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## THE IMPACT OF GLOBALIZATION ON THE CHARACTERISTICS OF EUROPEAN COUNTRIES' TAX SYSTEMS

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**ABSTRACT:** *In the international literature, a great number of studies have sought to determine the relationship between the characteristics of the national tax systems and globalization. Most of the research was conducted to prove the impact of the tax system on the competitiveness of the national economy, in order to give a clear recommendation for how economic and fiscal policy should create a stimulating economic background and enable greater involvement of the national economy in international flows. However, the process can*

*be viewed from the reverse perspective, in the sense that the process of globalization and international competition can shape the characteristics of national tax systems. This paper aims to determine by empirical evidence the impact of the process of globalization and international competition on the characteristics of taxation in observed European countries.*

**KEY WORDS:** *Globalization, Taxation, Taxation trends in the European countries, Cluster analysis, Discriminant analysis*

**JEL CLASSIFICATION:** C38, F60, H29

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## **1. INTRODUCTION**

Taxation in an increasingly globalized world economy has attracted economists' attention over the last few decades. A common and widely accepted view is that globalization dramatically reduces the ability of a government to collect taxes and to set any of its policies independently of market forces and policies in other jurisdictions. If labour and capital (and even consumption) can move easily from one jurisdiction to another, then any attempt to tax these factors more heavily than a neighbouring country will lead to a "vanishing taxpayer", as labour and capital flee from high- to low-tax regions (Neumann et al. 2002). While some countries are trying to protect the domestic market by increasing tariffs and taxes, others are trying to take advantage of global growth by lowering tax rates and negotiating favourable trade arrangements (Saravia Aguirre et al. 2012). The present tax systems evolved as each country formulated its own tax policy, focusing on the requirements of its domestic economy. When tax treaties, agreements, and conventions among nations were negotiated, they were within the framework of national sovereignty in tax policy. The globalization process has changed this, particularly with respect to the level of taxation, mix of taxes, design of particular taxes, and the manner of their administration and compliance. Countries are being forced to exhibit much greater awareness of and sensitivity to the tax changes being undertaken by their trading partners (Asher et al. 1999).

In recent decades the emphasis in the study of the interaction between globalization and national tax systems is on the effects of changes in tax rates and providing tax incentives to improve the international position of the national economy. The majority of papers have analysed cuts in the taxation of corporate profit and the continuous reduction of the tax burden on capital. A number of countries in the world have gradually adopted this way of attracting investment, especially developing countries where the need for fresh capital is the greatest. That process is still ongoing, since effective tax rates on profit have steadily declined in nearly all OECD and EU countries.

Tax competition is particularly topical in European countries because the ratio of tax to GDP is very high in the EU compared with international averages. Most of the old member countries have maintained relatively high corporate income tax rates compared to the new EU member states and non-EU countries

that have adopted a lower rate of corporate taxation and a small number of tax brackets. Also, the average effective tax rates on labour and consumption are higher in EU countries than in most other OECD countries. On the other hand, many new EU member countries are becoming very attractive due to an improved tax environment: lower tax rates accompanied by increasing administrative efficiency in taxation. Nowadays developing countries are even forced to offer foreign investors a stimulating tax environment in order to build and maintain a position in the international capital market. Thus the initial use of the tax system to increase the competitiveness of the national economy has turned into the reverse process: globalization shapes the design of the tax system.

## **2. LITERATURE REVIEW**

Numerous studies have examined how the process of globalization is related to the characteristics of national tax systems. Most of the early studies analysed the impact of taxation on the competitiveness of the economy, mainly the impact of corporate income taxes on foreign direct investment and increased investment overall. Just a few studies analysed the process from the opposite perspective, considering the impact of international competition on the characteristics of national tax systems. However, with the rise of interest in topics such as tax competition, income shifting, and transfer pricing, the impact of globalization on national tax systems is clearly a fruitful area of research.

