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ВЕСТНИК

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
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NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources CitationIndex, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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STABILITY OF FISCAL REVENUES IN EU: WHAT TO TAX?

Abstract. Certain and predictable tax revenues are desirable by states to run fiscal policy smoothly and minimize any negative effects of business cycles. Over the last decades sizes of government budgets in most EU Member States have experienced rather small transformations. However, particular kinds of taxes contribute to that stability to different extent. Although, this matter is important from the perspective of state budget, it has not been analysed thoroughly before – especially in EU. Based on statistical analysis of macroeconomic data I calculated that revenues from payroll taxes feature especially low variability and positively influence the budget constancy. Changes over time are slightly bigger for taxes imposed on production. Inflows from taxation of income of corporations are particularly unstable. These findings may support policymakers in appropriate budget revenues design.

Expansionary fiscal policy is believed to boost economic growth ((Aschauer, 1989), (Munnell, 1990)). Public investments are traditionally believed to support long-term growth of economies (Barro, Government Spending in a Simple Model of Endogenous, 1990). On the other hand low taxes should support development of economy as well ((Engen & Skinner, 1992), (Daveri & Tabellini, 2000), (Karras & Furceri, 2009), (Padovano & Galli, 2001) or (Lee & Gordon, 2005) to mention only selected research). For example Romer and Romer estimated that a 1% increase in taxation relative to GDP induces reduced output of up to 3% over the following three years (Romer & Romer, 2007). Mountford and Uhling claimed that tax cuts - even if financed from budget deficit – are most effective from the perspective of economy growth (Mountford & Uhlig, 2008). Blanchard and Perotti found that tax shocks affect investment, consumption and output (Blanchard & Perotti, 2002).

However, some empirical analysis failed to confirm significance of the relation between GDP and tax rates ((Easterly & Rebelo, 1993), (Mendoza, Milesi-Ferretti, & Asea, 1997)). The correlation between the level of the tax rate and output was found to be indeed negative but sometimes non-existing. These results are in line with common sense. However, in the long run high public spending cannot be combined with low taxes (assuming that low taxes transfer into smaller budget revenues). High public deficits, which may arise in consequence of expansionary fiscal policy, are eventually harmful for economic growth in the long-run. Therefore, satisfactory inflows from taxes are desirable.

Maintaining balanced budgets is a typical objective of several world economies. Yet this requirement seems key for European Monetary Union states, which use single currency and hence lead common monetary policy [1]. To improve economic stability of those countries and to provide for at least impeded policy-mix tools, certain requirements related to fiscal policy were imposed on them. According to the so called Convergence Criteria (also known as Maastricht Criteria)(i) the ratio of the annual government deficit to GDP must not exceed 3 percent and (ii) the ratio of government debt to GDP must not exceed 60 percent. However, several Member States are struggling against high budget deficits which are followed by excessive public debts. Most EU Member States have been returning to balance over last years and in 2017 almost half of them recorded government surplus. However, the budget deficit for the EU as a whole is still substantial and in 2017 amounted to 81.6% of its GDP. This is far more than before the crisis in 2007 when a figure of 57.5% of GDP was recorded. Moreover, although from peak in 2014 general government debt decreased on average in a number of Member States, still in 2017 as much as 12 out of 19 eurozone countries bound by the Maastricht criteria recorded debt above required level of 60% of local GDP. Identification of reliable sources of state revenues may provide a useful tool to cope with that issues.

Key words: Income Tax, National Budget, Public Finance, Revenue, Taxation.

Introduction. Therefore, it is believed that public expenditures should match government revenues within some limits. Keeping an appropriate balance between taxation and budget expenses should support economic growth as long as the size of the government is not excessive ((Fölster & Henrekson, 2001), (Bassanini, Scarpetta, & Hemmings, 2001)).However, fiscal spending should accommodate to current economic conditions.

In the literature the typically mentioned drawback of volatile fiscal revenues is the disability of government to avoid significant spending reductions or increases of taxes in times of low tax inflows. In addition such actions of government often affect real economy and push it to a vicious circle of cyclicality (Kwak, 2013). Levinson, who analysed US states found that strict balanced budget requirements exacerbate business cycle (Levinson, Balanced budgets and business cycles: evidence from States, 1998). Canova and Pappa found that the fiscal constraints are almost unimportant for macroeconomic fluctuations. However, they conclude that the reason could be that (i) constraints apply only to a portion of the total budget, (ii) that no formal provision for the enforcement of the constraints exist and that (iii) rainy days funds play a buffer-stock role (Canova & Pappa, 2005).

Assuring stable revenues for the budget seems crucial both to maintain the balance and to foster economic growth of a state. Tax revenues tend to follow business cycle. Therefore, secure revenue sources that are less prone to business cyclicality are particularly desirable as they enable to run fiscal policy more independently from current economic situation. For this reason this analysis focuses on volatility of government revenues [2].

The study dig further and is focused on particular components of revenues, which is seldom done in the literature (Afonso & Furceri, 2010).There is not only need for better understanding of tax policy mechanisms – especially in EU - (which this article should contribute to) but also there are practical reasons mentioned above (and hereinafter in this article) that justify the necessity of this research.

Methods. Methods used are general scientific and special, such as: system analysis method; content analysis method; comparative analysis method; method of analysis and synthesis; method of systematic approach.

Results. Size of the government in EU countries generally stabilized over the last twenty years. However, still there were states where budget revenues from taxes (which are the main financing source, as explained above) were ongoing significant changes. The biggest change in the period 1995–2016 was recorded in Greece - increase by 12.5 percentage points relative to GDP. Ireland ranked second with a decrease of 9.9 percentage points of local GDP. Concurrently, there are as much as eighteen countries, where the changes did not exceed 3 percentage points (both in plus or in minus) [3].

