD = 0.47), indicating differences in labour market conditions across countries. Finally, the industrial production variable presents the lowest variation (SD = 0.27), implying relative stability in the share of industry within total output across the sample.

Overall, the descriptive statistics indicate that the variables display sufficient variation both across countries and over time, which is appropriate for subsequent dynamic panel data estimation.

In all estimated models, the dependent variable is the tax burden, expressed as the total tax revenue of the central government as a percentage of GDP. The set of independent variables includes GDP per capita, which captures the level of economic development; trade openness, measured by the ratio of exports and imports to GDP; labour force size, representing the scale of the active working population; unemployment rate, reflecting labour market performance; and the industrial production share, which indicates the relative importance of manufacturing in the economy.

1.2 Panel unit root tests

Before estimating the dynamic panel model, we examine the stationarity of the variables to avoid spurious regression results. To determine whether the panel series are stationary, the Levin–Lin–Chu (LLC) unit root test was applied to all log-transformed variables.

Table 3: Results of the panel unit root tests

Variable	Unadjusted t	Adjusted t	Integration order
lnTB	−8.127	−2.2952b	I(0)
lnGDP	−12.447	−8.6663a	I(0)
lnEXIM	−2.766	2.0647	I(1)
lnLF	−1.244	0.8108	I(1)
lnUNEMP	−4.577	1.0789	I(1)
lnINDUSTRY	−6.862	−3.4878a	I(0)
ΔlnEXIM	−20.398	−13.5653a	I(0)
ΔlnLF	−19.185	−12.6311a	I(0)
ΔlnUNEMP	−15.860	−9.8134a	I(0)

Source: own calculating (Gretl)

Statistical significance is denoted as follows - a: $p < 0.01$, b: $p < 0.05$, c: $p < 0.10$.

The results (see Table 3) of the test indicate that some variables are non-stationary at levels but become stationary after first differencing, suggesting that they are integrated of order one, I(1). Specifically, the variables lnEXIM, lnLF, and lnUNEMP were found to be non-stationary

in levels, while lnTB, lnGDP, and lnINDUSTRY were stationary at level I(0). Therefore, for the subsequent GMM estimation, the first differences of the non-stationary variables were used to ensure model validity.

1.3 Model specification and estimation method

To investigate the relationship between the tax burden and selected macroeconomic variables, a dynamic panel data model was employed. This approach accounts for potential endogeneity of the explanatory variables and for the dynamic nature of the dependent variable, as the current level of the tax burden may depend on its past realizations. For this reason, the System GMM estimator is applied, since it allows the use of internal instruments to correct for endogeneity, eliminates bias arising from the inclusion of the lagged dependent variable, and provides consistent and efficient estimates in panels with many countries but relatively short time periods.

Based on the formulated research question – What are the relationships between the tax burden and selected macroeconomic indicators in the member states of the European Union? – the following econometric model has been constructed:

$$\ln\text{Taxburden}_{it} = \alpha \ln\text{TB}_{i,t-1} + \beta 1 \ln\text{GDP}_{it} + \beta 2 \Delta \ln\text{EXIM}_{it} + \beta 3 \Delta \ln\text{LF}_{it} + \beta 4 \Delta \ln\text{UNEMP}_{it} + \beta 5 \ln\text{INDUSTRY}_{it} + \mu i + \varepsilon it$$

where i=1,…,27 denotes the country and t=1,…,23 the time period. μi represents unobserved country-specific effects, and εit idiosyncratic error term.

Because the presence of the lagged dependent variable ($\ln\text{Tb}_{i,t-1}$) makes the use of standard estimators such as fixed effects inconsistent, the model was estimated using the System Generalized Method of Moments (System GMM) developed by Arellano and Bover (1995) and Blundell and Bond (1998). This estimator combines equations in first differences and in levels, which improves efficiency, especially when the series are persistent over time.

The two-step System GMM estimator was applied, as it provides asymptotically efficient estimates and robust standard errors (Windmeijer, 2005). To prevent the problem of instrument proliferation and potential overfitting, the number of instruments was limited following the recommendations of Roodman (2009). Additionally, asymptotic standard errors were used to obtain reliable inference.