Heinemann (2000) studied the impact of globalization on national fiscal components such as the structure of tax revenues, the structure of government spending, public debt, and budget size, using a sample of OECD countries. The results show that states retain autonomy in the area of public debt and the structure of government spending, but are heavily influenced by globalization in creating the structure of tax revenues and the size of the budget. Avi-Yonah (2001) comes to the conclusion that due to the impact of globalization and tax competition, tax rules can no longer be formed unilaterally or through bilateral agreements, because in a world where capital can move without restrictions and multinational corporations are free to choose investment locations, the ability of a state to tax such capital is limited. The author believes that any unilateral attempt is disabled at root, so a multilateral solution is necessary (at the level of an organization of global importance). Neumann et al. (2002) found that

governments retain the ability to collect taxes even in the face of increasing globalization, that is, the taxpayer remains immobile, but taxed factors of production move between countries to escape higher domestic tax burdens. Paris (2003) claims that, given that the state's history is inseparable from the history of taxation, globalization of taxation can have long-term political implications. Vogiatzoglou (2004) believes that the fiscal aspect of the single European market is ignored and reduced to the level of national fiscal authorities, as opposed to the economic aspect, which is institutionally supported. That is why, despite the high level of economic integration within the EU, EU fiscal integration receives little attention and is progressing very slowly. Aizenman and Jinjark (2006) discussed the impact of the process of globalization on the tax base of countries at different levels of economic development. They conclude that trade and financial openness are positively correlated with taxes such as value added tax and taxes on income and profit (they call them "difficult to collect taxes"), and negatively with tariffs ("easy to collect taxes"), which leads to changes in the structure of tax revenues from "easy" to "difficult" taxes. Kubatova et al. (2008) have shown that economic, social, and political globalization factors have influenced the process of tax mixes becoming more similar. Also, separate influences of these factors on tax mix structure have intensified recently, particularly in the economic area. Hines and Summers (2009) argue that the small open economy is less reliant on taxing profit and income, and more reliant on consumption taxes and taxes on international trade, reflecting the fact that a well-designed tax system based on consumption taxes may create fewer economic distortions than many forms of tax on corporate profit and personal income. Kumar and Quinn (2012) analyse the extent to which international economic integration, both financial and trade, affects corporate taxation. They conclude that a negative relationship between financial globalization and corporate tax rates does not exist: moreover, in some groups of OECD countries and non-OECD countries the growth of financial globalization is associated with an increase in tax rates and tax revenues. On the other hand, the growth of trade integration leads to lower corporate tax rates.

### 3. METHODOLOGY

The hypothesis considered in this paper is that globalization affects the design of national tax systems. Specifically, the differences between European countries' national tax systems can be explained by differences in the achieved level of involvement in the globalization process.

The analysis considers 36 European countries, of which 26 are members of the European Union, 4 are EU candidate countries (Serbia, Macedonia, Montenegro, and Turkey), 2 countries are potential candidates (Albania and Bosnia and Herzegovina), while 4 countries are not involved in the process of joining the EU (Belarus, Moldova, Russia, and Ukraine).

In order to present the characteristics of taxation, the tax system will be viewed from three perspectives:

- 1) the tax burden on business activity;
- 2) the structure of tax rates;
- 3) taxes expressed as a share of commercial profit.

The tax burden on business activity takes into account the data contained in the Paying Taxes 2012 report.<sup>1</sup> In the first step, concrete data are collected on the total tax rate (TTR), number of tax payments during the tax year, and the time required to fulfil all the requirements of tax administration.<sup>2</sup> Then the structure

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<sup>1</sup> The Paying Taxes 2012 Report is part of the World Bank Group Doing Business project, which monitors changes and reforms made to tax regimes around the world. It records the taxes and mandatory contributions that a medium-sized company must pay in a given year as well as measuring the administrative burden of paying taxes and contributions. The project is developed and implemented by the World Bank and IFC in cooperation with PwC (PricewaterhouseCoopers).

