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MEASURING THE TAX GAP IN THE EUROPEAN ECONOMY

Abstract

The objective of the paper is to reveal the methodology used to examine the tax gap and calculate the tax gap for all EU states over 2011-2014. The paper draws on the review of reference literature addressing the tax gap in the context of tax avoidance and tax evasion. The paper features the GDP size across countries so as to demonstrate the overall level of the shadow economy compared to the aggregate tax burden. Finally, for the first time, the calculations of the tax gap for all EU states over 2011-2014 were displayed.

Introduction

The issue of effective collection of tax revenues is today one of the most significant problems faced by individual states, as public levies are the primary source of budget revenues. At the same time, almost every state is obliged, to a greater or lesser degree, to pursue the overriding fiscal goal through shrinking excessive general government

deficit in a manner that does not hamper the growth outlook for the state, and simultaneously support business activities.

Lack of adequate levels of budget revenues hinders, and at times prevents the state from effective functioning. Meanwhile, business entities always optimize their operations so as to make them profitable and one of the common methods is tax optimization, increasingly carried out in an aggressive form by combining legal tax avoidance with illegal tax evasion. Therefore, demonstration of the economic growth in the specific country does not necessarily suggest an increase in the level of budget revenues despite heftier companies' revenues and profits. The reasons behind this situation should be traced to the occurring and widespread tax gap, likely to increase when the state becomes incapable of opposing illegal tax activities conducted by the entities that commit tax crimes without being punished, because either the act was not disclosed, insufficiently penalized or not penalized at all on the grounds that the perpetrator cannot be identified.

Therefore, the objective of this paper is to present the methodology behind the research into the tax gap as a point of departure for determining budget losses in a specific EU state. It must also be stressed that the presented study is the first of its kind in the world – since so far there has been no comparative study of tax gaps based on standardized methodology which is proposed in the paper.

1. Tax gap in today's economy

Tax gap may be defined from the institutional perspective of tax authorities as the difference between tax collected and the tax that should be collected" (HMRC, 2012, p. 3). This definition is compatible to

the conception embraced by the US fiscal authorities (IRS) as "The difference between the tax that taxpayers should pay and what they actually pay on a timely basis" (US, 2005) or otherwise "the difference between the true tax liability in any year and the amount of tax that is paid voluntarily and on time" (Holmgren, 2013, p. 1). It is the IRS in the US which was the first worldwide to implement Taxpayer Compliance Measurement Program (TCMP) in 1963 with the goal of periodically (every few years) estimating the number of taxpayers that discharge tax obligations, and to assess potentially lost tax revenues (Rotz, Murlow, Falk, 1994, p. 121). The research TCMP applied the Discriminant Inventory Function (DIF), and the surveys covered around 50,000 individual taxpayers. The programme was suspended in 1998 and then replaced (as a specific continuation) by the National Research Program (NRP) which is currently running (Dubin, 2012, pp. 6-7).

The reference literature principally features the above definitions of the tax gap concept (Toder, 2007, pp. 367-378; Mazur, Plumley, 2007, pp. 569-576), though as proved by the most recent research by N. Gemmell and J. Hasselidne (2014, pp. 275-296) such a perspective of the tax gap as widely adopted for the research is faulty, because it fails to incorporate the taxpayers' behavioural reactions. Basically, this may lead to overestimating the magnitude of the tax gap in the traditional concept of the calculation methodology, because a large portion of so-called potentially lost revenues under the tax gap does not exist, is not subject to tax refund and is unlikely to be collected. The authors suggest to adopt even low behavioural response coefficients in the research in order to improve the quality of the findings produced.

For the purposes of the present paper but also as part of systematization of fundamental notions, the author have put forward and adopted a **definition of the tax gap which states that it is the level of application of tax evasion by the taxpayer, which results in an undue reduction in the tax base and a decrease in due contributions to the state budget**.

Reference literature as well as practice disclose continual divergences in views on whether tax avoidance should be methodically reckoned in the tax gap or not. Essentially, the answer in this respect is relatively explicit – certainly it should not be reckoned if it is lawfully performed. However, the opposite applies when the activities are unlawful, and thus triggering tax evasion and excluding definition-based tax avoidance.

