RELATIONSHIP BETWEEN TAX BURDEN AND TAX EVASION: FLIGHT TO THE OFFSHORE

by

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Abstract

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The study focuses on investigating the influence of tax policy on the capital outflow to the offshore countries. According to the literature, one major reason for these capital outflows is tax evasion. We use corporate tax rate as one possible measure of tax policy burden. The results show that tax rates do not have a high effect on the deposit on the offshore countries, more precisely, the corporate tax rate has a very small impact on the tax evading, and meanwhile increasing personal income tax rate can force wealthy individuals to relocate their income to the deposits in the offshore accounts.

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LIST OF ABBREVIATIONS

BIS. Bank of International Settlement

FSI. Financial Security Index

Chapter 1

INTRODUCTION

The tax evasion is associated with the unwillingness of companies, organizations or individuals who try to minimize their tax liability. In this work, we concentrate on the evading tax through offshore financial centers.

Various tax policies are proposed in countries all over the world. The governments imposed taxes due to their needs. Quite often business companies and organization accept the respective tax rates on their profit as overcharged. Moreover, it is generally recognized that a high tax rate on personal income can also be a partial cause of tax evasion. As a result, tax evasion befalls, which may lead to thriving corruption in general at all levels. Worse still, it leads to the lack of trust to the governments from citizens, which is followed by the fact that citizens do not have credibility in reasonably and diligently way of tax breakdown.

One of the possible ways to avoid taxes is through the opening of shell companies in offshore countries, where the tax rates are low (or 0), and anonymity is valued. Using the tax havens became a problem of profit shifting both in the developed and developing countries. There is the problem of lack of sharing international information to the residents' authorities.

Hiding taxes leads to a budget deficit, which results in funding shortages in different types of spending. It consequences to decreasing living standards, increasing both poverty and corruption level.

Tax evasion can be divided into to categories: business and corporate tax evasion and private income tax evasion. The corporate tax evasion is similar to the private income evasion, for example, underreporting of income, claiming too many tax credits, overstating deductions, and hiding money from the government through laundering or illegal accounting schemes. We are concentrating on the last two points, and the assumption is that the laundered money is relocated to the deposit in tax haven countries. The corporate tax evasion reaches 20 percent of the corporate tax revenue that is collected each year only in the United States. The biggest company, such as Google, Amazon, Starbucks, and Apple were engaged in the scandal with tax evasion. Nevertheless, we are talking not only about big corporations but also small ones have a largest single contributor to the tax gap. Underreporting of corporate income accounts for $125 billion, which is 27 percent of the total $458 billion tax gap in the US for 2008-2010 (IRS, 2016)

Furthermore, an estimated $8.7 trillion, which is 11.5 percent of the entire world's GDP and Global corporate tax revenue loss around $200 billion per year (approximately 12% of global corporate tax revenue). Under 'most sensible apportionment rule, European Union is the main loser, which is approximately 20% of its revenue'. Meanwhile, the primary winners are Luxembourg, Ireland, and Netherlands. These countries impose low rates of 2-3% (Tørsløv et al., 2017).

Another indicator of tax haven country is the profit of corporations. While average taxable corporate profit in European Union among non-havens country reach 34%, Luxembourg reach more than 250 percent, Ireland has around 200 percent, Malta stays for approximately 150 percent and the Netherlands – more than 50 for 2015. In addition, tax havens run a huge trade surplus and then paid back to foreign parents (Tørsløv et al., 2017).

This issue is widely discussed by policymakers and as a result, in 2012, OECD started the program Base Erosion and Profit Shifting that focuses on closing the gaps and mismatches in tax rules for hiding profits in areas with 0 or low-tax.

The purpose of the study is to investigate whether tax burden has a significant influence on tax evasion through an offshore flight. Prior studies yielded ambiguous results (obtained both positive and negative effect).

We are going to concentrate on three classifications of offshore financial centers: the OECD classification, IMF classification and 2015 Financial Secrecy Index and estimate if results differ.

It is worthwhile noting that tax evasion and tax avoidance denominate the same event but differ by juridical basis. Namely, tax avoidance is a hidden income within legislative requirements, while tax evasion is an unlawful activity to reduce the tax burden. In the paper, the term 'tax evasion' will be conceived as having a try at hiding tax without consideration of legality.

In our analysis, we used the unbalanced panel data set for 13 years with ten offshore countries. As a dependent variable, we considered the total liabilities from Bank of International Settlements in millions of US dollars. We expect the positive signs of income and corporate tax rates. The econometric model, which is used, is a fixed-effects and cross-section models. To estimate the effect of tax policy the fixed effect was used for different tax rates. We also control for cross-sectional differences by dividing years into two periods until 2008 and after 2009.

The signs for resident tax rates are positive, while for offshore countries tax rate are negative, GDP of country pairs also are positive; meanwhile, the spread of interest rates have the negative effect.

