Economic Globalization, Taxation and Public Expenditures: Evidence From OECD Countries

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ABSTRACT

Globalization shapes the fiscal policies of countries, leading to changes in the structure of taxation and public expenditures. According to the theory of international tax competition, as globalization increases, countries use their tax policies to attract more mobile factors, resulting in tax competition. This competition causes capital tax rates to decrease and labor tax rates to increase, which is known as the efficiency effect of globalization. On the other hand, governments expand the welfare state to compensate for the increased economic risks resulting from globalization. This is known as the compensation effect of globalization. The purpose of this paper is to empirically test these hypotheses using a dataset of 26 OECD countries from the period 1990-2020. The study employed the Driscoll-Kraay estimator, which produces reliable estimates with robust standard errors in the presence of heteroscedasticity, autocorrelation, and cross-sectional dependency issues. The results indicate that economic globalization has a negative effect on corporate tax rates and a positive effect on labour tax rates. Additionally, it was observed that a high level of social spending is linked to an increase in economic globalization. These results emphasise that the efficiency effect and the compensation effect coexist and complement each other rather than being rivals.

***Key words**: Globalization, tax competition, public expenditure, panel data*

***JEL Classification**: E15, E62, C23*

Ekonomik Küreselleşme, Vergilendirme ve Kamu Harcamaları: OECD Ülkelerinden Kanıtlar

ÖZ

Küreselleşme, ülkelerin maliye politikalarını şekillendirmekte ve dolayısıyla vergilendirme ve kamu harcamalarının yapısını değiştirmektedir. Uluslararası vergi rekabeti teorisine göre, küreselleşme arttıkça ülkeler vergi politikalarını daha hareketli faktörleri çekmek için kullanmakta ve böylece vergi rekabeti ortaya çıkmaktadır. Teori, bu rekabetin sermaye vergisi oranlarının düşmesine ve emek vergisi oranlarının artmasına neden olduğunu öne sürmektedir. Bu, küreselleşmenin verimlilik etkisidir. Öte yandan hükümetler, küreselleşme nedeniyle artan ekonomik riskleri telafi etmek için refah devletini genişletiyor. Bu, küreselleşmenin telafi edici etkisidir. Bu makalenin amacı, 1990-2020 dönemi için 26 OECD ülkesinden oluşan bir veri seti kullanarak bu hipotezleri ampirik olarak test etmektir. Çalışmada değişen varyans, oto-korelasyon ve yatay kesit bağımlılığı sorunları karşısında dirençli standart hatalarla tutarlı tahminler yapan Driscoll-Kraay tahmincisinden yararlanılmıştır. Bulgular, ekonomik küreselleşmenin kurumlar vergisi oranı üzerinde negatif, emek vergisi oranı üzerinde pozitif bir etkiye sahip olduğunu göstermektedir. Ayrıca, yüksek düzeyde sosyal harcamaların artan ekonomik küreselleşme ile ilişkili olduğu gözlenmektedir. Bu sonuçlar, verimlilik etkisinin ve telafi etkisinin bir arada var olduğunu ve bunların rakip değil, tamamlayıcı olduğunu göstermektedir.

***Anahtar kelimeler**: Küreselleşme, vergi rekabeti, kamu harcamaları, panel veri*

***JEL Sınıflandırması**: E15, E62, C23*

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INTRODUCTION

Countries have experienced heightened integration since the 1980s, giving rise to a phenomenon transcending national boundaries, incorporating national economies, cultures, technologies, and governance. This intricate interplay of relationships is commonly known as globalization (Dreher, 2006). While its impacts extend across various aspects of politics and society, the profound effects on the economy warrant careful consideration. In a world characterized by increased interconnectedness, the pursuit of an independent economic policy by individual countries becomes a formidable challenge. The globalization paradigm requires that countries factor in the reactions of others when making decisions about economic policy. The inevitability of competition arises as countries closely observe and respond to each other's strategic moves (Winner, 2005). Consequently, the growing integration weakens the monopoly power traditionally held by governments over fiscal policy. In such dynamic environment, national governments find themselves compelled to strategically engage with their counterparts. Scholars such as Tanzi (1996), Schulze and Ursprung (1999), as well as Bretschger and Hettich (2002) have underscored the significance of these strategic interactions in the context of global economic dynamics. Overall, as globalization continues to reshape the global landscape, understanding and adapting to the complexities of interdependence become essential for nations navigating the intricate web of economic, social, and political relations.

Taxation is an area where this phenomenon is common. This is related to the inability of governments to freely tax mobile factors, especially capital. While it is simple to tax capital in an environment with limited capital mobility, increasing taxes on capital in an environment with high capital mobility can have unintended consequences. According to tax competition theory, as capital mobility increases, firms seek countries with lower tax rates to avoid tax. This situation puts pressure on governments and leads to a decrease in capital taxes (Zodrow and Mieszkowski, 1986; Wilson, 1999). Additionally, the rise of e-commerce and the presence of tax havens make it challenging to monitor company activities and profits, which further compels governments to reduce corporate taxes (Kumar and Quinn, 2012). Under the conditions of financial globalization, the taxation of capital may increase capital outflow in developed countries while reducing capital inflows in developing countries. To increase declining tax revenues or attract more capital investments, countries reduce their tax rates to a competitive level (Devereux et al., 2008; Razin and Sadka, 2004). This phenomenon, known as the 'race to the bottom', is a result of economic globalization.

