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Tax Competition in the Era of Financial Globalization: An Empirical Non-Linear Analysis for European Countries

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Abstract:

The aim of this study is to empirically investigate how financial globalization affects tax competition, focusing on implicit and effective tax rates across 29 European countries over the period 2010–2021. Our linear dynamic panel findings suggest that while financial globalization increases implicit tax rates on labor and consumption, it exerts downward pressure on corporate tax rates. The non-linear analysis further reveals threshold effects, where the influence of financial globalization varies depending on its intensity. These results highlight the critical role of tax policy adjustments in response to globalization, emphasizing the need for international regulatory coordination to mitigate the adverse effects of tax competition.

Keywords: tax competition, financial globalization, dynamic panel threshold.

Jel codes: C23, F36, H26

1. Introduction

Globalization is a dynamic and multidimensional process characterized by increasing mobility of national resources on a global scale and by deepening the interdependence among economies. The process of globalization refers to a situation that erodes national borders, integrates different economies, cultures, technologies, and governance systems, and reveals complex

relationships of interdependence. The fact that globalization is a process in which economic, social, and political dimensions interact has brought along various economic developments and led to significant changes in both public expenditure and public revenue policies. Increasingly porous borders between economies have increased the mobility of factors of production, particularly labor and capital. Different welfare state models create changing expectations and dependency relations among citizens, making it difficult to change these structures quickly due to electoral concerns (Kautto and Kvist, 2002). This situation also plays an important role in shaping the fiscal policy of governments, particularly tax policies.

Although taxes on capital were mostly set at relatively high rates, with globalization, countries have tended to reduce the tax burden on capital in order to attract and retain capital. The increasing mobility of capital has made it easier for firms to move to countries that offer lower tax rates, triggering a global downward trend in corporate tax rates. This has led countries to engage in tax competition by lowering their statutory tax rates, narrowing their tax bases, making tax practices more flexible, and improving domestic regulatory arrangements.

International tax competition and especially unfair tax competition practices have changed the direction of financial flows and thus physical investment decisions. This situation has led countries that are eager to attract global capital to ease the tax burden on capital. As a result, the tax base has started to shift from more mobile factors of production to less mobile. The process of globalization has transformed the world into a single common market and increased the international movement of goods and capital at a great pace. With the neo-liberal ideology taking advantage of the opportunities provided by globalization, capitalism has entered a kind of financialization process. The concept of 'financialization', developed by heterodox social scientists, is defined as the process of shifting the capital accumulation mechanism of capitalism from the industrial field to the financial field. However, the effects of financial globalization are not uniform across countries. Structural, institutional, and fiscal asymmetries determine how economies respond to the increasing mobility of capital. Countries with sound fiscal frameworks, robust financial systems, and diversified tax bases tend to manage globalization-driven pressures more effectively, mitigating the risk of excessive tax competition. In contrast, economies with weaker institutional quality or limited fiscal space are more vulnerable to shifts in global capital flows, which may accelerate the erosion of their tax bases. Therefore, understanding the country-specific heterogeneity in the effects of financial globalization is essential for a comprehensive analysis of international tax competition dynamics.

The increase in international capital movements and the integration of financial markets are related to financial globalization, which is one of the leading sub-dimensions of economic

globalization. This situation improves competitive environments with tax policies and enables more efficient use of financial resources at the global level. Financial globalization both creates opportunities for economic growth and poses challenges for policymakers in terms of ensuring international financial stability. Briefly, financial globalization increases competition, especially in terms of tax rates, in line with the objective of attracting international capital, thus directly affecting the process of tax competition.

Within this framework, our study examines the impact of financial globalization on tax competition based on dynamic panel data analysis covering 29 European economies over the period 2010 and 2021. Our research is based on two main questions: (i) "How does financial globalization affect tax rates?" (ii) "Does financial globalization reach above a certain level affect tax competition?" We aim to contribute to the current empirical literature by analyzing not only the effect of financial globalization on tax rates but also regarding relations in line with certain threshold levels. This two-stage empirical strategy enables us to first establish the baseline relationship and then to identify potential non-linearities that arise as the intensity of financial globalization changes across countries. The combination of these models thus forms the core of the study's contribution, allowing a more realistic representation of heterogeneous tax competition responses within the European context.

Our study intends to contribute to the literature regarding various dimensions. The methodological superiority of the study stems from the analytical depth provided by the dynamic and non-linear methodological process. The dynamic panel threshold analysis method developed by Kremer et al. (2013), which identifies structural relationships and breakpoints through certain threshold levels, allows testing the nonlinear effect of financial globalization on tax rates. Moreover, our study uses implicit tax rates instead of traditional tax rates to assess the effects of financial globalization on direct and indirect taxation in a more comprehensive framework. The use of implicit tax rates enables us to analyze the impact of financial globalization on taxation structures in a holistic perspective by decomposing the impact of taxes on different factors of production and consumption. In this respect, the study is expected to make a significant contribution to the literature by addressing the impact of financial globalization processes on tax policies in more depth.

The remainder of the study is structured as follows. Firstly, the main factors in the focus of the study, namely (financial) globalization, tax competition, and implicit taxation, are discussed in a conceptual and theoretical framework. Subsequently, the related literature is reviewed. In the application part of the study, data, methodology, and empirical findings are presented, respectively. Finally, the study is concluded with the discussion section.

2. Conceptual and Theoretical Framework

The acceleration of cross-border activities with globalization has led to integration in economic, social, cultural, and political terms. According to Dreher (2006), globalization is a process that creates networks between actors at the international level through various dynamics such as individuals, information, ideas, the flow of capital, and goods. Multinational companies organize their business activities across national borders in order to maximize production efficiency and minimize the global tax burden (Eurostat, 2013).

One of the main challenges in measuring globalization in terms of national accounts is the increasing share of international transactions carried out by multinational corporations. This emphasizes the need to use composite indices when analyzing the effects of globalization. The most widely used globalization index in the academic literature is the KOF Globalization Index (Potrafke, 2015). Dreher (2006), who developed the KOF Globalization Index based on the work of Nye and Keohane (2000), considers globalization in three different dimensions: economic, political, and social. Among those extents of economic globalization, which is the main focus of our study, refers to the expansion in trade in goods and services, the growth in the volume of international financial flows, and the increase in labor mobility within the framework of the increasing interdependence process between countries (Fischer, 2003). Economic globalization has made possible the increase in international trade and investment activities, the evolution of economic relations on a global scale, and the formation of an integrated world market. As a component of economic globalization, financial globalization emphasizes the mobility of capital flows and financial assets. While both processes are fundamental components of global economic integration, they have functionally different dynamics and outcomes.

