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**IMPACT OF TAXES
ON THE EXPORT-IMPORT TENDENCIES
IN THE COUNTRIES OF THE EU
IN UNSTABLE PRESENT-DAY**

Abstract

The problem of rationales for taxes and transfers is given a lot of attention by both researchers and politicians. Taxes are one of the main sources of government revenue and are considered a strong resource for welfare state. Taxes have an impact on the development of international trade and business, as the latter chooses a more attractive location with less tax burden and costs. Never-

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theless, the country's status, competitiveness of industries, development of the infrastructure, safety and transparency are also important factors for the domestic and foreign business and investors. That is why it is necessary to study the impact of taxes on the export and import policy. In this article we study the development of export-import tendencies in the EU countries over the period from 2002 to 2018. Statistical calculations are done for EU-28 countries. The results show that values of tax revenues as percentage of GDP change slowly and diverge little from set levels. A corresponding pattern is evident in the main tax categories, however the fiscal lag for direct taxes, indirect taxes and social contributions differs. Research indicates that different export-import strategies prevail across the EU countries, as do systems of taxation. A system of two equations is basis for the model, which uses the econometric approach to assess the impact of taxes on the development of export-import tendencies in the EU. The analysis proves that if tax rates on exports are reduced in the short term, there is a positive effect on the intensity of export activities, but this may increase the dependence of the national economy on foreign markets both in the short and in the long term. Thus, reductions in import tax rates, on the one hand, help to strengthen the competitiveness of domestic producers in foreign markets, and on the other, intensify competition in the domestic market.

Key Words:

Taxes; import; export; econometric model.

JEL: H30, F10.

3 figures, 6 tables, 15 references.

Problem Statement and Literature Review

Nowadays we can observe the influence of different challenges on the global economy. A big number of large-scale events trickle down in our turbulent economic development and have their consequences for European economies and countries of the EU. The last historical period has brought some political and economic crises, many conflicts, sharp increase in competition due to new technologies, changes of geopolitical pillars, emergence of new players on international markets, and so on. In addition, there is problem of flexible balances between centralization and decentralization (independence, more autonomy on national or regional level) in the EU (Alworth, 1988; Buettner, 2002; Fabuš et al., 2019; Mahler & Jesuit, 2006). On the one hand, EU gradually implements the strategies for the convergence of the economic development of EU members and regulates different aspects of the economic and social relations for these countries (Dubrovina et al., 2016; Dubrovina, 2015; Neubauerová & Dubrovina, 2015; Schultzová, 2009). On the other hand, we can see the fall of European optimism which was seen during the enlargement of the EU in 2004 and some years later. One of the biggest upheavals was global economic and financial crisis of 2008-2010 which had a significant negative impact on the development of the economy in the EU, especially in some countries such as Ireland, Greece, etc. (Richter & Dimitrios, 2013). Other negative effects were observed due to the terrorist attacks, episodes of vandalism, problems with control of illegal migration on some borders of the EU, post-crisis economic depression and less funding for joint EU projects, etc. Together, these made up sensitive stressful factors for common EU policy and openness of markets. In addition, one of the permanent problems the EU countries face is the need for cheaper energy. The complicated relations with Russia (one of the important suppliers of gas and other resources), have been especially strained over the last few years. Implementation of sanctions against Russia motivates some countries of the EU to change priorities in their export-import policies. Yet another acute effect on the EU was seen after a very important change – Brexit and the difficult negotiations between Brussels and London. Finally, last year brought a huge new crisis felt globally, associated, of course, with the spread of the coronavirus pandemic. Thus, these disturbances of different nature should be taken into account when we analyze the dynamics of leading economies and international markets.

The research topic of the impact that taxes have on the development of international cooperation and trade, foreign direct investments (FDI), and formation of export-import strategies is of utmost importance.

It should be noted that numerous studies have been devoted to these problems (Alworth, 1988; Buettner, 2002; Devereaux, 2006; Dubrovina et al., 2019; Klimešová, 2014; Ochotnický, 2012; OECD, 2008; Owens & Zhan, 2018; Schultzová, 2009). Thus, Owens and Zhan (2018) emphasize the link between

international trade, investment and tax policies. As it is noted in their paper, «taxation, tax relief and other fiscal incentives are key policy tools to increase exports and attract investors» (Owens & Zhan, 2018).

For example, analysts of another report devoted the study of tax effects on foreign direct investments note that the sensitivity of FDI to tax depends on the host country and the mobility of business activities underlying the tax base (OECD, 2008). Tax competition focused on the attractiveness for FDI is growing in global economy. In addition to the influence of taxes, other factors as non-tax barriers and business environment are also important for investors' decisions about investment location. Nevertheless, as it is discussed in OECD's report (2008), «most studies of the effects of tax reform on FDI ignore tax-planning strategies used by investors to lower their tax burden». In addition, authors emphasize that «in many countries, while there has been a great deal of debate about taxing inbound FDI, there has been surprisingly little public debate over what tax policies should be followed for outbound investment, and how the tax burden should compare with that for domestic investment and inward FDI» (OECD, 2008).