It may be therefore ascertained that the primary component embedded in the tax gap is tax evasion, alongside with the tax avoidance and tax debt included by numerous authors. Tax evasion comprises the following determinants (Murphy, 2014, p. 7):

a) trading in shadow economy,

b) untaxed proceeds of frauds and other crime,

c) capital gains tax,

d) inheritance tax,

e) offshore tax abuse,

f) criminal attacks on the tax system,

g) failure to take care (taxpayers' errors or negligence)

h) error (resulting from the action).

Fundamentally, it may be stated that two major groups of research methods

designed to investigate the tax gap occur in reference literature and practical perspective. The first rests on selected control and audit methods within the representative group, which is subsequently generalised for the whole population surveyed (so-called Audit-Based Methods or Taxpayer Surveys). Though, it should be kept in mind that audits should be limited in their scope, but adequately targeted. Nevertheless, they cannot be the most cost-effective form of research into the tax gap, yet they should rely on prospective analyses as part of the audit additionally carried out in the real time (O'Doherty, 2014, pp. 297-339).

The second group of methods, termed as indirect methods, do not conduct physical controls on the taxpayer, but rely on tax declarations and other data sources (e.g. tax refunds, money flows, type and number of business transactions completed) which mostly allow for determination of the tax gap in a less precise manner than physical audits. The second group (so-called macro approach) contains such methods as: National income-expenditure discrepancy methods, National income-fiscal discrepancy methods, single indicator models (currency-based, electricity use-based, labour force participation, transactions-based) and multiple indicators methods (MIMIC) (Gemmell, Hasseldine, 2012, pp. 203-231). At the same time, the components of the tax gap themselves, despite compatibility in their descriptions, may be labelled otherwise, and specify distinctly the type of the tax gap (Alm, Borders, 2014, pp. 61-67; Plumley, 2005) :

a) Underreporting gap (the top and principal factor also connected with overestimating through failure to disclose adequate tax base),

b) Underpayment gap (so-called tax underpayment disclosed in the tax return, though payment does not occur or is deferred in time),

c) Non-filling gap (paucity of the tax return, tax return submitted after deadline)

Although the World Bank refers to two sets of variables: economic structure of a specific country and higher potentials for raising tax proceeds, and the group of variables that affects the tax policy, it also defines the tax gap as "the difference between the revenue potential (legal) and the actual revenue collected" (Khwaja, Iyer, 2014). Additionally, it introduced the concept of tax space defined as "The difference between the revenue potential (economic) and the actual revenue collected" (Khwaja, Iyer, 2014). A simplified conclusion inferred from the surveys is that taxation of taxpayers in a specific country should be tailored to the economic strength, otherwise the propensity to avoid tax payment will grow, with a greater burden on the tax administration at the same time. After all, tax evasion, depending on the country, accounts for 80-90% of the total tax gap, which also increases as a result of tax avoidance, excessive corruption or low effectiveness of tax administration (Harremi, 2014, p. 365).

Though, it should be noted that there are profound regional determinants for designation which key public levies generate the propensity to the tax gap. In the Latin American countries a major component of the tax gap is a deficiency in direct taxes, particularly personal income taxes. In Mexico as much as 60% of budget revenues are generated by income tax, and receipts collected from VAT relative to GDP hit almost the lowest level in the region (Jiménez, Sabaini, Podestá,

2010, pp. 15-16). Whereas in OECD countries the tax revenues are in the first place raised from consumption taxes (32.8%) (Pomerleau, 2015), principally from VAT and excise duty. Meanwhile, in the US where VAT is non-existent, only a minor sales tax, the so-called combined state-local sales tax rate (from 0% in such states as: Delaware, Montana, Oregon and New Hampshire, up to the highest, i.e. 9.45% in Tennessee) (Drenkard, Walczak, 2015), primary tax receipts are generated by individual taxation (37.7%) (Pomerleau, 2015).