The race to the bottom hypothesis has been criticised in the literature. Quinn (1997) suggests that this hypothesis does not fit the facts. The author emphasises that capital liberalisation is not associated with an erosion of the tax base; on the contrary, capital mobility increases corporate tax revenues. Another criticism comes from Plümper et al (2009). The authors argue that the "race to the bottom" hypothesis lacks empirical support and that its prediction does not materialise. According to the authors, constraints such as fiscal rules and fairness

norms exert upward pressure on corporate tax rates. In this context, the response to international tax competition is determined by the fiscal constraint and the equity norm.

In particular, the literature examines the impact of tax competition on taxation and public spending. In this context, the efficiency hypothesis and the compensation hypothesis are put forward regarding the impact of globalisation on taxation and public spending. According to the efficiency hypothesis, which reflects the impact of globalisation on the supply side of the economy, increasing globalisation forces countries to lower tax rates in order to attract more capital or to prevent capital outflows. Falling tax rates narrow the income base of the welfare state. This reduces the government's room for manoeuvre in terms of spending, and so public spending falls (Garrett and Mitchell, 2001). In the face of increasing globalisation, governments have to reduce tax rates on the one hand and maintain fiscal discipline to adapt to integration on the other (Busemeyer, 2009). Thus, the efficiency effect of globalisation reduces the scope and size of the welfare state by putting benevolent governments under double pressure (Dreher et al 2008). The efficiency effect is therefore one of the main pillars of the critique of globalisation.

In contrast to the efficiency effect, the compensating effect of globalisation is related to the demand side of the economy. The compensation hypothesis suggests that governments respond to globalisation by increasing spending. According to this hypothesis, governments increase social spending to compensate for external risks, such as sectoral downturns and income inequality, caused by globalisation (Rodrik, 1997; Schulze and Ursprung, 1999).Rising spending demands force governments to maintain tax revenues (Cameron, 1978). In this context, Genschel and Seelkopf (2016) argue that globalisation feeds rather than undermines taxation. However, according to some authors, maintaining tax revenues under these conditions can only be achieved by increasing labour taxes (Bucovetsky and Wilson 1991; Rodrik 1997). This changes the structure of tax systems in an undesirable direction, reducing the progressivity of tax systems and making them less equitable (Tanzı, 1997). Grunberg (1998), expressing a similar view, notes that globalisation puts public authorities in a double bind. As the need for public expenditure increases with globalisation, the ability of governments to raise revenue decreases. As a result of the ensuing 'fiscal squeeze', governments face what Grunberg (1998) calls a 'double jeopardy' dilemma: either run a budget deficit and pay a macroeconomic price, or cut spending, which could jeopardise social cohesion and competitiveness.

This study investigates the impact of economic globalization on taxation and government expenditures, aiming to assess the validity of both efficiency and compensation hypotheses. Employing a fixed effects model with the Driscoll Kraay estimator, the analysis utilizes data from 26 OECD countries spanning the period 1990-2020. The results derived from the regression analysis reveal a dual effect of globalization: a negative impact on corporate tax rates, accompanied by an increase in labor tax. Additionally, economic globalization is found to decrease overall public expenditures, while concurrently boosting social expenditures.

Notably, the findings of this study provide empirical support for both the efficiency and compensation hypotheses. Specifically, the evidence concerning taxation aligns with the efficiency hypothesis, indicating that globalization tends to enhance tax efficiency. Conversely, the evidence pertaining to expenditures supports the compensation hypothesis, suggesting that globalization leads to a nuanced redistribution of government spending, particularly favoring social expenditures.

The next parts of this study are organised as follows. The relevant literature is reviewed in the next section. The third chapter discusses the data. The fourth chapter presents the research method and the fifth chapter presents the results of the analysis. The last part provides some concluding remarks.

I. LITERATURE REVIEW

Studies dealing with the impact of globalisation on corporate taxation reach different results depending on the preferred alternative tax burden measure (Adam et al., 2013). The results are therefore far from conclusive. Similarly, there is no consensus in the literature on the impact of globalisation on public expenditure. Dreher et al (2008) argue that this may be due to the fact that efficiency and compensating effects cancel each other out. However, Schulze and Ursprung (1999) link the strength of the efficiency and compensation hypotheses to the type and level of government activity and find that the two influences are complementary rather than competing.

In the literature, researchers commonly use corporate tax revenues to GDP, statutory corporate tax rates, and effective tax rates as dependent variables. Studies focusing on effective tax rates and statutory tax rates frequently reveal a negative association between globalization and corporate tax, supporting the validity of the efficiency hypothesis. However, investigations centered around tax revenues present a different perspective, indicating a positive correlation between globalization and tax revenues, as observed in the work of Adam and Kamas (2007). In the context of improving economic conditions, a reduction in tax rates can paradoxically lead to an broadening of the tax base, resulting in increased tax revenues. This phenomenon may obscure the presence of tax competition, as highlighted by Schulze and Ursprung (1999). The contradictory outcomes, challenging the international tax competition theory, underscore the significance of differences in the measurement of the dependent variable. Critically, Bretschger and Hettich (2002) critique the utilization of “capital tax revenues to GDP” as the dependent variable. They argue that the positive relationship between globalization and capital income may be attributed to changes in the tax base rather than the tax burden. Contrary to this perspective, Adam et al. (2013) argue that the results concerning the relationship between globalization and capital taxation are contingent upon the measurement of globalization rather than the chosen taxation metric. This underscores the importance of precision in selecting variables and measurement methods to draw accurate conclusions in studies exploring the intricate relationship between globalization and taxation.