As a result of financial globalization, capital flows have become increasingly flexible and tend to move away from dependence on a particular country and towards countries that offer lower tax rates and more favorable investment environments. This dynamic has encouraged governments to adopt more competitive tax policies and strengthened the tendency to lower tax rates to attract capital. Financial globalization has led governments to develop competitive tax policies, creating a complex dynamic that both supports economic growth and poses risks to public finances (Tobin, 2000).

The theory of tax competition was initially addressed at the local level by Tiebout (1956) in order to determine the appropriate tax and public expenditure policies to prevent factors in one region from going to other regions. Currently, with the effect of globalization, tax competition discussions have shifted to country-based analysis rather than at the local level (Bas-

karan and Lopes da Fonseca, 2013). Tax competition refers to the set of policies implemented by governments in order to strengthen the relative competitive position of a country vis-à-vis other countries. In this context, the tax burden on businesses and individuals is reduced in order to protect, expand, or regain highly mobile economic activities and, accordingly, the tax base. This process may aim to provide an advantage against other countries, or it may be considered as a strategy to support the sustainability of the national economic structure (Van De Velde and Cannas, 2021).

One strand of the theoretical background of the interaction between financial globalization and tax competition is associated with the study of Lockwood et al. (1994), which asserts that increased financial globalization will lead to lower taxes on capital. From a broader perspective, in an economic structure where factors of production have different degrees of mobility, these models consider globalization in the context of increased mobility of capital and argue that it will lead to a reallocation of the tax burden from more mobile factors, namely capital, to less mobile factor that is labor.

Tax burden is widely used as an indicator of tax competitiveness, which is analyzed by means of different variables that are tax rates and the taxes as a share of GDP (Barker, 2002; Goodspeed, 1998; Genschel and Schwarz, 2011). Although these measures are easily available and calculable, they have some drawbacks (Wolff, 2005). For instance, the complexity and diversity of tax deductions and exemptions make it difficult to arrive at true tax burdens from tax rates. The inadequacy of statutory tax rates to capture the actual tax burden emphasizes the importance of effective tax burdens in the evaluation of tax policies. For this reason, effective and implicit tax rates have also been widely used in recent studies (Carey and Tchilinguirian, 2000). Thus, besides those indicators, the effective ex-ante tax rate suggested by Devereux and Griffith (2003) is utilized as a prominent measure of tax burden. Another method used to calculate the tax burden closest to reality was developed by Mendoza, Razin, and Tesar (1994). Mendoza, Razin, and Tesar (1994) suggest that the implicit/effective tax rate of consumption, capital, and labor should be used to arrive at the real tax burden. More briefly, following the theoretical background, we intend to analyze the impact of financial globalization, which is decomposed from total globalization by means of the KOF approach, on tax competition through the implicit tax rate discussion for labor and consumption, while the effective tax rate on the corporate side.

3. Literature Review

The regarding literature particularly focuses on examining the empirical impact of globalization on corporate taxation, in terms of competitiveness extent. Studies on the impact of globalization on corporate tax yielded different results depending on the alternative tax burden measure preferences, which are the share of corporate tax revenues in GDP, statutory corporate tax rates, and effective tax rates as dependent variables.

In this extent, as an initial study, Rodrik (1997) asserts that globalization is associated with declining tax revenues by means of a panel approach over the period 1965 and 1991 for 19 OECD countries. The study using effective tax rates concludes that trade and financial globalization strengthen the tendency to lower corporate tax rates and is effective in increasing the tax burden on labor. On the other hand, Garret (1995), Quinn (1997), Swank (1998), and Adam and Kamas (2007) argue that globalization may increase corporate tax rates. Garret (1995) analyzes the data of 15 OECD countries for the period 1976–1990 with panel regression analysis and found that greater exposure to international trade as an indicator of financial liberalization leads to an increase in capital taxes. Adam et al. (2013) argue that the relationship between globalization and capital taxes depends on the method used to measure globalization rather than the chosen taxation indicator. Quinn (1997), in his analysis of a large sample of 64 countries with annual data from 1974–1989, finds a positive relationship between corporate tax levels and financial liberalization. This finding is also supported by Swank (1998), who asserts a positive correlation between three different capital mobility indicators and corporate taxes for 17 industrialized countries over the period 1966–1993. Likewise, Swank (2001) finds evidence supporting the upward pressure of globalization on tax burden by using tax revenues as a proxy to measure the degree of tax competition.

Bretschger and Hettich (2002) and Winner (2005) conducted analyses based on average effective tax rates. Bretschger and Hettich (2002) analyzed the data of 14 OECD countries for the period 1967–1996 using panel data analysis and found that globalization has a negative and significant effect on corporate taxes, whereas it increases the tax burden on labor. Winner (2005), in his study covering 23 OECD member countries, found that capital mobility has a decreasing effect on capital taxes and an increasing effect on labor taxes within the framework of tax competition theory. The study also analyses the dynamics of tax competition over time and emphasizes that this competition has intensified significantly since the mid-1980s.

Furthermore, there are various studies investigating the effect of globalization on labor and consumption besides capital taxes. Bachas et al. (2022) analyze a global macro-historical

database of effective tax rates on capital and labor in 154 countries. The study reveals that between 1965 and 2018, effective capital tax rates decreased in developed countries; however, these rates have increased in developing countries since 1990. Numerous studies at the country-level, sector-level, and firm-level studies show that the share of output produced in firms and larger firms with higher levels of trade openness and effective capital taxation increases, which in turn contributes to this increase. Contrary to popular belief, globalization has strengthened the capacity of governments in many countries to tax capital. In a more recent study, Bachas et al. (2022) analyze effective tax rates on capital and labor by deriving a new global macro-historical database covering 154 countries. Effective capital tax rates decreased in affluent nations from 1965 to 2018, whereas they have increased in developing nations after 1990. Complex research methodologies at the national, sectoral, and firm levels demonstrate that trade openness enhances this growth by elevating the output share generated by firms subjected to higher effective capital taxation and by large enterprises.

Dreher (2006) conducts a panel regression analysis for the period 1970–2000 to analyze whether globalization affects social and general expenditures as well as tax rates on labor, consumption, and capital in OECD countries. Using the old version of the KOF globalization index derived before 2007, the study measures globalization with 23 variables and concludes that globalization did not reduce the room for maneuver for national economic policy. This is largely due to economic integration, and when the regulatory data is analyzed, it is observed that there is competition on tax rates on capital.