As argued by C. Devereux, J. Freedman and J. Vella, HMRC may make grave mistakes while estimating the size of the tax gap for the United Kingdom (Devereux, Freedman, Vella, 2012, p. 5). When we compare the estimates made by the HMRC with calculations alternatively conducted since 2010 by R. Murphy, it transpires that the sizes differ in such proportions that they cannot be regarded as an error or measurement difference. Estimates by the HMRC are 3-4 times lower than calculations made by R. Murphy who indicated that the tax gap in the UK may stand at £ 122 billion a year by the end of 2014. Specifically, tax evasion may annually total £ 85 billion, tax avoidance £ 19 billion, while unpaid taxes may generate losses in tax revenues of £ 18 billion. He attributes the situation to inappropriate reorganisation of the HMRC that as early as in 2005 employed 92,000 employees and continues to reduce the personnel so as to attain the level of 52,000 employees in 2016. As a result of liquidation of multiple local structures and establishment of call centres, local knowledge and trust may be lost (Murphy, 2014, pp. 2-3). At this point it is worth emphasizing that large corporations implemented tax optimisation that, subject to the precise inspection, could be regarded as tax evasion. After all, how should we interpret the fact that the largest

companies in the UK such as Amazon which in 2012 earned £ 6 billion from sales, paid only £ 517,000 in corporate income tax (Rankin, O'Carroll, Monaghan, 2013), i.e. (0.0086%). Thus, it is possible to formulate the thesis that the public policy, including tax policy is pursued so as to act in the interest of corporations and to win new investment. However, the problem lies in the fact that particularly large corporations (but not only them), specifically within the freedom to choose a tax jurisdiction within EU or the whole global system, increasingly decide to exploit any forms of reductions in tax burdens (Farnsworth, Fooks, 2015, p. 34). Such measures increase profitability of business operations conducted, while disclosing a higher value of consolidated revenues from sales, that is a higher value of EBITDA (earnings before interest, taxes, depreciation and amortization), where its base determines bonuses and dividends paid. Hence, no wonder that manifold companies benefit from the exploitation of services provided by tax advisory companies, and even the establishment of the separate department charged with corporate tax optimisation tasked with possible reduction of the tax base from business activities conducted. Yet, in many cases it is not relevant whether optimisation applied is a form of tax evasion. The tax itself becomes a commodity and is subject to the law of supply and demand, likewise other classic production factors, but the capital obtained in this way does not always convert into the production form, it is rather a factor of competitive advantage over other enterprises in the sector.

Thus, the problem faced by all tax administrations that are committed to shrink the tax gap is the necessity of access to information. This entails the need to pay the costs for access to information which may even equal 10% of the budget of the specific administration. Information

itself is the key to the pursuit of appropriate tax policies and elimination of the tax gap by various means. Overall, integration of information theory to the taxation theory should be the theoretical connecting link for the process (Slemrod, Gillitzer, 2014, pp. 26-27), also, and maybe chiefly within the framework of the broader economic policy. The example illustrating such practices may be Scandinavian countries (Denmark, Norway, Sweden) which maintain the system of self-reporting (self-reported income shares) as well as the system of obtaining information from third parties (third-party information), i.e. employees, other companies or financial sector (95% of information obtained), which makes tax evasion, and thus production of the tax gap within illegal activities proves to be tremendously difficult, and in some cases almost impossible (Kleven, 2014, pp. 79-80).

It should be also noted that many countries do not carry out any estimates for the whole tax gap within official statistics. Basically, out of EU states only UK , Denmark, Sweden, France, Slovenia and Czech Republic continue such estimates in a systemic manner. Whereas Australia, instead of calculations of the tax gap, carries out analysis of the tax risk, thereby indicating potential areas of the tax gap (though such an approach is criticised by the Australian National Audit Office) (Villios, 2012, pp. 2-21).