Garrett's (1995) study is one of the first empirical investigations into the relationship between international market integration and capital taxation. The

study used a panel of 15 OECD countries during the period 1967-1990 and employed the ratio of capital tax revenues to GDP as the dependent variable. The results of the study indicate a positive relationship between international trade and the capital tax burden, supporting the efficiency hypothesis. Garret and Mitchell's (2001) findings suggest that globalization has varying effects on taxation and expenditure. The negative relationship between trade globalization and public expenditures supports the efficiency hypothesis, while the increase in the "capital tax rate to labor tax rate" supports the compensation hypothesis. Similarly, Quinn (1997) examines a similar relationship by considering the ratio of capital tax revenues to GDP as an independent variable. Quinn (1997) used a panel of 37 countries from 1974-1989 to demonstrate a positive correlation between financial liberalization and both capital tax revenues and capital tax rates.

Unlike previous studies, Rodrik (1997) uses effective tax rates and shows that trade globalisation and financial globalisation are effective in reducing corporate tax rates and increasing tax rates on labour. The author concludes that as economic integration increases, the tax burden shifts from capital to labour. The findings of Bretschger and Hettich (2002), who use average effective tax rates as a dependent variable in their study, support the results of Rodrik (1997). On the other hand, the authors find that the effect of increasing globalisation on social expenditures is positive. These findings suggest that efficiency affects taxation and compensation affects expenditures. According to the authors, the fact that both effects are valid at the same time shows that these effects are complementary rather than competing. Similarly, the findings of Adam and Kamas (2007) also support the co-existence of efficiency and compensation effects. Like Bretschger and Hettich (2002), Winner (2005) also uses average effective tax rates in his study. In the study covering 23 OECD countries, in line with the tax competition theory, it is found that capital mobility has a negative effect on capital taxation and a positive effect on labour taxation. The results of the above-mentioned studies show that the efficiency hypothesis is valid.

Swank and Steinmo (2002) examine the determinants of taxation in 14 advanced democracies using data from 1981-1995. The authors find that capital mobility and trade openness are associated with the decline in statory corporate tax rates, but not with the decline in average effective tax rates. The study by Slemrod (2004), covering the period 1980-1995, concludes that there is a negative relationship between trade openness and statutory tax rates, but no such relationship between the tax-to-GDP ratio and trade openness. Devereux et al (2008), in their study of 21 OECD countries, examined whether there is competition for corporate tax and whether this competition is an explanation for declining corporate tax. The study, which uses both effective marginal tax rates (EMTRs) and statory tax rates, finds that countries compete on both measures. According to the authors, tax cuts are the result of more intense competition due to the relaxation of capital controls. Overesch and Rincke (2011), in their study of 32 European countries, conclude that there is strong evidence that countries compete on statory tax rates, but not on effective marginal tax rates. Mourmans (2016) uses the statory corporate tax rate

as the dependent variable in his study covering 34 OECD countries. The results of the study show that there is a negative relationship between globalisation and taxation. Egger et al. (2019) find that due to the increasing mobility of firms and high-income workers, OECD countries are moving towards taxes paid by less mobile middle-income workers. Using a large data set of 55 countries, Jha and Gozgor (2019) find a negative relationship between globalisation and taxation on average, but a positive relationship between globalisation and taxation in countries with high capital-labour ratios. Using a dataset of 33 countries for the period 1998-2016, Sevinç et al. (2019) investigate the impact of different dimensions of globalization on corporate taxation. The results of the study show that globalization has a negative impact on corporate tax, with the exception of political globalization.

There are also studies in the literature that find a positive relationship between globalization and tax rates. Dreher (2006) shows that economic globalisation had a positive effect on average effective corporate tax rates over the period 1970-2000. The author argues that this result may be due to agglomeration forces, which allow governments to raise tax rates due to lower transport costs. In addition, the results of the study show that globalization has no significant impact on social expenditure or total expenditure. Krogstrup (2008) arrives at a similar result, arguing that tax competition is attenuated when agglomeration forces are strong enough. Kumar and Quinn (2012) also find a result that contradicts the general view in the literature. The study, which covers developed, emerging and low-income countries, finds that financial and trade globalization has had a positive effect on corporate tax rates and incomes over the last fifty years.

II. DATA

This study analyses data from 26 OECD countries for the period 1990-2020 using a panel regression model to understand the relationship between globalization and tax rates. The reason for starting the data set in 1990 is related to the acceleration of globalisation in those years. Looking at the OECD countries in terms of development, it is clear that they are a heterogeneous group of countries. In this context, a dataset of OECD countries was used in the study because of their different levels of development and therefore different levels of market integration. However, the number of countries remains limited as some of the OECD countries have recently become members of this organisation and data for some countries are not available. As globalisation is a phenomenon that affects both the revenue and expenditure sides of the budget, the study has examined the impact of globalization on revenue and expenditure separately.

