

# TAX COMPLIANCE AND SOCIAL SECURITY CONTRIBUTIONS – THE CASE OF SLOVENIA

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## Abstract

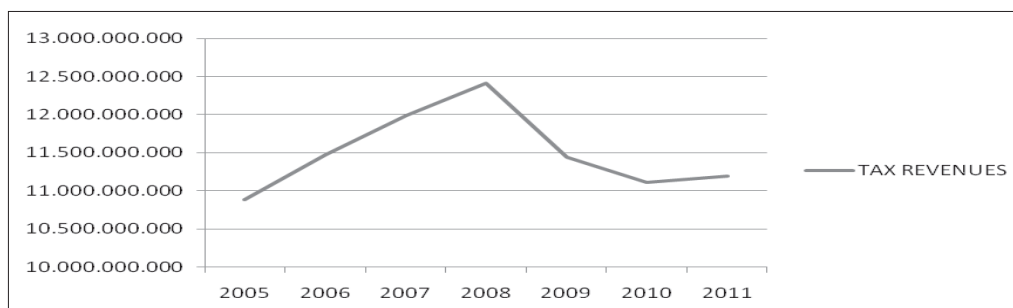
In this paper, we will examine the causes behind the higher level of compliance with social security contributions in comparison with other tax categories in the case of Slovenia. The results of econometric models suggest that the activities of the Tax Administration of the Republic of Slovenia, which were more stringently performed in the area of social security contributions in the most recent period, are an important – but not the only factor – behind the higher level of compliance in connection with social security contributions. At the same time, the decrease in tax compliance with other taxes (income tax, corporate income tax, and VAT) did not essentially influence the higher level of compliance with social security contributions. The more consistent treatment of unpaid social security contributions as a criminal offence and the higher public awareness about the importance of paying social security contributions in the latest period are recognized as important factors which simultaneously constitute the main difference between social security contributions and other taxes. The higher level of public awareness about the benefits that result from public services financed with taxes is recognized as a possible way to more optimally collect taxes in Slovenia.

**Keywords:** social security contributions, activities of the Tax Administration of the Republic of Slovenia, tax compliance, punishment, public awareness.

## 1. Introduction

Since 2008, the global economic and financial crisis has significantly influenced all important macroeconomic categories. The downward economic cycle has had a negative impact on economic activities, employment and consumption and also on the area of public finance. The first effects of the global economic crisis already impacted revenues in 2008, even though the annual growth in the EU only turned negative the following year (Eurostat, 2012, p. 4). At the same time, the essential element of the modern tax system, i.e. tax compliance, has worsened. This was confirmed by OECD data showing an increase in tax debts by the majority of tax administrations with more than 20%, and in some cases with more than 40% (OECD, 2011, p. 182). Also, the extent of the shadow economy has increased. Schneider (2010, p. 2) reported on the development of the shadow economy in Germany, Greece and in an additional 19 OECD countries since 1990 and provided first and preliminary calculations for 2010, taking the continuing economic crisis into account. As a result of the worldwide economic crisis, all OECD countries are again expected to face a renewed increase in the size of shadow economy for the second time in 2010 (the first time was in 2009).

In this paper we will focus on Slovenia, where as a result of recession the amount of collected revenues has fallen. In Slovenia, revenues are collected and recorded by the Tax Administration of the Republic of Slovenia (DURS) and the Custom Administration of the Republic of Slovenia (CURS). The most significant part of the collected revenues is represented by tax revenues; Figure 1 shows the reduction of tax revenues in Slovenia.

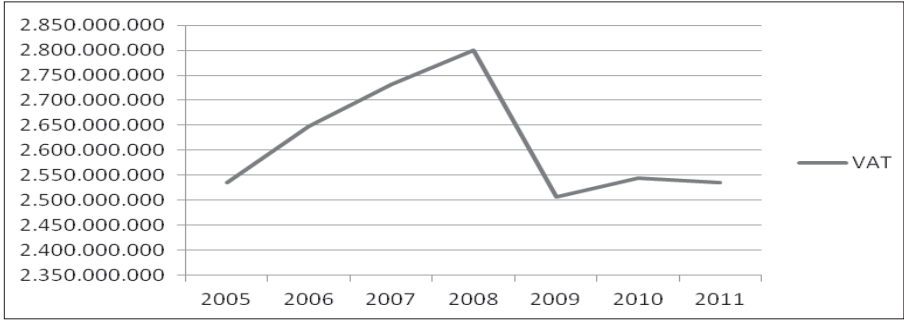


**Figure 1:** Tax revenues in Slovenia from 2005-2011 (in EUR, constant prices 2005)

**Source:** Ministry of Finance (Bulletin of Government Finance) and the authors' own calculations

The fluctuations in the individual tax categories for Slovenia in the period from 2005-2011 are presented below. We considered the main tax categories, namely value added tax (VAT), corporate income tax (CIT), income tax (INT) and social security contributions (SSC). The majority of the respective categories are collected by DURS, while CURS collects VAT from imports. Among all the collected revenues of DURS, tax revenues constitute the largest share by far (94.8% in 2011). SSC accounts for approximately one half of all tax revenues collected by DURS (in 2011 SSC accounted

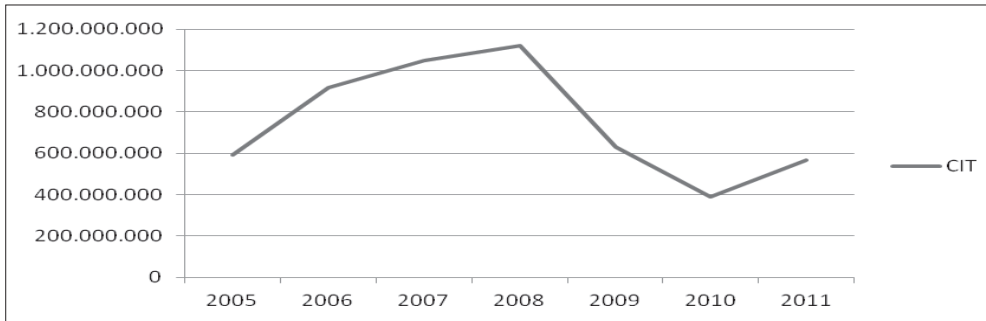
for 49.9% of all tax revenues collected by DURS). In Slovenia, SSC are divided into four large groups, namely: contributions for employment, contributions for parental care, contributions for pension and disability insurance, and contributions for health insurance. The majority of SSC is covered by contributions for pension and disability insurance (63.8% in 2011) and contributions for health insurance (35.1% in 2011).