<sup>2</sup> The total tax rate measures the amount of taxes and mandatory contributions borne by the business in the second year of operation, expressed as a share of commercial profit. The total amount of taxes borne is the sum of all the different taxes and contributions payable after accounting for allowable deductions and exemptions. The taxes withheld (such as personal income tax) or collected by the company and remitted to the tax authorities but not borne by the company (such as value added tax, sales tax, or goods and service tax) are excluded. The tax payments indicator reflects the total number of taxes and contributions paid, the method of payment, the frequency of payment, the frequency of filing, and the number of agencies involved for the standardized case study company during the second year of operation. It

of tax rates is assessed by the following variables: nominal corporate income tax rate, standard value added tax rate, and highest marginal rate of personal income tax. Tax rates are taken from Eurostat, the official website of the European Commission, and for countries outside the European Union from the official websites of national tax authorities. When considering the share of individual tax categories in companies' profits we use three categories: profit tax, labour tax, and other taxes, expressed as a percentage of the profit of a standard firm.<sup>3</sup>

As regards methodology, we use the approach previously used in Heinemann et al. (2000) and Kubatova et al. (2008). This approach assumes that cluster analysis is performed on a sample of a number of countries (in both papers samples consist of OECD countries), while the cluster variables are certain characteristics of the national fiscal systems. Heinemann introduced multiple fiscal dimensions (tax structure, the structure of government spending, debt and size of the country), and for each listed dimension took a number of indicators that were later used as cluster variables. Cluster analysis is performed based on the cluster variables, and for each of these dimensions the optimal number of clusters is determined. The next step is the implementation of discriminant analysis, which is carried out to determine whether the independent (predictor) variables (Heinemann used the openness of the economy, restrictions on international transactions, and the existence of a floating exchange rate) can be used to classify countries into predefined clusters. If the quantitative differences between the previously identified clusters are statistically significant in terms of the values of the independent variables, then it can be stated that these variables have a certain degree of influence on the differences between the fiscal characteristics of the clusters.

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includes taxes withheld by the company, such as sales tax, value added tax, and employee-borne labour taxes. These taxes are traditionally collected by the company from the consumer or employee on behalf of the tax agencies. Time is recorded in hours per year. The indicator measures the time taken to prepare, file, and pay three major types of tax and contributions: corporate income tax, value added or sales tax, and labour taxes, including payroll taxes and social contributions.

<sup>3</sup> Taxes expressed as a share of commercial profit are defined in the paper by Djankov, S. et al. (2010), *The Effect of Corporate Taxes on Investment and Entrepreneurship*, *American Economic Journal: Macroeconomics*, No. 2, July 2010, while detailed methodology is provided on the website <http://www.doingbusiness.org/methodology/paying-taxes>

A similar approach was used in Kubatova's paper, except that globalization indices were used as independent variables. Kubatova et al. studied taxation mixes in a sample of OECD countries. Taxation mixes comprise the most important taxes expressed as percentages of total tax revenues, and they include in particular personal income taxes, corporate income taxes, social security contributions, property taxes, and consumption taxes. However, Kubatova et al. used a dynamic approach, because they studied the development of tax mixes in OECD countries, and therefore the results of cluster analysis are changes in clusters during the time period 1965–2003. After clustering, the three sub-indices (economic, social, and political) that constitute the CSGR Globalization Index (developed by Centre for the Study of Globalization and Regionalization) are used as predictor variables. Discriminant analysis is also carried out for a defined time period, in this case 1980-2003.

