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Action plan on sustainability of fight against tax fraud and tax evasion: EU countries comparison

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Abstract. The aim of the article is to describe the activities of tax authorities in carrying out tax inspections and also the activities of its bodies aiming at eliminating tax fraud and tax evasion in order to maintain the sustainable development of individual Member States' economies. Given the fact that VAT revenues represent a substantial share of all EU state budget revenues, financial administration should pay attention to this issue as well, starting with registration of taxpayers, through inspections and efficient and quick actions of distrainers in recovering tax arrears. The biggest losses incurred by individual state budgets are caused by VAT frauds which are having a character of an organized crime. It is therefore inconceivable that their detection, documentation, enforcement and punishment are not organized properly. The anti-fraud measures proposed in this paper are based on legislation, and their success implies a centralized approach to addressing the issue and seeking coordinated efforts by competent EU Member States. Neither of the proposed anti-fraud instruments is sufficiently effective when applied individually. However, by adopting all the measures proposed and their consistent implementation in practice, we can minimize the rate of VAT frauds committed.

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1. INTRODUCTION

On the basis of the information provided by tax administrations, it can be stated that the following types of tax fraud and VAT evasions occur most frequently (Mažary, 2014): 1. Fraud and evasion in cross-border transactions; 2. Fraud and evasion related to invoicing and bookkeeping; 3. Avoiding VAT registration and VAT payments; 4. Other scams and leaks.

Tax fraud in general, and VAT frauds in particular, affect all areas of economic and social life by:

1. state budget income shortages
2. the distortion of competition
3. investing profits from illegal activities into other forms of criminal activities.

Tax fraud in general and VAT frauds in particular affect all the areas of economic and social life through:

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2. distortion of fair competition;
3. investing profits from illegal activities into other forms of criminal activities.

The fight against tax fraud requires a vigorous, uncompromising, comprehensive and, in particular, conceptual approach by all the state bodies involved (Srnková, 2014). Carousel fraud is causing the greatest damage to individual Member States' budgets. The common denominator of these frauds is a chain of traders who, through their activities, create an opaque network of companies that issue fictitious invoices with no real fulfillment (sometimes goods are present, but this is done only to deceive the tax office); payments for goods are either not made or the tax administrator is showed only receipts (again, for just a fictional payment), while the last link in a chain declares a high excess VAT deduction (Dobrovič, 2011).

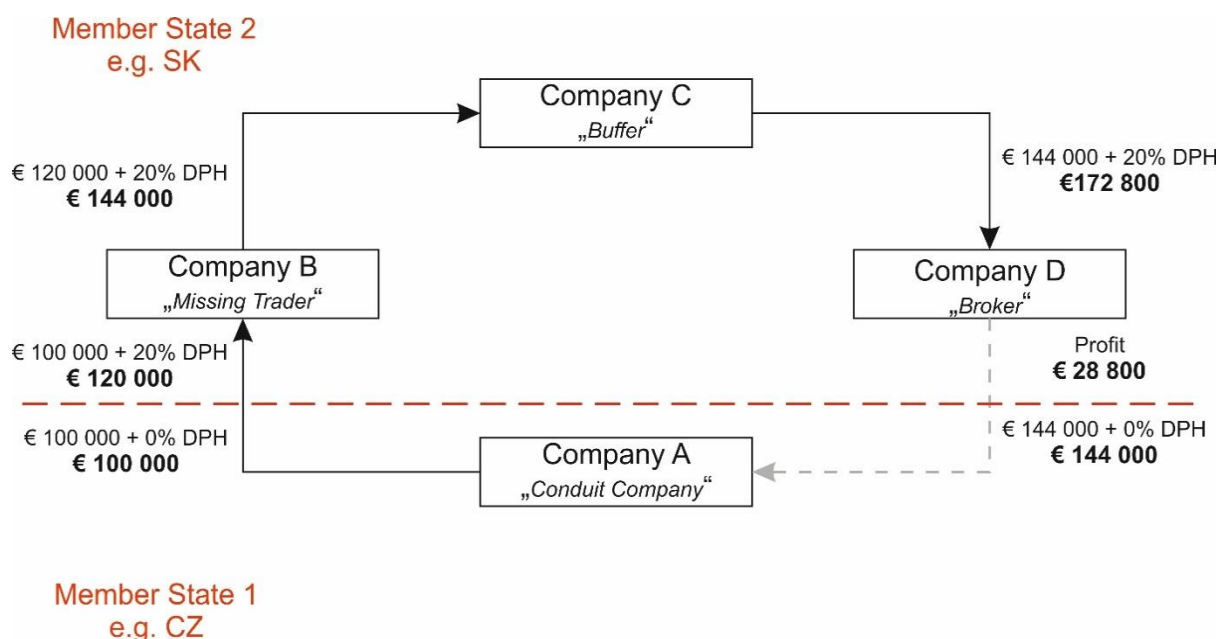


Figure 1. Carousel Store

Source: www.eurostat.eu / CustomProcessing/

Company A (a conduit company) is located in another EU Member State. In the case of intra-community delivery of goods to the Slovak Republic (taxpayer to taxpayer), the tax does not apply. Its activities do not have a direct negative impact on the budget of Slovakia, tax evasion is not a direct result of its activities, but the company participates in the fraud chain.