**Figure 2:** VAT revenues in Slovenia from 2005-2011 (in EUR, constant prices 2005)

**Source:** Ministry of Finance (Bulletin of Government Finance) and the authors' own calculations

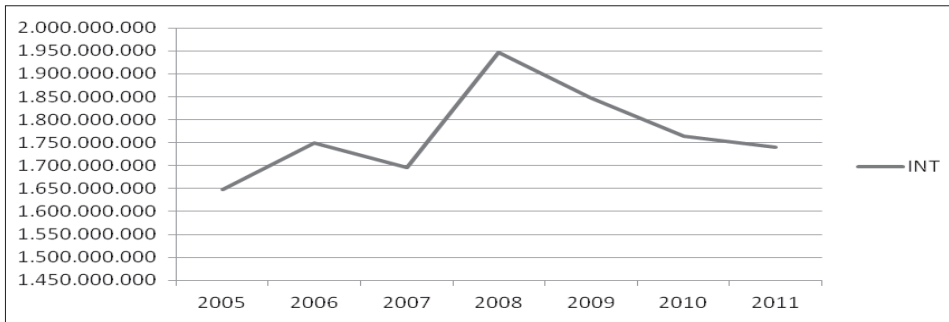
Figure 2 shows a sharp decline in VAT revenues which coincides with private and public consumption reduction and general economic activity decrease within the observed period.



**Figure 3:** CIT revenues in Slovenia from 2005-2011 (in EUR, constant prices 2005)

**Source:** Ministry of Finance (Bulletin of Government Finance) and the authors' own calculations

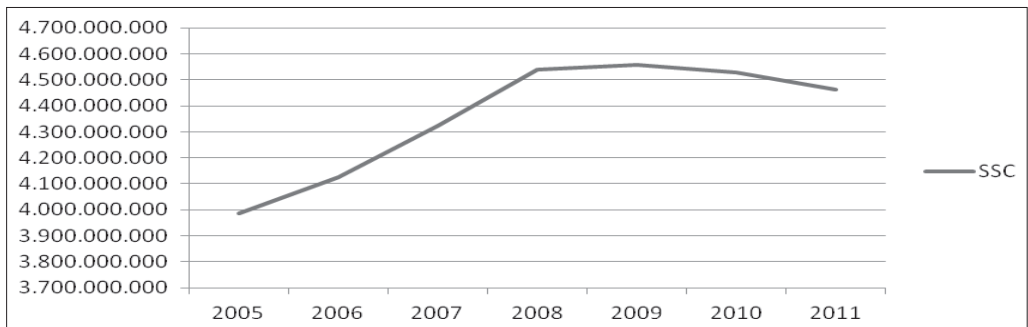
Likewise, the decrease in economic activity influenced the fluctuation of CIT revenues, as shown in Figure 3. We have to also consider the tax rate cut from 25% to 20% in the period from 2006-2010, as well. However, the collected CIT revenues still grew until 2008.



**Figure 4:** INT revenues in Slovenia from 2005-2011 (in EUR, constant prices 2005)

**Source:** Ministry of Finance (Bulletin of Government Finance) and the authors' own calculations

The most important INT sub-categories in Slovenia are income tax advance payments, annual income tax settlements and income tax on capital gains, dividends and interests. By far the largest source among the listed categories are the income tax advance payments and, within this category, advance payments from employment payrolls, which are mainly connected to the level of average wages and the employment rate. The unemployment rate has been steadily increasing during the course of the recession; likewise, average wages have been stagnating. Both of the mentioned indicators have influenced the drop in INT revenues, as shown in Figure 4. A short decline is evident in the year 2006, as well, due to the consequences of income tax reform in 2005 with the year 2006 to come into force.



**Figure 5:** SSC revenues in Slovenia from 2005-2011 (in EUR, constant prices 2005)

**Source:** Ministry of Finance (Bulletin of Government Finance) and the authors' calculations

Figure 5 shows the fluctuation of collected SSC, which differs from the other tax category fluctuations within the observed period. Namely, instead of a sharp decline after 2008, SSC maintains a constant level over the period of the crisis, whereas a slight decline can be observed after 2009. Although the amount of collected SSC is correlated with the level of average wages and employment rate, as it is fundamentally the case with INT revenues, there was no significant drop of SSC within the crisis period. However, it is necessary to highlight the flat rate on SSC in Slovenia (22.1%), while

progressive tax rates are used with INT. SSC (contributions for pension and disability insurance and contributions for health insurance) are payable from the insurance of individuals performing economic activity, farmer insurance, the voluntary insurance of the unemployed and some other categories which are also not directly connected with the level of average wages. The largest subcategory of contributions for pension and disability insurance and contributions for health insurance are made up of the contributions for employees and from employers. It should be noted that in the most recent period, this area in Slovenia has experienced some changes in comparison with the other tax categories, both in terms of stricter legal regulations, as well as in relation to the intensity of performing control activities over the payment of SSC. In 2010, DURS additionally intensified its control activities on the area of SSC and in 2011 even more intensively. In 2011, 1,465 controls were performed within the SSC project and identified additional charges of € 16,589,002. 2,462 taxpayers were asked to file a tax withholding returns and returns of SSC for incomes from employment (REK returns); 1,380 taxpayers filed 4,259 consolidated REK returns and 64 self incriminations. In the case of irregularities detected during inspections, the payment of wages on bank accounts or in cash still dominated, while REK returns were not submitted to DURS (Tax Administration of the Republic of Slovenia, 2012, p. 25). Due to rights arising from the SSC being paid, and in particular due to the numerous violations found in connection with this, public awareness about the importance of paying SSC has strengthened as well.