Before estimation, the Levin–Lin–Chu (2002) panel unit root test was employed to check for the stationarity of the series. To ensure model validity, variables that were found to be integrated of order one were used in first differences.

The validity of the instruments was evaluated using the Sargan and Hansen tests of overidentifying restrictions, while the absence of second-order autocorrelation was checked using the Arellano–Bond AR(2) test. As expected, the AR(1) test was significant due to first differencing, confirming the dynamic nature of the model.

The estimation was carried out in the Gretl software, using 621 observations in a balanced panel. The results are reported in Table 4 (SGMM and SGMM robust), which present models with different combinations of explanatory variables.

2 RESULTS

This chapter presents the empirical findings derived from the Generalized Method of Moments (GMM) estimation, building directly upon the methodological framework discussed in the preceding section. The primary results of our analysis are consolidated and presented in Table 4, which contains the coefficient estimates from the various GMM models. Crucially,

this table also includes the outcomes of the rigorous diagnostic tests necessary to validate the GMM approach, such as tests for serial autocorrelation and instrument exogeneity. These results offer a robust foundation for evaluating the proposed economic relationships and assessing their statistical significance. The following discussion interprets these key findings and examines their consistency with the theoretical hypotheses formulated earlier in the study.

Table 4: Results of the System GMM

Variable	(1) SGMM	(2) SGMM	(3) SGMM	(4) SGMM (robust)	(5) SGMM (robust)	(6) SGMM (robust)
lnTB$_{t-1}$	0.954886[a] [0.009909] (96.36)	0.898072[a] [0.021488] (41.79)	0.896291[a] [0.021797] (41.12)	0.956690[a] [0.024067] (38.88)	0.908107[a] [0.053360] (17.02)	0.894627[a] [0.052292] (17.11)
lnGDP	0.0130704[a] [0.002977] (4.39)	0.0185874[a] [0.003561] (5.22)	0.0197788[a] [0.003881] (5.10)	0.0125329[c] [0.007412] (1.69)	0.0167148[c] [0.008875] (1.88)	0.0198220[b] [0.008964] (2.21)
ΔlnEXIM	0.100586[a] [0.014274] (7.05)	0.118021[a] [0.015151] (7.79)	0.093812[a] [0.014258] (6.58)	0.0984272[b] [0.044100] (2.23)	0.116197[a] [0.041393] (2.81)	0.0919126[b] [0.041399] (2.22)
ΔlnLF	0.292142[a] [0.048656] (6.00)	0.418612[a] [0.037535] (11.15)	0.434934[a] [0.151046] (2.88)	0.291616[b] [0.128793] (2.26)	0.403340[a] [0.129800] (3.11)	0.429325 [0.274166] (1.57)
ΔlnUNEMP	−0.034319[a] [0.008101] (−4.24)	–	−0.032067[a] [0.007855] (−4.08)	−0.033959 [0.021148] (−1.61)	–	−0.031839 [0.021044] (−1.52)
lnINDUSTRY	–	0.037308[a] [0.009436] (3.95)	0.035221[a] [0.008731] (4.03)	–	0.033635 [0.024684] (1.36)	0.036727 [0.024155] (1.52)
Wald χ^2 (p-value)	1.55×10^7 (0.000)	3.56×10^6 (0.000)	4.89×10^6 (0.000)	1.91×10^6 (0.000)	4.26×10^5 (0.000)	3.75×10^5 (0.000)
AR(1) z (p)	−4.098 (0.000)	−4.096 (0.000)	−4.075 (0.000)	−4.082 (0.000)	−4.006 (0.000)	−3.987 (0.000)
AR(2) z (p)	0.335 (0.737)	0.141 (0.888)	0.210 (0.834)	0.333 (0.739)	0.148 (0.882)	0.211 (0.832)
Sargan χ^2 (p)	55.84 (0.0001)	62.12 (0.0000)	55.85 (0.0001)	22.65 (0.363)	23.40 (0.323)	22.74 (0.358)
Hansen χ^2 (p)	22.67 (0.362)	23.42 (0.322)	22.75 (0.358)	–	–	–

Source: own calculating (Gretl)

Explanatory note: Standard errors are reported in brackets [ ]. *t*-statistics are shown in parentheses ( ). Statistical significance is denoted as follows - a: $p < 0.01$, b: $p < 0.05$, c: $p < 0.10$. All estimations were conducted using the System GMM method. The AR(1) and AR(2) tests refer to first- and second-order serial correlation in residuals, while the Sargan and Hansen tests examine the validity of the instruments.