In particular, the study examines the impact of financial and trade globalization on the composition of corporate taxation and public expenditure. There are many measures of corporate taxation. Studies examining the relationship between globalization and taxation use the statory corporate tax rate, the effective average tax rate, the effective marginal tax rate and the ratio of corporate tax revenue to GDP as tax measures. The statory tax rate, which is the simplest indicator of expected tax payments, ignores differences in the tax base and the existence of non-income taxes. For this reason, some authors such as Dreher (2006)

argue that the use of statory tax rate measurement is not appropriate. However, Rincke and Overesch (20011) argue that the statory tax rate is an appropriate indicator of competition in cases where the way the tax base is determined is not suitable for companies. On the income side, the statory corporate tax rate (CTO) is the preferred tax measure. As another dependent variable, the corporate tax rate / social security rate (CTR/SCR) ratio is preferred to demonstrate whether or not the tax burden shifts from capital to labor force. If globalisation is associated with both lower capital tax rates and a lower ratio of capital to labour tax rates, we might expect the tax burden to shift from capital to labour and the so efficiency view to prevail (Garret and Mitchell, 2001). Some studies suggest that tax revenues have increased despite the decline in tax rates in the face of increasing globalisation. Therefore, total tax revenue was also included in the analysis in order to make a comparison with the behaviour of corporate tax rates and to see whether there has been an increase in the tax base.

On the demand or expenditure side, in addition to total public expenditure and social expenditure, non-social expenditure is also included in the analysis, as in Busemayer (2009), to see whether the impact of economic integration differs between social and other types of expenditure.

The KOF index of de facto financial globalization and the KOF index of de facto trade globalization are used as independent variables to determine the impact of globalization on taxation and expenditure. The KOF de facto financial globalization index is calculated as the ratio of FDI, portfolio investment, international reserves and international income variables to GDP, and the KOF de facto trade globalization index is calculated as the ratio of the sum of exports and imports to GDP (Gygli et al. 2019).

Some economic and demographic variables, including total public expenditure, unemployment rate, GDP growth, inflation and private capital stock per capita on the revenue side, and unemployment rate and GDP growth as well as dependency ratio and total tax revenue on the expenditure side, were included in the analysis. Table 1 presents the data used in the analysis, including their descriptive characteristics and sources.

Table 1.Data Sources and Descriptive Statistics

Variables	Description	Source	Mean	St.dev	Min	Max
CTR	Statory corporate tax rate	Tax Foundation	31.32	8.39	12	58.15
CTR/SCR	Capital tax rate/ Employee's social security contribution rate	Tax Foundation,OECD Revenue Statistics,	6.3	18.2	0.48	200.1
TTREV	Total tax revenue (% of GDP)	OECD Revenue statistics	33.4	8.44	9.91	50.8
TEXP	Total government expenditure (% of GDP)	IMF WEO Database	43.3	8.49	19.3	67.7
SEXP	Social government expenditure (% of GDP)	OECD Social Expenditure Database	19.7	6.32	3.1	33.7
NSEXP	Non-social government spending (% of GDP)	OECD Social Exp. Database, IMF WEO	23.6	5.17	10.5	43.2
FG	De facto financial global. index (from 0 to 100)	Gygly et al. (2019)	73.2	17.5	27.5	97.4
TG	De facto trade globalization index (index from 0 to 100)	Gygly et al. (2019)	49.5	18.4	8.3	89.3
CSPC	Private capital stock per capita	IMF Investment and Capital Stock Dataset,	75.0	31.9	8.6	181.7
UNEMP	Unemployment, total (% of total labor force)	The World Bank, WDI	7.59	4.11	1.5	27.4
GROW.	GDP growth	The World Bank, WDI	2.3	2.7	-9.1	25.1
DEPEND	Age dependency ratio (% working age population	The World Bank, WDI	51.2	4.8	40.2	77.0
INF	Yearly percentage change of CPI	IMF WEO Database, 2020	4.4	10.8	-2.5	43.2

III. RESEARCH METHOD

In this section, the panel regression model is used to identify the impact of economic globalisation on taxation and public expenditure. The panel regression model, which determines the effect of the independent variables on the dependent variable, is expressed in the following equation:

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it} i=1, 2, \ldots\ldots,N \text{ and } t=1,2,...T \quad (1.1)$$

In equation (1.1), Y symbolizes the dependent variable and X symbolizes the independent variable. α is the constant term and β is the coefficient of the independent and control variables. i represents the cross-section units (countries) of the study and t represents time (years).