In this paper we try to find the causes behind the higher realization of collected SSC in comparison with other tax categories, while SSC are considered as an indicator for the level of tax compliance. The following questions are put forward:

- 1) Has the more strict oversight of DURS with regard to SSC influenced (and if so, to what extent) the higher level of compliance with SSC in the most recent period? We will test an econometric model to establish a connection between audit activities, penalty activities and the level of compliance with SSC, while at the same time considering the impact of worsened macroeconomic indicators with the introduction of relevant explanatory variables in the model.
- 2) Have the activities of DURS in the area of SSC influenced the level of compliance with SSC within the observed period more intensely than the total activity of DURS influenced the general level of tax compliance? For this, we will test an econometric model to establish the dependence of the level of tax compliance in general from the total activities of DURS, and then compare the results of both models with regard to DURS activities' significance determination in the individual model.
- 3) Was tax compliance in other areas (VAT, CIT and INT) reduced within the observed period on account of higher compliance with SSC? We will try to confirm this with an analysis of correlation coefficients in pairs between the level of tax compliance with SSC and the individual levels of compliance in other areas. At the same time, we will test an econometric model for establishing the dependence of the compliance level with SSC from tax compliance levels in other areas.

- 4) Depending on the results of the econometric models, we want to determine whether compliance with SSC was influenced by some other facts along with the DURS activities within the observed period, especially more consistent dealing with SSC non-payment as a criminal offence, the higher public awareness regarding the importance of SSC payments and the decision of the Constitutional Court of the Republic of Slovenia repealing article 228 of the Law on Pension and Disability Insurance, which allowed the write-off, partial write-off, delay, and installment payment of SSC.

## 2. Literature review

Many authors have investigated the connection between tax compliance and the revenue administration's measures. Dubin and Wilde (1988) provided empirical evidence on the relationship between compliance with the Federal Income Tax and auditing by the Internal Revenue Service. Alm, Jackson and Mckee (1992) empirically showed that taxpayer reporting increases along with greater audits and penalty rates; however, these responses are not significant. Cebula (1997) empirically examined the impact of federal income tax rates, IRS penalties on unpaid tax liabilities, and audit rates of the Internal Revenue Service on the size of the underground economy in the United States within the period from 1973-94. The size of the underground economy was found to be a decreasing function of both the percentage of tax returns audited and the penalties imposed by the IRS on unpaid taxes. Ali, Cecil and Knoblett (2001) explored IRS data and the relationship between taxpayer compliance, audit rates, penalties, tax rate schedules, income levels and sources of self-employment income. They found that the audit rate and penalty rate were both effective deterrents for non-compliance. Also Plumley (2002) found a statistically significant impact of some IRS activities on tax compliance, including audit and criminal investigations. Bergman and Nevarez (2006) for the first time analyzed VAT tax return information and enforcement data to assess the impact of audits on the subsequent compliance of taxpayers in Argentina and Chile. The analysis showed that audits have the undesired effect of furthering non-compliance behavior among cheaters but a more positive effect among those prone to compliance. Kastlunger *et al.* (2009) and Hoopes, Mescall and Pittman (2012) studied the influence of audits on future tax compliance and proved a positive correlation. Galbiati and Zanella (2012) investigated the role of externalities in tax evasion arising from the congestion of auditing resources and established the range of social multipliers in this connection. Also, Black *et al.* (2012) with the help of operative audit results has estimated the tax gap and on the area of corporate income taxation presented tax gap estimates in account of lower reported incomes. Niu (2011) in his study examined the impact of New York State tax audits on voluntary compliance in one segment of the New York State Economy, Food Services and Drinking Places. A sales growth rate was set as the dependent variable. The results of his analysis suggest that after an audit, a firm reports a higher sales growth rate. The behavioral responses of taxpayers with reference to random audit programs are the subject of Gemmel and

Ratto (2012) study, while Feld and Larsen (2011) proved that (subjectively perceived) deterrence by the government policies has an impact on undeclared work, but the influence of social norms is similarly important. Palil and Mustapha (2011) concluded that in the self assessment system in Malaysia, tax knowledge has a significant impact on tax compliance. Authors also found that tax compliance is influenced by probability of being audited, perception of government spending, penalties and personal financial constraints. Das-Gupta, Ghosh and Mookherjee (2004) evaluated the effects on tax compliance of simple reforms in personnel policy in the Indian income tax administration. The results of their analysis implied significant compliance gains would accrue from expanded staff employment and changes in assignment procedures for staff and taxpayers.

There are different aspects of tax compliance which are also interesting. Alm, Mckee and Beck (1990) studied the role of tax amnesty on tax compliance. The results indicated that the average level of compliance falls after an amnesty. If post-amnesty enforcement efforts increase, then aggregate compliance actually increases. In fact, post-amnesty compliance is higher when the amnesty is accompanied by increased enforcement efforts than when enforcement increases without an amnesty. In their experimental study, Chung and Trivedi (2003) examined the impact of friendly persuasion and gender on tax compliance behavior. The results showed a significant primary effect for gender as well as a significant interaction effect between gender and friendly persuasion on income reported. Ahmed and Braithwaite (2005) could confirm the thesis that discontent with the provision and funding of higher education plays a significant role in lowering tax compliance. Torgler and Schneider (2005) examined citizens' attitudes toward paying taxes. The focus of their study was the question of tax morale in Austria. Social variables, such as trust or pride, were identified as key determinants that shape tax morale in Austria. Furthermore, lower perceived compliance led to a decrease in tax morale, which would indicate that social comparisons are relevant. The results of the study also showed a decrease in tax morale between 1990 and 1999, although Austria's taxpayers still have a very high tax morale compared to other European countries. Murphy (2005) showed that attempts to restrain and threaten taxpayers into compliance can undermine the legitimacy of the Tax Office authority, which in turn can affect the subsequent compliance behavior of taxpayers. Raskolnikov (2009) argues that it is possible to design a more tailored tax regime. The idea is to separate taxpayers based on their taxpaying motivations by creating two different enforcement regimes and inducing taxpayers to choose one when they file their annual report. With this separation accomplished, the government can target enforcement by matching enforcement policies to taxpayer types. Those who choose to game the system will be deterred by higher penalties in one regime. Everyone else will be induced to comply by cooperative enforcement measures in the other. If successful, the separation and the targeted enforcement will improve tax compliance without raising its social cost, or keep the level of compliance unchanged while making tax administration more efficient. Muehlbacher, Kirchler and