The structure of the paper is the following. Chapter 2 provides a review of the literature. Chapter 3 describes the methodology used in the research. Chapter 4 provides the data description. Estimation results are presented in Chapter 5. Moreover, the last one, conclusion and discussion of the results and possible alternatives for improving the model.

Chapter 2

LITERATURE REVIEW

To investigate a capital flight to offshore we have to focus on international bilateral deposits namely, links between offshore centers and other countries. We will concentrate on non-bank liabilities, as they are debts to individuals or businesses (particularly those with excluding debts to other banks).

Imposing high tax rates on the taxpayers is known to bring about tax evasion. However, previous studies promoted the undetermined value of tax policies. The prior study of Allingham and Sandmo (1972) found that consequences of tax policy were unascertainable. They focused on the taxpayer's choice of reporting their real income level or reporting less than actual income level. Also, the tax authorities are presented in this theoretical model. Thus, individual's pay off depending on the investigation of tax authorities. If he chose to report less than actual income and he does not inquire, as a result, he is better off. In the case of the investigation, a taxpayer is worth off. The authors concluded the presence of negative income effect and positive substitution effect at the same time, which demonstrate the net effect of tax policy is uncertain.

Yitzhaki (1974) estimated the negative effect of the tax evasion. He argues the model of Allingham and Sandmo. He claims that it is better to impose the penalty on tax evasion as opposed to the underreported income, as a result, there no substitution effect. Thus, there is a negative relationship between the tax rates and income.

Nonetheless, the later studies of Clotfelter (1983) showed that increasing tax rates increased tax evasion. The last article was used as the benchmark model for a number of studies.

In comparison to Clotfelter (1983), Feinstein (1991) executed the cross-section analysis of 1982 and 1985 from Taxpayer Compliance Measurement Program database. He faced the problem of unclear separation of tax and income effects. Besides, Feinstein was more likely to interpret his result as a negative relationship between marginal tax rate and evasion, which is more consistent with Yitzhaki.

Zucman (2011) focuses on shifting wealth, in particular, personal income, to the tax haven. He pays attention to the importance of existing tax havens as an essential mechanism that drives the global economy. The author claims that due to the globalization of international statistics, it became harder to define the owners of the assets (for approximately 20% of assets, according to Zucman) as a part of the assets is invested into equities. Moreover, based on the results of the study "around 8% of global net household wealth is held unrecorded in offshore banks". We are interested here in evolving personal wealth as we estimate non-bank liabilities, which include household's wealth.

Huizinga and Nicodeme (2004) analyze the determinants of international deposits and influence of the tax policy in the form of wealth taxation and interest income taxation. Moreover, the study considers the question of international information exchange. Authors find a positive relationship between interest income taxation and international deposits and information sharing of reporting of a domestic bank. Moreover, the authors conclude this result as a possible alleviation of tax evasion. Huizinga and Nicodeme use the data from International Bank of Settlement at non-bank external liabilities and deposits for 1983-1999. They run two pooled cross-sections regressions for two periods and one similar cross-section model

specification for the year 1999. The primary model conditionally can be divided into banks' country and customers' country variables such as real GDP, bank interest spread of lending and deposit interest rates, dummy variables for the rule of law, which defines a legal system for the country, wealth tax rates; control variables such as the distance between countries and language. Furthermore, they introduce the interaction term, which is income tax x deposit rate variable as the load for a customer in his country. This coefficient is positive and significant. The model of Huizinga and Nicodme will be a benchmark for the investigation in this study.

One important issue has to be discussed, namely, what countries can be specified as tax havens. There is no official definition of this term. In this study, we will use tax havens/countries and offshore financial centers interchangeably as the main characteristics are similar.

Dharmapala (2008) focuses on the analysis of offshore countries' characteristics and examine the outcomes of the existence of tax haven countries. He defines tax havens with following criterias such as zero or low withholding tax rates for non-residents, bank secrecy laws (lack of international information interchange), English language as the official language, economic openness. The author also mentions the legal origin, and namely, tax havens likely to have British legal origins than the French ones. Havens are unlikely to be an independent country to have fewer members in the United Nations.

Besides, Hines (2005) shows that the tax haven countries had a more prosperous economic growth rate for the period 1982-1999 than non-havens, which means that some countries may have the incentive to become havens.

Alworth and Andresen (1992) analyze more specifically economic determinants of cross-border deposits. They use a gravity model to estimate the determinants of

cross-border flows, particularly the non-bank bilateral deposits using the available data up to 1990th. Alworth and Andresen find that the withholding tax and bank secrecy variables jointly have a positive influence on non-bank deposits.

These articles consider the tax evasion from the different perspectives and explain the international depositing.