The study analyses the impact of economic globalisation on corporate taxes and expenditures. In order to separate these effects, two separate models can be estimated using equation (1.1):

$$TAX_{it} = \alpha_i + \beta_1 GLOBAL_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \quad (1.2)$$

$$EXP_{it} = \alpha_i + \beta_1 GLOBAL_{it} + \beta_2 CONTROLS_{it} + +\varepsilon_{it} \quad (1.3)$$

In equation (1.2), TAX is the dependent variable indicating different measures of taxation in each model, such as corporate tax rate, corporate tax/social security contribution rate, corporate tax revenue, total tax revenue. In equation (1.3), EXP is the dependent variable indicating different measures of expenditure in each model in the form of total government expenditure, social expenditure and

non-social expenditure. GLOBAL is the independent variable representing the KOF de facto financial globalisation index and the KOF de facto trade globalisation index. CONTROLS represent control variables such as unemployment rate, dependency ratio, GDP growth, inflation and private capital stock per capita.

Unemployment can affect both expenditure and corporate taxes. High unemployment rates have a positive impact on spending, especially through income transfers. On the other hand, in periods of high unemployment, governments can facilitate more employment by reducing taxes on capital. Therefore, a negative relationship between the corporate tax rate and unemployment can be expected. As another control variable, the welfare effect generated by economic growth inevitably leads to more public spending. However, a negative relationship between economic growth and tax rates is expected. Another control variable that increases expenditure is the dependency ratio. An increase in income transfers due to the dependency ratio ultimately leads to an increase in total expenditure. Another variable related to corporate tax is total capital stock. Kumar and Quinn (2012) find that capital taxes are relatively lower in economies with high capital stock.

Prior to conducting regression analysis, it is essential to test the stationarity tests as regression analysis requires stationary variables. Non-stationary variables at the level should only be included in the analysis after they have been stabilized. It is important to determine the appropriate unit root test to establish stationarity, which requires investigating the presence of cross-sectional dependence between variables. Cross-sectional dependence may arise from the behavioral interaction between individuals or due to unobservable common shocks, as is popular in macroeconomics (Baltagi et al., 2012). The presence of cross-sectional dependence indicates that a shock to any of the panel's cross-sectional units affects the other units to varying degrees. Therefore, analysing variables without taking cross-sectional dependence into account may lesd to biased and inconsistent results (Menyah et al., 2014).

Several tests are employed in the literature to determine cross-sectional dependence.. One such test used to investigate the presence of cross-section dependence in a series is the Berusch-Pagan (1980) LM test. However, this test can only be applied when the time dimension of the panel is larger than the cross-section dimension (T > N) (Baltagi et al., 2012). Due to this limitation, Pesaran (2004) proposed a scaled version of the LM test, referred to as the CDlm test. The CDlm test can be used for $T \rightarrow \infty$ and $N \rightarrow \infty$, but it exhibits distortion as N increases. CD is based on the average of sample correlations and is valid for large N. Baltagi et al. (2012) showed that the scaled LM has an asymptotic bias term resulting from the incidental parameters problem. Therefore, they suggest a simple bias-corrected LM test, called LMP test, as the within residuals are estimated imprecisely for small T.

The hypotheses of these tests are as follows:

H_0: *There is no cross-section dependence.*

H_1: *There is cross sectional dependence.*

The tests' hypotheses are as follows:

Based on the test results, if the H_0 hypothesis is accepted, it is recommended to use unit root tests that do not consider cross-sectional dependence. However, if the H_1 hypothesis is accepted, it is recommended to use unit root tests that take cross-sectional dependency into account.

Once the unit root test is completed, the appropriate panel data models should be determined. Panel data models can be estimated using pooled least squares (Pooled OLS), fixed effects (FE), or random effects (RE) methods. The Pooled OLS mmodel assumes that both constant term and slope parameters remain constant with respect to units and time. On the other hand, the Fixed Effects (FE) model assumes that each unit has unobservable properties that do not change over time. In this model, effects are considered as an estimated parameter for each cross-section observation. The Fixed Effects model is used in cases where unit effects (μi) and differences between units are constant. The random effects (RE) model treats effects as a random variable, similar to an error term. This model randomly selects units, resulting in random differences between them (Baltagi, 2005).

To determine the most appropriate model among those mentioned above, we must conduct the F test, LM test, and Hausman test, respectively. The validity of the Pooled OLS model or Fixed Effects models is determined by the F test, which assesses whether the data vary across units. If the data does not vary by unit, the Pooled OLS model is valid. For this, the probability value of the test is taken into account. If the probability value of the F test is greater than 0.05, the pooled model is accepted; otherwise, the fixed effects model should be accepted. The LM test is used to choose between a pooled model and a random model. If the probability value of the LM test is less than 0.05, the null hypothesis should be rejected and the random model should be considered appropriate. In the last stage the Hausman test is used to determine whether to use a fixed model or a random model. The Hausman test identifies whether the differences between fixed effects and random effects are systematic. The systematic nature of the differences suggests that fixed effects are suitable. If the Hausman test rejects the null hypothesis that the conditional mean of the given regressors is zero, the FE estimator is more appropriate. Otherwise, the RE estimator should be accepted (Baltagi et al., 2003; Frondel and Vance, 2010).

To effectively apply panel regression models, it is imperative to ensure that the fundamental assumptions of the model are met, including the absence of autocorrelation, heteroscedasticity, and cross-sectional dependency. These assumptions serve as the foundation for reliable and accurate results. Once the suitable model is determined, a crucial step involves testing the model for adherence to these fundamental assumptions. If deviations from these assumptions are detected, it becomes necessary to re-evaluate the model using estimators designed to rectify the identified issues.