Company B (a missing traded) is a company that bought the goods from the company "A" from another EU Member State. If it submits a tax return, it declares the acquisition of goods from another EU Member State (it declares tax but at the same time has the right to deduce it) and the sale of the goods in the country, it also declares the tax but does not deduce it. It is essentially an output tax, which is requested back in the form of an excessive VAT deduction at the end of the chain.

There are also cases when the company does not submit a tax return or submits a negative tax return. In these cases, we talk about a no-contact company (the executive manager is a homeless person or a straw man or a person deleted from the Business Register, there are also cases where the entire company has been deleted from the Business Register).

Company C (a buffer company) is a company whose aim is to disrupt or obstruct the tax investigation. It creates the impression of a reliable trader who buys and sells goods on the domestic market. In the tax return it declares the purchase and sale of goods with a minimum surcharge. It fulfills all its obligations towards the tax office, it reports a high input tax, a high output tax and a minimum tax liability, which it also pays.

Company D (trader) is the final element of the chain that benefits from the entire scheme. It simulates the delivery of goods to another EU Member State under a tax exemption and applies a high excess VAT deduction from its domestic purchase. However, from the beginning to the end of the chain, the whole business is fictitious, no goods are actually delivered, only invoices are issued in order to fraudulently obtain real money from the state. Given that the company "B" is basically managed by a non-existent person without any contact details, the tax office has serious difficulties in proving that taxable transactions in the chain have not been carried out. The companies "C" and "D" are willing to cooperate with the tax administrator, submit various evidence to their claims, and the company "D"'s excess VAT deduction is paid despite the fact that no tax has been paid. (Fig.1 CarouselStore).

However, carousel fraud actually has several forms. It can be international, other forms take place exclusively in the country. The common denominator of these illegal activities is the use of blind spots in legislation, as well as detailed knowledge of the work and procedures of the competent authorities (tax administration, police, registry courts, prosecution offices) (Mažáry 2014).

2. LITERATURE REVIEW

The tax system includes institutional arrangements for tax administration (Schultzová, 2011). According to Široký (2008), the tax system includes legal, regulatory and technical institutions providing tax administration, assessment, enforcement and inspection. The tax system is also a system of tools, practices and methods that these authorities apply to ensure taxpayers pay their share of taxes (Kubatová, 2010).

The first modern value-added tax (VAT) was introduced in France on 10 April 1954 at the initiative of a French economist named Maurice Lauré. However, the initial idea originated in Germany in 1918. But it was Lauré's system which for the first time in the modern economy took the burden of collecting taxes off tax authorities and retailers and placed it upon taxpayers (Arp 2013).

VAT is a tax that determines the added value at an aggregate level over a period of time. It taxes the difference between the total turnover and total purchases from another business (Brederode, 2009).

Tax fraud is an act by which a taxpayer seeks to evade his tax liability (Dvořáček, Tyll, 2010).

Ključnikov et al. (2016) also point out that for the creation of quality business environment necessary for economic development, social, cultural and other factors besides those economic are important. In this context, Belás et al. (2014) add that optimism of the economic system participants is also substantial for its optimal functioning.

This situation ultimately leads to the aforementioned reduction in the state's competitiveness and its credibility in the eyes of citizens. (Belás et al., 2015). Attributes of satisfaction and dissatisfaction over a certain period of time show objective and fair view of the situation (Belás, Demjan, 2014). Adequate projection of innovation capacity in relation to increasing the efficiency of business processes guarantees a strategic growth of the company and directs management decision-making towards gaining knowledge on the flow rate represented by innovation outputs (Chromjaková, Rajnoha, 2009).

Slovakia tries to get to the economic level of the European Union countries and at the same time compete with them by creating an attractive business environment (Chochořáková et al., 2015). To meet this objective, it is necessary to ensure appropriate business conditions to which the country's tax system would significantly contribute (Burák, 2004).

Taxes are the most important non-credit source of public revenues. There are many plausible definitions, including those that describe taxes from two different perspectives. From the formal and legal point of view, we can see them as “mandatory and statutory payments that taxpayers pay to the relevant public budget in a specified amount and set deadlines (Korauš et al., 2016). Such a definition is related to tax laws and constitutions, but it is not sufficient for the purposes of the economic tax theory and, thus, needs to take into account the economic perspective. From an economic and financial point of view, “taxes represent a fiscal relationship between a taxpayer and a state. Taxes are used by the government to reach its goals (Paulík, Kombo, Ključnikov, 2015). From this point of view, taxation represents financial relations that are characterized by irreversibility and unilateralism. At the same time, however, these claims indicate the need to define taxes also in terms of philosophy, thus creating room for exploring qualitative features (Tvaronavičienė et al., 2016).

Schultzová (2005) classifies taxes as taxes levied on the goods market and taxes levied on the factor market. For example, the payroll tax levied by the employer is levied on the production factors market and value-added tax or excise duties on goods market (Wu, Wang, 2007). The current business environment for SMEs is very difficult and thus SMEs have a hard time gaining access to external resources (Belas et al., 2013). All these definitions can be considered correct and fit for the purpose of our paper, as we consider the selection and organization system itself more relevant (Bilen, 2013).