Chapter 3

THE METHODOLOGY

As we are interested in determining the role of the tax burden on the capital outflow to offshore countries the main regression equation is as follows:

$$\boldsymbol{Liabilities_{ijt} = \alpha + \beta_i X_{it} + \beta_j X_{jt} + \beta_j X_{ij} + Z + e_{ijt}} \quad (1)$$

$\boldsymbol{Liabilities_{ijt}}$-dependent variable bilateral deposits and loans in country i's banks by a customer of j's country

$\mathbf{X_{it}}$ -bank country variables such as

GDP – GDP of an offshore country, in log form

Lending and deposit interest rate

Corporate tax rate and Personal tax rate

X_{ij} – Customer country variables

GDP – GDP of counterparty country, in log form

Corporate tax rate and Personal tax rate

Deposit and lending interest rate

Z - Characteristics of the bilateral relationship between the bank and the customer countries

Distance – a distance between capitals, measured in kilometers.

Common official language – indicates 1 for at least one common official language in a country pair, and 0 otherwise.

Contiguity – refers to 1 if countries have common borders and 0 otherwise.

We estimate the regression for panel dataset for ten offshore countries and the period of 13 years. Then the restricted regression for tax haven countries and compare results for different classifications.

The various classifications are presented in the literature that determining the offshore countries. We considering three main classifications of IMF, OECD, and FSI.

The OECD has following determinants of offshore financial centers as the OECD has following determinants of offshore financial centers as 'No or nominal tax on the relevant income; lack of effective exchange of informa tion; lack of transparency; no substantial activities.' (OECD, 1998).

Similar characteristics has IMF classification with few supplements such as 'no need for financial institutions and/or corporate structures to have a physical presence; an inappropriately high level of client confidentiality based on

impenetrable secrecy laws; light and flexible supervisory regimes; and flexible use of trusts and other special corporate vehicles' [1]

Meanwhile, FSI 'ranks jurisdictions according to their secrecy and the scale of their offshore financial activities', which is based on twenty secrecy indicators. These indicators are the set of qualitative and quantitative data which composing weights for each jurisdiction. This classification includes the higher number of countries due to its extensive Key Financial Secrecy Indicators, for example, banking secrecy, tax administration capacity, country by country reporting, tax court secrecy, avoids promoting tax evasion and other secrecy indicators (Tax Justice Network, 2018).

We estimate whether the signs for all classifications have the similar trends and the same significant variables across this samples respectively. In addition, we compare it with regression where all countries included.

The other type of model included in order estimating the relationship between tax burden and capital outflow is the gravity model, which shows the relationship between the country pair considering the different measures of bilateral indicators. In our case, these variables are a distance between capitals in kilometers, common official language, and contiguity as dummy variables.

[1]Financial Stability Board. 2000. http://www.fsb.org/

Chapter 4

DATA DESCRIPTIONS

The data for this study were retrospectively collected from the Bank of International Settlement, OECD database, KPMG tax reports, World Bank Dataset and IMF's International Financial Statistics database. The data were merged into one data set, which includes years from 2005 to 2016.

The final dataset comprises 2142 country-to-country observations which include ten offshore country and 65 developed and developing countries and comprises the variables for total liabilities, lending rates, deposit rates, GDP, income tax rate, corporate tax rates, common language, contiguity and distance between capitals. The summary statistics of the data is presented in Table 1.

Liabilities

The Bank of International Settlement collected data for total liabilities of reporting country banking systems. Total liabilities constructed from bank liabilities and non-bank liabilities. It has been reported in general by 41 countries. Only a part of all reporting countries has disaggregated data by countries. Due to the lack of disaggregated liabilities, only ten can be included in the model, which are presented in Table 2 according to classifications.

Table 1. Descriptive statistics

Variable	*Obs*	*Mean*	*Std. Dev*	*Min*	*Max*
Total liabilities	2142	618.53	1975.14	1	30120
Reported bank country variables					
Lending rate, %	2142	4.7	3.92	1.05	43.95
Deposit rate, %	2142	1.74	2.05	.01	12.62
GDP, billions of US $	2142	693	805	49.6	2780
Income tax	2142	43.16	8.34	22.5	62.28
Corporate tax	2142	25.86	5.20	12.5	36.1
Counterparty country variables					
Lending rate, %	2142	10.823	8.04	1.14	67.71
Deposit rate, %	2142	4.86	3.91	.01	24.27
GDP, billions $US	2142	510	1080	0.67	5990
Income tax	2142	26.89	13.54	0	52
Corporate tax	2142	24.58	9.24	0	55
Bilateral controls					
Contiguity	2142	.03	.17	0	1
Official language	2142	.11	.31	0	1
Distance between capitals	2142	6977.7	4230.03	215.66	17693.2

The data provided by BIS do not provide access to break down of total liabilities into components so it can be a concern of not accurate representation of deposits and loans. However, we can see from Figure 1 that liabilities mostly consist of loans and deposits for the Cayman Islands and Luxembourg. They are the significant part of liabilities, and we can assume that this tendency consists of tax haven countries.

Table 2. List of offshore countries according to different classifications

Country	IMF classifier	OECD classifier	FSI classifier
Austria		✓	✓
Brazil		✓	✓
Canada			✓
Chile		✓	
Denmark			✓
France			✓
Ireland	✓	✓	✓
Luxemburg	✓	✓	✓
South Africa			✓
Switzerland	✓	✓	✓

The frequency of data is quarter and the last quarter gives cumulative value for all year. The data are used for the period from 2005-2016.