Schwarzenberger (2011) employed the 'slippery slope' framework to research tax compliance, which suggests two key variables to obtain taxpayers' compliance: trust and power. Furthermore, two forms of compliance are distinguished. The authors hypothesized that voluntary compliance depends primarily on trust in the authorities, whereas enforced compliance is a function of the power attributed to authorities. These hypotheses could be confirmed using a large data set of taxpayers from Austria, the United Kingdom and the Czech Republic. The authors also stated that whereas voluntary compliance seemed to be positively related to age and education, enforced compliance was negatively related to education. The meaning of taxpayer information assistance services that reduce the uncertainty and increase tax compliance is the subject of a study by Alm *et al.* (2010), while Lawsky (2013) presented a new formal model of tax compliance that considers the level of taxpayer uncertainty, i.e. the model of uncertainty that incorporates both the extent of a taxpayer's uncertainty and the taxpayer's attitude towards uncertainty. Batrancea *et al.* (2012) reviewed the models of tax compliance with an emphasis on economic and behavioral perspectives. Verboon and van Dijke (2011) pointed to the role of procedural fairness and effectiveness of sanction severity in compliance with authorities. Hartner *et al.* (2011) showed that both forms of tax compliance (i.e. individual and collective European Union – tax compliance) were influenced by perceived distributive fairness judgments of EU transfer payments. Cummings *et al.* (2009) presumed that cross-cultural differences in tax compliance behavior have foundations in the institutions of tax administration and citizens' assessment of the quality of governance. Results from artefactual field experiments conducted in countries with substantially different political histories and records of quality governance demonstrate that observed differences in tax compliance levels persist over alternative levels of enforcement. The experimental results are shown to be robust by replicating them for the same countries using survey response measures of tax compliance. Lubian and Zarri (2011) presented empirical evidence that 'tax morale' – taxpayers' intrinsic motivation to pay taxes – constitutes a new determinant of happiness, even after controlling for several demographic and socioeconomic factors. Coricelli *et al.* (2010) investigated the relationship between emotions, deception, and rational decision-making by means of an experiment on tax evasion. The authors showed that the intensity of anticipated and anticipatory emotions before reporting income positively correlates with both the decision to cheat and the proportion of evaded income. They also found that the risk of public exposure of deception deters evasion whereas the amount of fines encourages evasion. These results suggest that an audit policy that strengthens the emotional dimension of cheating favors compliance. Alm and Torgler (2011) argued that the puzzle of tax compliance can be explained, at least in part, by recognizing the typically neglected role of ethics in individual behavior. Walsh (2012) argued that better understanding of the motives of taxpayers and their attitudes and behavior towards taxation can improve both voluntary compliance and the efficiency of the tax administration. Konrad and Qari (2011) found a robust positive association be-

tween patriotism and tax compliance. Robinson and Slemrod (2012) investigated the multidimensional tax systems and within their research aspects they also ascertained that a standard measure of trust in government is positively associated with greater administrator coverage and administrative assessment, as well as more serious sanctions for non-compliance.

### 3. Data and methodology

#### 3.1. Model 1: The assessment of the dependence of compliance with SSC

We want to confirm the dependence of compliance with SSC from DURS activities on the area of SSC and from macroeconomic conditions. The basic data source and, simultaneously, the dependent variable in the model of tax compliance dependence is made of the ratios of annually collected SSC to the total annual revenue collections for 15 Tax Offices (TO) in Slovenia for the period 2006-2011, as shown in Table 1.

**Table 1:** The annually collected SSC / Total annual revenue collection (%)

Tax office /year	Annually collected SSC / Total annual revenue collection (%)					
	2006	2007	2008	2009	2010	2011
TO1	52	52	53	58	62	63
TO2	49	51	52	53	61	58
TO3	58	61	65	64	69	69
TO4	44	46	45	50	48	46
TO5	47	47	45	50	53	51
TO6	38	38	38	43	43	44
TO7	45	47	47	51	55	55
TO8	54	55	54	60	66	65
TO9	47	46	47	53	57	57
TO10	49	47	49	51	57	57
TO11	55	60	60	65	69	63
TO12	67	70	59	59	66	63
TO13	53	54	52	58	60	61
TO14	44	46	46	49	53	45
TO15	52	56	57	60	66	66

**Source:** DURS data and the authors' own calculations

The Tax Administration (DURS) is composed of the General Tax Office and TOs. According to the Tax Administration Act, TOs are organization units of the Tax Administration, which are established for performing the tasks of the tax service on the specific area or for a specific work field. In the analysis, data of 15 TOs, which perform their activities according to the territorial principles of Slovenia, are applied. Due to introduction of some explanatory variables in the model, which take values according to the statistical regions (data of Statistical Office of the Republic of Slovenia – SURS), whereas the dependent variable takes values with regard to the territorial (regional)

principle of TO, the dependent variable was reasonably adapted to the explanatory variables on the basis of statistical regions.

Table 1 shows the upward trend of SSC ratios within the observed time period, even after 2008, which was influenced among other factors by a drop in other tax categories. For this reason, other taxes (VAT, CIT and INT) were not included as explanatory variables; however the possible impact of these tax categories on compliance with SSC was assessed separately.

The basic explanatory variables include the macroeconomic indicators that affect the collected SSC the most. As such, in the model, the SURS data on the average wage level in individual statistical regions of Slovenia were applied. The data was deflated by the consumer price index (Eurostat data) and the annual changes of deflated data were calculated. The collected SSC depended on the level of employment as well; therefore in the model the monthly changes in the unemployment rate for individual statistical regions of Slovenia were introduced. In the model, we also introduced the lagged dependent variable, i.e. the data on SSC ratios from the previous period (year).

With reference to the DURS activities in the model, we tested the audit measures, namely the number of subjects in the audit controls of SSC for the individual TOs as the yearly changes of ratios 'subjects in audit controls of SSC / total subjects in audit controls'. We also decided to include the variable that reflects the intensity of penalty activities, namely the imposing of penalties due to unfiled returns. In the model, the data on total liabilities for penalties imposed by individual TOs were applied; the values were deflated by the consumer price index (Eurostat data) and the yearly changes of deflated data were calculated. The statistical properties of the selected data are presented in Table 2.