Onaran et al. (2012) examine the impact of globalization on implicit tax rates (ITRs) on labor, capital, and consumption using panel data analysis for 15 European Union countries (EU15) and the New Member States of Central and Eastern Europe (CEE NMS). The findings show that implicit tax rates on labor have increased in EU15 countries but have no significant impact on capital incomes. The impact of globalization on tax rates on consumption varies across countries; countries with high consumption taxes react by lowering their tax rates. While the tax burden on capital decreases in social democratic welfare regimes, the burden on labor increases. In conservative and liberal regimes, taxes on labor also increase, but conservative and social democratic regimes react to globalization by reducing consumption taxes. In CEE NMS countries, while there is no significant change in tax rates on labor and capital incomes, it is found that globalization has a negative impact on these rates in countries with high consumption tax rates. Following this study, Onaran and Boesch (2014) find a positive correlation between globalization and tax rates. Egger et al. (2019) analyze the tax effects of globalization on labor incomes using a panel data set of 65 countries between 1980–1993 and 1994–2007. According to the main findings of the study, in the 1980–1993 sub-period, trade openness in the set

of OECD countries leads to a more progressive taxation structure and increases the relative tax burden of individuals in the highest income group. However, in the period 1994–2007, globalization tends to decrease the relative tax burden of individuals in the highest income group while increasing the tax burden of individuals in the median income group.

In parallel with the increasing mobility of capital under financial globalization, the issue of harmful tax competition has gained significant attention in the international tax literature. The OECD Base Erosion and Profit Shifting (BEPS) Project, particularly Action 5 on harmful tax practices, aims to limit preferential tax regimes and curb aggressive tax planning strategies that erode national tax bases. By enhancing transparency, country-by-country reporting (Action 13), and the exchange of tax information, BEPS provides an essential framework to counteract the fiscal risks arising from uncoordinated tax competition (OECD, 2021). Furthermore, the adoption of the Global Minimum Corporate Tax (Pillar Two) under the OECD/G20 Inclusive Framework represents a milestone in the effort to stabilize corporate taxation in the era of financial globalization. By introducing a 15% minimum effective tax rate for multinational enterprises, this initiative seeks to reduce the incentive for profit shifting, mitigate harmful tax competition, and protect the revenue capacity of high-tax jurisdictions (OECD, 2024). These developments in international tax governance complement the theoretical predictions of tax competition models by demonstrating that coordinated global responses are necessary to balance the benefits of financial integration with the protection of national fiscal interests.

A common tendency in the regarding literature is that international tax competition is particularly analyzed by i) focusing on tax competition, particularly through common corporate or labor tax indicators, ii) utilizing a total globalization measure rather than the components, and iii) implementing a linear approach, unnoticing a possible effect of globalization for different levels, above and below estimated thresholds. However, for a more comprehensive examination, it is crucial to analyze the impact of globalization in depth and conduct separate analyses for capital, labor, and consumption taxes, considering the interaction in the tax system to provide fiscal sustainability. Furthermore, in this regard, our study intends to make a novel contribution to the literature by evaluating both linear and nonlinear effects of financial globalization on tax competition, in terms of corporate, labor, and consumption taxes.

4. Empirical Application

4.1 Data

This segment of our research seeks to empirically investigate the influence of globalization on tax competitiveness concerning corporate tax, labor tax, and consumption tax. This empir-

ical application is based on two separate research questions. Firstly, "How does financial globalization affect tax rates?" Secondly, "Does financial globalization reach above a certain level affect tax competition?" These research questions are investigated with two different methodologies of dynamic panel data analysis for 29 European[1] countries over the period 2010–2021, selected according to data availability.

The current version of the KOF Globalization Index is used in the study. This dataset includes a large-scale panel data set spanning from 1970 to 2023 and covering 203 countries and regions. Many studies have found that trade and financial globalization, which are subheadings of economic globalization, have similar effects on issues such as economic growth and taxes (Lane and Milesi-Ferretti, 2007). The reason for focusing on financial globalization within the scope of this study is that although financial globalization is one of the prominent issues in recent times, the results obtained in the studies are different. For instance, although microeconomic data indicate certain advantages of financial integration and the distorting impacts of capital regulations, macroeconomic evidence remains inadequate (Kose et al, 2006).

Mendoza et al. (2005) introduced the concept of average effective (implicit) tax rates using macroeconomic variables based on national accounts. This concept is a methodology that calculates the implied tax rates on consumption, capital, and labor separately and at the same time determines the effective tax rates (Carey and Tchilinguirian, 2000). Implicit tax rates are derived by dividing the total tax revenue from labor and consumption by the pre-tax income of the relevant factor of production or consumption; the effective corporate tax rate is calculated by dividing the corporate tax revenue by the gross surplus of enterprises. Thus, as a better indicator of tax competitiveness, implicit tax rates obtained from Eurostat are preferred to be utilized in our study. A more detailed description of data, including sources and explanations on variable definitions, is given in Table 1 below.

According to Table 1, the dependent variables of our study are the implicit tax rate on consumption (imp_cons), the implicit tax rate on labor (imp_lab), and the effective average tax rates for large corporations (imp_corp), which reflect the burden of tax obligations on companies and the influence of tax policies on decision-making processes. As mentioned before, the use of implicit taxation aims to provide a more accurate representation of the tax burden. The regime-dependent variable is the financial globalization index (fin_glo), which serves as a dimension of globalization that accelerates tax competition. Additionally, this index is used as the threshold variable to distinguish between regimes in line with the second research question.

1 Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Table 1: Data

Variables and Abbreviations	Description	Source
Dependent variables		
imp_cons	Implicit Tax rate on consumption, %	European Commission, (2025)
imp_lab	Implicit Tax rate on labor, %	European Commission, (2025)
imp_corp	Effective average tax rates (large corporations), %	European Commission, (2025)
Regime-dependent variable & Threshold Variable		
fin_glo	**Financial Globalization Index**	**KOF Swiss Economic Institute (2025)**
Control Variables		
gdp_grw	GDP growth (annual %)	World Bank, WDI (2025)
curr_acc	Current account balance (Percent of GDP)	IMF, WEO (2025)
net_debt	General government net debt (Percent of GDP)	IMF, WEO (2025)
tot_exp	General government total expenditure (Percent of GDP)	IMF, WEO (2025)
inf_con	Inflation, average consumer prices (Percent change)	IMF, WEO (2025)
une_rat	Unemployment rate (Percent of total labor force)	IMF, WEO (2025)
con_cor	Control of Corruption. Estimate (ranges from-2.5 (weak) to 2.5 (strong))	World Bank, WGI (2025)
left_dum	Left governments, dummy	V-Dem (2025)

Source: Compiled by the authors.