Analysis of one's own competitiveness and its comparison with world's trends is an important factor for the survival of each national economy (Belas, Sopková 2016). Allocation of the VAT identification number (VAT number) and gaining a status of a taxpayer allows taxpayers to commit frauds with regard to the attractiveness of the tax mechanism - excessive VAT deductions. The data on these payers in EU national registers do not tell much about possible risks (Dobrovič 2015).

For example, inspection activities of the SR between the years 2012 to 2017 (Table 1) indicate that the number of VAT inspections carried out is decreasing despite the fact that the number of excess VAT deductions and the additional tax levied is still rising.

Table 1

Development of inspection activities of the SR during 2012 to 2017

Year	2012	2013	2014	2015	2016	2017
No. of VAT inspections	18 267	19 352	15 781	15 031	12 926	10 873
Detained NO (excessivededuction) inths. EUR	20 137	26 700	18 981	28 736	40 185	35 796
Additionally levied VAT in ths. EUR	173 848	165 736	160 109	200 739	242 889	304 619

On the one hand, this result shows an increase in the effectiveness of the inspections carried out; (Rajnoha et al., 2011). The latest study on the estimated volume of VAT evasion within the EU (carried out by an external contractor) was published by the European Commission in November 2017 (Table 2).

The figures in this table not only include actual frauds committed, but also the figures on tax non-payment due to secondary insolvency, as well as legal tax avoidance (e.g. if a taxpayer gives his employee a car that has already been depreciated as a benefit, the residual price of the car is zero. However, its market price may still be several thousands of euros). The results of this study highlight the differences between EU Member States in terms of their approach to frauds (Sivák et al., 2007).

3. METHODOLOGY

The main objective of the paper is to analyze the rate of tax evasion of individual EU Member States and create a predictive statistical model. The tax evasion analyzed is understood on two levels - as a percentage share on the total tax liability and as a total tax evasion expressed in euros. In the analysis, tax evasion is a dependent variable, while the value of GDP of individual Member States expressed in absolute values in euros as well as per capita being an independent variable. The research hypothesis was based on the above-stated objective:

H₁: Countries with higher GDP show higher numbers of tax evasion (in 1.10⁶euros)

H₂: Countries with higher GDP per capita show higher numbers of tax evasion (in 1.10⁶euros)

The source of data was VIES and EUROSTAT.

In order to verify the established hypotheses, the following statistical procedures were chosen:

1. Nonlinear regression analysis to verify the hypothesis H₁

2. Correlation analysis to verify the hypothesis H₂

Most of the economic variables depend on a number of factors from which only those that can be measured (quantified) can be used in the regression analysis. These then form a set of explanatory variables that are used to estimate the values of the variables to be explained. Usually, however, only some of these explanatory variables are used for these estimates. The variable whose dependence on other variables is under investigation (eg. income, turnover, etc.) is denoted by Y and is called a dependent variable. Its variations (changes) are represented by the symbol y_i where $i = 1, 2, 3, \dots, n$ and n is the number of observations in the sample.

Variables that we suppose cause changes in a dependent variable, and through which we estimate the values of a dependent variable, are called independent variables. We will assume for the sake of simplicity only one such variable with the designation X and with the values x_i , where $i = 1, 2, 3, \dots, n$ and n is the number of observations in the sample. This will be a simple (paired) regression. Assuming a greater number

of independent variables, we talk about a multiple regression. Using multiple regression methods, we may get better estimates of the values of the variables to be explained compared to a simple regression. However, the inclusion of a greater number of independent results in the model also entails some risks, e.g. complicated analysis and difficult interpretation of results

We focus on the so-called statistical (free) dependence – the dependent variable is also influenced by other non-specified variables and random influences in addition to independent variables. They are often called model failures or errors. This fact has to be captured in the regression model.

Each value of the variable to be explained can be divided into two components:

- deterministic component η_i , which is a function of explanatory variables
- a random component of ε_i that reflects the effects of factors not included in the model and the impact of random effects.

4. RESEARCH RESULTS

The submitted paper views tax evasion from two perspectives. The first perspective is to see tax evasion as a percentage of the total tax liability and the second is the total tax evasion expressed in euros. A summary table of these two views for individual EU Member States is presented in Table 2.

An overview of tax evasion within the EU Member States (Figure 2 and Figure 3), based on Table 2 (ec.europa.eu), shows that the Slovak Republic maintains a tax gap during every year under review at the approximately same rate - 37%. Italy reports the highest tax evasion with more than € 39 billion in 2015, followed by a decline to € 31 billion in 2017. The second country is France, where tax evasion, expressed in absolute terms, reached € 33 billion in 2015. The rate is kept constant throughout the reporting period. This means that in the total amount of tax evasion, France is ranked the first of the EU countries for the last year of the reporting period. France is followed by Spain, which reported more than € 23 billion lost in tax evasion, with a significant decline in the observed indicator in 2016 and 2017. In 2016 and 2017, Germany increased the value of tax evasion to € 26 billion, which it maintained in 2017, thus getting ahead of Spain in those years. The average value of EU tax evasion in absolute terms is almost € 7 billion in 2015, € 6.5 billion in 2016 and over € 7 billion in 2017. Thus, it is possible to observe an increase in tax evasion, especially in 2017 compared to previous years. The total amount of tax evasion within the EU in 2015 is € 185 billion with a slight decrease in 2016 to € 173 billion and a gradual increase of € 196 billion in 2017.