Michael Devereux (2006) presents the research results focused on the study the impact of taxation on the location of capital, firms and profit. This author gives a review of different theoretical and empirical studies concerning effective marginal tax rates or cost of capital, effective average tax rates, and average tax rates. This research is based on a survey which covered a lot of ground, examining evidence of taxation's influence on many aspects of locational decisions of multinational companies. This survey also included some questions about discrete location choices; capital expenditure decisions of affiliates; the overall allocation of capital across countries; differences in the rates of profit across countries; financial and organizational form decisions, especially the use of debt and the form and size of income repatriated to the parent; and intrafirm transfer prices and trade. Using the statistical elaboration of this survey, the author studies the relation between impact of taxation and investment choice to provide business abroad or in home country (Devereux, 2006).

As it is known from the economic theory, tariffs and taxes are important factors that have essential impact on the development of international trade (Alworth, 1988; Buettner, 2002; OECD, 2008; Schultzová, 2009). If conditions for international trade are attractive and the country has advantages, it will actively participate in international markets and export goods and services. Moreover, highly developed countries – engines of the EU – focus on the strategies of exporting new technologies and innovative production, whereas less developed countries prefer to support traditional exports of food and agricultural goods, raw materials, energy, etc.

Although countries provide protectionist policies and defend the interests of their national markets, international corporations, holdings, consortia, transnational financial companies and structures are interested in full openness of

economies and globalization of their business. In this regard, it is interesting to analyze the nature of the impact that taxes have on the export-import tendencies in the EU countries in the unstable modern period. It is important to determine whether the impact on the development of export-import strategies for the EU countries will be deterministic or stochastic.

The aim of this article is to study the development of export-import tendencies in the EU countries over period of 2002-2018 and, by means econometric approach, to evaluate the impact of taxes on the development of export-import tendencies in the EU.

We used databases from Eurostat for EU-28 countries as primary data. Statistical and econometric methods were used for the elaboration of the data.

Research Results

Theoretical background

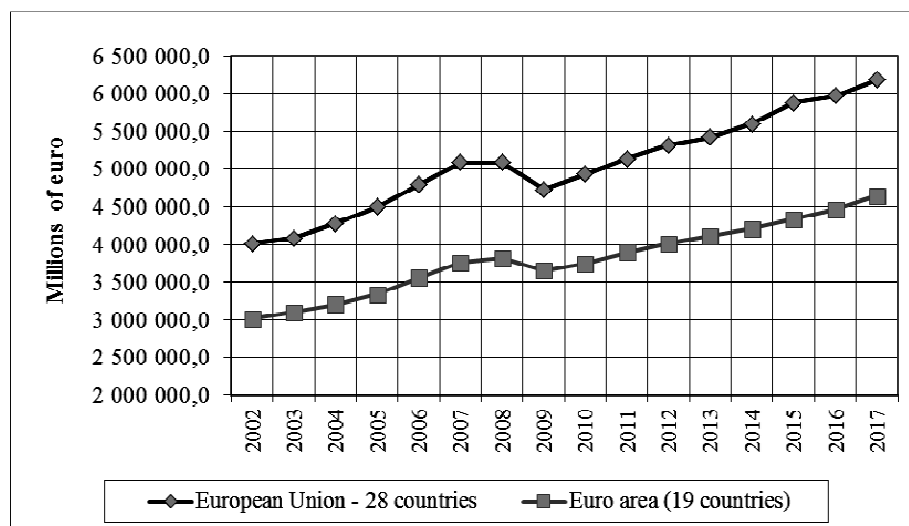
The problem of rationales for taxes and transfers is very popular among as researches as well as policy makers (Klimešová, 2014; Owens & Zhan, 2018; Schultzová, 2009). Taxes and social transfers played a very important role in the formation of the concept of «social state» and improvement of the living standards in the period of the Second World War both in USA and in West Europe. Taxes as an important part of public finance fulfill the three important functions: (1) allocation, (2) distribution and redistribution, and (3) stabilization (Schultzová, 2009). The function of allocation is related to the governmental expenditures on socio-economic needs and their optimal proportions (between public and private sectors) in the economy. The functions of distribution and redistribution ensure the necessary shifts of parts of income and wealth from the rich to the poor by using social transfers as instruments. The function of stabilization is very important as a preventive measure against the negative consequences of the cyclic development of market economy.