The reporting countries disclose their bilateral agreements with other countries using the US dollar as a unit of measurement.

The highest observed value of total bilateral liabilities occurred in 2015 for France and Japan the country pair. It also worth mentioning that typically offshore countries have a high value of bilateral liabilities with other offshore havens, in our case we observe incredibly high values for bilateral liabilities with offshore countries for the Bahamas, Netherlands, and Switzerland.

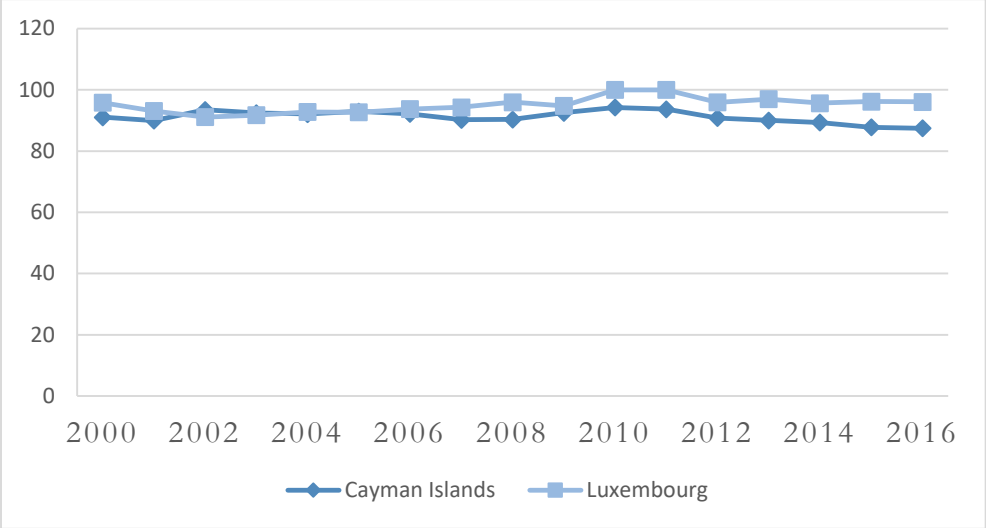

Figure 1. The ratio of cross-border Loans and Deposit to Total Liabilities in 2000- 2016
Source: Bank of International Settlements

In addition, we should notice that the data obtained are non-bank liabilities, which are defined by BIS as 'the liabilities of non-banking institutions such as private or public financial institutions', so we can assume that corporations, businesses, and private individuals make a part of the money that put down into the offshore account. Consequently, the private income tax rate and corporate income tax rate can be included as a repressor as a proxy of a tax burden. From the BIS data, non-bank liabilities are around 24% of total liabilities (Huizinga, Nicodème).

Tax Burden

There is no strict definition on tax burden, and as we do not have disaggregation for nonbank liabilities by deposits and loans for corporates and personal capital, we will include and compare results for the corporate and personal income tax rates. For corporate tax, we choose the highest value for each given country, and

we included top marginal personal income tax. The reason for this is that companies and wealthy individuals have much higher incentive to hide their wealth under the higher tax policy.

We are going to run restricted and unrestricted regressions in order to estimate which one has a significant positive effect.

The data on income tax rates are from the following sources: the OECD database and KPMG tax reports. The highest value for income tax in

Deposit and Lending Interest rates and GDP

The GDP data are taken from the World Bank Dataset. Besides, it is included as the proxy of the country wealth and size of the economy as the part of its wealth will be held as international deposits.

The data on deposit and lending interest rates come from the International Financial Statistics database. As the dependent variable is liabilities, which includes deposits and loans it is essential to include lending and deposit interest rates of the reporting country.

The ratio of deposit to loan interest rate included in the model. We expecting negative sign as the increasing loan rate in the country increases interest rate burden, so residents have the incentive to relocate their capital to other jurisdiction. The same situation is applicable for decreasing the deposit rate or simultaneously increasing loan rate and decreasing the deposit rate.

Bilateral variables

Control variables are a common language, which refers to 0 if countries do not have a common language as official and one otherwise, contiguity takes a value of 1 identifying a common border and 0 otherwise and a distance between capitals measures in kilometers. The expected signs for the common language, contiguity and distance are positive.

These data are available from CEPII's database.[2]

[2] http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=6

Chapter 5

EMPIRICAL RESULTS

This section can be conditionally divided into two subsections. The first subsection considering the fixed effects models for classifications mentioned above, meanwhile the second one present results for cross-sectional models with time-invariant variables and checking the structural breaks in the data.

5.1 Fixed effect models

For this particular study, we used the fixed-effect model. The pooled OLS model was rejected based on the results of the Lagrange-Multiplier test. According to the results of the Hausman test, the fixed effect model is appropriate, according to Wooldridge (2015).