**Table 2:** Statistical properties of selected data

Variable Abbreviation	Social security contributions LOG (SSC)	Social security contributions as lagged variable LOG (SSCLAG)	Wages LOG (WAG)	Subject in audit controls LOG (AUD)	Unemployment LOG (UNE)	Penalties LOG (PEN)
Mean	4.037172	3.998590	4.621324	4.755561	4.719612	4.794922
Median	4.054493	3.988317	4.619928	4.685213	4.741126	4.743912
Maximum	4.238126	4.238126	4.663433	6.526983	5.106650	5.273939
Minimum	3.752504	3.647058	4.596022	2.813411	4.413279	4.501058
Std. Dev.	0.133231	0.140245	0.014715	0.727365	0.198112	0.178034
Skewness	-0.463231	-0.278629	0.383870	0.083287	-0.108821	0.577588
Kurtosis	2.332429	2.491438	3.040848	3.163090	1.815247	2.670121
Jarque-Bera	2.444965	1.067196	1.108300	0.101897	2.720640	2.706097
Probability	0.294498	0.586491	0.574561	0.950328	0.256579	0.258451
Sum	181.6728	179.9365	207.9596	214.0002	212.3825	215.7715
Sum Sq. Dev.	0.781025	0.865425	0.009527	23.27863	1.726925	1.394625
Observations	45	45	45	45	45	45

As we can see from Table 2, all of the data series exhibit normal empirical distributions. A cross-section model with the following specifications was formed:

$$\log(\text{SSC})_{t,i} = \beta_0 + \beta_1 \log(\text{WAG})_{t,i} + \beta_2 \log(\text{UNE})_{t,i} + \beta_3 \log(\text{AUD})_{t,i} + \beta_4 \log(\text{PEN})_{t,i} + \beta_5 \log(\text{SSCLAG})_{t,i} + u_{t,i}$$

where  $\log(\text{SSC})$  stands for the logarithm of ratios ‘annually collected SSC / total annually collected revenues’,  $\log(\text{WAG})$  stands for the logarithm of yearly changes of deflated average wages by the individual statistical region,  $\log(\text{UNE})$  captures the yearly changes of unemployment rate by the individual statistical region,  $\log(\text{AUD})$  captures the logarithm of yearly changes of ratios ‘subjects in audit controls of SSC / total subjects in audit controls’ for the individual TO,  $\log(\text{PEN})$  stands for the logarithm of yearly changes of deflated total liabilities for penalties imposed by the individual TO and  $\log(\text{SSCLAG})$  stands for the logarithm of ratios ‘annually collected SSC / total annually collected revenues’ from the previous year.

### 3.2. Model 2: The assessment of general tax compliance dependence

We tried to determine the general tax compliance dependence from the DURS activities and macroeconomic conditions. As a dependent variable, the ratios ‘total annual revenue collection / GDP by individual statistical region’ for 15 TOs within the period 2006-2010 were applied. The values for GDP on the basis of statistical region were adapted to the values of total annual revenue collection on the basis of the individual TO territory. The results are presented in Table 3.

**Table 3:** Total annual revenue collections / GDP by individual statistical region, respectively TO territory (%)

Tax office /year	Total annual revenue collections / GDP by individual statistical region, respectively TO territory (%)				
	2006	2007	2008	2009	2010
TO1	15.2	14.8	15.1	15.0	14.3
TO2	13.4	13.0	13.7	14.1	12.9
TO3	2.5	2.2	2.1	2.3	2.2
TO4	19.3	17.4	19.4	18.6	19.4
TO5	18.1	17.8	20.2	19.5	19.1
TO6	32.6	31.3	33.7	32.6	32.9
TO7	17.0	16.0	17.2	16.5	16.0
TO8	18.2	17.7	19.2	19.0	18.6
TO9	18.4	17.6	18.7	17.7	16.6
TO10	13.0	12.8	13.3	13.6	12.7
TO11	11.3	9.9	12.0	11.7	11.2
TO12	2.8	2.6	3.3	3.5	3.1
TO13	19.0	17.0	20.9	19.8	18.7
TO14	3.6	3.4	3.5	3.5	3.5
TO15	19.9	18.0	18.9	18.5	16.8

Source: DURS data and the authors’ own calculations

Table 3 shows the downward trend of respective ratios for all TOs. The explanatory variables are presented by macroeconomic conditions and DURS activities. As a macroeconomic variable, the data on GDP by individual statistical region are applied, while the nominal values were deflated by the consumer price index (Eurostat data) and yearly changes of deflated data were calculated. The yearly changes in the unemployment rate by individual statistical regions were also introduced into the model as well as the lagged dependent variable. Thus, the ratio 'total annual revenue collections / GDP by individual statistical region' from the previous period was tested as an explanatory variable. With regard to DURS activities, the data on total liabilities from penalties imposed by an individual TO have proven to be statistically significant. The values were deflated by the consumer price index (Eurostat data) and the annual changes in deflated data were subsequently calculated. The statistical properties of the selected data are presented in Table 4.

**Table 4:** Statistical properties of the selected data

Variable Abbreviation	Total annual revenue collection/GDP by statistical Region REV	Total annual revenue collection/GDP by statistical region as lagged variable REVLAG	GDP GDP	Unemployment UNE	Penalties PEN
Mean	15.00319	14.85793	101.0251	114.2735	122.8455
Median	16.46034	16.46034	101.8692	114.5631	114.8827
Maximum	33.72570	33.72570	109.5081	165.1163	195.1832
Minimum	2.146375	2.146375	90.79584	82.53968	90.11243
Std.Dev.	7.722852	7.640489	5.797022	22.33066	23.06130
Skewness	0.160300	0.125623	-0.279298	0.157159	0.958553
Kurtosis	3.366948	3.337183	1.717430	2.098104	3.581414
Jarque-Bera	0.445191	0.331531	3.669405	1.710397	7.525007
Probability	0.800439	0.847245	0.159661	0.425199	0.023226
Sum	675.1434	668.6067	4546.131	5142.306	5528.046
SumSq.Dev.	2624.268	2568.591	1478.640	21940.96	23400.23
Observations	45	45	45	45	45

As we can see from Table 4, one out of five time series exhibit empirical distributions, which differ from a normal distribution. But as we will see in diagnostic tests for the model, this finding did not influence the properties of the model.