In most countries, the total taxes are about 40% of national income and total monetary transfers are approximately 15% of national income. Usually monetary transfers are public pensions, unemployment and family benefits, means-tested transfers. Other government spending or in-kind transfers make up approximately 25% of national income and they are used for education, health care, police, defense, roads, etc. Comparison with the statistics from the early 20th century shows that the ratio of taxes to national income has significantly changed from less than 10% to 40% nowadays.

Taxes are the main contribution to the government revenue, with the tax revenue accounting for about 90% of total government revenue in the European Union. Government revenue, expenditure and deficit/surplus are main objectives of fiscal policy and the analysis of their dynamics plays a very important role in choosing and coordinating the strategic and tactic tasks for socio-economic development. For the comparative analysis tax revenue is measured in absolutes (in millions of euro) or as ratio of taxes to GDP, or as ratio of absolutes to the inhabitants. In Fig.1 and Fig.2 the total tax revenue and social contributions in EU-28 and EU-19 (in % of GDP and in millions of euro) are presented for period of 2002-2017.

Figure 1

Total revenue from taxes and social contributions for period of 2002-2017, EU-28 and EU-19, % of GDP



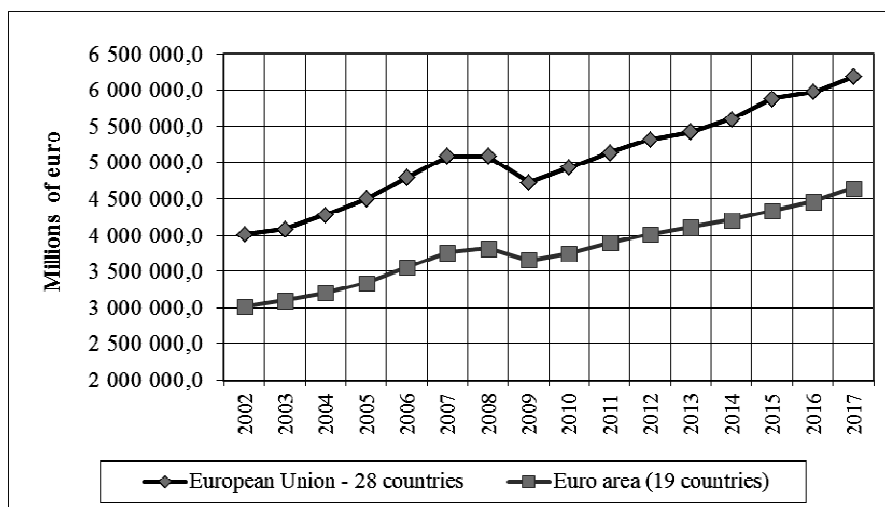
Source: created by the authors base on the statistical data of Eurostat.

As Eurostat data indicates, the overall tax-to-GDP ratio started decreasing in 2000 and continued falling until 2004, but from 2004 till 2007 this trend reversed (fig. 1, fig. 2). In 2002, revenue from taxes and social contributions in the EU-28 made up 40.0% of GDP, and in EU-18 this ratio was 40.8%. In 2004, tax revenue (including social contributions) in the EU-28 was 39.9% of GDP and in

the EU-18 this value made up 40.5% of GDP. In 2000 and 2007, the higher values of these ratios were observed: in 2006-2007 the tax revenue (including social contributions) to GDP varied at 40.6% in EU-28 and at 41.2% in EU-18. However, from 2008 and till 2010 the unfortunate impact of global economic crisis led to a drop in revenues from taxes and social contributions. For example, in 2010 tax revenue (including social contributions) made up 39.6% of GDP in the EU-28 and 40.3% in the EU-18. In 2012, as a ratio of GDP, tax revenue (including social contributions) increased and made up 40.6% of GDP in the EU-28 and 41.7% of GDP in EU-18, that is the ratio of tax revenue to GDP in the euro area was slightly higher than that of the EU-28. As a ratio of GDP, in 2015 tax revenue (including net social contributions) accounted for 40.0 % of GDP in the European Union (EU-28) and 41.4 % of GDP in the euro area (EA-19). In 2015, the highest revenue to GDP ratios from the main categories of taxes and social contributions were at 47% – 48.0 % and recorded in Denmark, France and Belgium. In 2017, the tax revenue (including social contributions) to GDP reached 40% in EU-28 and 41.2% in euro area (EA-19). In 2018, the highest level of the tax revenue (including social contributions) to GDP was observed in France (48.4%) and the lowest was in Ireland (23.5%).

Figure 2

Total revenue from taxes and social contributions for period of 2002-2017, EU-28 and EU-18, millions of euro



Source: created by the authors base on the statistical data of Eurostat.

However, the tendencies of the tax revenue (including social contributions) for EU-28 and EU-19 were different in absolute values. As it is seen from the figures, the absolute values of the tax revenue (including social contributions) increased till 2008 in the both dimensions, but then, due to the global financial crisis, these values dropped and this indicator decreased by 7.11% for EU-28 and by 4.23% for EU-19.