Table 2

Tax evasion in EU Member States as a share of total tax liability in % and tax evasion in 1.10⁶euros

EU States	Year 2015		Year 2016		Year 2017	
	%	Sum	%	Sum	%	Sum
Austria	9	2 452	10	2 776	13	3 868
Belgium	16	4 691	15	4 476	16	5 370
Bulgaria	15	754	10	483	25	704
Cyprus	8	346	7	316	6	267
Czech Republic	25	3 831	29	4 617	28	4 446
Croatia	31	2 509	29	2 220	27	1 985
Denmark	9	2 464	9	2 582	10	2 886
Estonia	13	282	15	321	18	361
Finland	10	1 926	15	3 362	14	2 937
France	20	33 468	19	32 348	19	32 633

Germany	10	19 587	13	26 144	12	26 909
Greece	35	8 569	31	7 531	39	9 962
Hungary	26	2 976	28	3 654	30	3 796
Ireland	15	1 913	11	1 396	10	1 198
Italy	31	39 983	25	31 887	27	36 634
Lithuania	42	864	37	798	41	996
Latvia	40	1 497	36	1 363	36	1 462
Luxemburg	8	324	17	704	17	691
Malta	10	73	9	65	4	31
Netherlands	9	3 958	3	1 755	9	4 102
Poland	15	3 995	12	3 852	15	5 610
Portugal	20	3 411	16	2 765	16	2 964
Romania	49	7 830	48	8 987	48	10 648
Slovakia	36	2 695	38	2 624	37	2 774
Slovenia	11	392	10	386	10	345
Spain	34	23 484	16	12 783	21	16 596
Sweden	2	588	1	345	2	986
UK	13	14 655	13	17 337	13	19 986
EU average	20,1	6768	18,6	6353	20,1	7184

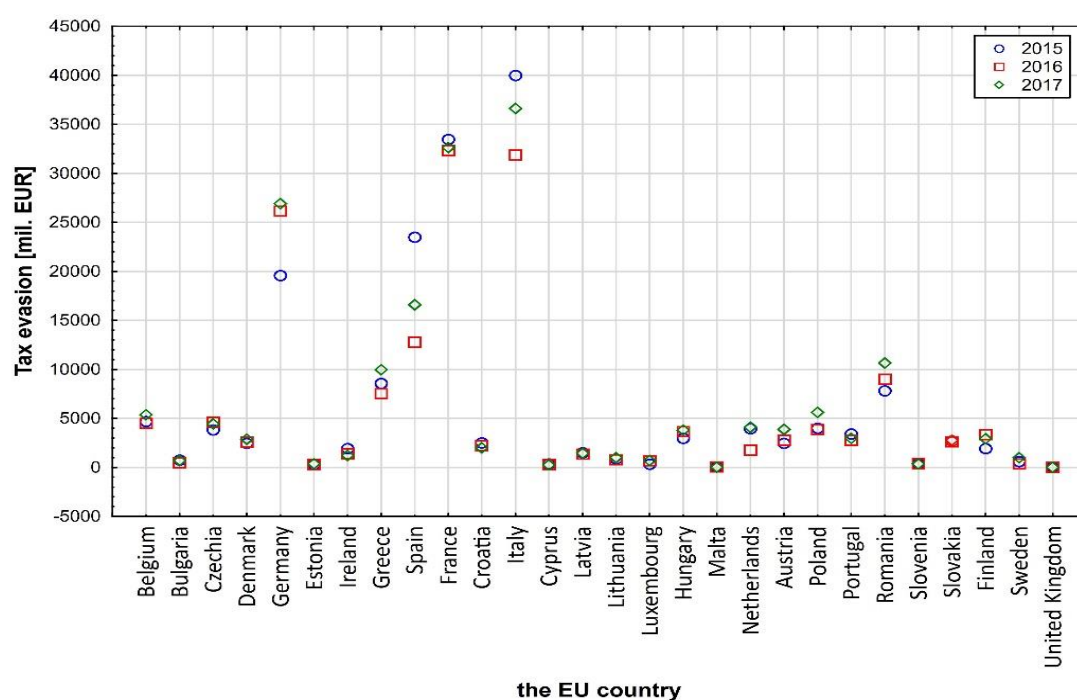


Figure 2. Tax evasion in EU Member States in mill. EUR (2015-2017)

The table is topped by Romania, which in 2015 recorded 49% tax evasion with regard to its total GDP. Sweden, on the contrary, recorded the lowest number, only 2%. Compared to 2015, in 2016, Romania holds the same position. The tax evasion rate dropped to 48% from 49%, and this trend is maintained in 2017 as well. Sweden reduced its share to 1% in 2016, although in the following reporting year it increased its share of the original 2% from 2015 again. Countries keeping their tax evasion numbers under 10% expressed as the arithmetic average of the reference period 2015-2017 include Malta (7.6%), the Netherlands (7%),

Cyprus (7%) and Denmark (9.33%). By contrast, countries with high rates of tax evasion include Romania (48.33%), Lithuania (40%), Latvia (37.33%), Greece (35%) Slovakia (37%), Hungary (28%). A graphical representation of the tax evasion rate of EU Member States as a share of the overall tax liability is shown in the figure 3.