This paper draws on the ideas presented in previously published papers. The goal of cluster analysis is to classify the elements of the sample into groups (clusters) with a high degree of internal homogeneity and external heterogeneity. Objects (cases, observations) in the same cluster have similar characteristics, but differ greatly in relation to objects outside the cluster (Mooi & Sarstedt 2011). Classification is carried out taking into account the features of objects, based on which it is possible to calculate the distance between objects and clusters if the distance criterion is defined (Heinemann 2000). The division into clusters in this paper is carried out using K-means cluster analysis. This concept of clustering represents a prototype-based, partitional clustering technique that attempts to find a user-specified number of clusters (K), which are represented by their centroids, usually the mean of a group of points (Tan et al. 2006). We shall use the above mentioned fiscal categories with the described indicators as cluster variables for the chosen sample of countries. Specifically, in the first cluster analysis the tax burden on business activity indicators are taken as cluster variables: total tax rate (TTR), the number of tax payments per year (Payments), and the time required to complete all tax procedures (Time). In the second cluster analysis, division of the sample into clusters is based on the structure of tax rates: corporate income tax (CIT), value added tax (VAT), and personal income tax (PIT). In the third cluster analysis the share of individual tax categories in company profit indicators are taken as cluster variables: tax on profits (ProfitTax), labour taxes (LabourTax), and other taxes (OtherTaxes).

The initial classification of the countries is obtained based on the clusters, and is then revised using discriminant analysis. Discriminant analysis is a multidimensional statistical analysis that examines the relationship between the group of independent variables and a single qualitative dependent variable (Kubatova et al. 2008). It is commonly used to predict membership in naturally formed groups and to answer the question of whether the combination of variables can be used to predict group membership. Usually, several variables are included in a study to see which ones contribute to the discrimination between groups (Poulsen & French 2008). Belonging to a pre-established group can be marked either by numbers or words and can be used as the dependent variable. In this paper the goal of discriminant analysis is to show that the classification determined by placing the sample of countries into clusters according to the aforementioned tax variables can also be supported using globalization indices; or in other words, to determine whether the process of globalization and international competition is significant in explaining the similarities within and differences between the clusters that were obtained using tax variables as cluster variables. If we are satisfied with the discriminant analysis (the percentage of correct classification of objects is relatively high), then we can say that the independent (predictor) variables can be used to predict group membership of objects in the original sample.

KOF Globalization indices are used as independent (predictor) variables, which are internationally accepted as a general indicator of international competitiveness and integration of national economies in globalization trends. Axel Dreher (2006) worked out KOF indices of globalization in detail and calculated them for three areas: economic globalization, social globalization, and political globalization. The index of economic globalization can be divided into two sub-indices: the index of current flow and the index of economic barriers.

## **4. EMPIRICAL RESULTS**

### **4.1 The first cluster analysis**

The first cluster analysis is conducted using the following cluster variables: total tax rate (TTR), the number of tax payments (Payments), and the time necessary to fulfil tax procedures (Time). Table 4.1.1 shows the results of the cluster analysis, showing the three-cluster option that was found to be optimal. The



first cluster consists of 4 countries that have relatively burdensome tax systems (high average total tax rate, a large number of annual tax payments, and a lot of time necessary to fulfil tax claims). The second cluster (stimulating tax systems) comprises 15 countries that have a relatively low TTR, a very small average number of tax payments during the year, and few hours necessary to fulfil tax claims. The third cluster (moderately efficient tax system) consists of 17 countries with moderate ratios. These countries have a TTR somewhat lower than countries in the first cluster but slightly higher than those in the second cluster, a lower number of tax payments than the first cluster countries but higher than countries in the second cluster, and a number of required hours lower than countries in the first cluster but higher than countries in the second cluster.

**Table 4.1.1:** *Clusters obtained using variables of the tax burden on business activity*

Cluster 1 (burdensome tax system)	Cluster 2 (stimulating tax system)	Cluster 3 (moderately efficient tax system)
Bulgaria	Austria	Germany
Czech Republic	Belgium	Greece
Belarus	Cyprus	Hungary
Ukraine	Denmark	Italy
	Estonia	Latvia
	Finland	Poland
	France	Portugal
	Ireland	Romania
	Lithuania	Slovakia
	Holland	Slovenia
	Spain	Albania
	Sweden	Bosnia and Herzegovina
	United Kingdom	Moldova
	Croatia	Montenegro
	Macedonia	Russia
		Serbia
		Turkey

**Source:** *Author's calculations*

The interpretation of the cluster characteristics is derived from Table 4.1.2, showing the final cluster centres (averages of cluster variables for each cluster).