Such findings do not give sufficient information on the changes of tax inflows within the analysed period as only the extreme dates are compared. Therefore, as one of the solutions I calculated standard deviation of revenues for total taxes for each country for the verified time span. However, this measure in terms of deviation analysis is also not particularly informative as government revenues from total taxes vary significantly among EU states in comparison to their GPDs. For example, in 2016 in Denmark government size accounted for 47.5 percent of local GDP but at the same time for Ireland the figure was exactly two times lower (for other countries please refer to table 3 included above) [4]. Therefore, to account for comparability among the sample standard deviation applicable for each state was compared with average tax revenues of such state and in effect coefficient of variation was calculated.

From these descriptive statistics calculations stems out that coefficient of variation is the biggest for Cyprus (11.8%) followed by Slovakia (10.1%). Greece, where changes in tax revenues in extreme dates where the biggest (as analysed earlier) is now ranked third. However, for several EU countries the figure is relatively low [5]. This means that in majority of Member States tax revenues have been relatively stable over last two decades and on average coefficient of variation was 4.7%.

Fiscal policy is lead so far independently by any EU Member State, even within eurozone. Some countries finally worked out their taxation system and do not amend the rules significantly, whereas the others continuously amend the system by increasing or decreasing the role of government in the economy.

Therefore, it seems reasonable to estimate the trend for total tax revenues for each state for the verified period. To eliminate any seasonal or cyclical factors simple linear function seems most appropriate:

$$y_t = at + b$$

Where *t* is a year from the period 1995–2016, *a* is the gradient of the function and *b* is the intercept. Trend line was estimated using OLS method which minimizes the sum of the squared errors in the data series and hence provide for best possible fit to the empirical data.

Table 1 – Average total tax revenues for the Member States in the period 1995 – 2016 including standard deviation and coefficient of variation

State	Standard deviation	Average total tax revenues	Coefficient of variation
Cyprus	3,5	29,9	11,8%
Slovakia	3,2	32,3	10,1%
Greece	3,2	34,3	9,4%
Malta	2,8	31,1	8,9%
Ireland	2,6	30,1	8,8%
Bulgaria	1,8	28,6	6,4%
Lithuania	1,6	29,6	5,6%
Estonia	1,7	32,5	5,1%
Portugal	1,6	34,3	4,8%
Poland	1,6	34,5	4,7%
Sweden	2,1	45,9	4,6%
Romania	1,3	28,1	4,5%
Latvia	1,2	29,4	4,2%
Spain	1,3	33,9	4,0%
Finland	1,6	43,1	3,7%
United Kingdom	1,2	33,8	3,7%
Italy	1,5	41,1	3,5%
France	1,3	44,8	3,0%
Netherlands	1,0	37,0	2,8%
Hungary	1,0	38,1	2,7%
Austria	1,1	43,3	2,7%
Germany	1,0	39,6	2,5%
Denmark	1,1	47,8	2,4%
Czech Republic	0,8	33,7	2,4%
Luxembourg	0,8	38,5	2,1%
Belgium	0,8	45,6	1,7%
Slovenia	0,5	37,2	1,4%

Source: Authors' own calculations.

Table 2 – Estimated trend function for total tax revenues of EU Member States for the period 1995 – 2016

State	Gradient	Intercept
Cyprus	0,48	24,3
Greece	0,44	29,2
Malta	0,39	26,7
Portugal	0,23	31,6
Italy	0,15	39,4
France	0,14	43,2
United Kingdom	0,14	32,1
Luxembourg	0,05	37,9
Belgium	0,04	45,1
Czech Republic	0,04	33,2
Spain	0,01	33,8
Hungary	-0,01	38,2
Latvia	-0,02	29,6
Estonia	-0,02	32,7
Slovenia	-0,02	37,5
Netherlands	-0,03	37,4
Denmark	-0,04	48,3
Romania	-0,05	28,7
Bulgaria	-0,05	29,2
Germany	-0,08	40,4
Lithuania	-0,08	30,5
Austria	-0,10	44,4
Finland	-0,12	44,6
Poland	-0,19	36,6
Sweden	-0,29	49,3
Ireland	-0,34	34,0
Slovakia	-0,40	36,8

Source: Authors' own calculations.

Such trend line estimated for the whole EU is almost constant. In 1995 so estimated tax revenues are at 36.1% of GDP and are increasing by 0.01% p.a. to reach 36.22% in 2016. Yet, the empirical data differ substantially and at 0.05 significance level the F statistics suggests that there is no linear linkage with the real values. This seems to be due to the fact that the trend for particular Member States is either generally increasing, decreasing or there is no clear trend. Detailed data is presented in a table below [6].

As we see the gradient value is modest for most countries. This suggest that the changes in tax revenues are relatively small. However, it turned out that at 0.05 significance level the estimated functions are statistically significant only for 14 states (using F statistics). This means that there is no clear linear trend for the rest of the sample. For details please refer to the table below.

This finding may suggest that ca. half of EU Member States have led stable tax policy over the last years. It does not mean of course that the tax revenues did not change. They did, but such changes were proportional over time. In fact, tax revenues were generally either increasing, decreasing or remain constant but always followed a statistically significant trend line for the period considered [7].

