Comparison of essential indicators related to the personal income tax burden in the EU countries

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ABSTRACT

Agriculture performs productive functions and is an essential provider of job opportunities. The labour force is one of the important factors affecting agricultural and food production. In general, the business environment affects, among other things, employers' and employees' personal income tax burden. Increasing the efficiency of business activity is inevitably associated with achieving the lowest possible costs. It can be concluded that labor and other personal costs represent, on average, 30-60% of the costs of the agricultural product. In general, taxation of individuals engaged in agriculture with personal income tax does not differ from taxation of individual's income in other sectors of the national economy. The paper focuses on assessing indicators related to the personal income tax burden in the EU countries for the years 2008-2020 based on the data from the Eurostat Tax Classification presented by descriptive characteristics. Achieved results are compared within the EU Member States and for particular countries with an EU-27 average. The West EU countries implement tax and fiscal policies compared to the East EU countries, which are not subject to significant changes in the tax system and thus ensure relatively stable tax revenues to public budgets regarding total taxes and employment income, including unchanged personal income tax rates. The East EU countries declare a lower tax burden of personal income tax. Still, due to the competitiveness of the countries, this burden is also being gradually reduced in the reviewed period in the case of the West EU countries, thus bringing closer unification of the tax policies. Slovakia achieved below-average values of all assessed indicators and at the same time high variability.

INTRODUCTION

Agriculture and food production in Slovakia are one of the main pillars of the national economy. The sustainability of these industries is crucial for further economic development, ensuring the country´s food security, and satisfying domestic demand [1]. Using the specific function and the importance of agriculture within the national economy this sector is the subject of government regulations [2]. The essential specific of entrepreneurship in agriculture is the active participation of the government and its agricultural policy in trying to sustain the food balance, utilize the domestic production potential, and fulfill outside production functions of agriculture [3]. Farmers and agriculture systems play an essential and increasingly important role in protecting the landscape, and rural environment, and contributing to the social and economic development of rural areas [4]. The structure of tax systems is one of the factors that significantly affect countries' economic growth. For this reason, it is important to look at individual taxes as a possible source of budget revenue and their impact on economic growth [5]. Major changes in the tax systems of the EU countries have resulted in the globalization and digitalization of the economy, which has substantially increased the geographical mobility of taxation. This has

created a competitive environment between the tax systems that raised concerns about the level and fairness of the tax policies from a global perspective [6]. The importance of taxation for the EU is visible through the four pillars of progress and development, namely, a true Economic Union, which will allow each Member State to have the structural characteristics for prosperity in the Monetary Union, Financial Union, which guarantees the integrity of the common currency and through which a fair risk distribution takes place; a Fiscal Union that would lead to fiscal stability and fiscal sustainability; a Political Union based on responsibility, legitimacy, and consolidation [7]. Taxation is one of the few fields of EU policy in which unanimity is required for new legislation to be implemented. EU Member States remain extremely reluctant to cede any of their sovereignty in tax matters to the EU [8]. Macroeconomic indicators are used to assess the state of a country´s economy and measure a country´s overall economic performance. These indicators are different quantified and focus on certain countries or sectors. The most important indicator of the performance of the economy of the given country as a whole, which is related to supply and demand on consumption, is GDP [9], [10]. Given the relationship between collected tax and the gross domestic product, many economic components can affect the tax burden. The tax burden can be defined as the ratio of collected taxes in a particular period against the total product. Calculations of tax burden mean determining taxes' effects on national and international approaches [13]. One of the macroeconomic indicators represents tax quota, which is constructed as a ratio of total tax revenue and nominal GDP of the economy. The indicator itself includes direct and indirect taxes. It is necessary to distinguish between tax quota and so-called compound tax quota, which, besides direct and indirect taxes, also includes compulsory social security contributions, which predicate the tax burden precisely [11]. Calculating the tax burden becomes more important for the comparison of tax systems. Each country has its own tax system. It should be noted that the tax systems have gradually changed; they were adapted to the specificities and requirements of each country [12]. EU Member States have proposed a wide range of reforms across many types of taxes both in terms of direct and indirect taxation, from personal income tax to corporate income tax, from value-added tax to environmental taxation. Personal income tax-related reforms also took place due to the economic recovery after the COVID-19 pandemic as the temporary measures taken during the COVID-19 pandemic have slowly been adjusted back to those of normal times [13]. A different construction of taxes in the individual EU countries is the reason for the low information value of specific taxes in the international comparison [14]. The present tax policy of the EU prefers revenue from indirect taxes (e.g. value, added tax and excise taxes); the value of indirect taxes has continuously increased since 2001. The development of revenue from direct taxes (e.g. personal income tax and social security contributions) has fluctuated. On the other hand, the value of revenue from quasi-taxes, mainly from social contributions, has a steady development in the EU countries, and it only decreases very slowly [15]. The most important financial source of revenue for the state budget is taxes and is considered an instrument for the implementation of the state's fiscal policy with medium to long-term results [16]. Despite increasing globalization, income tax revenues have provided comparable inflows to state budgets over the last years [17]. Personal income tax is the most important fiscal instrument. Its share amounts to 20-25% of total fiscal revenues in many European countries and other developed economies because of its important role in enhancing social equity. On the other hand, a high personal income tax rate is considered a significant factor for inefficiencies in labor markets. Therefore, over the last decades, most industrialized countries initiated reforms aiming at reducing the overall tax burden, particularly personal income tax rates. The reforms in most of these countries focused on decreasing top marginal tax rates, but also on decreasing minimum marginal tax rates on low-income workers [18]. Decreasing personal income tax rates has a positive effect on the creation labor market and also a positive impact on domestic consumption. Labor tax burdens represent the relationship between personal income tax and social security contributions and are complicated since the relationship is simultaneously both close and distant [19]. The relationship between tax and social security contributions is complicated since the relationship is simultaneously both close and distant. The payments share some similar characteristics, but they are also very different in nature due to the divergent purpose of the payments [20]. Neither personal income tax nor social security is harmonized within the EU. In most EU countries, personal income tax and social security contributions are relatively distinct payments. Personal income tax and social security contributions are integral parts of the overall taxation system in modern economies [21]. Labour taxation (i. e. the taxation of employment income and social security contributions) contributes, on average, just over half of the tax revenues in the EU Labour taxation influences economic growth by affecting the incentives to work and hire. The European Commission and other international organizations such as the OECD and IMF have argued that shifting some of the tax burden from labor taxation towards consumption and property taxation could foster economic growth. This position is part of a large debate involving academic scholars and policymakers on the implications of the taxation structure [13].