**Table 4.1.2:** *Final cluster centres*

	Cluster		
	1	2	3
TTR	49.23	40.43	41.49
Payments	44	12	31
Time	592	135	280

Analysis of variance (ANOVA) shows which variables contribute most to the resulting cluster solution. In this case, Table 4.1.3 shows that the number of payments and the number of hours are able to classify objects into clusters in a satisfactory manner, because the F statistic, which is used as a criterion for accepting/rejecting the hypothesis that the arithmetic means of cluster variables are equal among clusters, is relatively large in both cases. The obtained p-values are smaller than the significance level  $\alpha = 0.05$  for the variable Time (number of hours) and smaller than the significance level  $\alpha = 0.10$  in the case of Payments variable (the number of tax payments). The exception is TTR, for which the F-statistic value is extremely low, and the obtained p-value is much higher than any level of significance chosen in practice.

**Table 4.1.3:** *The analysis of variance*

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
TTR	125.032	2	177.437	33	0.705	0.502
Payments	2369.835	2	739.999	33	3.202	0.054
Time	339760.470	2	2808.110	33	120.993	0.000

Table 4.1.4 shows the Euclidean distance between the centres of the final clusters. The formula for the distance between two points in the plane with coordinates  $(x,y)$  and  $(a,b)$  is  $\text{dist}((x, y), (a,b)) = \sqrt{(x - a)^2 + (y - b)^2}$ . This formula becomes more complicated in the case of a larger number of dimensions or cluster variables (in our case, three variables are used). From here, we can see that clusters 2 and 3 are relatively similar, while cluster 1 is significantly different to both the second and third clusters.

**Table 4.1.4:** *Distances between final cluster centres*

Cluster	1	2	3
1		457.747	311.995
2	457.747		146.210
3	311.995	146.210	

After the cluster analysis we perform discriminant analysis using globalization indices as independent variables. For analytical purposes we will use the following four indices: index of current flow (ActFlow), index of economic barriers (Restrictions), index of social globalization (Social), and political globalization index (Politic). Pre-determined cluster labelling is used as a qualitative variable (labels 1, 2, and 3 indicate belonging to a particular cluster). Due to missing data for Belarus for the index of economic barriers and Montenegro for the index of current flow, the two countries were excluded from the analysis, so we have a sample of 34 countries.

Group descriptive statistics suggest measures (arithmetic mean and standard deviation) for each of the clusters previously determined by each of the predictor variables. From Table 4.1.5 we see that Cluster 1 shows an arithmetic mean greater than that calculated for the entire sample for the actual flow index and the index of political globalization, and the lowest mean for the index of social globalization. Cluster 2 records relatively high means for all variables (all variables achieve greater means than the arithmetic means of the entire sample), while Cluster 3 achieves lower means than the total sample means for all indices. To sum up, countries that have burdensome tax systems show very solid performance in terms of globalization indices, which can be attributed to the

small size of the cluster (since we observe only three countries we cannot derive an unambiguous conclusion). Countries that have stimulating tax systems achieve the highest averages for all globalization indices. On the other hand, countries with moderate tax systems have the lowest averages for all globalization indices.

**Table 4.1.5:** *Group statistics*

Cluster Number of Case		Mean	Std. Deviation
1	ActFlow	80.2067	7.01232
	Restrictions	72.3767	12.25114
	Social	66.8100	14.38832
	Politic	87.0667	1.18247
2	ActFlow	80.5680	13.07364
	Restrictions	83.5027	7.93243
	Social	81.7667	9.20677
	Politic	87.0960	14.31485
3	ActFlow	67.3238	11.88816
	Restrictions	74.6312	12.15165
	Social	70.0931	12.18415
	Politic	84.8025	12.41548
Total	ActFlow	74.3035	13.57786
	Restrictions	78.3462	11.17709
	Social	74.9535	12.43256
	Politic	86.0141	12.58683

\* 34 cases were used in the analysis. The first cluster consists of 3 countries, the second of 15 countries, and the third of 16 countries

A test of equality of group arithmetic means shows that all variables, except the index of political globalization, can be considered good predictors, because for this index only the F-statistic is very low, and consequently the obtained p-value is very high (Table 4.1.6).

