

# The VAT gap as a limiting factor for economic development of the CEE countries

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## Abstract:

**Purpose and Originality:** The aim of the study was to compare the VAT revenue growth and the GDP growth in the Central and Eastern European countries belonging to the European Union within the 2000-2016 to verify the VAT gap estimations made by European Commission.

**Method:** To achieve the goal, an analysis of the strength of the correlation between the yearly changes in nominal GDP and the yearly changes in nominal VAT revenue in the Central and Eastern European countries belonging to the European Union within the 2000-2016 period was carried out (chain base indices). On the basis of the statistical analysis of data with the use of Pearson's correlation coefficients, an international comparison also with European Commission's estimates was made with the use of the inductive reasoning methodology.

**Results:** The results of conducted correlation analysis show very strong positive dependence between the yearly changes in nominal GDP and the yearly changes in nominal VAT revenue in the Central and Eastern European countries belonging to the European Union within the 2000-2016 period (chain base indices) in the case of 8 out of 11 CEE countries (Pearson's  $r$  from 0.78 to 0.93) and strong correlation in the case of rest 3 CEE countries (Pearson's  $r$  from 0.59 to 0.69). But it must be stressed that the assessment of these results must take into account changes in the VAT rates introduced in almost all CEE countries as the consequence of 2008 crisis. That's why these very high Pearson's correlation coefficients between analyzed values seem to confirm a growing problem with VAT collection, though VAT rates were increased almost in all CEE countries (in some of them significantly).

**Society:** The high and/or growing VAT gap especially in the case of less credible CEE countries with permanent state budget deficits, growing public debt and higher tax rates, increases instability of sources for public expenditures and increases risk premium, thus market cost of capital, i.e. has an effect on future investment level, entities' creditworthiness, consumption level, the rate of debt growth and the rate of catchin-up process of the CEE countries and the rate of their social and economic development.

**Limitations:** It must be stressed that the VAT gap analysis is based on estimates, incomplete data and adopted particular estimation method. Furthermore, the estimates of the VAT gap are updated and revised backwards every year, mainly because of updates in the underlying national accounts data published by Eurostat and corrections in estimation methods (for example revision of the parameters of the VTTL model used by European Commission; European Commission, 2017).

**Keywords:** VAT gap, tax revenue, general government budget, financial security of the state, tax avoidance, tax evasion.

## 1 Introduction

The VAT gap is a difference between the actually collected VAT revenue and the VAT Total Tax Liability (VTTL), i.e. the theoretical tax liability according to tax law. The VTTL is estimated as the sum of the liability based on theoretical values of consumption and

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investment (plus country specific net adjustments)<sup>1</sup>. It makes difficult to estimate the size of the VAT, its main drivers and its structure, because this phenomenon concerns mainly not registered activity either by statistical offices or by the tax administration. According to the European Commission estimation the total VAT gap in the European Union amounted in 2015 to EUR 151.5bn, i.e. 1.02 % EU28 GDP as a whole. It's a slightly decrease in contrast to previous years, when the VAT gap was growing and reached EUR 162bn, i.e. 1.2 % GDP (figure 1).

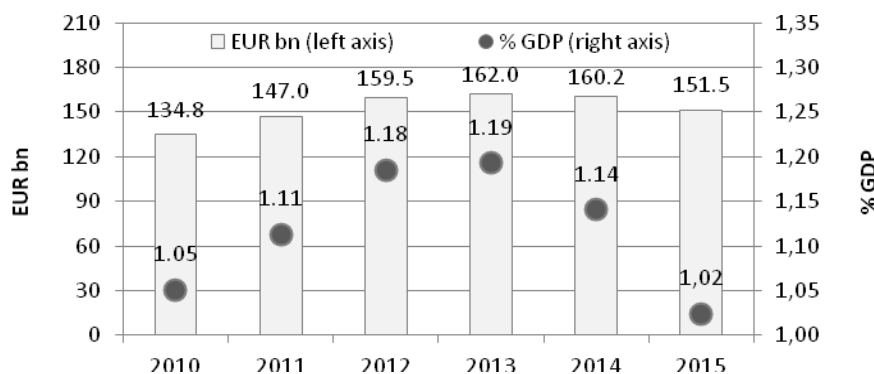


Figure 1. The VAT gap in the European Union countries\* in the years 2010-2015 (in EUR bn – left axis and in % GDP – right axis)

\* EU28 in 2015, EU27 in 2014 (without Cyprus), EU26 in the years 2010-2013 (without Cyprus and Croatia)

Source: self-reported data on the basis of European Commission's and Eurostat's data (European Commission, 2017; Eurostat 2018a).