In order to test the hypothesis on the difference between various classifications of offshore countries (we mentioned above three different classifications), we run our regressions.

The dependent variable of all our models is the log of total liabilities. We run three regressions for each of classifications and another three for the whole available countries. Those models were restricted to different types of taxes included.

The first type of regression includes corporate taxes for each member of the country pair 'offshore country – counterparty country'.

The second set of regressions includes top personal income tax for each country pair.

The third type includes both – the corporate tax and personal income tax for each member of the country pair.

Total non-bank liabilities do not have a breakdown by the type of loans or deposits, so we cannot make a distinction between the share of personal and corporate funds in offshore countries. Therefore, we are using three different regressions (two restricted regression models and one unrestricted) in order to separate the effect of different personal and corporate tax policies on the capital outflow.

Because of the positive test on heteroskedasticity and autocorrelation – we used a clustering method in order to estimate robust standard errors. We used the customer country variable for clustering data. All standard errors in provided tables are robust standard errors.

Table 3 contains the results of the fixed effect regression models based on IMF classifier. The first restricted model with corporate tax variable included demonstrates a negative effect of increases in corporate tax variable of the counterparty (i.e., customer) country on capital outflow to the offshore countries, but this effect turned out to be statistically insignificant. This model has only two statistically significant variables – GDP of customer country (in log form) and corporate tax in offshore countries. While GDP of the customer country significant at 1% confidence level and has a positive effect on capital outflow – corporate tax in the offshore country is statistically significant at 5% confidence level and has a negative effect on the capital outflow. This result supports our hypothesis that larger customer countries tend to have more total liabilities in the offshore countries (more money in the economy – higher capital outflow to

offshores), 1% increase in the GDP of the counterparty country increases the total liabilities in the offshore countries by 1.32%.

Meanwhile, increasing the corporate tax in the offshore country by 1% (e.g., from 5% to 6%) leads to a decrease in total liabilities in this country by more than 6%, which is in line with our hypothesis.

All other variables are insignificant at 5% confidence level.

Regression number two from Table 3 has three statistically significant variables - GDP of the customer country (in log form), and income taxes in both – offshore and customer countries. GDP is significant at 0.1% significance level, increasing by 1% of GDP increases capital outflow by 1.7%. Income tax in the reported (offshore) country has significant negative effect at 1% confidence level effect on total liabilities – 1% increase in income tax of offshore country leads to 1.2% decrease in total liabilities. For income tax in counterparty countries 1% increase in income tax leads to 2.2% decreases in total liabilities, and this variable is significant at 5% confidence level.

Unrestricted regression based on IMF classification (regression number three) has four statistically significant variables – GDP of the customer country (1% confidence level), income tax in the bank country (also on 1% confidence level) and corporate tax in offshore country, income tax in the counterparty country, which are significant at 5% confidence level. According to this regression, the model 1% increase in GDP leads to 1.25% increase in capital outflow, 1% increase in the corporate tax in the bank countries leads to 6.5% decrease in total liabilities, increase in income tax by 1% in the customer country causes 2% decrease in the outflow. Increase in income tax in the offshore country by 1% causes 1.38% decrease in total liabilities of the offshore country.

Table 3. Fixed Effect for IMF classifier

	(1) Total liabilities	(2) Total liabilities	(3) Total liabilities
Interest rate spread(log), Reported country	-0.063	-0.078	-0.072
	(0.048)	(0.047)	(0.046)
Interest rate spread(log), Counterparty country	0.039	0.044	0.028
	(0.120)	(0.127)	(0.124)
Log GDP, Counterparty country	1.320***	1.706***	1.256***
	(0.447)	(0.454)	(0.434)
Log GDP, Reported country	-1.251	-1.137	-1.076
	(1.029)	(1.032)	(1.021)
Corporate tax, Counterparty country	-0.002		-0.000
	(0.006)		(0.005)
Corporate tax, Reported country	-0.064**		-0.064**
	(0.028)		(0.027)
Income tax, Counterparty country		-0.022**	-0.020**
		(0.009)	(0.009)
Income tax, Reported country		-0.012***	-0.013***
		(0.004)	(0.004)
Constant	4.934	-8.791	3.020
	(25.94)	(22.74)	(26.30)
Observations	1,256	1,256	1,256
R-squared	0.058	0.047	0.073

Note: robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; total liabilities in log form

The next set of regression models based on the OECD classification are presented in Table 5, see Appendix. The first restricted model with corporate taxes included has only one statistically significant variable – corporate tax in the offshore country, this variable is highly statistically significant, at the 0.1% confidence level, and according to our model – unit percentage increase in corporate tax for the offshore country causes 18.6% drop in the total liabilities.