**Table 4.1.6:** *Test of equality of group arithmetic means*

	Wilks' Lambda	F	Sig.
ActFlow	0.758	4.950	0.014
Restrictions	0.824	3.316	0.050
Social	0.750	5.156	0.012
Politic	0.992	0.133	0.876

\*degrees of freedom 1 equals 2, degrees of freedom 2 equals 31

A test of equality for other variables gives p-values lower than the level of significance of 0.05 (5%), so they can be used in further analysis. Wilks' lambda is a measure of the capacity of variables as predictors, with smaller values implying that the variable is more efficient for classifying objects into groups. From Table 4.1.6. we can see that the current flow index and the social globalization index are the best discriminators, while the discriminant capacity of the economic barriers index is acceptable.

The number of discriminant functions is equal to the number of discriminant variables if there are more clusters than independent variables; otherwise the number of functions is equal to the number of levels in the qualitative grouping variable minus one (Heinemann 2000). In our case the number of variables is 4 and the number of clusters is 3 (the number of clusters is lower than the number of variables), so we have two discriminant functions.

**Table 4.1.7:** *Discriminant functions*

Function	Eigenvalue	% of Variance	Wilks' Lambda
1	0.501	68.9	0.543
2	0.226	31.1	0.816

The first discriminant function has a greater discriminant power with lower Wilks' lambda statistic value and higher levels of Eigenvalue (also an indicator of discriminant capacity, but higher values of this ratio are preferable) and a larger proportion of explained variance (Table 4.1.7).

**Table 4.1.8:** *The classification results*

		Cluster Number of Case	Predicted Group Membership			Total
			1	2	3	
<b>Original Group Membership</b>	Count	1	2	1	0	3
		2	0	10	5	15
		3	3	4	9	16
	%	1	66.7	33.3	0.0	100.0
		2	0.0	66.7	33.3	100.0
		3	18.8	25.0	56.3	100.0

Classification results (Table 4.1.8) show the percentage of successful classifications obtained using discriminant analysis. Successful cases given in absolute and relative terms are found in the intersection of the original and predicted group memberships. We have successfully predicted approximately 62% of the original classification previously obtained in cluster analysis (21 out of 34 cases).

**4.2. The second cluster analysis**

The second cluster analysis uses tax rates as cluster variables. Specifically, we use the corporate income tax rate (CIT), value added tax rate (VAT), and the rate of personal income tax from the highest tax bracket (PIT).

**Table 4.2.1:** *Clusters obtained using tax rates as cluster variables*

Cluster 1 (moderate CIT rate, high PIT rate)	Cluster 2 (high CIT rate, high PIT rate)	Cluster 3 (low CIT rate, low PIT rate)
Czech Republic	Austria	Bulgaria
Greece	Belgium	Cyprus
Hungary	Denmark	Estonia
Ireland	Finland	Latvia
Poland	France	Lithuania
Slovenia	Germany	Romania
Croatia	Italy	Slovakia
Turkey	Holland	Albania
	Portugal	Belarus
	Spain	Bosnia and Herzegovina
	Sweden	Macedonia
	United Kingdom	Moldova
		Montenegro
		Russia
		Serbia
		Ukraine

Analysis performed using tax rates as cluster variables classifies countries from the sample into three clusters. Cluster 1 comprises 8 countries with moderate corporate income tax rates and relatively high personal income tax rates. This can be called a moderate structure. Cluster 2 contains 12 countries whose corporate income tax rates are high and personal income tax rates are extremely high, while Cluster 3 consists of 16 countries that have extremely low rates of both corporate income tax and personal income tax. It should be noted that we perform cluster analysis taking into account the variable VAT (the rate of value added tax), but the difference in the average VAT rate is negligible between clusters. This can be explained by the fact that VAT is generally accepted as the European tax that is most harmonized on an international level, so it makes sense that differences in group mean values are insignificant. These principles can be seen in Table 4.2.2, showing the final cluster centres. It is worth noting that all countries that are candidates for EU accession, with the exception of

Turkey, are located in the third cluster, while Croatia, a country that has recently become a new member state, is located in the first cluster.