It must be stressed that VAT gap can't be treated only as a consequence of criminal activity, tax fraud and tax evasion, which, however, belong to its main determinants. The VAT gap is also an effect of natural bankruptcies, tax arrears, as well as reporting problems in national accounts (errors and omissions) (Poniatowski, 2016). There is one more important factor, namely tax avoidance, which is increasingly contributing to the tax gap in the EU.

## 2 Theoretical framework

The processes of globalization and internationalization of companies contributed to popularization of the tax optimization phenomenon (*see, e.g.,* Wyciśłok, 2013). Tax reduction solutions formerly reserved only for the largest enterprises are now widely available for the average company. It is, on one hand, forced by international competition and, on the other, by especially high public levies in Europe (Redo, 2017) and it is also provoked by complex and diverse legal systems. Explosion of tax consulting services in the area of tax optimization and free internet access to them are also an important factor. Tax planning is currently a standard tool used to manage business finance (Jamroży and Kudert, 2013) and is used not only to

<sup>1</sup> The six main components are: household, government, and non-profit institutions serving households final consumption; intermediate consumption; gross fixed capital formation; and other, largely country-specific, adjustments (European Commission, 2017).

improve net profitability but also financial liquidity (Ballion, 2014). It could have been expected that also enterprises from Central and Eastern Europe, after the period of finding themselves on the single European market, will be more and more actively striving to improve their competitive position, especially that the majority of them belong to some of the most open economies not only within the EU (with the highest relations of export and import to GDP). It must be stressed that the highest benefits from tax optimization achieve those entrepreneurs whose moves cross-border (Kudert et al., 2009; Jamroży, 2014). They are, without a doubt, also attracted by high tax rates in Europe. European VAT rates are one of the highest in the world. The differences in the amount of different public levies are worth noting here, as they explain the tendency for tax optimization in Europe as well as social acceptance of this phenomenon. Especially in the Central and Eastern European countries with the lowest GDP per capita, the highest standard VAT rates in the EU and the propitious legal environment after entering the EU. Apart from the numerous agreements for the avoidance of double taxation, the key role in the process of tax optimization played the transposition of EU tax directives into the national legal systems which opened the door to many interesting solutions. And the last factor that seems to drive the tax gap is greater tolerance of international opinion after 2008 crisis towards actions that are to alleviate the crisis; also towards enterprises' greater measures that are to rationalize and improve their resistance to global downturn after the crisis. This greater tolerance might be a result of lack of conventional tools for economy stimulation and the need to use radical solutions, for example reduction of interest rates to a historically low level and quantitative easing programme with the simultaneous significant increase of public debt (Redo, 2018).

### **3 Method**

The aim of the study was to analyze the strength of the correlation between the yearly changes in nominal GDP and the yearly changes in nominal VAT revenue in the Central and Eastern European countries belonging to the European Union within the 2000-2016 period (chain base indices). On the basis of the statistical analysis of data with the use of Pearson's correlation coefficients, an international comparison also with European Commission's estimates was made with the use of the inductive reasoning methodology.

The data comparability problem. It must be stressed that the VAT gap analysis is based on estimates, incomplete data and adopted particular estimation method. Furthermore, the estimates of the VAT gap are updated and revised backwards every year, mainly because of updates in the underlying national accounts data published by Eurostat and corrections in estimation methods (for example revision of the parameters of the VTTL model used by European Commission; European Commission, 2017). Additionally, in author's opinion there is greater value in presenting the amount of VAT gap in relations to the actual VAT revenue in a given country than to an estimate hypothetical amount of potential VAT revenue (VTTL) used in the analyses of European Commission or CASE (performed also for European

Commission). This is also the view presented in this overview. That's why the figures should be interpreted and compared with other data cautiously.

## 4 Results and discussion

### 4.1 The VAT gap in the Central and Eastern European countries

The VAT gap in 11 Central and Eastern European countries is twice as high as in EU15 (table 1) – respectively 29.5% of VAT revenue compared with 14.6%. This disproportion has been maintained for several years. However it must be stressed that there was a decrease in the VAT gap in the CEE countries in the years 2010-2015 from 34.7% of VAT revenues to 29.5%. Although all central measures for the VAT gap in CEE countries in the indicated period have been reduced (the average, the median, the first and third quartiles), the most of the CEE countries still belong to those with the highest VAT gap in relation to VAT revenue in the EU. Eight out of 11 EU countries with the highest VAT gap are the CEE countries<sup>2</sup>.