The second restricted model with income taxes included exhibits similar to the regressions based on IMF classification pattern, except a significant for the OECD classification variable called Interest rate spread for reported countries (significant at 5% confident level) 1% increase in the spread for the offshore country cause only 0.17% drop in the total liabilities. Three other significant variables – GDP of the counterparty country (at 1% confidence level), income tax in the bank and the counterparty countries (both at 5% confidence level). According to this model – 1% increase in the size of the customer economy increases the total liabilities by more than 2%. At the same time – coefficients for income taxes in both bank and customer countries have a negative sign, 1% increase in the income tax rate of the offshore country leads to 3.6% decrease in total liabilities, for the same increase for the tax of the customer country – decrease is slightly less dramatic – 2.86%.

Third, the unrestricted model based on OECD classification exhibits a high statistical and economic significance of the corporate tax rate in the offshore country. This variable is significant at the 0.1% confidence level, and 1% increase in this tax rate drops the number of total liabilities by 18.4% (similarly to the first restricted regression from the same table). We also have similar results for the spread in the offshore countries – the same level of statistical significance and similar results for the unit percentage increase – decrease in total liabilities roughly

by 0.16% (in the second model our coefficient was equal to 0.17%). Income tax for the customer country is also significant at the 5% confidence level, and decreasing in total liabilities is equal to 2.37% for each 1% of the increase in the tax rate. However, the income tax rate for the offshore country became even more statistically significant compared to the second regression, it is significant at the 1% confidence level, and unit percentage increase in this tax rate causes 4.4% drop in the level of total liabilities, according to the third model based on OECD classification. GDP of the customer country in this model turned out to be statistically insignificant.

Regression models based on the FSI classification (presented in table 5) exhibits an absolute consistency in the results. There are only two statistically significant variables that have the same level of significance (significant at the 0.1% confidence level) and have incredibly close coefficients for the restricted and unrestricted models. The first variable is the corporate tax rate in the offshore country, 1% increase in the tax rate causes 7.59% decrease in total liabilities according to the restricted model and 7.5% decrease according to the unrestricted model. The second statistically significant model is the personal income tax in the offshore country, 1% increase in this tax rate drops the total liabilities by 1.9% according to the restricted model, while the unrestricted model predicts 1.92% decrease for the same unit percentage increase in the tax rate.

Table 7 (from Appendix) contains the results of fixed-effect models for all countries. Those models have a lot in common with the model based on FSI classification. Coefficients for both corporate tax and for personal income tax in the offshore countries are similar for unrestricted and restricted models and have the same level of statistical significance in both models, 1% confidence level for corporate tax and 0.1% confidence level for personal income tax. According to estimated coefficients, the increase in corporate tax by 1% in absolute value drops

the amount of total liabilities by 7.5% according to the restricted model and by 7.45% according to the unrestricted model. The same 1% increase in personal income tax in the offshore country causes 1.86% decrease in total liabilities according to restricted model and 1.95% if we refer to the unrestricted model. The other feature of models based on the data for all countries – the interest rate spread of the offshore countries is statistically significant at 5% confidence level in two models – first and third. According to the first model – 1% increase in the interest rate spread decreases the total liabilities by almost 0.05% when the third model estimates the decreasing rate for the same change in the spread as 0.06%.

5.2 Cross-sectional models

The next regression model, which is a cross-sectional model is reported in Table 4.

The data are divided into two periods. The first period is from 2005 to 2008 and the second one is for the year from 2009 until 2016. The data are aggregated for these periods by taking average values for all variables included in our regression model.

We also introduced dummy variable, which equals to zero if observation lies in the first period (from 2005 to 2008) and one otherwise. The reason for including this dummy variable is that we want to test the hypothesis about the presence of the structural break in 2008-2009 caused by the global financial crisis. Additionally, we introduced Dummy multiplied by Corporate tax for counterparty country; Dummy multiplied by Corporate tax for the reported country, the same for income taxes – Dummy multiplied by Income tax for counterparty country and the dummy multiplied by Income tax for a reported country. Those variables were introduced apart from the averages for the whole available years for the Corporate tax for the

reported country, Corporate tax for counterparty country and the Income tax for the reported country and the Income tax for counterparty country. The reason for introducing both types of variables (with dummy and without) is that if there is a structural break, we want not only to capture the presence or absence of it, not only define the effect in the sense of positive or negative effect on total liabilities, we want to estimate the effect of structural break (if it is) in numerical terms.

Apart from variables mentioned above aimed to estimate the effect of structural break (if any) – we also included in our model three new time-invariant variables. Those variables are called: contiguity, an official language, distance between capitals, and the first two of them are the dummy variables. Variable contiguity takes the value of one if the country pair has the shared border. The 'official language' variable takes the value of one if the pair of countries has at least one common language. Those variables were impossible to introduce into our panel data model because of the features of chosen fixed effect model. This model does not allow us to include time-invariant variables (such variables as mentioned above) because of the calculation procedure of fixed effect model. The aim of introducing such variables into our model is to try to capture the effect of non-economic factors that may influence the decision about moving the capital into the offshore countries. We chose three such variables, and the reasoning behind choosing them is straightforward.