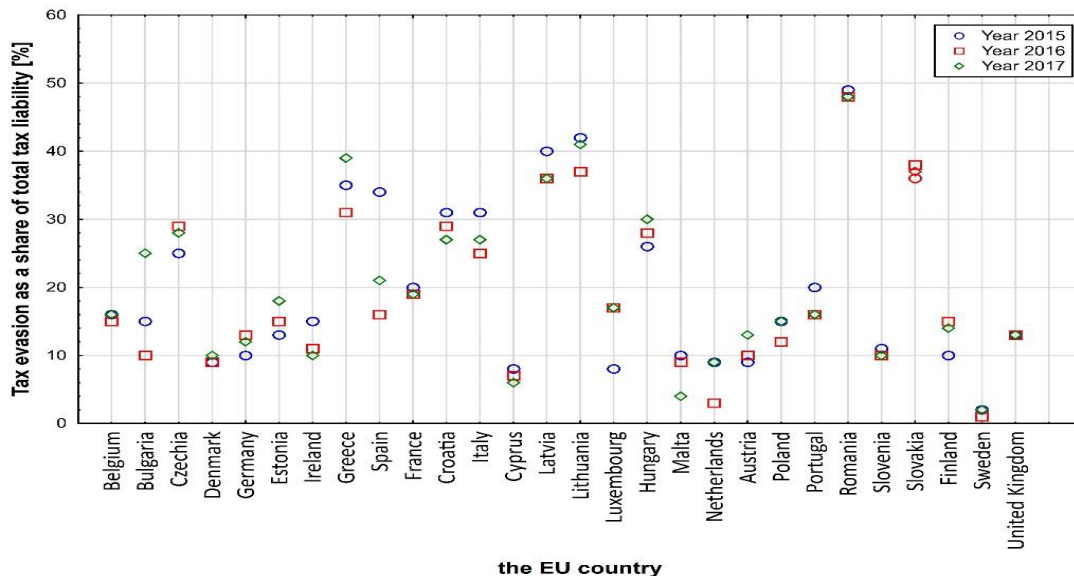


Figure 3. Tax evasion in EU Member States as a percentage share of total tax liability in % (2015-2017)

In order to analyze tax evasion, we focused primarily on the absolute terms in millions of euros.

As a reference independent variable, we chose the overall GDP in each EU Member State. The analysis was carried out separately for each year in the period 2015 - 2017. The graphical representation of the dependence of the total amount of tax evasion on the total GDP for 2015 in the individual EU countries is shown in Fig.4.

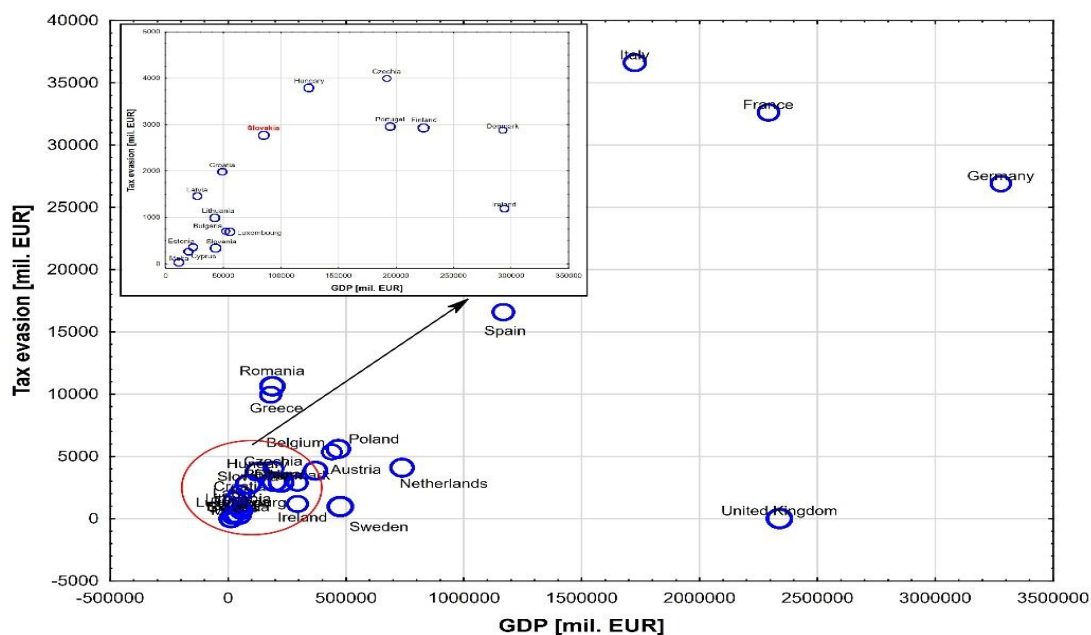


Figure 4. Dependence of tax evasion expressed in mil. EUR on the total GDP of EU member states in 2017

Fig. 4 shows that with regard to numbers obtained for 2017, EU countries can be divided into three separate groups. The first group is the UK, which, despite having the second-highest GDP in 2015, has the lowest value of tax evasion per GDP. The second group consists of Germany, Italy and France, which, despite the high GDP value, reach high rates of tax evasion. The third independent group is made up of EU countries with low GDP. Within this group, the leading position in absolute terms of tax evasion belongs to Romania and Greece.