At this point, it should also be stated that this cluster analysis only considers the structure of tax rates, and should not be confused with the previous analysis that considers the tax burden on business activity. For example, some countries are classified as low-CIT, low-PIT-rate countries (Belarus, Bulgaria, and Ukraine), although they have burdensome tax systems (measured by total tax rate, number of tax payments, and time necessary to fulfil tax procedures). The explanation is that at this point only three taxes are included in the analysis, and in some countries there are other taxes with significant revenues that are not included (in the case of the aforementioned countries, social security contributions generate large tax revenues).

**Table 4.2.2:** *Final cluster centres*

	Cluster		
	1	2	3
CIT	18.13	28.67	14.56
VAT	20.88	20.68	19.56
PIT	36.38	47.88	14.75

The distances between the cluster centres (Table 4.2.3) show that the greatest differences exist between the second and third clusters, where the distance is the largest, while the distance between the first and the second clusters is the smallest.

**Table 4.2.3:** *Distances between final cluster centres*

Cluster	1	2	3
1		15.602	21.956
2	15.602		36.020
3	21.956	36.020	



The Anova table (4.2.4) shows the above statements more exactly.

**Table 4.2.4:** *The analysis of variance*

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
CIT	701.205	2	28.295	33	24.782	0.000
VAT	6.416	2	5.599	33	1.146	0.330
PIT	3933.736	2	23.089	33	170.373	0.000

Specifically, the CIT and the PIT variables in the process of variance analysis achieve a large F-statistic value with low p-values, so the hypothesis of equality of group arithmetic means can be rejected for these variables. However, VAT is not a good cluster variable because it gives a small F-value followed by a high p-value in the testing procedure. This variable is not excluded from the analysis because of the great importance of VAT in all European countries. In addition, Clusters 1 and 3 have significantly lower rates of PIT and CIT in relation to Cluster 2, which can be explained by the fact that there are old EU member countries in Cluster 2 where tax rates are traditionally higher than in the new member states.

Discriminant analysis is conducted using the previously introduced globalization indices. Again, we will use the four indices that we used in the previous discriminant analysis. Montenegro and Belarus are excluded from the analysis due to lack of data.

**Table 4.2.5. Group statistics**

Cluster Number of Case		Mean	Std. Deviation
1	ActFlow	78.1113	15.49922
	Restrictions	78.6800	7.21548
	Social	78.8275	9.50497
	Politic	89.4025	5.31368
2	ActFlow	78.4258	12.77619
	Restrictions	86.2967	2.65677
	Social	84.2033	4.39327
	Politic	95.5783	2.35025
3	ActFlow	68.5943	11.86609
	Restrictions	71.3407	13.10911
	Social	64.8114	11.33139
	Politic	75.8800	13.42324
Total	ActFlow	74.3035	13.57786
	Restrictions	78.3462	11.17709
	Social	74.9535	12.43256
	Politic	86.0141	12.58683

\* 34 cases were used in the analysis. The first cluster consists of 8 countries, the second of 12 countries, and the third of 14 countries

Table 4.2.5 shows that Cluster 1 has higher means than the entire sample means based on all globalization indices. Cluster 2 also achieves higher means for all variables than the total sample means. On the other hand, Cluster 3 achieves lower means value based on all the variables than the total sample means.

The test of equality of group arithmetic means (Table 4.2.6) shows that all predictor variables, except the actual flows index, have a satisfactory discriminant capacity, because the p-value obtained in the testing procedure is very small.