Table 1. Measures of central tendency for the VAT gap in CEE11\* countries, EU28\*\* and EU15 in the years 2010-2015 (in % of actually collected VAT revenues)

	2010	2011	2012	2013	2014	2015
01) CEE 11	34.7	31.4	37.3	35.5	32.8	29.5
02) $\bar{x}$ CEE 11	36.9	31.6	34.0	31.2	27.9	24.3
03) M CEE 11	30.0	30.6	29.6	28.7	23.5	21.9
04) Q1 CEE 11	26.5	22.0	25.7	20.5	14.7	10.9
05) Q3 CEE 11	52.2	41.2	42.4	39.8	35.6	34.2
06) EU 28	15.7	16.3	17.3	17.3	16.4	14.6
07) EU 15	13.9	14.8	15.4	15.7	14.8	13.2
08) $\bar{x}$ EU 28	24.5	23.8	24.6	23.7	21.2	17.7
09) $\bar{x}$ EU 15	13.6	15.5	15.1	15.6	13.2	12.8

\* CEE11 in the years 2014-2015, CEE10 in the years 2010-2013 (without Croatia)

\*\* EU28 in 2015, EU27 in 2014 (without Cyprus), EU26 in the years 2010-2013 (without Cyprus and Croatia)

Source: own calculations on the basis of European Commission's data (European Commission, 2017).

According to the European Commission's data, Romania has the highest VAT gap not only among CEE countries but also among all EU28 countries, which amounted in 2015 to 59.2 % of actually collected VAT revenue. The VAT gap in Slovakia, Lithuania and Poland reached about 32-42% of collected VAT revenue (respectively 41.6 %, 35.9 % and 32.5 %) and in Bulgaria, Latvia, Czech Republic and Hungary about 16-26% of VAT revenue (respectively 25.9 %, 21.9 %, 19.7 % and 15.9 %) – see figure 2. The VAT gap in all those 8 countries is higher than the VAT gap in whole EU28 (14.6 % in 2015; table 1).

<sup>2</sup> The other three countries in this group are: Greece, Italy and Malta.

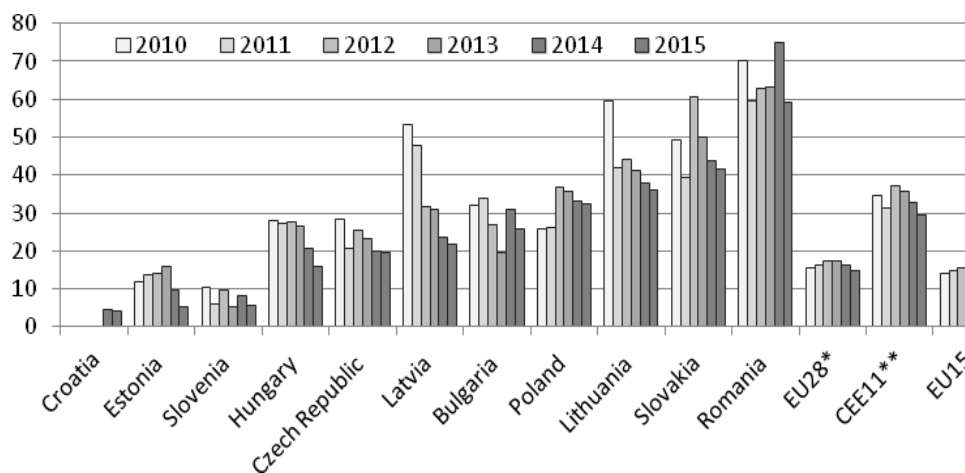


Figure 2. The VAT gap in the Central and Eastern European countries (as a percent of actually collected VAT revenues) in the years 2010-2015

\* EU28 in 2015, EU27 in 2014 (without Cyprus), EU26 in the years 2010-2013 (without Cyprus and Croatia)

\*\* CEE11 in the years 2014-2015, CEE10 in the years 2010-2013 (without Croatia)

Source: own calculations on the basis of European Commission's data (European Commission, 2017).

Croatia, Estonia and Slovenia are three exceptions where the VAT gap was estimated in 2015 at only 4.1-5.8 % of actually collected VAT revenue (respectively 4.1 %, 5.1 % and 5.8 %; figure 2). Moreover, they were among the five countries with the lowest VAT gap in relation to VAT revenue in the whole EU.

It must be also noted that there was a VAT gap drop in the 2010-2015 period in almost all CEE countries (figure 3). The biggest decrease took place in the case of Latvia and Estonia (by 57-59 %) and Slovenia, Hungary and Lithuania (by 40-45 %).