Revenue from taxes and social contributions varied across countries, which can be explained by the differences in the national tax policies, conditions of national economies, social support programmes, etc. (Dubrovina et al., 2016; Neubauerová & Dubrovina, 2015).

Table 1 presents the data for tax revenue (including social contributions) as percentage of GDP for EU-28 countries for period of 2002-2017.

The data in table 1 and statistical calculations allow us to conclude that values of tax revenues (including social contributions) as percentage of GDP for EU-28 countries changed slowly or fluctuated at a certain level. It should be noted that tax revenues in the main tax categories displayed a corresponding pattern, with a differing fiscal lag for direct taxes, indirect taxes and social contributions. During period of 2002-2017 the average value of the tax revenue (including social contributions) to GDP was 39.1% in EU-28, and coefficient of variance was low (1.6%). In the euro area (EU-19), the average value of the tax revenue (including social contributions) to GDP was 46.4% and coefficient of variance was a little higher (2.2%). Relatively low values of the coefficients of the variance were observed for countries such as: Belgium (2.2%), Czech Republic (2.4%), Denmark (2.3%), Germany (1.6%), Croatia (2%), Luxembourg (2.3%), Hungary (2.7%), Austria (2%), Slovenia (1.2%), Finland (2.5%), Sweden (2.9%), and UK (2.1%). Low values of the coefficient of variance for the indicator explain the certain stability (or small fluctuations) in tax and socio-economic development. In Slovakia the coefficient of variance for tax revenue (including social contributions) to GDP was 5.8%, but for some countries such as Ireland and Greece the coefficients for this indicator were quite high – approximately 10%. Consequently, such countries implemented substantial changes in their tax policies. Additionally, as it is known, the negative consequences of the global financial crisis for Ireland and Greece were more serious than those of the other countries of EU.

It should be noted that the ratios of total tax revenues to the GDP are essentially correlated in many countries of the EU. Thus, the analysis of the tendencies of the total revenue to the GDP in EU-28 countries has revealed the common characteristics of the tendencies for one group of countries and the opposite behavior in the other group. Despite the declaration of the common economic policy, as well as tax consolidation policy in EU, we have observed some differences in the total revenue to the GDP tendencies (Dubrovina et al., 2019), but these differences can be explained by the effect of possible convergence in tax burden policy in the EU countries (Dubrovina et al., 2016; Dubrovina, 2015).

Table 1

Total tax revenue (including social contributions) as % of GDP

	2002	2006	2008	2010	2012	2015	2017	Min	Max	Mean	Std.Dev.	Coefficient of variance, %
BE	46,3	45,5	45,8	45,5	47,3	47,5	47,3	45,2	48,2	46,4	1,01	2,2
BG	28,0	29,9	30,7	26,0	26,7	29,1	29,5	25,3	31,7	28,9	1,93	6,7
CZ	33,4	34,0	33,2	32,7	34,3	34,1	35,4	32,3	35,4	34,0	0,81	2,4
DK	47,0	47,8	46,0	46,3	46,9	47,3	46,5	46,0	49,9	47,3	1,09	2,3
DE	39,1	38,8	39,2	38,2	39,3	39,8	40,5	38,2	40,5	39,2	0,64	1,6
EE	31,3	30,7	31,6	33,5	31,9	33,5	33,0	30,1	35,1	32,1	1,32	4,1
IE	29,1	32,7	30,4	28,4	29,1	23,8	23,5	23,5	32,7	28,9	2,81	9,7
EL	34,6	32,7	33,7	34,2	38,8	39,8	41,8	32,1	41,9	36,0	3,41	9,5
ES	34,0	36,7	32,9	32,1	33,1	34,5	34,5	30,6	37,1	34,1	1,7	5,0
FR	44,1	45,1	44,4	44,2	46,5	47,7	48,4	44,0	48,4	45,6	1,65	3,6
HR	37,6	36,9	36,8	35,9	35,9	37,3	37,8	35,2	37,8	36,7	0,73	2,0
IT	39,9	40,4	41,5	41,7	43,8	43,3	42,4	39,2	43,8	41,7	1,52	3,6
CY	28,0	32,1	34,8	31,9	31,6	33,3	34,0	28,0	36,1	32,1	2,1	6,6
LV	28,0	29,0	28,4	28,7	29,3	30,4	31,4	27,7	31,4	29,1	1,2	4,1
LT	29,0	30,4	30,9	28,7	27,3	29,2	29,8	27,3	30,9	29,2	1,19	4,1
LU	38,9	37,1	38,1	38,9	39,9	38,8	40,3	37,1	40,3	38,9	0,88	2,3
HU	37,4	36,5	39,5	37,3	38,4	38,9	38,4	36,5	39,5	38,0	1,04	2,7
MT	30,8	33,3	33,4	33,2	33,7	32,1	33,4	30,8	34,2	32,9	1,06	3,2
NL	35,9	36,6	36,5	36,1	36,1	37,5	39,2	35,6	39,2	36,6	1,12	3,1
AT	44,1	41,5	42,4	41,9	42,6	43,9	42,4	41,5	44,1	42,7	0,85	2,0
PL	34,1	34,6	35,0	32,4	33,0	33,3	35,1	32,1	35,5	33,7	1,04	3,1
PT	34,0	34,8	34,9	33,7	34,5	37,0	36,9	33,4	37,2	35,2	1,38	3,9
RO	28,4	29,0	27,5	27,1	27,7	28,0	25,8	25,8	29,0	27,6	0,9	3,3
SL	37,4	37,9	36,8	37,4	37,4	36,9	36,8	36,7	38,2	37,2	0,44	1,2
SK	33,0	29,4	29,1	28,2	28,4	32,2	33,2	28,2	33,2	30,6	1,77	5,8
FI	43,5	42,3	41,3	40,9	42,8	44,0	43,4	40,9	44,2	42,6	1,08	2,5
SE	45,6	46,4	44,5	43,7	43,1	43,6	44,9	43,0	47,1	44,7	1,31	2,9
UK	33,3	34,9	35,8	34,9	34,5	34,4	35,4	33,3	35,8	34,6	0,72	2,1