**Table 4.2.6:** *Test of equality of group means*

	Wilks' Lambda	F	Sig.
ActFlow	0.872	2.267	0.121
Restrictions	0.649	8.378	0.001
Social	0.493	15.950	0.000
Politic	0.497	15.658	0.000

\*degrees of freedom 1 equals 2, degrees of freedom 2 equals 31

Also, the value of Wilks' Lambda shows that the discriminant capacity is greatest for the political index and the social globalization index, while it is slightly lower for the economic barrier index. The index of actual flows does not achieve a sufficiently low Wilks' Lambda to be considered a good predictor variable.

Given that the same conditions (in terms of the number of groups and the number of discriminators) exist as in the previous analysis, the number of discriminant functions will be two.

**Table 4.2.7:** *Disciriminant functions*

Function	Eigenvalue	% of Variance	Wilks's Lambda	Sig.
1	2.063	97.9	0.313	0.000
2	0.044	2.1	0.958	0.737

Table 4.2.7 shows that the value of the Wilks' Lambda indicator is significantly lower for the first function, and also lower than the values from the previous analysis, while the Eigenvalue is significantly higher than the value from the previous analysis.

**Table 4.2.8:** *Classification results*

		Cluster Number of Case	Predicted Group Membership			Total
			1	2	3	
<b>Original Group Membership</b>	Count	1	7	1	0	8
		2	0	12	0	12
		3	2	1	11	14
	%	1	87.5	12.5	0.0	100.0
		2	0.0	100.0	0.0	100.0
		3	14.3	7.1	78.6	100.0

According to all indicators, the chosen variables are very good discriminators with adequate discriminant functions, and as a result a high percentage of successful predictions is obtained. Classification Table 4.2.8 shows that the percentage of successful predictions is 88.2% (30 out of 34 successful).

**4.3 The third cluster analysis**

In the final cluster analysis we use the shares of tax in commercial profit as cluster variables, that is, the share of taxes on corporate profit, the share of taxes on labour (including contributions for social insurance), and the share of other taxes in total commercial profit.

**Table 4.3.1:** *Clusters obtained using shares of taxes in company profit as cluster variables*

Cluster 1 (low profit tax share)	Cluster 2 (high labour tax share)	Cluster 3 (moderate shares)
Austria	Belgium	Cyprus
Bulgaria	Czech Republic	Denmark
Finland	Estonia	Germany
Greece	France	Ireland
Hungary	Italy	Holland

Latvia	Slovakia	Slovenia
Lithuania	Sweden	United Kingdom
Poland	Belarus	Bosnia and Herzegovina
Portugal	Russia	Croatia
Romania	Ukraine	Macedonia
Spain		Montenegro
Albania		Serbia
Moldova		Turkey

The cluster analysis classifies all countries into three groups (Table 4.3.1). Cluster 1 comprises 13 countries with a low average share of tax on profit in total profit of company, but with a high share of tax on labour. Cluster 2 consists of 10 countries with a slightly higher share of tax on profit, but significantly higher share of tax on labour; while the average share of tax on corporate profit and tax on labour are almost equal in the third cluster, which consists of 13 countries. Thus the first group is characterized by a low share of profit tax, the second cluster is characterized by a high labour tax share, while the third cluster has moderate shares of profit and labour taxes. The rest of the analysis is carried out in the same manner as in the previous two cases, so only final results are shown here. The results of discriminant analysis show a very low level of successful prediction of group membership. Only 47% of the original group membership can be explained by independent globalization variables (16 out of 34 successful).

## 5. CONCLUDING REMARKS

The conducted analysis shows that the impact of international competition and globalization trends in European countries is most pronounced in the area of establishing tax rates, where satisfactory results were obtained using discriminant analysis, whereas the influence is somewhat less pronounced in the area of tax burden on business activity. The impact of globalization is not statistically significant in the area of share of taxes in company profit, where discriminant analysis did not give statistically significant results. Thus, the hypothesis that the impact of globalization on the characteristics of national tax systems is significant may be accepted, but only to a certain extent and in

certain areas of taxation. The analysis could be improved by using a larger sample that includes other European countries, in order to obtain more representative results.

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