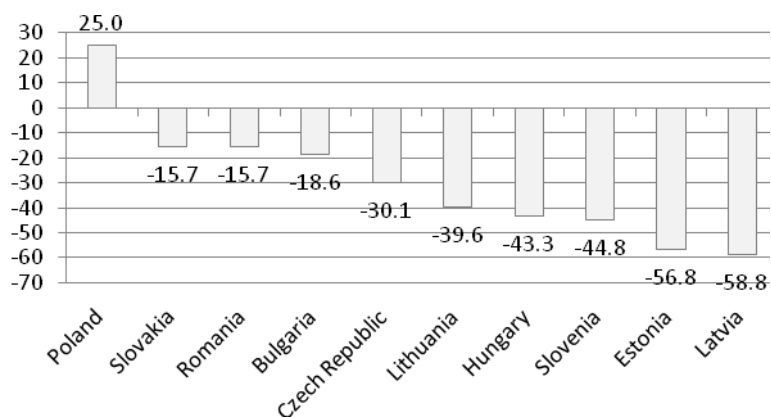


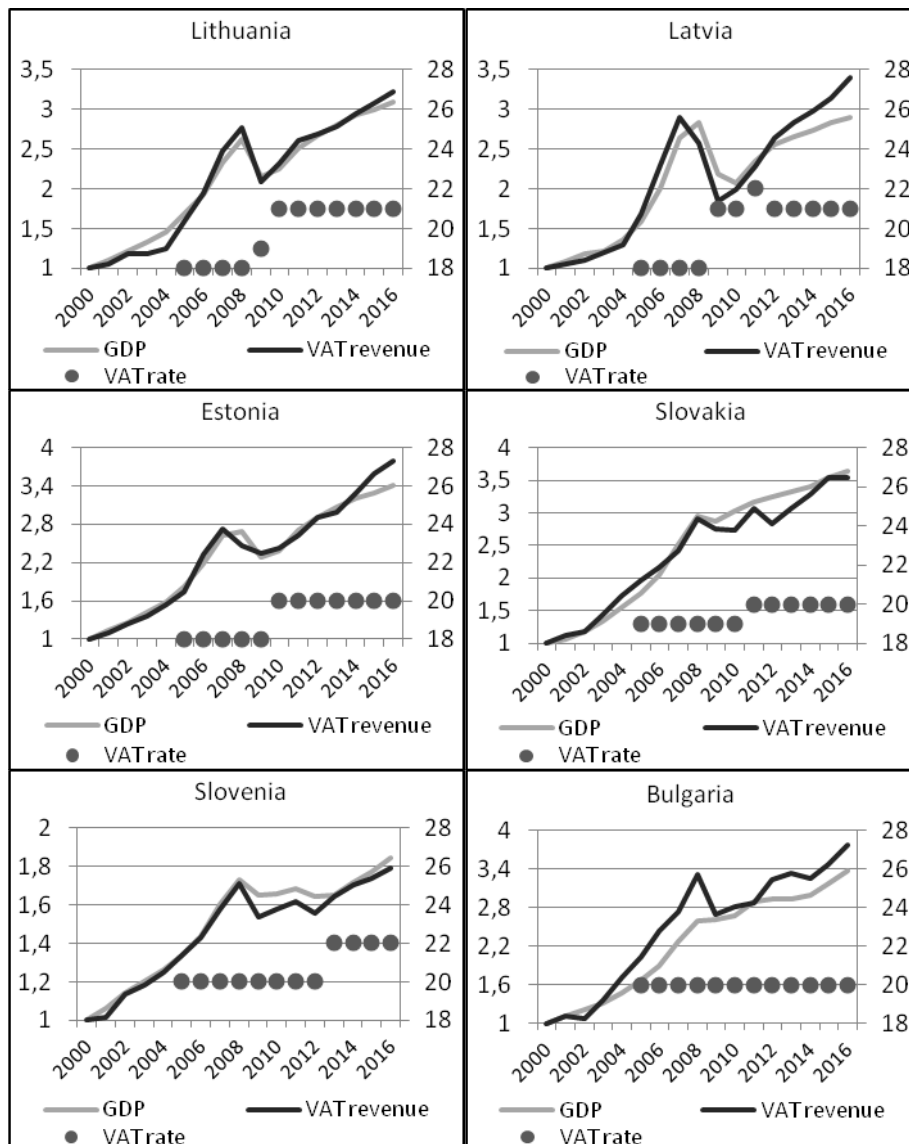
Figure 3. The change in the level of VAT gap (as a percent of actually collected VAT revenue) in CEE countries in the years 2010-2015 (%)

Source: own calculations on the basis of European Commission's data (European Commission, 2017).

Poland was the only CEE country with VAT gap increase (in relation to collected VAT revenue) in the analyzed period: from 26 % in 2010 to 32.5 % in 2015, i.e. by 25 % (see figure 3 and figure 2).

#### 4.2 Comparative analysis of nominal changes in the GDP level and in the VAT revenues level in the CEE11 countries in the period 2000-2016

The comparative analysis of nominal changes in the GDP level and in the VAT revenues level in CEE11 countries in the period 2000-2016 was conducted to verify the VAT gap estimations of the European Commission. The results are presented in the graphs below (figure 4).