At the theoretical and practical level, several studies deal with the assessment of the tax burden through selected macroeconomic indicators in EU countries [22], [11], [15], [23], [24], [25], [26], [27], [14], [28], [29], [30] and the others. In general, the tax quota is one of the most comprehensive indicators of the tax burden in

international comparisons of countries. It measures the share of taxes collected as a share of gross domestic product (further referred to as "GDP") in a given tax year. The composite or aggregate tax quota reflects the total tax and levy burden on entities. Our research builds on previous research that focused on assessing the selected countries' overall tax burden in 2002-2011.

Current research and hence the paper aim to assess the personal income tax burden through the selected indicators such as Total taxes, Employment income, and Top statutory personal income tax rate of 27 EU Member States as well as to compare each particular country with EU-27 average in the reviewed period of the years 2008-2020.

Scientific Hypothesis

The structure of taxation varies significantly in EU countries. It depends on several factors such as historical development, different conceptions of tax and social system, and tax and fiscal policy. The status of individuals and taxation of the labor force in agriculture is generally identical to other sectors of the national economy of individual countries. For this reason, it is necessary to first deal with the tax burden of personal income tax within the EU Member States. We assume that the average values of selected indicators such as Total taxes, Employment income, and Personal income tax rates in EU countries are significantly different for the reviewed period.

MATERIAL AND METHODOLOGY

Data sources that are tax revenue by type of tax are obtained from Eurostat and follow the tax classification defined by the ESA 2010 methodology. Eurostat supplements its database with the national tax lists supplied to Eurostat by the EU member states. Many revenue indicators are presented as a percentage of GDP. Considering the issue of personal income tax, our research focuses on the evaluation of the data obtained from Eurostat Tax Classification (data updated in June 2022 including tax revenue data up to 2020), in the years 2008-2020 in 27 particular Member States of the EU (without Iceland and Norway). These are specifically the following indicators:
- ✓ Total taxes, according to tax revenues by type of tax and level of government, present total taxes including social security contributions expressed as a percentage of GDP;
- ✓ Taxes on employed labor (further referred to as "Employment income"), according to tax revenues by the tax base, present tax revenues from employment income expressed as a percentage of GDP;
- ✓ In addition, we assess the other indicators such as the Top statutory personal income tax (further referred to as "PIT") rate expressed as a percentage.

Total taxes including social security contributions are defined as taxes on production and imports, current taxes on income and wealth, capital taxes, and social security contributions. Employment income comprises all taxes, directly linked to wages and mostly withheld at source, paid by employers and employees, including actual compulsory social contributions. This means the personal income tax is typically levied on different sources of income: labor income, including taxable social benefits. Apart from the aggregate data in national accounts, additional assessed data are the Top statutory PIT rates defined by national legislations and reported by each particular EU Member State. According to Eurostat, the Top statutory PIT rate does not differentiate by source of income, so surcharges and deductions specific to income source are not considered.