Source: compiled by the authors base on the statistical data of Eurostat.

Despite the variety of modern optimal tax theories, it is possible to group them into two approaches: (1) theories of the optimal taxation based on the normative or standard approach; (2) theories of the optimal taxation based on the positive approach (Klimešová, 2014; Schultzová, 2009). The normative approach looks for an ideal tax system, which minimizes the tax burden. The disadvantage of this approach is that theories have poor implementation in practice, because they do not consider such issues as tax evasion, vertical and horizontal tax distribution and redistribution, different kinds of taxes, etc. The positive approach is related to the policy makers and theory of public elections. The representatives of this approach concentrate their attention on the attractiveness of tax systems for the different target groups such as politicians, electors, different social groups, etc. These kinds of theories focus more on the behavioral and institutional aspects of tax systems and improvement of their efficiency.

Taxes play an important role in the development of economy, so the dynamic equilibrium between welfare state and motives to develop business should be taken into account. If the national economic system sets a very high level of taxes, it reduces entrepreneurship and pushes the business to look for a better business environment abroad; alternatively, tax evasion is observed. On the other hand, a low level of taxation leads to reductions in total government revenue and, as a consequence, total government expenditure on education, science, healthcare, safety, social programmes, etc. Thus, competitiveness of the national economy may suffer due to lacking scientific achievements, poor infrastructure in the public sector, «brain drain», and labour migration. In such countries, social inequity, conflicts and corruption increase and these economies are not attractive for foreign investors. Conversely, well-developed countries with transparency for business, rational system of taxes, good infrastructure, comfortable business environment and high social standards are arenas for international cooperation, business, and foreign investments.

In this research we studied the relationship between export and import tendencies in the EU countries, as well as the impact of some taxes on export-import tendencies. As indicators for export and import tendencies we selected: (1) Share of imports by EU-28 partner in total imports (%), and (2) Share of exports by EU-28 partner in total exports (%). As tax indicators we used: (1) Taxes on production and import, receivable (as % of GDP), (2) Capital taxes, receivable (as % of GDP), and (3) Capital transfers, payable (as % of GDP). All data used are from Eurostat databases for the period of 2002-2018.

In the first stage of our research we calculate the main statistical characteristics for the mentioned indicators.

In Table 3 the characteristics for indicators «Share of imports by EU-28 partner in total imports (%)» and «Share of exports by EU-28 partner in total exports (%)» are presented for the EU-28 countries for the period of 2002-2018.