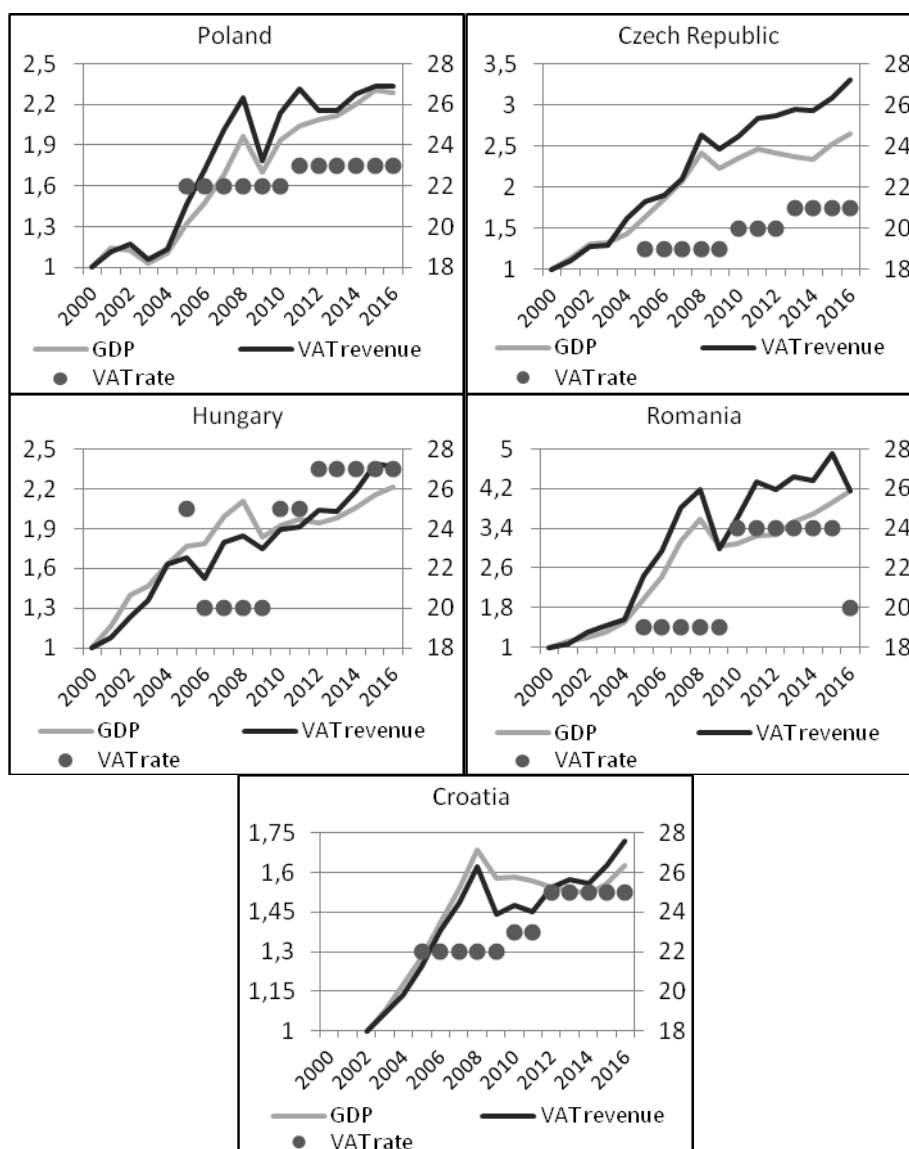


Figure 4. GDP at market prices and VAT revenue (2000=100; left axis) and standard VAT rate (%; right axis) in the CEE countries in the years 2000-2016  
 Source: self-reported data on the basis of Eurostat 2018b and KPMG 2018.

The above results (figure 4) should be confronted with the European Commission's VAT gap estimates (presented in figure 2). This comparison provides mixed results. In the case of some countries, despite the high convergence between the pace of GDP changes and the pace of VAT revenue changes (figure 4) the VAT gap according to EC data belong to the highest among the CEE11 countries (e.g. in Lithuania). On the other hand, in the case of Slovenia and Estonia visible on the figure high convergence of the pace of changes coincides with the low VAT gap estimate. This may be the effect of maintaining the VAT gap in these countries at the stable level throughout the analyzed period. Unfortunately, the European Commission's VAT gap time series are too short and do not allow to verify this hypothesis.