Statistical Analysis

The research is focused on the consideration of the selected indicators mentioned above (Total taxes, Employment income, and Top statutory PIT rate) and also their comparison with the EU-27 average presented by the descriptive characteristics [31], [32], [33] that are assessed in the period 2008-2020, i.e. for 13 years. Exploratory techniques were used to process the results obtained from public databases to compare monitored indicators between the EU-27 Member States and against the overall EU-27 average. The comparison was based on the calculation and visualization of point and interval estimates of location characteristics and variability (the point and interval mean estimate, the standard error of mean estimate, and the standard deviation) of the monitored indicators (Total taxes, Employment income, and Top statutory PIT rate) for the EU-27 and particular EU Member State.

RESULTS AND DISCUSSION

In general, it is currently difficult to find a comprehensive indicator of the tax burden suitable for international comparison, mainly because of the different tax systems constantly evolving and changing over time. The tax quota is one of the most widely used indicators for comparing the tax burden among countries. This macroeconomic indicator can take several forms and generally represents the share of taxes and social security contributions in relation to GDP.

For the indicator Total taxes (Table 1), based on the results of the mean, 95.00% confidence interval, and standard deviation, we found that compared to the EU-27 average values (Mean = 39.33164; 95.00% confidence interval of mean estimate between 38.83127 and 39.83201; Std. Dev. = 0.828018) recorded higher and therefore above-average values of the Total taxes indicator and at the same time lower variability of the selected indicator, i.e. homogeneous countries, which include Austria (Mean = 42. 02729; Std. Dev. = 0.679653), Italy (Mean = 42.11863; Std. Dev. = 0.771224), Sweden (Mean = 43.04061; Std. Dev. = 0.784335) and Belgium (Mean = 44.47251; Std. Dev. = 0.885526).

Table 1 Descriptive statistics for indicator Total taxes.

Country	N	Mean	Std.Dev.	Std.Err.	-95.00%	+95.00%
Denmark	13	45.88	1.19	0.33	45.16	46.60
France	13	44.70	1.53	0.42	43.78	45.62
Belgium	13	44.47	0.89	0.25	43.94	45.01
Sweden	13	43.04	0.78	0.22	42.57	43.51
Finland	13	42.34	1.07	0.30	41.70	42.99
Italy	13	42.12	0.77	0.21	41.65	42.58
Austria	13	42.03	0.68	0.19	41.62	42.44
Germany	13	38.78	0.88	0.24	38.25	39.31
Hungary	13	37.89	1.16	0.32	37.19	38.59
Slovenia	13	37.54	0.21	0.06	37.42	37.67
Netherlands	13	37.12	1.64	0.45	36.13	38.11
Luxembourg	13	36.68	1.47	0.41	35.79	37.56
Croatia	13	36.53	0.76	0.21	36.07	36.99
Greece	13	36.22	3.13	0.87	34.33	38.11
Czechia	13	34.54	1.16	0.32	33.84	35.24
Spain	13	33.22	1.84	0.51	32.10	34.33
Poland	13	33.15	1.55	0.43	32.22	34.09
Portugal	13	33.15	1.77	0.49	32.08	34.21
Cyprus	13	32.93	1.17	0.32	32.22	33.63
Estonia	13	32.82	1.11	0.31	32.15	33.49
Slovakia	13	31.44	2.53	0.70	29.91	32.97
Malta	13	30.82	0.85	0.24	30.31	31.33
Latvia	13	29.65	1.31	0.36	28.85	30.44
Lithuania	13	28.98	1.46	0.41	28.10	29.86
Bulgaria	13	28.41	1.91	0.53	27.25	29.56
Romania	13	26.67	1.09	0.30	26.01	27.33
Ireland	13	25.59	3.27	0.91	23.61	27.57
EU-27	13	39.33	0.83	0.23	38.83	39.83

Note: - 95.00% +95.00% - 95% confidence interval of the mean estimate.

On the contrary, the countries with below-average values of this indicator and high variability compared to the EU-27 values, i.e. heterogeneous countries, include Ireland (Mean = 25.59330; Std. Dev. = 3.273899), which recorded the lowest average value of this indicator among the assessed countries and the highest variability, as well as Greece (Mean = 36.22006; Std. Dev. = 3.133599), are among the most heterogeneous countries.