The higher the coefficient of determination (calculated both for the empirical data and for the estimated trend line) the more balanced the tax revenues should be. Naturally for the countries where the Pearson correlation coefficient is closer to zero (i.e. for Luxembourg, Belgium and following countries in the bottom of the above table) it does not mean that there is no linkage between volume of tax revenues and the estimated trend line. The only information is that the relation is non-linear. This issue is, however, also an important finding as it confirms that in 13 cases the tax revenues of these EU Member States do not follow linear trend and hence we can assume their higher volatility or unpredictability [8].

Estimated linear trends allow us to calculate coefficients of residual variation. Due to statistical reasons their values obviously should be smaller in any case than calculated earlier coefficient of variation. Due to the nature of such estimation this of course holds for each country with no exception. The comparison of the values is included in the table below. Only countries with statistically significant trend lines were taken into consideration.

Table 3 – Coefficient of determination, correlation coefficient and results of F statistics for the estimated trend lines for EU Member States for 1995 - 2016

State	R2	Correlation coefficient	Is there linear correlation?
Portugal	0,80	0,89	Yes
Malta	0,79	0,89	Yes
Sweden	0,76	0,87	Yes
Cyprus	0,75	0,87	Yes
Greece	0,75	0,87	Yes
Ireland	0,66	0,81	Yes
Slovakia	0,60	0,77	Yes
Poland	0,54	0,74	Yes
United Kingdom	0,52	0,72	Yes
France	0,46	0,68	Yes
Italy	0,43	0,65	Yes
Austria	0,29	0,53	Yes
Germany	0,24	0,49	Yes
Finland	0,24	0,49	Yes
Luxembourg	0,14	0,38	No
Belgium	0,13	0,36	No
Czech Republic	0,12	0,34	No
Lithuania	0,10	0,31	No
Slovenia	0,07	0,27	No
Romania	0,07	0,26	No
Denmark	0,06	0,25	No
Netherlands	0,04	0,20	No
Bulgaria	0,03	0,18	No
Latvia	0,01	0,08	No
Spain	0,00	0,07	No
Estonia	0,00	0,07	No
Hungary	0,00	0,04	No

Source: Authors' own calculations.

From the above we see that on average the coefficient of residual variation is lower than the coefficient of variation by 35.3%. The higher the R2 value, the higher the percentage difference of coefficient of residual variation and coefficient of variation. This results from mathematical calculations and fully corresponds with the common sense. Unsurprisingly the higher the correlation of the trend line with the empirical data (and also the R2) and hence the fit of the trend line is better, the lower difference between the coefficient of variation calculated on empirical non-modelled data and the coefficient of residual variation calculated on the trend line [9].

The analysis made so far focused on revenues from all key taxes. Yet, the question arises how good particular taxes are in these countries in providing stable inflows to the government. To answer that question, I made similar calculations for all material kids of taxes – i.e. D2 - Taxes on production and imports, D5 - Current taxes on income, wealth, etc. and D61 - Net social contributions.

For each type of tax, the absolute changes were calculated. At first only two years – i.e. 2016 and 1995 were considered. For details please refer to the below table.

During the analysed period the smallest change were recorded for social security with the average value of 1.4 percentage point of total EU GDP (the figure is calculated as absolute value). Higher average change was for production taxes of 1.7 points and the highest for income taxes of 1.9 points. Naturally, this could be related to the fact that in percentage terms these three categories of taxes play different role in rising budget revenues. Whereas taxes imposed on production on average provide for highest budget revenues (13.6% of GDP for all EU Member States), both income taxes and social security are of lesser importance (11.5% of GDP each). When these shares are taken into account it strikes that income taxes are most volatile as such average relative change was 0.17, whereas for production taxes and social security it amounted for 0.12. These simple calculations lead to interesting conclusion, which is in line common sense. Namely, due to the fact that income taxes are particularly prone to tax competition among states, the volatility among them is above that for other taxes. The exposure of CIT for tax competition has been discussed widely in the literature from perspective of capital mobility investment location decisions of multinationals (e.g.

Table 4 – Coefficient of residual variation of total tax revenues

State	coefficient of variation	coefficient of residual variation	coefficient of residual variation lower than coefficient of variation
Portugal	4,8%	2,1%	55%
Malta	8,9%	4,0%	54%
Sweden	4,6%	2,3%	51%
Cyprus	11,8%	5,8%	50%
Greece	9,4%	4,7%	50%
Ireland	8,8%	5,1%	42%
Slovakia	10,1%	6,4%	37%
Poland	4,7%	3,2%	32%
United Kingdom	3,7%	2,5%	31%
France	3,0%	2,2%	27%
Italy	3,5%	2,7%	24%
Austria	2,7%	2,2%	15%
Germany	2,5%	2,2%	13%
Finland	3,7%	3,2%	13%
Average	**5,9%**	**3,5%**	**35%**

Source: Authors' own calculations.

(Winner, 2005), (Devereux & Griffith, 1998), (Becker & Fuest, 2010), (Büttner & Ruf, 2007), (Overesch & Wamser, 2010), (Ghinamo, Panteghini, & Revelli, 2010), (Barrios, Huizinga, Laeven, & Gaëtan, 2009), (Nicodème, 2009) etc.)

The above calculations considered only two years from the analysed period. Therefore, the information produced is not complete as the years 1996 – 2015 were disregarded. Therefore – similarly to the earlier calculations for total taxes - I computed also standard deviation of revenues for each category of taxes for each state for the whole verified time span. To assure comparability of volatility among EU Member States I considered the share of particular tax in building budget revenue in a given country. As a result, (i) standard deviation applicable for each state and for each type of tax was referred to (ii) average tax revenues for such tax type for each country. This provided for coefficient of variation [10].