It must be stressed that reasoning in this area is unfortunately hindered by changes in the level of VAT rates and/or in the range of products and services with reduced VAT rates (introduced

in all CEE countries except Bulgaria to improve public finance stance after the outbreak of 2008 crisis). That's why it's impossible to conclude whether the VAT revenues growth acceleration (in relation to nominal GDP increase; figure 4) is the result of the improvement of VAT collection in Czech Republic, i.e. the decrease in VAT gap, or only the effect of raising VAT. Therefore, it seems that if post-crisis increase in VAT rates is not illustrated in the VAT revenues growth acceleration, this may indicate the VAT gap increase. In addition, data analysis is hindered by the implementation of subsequent EU regulation, resulting, for example, in changes in the place where the tax obligation arises. There was in 2015 the EU-wide change in regulation regarding "place of supply" of electronic services. Before 2015, VAT charged on electronic services was invoiced to the country where the provider of services is registered, like for any other good. Since then, the VAT is to be paid to the country of customer residence (European Commission, 2017).

But it should be noted, that the observed acceleration in the growth of VAT revenues in Latvia since 2012 and in Estonia since 2014 (figure 4) can be seen in the VAT gap decrease in these countries in analyzed period (figure 2).

#### **4.3 The analysis of correlation between the yearly changes in nominal GDP and the yearly changes in nominal VAT revenue in the Central and Eastern European countries belonging to the European Union within the 2000-2016 period**

The results of conducted correlation analysis between the yearly changes in nominal GDP and the yearly changes in nominal VAT revenue in the CEE countries in the years 2000-2016 (chain base indices) confirm above mentioned mixed conclusions.



Table 2. Pearson's correlation coefficient between the yearly changes in nominal GDP and the yearly changes in nominal VAT revenue in the years 2000-2016 (chain base indices)

	Pearson's r	Student's t-distribution	critical value $t_{\alpha=0.05, n-2}$
<b>Poland</b>	0.93	9.5156	2.1448
<b>Lithuania</b>	0.91	8.0918	2.1448
<b>Slovenia</b>	0.87	6.7062	2.1448
<b>Croatia*</b>	0.86	5.7701	2.1788
<b>Latvia</b>	0.85	6.0154	2.1448
<b>Romania</b>	0.79	4.7744	2.1448
<b>Czech Republic</b>	0.78	4.6837	2.1448
<b>Estonia</b>	0.78	4.5992	2.1448
<b>Slovakia</b>	0.69	3.5763	2.1448
<b>Hungary</b>	0.67	3.3461	2.1448
<b>Bulgaria</b>	0.59	2.6991	2.1448
<b>CEE11**</b>	0.90	7.6606	2.1448
<b>EU28**</b>	0.92	8.9911	2.1448
<b>EU15</b>	0.91	8.3390	2.1448

\* 2002-2016

\*\* 2002-2016 without Croatia

Source: own calculations on the basis of Eurostat's data.

The determined Pearson's correlation coefficients for above variables indicates strong and very strong dependence (according to Guilford classification) between nominal increase in VAT revenues and nominal increase in GDP in all CEE countries in analyzed period (table 2). All results are statistically significant. Such high Pearson's correlation coefficients suggest that the VAT gap may remain at a stable level in analyzed period in the countries without greater changes in VAT rates or that the VAT gap increased in the countries with higher changes in VAT rates. But in the case of Poland despite a small increase in standard VAT rate (from 22% to 23%) and very high  $r=0.93$  the VAT gap (according to the EC estimation) has risen since 2012. In turn, in the case of Lithuania in the situation of a higher standard VAT rate increase, from 18% to 21%, and also very high  $r=0.91$ , the VAT gap has been decreasing since 2010 (see figure 2, figure 4 and table 2).

#### 4.4 VAT as the main source of public revenue in member states and an important source of EU budget

There is one more thing. Very high Pearson's correlation coefficients between nominal increase in VAT revenues and nominal increase in GDP for the whole EU28 ( $r=0.92$ ) despite increases in VAT rates in most EU countries seem to confirm a growing problem with tax collection in the whole EU (table 2). It concerns in particular CEE countries, where the VAT rates increases were higher and took place in 10 out of 11 CEE countries (while in the case of the EU15 in 11 countries; KPMG 2018). The growing tax gaps lower the total public revenues, the public service quality and lead to imposing higher public levies. All of this

suppresses the process of catching up and the social progress in the Central and Eastern Europe. It also contributes to faster public debt's growth, what consequently causes the decrease in creditworthiness, the increase of risk premium requested by investors and the absorption of capital from a rather small domestic financial markets. It results in a higher market cost of capital, what limits economic prospects and increases sensitivity to shocks, because it has an effect on future investment level, entities' creditworthiness, consumption level and the rate of debt growth. That's why it reduces not only the current but also the future economic growth (Redo et al., 2018).