The control variables of the study are determined based on the theoretical framework and empirical literature. These control variables consist of macroeconomic indicators that are closely related to tax rates. Among these are the annual percentage change in Gross Domestic Product (GDP growth rate, gdp_grw), the ratio of the current account balance to GDP (curr_acc), the ratio of general government net debt to GDP (net_debt), the inflation rate (inf_con), and the unemployment rate (une_rat). Additionally, the study incorporates the control of corruption (con_cor) variable to represent institutional quality. Lastly, a dummy variable associated with

institutional structure (left_dum) is also included. This variable (left_dum) indicates whether a country's government is classified as left-leaning in a given year. It takes the value of 1 if the government is predominantly left-leaning (e.g., socialist, social-democratic, or similar ideologies) and 0 otherwise. Governments not classified as left-leaning may include right-leaning (e.g., conservative, liberal) or centrist governments, as well as coalition governments where left-leaning parties do not dominate. This classification is based on data from the V-Dem dataset.

Table 2 presents the descriptive statistics for the variables utilized in the investigation.

Table 2: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
imp_cons	348	18.908	2.781	11.400	25.300
imp_lab	336	33.883	5.209	21.200	43.200
imp_corp	324	19.892	6.379	8.800	38.400
fin_glo	348	78.940	9.037	59	96
gdp_grw	348	2.073	3.742	–11.170	24.480
curr_acc	347	1.283	4.450	–20.724	14.885
net_debt	336	45.148	39.905	–85.054	140.755
tot_exp	348	45.380	7.310	23.581	64.873
inf_con	348	1.626	1.479	–1.636	6.113
une_rat	348	8.668	4.739	1.960	27.475
con_cor	348	1.022	0.804	0–.380	2.400

Source: Compiled by the authors.

In addition to the descriptives, Table 3 below displays the correlation matrix of the variables to serve as a diagnostic tool to confirm the independence of the explanatory variables. The results indicate that the correlations are relatively low, suggesting that multicollinearity is not a concern in the model.

Table 3: Pairwise Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
imp_cons (1)	1.000										
imp_lab (2)	0.142	1.000									
imp_corp (3)	−0.285	0.305	1.000								
fin_glo (4)	0.185	0.165	0.420	1.000							
gdp_grw (5)	0.104	−0.130	−0.116	0.120	1.000						
curr_acc (6)	0.392	0.088	0.231	0.275	0.118	1.000					
net_debt (7)	−0.512	−0.006	0.263	−0.155	−0.113	−0.310	1.000				
tot_exp (8)	0.142	0.570	0.461	0.103	−0.421	0.069	0.256	1.000			
inf_con (9)	−0.004	0.058	−0.080	−0.141	0.091	−0.121	−0.128	−0.054	1.000		
une_rat (10)	−0.406	−0.086	0.094	−0.251	−0.241	−0.360	0.360	0.101	−0.218	1.000	
con_cor (11)	0.325	0.315	0.418	0.592	0.022	0.506	−0.279	0.344	0.006	−0.384	1.000

Note: prob. values are given in brackets.

Source: Compiled by the authors.

To test the presence of cross-sectional dependence among the residuals, the Pesaran (2004) CD test is employed. This test is suitable for panel datasets with a relatively small-time dimension (T) and a larger cross-sectional dimension (N), and it provides a consistent diagnostic for identifying potential contemporaneous correlations across units. The null hypothesis of this test is that 'there is no dependence between cross-sectional units.' Since Model 1 and Model 4 share the same set of variables, Model 2 and Model 5 share the same set of variables, and Model 3

and Model 6 also share the same set of variables, the cross-sectional dependence test for these models was reported in a matched manner. As seen in Table 4, the p-values for all model pairs are above the 1%, 5%, and 10% significance levels. Therefore, the null hypothesis cannot be rejected, and there is no statistical evidence of cross-sectional dependence in the panel data set. This result indicates that the estimated coefficients in the models do not contain any bias that could be attributed to horizontal section dependence.

Table 4: Test of Cross-Sectional Dependence for the Panel Models

Model	CD-test	p-value
Model 1 and 4	1.206	0.2278
Model 2 and 5	1.160	0.2460
Model 3 and 6	–1.603	0.1090

Source: Compiled by the authors.

In order to provide a comprehensive understanding of the data structure and the underlying dynamics of the variables employed in the analysis, Figures A1 and A2 in the appendix visualize both their temporal evolution and cross-country level differences. Figure A1 displays the annual trajectories of the implicit tax rate on consumption, the implicit tax rate on labor, the effective average corporate tax rate for large firms, and the financial globalization index over the 2010–2021 period, with the EU average included as a benchmark reference, thereby enabling the identification of broad trends and countries' relative positions. Figure A2, in turn, presents the arithmetic mean values of the same variables for each country over the full sample period, making cross-country structural differences in tax composition and integration intensity clearly observable. Taken together, these visual patterns suggest that the relationship between financial globalization and tax structure is unlikely to be uniform across countries and may follow non-linear or regime-dependent dynamics. This motivates the empirical strategy adopted in the next section, where the study's two core research questions are examined using a dynamic panel model alongside a threshold framework that allows the impact of financial globalization to vary across different levels of integration.

4.2 Methodology and Empirical Results

This study, which examines the impact of financial globalization on tax competition, frames its first research question as follows: "How does financial globalization affect tax rates?" The inherent nature of financial globalization and tax competition processes, which is being shaped by historical trends and past dynamics, necessitates the use of analytical models with a dynamic structure. Employing a method that captures the effect of past values of the dependent variable on its current values ensures more reliable insights. Additionally, dynamic methods effectively address potential endogeneity issues, thereby enhancing the robustness and validity of the analysis. To address this first research question, the study employs the System GMM approach, a linear econometric method, to achieve more precise and reliable results.

The System GMM method, developed by Arellano and Bover (1995) and Blundell and Bond (1998), addresses the issue of weak instruments in the difference GMM method by utilizing moment conditions from both level and first-difference equations to estimate model parameters (Roodman, 2009). This approach models dynamic relationships and addresses endogeneity issues by using lagged levels of regressors as instruments for difference equations and lagged differences of regressors for level equations, offering more consistent and unbiased estimates compared to difference GMM (Blundell and Bond, 1998)[2].