A cross-section model with the following specifications was formed:

$$REV_{t,i} = \beta_0 + \beta_1 (GDP)_{t,i} + \beta_2 (UNE)_{t,i} + \beta_3 (PEN)_{t,i} + \beta_4 (REVLAG)_{t,i} + u_{t,i}$$

where REV stands for the ratio 'total annual revenue collection / GDP by individual statistical region', GDP stands for the yearly changes of deflated data on nominal GDP by individual statistical region, UNE captures the annual changes of the unemployment rate, PEN stands for the yearly changes of deflated total liabilities for penalties imposed by the individual TO and REVLAG captures the ratio 'total annual revenue collection / GDP by individual statistical region' from the previous period (year).

### 3.3. Correlation coefficients analysis: The assessment of the dependence of compliance with SSC from the level of tax compliance with other taxes

The results of the econometric model for establishing the connection between SSC and other tax categories were not completely relevant, since none of the applied macroeconomic variables proved statistically significant. Therefore, we tried to assess the possible dependence of compliance with SSC from the changes (reductions) of tax compliance with other tax categories (VAT, CIT and INT) with an analysis of correlation coefficients. The yearly changes of deflated data on collected SSC, VAT, CIT and INT for 15 TOs within the period 2008-2011 were applied. The nominal values of the collected categories were deflated by the consumer price index (Eurostat data). The correlation coefficients in pairs between the SSC and the individual levels of compliance in other areas (VAT, CIT and INT) were then calculated.

## 4. Results

The results of Model 1 are presented in Table 5. The parameters of the model were estimated using the OLS method and using White heteroskedasticity-consistent standard errors & covariance. After adjustments due to lagged variables, the sample size was 45 observations. Before we comment on the results, we will present the results of the tests that were applied in order to check the robustness of the model. We performed a Ramsey RESET test in order to check if the model was correctly specified. As we can see in Table 5, the RESET test shows no indication of any possible misspecification. This is also confirmed by the Likelihood ratio test statistic.

With regard to the possible presence of autocorrelation the results of the Durbin-Watson test are reported in Table 5. We also tested for the presence of multicollinearity. The results of the model in Table 5 and the correlation matrix in Table 6 indicate that the effects of a possible linear relationship between variables are not important.

**Table 5:** The results of Model 1 for the dependent variable log (SSC)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-10.06912	2.436210	-4.133108	0.0002
LOG (SSCLAG)	0.868286	0.043131	20.13128	0.0000
LOG (WAG)	2.259624	0.534371	4.228568	0.0001
LOG (AUD)	0.013183	0.007407	1.779899	0.0829
LOG (UNE)	-0.055150	0.032054	-1.720572	0.0933
LOG (PEN)	0.081234	0.043521	1.866551	0.0695
R-squared	0.893332	Mean dependent var.		4.03712
Adjusted R-squared	0.879657	S.D. dependent var.		0.133231
S.E. of regression	0.046219	Akaike info criterion		-3.187304
Sum squared resid.	0.083310	Schwarz criterion		-2.946416
Log likelihood	77.71434	Hannan-Quinn criter.		-3.097503
F-statistic	65.32427	Durbin-Watson stat		1.933005
Prob. (F-statistic)	0.000000			

Ramsey RESET Test:

	Value	df	Probability
t-statistic	0.588476	38	0.5597
F-statistic	0.346303	(1,38)	0.5597
Likelihood ratio	0.408239	1	0.5229

**Table 6:** Correlation matrix for explanatory variables for Model 1

	LOG (SSCLAG)	LOG (WAG)	LOG (AUD)	LOG (UNE)	LOG (PEN)
LOG (SSCLAG)	1.000000				
LOG (WAG)	-0.076352	1.000000			
LOG (AUD)	0.308321	-0.081369	1.000000		
LOG (UNE)	0.275898	-0.039102	0.457915	1.000000	
LOG (PEN)	-0.001828	0.308636	0.163399	0.257842	1.000000

The results of the model were in line with our expectations; the regression coefficients for macroeconomic explanatory variables show the expected signs. We can observe a positive regression coefficient with respect to wages, which suggests that an increase in the respective variable has a positive influence on the level of tax compliance with SSC. The unemployment rate shows a negative regression coefficient in the model, for an increase of a respective variable has a negative influence on the level of compliance with SSC and therefore on collected SSC reductions. Both DURS activities reveal regression coefficients in line with our expectations; namely the number of subjects in audit controls of SSC has a positive impact on the level of tax compliance with SSC. Likewise, the liabilities for penalties imposed have a positive influence on the value of the dependent variable. The introduced lagged dependent variable proved to be highly statistically significant with the positive regression coefficient. To determine the significance of the individual explanatory variable, the product of the average value of the explanatory variable (the average value of the logarithm of selected data) and the regression coefficient was calculated for each of the explanatory variables and the absolute values of the respective products were then compared. In terms of the most important variables, we can observe that the average wage level has a highly statistically significant positive regression coefficient, whereby the increase in that variable by one unit influences an increase in the dependent variable by 2.25 units, followed by a lagged dependent variable. Among DURS activities in the model, the penalty measures proved to be among the most important, whereas the increase in respective variables by one unit influenced an increase in the dependent variable by 0.08 units. The increase in the unemployment rate in the model by one unit influenced the dependent variable reduction by 0.05 units. The least important variable in the model was the number of subjects in audit controls of SSC, whereby the increase in the respective variable by one unit had a positive influence on the dependent variable by 0.01 units.

**Table 7:** The results of Model 2 for the dependent variable REV

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.347855	2.116235	-2.054523	0.0465
REVLAG	1.015437	0.013328	76.18863	0.0000
<b>GDP</b>	0.061187	0.019971	3.063729	0.0039
UNE	-0.030749	0.006671	-4.609183	0.0000
PEN	0.012993	0.004799	2.707768	0.0099
R-squared	0.991750	Mean dependent var		15.00319
Adjusted R-squared	0.990925	S.D. dependent var		7.722852
S.E. of regression	0.735682	Akaike info criterion		2.328402
Sum squared resid	21.64914	Schwarz criterion		2.529143
Log likelihood	-47.38905	Hannan-Quinn criter.		2.403236
F-statistic	1202.181	Durbin-Watson stat		1.913868
Prob (F-statistic)	0.000000			

#### Ramsey RESET Test

	Value	df	Probability
t-statistic	0.300827	39	0.7651
F-statistic	0.090497	(1,39)	0.7651
Likelihood ratio	0.104299	1	0.7467

The results of Model 2 can be seen in Table 7. The parameters of the model were estimated using the OLS method and using White heteroskedasticity-consistent standard errors & covariance. After adjustments due to lagged variables, the sample size was 45 observations. Before we comment on the results, we will present the results of the tests that were applied in order to check the robustness of the model. We performed a Ramsey RESET test in order to check if the model was correctly specified. As can be seen in Table 7, the RESET test shows no indication of any possible misspecification. This is also confirmed by the Likelihood ratio test statistic.