From these calculations stems out that the highest average coefficient of variation for EU states for the period 1995 – 2016 is for D5 - Current taxes on income, wealth, etc. with the value of 11%. This is followed by 8.5% for D61 - Net social contributions and 6.7% for D2 - Taxes on production and imports [11].

The findings provided by these statistics are more robust and reliable than calculated before. However, the key information is the same. Namely, these are income taxes that are characterized by highest volatility. However, this time the results are different for the remaining taxes. In particular, social security ranked second with average coefficient of variation of 8.5%, whereas taxes on production proved to be most stable in providing budget revenues (average coefficient of variation of 6.7%).

In the following step I estimate with OLS method the linear trend for each type of tax revenues for each EU state for the considered period. I do this using the same function as earlier in this article $y_c = at + b$ (where t is a year from the period 1995 – 2016, a is the gradient of the function and b is the intercept).

The gradient value in a number of cases is lower than for total taxes analysed before. This suggests that in general the volatility in tax revenues from each type of tax should be small in most countries.

However, it turned out that at 0.05 significance level the estimated functions are significant only from 16 to 17 states (depending on the type of tax). Conclusion is similar to the one applicable to total taxes – i.e. there is no clear linear trend for the rest of the sample. For details please refer to the table below.

From the above we see that there are seven countries, where the revenues from all different kinds of taxes changed over time in a linear way (highlighted in dark grey). For 11 countries the inflows of money from taxes followed a linear pattern only with respect to two kinds of taxes (highlighted in medium dark grey). For the remaining states only one tax provided for revenues, which fluctuated linearly (highlighted in bright grey) or there was no such tax at all (Netherlands and Spain).

Finally, we see that both (i) taxes on production and (ii) current income taxes in 17 states provided for linear tax inflows and in this respect were slightly better than social contributions, which gave linear revenues for 16 countries over the analysed period.

Table 5 – Estimated trend function for different types of tax revenues of EU Member States for the period 1995 – 2016

State	Taxes on production and imports		Current taxes on income		Social contributions	
	gradient	intercept	gradient	intercept	gradient	intercept
Cyprus	0,25	10,58	0,11	8,01	0,12	5,72
Bulgaria	0,22	11,65	-0,16	7,99	-0,11	9,59
Hungary	0,14	14,93	-0,11	9,84	-0,03	13,42
Greece	0,14	11,64	0,13	7,24	0,17	10,32
Romania	0,14	10,14	-0,16	8,76	-0,03	9,78
Italy	0,11	12,91	0,04	13,70	0,01	12,79
Malta	0,10	11,80	0,33	7,18	-0,05	7,69
Estonia	0,09	12,24	-0,13	9,40	0,02	11,08
Czech Republic	0,09	10,11	-0,07	8,69	0,02	14,39
United Kingdom	0,04	11,72	0,03	14,01	0,07	6,41
Portugal	0,03	13,63	0,10	8,00	0,10	9,98
Latvia	0,03	12,35	0,05	6,98	-0,09	10,24
Germany	0,03	10,50	0,03	11,15	-0,13	18,79
Luxembourg	0,02	12,32	-0,03	14,56	0,06	11,07
Finland	0,02	13,49	-0,13	18,54	-0,01	12,53
Belgium	0,01	12,99	-0,01	16,38	0,04	15,68
Spain	0,01	11,08	0,01	10,05	0,00	12,62
Netherlands	0,00	11,64	-0,02	11,07	-0,02	14,67
France	-0,01	15,60	0,15	9,43	0,00	18,16
Poland	-0,03	13,93	-0,15	9,47	-0,01	13,23
Sweden	-0,04	23,06	-0,11	20,51	-0,14	5,70
Austria	-0,04	15,14	0,00	13,31	-0,06	15,91
Denmark	-0,04	17,48	0,05	28,75	-0,05	2,07
Slovenia	-0,05	15,62	0,02	7,39	0,01	14,49
Lithuania	-0,06	12,75	-0,20	9,65	0,19	8,08
Slovakia	-0,15	13,35	-0,15	8,93	-0,09	14,52
Ireland	-0,23	14,79	-0,10	13,87	0,00	5,32

Source: Authors' own calculations.

Table 6 – Testing the linear trend of revenues from particular taxes of EU Member States for the period 1995 – 2016