The reliability of estimates is assessed through the Arellano-Bond autocorrelation test and Hansen test for over-identifying restrictions, which ensure instrument validity under heteroskedasticity and autocorrelation. However, as the number of instrumental variables increases, it becomes necessary to test a larger number of over-identification restrictions. This can weaken the power of the instrumental variables. In the context of GMM estimation, it is crucial to maintain the number of instruments at a level substantially smaller than the number of cross-sectional units (N) to prevent over-identification and the risk of instrument proliferation, which may otherwise bias the results (Baltagi, 2021). To evaluate the effectiveness of instrumental variables, the Sargan test (1958) and the Hansen-J test (1982) are commonly employed. However, due to the Sargan test's susceptibility to providing non-robust results, the Hansen-J test is preferred. Despite its strengths, Roodman (2009) notes the method's complexity and risk of invalid estimates in finite samples, as well as potential alignment of excessive instruments with endogenous variables. To mitigate these issues, Windmeijer's (2005) correction, implemented in xtabond2, improves the precision of two-step estimations by reducing bias in standard errors.

2 This study adopts the System GMM method to model dynamic relationships and address endogeneity issues, with analyses conducted using the Stata command, xtabond2. For a detailed description of the command, please see Roodman (2009).

These features make System GMM a robust and widely preferred approach in dynamic panel data analysis. Finally, in the System-GMM method, there should be no second-order autocorrelation (AR (2)) relationship that could affect the validity of the instrumental variables. The results presented in the text indicate that the instrumental variables satisfy this condition.

Accordingly, the models to be estimated for the first research question are presented in Table 5 below.

Table 5: Models for the First Research Question (Using the System GMM Approach)

Model 1	$imp\_con_{it} = \gamma imp\_con_{i,t-1} + \varphi_1 fin\_glo_{it} + \varphi_2 X_{it} + \partial_i + \emptyset_t + \varepsilon_{it}$
Model 2	$imp\_lab_{it} = \gamma imp\_lab_{i,t-1} + \varphi_1 fin\_glo_{it} + \varphi_2 X_{it} + \partial_i + \emptyset_t + \varepsilon_{it}$
Model 3	$imp\_corp_{it} = \gamma imp\_corp_{i,t-1} + \varphi_1 fin\_glo_{it} + \varphi_2 X_{it} + \partial_i + \emptyset_t + \varepsilon_{it}$

Source: Compiled by the authors.

We aim to explain the tax competition effect of financial globalization through 3 models embodying different tax structures as dependent variables, that are indicated by consumption tax *(imp_con),* labor tax *(imp_lab)* and corporate tax *(imp_corp).* The coefficient γ represents the effect of the lagged value of the dependent variable, while φ_1 denotes the magnitude and direction of the impact of the explanatory variable fin_glo (financial globalization) on the dependent variable. φ_2 corresponds to the vector of control variables, ∂ captures unobserved unit-specific effects, $\emptyset_t$ accounts for unobserved time-specific effects, and $\boldsymbol{\varepsilon}$ represents the error term. Within this framework, Table 6 below presents the findings obtained using the two-step System GMM approach, a linear dynamic panel data estimation method.

Table 6: Findings for the First Research Question (Using the System GMM Approach)

	Model 1 (imp_con)	Model 2 (imp_lab)	Model 3 (imp_corp)
Coefficient Estimates			
1.imp_con	0.343*** (2.19)	–	–
1.imp_lab	–	0.488*** (3.33)	–
1.imp_corp	–	–	0.513*** (8.28)
fin_glo	0.043*** (2.11)	0.041** (2.05)	–0.016** (–2.31)
gdp_grw	0.021*** (3.28)	–0.002 (–0.41)	–0.003 (–0.58)
curr_acc	0.010 (1.61)	–0.001 (–0.28)	–0.016 (–1.89)
net_debt	0.017*** (3.40)	0.015*** (2.94)	–0.052 (–1.24)
tot_exp	0.032*** (4.15)	0.004 (0.26)	–0.017* (–1.70)
inf_con	–0.003 (–0.17)	–0.050*** (–2.38)	–0.051*** (–3.45)
une_rat	–0.056* (–1.69)	0.009 (0.65)	0.186*** (4.46)
con_cor	–2.300** (–1.94)	0.342 (0.60)	0.979 (0.79)
left_dum	0.074** (1.76)	0.243 (1.03)	0.073* (1.61)
constant	9.627*** (2.31)	12.601*** (2.63)	12.443*** (3.03)
Hansen-J	0.186	0.248	0.329
AR(2)	0.218	0.363	0.215
N	29	29	29
Obs.	285[3]	285	285

Notes: *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively.
The p-values of A-Bond AR(2) and Hansen-J test statistics are reported.

Source: Compiled by the authors.

3 Although the dataset covers European countries over the 2011–2022 period, due to limited data availability for some fiscal and financial variables, the panel is unbalanced. Moreover, because the dynamic panel GMM estimation relies on lagged and instrumental variables, the use of valid lag structures and first-differenced equations results in a minor reduction in the number of observations.

Table 6 above shows the results of the analysis of Models 1, 2, and 3. In System-GMM estimates, in line with the methodological approaches proposed by Roodman (2009) and Baltagi (2021), the lagged value of the dependent variable was used as an instrument variable in order to capture the dynamic structure of the model and prevent excessive instrument production. This choice was made considering the relatively short time dimension of the panel data set and the possibility that longer lag structures could lead to an excessive number of instruments, thereby weakening the Hansen test results. Hansen-J test statistics (0.186–0.329) indicate that the null hypothesis that the instrument variables are valid cannot be rejected. These results do not indicate a risk of instrument overfitting in the model. Furthermore, the number of instruments was kept below the number of cross-sectional units, thereby reducing the potential risk of overfitting. Together with the AR(2) test, which shows that there is no second-order autocorrelation, these results support the validity of the instrumental variables used.

When the results of the analysis are examined, it is seen that taxes on consumption and labor have increased with financial globalization, while corporate tax and the effect of the dummy variable are also noteworthy here. It is observed that there is a general tendency to increase taxes in structures where left-wing governments are effective rather than collegial or right-wing governments (there is a statistically significant effect of taxes on consumption and corporate taxes). The findings obtained in response to the first research question led us to the second research question, which is "Does financial globalization reach above a certain level affect tax competition?" In this framework, the second research question of this study aims to investigate how tax competitions are shaped in the face of globalization. This second research question of the study will be investigated with the dynamic panel threshold model of Kremer et al. (2013), which is a non-linear method.