Slovakia (Mean = 31.44262; 95.00% confidence interval of mean estimate between 29.91385 and 32.97139; Std. Dev. = 2.529841) has the third highest variability within the EU countries, with the lowest average value of the Total taxes indicator and at the same time the highest variability compared to the surrounding selected countries such as Hungary (Mean = 37.88882; 95.00% confidence interval of mean estimate between 37.18663 and 38.59101; Std. Dev. = 1.162001), Czechia (Mean = 34.53868; Std. Dev. = 1.158392) and Poland (Mean = 33.15391; Std. Dev. = 1.548724), as well as in the comparison of Slovakia compared to EU-27 values (Mean = 39.33164; 95.00% confidence interval of mean estimate between 38.83127 and 39.83201; Std. Dev. = 0.82801). Countries such as Hungary, Czechia, and Poland have thus recorded higher average values of this indicator compared to Slovakia and approximately the same level of variability. The lowest variability was found for Slovenia (Mean = 37.54419; Std. Dev. = 0.211915). Besides Ireland, the lowest mean values of this indicator were recorded for countries such as Romania (Mean = 26.67193; Std. Dev. = 1.090078) and Bulgaria (Mean = 28.40535; Std. Dev. = 1.905741).

Also in the case of the Employment income indicator (Table 2), its above-average values compared to the EU-27 average (Mean = 18.23237; 95.00% confidence interval of mean estimate between 18.02898 and 18.43576; Std. Dev. = 0.336573) were achieved by the following countries: Sweden (Mean = 21.95575; Std. Dev. = 0.555988), France (Mean = 21.57219; Std. Dev. = 0.765308), Belgium (Mean = 21.36801; Std. Dev. = 0. 894024), Austria (Mean = 20.97773; Std. Dev. = 0.433196) and Italy (Mean = 18.35758; Std. Dev. = 0.440902), which also have the lowest variability of the indicator, i.e. they are homogeneous countries.

Table 2 Descriptive statistics for indicator Employment income.

Country	N	Mean	Std.Dev.	Std.Err.	-95.00%	+95.00%
Sweden	13	21.96	0.56	0.15	21.62	22.29
France	13	21.57	0.77	0.21	21.11	22.03
Belgium	13	21.37	0.89	0.25	20.83	21.91
Austria	13	20.98	0.43	0.12	20.72	21.24
Germany	13	19.18	0.75	0.21	18.73	19.64
Finland	13	19.04	0.69	0.19	18.62	19.46
Italy	13	18.36	0.44	0.12	18.09	18.62
Denmark	13	18.03	0.51	0.14	17.72	18.34
Slovenia	13	17.90	0.44	0.12	17.64	18.17
Hungary	13	17.46	0.83	0.23	16.95	17.96
Czechia	13	16.58	0.96	0.27	16.00	17.16
Estonia	13	15.82	0.55	0.15	15.49	16.16
Netherlands	13	15.70	0.28	0.08	15.53	15.87
Spain	13	15.48	0.81	0.22	14.99	15.96
Luxembourg	13	14.74	0.78	0.22	14.27	15.21
Croatia	13	14.27	0.60	0.17	13.91	14.64
Latvia	13	13.92	0.55	0.15	13.59	14.25
Slovakia	13	13.77	1.57	0.44	12.82	14.72
Greece	13	13.76	1.06	0.29	13.12	14.40
Lithuania	13	13.21	0.87	0.24	12.68	13.74
Portugal	13	12.61	0.87	0.24	12.08	13.14
Poland	13	12.30	0.87	0.24	11.77	12.83
Cyprus	13	11.60	1.17	0.32	10.89	12.31
Romania	13	11.03	0.82	0.23	10.54	11.53
Ireland	13	10.94	1.53	0.42	10.01	11.86
Bulgaria	13	9.71	1.03	0.28	9.09	10.33
Malta	13	9.50	0.55	0.15	9.17	9.84
EU-27	13	18.23	0.34	0.09	18.03	18.44

Note: - 95.00% +95.00% - 95% confidence interval of the mean estimate.

The countries that have below-average values of this indicator compared to EU-27 values and the highest variability within them, i.e. heterogeneous countries, can be classified as Slovakia (Mean = 13.77149; Std. Dev. = 1. 569211), which among all the assessed countries recorded the highest variability together with Ireland (Mean = 10.93575; Std. Dev. = 1.528891), Cyprus (Mean = 11.59966; Std. Dev. = 1.167690), Greece (Mean = 13.76254; Std. Dev. = 1.057570), Bulgaria (Mean = 9.70596; Std. Dev. = 1.025974). Countries such as Hungary (Mean = 17.45821; Std. Dev. = 0.834386) and Czechia (Mean = 16.57977; Std. Dev. = 0.957086) recorded higher mean values of this indicator and its lower variability value compared to Slovakia. Poland (Mean = 12.30156; Std. Dev. = 0.872068) achieved a lower mean value of this indicator than Slovakia and approximately the same variability as Hungary and Czechia.