IV. EMPIRICAL FINDINGS

Since panel data models require stationary data, it is necessary to test the stationarity of the data by applying unit root tests before starting the analysis. Depending on whether there is cross-sectional dependence in the series, first generation unit root tests or second generation unit root tests are used. Therefore,

firstly, in order to determine the appropriate unit root test, the tests for cross-sectional dependence such as LM, CDlm, LMP and CD, which are frequently used in the literature, should be applied. Table 2 shows the results of these tests. Based on the test results, the null hypothesis H_0 is strongly rejected as the probability values of the variables are less than 0.05. Therefore, the null hypothesis H_1 , which suggests cross-section dependence in the series, is accepted.

Table 2. Cross-Sectional Dependency Tests

Variables	LM (Breusch and Pagan, 1980)	CDlm (Pesaran, 2004)	LMP (Baltagi et al, 2012	CD (Pesaran, 2004)
CTR	4321.33 (0.00)	155.72(0.00)	155.26(0.00)	61.07(0.00)
CTR/SCR	2918.26(0.00)	88.160(0.00)	87.31(0.00)	37.91(0.00)
TTREV	1941.98(0.00)	62.403(0.00)	61.93(0.00)	10.05(0.00)
TEXP	2453.79(0.00)	82.47(0.00)	82.01(0.00)	19.05(0.00)
SEXP	2917.78(0.00)	100.67(0.00)	100.21(0.00)	27.94(0.00)
NSEXP	2645.43(0.00)	89.99(0.00)	89.53(0.00)	27.13(0.00)
FG	7292.00 (0.00)	272.24(0.00)	271.78(0.00)	84.64(0.00)
TG	4806.20 (0.00)	174.74(0.00)	174.28(0.00)	50.76(0.00)
CSPC	6922.04(0.00)	282.87(0.00)	282.44(0.00)	83(0.00)
UNEMP	1679.01(0.00)	52.08(0.00)	51.62(0.00)	12.49(0.00)
GROWTH	2588.72(0.00)	87.77(0.00)	87.3(0.00)	45.49(0.00)
DEPEND	3841.62(0.00)	136.91(0.00)	136.44(0.00)	24.68(0.00)
INF	2336.84(0.00)	77.89(0.00)	77.42(0.00)	42.69(0.00)

Note: p values in parentheses

Observation of cross-sectional dependence in variables requires stationarity to be investigated with second generation unit root tests. Since all tests in Table 2 indicate the existence of cross-sectional dependence in the series, at this stage the stationarity of the variables is examined with second generation unit root tests that take cross-sectional dependence into account. In the standard ADF unit root test, each unit in the panel data set is tested, but its power is weakened in case of cross-sectional dependence. Therefore, the multivariate augmented Dickey-Fuller (MADF) test, developed by Taylor and Sarno (1998) and taking into account cross-sectional dependence, was applied in the study. The basic hypothesis H_0 of this test, which can be applied in the N<T case, is that all series in the panel are I(1). If the MADF test statistic is greater than the critical value of 0.05, the basic hypothesis is rejected and the series is considered stationary. MDF test results are shown in Table 3.

Table 3.MADF Unit Root Test

Variables	MADF statistic	%5 critical value
CTR	2099.964	28.150
CTR/SCR	8895.123	28.150
TTREV	4297.588	28.150
TEXP	8543.317	28.150
SEXP	7688.935	28.150
NSEXP	2268.987	28.150
FG	8511.045	28.150
TG	797.316	28.150
CSPC	7471.198	28.150
UNEMP	2973.548	28.150
GROWTH	4587.315	28.150
DEPEND	1820.08	28.150
INF	77344.475	28.150

Table 3 shows that the MADF test statistic exceeds the 5% critical value for all series, leading to the rejection of H0 at a 95% confidence level and the conclusion that the series are stationary.

As a result, variables are included in the regression equation with their level values (I(0)). The first step of the regression analysis requires the selection of an appropriate method, which can be determined through the application of various tests. The F test was used to choose between pooled OLS and fixed effects, indicating that the fixed effects method is more suitable for all models. In the second stage, the Bresuch-Pagan LM test was used to determine the appropriate model between the Pooled OLS method and the random effects method, indicating that the random effects are suitable for all models. Finally, the Hausman test was applied to decide whether regression models should be fixed or random effects. The results suggest that fixed effects are more suitable for all models.

Once the decision to apply the fixed effects model was made, we tested the basic assumptions. The Modified Wald test was used to detect the presence of heteroskedasticity in all models, even in cases where the normal distribution assumption is violated. To determine autocorrelation in a fixed effects model, Bhargava et al. (1982) proposed using the Durbin-Watson test with an AR(1) model. If DW < 2, it is concluded that there is autocorrelation in the model. In this study, autocorrelation was found in all models. To test the correlation between units (cross-section dependence), the Pesaran (2004) CD test was used. If the p-value is less than 0.05, the H_0 hypothesis, which suggests a correlation between units, is rejected and the H_1 hypothesis is accepted. The test results show that the p-value is less than 0.05 in all models. Therefore, H_0 is strongly rejected, and it is concluded that there is cross-sectional dependence in the models.