If we take a closer look at the amount of tax evasion related to the GDP per capita of EU countries, it is possible to define four separate groups of countries. The first separate group is Luxembourg, with the highest GDP per capita and the almost lowest value of tax evasion in millions of euros. Ireland, Denmark, Sweden, Austria, the Netherlands, Belgium, Finland and the UK form the second group of states with a relatively high GDP per capita and a low value of tax evasion in millions of euros. The third separate group consists of countries with a relatively high GDP per capita but at the same time with high rate of tax evasion expressed in millions of euros, namely Germany, Spain, France and Italy, the latter of which is the winner in terms of absolute tax evasion. The last group with relatively low GDP per capita is formed by the rest of the countries. The group is led by Romania and Greece. Despite reaching the second lowest GDP per capita, Romania achieves the highest values of tax evasion in the fourth group.

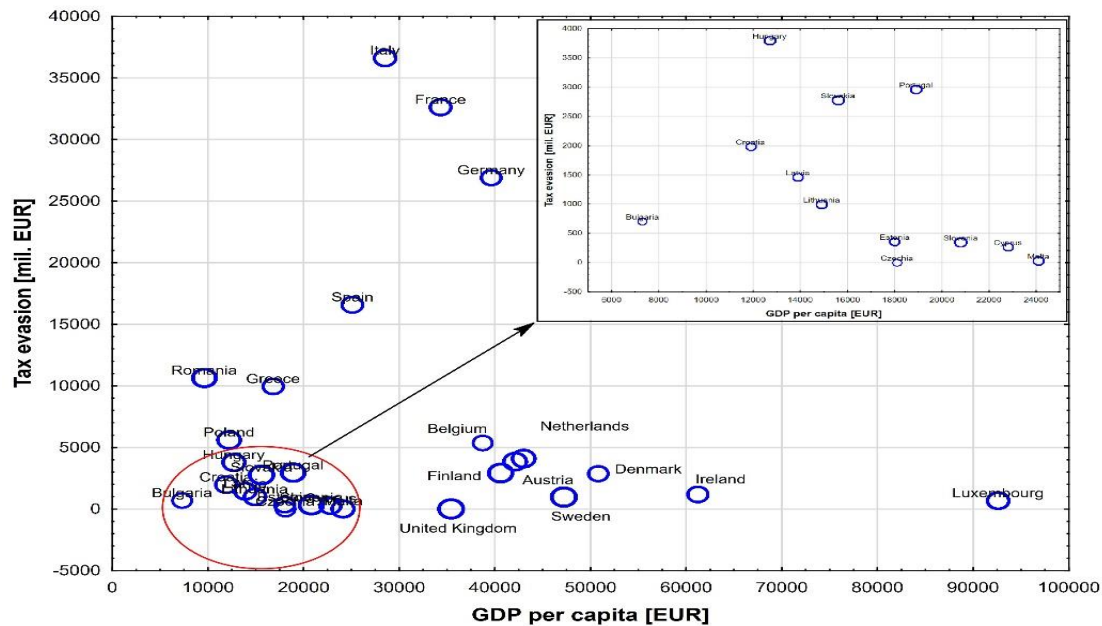


Figure 5. Dependence of tax evasion expressed in mil. EUR on GDP of EU member states in 2017 per capita

Another view of the same issue is provided by a graphical representation of tax evasion expressed as a proportion of the total tax liability in% on the GDP of EU member states in 2017 per capita. Figure 6 shows that Romania has the highest rate of tax evasion as a percentage of total tax liability, despite the fact that it reaches the second lowest per capita GDP of EU countries. Lithuania placed second, followed by Greece. Slovakia ranked fourth in this ranking. Figure 6 further shows that Sweden has the lowest rate of tax evasion expressed as a percentage of total tax liability.