Countries with below-average indicator values and the lowest variability, i.e. homogeneous countries, include the Netherlands (Mean = 15.70239; Std. Dev. = 0.280917). Similarly, as in the case of the indicator of Total taxes, in the case of Employment income, the lowest mean values of the indicator were recorded for countries such as Bulgaria (Mean = 9.70596; Std. Dev. = 1.025974), Ireland (Mean = 10.93575; Std. Dev. = 1.528891) and Romania (Mean = 11.03187; Std. Dev. = 0.820205).

In the case of the Top statutory PIT rate indicator (Table 3), above average values compared to the EU-27 average (Mean = 38.57962; 95.00% confidence interval of mean estimate between 38.33033 and 38.82891; Std. Dev. = 0.412527) were achieved by the following countries: Denmark (Mean = 56.67589; Std. Dev. = 2.46646),

Sweden (Mean = 56.46308; Std. Dev. = 1.28418), Belgium (Mean = 53.50006; Std. Dev. = 0.31294), which also recorded the lowest variability.

In contrast, countries such as Austria (Mean = 50.00000; Std. Dev. = 0.00000) and Germany (Mean = 47.47500; Std. Dev. = 0.00000) had zero variability in the indicator, Portugal (Mean = 51.54538; Std. Dev. = 5.39669) and Greece (Mean = 48.76923; Std. Dev. = 5.11784) had the highest variability in the indicator among the countries that scored above average values.

Countries with below-average values of this indicator compared to the EU-27 values and countries such as Austria (Mean = 50.00000; Std. Dev. = 0.00000) and Germany (Mean = 47.47500; Std. Dev. = 0.00000) achieved zero variability of this indicator, Portugal (Mean = 51. 54538; Std. Dev. = 5.39669) and Greece (Mean = 48.76923; Std. Dev. = 5.11784) the highest variability of the indicator among the countries that recorded above average values. with the highest variability include Hungary (Mean = 21.86154; Std. Dev. = 10.61638) and Lithuania (Mean = 17.92308; Std. Dev. = 5.79456). Countries with below-average values for this indicator, such as Malta (Mean = 35.00000), Czechia (Mean = 15.00000), and Bulgaria (Mean = 10.00000), recorded zero variability.

Table 3 Descriptive statistics for indicator Top statutory PIT rate.

Country	N	Mean	Std.Dev.	Std.Err.	-95.00%	+95.00%
Denmark	13	56.68	2.47	0.68	55.19	58.17
Sweden	13	56.46	1.28	0.36	55.69	57.24
Belgium	13	53.50	0.31	0.09	53.31	53.69
Netherlands	13	51.78	0.69	0.19	51.37	52.20
Portugal	13	51.55	5.40	1.50	48.28	54.81
Finland	13	50.53	1.09	0.30	49.87	51.18
Austria	13	50.00	0.00	0.00	50.00	50.00
France	13	49.14	2.44	0.68	47.66	50.61
Greece	13	48.77	5.12	1.42	45.68	51.86
Germany	13	47.48	0.00	0.00	47.48	47.48
Croatia	13	47.11	4.20	1.17	44.57	49.65
Italy	13	47.02	1.28	0.35	46.24	47.79
Ireland	13	46.62	2.79	0.77	44.93	48.30
Slovenia	13	46.54	4.56	1.26	43.78	49.29
Spain	13	45.69	3.67	1.02	43.47	47.91
Luxembourg	13	42.92	2.65	0.73	41.32	44.52
Malta	13	35.00	0.00	0.00	35.00	35.00
Cyprus	13	33.85	2.19	0.61	32.52	35.17
Poland	13	32.62	2.22	0.62	31.27	33.96
Latvia	13	25.78	3.34	0.93	23.77	27.80
Slovakia	13	22.69	3.04	0.84	20.86	24.53
Hungary	13	21.86	10.62	2.94	15.45	28.28
Estonia	13	20.54	0.52	0.14	20.22	20.85
Lithuania	13	17.92	5.79	1.61	14.42	21.42
Czechia	13	15.00	0.00	0.00	15.00	15.00
Romania	13	14.62	2.63	0.73	13.03	16.21
Bulgaria	13	10.00	0.00	0.00	10.00	10.00
EU-27	13	38.58	0.41	0.11	38.33	38.83

Note: - 95.00% +95.00% - 95% confidence interval of the mean estimate.

Slovakia (mean value of this indicator was at the level of Mean = 22.69231; 95.00% confidence interval of mean estimate between 20.85633 and 24.52828; Std. Dev. = 3.03822) achieved lower mean values of the above indicator compared to Poland (Mean = 32.61538; 95.00% confidence interval of mean estimate between 31.27458 and 33.95619; Std. Dev. = 2.21880). On the contrary, Hungary (Mean = 21.86154; 95.00% confidence interval of mean estimate between 15.44612 and 28.27695) and Czechia (Mean = 15.00000; 95.00% confidence interval of mean estimate between 15.00000 and 15.00000) recorded lower average indicator values than Slovakia. The lowest average values for this indicator are for countries such as Bulgaria (Mean = 10.00000; Std. Dev. = 0.00000) and Romania (Mean = 14.61538; 95.00% confidence interval of mean estimate between 13.02538 and 16.20539; Std. Dev. = 2.63117).