Hansen (1999), in a groundbreaking study, proposed a threshold estimator for non-dynamic panels, arguing that a regression function could vary across data and that specific threshold values could divide the regression into multiple groups. This panel threshold model allows for the analysis of the number of regimes associated with a given variable, along with the estimation of threshold values and the marginal effects of the relevant variable. However, this technique overlooks the potential endogeneity bias arising between the dependent and independent variables. Caner and Hansen (2004) extended Hansen's (1999) framework by incorporating instrumental variable methodology to account for endogenous components and an exogenous threshold variable in cross-sectional data, thereby mitigating endogeneity concerns. Nevertheless, since the methodology proposed by Caner and Hansen (2004) is specifically designed for cross-sectional data, it is not directly applicable to dynamic panel contexts. In this paper, we use a modern dynamic panel threshold method based on the panel structures elaborated by Kremer

et al. (2013) and developed by Caner and Hansen (2004) based on a horizontal cross-sectional model with instrumental variables. Kremer et al. (2013) extend the applicability of this approach to dynamic panel models by adopting a forward orthogonal transformation to reduce the effect of country-specific fixed effects. The forward orthogonal transformation removes the serial correlation between the transformed error terms, allowing the error term to be expressed as follows.

$$\varepsilon_{it}^{*} = \sqrt{\frac{T-t}{T-t+1}} \left[\varepsilon_{it} - \frac{1}{T-t}\left(\varepsilon_{i(t+1)} + ... + \varepsilon_{iT} \right) \right] \tag{1}$$

While ε_{it} denotes the original errors in the regression, ε_{it}^{*} signifies the transformed errors. $T = 1, \ldots, T$ denotes time, while $i = 1, \ldots, N$ signifies units.

The forward orthogonal deviation transformation removes the unobserved individual effects and preserves the orthogonality of the transformed variables, ensuring that the resulting error structure remains uncorrelated across time. This correction ensures consistency with the dynamic panel threshold model framework of Kremer, Bick and Nautz (2013), where the forward orthogonal deviations transformation eliminates individual fixed effects without inducing serial correlation in the transformed errors, thereby preserving the validity of the threshold estimation procedure.

$$Var\left(\varepsilon_i\right) = \sigma^2 I_T \Rightarrow Var\left(\varepsilon_i^{*}\right) = \sigma^2 I_{T-1} \tag{2}$$

σ^2 is the variance of the error terms. I (.) represents the identity matrix, and T and T–1 denote the current and lagged time dimensions, respectively.

Therefore, the forward orthogonal deviations transformation eliminates the individual fixed effects and preserves the orthogonality of the transformed error terms, ensuring that the resulting error structure remains free from serial correlation.

By applying the forward orthogonal deviations transformation in Equation (2) to the threshold model in Equation (1) and instrumenting the endogenous variables accordingly, we obtain the estimable dynamic panel threshold specification presented in Equation (3). Thus, the dynamic panel threshold model employed in this study follows the methodological framework of Kremer et al. (2013) and can be expressed as follows:

$$y_{it} = \mu_i + \beta_1^{'} z_{it} I\left(q_{it} \le \lambda\right) + \beta_2^{'} z_{it} I\left(q_{it} > \lambda\right) + \varepsilon_{it} \tag{3}$$

In our specification, y_{it} is the dependent variable, and μ_i represents the individual fixed effects, which are removed using the forward orthogonal transformation, as discussed in Kremer

et al. (2013). The error term ε_{it} is assumed to be independent across units and time, and to follow the same probability distribution with zero mean and constant variance σ^2. The threshold mechanism is governed by the indicator function I ($q_{it} \leq \lambda$), where q_{it} is the scalar threshold variable (financial globalization index) and λ denotes the estimated threshold level. The vector z_{it} is an $m \times 1$ set of explanatory regressors, which may include lagged values of y_{it} and other potentially endogenous variables. The coefficient vectors β_1 and β_2 are $m \times 1$ regime-specific parameter vectors, such that $\beta_1' z_{it}$ and $\beta_2' z_{it}$ represent the corresponding linear index terms. The regressor vector z_{it} is further partitioned into z_{1it}, which is assumed to be uncorrelated with ε_{it}, and z_{it}, which may be endogenous and therefore requires instrumentation.

Within this framework, the explicit specifications of the dynamic panel threshold model to be employed to determine whether tax competition varies at different levels of financial globalization are presented using Models 4, 5, and 6 in Table 7.

Table 7: Models for the Second Research Question (Using the Dynamic Panel Threshold Regression)

Model 4	$imp\_con_{it} = \mu_i + \beta_1^{'} fin\_glo_{it} I(fin\_glo_{it} \leq \gamma) + \delta_1 I(fin\_glo_{it} \leq \gamma) + \beta_2^{'} fin\_glo_{it} I(fin\_glo_{it} > \gamma)$
Model 5	$imp\_lab_{it} = \mu_i + \beta_1^{'} fin\_glo_{it} I(fin\_glo_{it} \leq \gamma) + \delta_1 I(fin\_glo_{it} \leq \gamma) + \beta_2^{'} fin\_glo_{it} I(fin\_glo_{it} > \gamma)$
Model 6	$imp\_corp_{it} = \mu_i + \beta_1^{'} fin\_glo_{it} I(fin\_glo_{it} \leq \gamma) + \delta_1 I(fin\_glo_{it} \leq \gamma) + \beta_2^{'} fin\_glo_{it} I(fin\_glo_{it} > \gamma)$

Source: Compiled by the authors.

In the models in Table 7; imp_con_{it}, imp_lab_{it} and imp_corp_{it} are the dependent variables representing the implicit taxation rate on consumption, implicit taxation rate on labor , and effective taxation rate on corporations in country i in period t, respectively μ_i; represents country-specific fixed effects removed by forward linear transformation as reported by Arellano and Bover (1995). Thus, serial correlation of the transformed errors is avoided. In the analysis, the financial globalization index is used as both an explanatory variable and a threshold variable to separate regimes. I(.) is an indicator function that determines the regimes depending on the threshold variable and separates into two different regimes according to the level of the threshold parameter (γ). After determining the threshold value that minimizes the sum of squared error terms, the slope coefficients are estimated by GMM method. In this context, β_1 and β_2 denote the regime-dependent slope coefficients, δ_1 denote the constant regime coefficient common to all cross-sections, ε_{it} and the independent and identically distributed error term.

Table 8 shows the estimation results obtained with the dynamic panel threshold approach of Kremer et al. (2013).