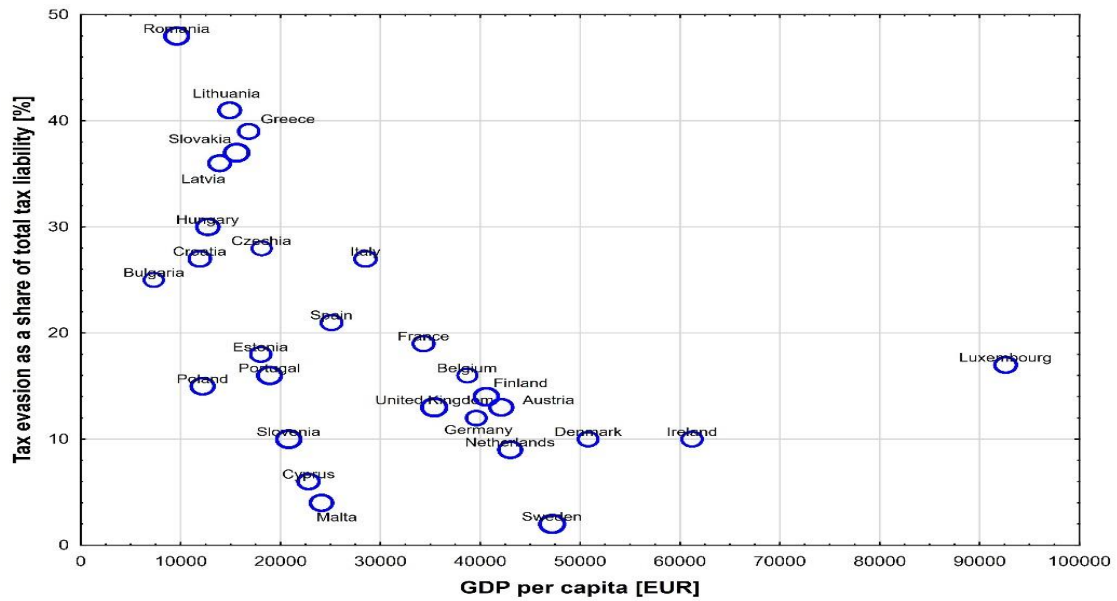


Figure 6. Dependence of tax evasion expressed as a percentage of total tax liability in % on GDP of EU Member States in 2017 per capita

It should be noted here that the dependencies listed for 2017 are largely similar to the previous period under review, i.e. 2015 and 2016, with minimum deviations from that analysis. In order to create a mathematical prediction model of the dependence of the total amount of tax evasion expressed in millions of euros on the total GDP of individual EU countries will only be carried out for the last year of the period under review.

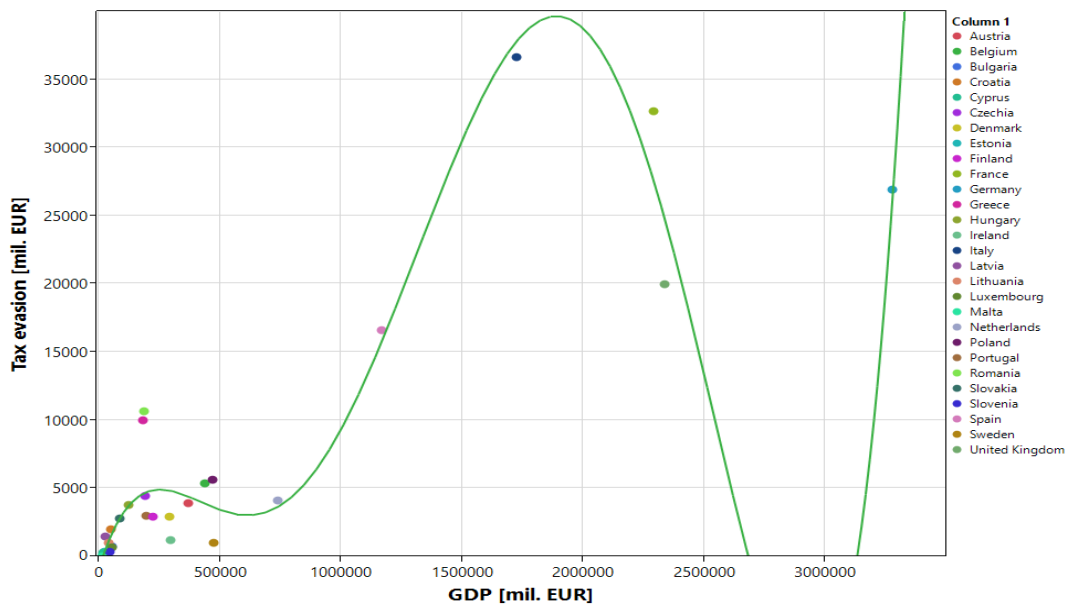


Figure 7. Dependence of tax evasion expressed in mil. EUR on the total GDP of EU member states in 2017

In view of the distribution of the absolute rates of tax evasion expressed in millions of euros depending on the total GDP of each EU Member State, we will use polynomial regression:

$$\hat{y} = a + b.x + c.x^2 + d.x^3 + e.x^4 + f.x^5 \quad (1)$$

where \hat{y} represents the total amount of tax evasion expressed in millions of € and the variable x the value of GDP in millions of euros. The 5-degree polynomial model describes the observed dependence with the adjusted determination index (R_{adj}) at 94.305%. It follows that the model is not able to describe only 5,695% of the data and can, therefore, be seen as a functional dependence of the variables examined. The Akaike Information Criterion (AIC_c) reaches value of 534.03771 and the Bayes Information Criterion (BIC) value is 537.76314. These two values represent comparison values for the prediction model selection. The individual regression coefficients of the model (1) were calculated by the least squares method and are shown in Table 3.