If two countries, for example, have the same official language (at least one) – it could be easier for some particular agents from those country to communicate with each other, the same language could increase the trust in such negotiations and may contribute to the taking decision of whether invest the money in this country or not. Alternatively, at least, it may give some competitive advantage if the agent compares different offshore countries seeking the best opportunities to keep his money. The similar logic was behind choosing the contiguity variable and the

distance between capitals. According to our hypothesis, the distance may influence making the decisions about whether making this 'investment' or not, because of the psychological reasons. It may seem to an investor that the closer countries are more preferable.

All standard errors in our model are robust due to heteroskedasticity in counterparty country variables.

According to data presented in Table 4 – our dummy variable indicating the breakdown by periods (zero for the period up to 2008 and one for the period from 2009) turns out to be statistically insignificant. However, if we look at tax variables multiplied by our dummy – the result is somewhat different. All four variables are significant at least at 10% confidence level, and two of them are significant on the 1% confidence level. The signs for both corporate taxes (for reported and counterparty countries) multiplied by dummy are negative implying that after the global financial crisis the rate of corporate tax has a smaller impact on the total volume of liabilities in the offshore countries than before it. It also worth to mention that the variable for the reported country is significant at 1% confidence level.

Table 4. Cross-sectional model for aggregated values for periods until 2008 and from 2009 with interaction terms

	Total liabilities
Interest rate spread(log), Reported country	0.489***
	(0.099)
Interest rate spread(log), Counterparty country	0.181*
	(0.109)
Log GDP, Counterparty country	0.581***
	(0.057)
Log GDP, Reported country	0.132
	(0.085)
Corporate tax, Counterparty country	-0.044***
	(0.016)
Corporate tax, Reported country	0.167***
	(0.036)
Income tax, Counterparty country	-0.0008
	(0.011)
Income tax, Reported country	-0.077***
	(0.016)
Contiguity	0.388
	(0.606)
Official language	0.283
	(0.295)
Distance Between Capitals	-0.000104***
	(2.22e-05)
Dummy (1 for >2009)	1.127
	(1.421)

Table 4 – Continued

	Total liabilities
Dummy*Corporate tax, Counterparty country	-0.0385*
	(0.022)
Dummy*Corporate tax, Reported country	-0.220***
	(0.036)
Dummy*Income tax, Counterparty country	0.028*
	(0.015)
Dummy *Income tax, Reported country	0.083***
	(0.020)
Constant	-13.95***
	(2.814)
Observations	615
R-squared	0.340

Note: All variables are average values for two periods until 2008 and from 2009, with an exception for time-invariant variables; robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; total liabilities in log form.

Talking about income taxes for counterparty and reported countries after the financial crisis – both variables have a positive sign, implying that after the crisis the impact of income taxes on total liabilities in the offshore countries increased. One of the most interested results of our model is that according to our estimates, prior to crisis income tax in the reported country had negative sign, higher tax in the reported country decreased the total volume of liabilities in the offshore, but after the crisis, according to our estimates, the corresponding coefficient is approximately equal to zero (both income tax variables, with and without dummy variable, for the reported country, are statistically significant).

Despite the initial hypothesis the variables for contiguity and language turns out to be statistically insignificant. Therefore we cannot say that the presence of common border and (or) common language affects capital outflow to the offshore countries. However, the 'distance between capitals' variable is highly statistically significant, and it also has a significant economic effect on total liabilities in the offshore countries. The coefficient corresponding to this variable seems to be incredibly small, -0.000104, but we should mention that the distance between capitals in our models was measured in kilometers. So, one additional kilometer in the distance between capitals decreases total liabilities by 0.01%. It means that if the distance between capitals is 1,000 km, ceteris paribus, it decreases total liabilities in the offshore countries by more than 10%.

Foreseeable, the variable for the GDP of the counterparty country is highly statistically significant, according to our model, 1% increase in the GDP of the counterparty country cause total liabilities in the offshore country to increase by more than the half of percent (0.581%). Talking about unexpected results and signs, we can highlight the variable for interest rate spread in the reported country is highly statistically significant, but it also has the unexpected sign, according to presented in the Table 4 model – increase in the interest rate spread in the reported country cause the increase in the total liabilities in the offshore countries by almost the half of the percent.

Chapter 6

CONCLUSIONS

From the regressions above, we can see that the tax burden on customer's countries has a more undetermined effect on the capital outflow. Moreover, increases in personal income tax rate in customer countries shows a small significant negative effect on deposits and loans in offshore countries, meanwhile, the corporate tax in customer countries has a positive but mostly insignificant effect. However, what is more critical in capital outflows to the tax havens are the tax policy in offshore countries, more precisely increasing tax rates lead to a decrease in the amount of capital in the offshore countries, which is quite logical, by increasing tax rates customers may be willing not to open the deposits in offshore countries.

All classifications show almost the same pattern for each of tax rates.