State	Taxes on production and imports			Current income taxes			Social contributions		
	R2	Correlation coefficient	Linear correlation?	R2	Correlation coefficient	Linear correlation?	R2	Correlation coefficient	Linear correlation?
Slovakia	0,76	0,87	Yes	0,53	0,73	Yes	0,27	0,52	Yes
Cyprus	0,54	0,73	Yes	0,32	0,57	Yes	0,86	0,93	Yes
Bulgaria	0,50	0,71	Yes	0,63	0,79	Yes	0,32	0,57	Yes
Czech Republic	0,49	0,70	Yes	0,38	0,61	Yes	0,19	0,43	Yes
Malta	0,42	0,65	Yes	0,92	0,96	Yes	0,63	0,79	Yes
Greece	0,41	0,64	Yes	0,52	0,72	Yes	0,92	0,96	Yes
Lithuania	0,29	0,54	Yes	0,53	0,73	Yes	0,65	0,81	Yes
Ireland	0,79	0,89	Yes	0,53	0,73	Yes	0,00	0,02	No
Romania	0,48	0,69	Yes	0,48	0,69	Yes	0,02	0,15	No
Hungary	0,47	0,69	Yes	0,36	0,60	Yes	0,12	0,34	No
Estonia	0,46	0,68	Yes	0,49	0,70	Yes	0,03	0,17	No
Austria	0,38	0,62	Yes	0,00	0,01	No	0,50	0,71	Yes
Germany	0,36	0,60	Yes	0,06	0,24	No	0,78	0,89	Yes
Denmark	0,29	0,54	Yes	0,07	0,27	No	0,62	0,79	Yes
United Kingdom	0,25	0,50	Yes	0,06	0,24	No	0,78	0,88	Yes
Sweden	0,14	0,37	No	0,38	0,62	Yes	0,68	0,83	Yes
Portugal	0,13	0,37	No	0,42	0,65	Yes	0,78	0,88	Yes
Latvia	0,03	0,18	No	0,33	0,58	Yes	0,51	0,71	Yes
Italy	0,43	0,65	Yes	0,11	0,33	No	0,00	0,06	No
Slovenia	0,32	0,57	Yes	0,06	0,24	No	0,00	0,06	No
Belgium	0,14	0,38	No	0,01	0,12	No	0,29	0,54	Yes
Poland	0,10	0,32	No	0,39	0,63	Yes	0,01	0,07	No
Luxembourg	0,05	0,22	No	0,09	0,31	No	0,52	0,72	Yes
Finland	0,03	0,18	No	0,47	0,69	Yes	0,02	0,13	No
France	0,03	0,17	No	0,57	0,75	Yes	0,00	0,03	No
Netherlands	0,00	0,04	No	0,04	0,20	No	0,02	0,13	No
Spain	0,00	0,04	No	0,01	0,09	No	0,00	0,07	No
Number of significant coefficients of determination			**17**			**17**			**16**

Source: Authors' own calculations

Finally, I calculate coefficients of residual variation (for countries where trend lines were statistically significant) and compare them with coefficient of variation [12].

From the above calculations we see that the difference between coefficient of residual variations and coefficient of variations are particularly high for social contributions (a mean of 39.1% for EU states, for which linear correlation was statistically significant). This means that although the volatility of revenues

from social security could be sizeable, the revenues from that tax follow a linear trend more than in case of revenues from current income taxes or taxes on production [13].

Finally, the calculation is made separately for (i) revenues from CIT and for (ii) revenues from payroll – i.e. PIT including social security.

The above analysis provides for very interesting finding. The average coefficient of variation for payroll for all EU Member States for the period 1995 - 2016 is just 6.1%, which is the lowest value among analysed taxes. This suggests that taxing workforce provides for exceptionally stable fiscal revenues.

On the other hand, coefficient of variation for CIT is on average for EU countries over the analysed period on the level of 22.2%. This value is by far the highest among the considered types of taxes. It may be stated that taxation of corporations has not provided stable tax revenues for the verified sample.

Both findings correspond with the common perception of elasticity of workforce and mobility capital as well as reflect the composition and aim of applicable taxation acts (i.e. employee's remuneration is relatively stable and their income is taxed with PIT and social security, whereas income of corporations greatly depends on business cycle and hence is more volatile, which transforms into unstable revenues from that tax).

Table 7 – Average tax revenues for (i) PIT including Social security and (ii) CIT for the EU Member States in the period 1995–2016 including standard deviation and coefficient of variation

State	PIT + Social security			CIT			Total coefficient of variation
	Standard deviation	Average revenue for the period	Coefficient of variation	Standard deviation	Average revenue for the period	Coefficient of variation	
Lithuania	1,20	15,96	7,5%	0,65	1,52	43,0%	50,5%
Bulgaria	1,53	11,56	13,2%	0,98	2,81	34,7%	48,0%
Slovenia	0,70	20,08	3,5%	0,69	1,61	42,7%	46,2%
Malta	0,68	13,02	5,2%	1,53	4,45	34,3%	39,6%
Greece	2,01	16,89	11,9%	0,67	2,46	27,1%	39,1%
Finland	1,22	25,48	4,8%	0,96	3,10	30,8%	35,5%
Slovakia	1,53	16,72	9,2%	0,79	3,07	25,9%	35,1%
Estonia	1,25	17,62	7,1%	0,41	1,59	26,0%	33,1%
Romania	1,00	13,10	7,7%	0,66	2,81	23,6%	31,2%
Spain	0,43	19,67	2,2%	0,78	2,76	28,3%	30,5%
Hungary	1,12	19,39	5,8%	0,46	1,95	23,7%	29,5%
Latvia	0,66	14,76	4,4%	0,42	1,80	23,3%	27,7%
Netherlands	1,16	21,05	5,5%	0,70	3,17	22,0%	27,5%
Cyprus	0,89	10,43	8,5%	0,97	5,27	18,4%	26,9%
Ireland	1,11	14,49	7,7%	0,55	3,02	18,3%	26,0%
Italy	1,23	23,86	5,1%	0,52	2,61	19,7%	24,9%
Sweden	1,78	20,17	8,8%	0,44	2,79	15,8%	24,6%
Luxembourg	1,22	19,40	6,3%	1,00	5,84	17,2%	23,5%
Poland	1,23	18,23	6,7%	0,36	2,19	16,6%	23,3%
Germany (until 199	1,07	25,97	4,1%	0,39	2,27	17,0%	21,1%
Portugal	1,40	16,83	8,3%	0,36	3,00	12,0%	20,3%
Denmark	1,24	27,02	4,6%	0,41	2,73	15,1%	19,7%
France	0,96	25,93	3,7%	0,36	2,51	14,5%	18,2%
United Kingdom	0,95	16,58	5,7%	0,37	2,95	12,4%	18,1%
Austria	0,79	25,30	3,1%	0,29	2,21	13,1%	16,2%
Czech Republic	0,46	18,59	2,5%	0,47	3,64	13,0%	15,4%
Belgium	0,70	28,69	2,4%	0,34	3,00	11,4%	13,8%
Average coefficient of variation			**6,1%**			**22,2%**	

Source: Authors' own calculations.