With regard to the possible presence of autocorrelation, the results of the Durbin-Watson test are reported in Table 7. We also tested for the presence of multicollinearity. The results of the model in Table 7 and the correlation matrix in Table 8 indicate that the effects of a possible linear relationship between variables are not important.

The results of Model 2 confirm tax compliance dependence on economic growth; a positive regression coefficient can be observed with respect to the introduced explanatory variable (GDP). The unemployment rate also proved to be statistically significant with the negative regression coefficient. The penalty activities, namely the liabilities of penalties imposed, with the positive regression coefficient confirmed the purpose of DURS activities with respect to their positive impact on the tax compliance level.

To determine the significance of an individual explanatory variable, the product of the average value of the explanatory variable and the regression coefficient was calculated for each of the explanatory variables, and the absolute values of the respective

products were then compared. In terms of the most important variables, we can include the lagged dependent variable, whereby the increase of this variable by one unit positively influences the collected revenues by 1.01 units. In terms of importance, the second variable is GDP, in that the increase of a respective variable by one unit causes the dependent variable to increase by 0.06 units, followed by the unemployment rate, in which with the increase by one unit leads to the dependent variable's reduction by 0.03 units. Among the least important variables in the model, are DURS activities, in particular the total liabilities for penalties imposed.

**Table 8:** Correlation matrix for explanatory variables for Model 2

	REVLAG	GDP	UNE	PEN
REVLAG	1.000000			
GDP	-0.040987	1.000000		
UNE	0.126329	-0.446745	1.000000	
PEN	-0.063037	0.184363	0.296749	1.000000

Table 9 shows the correlation coefficients between SSC and individual tax categories (INT, CIT, and VAT). The correlation matrix reveals a strong positive correlation between SSC and INT. Such correlation can be explained by the fact that the taxpayers, which is to say wage payers, calculate and pay SSC and INT (income tax advance payments from employment) simultaneously in the unified tax return (REK return). We can observe a negative correlation between SSC – CIT and SSC – VAT, however these correlations are weak and may therefore be considered irrelevant.

**Table 9:** The correlation matrix for establishing correlation between individual tax categories

	SSC	INT	CIT	VAT
SSC	1.000000			
INT	0.769235	1.000000		
CIT	-0.049115	0.368551	1.000000	
VAT	-0.286626	-0.199722	0.089272	1.000000

## 5. Discussion

Model 1 was introduced in order to establish the connection between DURS activities and the compliance with SSC and to simultaneously assess the significance of DURS activities with SSC in comparison with other explanatory variables applied in the model. Model 2 was tested for the purpose of establishing whether the DURS activities in the area of SSC influenced the level of compliance with SSC within the observed time period more intensely than the total activities of DURS influenced the general level of tax compliance. The comparison of both model results indicates that DURS activities certainly contributed to a higher level of tax compliance. In Model 1, among the audit measures and penalties imposed (mostly for unfiled tax returns) the penalties were shown to be more important, which also constitutes a statistically significant variable in Model 2 as well. The results of both models suggest that DURS

activities in the SSC area within the observed time period have somewhat contributed to the higher level of compliance with SSC than total DURS activities have contributed to the general level of tax compliance. Still, in both of the models we can observe that the DURS activities with the relative same level of importance (in terms of the most important variable) fall behind the lagged dependent variables and macroeconomic variables, with the exception of Model 1, where penalties take precedence over the unemployment rate. This might imply that DURS activities are not the only factor behind a higher level of compliance with SSC.

A correlation matrix, with the correlation coefficients calculated between the dependent and individual explanatory variables, was introduced to assess the possible relationship between SSC and other tax categories (VAT, CIT and INT). The calculated correlation coefficients show weak, which is to say, irrelevant correlation. This further suggests that the decrease in tax compliance with other taxes (VAT, CIT and INT) did not essentially influence the higher level of tax compliance with SSC.

An important distinguishing fact about the SSC area compared to other tax categories is the statutory provision declaring SSC non-payment to be a violation of fundamental workers' rights as a criminal offence (art. 196 of The Criminal Code). Public awareness about the importance of SSC payments and the consistent dealing with SSC non-payment as a criminal offence has strengthened in the most recent period. As the control institution over the regularity of accounting and payment of SSC, in 2010 DURS filed 81 criminal charges for violations of fundamental workers' rights according to art. 196. This constitutes a 35.06% share of all criminal charges filed by DURS, making it the most commonly brought criminal offense (Tax Administration of the Republic of Slovenia, 2011, p. 30). In 2011, DURS filed 61 criminal charges against related criminal offences, which meant a 37.4% share of all criminal charges, which is to say the second most commonly charged criminal offence (Tax Administration of the Republic of Slovenia, 2012, p. 25). Another relevant factor with respect to tax compliance is the level of successful control, detection and punishment of tax abnormalities, which has been confirmed by many studies. It is reasonable to expect a positive influence on the level of compliance with SSC on account of an increase in criminal offence activities in the area of SSC. Within the context of more severe legal regulations, we can point to the decision of the Constitutional Court of the Republic of Slovenia repealing art. 228 of the Law on Pension and Disability Insurance in the part that allowed the write-off, delay and installment payment of contributions for pension and disability insurance as part of SSC. However, we have to consider the fact that procedural regulations do not already allow write-offs, delays and installment payments for the advance payments of taxes and tax withholding.