It must be stressed, that the VAT revenues are the main source of public revenues in all CEE countries, so they decide about the economic policy options. VAT provides from one third to even half of total tax receipts in CEE countries and from 17% to 28% of total general government revenues (2016; figure 5).

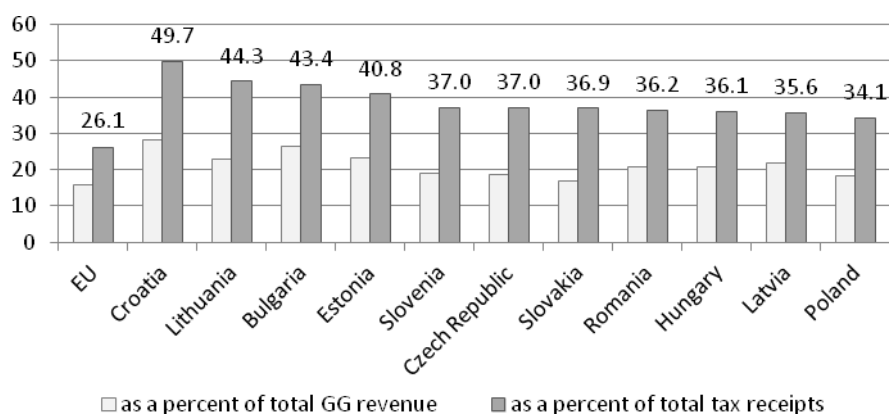


Figure 5. VAT revenue as a percent of total general government revenue and of total tax receipts in 2016 (%)  
Source: self-reported data on the basis of Eurostat 2018b and European Commission 2017.

VAT plays the most significant role in public expenditure financing in Croatia, where VAT revenues accounted in 2016 for 49.7% of total tax receipts and for 28.1% of total general government revenues. In Lithuania, Bulgaria and Estonia VAT revenues accounted for 41% to 44% of total tax receipts and in other CEE countries for 34% to 37%.

Finally it must be added, that VAT revenues are also an important revenue source of the European Union budget which is the key source of financing the catching-up process and public investment in less developed EU region, i.e. especially in CEE countries, as they all are net beneficiary of the EU's budget (Redo, 2011).

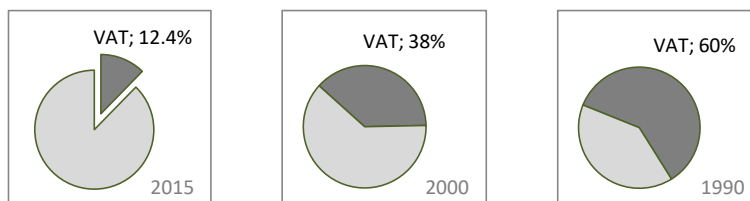


Figure 6. VAT revenue as a percent of total EU budget revenue in the year 1990, 2000 and 2015

Source: self-reported data on the basis of European Commission's financial reports.

In 2015, VAT revenues accounted for 12.4% of all the EU's budget revenue and amounted to EUR 18.1bn. This is a much smaller percentage of the EU budget's total revenue as compared to a few decades ago, when VAT revenues accounted for 38% of the total EU budget in 2000 or for 60% like in 1990 (figure 6). This, however, does not mean that the problem has diminished. The growing issue of the VAT gap is causing further decrease in financial independency of the EU as it increases the weight of the largest EU budget's revenue based on GNI (the so called 4th financing source), dependent on national policy through annually enacted states' budgets (Dynus, 2007). The weight of the 4th source of the EU's budget revenue was previously significantly lower: it accounted for 40.5% of all the EU's budget revenue in 2000, whereas in 2015 for 68.8% (European Commission, 2016). And the financing sources of the "4th source" are the national budgets of all EU member states, whose main source of financing, as mentioned above, is VAT.

## 5 Conclusion

The internationalization process of enterprises and globalization have contributed to the tax revenues decrease in some countries. This applies in particular to the European countries that belong to those with the highest tax rates in the world, which explain in part together with the differences in the amount of public levies, the tendency for tax optimization in Europe as well as social acceptance of this phenomenon. Especially in the Central and Eastern European countries – the poorer part of the EU. It must be stressed, that there is not only problem with VAT gap, but also with CIT and PIT collection. Tax planning became a standard tool used to manage business and private finance. Solutions once available only for biggest international companies are nowadays also available for free on the internet and used at a much bigger scale by much smaller businesses. And it concerns not only companies. There are also more and more people earning high salaries that look for more favorable tax solutions in other countries. And make use of them.