This finding is also well confirmed by calculation of trend lines and calculation of their explanatory value and testing [14].

The above table suggests that for payroll in 20 cases the estimated trend line is robust and well reflects reality. This is the highest figure among the analysed earlier in this article. This contributes to the hypothesis of relatively stable tax revenues that are provided by the work force [15].

On the other hand, only for 11countries the estimated linear trend for CIT revenues proved to be applicable. This is the lowest figure among those considered for the sample. This finding also supports the claim that inflow of sources from that tax are especially volatile and non-linear.

Discussion. Stable fiscal revenues are supposedly desirable by most governments. As available research show balanced government budgets should support investment and economic growth of states. In

the period 1995-2016 the average coefficient of variation for the whole EU (except for Croatia) for total tax revenues was 4.7%. Thus, indeed taxes in general provide for relatively stable budget inflows and hence may support local EU economies.

However, the volatility of taxes depends on the objects they are levied on. Corporate income taxes provide for particularly unstable revenues to the budgets(where the average coefficient of variation for the considered sample of countries and states is 22.2%). This is followed by taxes levied on production with 8.1% and payroll taxes (i.e. PIT plus social security), where such value is 6.1%.These findings are generally in line with common sense as they reflect the sensitivity of particular taxes to business cycles. Yet they are interesting, as expectations are confirmed in empirical data. It is worth to underline that inflows from CIT proved to be approximately three times more volatile than those from payroll taxes and taxes levied on production.

Table 12 – Testing the linear trend of revenues from particular taxes of EU Member States for the period 1995 – 2016

State	PIT + Social security			CIT		
	R2	Correlation coefficient	Linear correlation?	R2	Correlation coefficient	Linear correlation?
Greece	0,87	0,94	Yes	0,21	0,46	Yes
Luxembourg	0,71	0,84	Yes	0,69	0,83	Yes
Cyprus	0,65	0,81	Yes	0,43	0,66	Yes
Romania	0,59	0,77	Yes	0,74	0,86	Yes
Poland	0,48	0,69	Yes	0,39	0,63	Yes
Bulgaria	0,47	0,69	Yes	0,59	0,77	Yes
Malta	0,29	0,54	Yes	0,90	0,95	Yes
Italy	0,24	0,49	Yes	0,42	0,65	Yes
Ireland	0,20	0,44	Yes	0,37	0,61	Yes
Portugal	0,87	0,93	Yes	0,00	0,06	No
Sweden	0,84	0,92	Yes	0,04	0,19	No
France	0,70	0,84	Yes	0,15	0,39	No
Germany	0,60	0,78	Yes	0,10	0,31	No
Hungary	0,57	0,75	Yes	0,14	0,37	No
United Kingdom	0,40	0,64	Yes	0,14	0,37	No
Slovakia	0,38	0,61	Yes	0,13	0,36	No
Austria	0,33	0,58	Yes	0,02	0,13	No
Estonia	0,31	0,55	Yes	0,01	0,08	No
Latvia	0,20	0,45	Yes	0,06	0,24	No
Czech Republic	0,19	0,43	Yes	0,04	0,19	No
Finland	0,18	0,42	No	0,34	0,58	Yes
Netherlands	0,08	0,28	No	0,54	0,73	Yes
Spain	0,15	0,39	No	0,01	0,11	No
Denmark	0,06	0,25	No	0,00	0,02	No
Belgium	0,02	0,15	No	0,09	0,29	No
Slovenia	0,02	0,14	No	0,13	0,36	No
Lithuania	0,02	0,13	No	0,01	0,08	No
Number of significant coefficients of determination			**20**			**11**

Source: Authors' own calculations

Particularly curious is the fact that a set of PIT including Social security provide for considerably less volatile tax revenues than CIT. Therefore, although both PIT and CIT are income taxes and so are categorized by Eurostat, their joint analysis (which was done earlier in the article for comparison purposes and in other previous literature) may provide for misleading results in terms of behaviour of these sources of budget income.

When the trend line was estimated for analysed set of taxes the information produced was similar. For CIT only in 11 out of 27 cases such estimation was statistically reasonable. This means that in most EU states inflows from that tax did not follow linear pattern. The results were considerably better for taxes on production (17 countries) and the best outcome produced employee levies (20 states). Therefore, the linear trend is much more appealing to for these two latter taxes. Hence it should be concluded that revenues they produce are more foreseeable. As a result, governments with greater certainty may assume revenues from production and especially payroll taxes when planning future budget expenditures[16].

Summarizing, direct income taxes are believed to be more volatile than sales taxes. Yet, according to findings presented in this article, indeed this is the case but only for CIT. Payroll taxes in EU assured over

last years for exceptionally stable inflows. This is contradictory to most previous literature, where sales taxes were claimed to provide for least volatile revenues (although it should be admitted that in my research the difference between payroll taxes and taxes levied on production is not significant). Thus, my results basically correspond with those presented in some literature (e.g. (Tucker, 2015)). However, other researchers arrived at different findings for other jurisdictions and time (e.g. as mentioned earlier Dye And McGuire, who work on data for US found that sale taxes could be less stable than income taxes (Dye & McGuire, 1991) or Felix, who estimated that sales taxes are least volatile (Felix, 2008)).