According to the results, the increase of corporate tax rate in the resident country does not have a determining influence on the capital outflow to the offshores. Which means that we may increase corporate tax rate with a low probability of causing a notable capital outflow to the offshore countries. Meanwhile, if the government increase marginal personal income tax rate, the capital outflow will also increase. Another aspect is that the GDP growth also leads to increase in capital outflow, which can be explained by nature, the bigger economy – the higher capital outflow to offshores.

The cross-sectional regression model shows that the contiguity variable and the presence of common official language do not influence capital outflow. However, the distance between capitals has substantial economic impact on the amount of

total liabilities in the offshore countries, and it is also highly statistically significant. The other implication of the cross-sectional model is that we can see the pattern of the structural break because of the global financial crisis.

BIS dataset problems. The database does not include disaggregated data for all offshore countries however we expect the missing offshore countries to have a similar tendency that our sample has. We may well have a problem with double accounting in the BIS dataset. The final beneficiary money could transfer from one offshore country to another in order to hide the origin of these funds to evade the excessive taxation or some legislation issues.

One of the possible ways of improving the current model and further topic for research – it is to include withholding tax rate for non-residents in offshore countries, which could be a powerful determinant of loans and deposits in offshore countries. Another interesting topic for research – the impact of law jurisdiction on the capital outflow from the counterparty countries. The reason for that is the following – offshore countries are often used to protect property, capital or other rights and assets from local legislation, thus putting it into the jurisdiction with the proven rule of law. Another way of improving our current model is to try to find other approaches for solving the heteroskedasticity and serial correlation issues.

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APPENDIX

Regression Results

Table 5. Fixed Effect for OECD classifier

	(1) Total liabilities	(2) Total liabilities	(3) Total liabilities
Interest rate spread(log), Reported country	-0.146*	-0.174**	-0.158**
	(0.0792)	(0.0803)	(0.0756)
Interest rate spread(log), Counterparty country	0.186	0.152	0.172
	(0.147)	(0.173)	(0.147)
Log GDP, Counterparty country	1.058	2.018***	0.968
	(0.719)	(0.618)	(0.685)
Log GDP, Reported country	0.208	-2.257*	0.526
	(1.397)	(1.308)	(1.340)
Corporate tax, Counterparty country	0.00195		0.00447
	(0.00545)		(0.005)
Corporate tax, Reported country	-0.186***		-0.18***
	(0.0511)		(0.050)
Income tax, Counterparty country		-0.028**	-0.023**
		(0.014)	(0.011)
Income tax, Reported country		-0.036**	-0.04***
		(0.014)	(0.015)
Constant	-25.38	13.54	-28.74
	(32.33)	(33.35)	(32.03)
Observations	750	750	750
R-squared	0.105	0.079	0.131

Note: robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; total liabilities in log form

Table 6. Fixed Effect for FSI classifier

	(1) Total liabilities	(2) Total liabilities	(3) Total liabilities
Interest rate spread(log), Reported country	-0.026	-0.022	-0.036
	(0.023)	(0.020)	(0.021)
Interest rate spread(log), Counterparty country	-0.027	-0.025	-0.032
	(0.054)	(0.054)	(0.054)
Log GDP, Counterparty country	0.182	0.297	0.142
	(0.385)	(0.379)	(0.386)
Log GDP, Reported country	-0.980	-0.071	-0.740
	(0.797)	(0.775)	(0.797)
Corporate tax, Counterparty country	0.006		0.007
	(0.008)		(0.007)
Corporate tax, Reported country	-0.075***		-0.075***
	(0.018)		(0.018)
Income tax, Counterparty country		-0.012	-0.012
		(0.008)	(0.008)
Income tax, Reported country		-0.019***	-0.019***
		(0.004)	(0.004)
Constant	27.42	-0.409	23.20
	(17.55)	(16.94)	(17.65)
Observations	2,046	2,046	2,046
R-squared	0.031	0.018	0.047

Note: robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, total liabilities in log form

Table 7. Fixed Effect for all countries

	(1) Total liabilities	(2) Total liabilities	(3) Total liabilities
Interest rate spread(log), Reported country	-0.049**	-0.032	-0.059**
	(0.02)	(0.026)	(0.023)
Interest rate spread(log), Counterparty country	0.019	0.010	0.0125
	(0.081)	(0.091)	(0.083)
Log GDP, Counterparty country	0.279	0.483	0.250
	(0.386)	(0.385)	(0.385)
Log GDP, Reported country	-0.468	-0.284	-0.262
	(0.770)	(0.788)	(0.756)
Corporate tax, Counterparty country	0.007		0.008
	(0.007)		(0.006)
Corporate tax, Reported country	-0.075***		-0.074***
	(0.024)		(0.024)
Income tax, Counterparty country		-0.014*	-0.013*
		(0.007)	(0.007)
Income tax, Reported country		-0.018***	-0.019***
		(0.004)	(0.004)
Constant	11.14	0.423	7.577
	(16.98)	(16.25)	(16.72)
Observations	2,142	2,142	2,142
R-squared	0.031	0.017	0.045

Note: robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1; total liabilities in log form