The problem with decreasing effectiveness in VAT collection is a special one in the Europe, because VAT revenues are the main source of public expenditures in all CEE countries (VAT provides from one third to even half of total tax receipts in CEE countries and from 17% to 28% of total general government revenues), so they decide about the development abilities

and opportunities, and thus about the attractiveness to investors, and the economic policy effectiveness in stimulating economic growth and mitigating crises. This concerns in particular the CEE countries, which are net beneficiary of the EU's budget. And VAT revenues are also an important revenue source of the European Union budget which is the key source of financing the catching-up process and public investment in less developed EU region.

Very high Pearson's correlation coefficients between nominal increase in VAT revenues and nominal increase in GDP for the whole EU28 ( $r=0.92$ ) within the 2000-2016 period (chain base indices), though VAT rates were increased not only in the CEE countries, seem to confirm a growing problem with tax collection in the whole EU. The growing VAT gap in the EU raises concerns about the further increase in high public debt in most of member states and their fiscal policy effectiveness. But its effects are much more severe in the case of developing economies which have lower credibility and high borrowing needs to finance the catching-up. It must be stressed that 8 of 11 CEE countries are among the 11 EU member states with the largest VAT gap. This problem applies especially to less credible countries with permanent state budget deficits, growing public debt and higher tax rates compared to other CEE countries. The high and/or growing VAT gap in their case increases instability of sources for public expenditures and increases risk premium, thus market cost of capital, i.e. has an effect on future investment level, entities' creditworthiness, consumption level and the rate of debt growth. Without a doubt, it is necessary to tighten the tax system up and track illegal activities, but it must be noted that constant changes in business rules create additional uncertainty and new solutions complicate the situation in already complicated tax systems. It all discourages people from establishing and developing enterprises, as it also encourages them to look for simpler and more profitable solutions in other countries which is easier thanks to globalization and international legal environment.

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## **Povzetek:**

### **Razkorak DDV kot zavirajoči dejavnik ekonomskega razvoja v srednji in vzhodnji Evropi**

**Namen:** Cilj raziskave je primerajti rast prihodkov DDV in rast BDP v Srednje in Vzhodnoevropskih državah članicah Evropske unije med leti 2000 in 2016 z namenom potrditve ocene primanjkljaja DDV kot ga je predvidela Evropska komisija.

**Raziskovalna metoda:** Za potrebe doseganja namena bo uporabljena analiza moči povezanosti med letnimi spremembami nominalnega BDP in letnimi spremembami nominalnega DDV v Srednje in Vzhodnoevropskih državah članicah EU z uporabo drsne osnove. Na podlagi uporabe Pearsonovega korelacijskega koeficienta in mednarodne primerjave bo uporabljena induktivna metoda vzpostavitve zaključkov.

**Rezultati:** Rezultati korelacijske analize kažejo zelo močno pozitivno povezanost med letnimi spremembami nominalnega BDP in letnimi spremembami nominalnega DDV v primeru 8 od 11 analiziranih držav (Pearsonov r se giblje med 0.78 in 0.93) v ostalih treh primerih pa je ta povezava močna (Pearsonov r je med 0.59 in 0.69). Pri tem pa je potrebno poudariti, da je potrebno upoštevati spremembo v višini stopnje DDV v praksi vseh analiziranih državah zaradi ekonomske krize 2008. To je namreč vpliv, ki povzroča visoko stopnjo povezanosti med danima spremenljivkama in napeljuje na zaključek, da prihaja do težav s pobiranjem DDV, čeprav se je DDV praktično v vseh analiziranih državah povečal (v nekaterih primerih zelo).

**Družbeni pomen:** Višina in rast primanjkljaja DDV predvsem v primeru manj verodostojnih Srednje in Vzhodnoevropskih držav s stalnimi proračunskimi primanjkljaji, rastjo javnega dolga in visokimi davčnimi stopnjami povečuje nestabilnost virov za javnofinančne odhodke in povečuje zavarovanje rizika (tržne vrednosti kapitala) ter posledično vpliva na sposobnost nadaljnjih investicij, kreditno bonitetno oceno, stopnjo potrošnje, stopnjo rasti dolga ter sposobnost dohajanja omenjenih držav na področju družbenega in ekonomskega razvoja.

**Omejitve:** Poudariti je treba, da analiza pomanjkljivosti DDV temelji na ocenah, nepopolnih podatkih in sprejetu posebnih metod ocenjevanja. Poleg tega se ocene primanjkljaja DDV vsako leto posodablajo in popravljajo nazaj, predvsem zaradi posodobitev osnovnih podatkov nacionalnih računov, ki jih objavlja Eurostat, in popravkov v metodah ocenjevanja (na primer revizija parametrov modela VTTL, ki ga uporablja Evropska komisija; Evropska komisija, 2017).

**Ključne besede:** davčni primanjkljaj, davčni prihodki, javnofinančni proračun, finančna varnost države, izogibanje davkom, davčne utaje.

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