Table 8: Findings for the Second Research Question (Using the Dynamic Panel Threshold Approach)

	Model 4 (imp_con)	Model 5 (imp_lab)	Model 6 (imp_corp)
Threshold estimate for fin_glo (%)	70	80	73
Regime 1: (β_1)	0.080 (1.15)	0.170*** (4.19)	−0.573 (−1.39)
Regime 2: (β_2)	0.140*** (2.39)	−0.167*** (−4.34)	−0.124** (−1.99)
Coefficient Estimates			
l.imp_con	0.040 (−1.39)	–	–
l.imp_lab	–	0.223*** (5.63)	–
l.imp_corp	–	–	−0.012 (−0.48)
gdp_grw	0.031 (2.17)	0.030* (1.54)	0.022** (1.98)
curr_acc	0.037** (1.76)	0.006 (0.12)	−0.001* (−1.51)
net_debt	0.036*** (2.67)	0.057*** (2.71)	−0.001*** (−2.74)
tot_exp	0.037** (1.76)	0.017 (0.47)	0.001 (0.40)
inf_con	0.018 (0.73)	−0.054 (−1.51)	−0.001** (−1.87)
une_rat	−0.097* (−1.66)	−0.130** (−2.20)	0.003*** (4.21)
con_cor	−0.501 (−0.46)	0.208 (0.216)	1.881 (1.11)
left_dum	0.106 (0.49)	0.264 (0.89)	2.030*** (2.42)
constant	7.048* (1.41)	38.777*** (9.54)	38.562*** (5.19)
N	29	29	29
Obs.	297	297	297
Wald chi² (Prob > chi²)	(0.000)	(0.000)	(0.000)

Notes: i) *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. ii) Each regime comprises a minimum of 5% of all data, as per Hansen (1999). iii) The t-statistics are presented in parenthesis. iv) Refer to the text for variable definitions. v. The estimated threshold value falls within the lower and upper limits of the confidence interval, confirming that the regimes are statistically different and that the dynamics of tax competition change significantly at different levels of financial globalisation.

Source: Compiled by the authors.

Table 8 seeks an answer to the second research question of the study. In this direction, the financial globalization index, which is considered as an indicator of countries' globalization, is also used as a threshold variable to differentiate regimes. In Model 4, implicit taxes on consumption are considered first. The threshold value for financial globalization is 70 for Model 4. While no significant effect is detected below the threshold, a significant and positive effect was detected above the threshold. In other words, when financial globalization is above 70 points, implicit taxes on consumption increase. Model 5, which examines the change in implicit taxes on labor with financial globalization, shows that the threshold value is set as 80. It is possible to talk about a threshold effect for taxes on labor that differs depending on the regimes. As a matter of fact, although implicit taxes on labor increase when financial globalization is below 80 points, this effect is reversed when globalization is above the threshold. Finally, in Model 6, the course of implicit taxes on corporations in the financial globalization process is considered. The threshold value determined for Model 6 is 73. Although there is a negative effect both below and above the threshold in Model 6, only this negative effect is significant above the threshold.

In line with these findings, we approve the positive effect of financial globalization on tax competition in terms of our second research question. Accordingly, the positive association between globalization and tax competition observed in the analysis stems from the negative coefficient of corporate income tax, indicating that competitive pressures are manifested through downward adjustments in corporate taxation. This pattern is consistently evident across both Model 1 and Model 2, confirming that the positive tax competition outcome should be interpreted within the context of declining corporate tax rates rather than an overall expansionary tax stance. Moreover, the results are in line with some aspects of harmful tax competition practices, which can also be expressed as the negative effects of tax competition. In fact, the findings obtained are in line with the shift of the tax burden from direct taxes to indirect taxes in countries due to the 'race to the bottom' paradigm observed, especially in corporate tax with globalization. The shift of the tax burden from direct taxes to indirect taxes points to a problem of fairness in income distribution and has a detrimental effect. This situation varies depending on the different levels of financial globalization. In other words, it is seen that the findings in linear models can actually be interpreted more accurately with the threshold effect. Indeed, these findings are consistent with the majority of the existing literature (Lockwood et al., 1994; Garret, 1995; Quinn, 1997; Rodrik, 1997; Swank, 1998; Winner, 2005; Dreher, 2006; Bretschger and Hettich, 2022; Onaran, Boesch and Leibrecht, 2012; Onaran and Boesch, 2014; Bachas et al., 2022; Jha and Mukherjee, 2023).

5. Concluding Remarks

Financial globalization has intensified tax competition and led states to reshape their tax policies to adapt to capital mobility. Reduced tax burden on capital, narrowing the tax base, and changes in public revenues are among the main effects of the globalization process on fiscal policies. However, international tax regulations and coordination mechanisms are becoming increasingly important to balance the negative effects of excessive tax competition.

In our study, we aim to empirically examine the impact of financial globalization on tax competition with respect to taxes on corporations, labor, and consumption, based on two separate research questions. These questions were "How does financial globalization affect tax rates?" and "Does financial globalization reach above a certain level affect tax competition?" These research questions are investigated by means of two different methodologies of dynamic panel data analysis for 29 European countries over the period 2010–2021. For the first research question, the 'System GMM' model developed by Arellano-Bover (1995) / Blundell-Bond (1998) is employed as a linear method while for the second research question, the 'Dynamic panel threshold model' of Kremer et al. (2013) is performed as a non-linear method in terms of the second research question. By employing a dynamic and non-linear methodological approach, this study provides empirical insights into the evolving nature of tax structures in an increasingly integrated global economy. According to the findings from the linear method, the financial globalization process raises taxes on consumption and labor and, conversely, decreases taxes on corporations. However, according to the non-linear method, taxes on consumption increase when financial globalization is above the threshold value. On the other hand, while there is an upward pressure in taxes on labor below the threshold value, the direction of the effect turns negative above the threshold value. Finally, the decrease in corporate tax is also found to be statistically significant above the threshold. This analysis explains the multidimensional effects of financial globalization on tax competition and reveals how this process is handled at the global level. In terms of taxes on capital, tax competition theory suggests that with the increasing mobility of capital, firms tend to avoid high taxes by preferring countries with lower capital tax burdens.