2. Methodical remarks

This research was conducted for all 28 EU states for 2011-2014. A starting point for estimating the tax gap was determination of the GDP nominal value (in USD billion) for each individual state within the group. To avoid statistical mistakes and inconsistence in data provided by

national statistical agencies, the researchers harnessed the Word Bank Database (official GDP and Total Tax Rate – TTR). Further, the established estimates for the level of the shadow economy (indicated as % of GDP) was applied using multifactorial macroeconomic modelling in line with the method MIMIC (Multiple Indicators Multiple Causes) – Fig. 1 that specifies its level for specific countries over the time period previously outlined (Schneider, Raczkowski, Mróz, 2015, pp. 34-51).

Both values made it possible to calculate the level of the shadow economy in nominal terms (GDP value x percentage of the shadow economy). The result was denominated in USD currency, because this is the official reserve currency for most of countries, used to settle the vast majority of transactions in international trading. To obtain the nominal value of the shadow economy in a currency other than USD, it is necessary to adopt the exchange rate for USD for the specific year so that it was an arithmetic average from monthly weighted average exchange rate for that currency. Another step was to acquire data related to the level of tax burdens occurring over 2011-2014 across EU states, with focus on two elements: percentage average rate of total tax burden (TTR) and average rate of capital gains rate (Profit TTR). The above information was found in World Bank Database. Collection of all data helped to calculate the level of the tax gap in nominal terms across specific countries as a product of the shadow economy level and total tax rate (TTR), and to demonstrate the result in USD currency. The overall and simplified progress of such proceedings may be depicted by the formula (1) or the simplest version of the final formula (2):

$$TG_n = \frac{SE(\%)_r}{100\%} \cdot GDP_n \cdot \frac{TTR(\%)}{GDP_n} = \frac{SE(\%)_r}{100\%} \cdot TTR(\%)$$

Formula 1

$$TG_n = TTR\% \cdot SE_n$$

Formula 2

where:

TG_n – tax gap (nominal)
SE_n – shadow economy (nominal, in the given year)
GDP_n – GDP (nominal, in current prices)
TTR – Total tax rate

Estimate amounts of taxes due to the state budget that were neither declared or paid, illustrates the scale of operations conducted by entities operating in the shadow economy as well as those that deploy tax optimisation, frequently of aggressive nature. It is harnessed through execution of transactions that have no economic justification for an entity's operations in the market, and only cause diminished tax burdens, at the same time generating profits for persons managing the companies or the companies' owners that are typically not taxed as well.

Research restriction for that method lies in failure to incorporate, due to lack of information, direct VAT refunds on accounts of tax offices across EU countries in transactions taxed at the zero VAT rate. In addition, the calculations did not take into account separate calculations of trade asymmetry within EU, exposed in Eurostat databases, because without accurate analyses of databases administered by tax and customs agencies within EU states, access to companies' bank accounts and representative cross-check of business transactions, it is impossible to reliably reveal fictionality and illusion in trading within the European Union. Therefore, information provided in official statistics of all states – particularly net export and domestic demand may show economic growth attained in an inaccurate and untrue manner. Nevertheless, this situation is

partially offset by using information concerned with the increase in tax burden, increase in regulatory burden, decline in tax morality, upsurge in money transactions or fallen activity in official economy in the MIMIC method, which allows for the statement that the method of indirect research used, tends to be the most reliable out of existing ones in relation to the shadow economy. The application by the author of its extended and supplemented form for examining the tax gap certainly falls into bottom (lowest) boundaries used for determining this gap, and its measurements should be enhanced by micro approach through direct audits of the taxpayer as part of harmonised methodologies across all EU states. Besides, while investigating the value of GDP it is recommended to take into consideration, alongside widely used dynamic factorial model MIDAS (Mixed Data Sampling Regressions), for handling a lack of data and dynamic regression models with mixed sampling frequency, which could facilitate the estimation of economic growth, shadow economy and tax gap more realistically.

3. Calculation of the tax gap for European Union states

The highest level of the shadow economy in 2014 (as % of GDP) was estimated in Bulgaria, standing at over 30% of GDP over the period. Estimate data with regard to the shadow economy reveals that its level in 2014 was lower across all EU countries compared to 2011 (Schneider, Raczkowski, Mróz, 2015).