The coefficient of the lagged dependent variable - Tax burden is positive and highly significant at the 1% level across all model specifications. Its estimated values range between 0.89 and 0.96, indicating a strong persistence of the tax burden over time. This suggests that the current level of taxation is largely determined by its past values, reflecting a degree of fiscal inertia and institutional rigidity in tax systems. A high autoregressive coefficient implies that tax policy adjustments occur gradually rather than abruptly, which may stem from political constraints, administrative capacity, or path-dependent fiscal structures. This finding confirms the dynamic nature of the tax system and supports the appropriateness of using a dynamic panel model for the analysis. Similar evidence has been reported in earlier studies on OECD and

European countries, where tax ratios tend to exhibit strong serial correlation due to the long-term effects of policy reforms (Celikay, 2020). The persistence effect found here is therefore consistent with theoretical expectations and the empirical literature, highlighting the stability and gradual evolution of tax burden levels across European economies.

The estimated coefficient for - GDP per capita is positive and statistically significant in all model specifications. In the SGMM models, the coefficient ranges from 0.013 to 0.020 ($p < 0.01$), while in the robust estimations it remains positive and significant at the 5–10% level. These results confirm that higher levels of economic development are associated with a higher tax burden. This relationship indicates that as income per capita increases, governments tend to collect a greater share of taxes relative to GDP. Economies with higher income levels generally have broader tax bases, more diversified economic structures, and more effective tax administrations, which enable them to generate higher revenues. In addition, citizens in wealthier economies may have a greater willingness and ability to pay taxes, reflecting stronger fiscal capacity and institutional trust. This finding aligns with standard fiscal capacity and modernization theories, which argue that the development of the economy leads to an expansion of the public sector and thus higher tax collection. It is also consistent with previous empirical studies on OECD and EU countries, such as Celikay (2020) and Baranová and Janicková (2012), which similarly reported a positive and significant relationship between income per capita and tax burden levels.

The coefficient of trade openness is positive and statistically significant in all model specifications. In the standard SGMM estimations, the coefficient values range between 0.09 and 0.12 ($p < 0.01$), while in the robust models the effect remains positive and significant at the 5% level. This indicates that greater trade openness contributes to a higher tax burden among the examined European countries. These results are consistent with the theoretical expectation that economic openness promotes fiscal capacity through higher productivity and stronger economic linkages. Similar findings were reported in empirical research on OECD countries, where openness was found to exert a positive influence on total tax revenues (Celikay, 2020).

The coefficient of labour force is positive and statistically significant in most model specifications. In the SGMM estimations, the coefficient ranges from 0.29 to 0.43 ($p < 0.01$), while in the robust models it remains positive but with slightly lower statistical significance. This indicates that a larger labour force is associated with a higher tax burden across European economies. However, the reduction in statistical significance in the robust models may indicate heterogeneity across countries or structural differences in labour taxation systems. In some economies, labour taxes form the largest portion of total revenues, while in others, indirect taxes dominate the fiscal structure. This heterogeneity may partly explain the varying strength of the estimated coefficients. The positive relationship between the labour force and tax burden aligns with previous empirical evidence on European and OECD countries, which found that labour market expansion tends to strengthen fiscal capacity and revenue stability (Celikay, 2020). These results are also broadly in line with the findings of Schüttelaar et al. (2014), who show for OECD countries labour-market size significantly increase tax revenue.