Table 3

Predictive model parameters

Parameter	Estimate	Std Error	Lower 95%	Upper 95%
Intercept (a)	-712,8101	1145,6137	-2958,172	1532,5515
b	0,0559924	0,013639	0,0292604	0,0827243
c	-1,821e-7	4,0416e-8	-2,613e-7	-1,029e-7
d	2,169e-13	4,114e-14	1,363e-13	2,975e-13
e	-9,39e-20	1,65e-20	-1,26e-19	-6,16e-20
f	1,322e-26	2,241e-27	8,83e-27	1,761e-26

Considering that the last three regression coefficients reach very low values, we can disregard them. Thus, the resulting prediction equation will be:

$$TE = -712,8101 + 0,0559 * HDP_{2017} - 1,821 \cdot 10^{-7} \cdot HDP_{2017}^2 \quad (2)$$

Where TE represents the amount of tax evasion expressed in millions of € and GDP_{2017} represents the GDP in 2017 in millions of €. A graphical representation of the differences between the actual tax evasion values and the calculated values using the regression model (2) is shown in Figure 8.

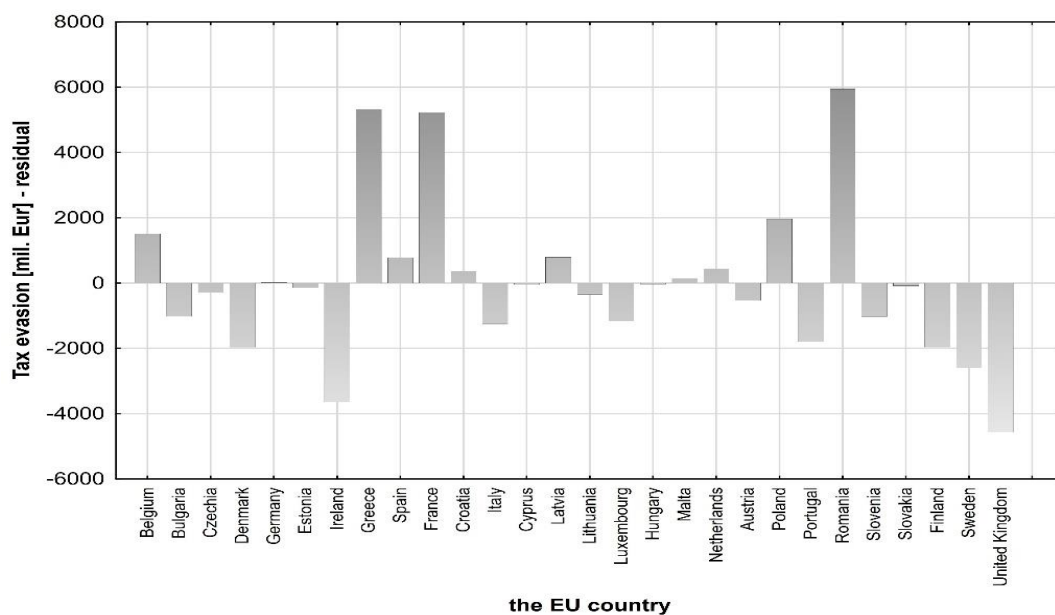


Figure 8. Residual values of tax evasion for 2017

The graph shows that the residual values of some Member States are relatively high. This is, of course, due to the simplification of the prediction model - regression. It is evident that very many factors have an impact on the amount of tax evasion.

Based on correlation analysis, the correlation coefficient between tax evasion (in mil. EUR) and GDP per capita for 2015 is $r_{2015} = -0.0068$ ($p = 0.973$), for 2016 $r_{2016} = 0.0167$ ($p = 0.933$) and for 2017 $r_{2017} = 0.0017$ ($p = 0.993$). With regard to the significance level of $\alpha = 5\%$ we can say that there is no dependence between the amount of tax evasion and GDP per capita in the individual years under review.

CONCLUSION

Therefore, based on the analyzes we can conclude the following:

1. The hypothesis H1: *Countries with higher GDP show higher numbers for tax evasion* was not confirmed on the basis of the regression analysis. The reason is the nonlinear trend of the dependence of the variables under investigation.

2. The hypothesis H2: *Countries with Higher GDP per capita show higher numbers for tax evasion* was not confirmed, as evidenced by the correlation coefficient between the variables under examination and its statistical insignificance at the chosen significance level of $\alpha = 5\%$ in the individual years under review. Based on the correlation analysis, the correlation coefficient between tax evasion (in mil. EUR) and GDP per capita for 2015 is $r_{2015} = -0.0068$ ($p = 0.973$), for 2016 $r_{2016} = 0.0167$ ($p = 0.933$) and for 2017 $r_{2017} = 0.0017$ ($p = 0.993$). With regard to the significance level of $\alpha = 5\%$ we can say that there is no dependence between the amount of tax evasion and GDP per capita in the individual years under review.

The amount of tax evasion depends on many other factors than just GDP alone. However, the development of VAT-related revenues largely depends on the tax discipline of taxpayers. The free movement of goods, services, persons and capital in the context of the creation of the European Union's internal market ("the EU") causes EU Member States to face increasing number of tax frauds. The biggest frauds are related to VAT due to its mechanism as well as the abolition of border controls in the EU.

Fig. 7 shows that some Member States show relatively high values. This is, of course, due to the simplification of the prediction model to one independently variable, i.e. regressor. It is further evident that tax evasion is influenced by very many factors. Therefore, in a further analysis of tax evasion, authors will seek to identify these factors, analyze their potential impact, and refine prediction models.

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