Meanwhile, in the nominal terms, the highest level of the shadow economy is reported in Germany and Italy. Poland, as the only country in Europe that did not record negative economic growth after financial crisis 2008+, is ranked in the fifth place among all EU states. The level of the

shadow economy in Poland in 2011 and 2014 was higher than the average in EU by 5.4 (pp of GDP) and 5.0 (pp of GDP) respectively. Over 2011-2014 two countries standing out for their highest real levels of the shadow economy, i.e. Italy and Germany see completely different trends in relation to its level. The drop in the value of the shadow economy by 0.7 pp of GDP (i.e. USD 14.1 billion) was noted in Greece, which is possibly connected with numerous reforms of public finances pursued in the country. Undoubtedly, this is the effect of substantial contraction of Greek GDP in the aftermath of the grave crisis, in 2014 GDP stood at USD 237.6 billion and was lower than in 2011 by USD 51.2 billion (the level of the shadow economy retained at 24.3% in 2011 and 23.6% in 2014).

The conducted research demonstrates that in 2014 the level of the tax gap as the percentage of the GDP (Figure 2) was the highest for countries such as: Italy (13.8% of the GDP), Estonia (13.6% of the GDP), and Romania (12.9% of the GDP). Whereas the lowest level was recorded in Luxembourg (1.7% of the GDP), Ireland (3.2% of the GDP), and the United Kingdom (3.3% of the GDP); while the average for the whole EU amounted to 10.7% of the GDP. However, in order to draw conclusions from the results obtained in such a way, one must also refer to the nominal value of the tax gap (Figure 2). It turns out that the highest value was recorded for Italy ($295.9 billion), but Germany ($244.4 billion) and France ($186.5 billion) held the second and third place, respectively. Firstly, it may be supposed that such a high proportion of the tax gap in the economy of Italy (both nominal and percentage) is a consequence of a high coefficient of the shadow economy that is maintained and firmly rooted; and a major role in the shadow economy is played by organised

crime as well as corruption of the state authorities. Whereas in the case of Germany and France – which have higher fiscal morality and a better-established legal culture – the nominal proportion is very high, but if the percentage of the GDP is considered, it is as much as 109 per cent lower for France and 119 per cent lower for Germany (in comparison to Italy). Secondly, the large size of the national economy is of importance too as very high nominal values of the tax gap are in fact much lower when considered as the percentage of the GDP. This means that larger economies (measured with the GDP) are capable of more effectively adopting the factors of production and nullifying some part of loss that is brought about by tax evasion. However, this is true for the countries where transparency and efficiency of operation of public institutions is higher and criminality (including organised criminality) is being consistently combated.

Malta which is the smallest economy out of all the EU member states ($10 billion) also has the lowest nominal value of the tax gap (1 billion), next to Luxembourg. Nevertheless, in Malta's case, this amounts to as much as 10 per cent of the GDP. Although the economy of Luxembourg is over six times larger than the economy of Malta, Luxembourg has the lowest percentage share of the tax gap in the GDP (next to Malta, and the nominal value as well). This is a consequence of the fact that the total tax rate (TTR) in Luxembourg is merely 20 per cent and this country is the largest tax haven – otherwise referred to as secrecy jurisdiction – where the terms and conditions of secret agreements for companies were negotiated with the government.

At this point it is worth emphasizing that according to author's calculations, the nominal tax gap for the United Kingdom in 2014

attained USD 96,2 billion (Fig. 3, Tab. 1), which corresponds to around £ 58.6 billion. If we add the calculations of tax gap made by R. Murphy (2014), outlined in the theoretical section of this publication, the tax gap totalled £ 122 billion, that is 108% more than in surveys revealed. Meanwhile, according to the HMRC the tax gap could amount to around £ 35 billion in 2014, that is 67% less than author's calculations and 248.5% less than calculations completed by R. Murphy, thereby exposing hefty methodological discrepancies in calculations.