The calculation of descriptive characteristics and 95.00% confidence interval of mean estimate were chosen for the selected variables such as Total taxes, Employment income, and Top statutory PIT rate for Member States

of the EU as well as indicators comparison among the countries. These are the point and interval mean estimate, the standard error of the mean estimate, and the standard deviation for the individual countries. The average values were collected over the 13 years 2008-2020, which we visualize in Figure 1, where the EU countries are listed alphabetically. These countries are compared with the EU-27 average values through selected indicators.

The results show which countries have achieved above-average and below-average values compared to the EU-27 average for each selected indicator separately. For the period 2008-2020, Slovakia shows below-average values in all assessed indicators compared to Sweden, which, on the other hand, recorded above-average values for each indicator. For some countries, such as Croatia, the selected indicators Total taxes and Employment income reached below average values. In contrast, the indicator Top statutory PIT rate recorded an above average value, as is the case for Portugal.
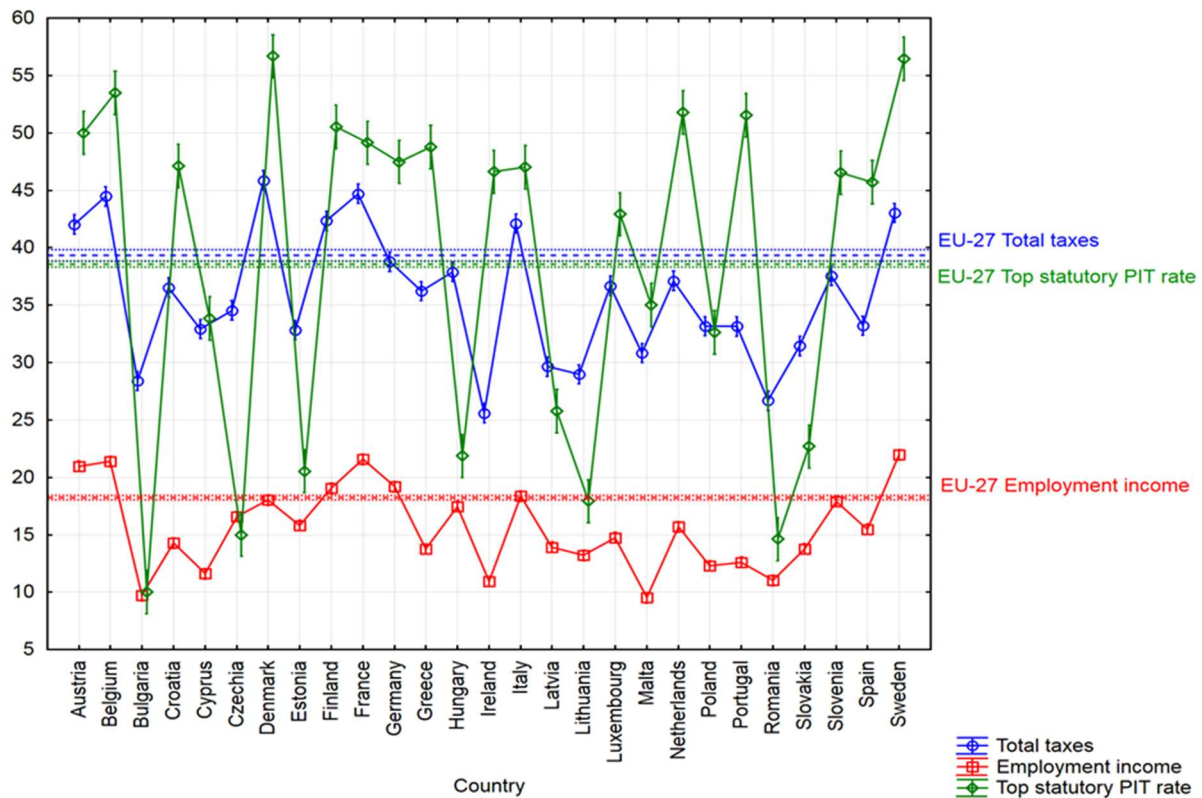
Figure 1 Diagram of averages and confidence intervals of the monitored indicators for EU-27 and individual EU Member States.