The estimated coefficient of unemployment is negative and statistically significant in the standard SGMM estimations, indicating that a higher unemployment rate is associated with a lower tax burden. In the robust models, the coefficient remains negative but becomes statistically insignificant, suggesting that the magnitude of this relationship may depend on the estimation method and the overall model specification. This negative relationship is economically intuitive: a rise in unemployment leads to a decrease in income tax revenues and social security contributions, as fewer individuals participate in formal employment. Moreover, higher unemployment tends to reduce consumption and thus lower the collection of indirect taxes, such as VAT and excise duties. The results are consistent with theoretical expectations and with empirical evidence from studies on OECD and EU economies, which show that labour

market performance is a key determinant of fiscal capacity. Schüttelaar et al. (2014) found a similar negative relationship between unemployment and total tax revenue in OECD countries, emphasizing that employment growth directly strengthens government revenues. Although the coefficient becomes insignificant in the robust models, the overall direction of the relationship remains stable, indicating that reducing unemployment supports fiscal sustainability and contributes to maintaining a stable tax base across European economies.

The coefficient of Factory is positive and statistically significant in the standard SGMM estimations, with values around 0.035–0.037 ($p < 0.01$). However, in the robust estimations, the coefficient remains positive but becomes statistically insignificant, suggesting that the relationship between industrialization and the tax burden is weaker when accounting for heteroskedasticity and potential cross-country differences. The positive effect of industrial activity on the tax burden is also supported by recent policy analyses. According to the OECD (2024), economies that pursue active industrial policies and maintain a stronger manufacturing base often experience indirect fiscal benefits, as industrial expansion generates higher production, employment, and income, all of which translate into increased tax revenues. This mechanism helps explain the positive coefficient found in the present study — countries with larger industrial sectors tend to exhibit greater fiscal capacity and more stable tax collection. These findings are consistent with Celikay (2020), who reported that structural characteristics such as industrialization and trade integration positively affect tax revenues in OECD countries. Similarly, Schüttelaar et al. (2014) found that economies with a higher industrial output share benefit from stronger fiscal performance, as industrial sectors contribute more consistently to both direct and indirect tax collection.

CONCLUSION

This study investigated the macroeconomic variables of the tax burden in the European Union using annual panel data from 2000 to 2024 and the System Generalized Method of Moments (System GMM) estimator. The dynamic approach made it possible to account for both the persistence of fiscal variables and the potential endogeneity between taxation and macroeconomic performance.

The results provide several important insights. First, the strong and statistically significant coefficient of the lagged dependent variable confirms the high persistence of the tax burden over time, reflecting fiscal inertia and institutional rigidity in the EU. Changes in tax policy therefore tend to occur gradually rather than abruptly, as governments face both political and structural constraints when adjusting tax systems.

Second, economic development (GDP per capita), trade openness, and labour force size were found to have a positive and statistically significant impact on the tax burden. This suggests that more developed and open economies possess greater fiscal capacity and are able to sustain higher levels of taxation without necessarily hindering growth. The positive link between openness and taxation also highlights the fiscal benefits of integration and participation in international trade, as broader economic activity expands the tax base.

Third, the unemployment rate showed a negative relationship with the tax burden, consistent with the theoretical expectation that weaker labour market performance reduces tax revenues through lower income and consumption taxes. Meanwhile, the industrial production share had a positive but less robust effect, implying that industrial structure contributes to fiscal performance but varies depending on national economic composition.

From a broader policy perspective, these results underline the importance of macroeconomic stability and structural competitiveness in maintaining sustainable public finances. The findings suggest that promoting employment, productivity, and economic

diversification strengthens fiscal resilience and enables more consistent revenue generation across economic cycles.

Despite the robustness of the System GMM estimation, several limitations must be acknowledged. First, the dataset, while extensive, may not fully capture differences in institutional quality, tax compliance, or informal economic activity, which are known to influence fiscal outcomes. Second, the model focuses primarily on the aggregate tax burden, without distinguishing between direct and indirect taxes—a distinction that could provide deeper insight into the structure of fiscal systems. Third, potential cross-sectional dependence among EU countries, given their economic and policy interlinkages, might partially bias the results despite the use of dynamic panel techniques.

Future research could therefore expand this analysis by incorporating institutional and policy variables, examining the cyclical behaviour of tax revenues, or applying nonlinear and spatial panel methods to explore regional spillover effects.

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