Conclusions

The surveys showed that total tax gap for all 28 EU states in 2014 totalled USD 1331.6 billion (USD 1,33 trillion). It was proved that in order to better and comparatively illustrate the magnitude of the tax gap in the specific state, principally it is critical to investigate it within analogical or similar methodologies. One of them may be an indirect method demonstrated by the author that is based on the results from research into shadow economy in compliance with MIMIC method, for GDP of the specific state and total sum of taxes in the specific state. Certainly this method may be supplemented in further research by behavioural methods analysing taxpayers' behaviour, based on both questionnaire surveys of representative groups of taxpayers as well as research conducted during direct tax inspections.

These methods may be extended by future classifications of countries by their level of tax gap, shadow economy, and tax burdens which values were observed over specific years. They may be illustrated on classification trees within the agglomeration by Ward method and mapped on dendrograms.

Significant finding of the research is also corroboration that
magnitude of tax burdens is not correlated with analogical or comparative
characteristic of the shadow economy occurring in the specific country,
which implies that different drivers may determine the level of tax gap
and the shadow economy across countries.

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Tab. 1. Calculations of the tax gap for 28 UE states over 2011-2014

Country / Year	2011				2012				2013				2014			
	GDP	(SE)	TTR	Tax gap	GDP	(SE)	TTR	Tax gap	GDP	(SE)	TTR	Tax gap	GDP	(SE)	TTR	Tax gap
	bln USD	% of off. GDP	%	bln USD	bln USD	% of off. GDP	%	bln USD	bln USD	% of off. GDP	%	bln USD	bln USD	% of off. GDP	%	bln USD
Austria	429,1	7,9	52,3	17,73	407,6	7,60	52,4	16,23	428,3	7,60	51,9	16,89	436,3	7,50	52,0	17,02
Belgium	528,1	17,1	57,0	51,47	498,7	17,4	57,6	49,98	524,8	16,8	57,4	50,61	533,4	16,4	57,8	50,56
Bulgaria	55,8	32,3	27,2	4,90	52,6	32,6	27,7	4,75	54,5	31,9	27,0	4,69	55,7	31,2	27,0	4,69
Croatia	62,2	29,5	21,9	4,02	56,5	29,8	21,8	3,67	57,9	29,0	19,6	3,29	57,2	28,4	18,8	3,05
Czech Republic	227,3	16,4	48,1	17,93	206,8	16,7	48,1	16,61	208,8	16,0	48,0	16,04	205,5	15,5	48,5	15,45
Denmark	341,5	13,8	26,4	12,44	322,3	14,0	27,0	12,18	335,9	13,4	26,3	11,84	342,0	13,0	26,0	11,56
Estonia	22,8	28,6	57,8	3,77	22,7	29,3	66,7	4,44	24,9	28,2	49,6	3,48	25,9	27,6	49,3	3,52
Finland	273,7	13,7	39,0	14,62	256,7	14,0	40,6	14,59	268,2	13,3	39,8	14,20	270,7	13,0	40,0	14,08
France	2862,5	11,0	65,7	206,87	2681,4	11,3	66,5	201,49	2810,2	10,8	66,6	202,13	2829,2	9,90	66,6	186,54
Germany	3751,9	13,7	45,6	234,39	3533,2	13,9	45,9	225,42	3730,3	13,3	49,1	243,60	3852,6	13,0	48,8	244,41
Greece	288,8	24,3	45,9	32,21	249,5	25,4	44,1	27,95	242,2	24,0	44,0	25,58	237,6	23,6	49,9	27,98
Hungary	139,4	22,8	52,0	16,53	126,8	22,5	49,8	14,71	133,4	22,5	49,3	14,80	137,1	22,1	48,8	14,54
Ireland	237,8	12,8	25,4	7,73	222,0	13,0	25,4	7,33	232,1	12,7	25,7	7,58	245,9	12,2	25,9	7,77
Italy	2278,1	21,2	67,7	326,96	2075,2	21,8	67,7	306,27	2136,9	21,6	65,8	303,71	2144,3	21,1	65,4	295,90
Latvia	28,3	26,5	37,5	2,81	28,5	27,3	35,7	2,78	30,9	26,1	35,0	2,82	31,9	25,5	35,0	2,85
Lithuania	43,5	29,0	43,1	5,44	42,8	29,7	43,0	5,47	46,4	28,5	42,9	5,67	48,2	28,0	42,6	5,75
Luxembourg (Grand-Duché)	59,0	8,20	19,8	0,96	56,3	8,4	20,0	0,95	60,1	8,2	20,4	1,01	62,2	8,00	20,2	1,01
Malta	9,3	25,8	41,5	1,00	8,9	26,0	41,5	0,96	9,6	25,3	41,5	1,01	10,0	24,3	41,6	1,01
Netherlands	893,7	9,8	39,6	34,68	823,1	10,0	39,2	32,27	853,5	9,5	39,5	32,03	869,5	9,10	39,0	30,86
Poland	524,4	25,0	39,5	51,78	496,2	25,4	39,8	50,16	526,1	24,40	38,5	49,42	548,0	23,8	38,7	50,47
Portugal	244,9	19,4	42,8	20,33	216,4	19,2	42,0	17,45	224,9	19,4	42,3	18,46	229,6	19,0	42,4	18,50
Romania	182,6	29,6	43,5	23,51	169,4	29,8	43,3	21,86	189,6	29,1	43,2	23,83	199,0	28,4	43,2	24,41
Slovakia	97,5	16,0	47,6	7,43	92,7	16,4	47,2	7,18	97,7	15,5	47,0	7,12	99,8	15,0	48,6	7,28
Slovenia	51,2	24,1	33,9	4,18	46,3	24,3	33,9	3,81	48,0	23,6	32,4	3,67	49,4	23,1	32,0	3,65
South-Cyprus	27,1	26,0	22,0	1,55	24,9	26,2	22,2	1,45	24,1	25,6	22,5	1,39	23,2	25,2	23,2	1,36
Spain	1494,5	19,2	37,6	107,89	1355,7	19,4	37,7	99,15	1393,0	19,2	56,8	151,92	1404,3	18,6	58,2	152,02
Sweden	563,1	14,7	52,1	43,13	543,9	15,0	52,1	42,51	579,5	14,3	52,1	43,17	570,6	13,9	49,4	39,18
United Kingdom	2592,0	10,5	36,1	98,25	2614,9	10,7	35,0	97,93	2678,2	10,1	34,6	93,59	2941,9	9,70	33,7	96,17
28 EU-Countries / Average (unweighted)	662,3	19,6	41,7	54,17	623,1	19,9	41,9	51,99	641,1	19,3	41,7	51,65	659,3	18,8	41,9	51,87