Therefore, from this perspective governments should prize particularly taxes imposed on workforce and on production. CIT seems least desirable. However, resigning from corporate income taxation is not an option for most EU countries. Even knowing the deficits of that tax, it still provides for important share of budget sources. Moreover, it acts also as a backstop for PIT – which as I calculated shows smaller variability. There are also several other arguments in favour of CIT existence, which include progressiveness of taxation system connected vertical justice issues or fewer distortions to the economy, which is easier to achieve with multiple but low taxes.

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ЕВРО ОДАҚТАҒЫ ФИСКАЛДЫҚ АРТЫҚШЫЛЫҒЫНЫҢ ТҰРАҚТЫЛЫҒЫ: САЛЫҚТЫ НЕ ҮШІН ТӨЛЕУ КЕРЕК?

Аннотация. Белгілі бір және болжанатын салықтық түсімдер мемлекеттердің салық саясатын бірқалыпты жүргізіп, бизнес циклдерінің кез келген жағымсыз әсерлерін азайтуды қалайды. Соңғы бірнеше онжылдықта ЕО мүше-мемлекеттерінің көпшілігінде үкіметтік бюджеттер шамалы өзгеріске ұшырады. Алайда, белгілі бір салық түрлері әр түрлі дәрежеде тұрақтылыққа ықпал етеді. Бұл мәселе мемлекеттік бюджет тұрғысынан маңызды болғанымен, ол бұрын-соңды талданып көрмеген, әсіресе ЕО-да. Макроэко-номикалық деректерді статистикалық талдауға сүйене отырып, жалақыға салынатын салықтардан түсетін түсімдер өте төмен өзгергіштікке ие және бюджеттің тұрақтылығына оң әсер етеді деп есептедім. Уақыт өте келе өзгерістер өндіріске салынатын салықтар үшін біршама үлкен. Корпорациялардың кірістеріне салық салудан түскен түсімдер әсіресе тұрақсыз. Бұл нәтижелер бюджет кірістерін жобалау кезінде саясаткерлерді қолдауы мүмкін.

Кеңейту фискалдық саясаты экономикалық өсуге ықпал етеді деп санайды ((Ащауер, 1989), (Муннелл, 1990)). Дәстүрлі түрде мемлекеттік инвестициялар экономиканың ұзақ мерзімді өсуін қолдайды (Barro, Endogenous қарапайым үлгісіндегі үкіметтің шығыны, 1990). Екінші жағынан, төмен салықтар экономиканың дамуын қолдауы керек ((Энген и Скиннер, 1992), (Давери и Табеллини, 2000), (Каррас & Фурцери, 2009), (Падовано және Галли, 2001) немесе (Ли & Гордон) , 2005 ж.) Тек таңдаған зерттеулер туралы айту керек). Мысалы, Ромер мен Ромер ЖІӨ-ге қатысты салықтың 1% -ға артуы кейінгі үш жыл ішінде өнім шығаруды 3% дейін қысқартады деп санайды (Ромер & Ромер, 2007). Маунтфорд пен Ухлинг салықтың азаюы, тіпті бюджет тапшылығынан қаржыландырылған болса да, экономиканың өсуі тұрғысынан тиімді деп санайды (Маунтфорд и Ухлиг, 2008). Бланчард пен Перотти салықтық күйзелістер инвестицияларға, тұтынуға және өндіруге әсер ететінін анықтады (Blanchard & Perotti, 2002).

Алайда, кейбір эмпирикалық талдау ЖІӨ мен салық ставкалары арасындағы байланыстың маңыздылығын растай алмады ((Easterly & Rebelo, 1993), (Мендоза, Милеси-Ферретти, & Асеа, 1997)). Салық ставкасы мен шығу деңгейі арасындағы байланыс шынымен теріс, бірақ кейде жоқ болып шықты. Бұл нәтижелер жалпы мағынасына сәйкес келеді. Алайда ұзақ мерзімді перспективада мемлекеттік шығыстарды төмен салықтармен біріктіру мүмкін емес (егер салық аз бюджетке түсетін болса). Экспансиялық фискалдық саясаттың нәтижесінде туындауы мүмкін жоғары қоғамдық тапшылық болашақта экономикалық өсу үшін зиянды болып табылады. Сондықтан салықтардан қанағаттанарлық түсулер қажет.

Теңгерімді бюджеттерді сақтау - бұл әлемдік экономиканың әдеттегі міндеті. Бұл талап бірыңғай валютаны пайдаланатын, демек ортақ ақша-несие саясатын жүргізетін Еуропалық Валюта Одағының мемлекеттері үшін маңызды болып табылады [1]. Сол елдердің экономикалық тұрақтылығын жақсарту және саясатқа араласпайтын құралдарды қамтамасыз ету үшін оларға салық саясатына қатысты белгілі бір талаптар қойылды. Конвергенция критерийлері бойынша (Маастрихт өлшемдері деп те аталады) сәйкес (і) үкіметтің жылдық тапшылығының ЖІӨ-ге қатынасы 3 пайыздан аспауы керек және (іі) мемлекеттік қарыздың ЖІӨ-ге қатынасы 60 пайыздан аспауы керек. Алайда, бірнеше мүше мемлекеттер бюджеттің жоғары тапшылығымен күресуде, оның салдарынан мемлекеттік қарыздар артып келеді. ЕО-ға мүше көптеген мемлекеттер соңғы жылдары

теңгерімге қайта оралды және 2017 жылы олардың жартысына жуығы үкіметтің профицитін тіркеді. Алайда, жалпы ЕО үшін бюджет тапшылығы әлі де айтарлықтай болып табылады және 2017 жылы оның ЖІӨ-нің 81,6% құрады. Бұл 2007 жылғы дағдарысқа қарағанда ЖІӨ-нің 57,5% -ын құраған дағдарысқа қарағанда әлдеқайда көп. Сонымен қатар, 2014 жылы ең жоғарғы деңгейден бастап үкіметтің жалпы қарызы бірқатар мүше мемлекеттерде орташа есеппен азайды, алайда 2017 жылы 12-ден 12-ге жетті. Маастрихт критерийлерімен байланысты еуроаймақтың 19 елі қарызды жергілікті ІЖӨ-нің 60% деңгейінен асып түсті. Мемлекеттік кірістердің сенімді көздерін анықтау осы мәселелерді шешудің пайдалы құралы болуы мүмкін.