Table 3

**Main statistical indicators for the share of imports and exports
for the EU-28 countries for the period of 2002-2018**

Countries	Indicator i_c – Share of imports by EU-28 partner in total imports (%)					Indicator e_c – Share of exports by EU-28 partner in total exports (%)				
	Mean	Std. Dev.	Max	Min	Coeff. of Var.	Mean	Std. Dev.	Max	Min	Coeff. of Var.
Belgium	68,31	3,59	73,6	62,8	5,25	73,83	2,62	77,3	70	3,55
Bulgaria	60,74	2,8	66,4	57	4,61	63,06	2,36	67,6	58,9	3,74
Czechia	77,11	2,68	81,5	71,5	3,48	84,56	1,95	87,9	81,1	2,31
Denmark	71,02	1,48	74,8	69,5	2,08	66	4,16	71,2	58,8	6,3
Germany	65,07	1,14	66,7	63,3	1,75	60,94	3,14	65,2	56,8	5,15
Estonia	77,46	4,62	82,1	65	5,97	72,33	5,3	82,5	65,6	7,33
Ireland	66,33	1,86	70	62,8	2,81	58,06	5,71	66	47,4	9,83
Greece	55,86	4,64	63,7	47,6	8,31	57,28	7,07	67	44,5	12,34
Spain	61,08	4,42	69,3	54,2	7,24	68,68	3,94	75,4	62,9	5,74
France	68,7	0,93	70,3	67,1	1,36	61,9	3,02	66,8	58,2	4,87
Croatia	70,01	6,56	79,8	60,2	9,37	63,61	3,03	68,3	58,2	4,77
Italy	58,41	3,05	63,7	53,3	5,23	58,2	3,25	63,2	53,8	5,58
Cyprus	66,32	4,58	72,5	57,6	6,9	58,41	12,63	73,3	29,4	21,62
Latvia	77,37	1,83	80,4	74,8	2,36	70,29	4,69	79,5	63,6	6,68
Lithuania	62,68	5,47	71,1	56,1	8,73	61,63	3,81	69,3	54,8	6,18
Luxembourg	77,94	4,95	87,8	70,6	6,36	85,31	3,55	90,3	79	4,16
Hungary	71,14	3,77	77,7	64,7	5,3	80,93	2,4	85,4	77,4	2,97
Malta	70,37	5,69	77,1	55,5	8,08	47,04	5,75	56,5	39,1	12,21
Netherlands	48,25	3,18	55,2	45,2	6,59	77,3	2,19	80,5	73,4	2,84
Austria	78,81	2,11	83,5	76,5	2,68	72,32	2,07	76,5	69,9	2,86
Poland	71,22	2,2	75,4	67,7	3,09	79,17	1,74	82,2	75	2,2
Portugal	76,22	2,29	79,9	71,5	3	75,84	3,44	81,4	70,3	4,53
Romania	71,86	4,41	77,2	63,2	6,14	73,24	2,45	77,1	69,6	3,35
Slovenia	74,37	6,24	85,7	63,3	8,39	76,27	1,13	77,6	73,5	1,48
Slovakia	76,23	2,84	80,8	72,6	3,73	85,86	1,65	90,1	82,8	1,93
Finland	67,21	3,72	73	61,5	5,54	57,43	2,04	61,2	53,7	3,56
Sweden	69,84	1,56	72,3	67,1	2,23	58,71	1,25	61,3	56,1	2,14
United Kingdom	52,51	3,08	57,3	47,6	5,86	52,51	6,07	62,7	43,5	11,56

Source: compiled by the authors base on the statistical data of Eurostat.

In table 4, the main statistical characteristics for selected taxes which have an impact on the export-import tendencies in the EU countries are given.