At the global level, strengthening multilateral tax coordination is essential to mitigate harmful tax practices and prevent a persistent "race to the bottom." In this regard, the OECD/G20 BEPS Project plays a pivotal role in curbing profit shifting, limiting preferential regimes, and fostering greater tax transparency. In particular, Action 5 on harmful tax practices and Action 13 on country-by-country reporting provide critical tools to counter aggressive tax planning and protect national tax bases. Additionally, the recent adoption of the Global Minimum Corpo-

rate Tax (Pillar Two) represents a significant step in the international fight against harmful tax competition. By introducing a 15% minimum effective tax rate on multinational corporations, this initiative aims to reduce incentives for profit shifting, stabilize corporate tax revenues, and promote a fairer distribution of tax rights among countries. Full and coordinated implementation of the global minimum tax, alongside BEPS standards, will be crucial to limit the erosion of national fiscal capacities under financial globalization.

At the national level, policymakers should focus on rebalancing tax structures to reduce excessive dependence on indirect taxation, which risks exacerbating income inequality. Implementing targeted incentives for productive and sustainable investments, enhancing domestic anti-avoidance measures, and integrating digital taxation mechanisms into existing frameworks can strengthen fiscal resilience. Moreover, aligning domestic tax practices with BEPS-compliant and global minimum tax standards would limit the incentives for harmful tax competition and ensure consistency with international tax governance.

In conclusion, the findings of this study highlight that the benefits of financial globalization can only be fully realized under a framework of coordinated and transparent tax governance. Strengthening the global fight against harmful tax practices through OECD BEPS initiatives, combined with the implementation of the global minimum corporate tax, and complementary domestic reforms, is essential to prevent long-term erosion of fiscal capacity and to promote a more stable and equitable international tax environment.

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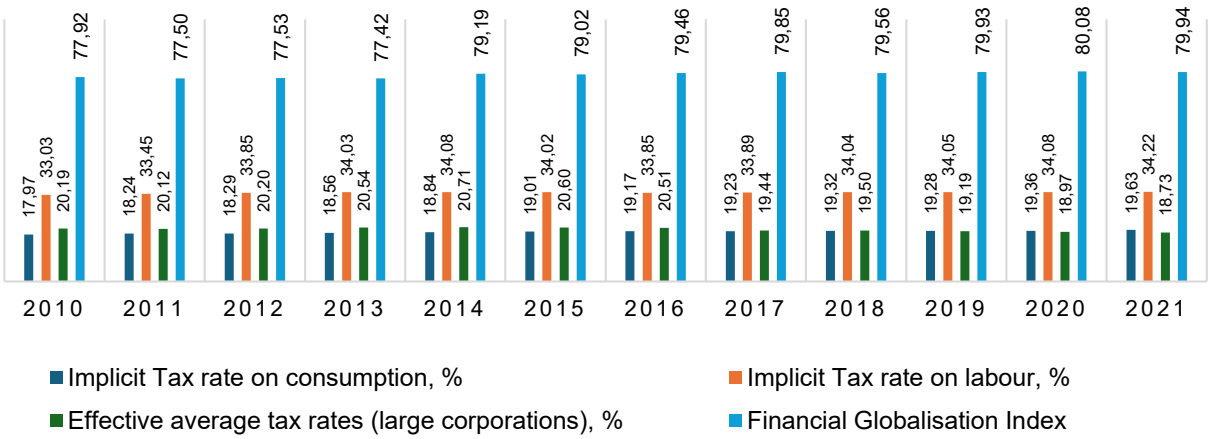
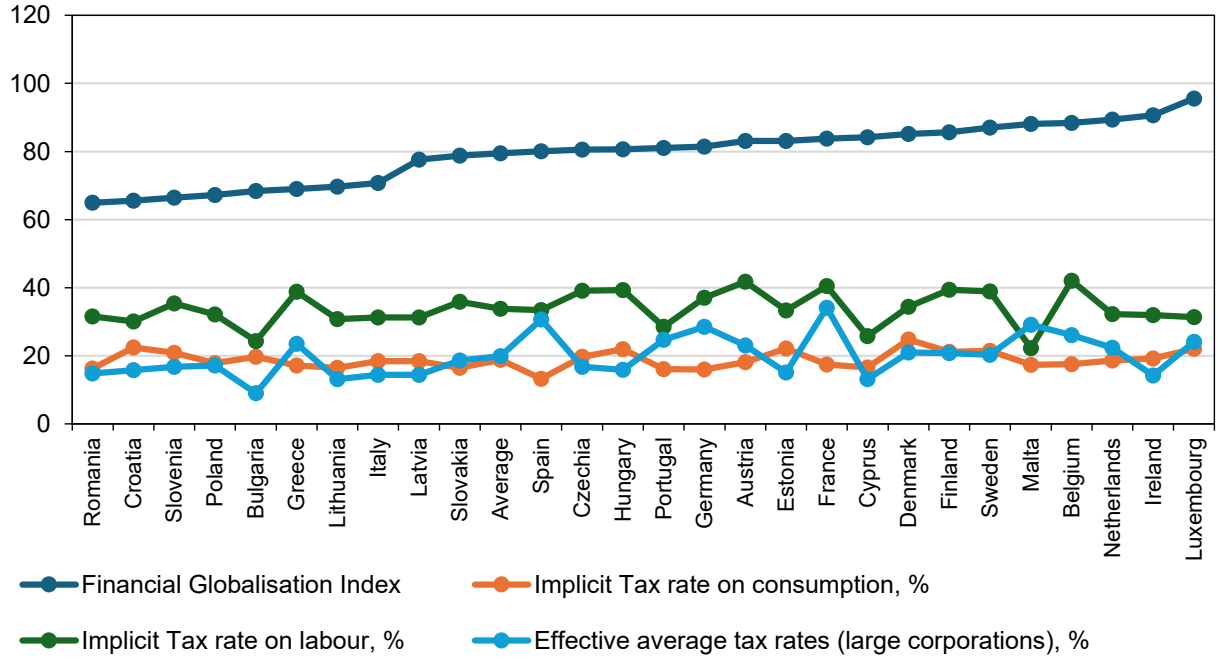
Appendix

Figure A1: Cross-Country Averages of the Key Variables Used in the Analysis (2010–2021)



Note: This figure illustrates the annual evolution of the key variables across the sample for the period 2010–2021. The EU average trajectory is overlaid to provide a benchmark for comparing country-specific dynamics and identifying convergence/divergence patterns and potential structural shifts over time.

Figure A2: Cross-Country Comparison of Average Levels of the Key Variables (2010–2021)



Note: This figure displays the average values of each key variable for all countries in the sample over the 2010–2021 period, highlighting cross-country variation in tax structure and financial globalization intensity. Countries are ordered from the lowest to the highest level of financial globalization.