Түйін сөздер: табыс салығы, республикалық бюджет, мемлекеттік қаржы, кіріс, салық.

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УСТОЙЧИВОСТЬ ФИСКАЛЬНЫХ ПРЕИМУЩЕСТВ В ЕС: ЧТО ОБЛАГАТЬ НАЛОГОМ?

Аннотация. Определенные и предсказуемые налоговые поступления желательны для государств, чтобы гладко проводить налогово-бюджетную политику и минимизировать любые негативные последствия деловых циклов. За последние десятилетия размеры государственных бюджетов в большинстве стран-членов ЕС претерпели довольно небольшие преобразования. Однако определенные виды налогов в разной степени способствуют этой стабильности. Хотя этот вопрос важен с точки зрения государственного бюджета, он не был тщательно проанализирован ранее – особенно в ЕС. На основании статистического анализа макроэкономических данных я подсчитал, что доходы от налогов на заработную плату имеют особенно низкую изменчивость и положительно влияют на постоянство бюджета. Изменения со временем немного больше для налогов, взимаемых с производства. Поступления от налогообложения доходов корпораций особенно нестабильны. Эти выводы могут помочь лицам, определяющим политику, в надлежащем планировании доходов бюджета.

Экспансионистская налогово-бюджетная политика, как полагают, стимулирует экономический рост (Aschauer, 1989), (Munnell, 1990)). Традиционно считается, что государственные инвестиции поддерживают долгосрочный рост экономики (Барро, «Государственные расходы в простой эндогенной модели», 1990). С другой стороны, низкие налоги также должны поддерживать развитие экономики ((Engen & Skinner, 1992), (Daveri & Tabellini, 2000), (Karras & Furceri, 2009), (Padovano & Galli, 2001) или (Lee & Gordon, 2005), чтобы упомянуть только избранные исследования). Например, по оценкам Ромер и Ромер, увеличение налогообложения на 1% по отношению к ВВП приводит к сокращению производства до 3% в течение следующих трех лет (Romer & Romer, 2007). Маунтфорд и Улинг утверждают, что сокращение налогов – даже если оно финансируется за счет дефицита бюджета – наиболее эффективно с точки зрения роста экономики (Mountford & Uhlig, 2008). Бланшар и Перотти обнаружили, что налоговые потрясения влияют на инвестиции, потребление и выпуск продукции (Blanchard & Perotti, 2002).

Тем не менее, некоторые эмпирические исследования не смогли подтвердить значимость связи между ВВП и налоговыми ставками ((Easterly & Rebelo, 1993), (Mendoza, Milesi-Ferretti & Asea, 1997)). Было установлено, что корреляция между уровнем налоговой ставки и выпуском действительно отрицательная, но иногда отсутствует. Эти результаты соответствуют здравому смыслу. Однако в долгосрочной перспективе высокие государственные расходы не могут сочетаться с низкими налогами (при условии, что низкие налоги переходят в меньшие доходы бюджета). Высокий государственный дефицит, который может возникнуть в результате экспансионистской фискальной политики в конечном итоге наносит ущерб экономическому росту в долгосрочной перспективе. Поэтому удовлетворительные поступления от налогов желательны.

Поддержание сбалансированных бюджетов является типичной задачей нескольких мировых экономик. Тем не менее, это требование кажется ключевым для государств Европейского валютного союза, которые используют единую валюту и, следовательно, проводят общую монетарную политику [1]. Чтобы повысить экономическую стабильность этих стран и обеспечить, по крайней мере, затрудненные инструменты для выработки политики, им были наложены определенные требования, связанные с фискальной политикой. Согласно так называемым критериям конвергенции (также известным как критерии Маастрихта), (i) отношение годового дефицита государственного бюджета к ВВП не должно превышать 3 процентов, и (ii) отношение государственного долга к ВВП не должно превышать 60 процентов. Тем не менее, несколько государств-членов борются с высоким дефицитом бюджета, за которым следуют чрезмерные государствен-ные долги. Большинство государств-членов ЕС возвращаются к балансу в последние годы, и в 2017 году почти половина из них зафиксировала профицит государственного бюджета. Тем не менее, дефицит бюджета ЕС в целом по-

прежнему значительный и в 2017 году составил 81,6% его ВВП. Это намного больше, чем до кризиса 2007 года, когда была зафиксирована цифра в 57,5% ВВП. Более того, хотя с пика в 2014 году общий государственный долг в среднем уменьшился в ряде государств-членов, все еще в 2017 году целых 12 из 19 стран еврозоны, связанных по маастрихтским критериям, зафиксировали задолженность выше необходимого уровня в 60% местного ВВП. Определение надежных источников государственных доходов может стать полезным инструментом для решения этих проблем.

Ключевые слова: подоходный налог, национальный бюджет, государственные финансы, доходы, налогообложение.

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