When applying the fixed effects model, which was determined as appropriate for the analysis, heteroscedasticity, autocorrelation, and cross-sectional dependence are observed. These deviations render traditional estimation methods ineffective, and therefore, the model must be re-estimated using robust estimators. Although some techniques are robust to certain violations of basic assumptions, such as the Newey-West estimator, they do not take into account cross-sectional dependency. However, Driscoll and Kraay (1998) estimate the fixed effects regression model with robust standard errors to correct cross-sectional dependency as well as the other stated deviations. Therefore, as proposed by Hoechle (2007), the model is re-estimated using the Driscoll-Kraay estimator.

Table 4 reports the regression results for taxation. The taxation model uses three dependent variables: statutory corporate tax rate, the ratio of this rate to social security contribution rate, and the ratio of total tax revenue to GDP. The effects of financial globalization and trade globalization are analyzed separately for each dependent variable. Upon examining the regression results, it becomes apparent that financial globalization has led to a reduction in both corporate tax rates and corporate tax to labor tax rates (CTR/SCR). However, the impact on CTR/SCR is more pronounced. Specifically, a 1% increase in financial globalization leads to a 0.4% increase in the CTR/SCR ratio. A similar relationship is observed when trade

globalization is included in the model instead of financial globalization. As Garret and Mitchell (2001) pointed out, the efficiency approach is effective if greater market integration is to be associated with both lower capital taxation rates and the ratio of lower capital rate to labor taxation. The economic globalization variables (FG, TG) increasing total tax revenues suggest an expansion of the tax base, as proposed in the compensation approach.

Table 4 also includes findings on the impact of control variables such as unemployment rate, capital stock per capita, growth rate, public expenditures and inflation on taxation. Accordingly, the increase in unemployment rates decreases both corporate tax rates (CTR) and corporate tax rates / social security contribution rates (CTR / SCR). Such a relationship may be related to governments reducing corporate tax rates due to rising unemployment rate. As another control variable, the effect of capital stock per capita on taxation is negative and statistically significant, consistent with our expectations. Higher private capital stock per capita (CSPC) leads to lower corporate tax rates in both Model 1 and Model 2. The findings in Model 2, Model 4 and Model 5 show that the economic growth rate is associated with a higher capital tax rate and higher levels of tax revenue. Another factor that increases tax rates and tax revenues is budget constraint. This may be a case of increasing tax rates or imposing new taxes to finance increased public spending. Finally, it is clear that inflation has a negative, albeit limited, effect on real tax revenues.

Table 4. Fixed Effects Model Estimation (Taxation, 1990-2020)

	CTR		CTR/SCR		TTREV	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
FG	-0.173*** (0.033)		- 0.411** (0.172)		0.052*** (0.017)	
TG		-0.22*** (0.035)		-0.27*** (0.058)		0.069*** (0.018)
UNEMP	-0.161 (0.119)		-0.27** (0.206)	-0.214* (0.104)		
CSPC	-0.27 (0.033)***	-0.28*** (0.027)				
GROWTH		0.154** (0.059)	0.253 (0.170)	0.361*** (0.113)	0.116** (0.054)	0.089 (0.127)
TEXP	0.162** (0.075)	0.153** (0.059)			0.146** (0.057)	0.138** (0.050)
INF					- 0.051*** (0.009)	-0.049*** (0.008)
F statistic	0.000	0.000	0.000	0.000	0.000	0.000
LM statistic	0.000	0.000	0.000	0.000	0.000	0.000
Heteroskedasticity	0.000	0.000	0.000	0.000	0.000	0.000
Autocorrelation AR(1)	0.510	0.528	0.679	0.654	0.602	0.593
N	754	754	754	754	754	754
R^2 (Within)	0.51	0.51	0.09	0.05	0.17	0.17
Hausman test	0.000	0.000	0.037	0.000	0.000	0.000
Pesaran CD test	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Standard errors in parentheses. ***significant at 1%; **significant at 5%; *significant at 10%

Table 5 presents the regression results for the expenditure models. The relationship between globalisation and expenditures is analysed within the framework of six models, including three dependent variables representing expenditures: total public expenditures, social expenditures, and non-social expenditures. The results from Models 1 and 5 indicate that financial globalisation negatively affects both total and non-social expenditures. Models 1 and 5 reveal the impact of financial globalisation on expenditures. The coefficients indicate that financial globalisation negatively affects both total and non-social expenditures, with a more pronounced effect on the latter. Similarly, Model 2 and Model 6 reveal that trade globalisation, which is another dimension of globalisation, also reduces expenditures. The reliability of the results is enhanced by the fact that different globalization indices demonstrate similar effects on expenditures. Therefore, the findings strongly support the efficiency approach, indicating a reduction in the size of the public economy. On the other hand, Model 3 and Model 4 provide strong evidence for the validity of the compensation approach as the increase in social expenditures is associated with higher financial and trade integration.