At the same time, there was a significant increase in the number of cases of verifying the accounting and regularity of SSC payments by interested members of the public (employees, beneficiaries of SSC rights); this task is a legal obligation of DURS (the disclosure of paid SSC). According to DURS, 24,115 cases of disclosure of data on accounting and SSC payment regularity were performed in the year 2010 and 20,720

such cases in the year 2011. This type of disclosure was not possible in previous time periods (only via the Institute for Pension and Disability Insurance). Certainly, in this connection, the employees also have the opportunity to act within their legal means (to file a report to the competent authority or even press for criminal charges) against wage payers in cases of unaccounted and unpaid SSC. The disclosure of paid SSC can be connected with a higher level of taxpayer (i.e. wage payer) cooperation as well.

It is obvious that compliance with SSC is possibly connected with many different factors. An econometric analysis of the introduced models shows that changes in macroeconomic categories constitute the basic and most important factor of the dependent variable: the collected SSC fluctuations. Likewise, the level of compliance with SSC from the previous period had a considerable influence on this area. DURS activities in the SSC area were also revealed to be significant; among audit measures and penalty activities (mostly penalties imposed for unfiled tax returns) the latter was proven to be more important. Still, the variables that illustrate the macroeconomics situation, as well as lagged dependent variables and DURS activities, can be observed as variables with the relative same importance in the model of general tax compliance dependence in terms of the most important variables. At the same time, the correlation coefficients analysis suggests a possible tax payment avoidance or lower level of tax compliance with INT, CIT and VAT since the SSC area specificity did not considerably influence a higher level of compliance with SSC. The results of the econometric models, as well as the fact that the possibility for a write-off, delay and installment payment of contributions for pension and disability insurance was abolished in 2011 (the last observed year in our analysis) and that the write-off, delay and installment payment for the advance payments of taxes and tax withholding are not yet possible, suggest that these are not the only reasons for the higher level of collected SSC in comparison with other taxes, even after 2008.

Likewise, the more consistent dealing with SSC non-payment as a criminal offence and the higher level of public awareness about the importance of SSC payments are put forward in this paper as among the possible factors for the higher realization of SSC in comparison with other tax categories. The possibility of criminal proceedings against SSC debtors in such a legal form is not in force in other tax areas, which may be connected with a higher level of compliance with SSC. The level of public awareness about the rights issued from SSC payments has also risen considerably in the latest period. This is understandable, as we remember that the regularly accounted and paid contributions for pensions and disability insurance are the basis for direct benefits, namely pensions. We believe that the criminal proceedings for SSC non-payment and, especially, a better awareness of the beneficiaries of SSC rights (above all, the employees) have significantly contributed to the higher realization of collected SSC within the observed period and could simultaneously, with the consideration of the econometric model's results, constitute the most important explanatory factors for the higher level of compliance with SSC in comparison with other taxes. Particularly, increased awareness about the significance of SSC payments should raise the general

perception of the benefits that result in the betterment of the public good, as financed with taxes. Therefore, finding a way for broader public awareness about the importance of paying taxes should present the answer to the question of whether taxes in Slovenia are really optimally collected.

## 6. Conclusion

In the conclusion, we will summarize answers to the questions set forth in the introduction. Thus, with regard to the impact of DURS activities, the results of the econometric model (Model 1) suggest that DURS activities in the area of SSC certainly contributed to a higher level of compliance with SSC. The penalties imposed in the cases of unfiled tax returns and audit activities proved to be statistically significant. The DURS activities in the model that proved to be more important included the penalty measures, whereby an increase in the respective variable by one unit brought an increase of the dependent variable by 0.08 units. The increase in the number of subjects in audit controls of SSC by one unit positively influenced the dependent variable by 0.01 units.

With regard to the question of whether the activities of DURS in the area of SSC influenced the level of compliance with SSC within the observed period more intensely than the total activity of DURS influenced the general level of tax compliance, this paper tested an econometric model (Model 2) and presented a comparison with the results of Model 1. Model 2 was established to assess the general level of tax compliance dependence from the total DURS activities. In this connection, the liabilities from penalties imposed proved to be statistically significant whereby an increase in the respective variable by one unit positively influenced the dependent variable by 0.01 units. The results of both models suggest that DURS activities in the SSC area within the observed period have contributed to some extent to the higher level of compliance with SSC than total DURS activities have contributed to the general level of tax compliance. Still, in both of the models we can observe the DURS activities with the relative same level of importance (in terms of the most important variables, DURS activities fall behind the lagged dependent variables and macroeconomic variables – except in Model 1, where the penalties take precedence over the unemployment rate).

The question of whether tax compliance in other areas (VAT, CIT, and INT) was reduced within the observed period on account of higher tax compliance with SSC was set due to the specificity of the SSC area in comparison with the other analyzed tax categories (there is a possibility for prosecution for SSC nonpayment; likewise, the public's awareness regarding the significance of SSC payment in the most recent period has strengthened considerably). A correlation matrix with the correlation coefficients calculated between the dependent and individual explanatory variables was introduced to assess the possible relationship between SSC and other tax categories (VAT, CIT and INT). The calculated correlation coefficients showed weak, which is to say irrelevant correlation. This implies that the decreasing of tax compliance with other taxes did not essentially influence the higher level of tax compliance with SSC.

However, one can observe a strong positive correlation between SSC and INT. Such correlation can be understood by the fact that taxpayers – wage payers calculate and pay SSC and INT (income tax advance payments from employment) simultaneously in a unified tax return (REK return).

Depending on the results of the econometric models, primarily in the sense that DURS activities cover the same relative position in both models (in terms of variable importance), it is expected that the latter is not the only factor behind a higher level of compliance with SSC in comparison with other observed areas. The factors that we believe make up the main difference between SSC collection and other taxes, are the possibility for criminal proceedings against SSC debtors and the higher level of public awareness about the importance of SSC payment. Both of these areas have recently been given more attention and seen more active measures. More consistent and systematic criminal procedures in the case of SSC non-payment (criminal charges filed) were performed. According to theoretical studies, this has a positive impact on taxpayer cooperation. At the same time, the legal possibility of disclosing data for SSC payment regularity in comparison with previous years (when there was no possibility for verification in such a legal manner) has strengthened the public's awareness about the importance of rights issued from the paid SSC (above all, with reference to contributions for pension and disability insurance). We believe that the higher level of public awareness that these benefits result in public services financed by taxes should present a possible way to a more optimal tax collection system in Slovenia.

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