Based on the above-average values achieved for the selected indicators of Total Tax and Employment income, it is evident that the homogeneous countries, i.e. Denmark, Austria, Italy, Sweden, Belgium, and France, simultaneously showed a low variability of the above indicators. This means that in these countries total tax revenues from total taxes and tax revenues from employment income do not change over the years [28]. In our opinion, the above-mentioned countries perform a tax policy subject to insignificant changes in the tax system in the reviewed years, thus resulting in a stable collection of tax revenues for the public budgets of these countries [34]. The West EU countries present the highest values of tax quota in the long term including Denmark and Sweden [35]. These EU countries have a higher tax burden on individuals than the East EU countries but over reviewed years. A gradual reduction of this burden affects the competitiveness of particular EU countries [26]. We consider that this is a convergence of the particular tax systems of the West EU countries and the East EU countries. Relatively stable tax revenues to the public budgets of each country are ensured by a tax system with an unchanging administration and tax structure [36].

Following the above, countries with below-average values of the selected indicators' Total taxes and Employment income, and at the same time with high variability of these indicators, i.e. heterogeneous countries, include the V4 countries, Ireland, Greece, Bulgaria, and Romania. This means that in these countries total tax revenues from total taxes and tax revenues from employment income vary over the years. It can be concluded that the EU countries mentioned above have been significantly affected by legislative tax and levy changes, the global financial crisis in 2009 and 2010 [23], as well as the political situation affecting the fiscal and tax policies of these countries [15]. For example, the East EU countries have undertaken several tax reforms in the reviewed period

[11]. This fact is confirmed by several authors, e.g. [22] according to which OECD countries are experiencing an increase in inequality in income distribution due to reforms of their tax systems. In our view, the above countries are less stable regarding the tax revenues collected in their public budgets. At the same time, it should be stressed that these countries have a lower tax burden. Slovakia shows the lowest level of personal income taxation among OECD countries in the long term, followed by countries such as Czechia, Poland, and Hungary [35]. In this context, these countries' share of taxes to GDP is lower than the EU average. The Slovak Republic has the lowest overall tax burden, and the Czech Republic and Croatia are similar and below the EU average [37].

The personal income tax belongs to direct taxes. Therefore, decision-makers should carefully prepare reforms in this area [29]. Above average values for the Top statutory PIT rate indicator with its lowest variability over the 2008-2020 period were achieved in countries such as Belgium, Netherlands, and Sweden as well as Austria and Germany with zero variability of this indicator. This means that in these homogeneous countries, there have been no changes in the PIT rate and no significant changes in the collection and payment of PIT. This is one of the reasons why a country can provide stable tax revenues to public budgets. On the contrary, below-average values of this indicator were recorded for Hungary and Lithuania, which also achieved the highest variability of the indicator. Malta, Czechia, and Bulgaria showed zero variability of this indicator in the years assessed.

The tax rate, which significantly influences the tax burden is important information for politicians and economists [38]. Progressivity is a typical feature of a PIT [39]. The very high degree of tax progressiveness affects the motivation to work, which is why, for example, in Slovakia or the Czech Republic [14], the progressive tax rate was replaced by a nominal linear tax rate in the past [30]. In this context, the tax rates during the period of 2004-2012 were quite stable due to the flat tax rate and therefore it might be expected that the tax burden will be the same, but the tax quota is declining which suggests it was affected by the changes in GDP [29]. In our view, the tax reforms involve changes to the Top statutory PIT rates and items affecting the calculation of the PIT base and the settlement of the resulting PIT liability. Considering the Hungarian system personal income taxation is generally defined in terms of tax rates and tax brackets [40]. A progressive multifactorial system in terms of allowances was used in the Czech Republic in 2018, and this may be considered the simplest income tax system for the V4 countries [41]. The Slovak income tax system partially uses tools different from the Czech system. The super-grossing method determined the tax base in the Czech Republic. At the same time, in Slovakia the amount paid by the employee as a contribution to the social and health insurance system is not included in the tax base [42].

Tax revenue as a share of GDP and how it changes can vary from country to country for several reasons [24], [25]. The determination of the tax base and the level of PIT rates and the administration of the tax lead to differences in revenue collection for public budgets across countries. Each country has a different approach to the design and financing of the public sector, leading to differences in tax systems between countries. In times of economic change, the evolution of the tax revenue to GDP ratio needs to be analyzed from both perspectives: tax revenue and GDP growth [27]. In this context, it is important to note that in 2021 tax revenue grew faster than GDP in most EU countries, but this trend is not the same in all Member States [13].

The aforementioned facts, i.e. the level of tax revenues and GDP within the EU countries, are influenced by trends and structural changes, which mainly include consumption decisions, production processes, political economy, governance-related matters, migration, labor force movement, demographic changes, globalization, technological advances, digitalization, and the others, which pose current challenges for the sustainability of each of national tax system [43], [44]. In this context, it should be concluded that the labor costs in agriculture are approximately the same as in neighboring countries [3]. Differences in the area of PIT in individual EU member countries relate mainly to the adjustments of the income tax base, changes in PIT rates, settlement of the final tax liability as well as the collection method of this tax. In the taxation of the agricultural sector, it is necessary to observe differences specific to this economic sector, mainly because of the use of the various elements of the tax base [1].