SE- shadow economy, TTR- Total Tax Rate

GDP – current prices (USD)

GDP data: World Bank base: http://data.worldbank.org/indicator/NY.GDP.MKTP.CD

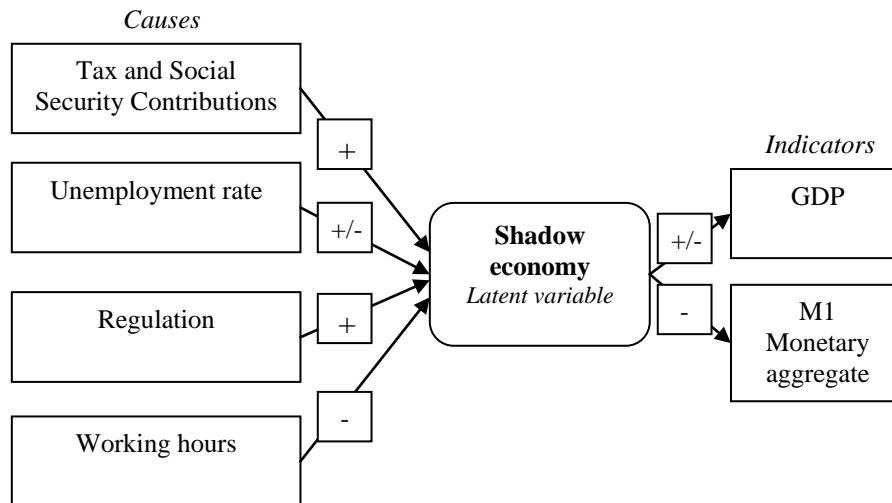TTR data: World Bank base: http://data.worldbank.org/indicator/IC.TAX.TOTL.CP.ZS