Table 4

**Main statistical indicators for selected taxes in the EU-28 countries
for the period of 2002-2018**

Countries	Indicator t1_c – Taxes on production and import, receivable (as % of GDP)				Indicator t2_c – Capital taxes, receivable (as % of GDP)				Indicator t3_c – Capital transfers, payable (as % of GDP)			
	Mean	Std. Dev.	Max	Min	Mean	Std. Dev.	Max	Min	Mean	Std. Dev.	Max	Min
Belgium	13,22	0,3	13,7	12,7	0,73	0,15	1	0,5	1,44	0,73	3,6	0,7
Bulgaria	15,07	1,08	16,7	12,3	0,28	0,11	0,5	0,1	1,01	1,01	3,9	0,2
Czechia	11,41	0,9	12,7	10,1	0	0	0	0	1,78	1,33	4,9	0,6
Denmark	16,54	0,52	17,5	15,7	0,22	0,04	0,3	0,2	0,51	0,38	1,8	0,2
Germany	10,73	0,24	11,3	10,3	0,19	0,02	0,2	0,1	1,44	0,37	2,6	1
Estonia	13,41	0,76	14,7	12	0	0	0	0	0,71	0,28	1,4	0,3
Ireland	10,76	1,87	13,6	7,8	0,17	0,05	0,2	0,1	2,34	5,06	22,1	0,5
Greece	13,99	2,09	17,2	11,6	0,14	0,06	0,3	0,1	2,04	2,74	12,2	0,3
Spain	10,97	1,09	12,2	8,1	0,46	0,07	0,6	0,4	1,27	0,84	4,4	0,6
France	15,41	0,61	16,8	14,7	0,51	0,07	0,6	0,4	1,05	0,19	1,6	0,8
Croatia	18,6	0,93	20,3	17	0	0	0	0	1,83	0,48	2,9	1,3
Italy	14,24	0,53	15,2	13,4	0,27	0,33	1,3	0	1,32	0,32	2,3	0,9
Cyprus	14,73	1,12	17	12,1	0,08	0,23	0,8	0	1,66	2,31	10,1	0,4
Latvia	12,63	1,11	14,3	10,8	0	0	0	0	0,72	0,79	2,3	0
Lithuania	11,52	0,32	12,4	11	0	0	0	0	0,81	0,98	4,5	0,3
Luxem- bourg	12,42	0,59	13,4	11,5	0,14	0,05	0,2	0,1	1,09	0,19	1,4	0,8
Hungary	16,98	1,45	18,7	14,9	0,04	0,05	0,1	0	2,04	0,72	4,1	1,3
Malta	13,07	0,73	14,3	12,1	0,2	0,06	0,3	0,1	1,01	0,67	3,4	0,1
Nether- lands	11,36	0,37	12	10,6	0,26	0,05	0,3	0,2	0,69	0,19	1,1	0,4
Austria	14,26	0,31	14,8	13,7	0,04	0,06	0,2	0	1,51	0,99	5	0,6
Poland	13,58	0,52	14,4	12,8	0	0	0	0	0,68	0,23	1	0,3
Portugal	14,17	0,69	15,2	12,5	0,02	0,05	0,2	0	1,23	0,9	4,1	0,5
Romania	11,94	1,07	13,3	10,2	0	0	0	0	1,33	0,55	2,6	0,3
Slovenia	14,58	0,65	15,7	13,5	0,01	0,03	0,1	0	1,46	2,43	11	0,3
Slovakia	11,44	0,67	12,6	10,3	0	0	0	0	0,87	0,76	3,5	0,3
Finland	13,56	0,62	14,3	12,4	0,27	0,06	0,4	0,2	0,32	0,07	0,4	0,2
Sweden	22,16	0,37	22,8	21,5	0,02	0,04	0,1	0	0,31	0,07	0,5	0,2
United Kingdom	12,27	0,63	13	10,9	0,29	0,33	1,6	0,2	1,22	0,46	2,7	0,8

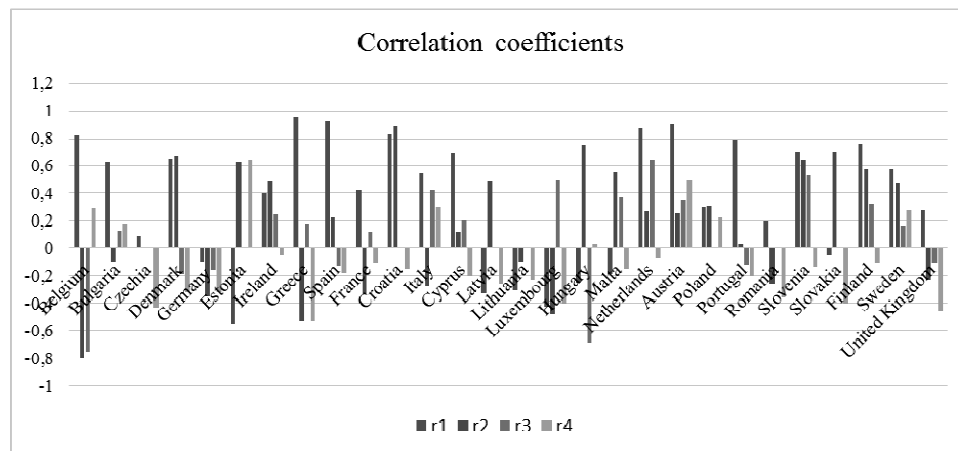
Source: compiled by the authors base on the statistical data of Eurostat.

As the data in tables 3 and 4 testifies, there is a great variety of values across the EU-countries, which proves that countries of the EU have different features in the export-import strategies and in the system of taxation.

In next stage, we calculate the coefficients of correlations between selected indicators (presented in Fig. 3).

Figure 3

Pair correlation coefficients for selected indicators of the EU-28 countries



In this stage, such coefficients of pair correlation are calculated: r1 – correlation between i_c and e_c ; r2 – correlation between i_c and $t1_c$; r3 – correlation between i_c and $t2_c$; r4 – correlation between i_c and $t3_c$.

As we can see from Fig. 5, different kinds of pair correlation are observed for various countries of the EU. In some countries, these values are relatively high and positive, in other countries the values of pair correlation for certain indicators are negative, in yet another set of countries there is no significant relationship between these indicators and pair correlation is relatively small or equal to 0.

This proves that despite the common policy in the EU and some regulation of economic policy, EU member states are characterized by a great variety of export-import policies and systems of taxation. This is also reflected by the different values of coefficients of correlation, which demonstrate the level of relation between two indicators. If coefficients of pair correlation in absolute values ap-

proach 1, there is a strong linear relationship between the relevant indicators. If coefficients of pair correlation in absolute values approach 0, there is no relation between the indicators. It is possible to evaluate the nature of the relationship between indicators – positive (positive slop) or negative (negative slop) – using the values of coefficients of the pair correlation.