Table 5. Fixed Effects Model Estimation (Government Expenditures, 1990-2020)

	TEXP		SEXP		NSEXP	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
FG	-0.058*** (0.017)		0.080*** (0.012)		-0.138*** (0.019)	
TG		-0.09*** (0.033)		0.049*** (0.015)		-0.14*** (0.021)
UNEMP	0.402*** (0.070)	0.454** (0.076)	0.338*** (0.034)	0.310*** (0.051)	0.064 (0.048)	0.144** (0.058)
GROWTH	-0.357*** (0.076)		-0.181*** (0.032)		-0.174*** (0.061)	
DEPEND	0.067* (0.039)	0.078 (0.054)	0.093*** (0.030)	0.071** (0.032)	-0.026 (0.059)	0.007 (0.065)
TTREV		0.274* (0.145)		0.311*** (0.098)		-0.037 (0.103)
F statistic	0.000	0.000	0.000	0.000	0.000	0.000
LM statistic	0.000	0.000	0.000	0.000	0.000	0.000
Heteroskedasticity	0.000	0.000	0.000	0.000	0.000	0.000
Autocorrelation AR(1)	0.512	0.502	0.391	0.408	0.529	0.503
N	754	754	754	754	754	754
R^2 (within)	0.20	0.18	0.38	0.32	0.21	0.14
Bulgular	0.000	0.000	0.000	0.000	0.000	0.001
Pesaran CD test	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Standard errors in parentheses. ***significant at 1%; **significant at 5%; *significant at 10%

Table 5 also shows the effect of control variables on all expenditure components. As expected, there is a negative relationship between unemployment rates and public expenditures. This relationship is statistically significant and strong for total and social expenditures. An increase of 1% in the unemployment rate leads to a 0.4% increase in total public expenditures and a 0.3% increase in social expenditures. These results indicate that unemployment is a significant factor in determining total public and social expenditures. However, this relationship is

either insignificant or weak when it comes to non-social expenditures, compared to other types of expenditures. But, the unexpected negative impact of growth on expenditures contradicts our expectations. The negative relationship between growth rates and public expenditures implies an cunter-cyclical relationship with expenditures. These results, which indicate that the share of expenditure in GDP declines as the level of GDP rises, support the findings of Garret and Mitchell (2001) and Busemeyer (2009).

Upon analysing the relationship between the dependency ratio and total expenditures, it is evident that there is no strong or significant correlation between the variables. However, the findings in Model 3 and Model 4 show that the effect of dependency ratio on social expenditures is relatively larger and the relationship is more significant. The fact that dependency ratios increase social expenditures such as income transfers and health expenditures may be effective in this result. However, it is important to note that dependency ratios do not have any impact on non-social expenditures. In contrast, total tax revenues have a significant effect on increasing both total public and social expenditures. It is worth noting that the effect of tax revenues on social expenditures is stronger and more statistically significant than on total expenditures. Moreover, the findings of Model 6 indicate that there is no significant relationship between total tax revenues and non-social expenditures.

As in Bretschger and Hettich (2002) and Winner (2005), the estimation results of the fixed effects model used in this study show that the efficiency hypothesis is effective in taxation and the compensation hypothesis is effective in social expenditures.

CONCLUSION

Globalization stands out as a pivotal force shaping the economic policies of nations. Two distinct effects of globalization play a crucial role in elucidating government behavior: the Efficiency effect concerning revenue and the Compensation effect regarding expenditure. The risks induced by economic globalization contribute to an amplified demand for social security programs. In response, the welfare state addresses these demands by escalating social spending.

In contrast to the compensation effect of globalization, which advocates for increased social spending, the efficiency approach posits that heightened economic integration curtails control over mobile factors, leading to a reduction in capital tax rates. Consequently, economic globalization yields a dual impact: a decrease in public expenditures and a shift in the tax burden from capital to the labor force. Collectively, these two effects may culminate in a lower capital tax rate, a higher labor tax rate, and increased social spending. It is crucial to note, however, that the realization of these outcomes hinges on the simultaneous occurrence of both effects.

Opponents and proponents of globalisation often base their arguments on efficiency and compensation hypotheses. In light of these debates, this study examines the empirical validity of efficiency and compensation effects and thus the impact of globalisation on fiscal policy in a panel of 26 OECD countries over the period 1990-2020. The results suggest that corporate tax rates and the ratio of the

corporate tax rate to the social security contribution rate are negatively affected by financial globalisation,but increase the labour tax rate. Trade globalisation, another dimension of economic globalisation, has a similar effect on taxation. On the expenditure side, there is a positive relationship between economic integration and social expenditures. All these results point to the validity of the compensatory and efficiency hypotheses of globalisation proposed in the literature.

The fact that both effects are valid means that globalisation reduces corporate tax rates, but increases social expenditures to compensate for the increased risks, and that these expenditures are financed through taxes on labour.

These findings have many important implications. First, although globalization decreases total public spending, it also increases public social spending. Therefore, globalization narrows the scope of public economy on the one hand, and expand the welfare state on the other. Second, besides global factors, domestic factors also have an effect on taxation and expenditures. Third, although globalization and consequent tax competition reduce the degree of policy maneuver on corporate taxation, increasing tax revenues can reduce the limitation on spending. Fourth, the co-existence of efficiency and compensation effects imply that they are not rivals but complementary.

Araştırma ve Yayın Etiği Beyanı

Makalenin tüm süreçlerinde Yönetim ve Ekonomi Dergisi'nin araştırma ve yayın etiği ilkelerine uygun olarak hareket edilmiştir.

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