Source: own work

Fig. 1. The MIMMIC Model Approach in the shadow economy test procedure
Source: based on: A. Bühn, F. Schneider, MIMIC Models, Cointegration and
Error Correction: An Application to the French Shadow Economy, CESifo
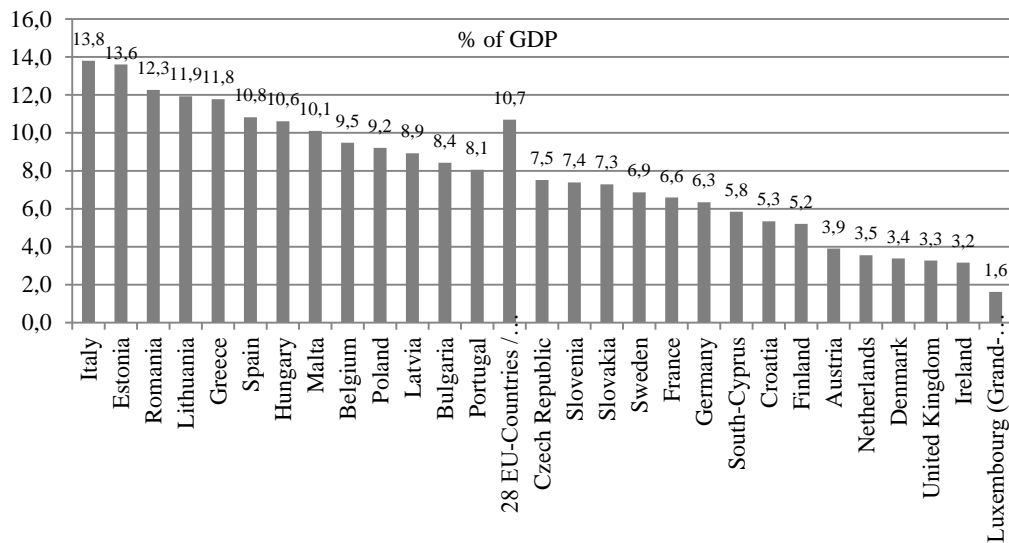Working Paper No.220, January 2008, p. 12.

Fig. 2. The level of the tax gap (% of GDP) in the European Union in
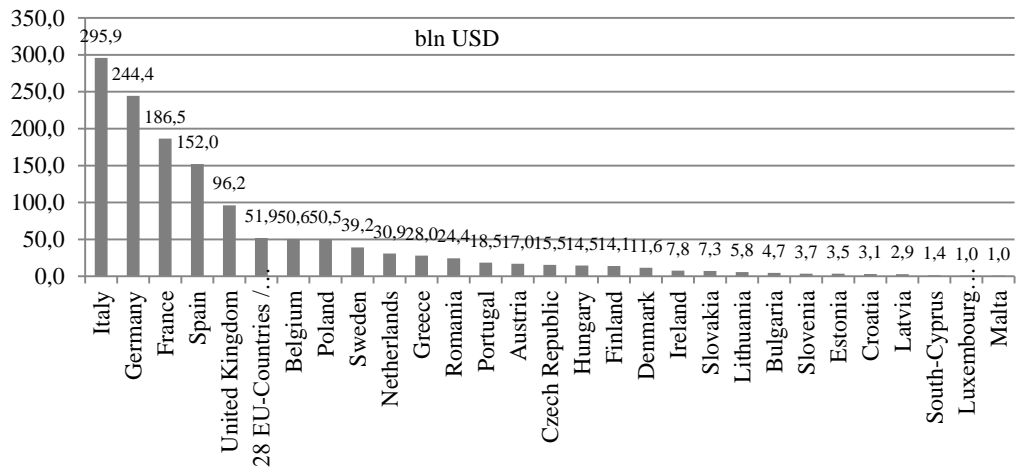2014.
Source: own work

Fig. 3. The level of nominal tax gap (USD billion) in the European Union
in 2014.
Source: own work