Taking into account this information, we propose to analyze a model that consists of a system of two equations for annual changes in values of import and export tendencies. We use pooled data to evaluate this effect for the EU as a single political and economic system.

The supposition in this model is that the changes of values in import and export tendencies may be related. We suppose that annual changes in import may depend on annual changes of values in the selected tax indicators; annual changes of values in export tendencies may have impact on the annual changes in import tendencies.

This model is presented below:

$$\begin{cases} \Delta i_c = a_0 + a_1 \cdot \Delta t_{1c} + a_2 \cdot \Delta t_{2c} + a_3 \cdot \Delta t_{3c} + \varepsilon_{ic} \\ \Delta e_c = b_0 + b_1 \cdot \Delta i_c + \varepsilon_{ec} \end{cases}$$

In this model, we use first differences for exogenous and endogenous variables. The delta symbol means that the first difference or year by year change was calculated for the related initial indicators. The unknown parameters may be estimated by 2-stage method of least squares. The stochastic terms ε_{ic} and ε_{ec} signify the impact of different shocks on import and export tendencies.

The results of estimation for first equation are presented in table 5.

There are other characteristics for this model: multiple R equals 0,110419; $F(3,472) = 1,94195$ ($p < 0,15$), Std.Err. of Estimate = 2,515 and $DW = 2,083$.

Table 5

Characteristics of the estimation for first model in the system of equations

	b*	Std.Err.	b	Std.Err.	t(472)	p-value
Intercept			-0,012268	0,115559	-0,10616	0,915501
delta_t1c	0,003411	0,045752	0,015588	0,209062	0,07456	0,940596
delta_t2c	0,089947	0,045751	1,656057	0,842339	1,96602	0,049882
delta_t3c	-0,064014	0,045749	-0,090631	0,064771	-1,39925	0,162396

As we can see from table 5, only the second tax factor (annual changes in Capital taxes, receivable) has statistically significant positive effect ($p < 0,05$) on annual changes on Share of imports by EU-28 partner in total imports. The first tax factor (annual changes in Taxes on production and import, receivable) does not have a significant statistical impact on annual changes on Share of imports by EU-28 partner in total imports. The third tax factor (annual changes in Capital transfers, payable) has a negative effect on annual changes on Share of imports by EU-28 partner in total imports. For this factor, the value of $p < 0,2$ is not statistically significant for the parameter.

Additionally, we can see that the value of multiple R is very small, which means that stochastic errors have a big impact on the formation of the indicator «annual changes in Share of imports by EU-28 partner in total imports». The results of estimation for second equation are presented in table 6.

Table 6

Characteristics of the estimation for the second model in the system of equations

	b*	Std.Err.	b	Std.Err.	t(474)	p-value
Intercept			-0,309457	0,109408	-2,82846	0,004876
delta_i_c_pred	0,075715	0,045800	0,649625	0,392955	1,65318	0,098957

There are other characteristics for this model: multiple R equals 0,07897; $F(1,475)$ ($p < 0,1$), Std.Err. of Estimate = 2,403 and DW = 2,094.

As we can see from table 6, intercept is negative and estimation for this parameter is statistically significant at $p < 0,01$. Factor «annual changes on Share of imports by EU-28 partner in total imports» has positive effect on indicator «annual changes in Share of export by EU-28 partner in total exports» and is statistically significant at $p < 0,1$.

Additionally, we can see that the value of multiple R is very small, which means that stochastic errors have a big impact on the formation of the indicator «annual changes in Share of export by EU-28 partner in total exports».

Taking into account the significant differences in the export-import policies and taxation systems across the EU countries, it is necessary to evaluate individual features in these countries and study panel data on fixed or random effects.

Conclusions

Export and import policies have a significant impact on most EU countries, nevertheless the study provided an opportunity to substantiate the dependence between these indicators. Tax factors have an impact on the export and import tendencies in the EU countries. Reducing tax rates on exports in the short term may have a positive effect on the intensification of export activities, but (in the short or long term) this may also increase the dependence of the national economy on foreign markets. Reducing import tax rates, on the one hand, helps to strengthen the competitive position of domestic producers in foreign markets, and on the other hand, intensifies competition in the domestic market.

Therefore, the research problem of taxes' impact on export-import tendencies in the EU countries requires a more in-depth analysis at the country level for each EU member state. For this purpose, it is possible to use panel data and test fixed or random effects which characterize some features of the export-import policy and taxation system of EU members. These features may be explained mainly by institutional, political and economic factors. Moreover, it is necessary to take into account the essential impact of different shocks on export and import policies in our unstable modern times.

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