The need to keep Slovak agriculture requires the introduction of effective support instruments by the state that would ensure the competitiveness of employers [2]. We think that one such tool is the reduction or exemption from employers' and employees' tax and social contributions obligations. Low costs represent an important competitive advantage for entrepreneurs [5]. It is necessary to ensure comparable legislative conditions for Slovak employers doing agriculture business, as in neighboring EU countries.

The European Commission has long recommended the Slovak Republic move from labor taxation to environmental and property taxes, improve tax collection, combat tax evasion, and improve compliance with tax regulations. In our opinion, changes in the tax system should be aimed at the investing attractiveness and the motivation to work and employ people, especially in productive sectors which include also agriculture.

Current relief effective as of 1 August 2023 a part of social contributions (sickness insurance, retirement insurance, disability insurance, unemployment insurance, and insurance for the solidarity reserve fund) reduces

the employer's costs by approximately 24% of the assessment base of each employee per calendar month up to the minimum wage amounted to EUR 750 in the period until 30 June 2024. In selected subsectors of the agri-food sector of the Slovak Republic (in addition to food production this also includes viniculture, vegetable and fruit growing, and animal husbandry with plant production), the employer does not pay social insurance contributions for the employee. The objective of the relief in question is to increase the level of self-sufficiency and the competitiveness of this industry as well as to reduce the prices of final consumers. This relief is not currently adequate due to the limited period applied and in our opinion, it should concern the entire agri-food sector.

Further research in the area of PIT will focus on the assessment of selected indicators within the V4 countries, as they have historically similar tax systems, including the structure of tax systems, as well as a similar way of forming the tax base and calculating PIT, including the method of collecting this tax.

CONCLUSION

Assessment of tax burden becomes more important for comparing tax systems and is used to determine the effect of fiscal and tax policies. The optimal indicator for measuring the tax burden does not exist. The tax burden, in particular the tax quota in an international comparison, defines the share of a country's total revenue (taxes and levies) in GDP, i.e. it expresses what part of the economy's annual output a country collects and can subsequently redistribute. The overall impact on tax revenues and its relation to GDP is rather country-specific. It depends on the type of measures, the magnitude and length of the support, the economic structure of each country, the type of employment, and others. In 2020, tax revenue in the EU decreased less than GDP, which increased the tax-to-GDP ratio. Based on the results of the descriptive characteristic of individual indicators, it can be stated that for the observed period of 13 years, 2008-2020, the values of the selected indicators, Total taxes and Employment income, are approximately identical for homogeneous countries with above-average values of these two indicators, as well as for heterogeneous countries with below-average values of the indicators. Employment income is a component of Total taxes in all reviewed countries. The structure of taxation varies significantly across countries. Some countries have a higher share of Employment income in total tax revenues collected in public budgets. The East EU countries report the lowest tax burden. The West EU countries present the highest tax burden. Differences among them derive from the different conceptions of tax and social systems. The trend in tax revenue development within EU countries has not changed significantly, and we expect the values to remain unchanged for 2021-2023. The results of descriptive statistics for the indicator Top statutory PIT rate document that this indicator for the assessed period 2008-2020 varies within the EU countries. The homogeneous countries with an average Top statutory PIT rate compared to the EU-27 average include the West EU countries. Heterogeneous countries with below-average Top statutory PIT rate values compared to the EU-27 average include Hungary and Lithuania. In the case of countries with below-average values, such as Malta, Czechia, and Bulgaria, the Top statutory PIT rate did not change over the years under review. Progressivity of income taxation is still retained within the East EU countries. PIT is included in each national tax system, and the revenue from this tax forms a significant part of total taxes, the amount of which depends mainly on the structure of the overall tax system. Every fair tax system is subject to certain requirements that respect the interests of taxpayers on the one hand and the economic interests of the country on the other. One of the preferred requirements in designing a tax system is to ensure sufficient revenue for the public budgets. Another requirement concerns the adjustment of tax revenue to GDP development related to introducing floating rates in personal income tax. The European Commission also recommends a fairer, simpler, and more modern tax environment. The above research findings are consistent with similar studies that have assessed the PIT burden in selected countries in previous years. Economic conditions in agriculture are an important part of the business environment related to government participation. In most developed countries, the government actively intervenes in business, primarily to utilise domestic production resources and the sustainability of this sector. The government participation is determined in the EU's Common Agricultural Policy. The regional dimension also needs to be taken into consideration. From the long-term point of view, a concept involving predictable conditions and guarantees of state support for the domestic agri-food sector is important.

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