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**Article**

## International Tax Planning and Ownership Structure in the Czech Republic

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# INTERNATIONAL TAX PLANNING AND OWNERSHIP STRUCTURE IN THE CZECH REPUBLIC

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## Abstract

Tax planning is part of modern financial management worldwide, and the countries of Central Europe are no exception. Tax havens provide opportunities for managers to increase companies' profits through tax reduction. Naturally, there are differences in ownership structures; therefore, the management of companies also has specific approaches, especially in family companies. Due to events in Czech history, the owners of family companies in that nation can have different priorities than those in Western ones. This article focuses on ownership structure specification and its impact on the tax burden of Czech companies. It uses data from the 233 most influential companies in the Czech Republic, covering 2009-2018. While the study aims to assess the ownership structure as a determinant of the tax burden, it adopts the regression of panel data as a method. The study contains pooled OLS and regression with random effects. Family companies are not less aggressive about tax planning in the Czech Republic. Historical development has caused a different approach among family companies than in Western countries. The ownership connection with foreign parent companies has not impacted Czech companies' tax burdens. On the other hand, tax burden determinants differ not only between family and non-family companies, but also between domestic-owned and foreign-owned companies. Indebtedness seems to be the critical factor that can help companies avoid paying taxes, regardless of their ownership structure. Companies often use intragroup loans to lower their tax burden, and this study shows that Czech companies are no exception. On the other hand, only companies with foreign parent companies can use tax planning schemes involving intangible assets and royalties. As for family companies, the variability of the tax burden is not fully explained by the usual determinants; therefore, further research should also consider the types of managers as a determinant.

**Keywords:** tax planning, tax avoidance, family companies, tax havens, Czech Republic

**JEL Classification:** F23, G32, H25, H26

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## Introduction

Tax planning can help managers increase the number of net profits and also win competitive fights because they are able to lower prices. On the other hand, the presence of tax planning also affects other economic entities, many of them in a negative way. In recent years, the digitalisation of the economy has brought the opportunity for tax planning to a wider range of companies, which are able to establish a subsidiary (or a parent company) in a different country and gain advantages from the lower tax burden. Naturally, when the profits are transferred to countries with better taxation conditions, some countries suffer from tax revenue loss.

Profit shifting is present in every part of the world (Huizinga and Laeven, 2008; Dowd et al., 2017; Elexa et al., 2022), and according to Tørsløv et al. (2018), tax havens absorb about 40% of multinational profits. Moreover, tax havens put pressure on other countries, which causes tax competition (Devereux et al., 2008), which is also present between EU countries (Banociova and Tahlova, 2019). This means that the tax burdens of companies have decreased in recent decades (Slemrod, 2004; Bräutigam et al., 2017; Dyreng et al., 2017). Tax planning is also an important topic in the Czech Republic, where the estimated tax revenue loss is around 10 billion CZK (Moravec et al., 2019). Central and Eastern European (CEE) countries also suffer from tax fraud, which is the subject of the study by Svabova et al. (2020).

Tørsløv et al. (2018) study where the profits are transferred and also from which countries. A brief look at their results shows differences between western countries and CEE countries. Tax havens are located in Western Europe, but Western EU countries suffer more from tax revenue losses than post-communist countries. An analysis of other studies also confirms that there are differences between the two groups of countries in terms of tax planning, because the results of post-communist countries (Janský and Kokeš, 2015, 2016; Jedlička, 2019) are not as significant as those of other countries (Desai et al., 2006; Davies et al., 2018).

From the perspective of the managers, tax planning can be seen as an opportunity to increase the performance of the company. The owners especially appreciate that tax planning can increase their profits. On the other hand, family companies (in this study, mostly American) use tax planning less than others (Chen et al., 2010). Because there are differences in tax planning between companies from Western countries and those from post-communist ones, several questions about ownership structure arise. Ownership was formerly due to communism; therefore, the owners (or family owners) have a relatively short history, and the companies have foreign owners. The willingness of family owners to pay taxes can be damaged especially due to past restrictions (even more so when it comes to participants in restitution).

As no study addresses ownership structure as a determinant of the tax burden in a post-communist country, the aim of this paper is to find if ownership structure (with an emphasis on family companies) has an effect on tax planning in one Visegrád Four (the Czech Republic, Hungary, Poland, and Slovakia) country, specifically the Czech Republic. Although the paper is focused on companies and their activities, it uses panel data from a selected group of Czech companies. Because the aim is related to the tax burden and its determinants, the regression of panel data is selected as a method. The paper adopts pooled OLS and regression with random effects (RE).

The following section contains a literature review connected to the topic raised. The method used and a description of the data, as well as the hypotheses, are then described. The next section presents the results connected with each selected regression type. Naturally, these are discussed in the following section. The paper ends with conclusions that point out the most important findings.

## 1. Theoretical background

Companies transfer profits through transfer pricing, interest payments, or royalties (Auerbach et al., 2017). All three methods can be used in several schemes, and studies confirm the significance of each (Griffith et al., 2014; Davies et al., 2018; Ištók and Kanderová, 2019). Naturally, each type is suitable for a different type of company (or group), and this is where the differences begin, especially according to internationalisation or type of activity. Studies demonstrate that companies from high-tech sectors with extensive research activities have better opportunities to gain an advantage from tax planning (Desai et al., 2006; Jones and Temouri, 2016) or that manufacturing companies are more sensitive to the tax burden when investing (Gumpert et al., 2016). Moreover, empirical results show that companies from the same sector react to tax planning schemes used by their competitors (Armstrong et al., 2019).

For all three basic tax planning schemes, tax havens are essential. Managers can edit internal prices according to tax legislation for the purposes of tax avoidance (Davies et al., 2018). As for intellectual property, companies with extensive research and development use tax havens more than others (Desai et al., 2006). Some countries even implemented special tax regimes for innovation income (IP boxes), although it is worth mentioning that after the application of OECD's nexus approach, the possibilities for tax planning via IP boxes have been reduced (Jedlička, 2018). Higher indebtedness is also connected with several tax havens when assessing Czech companies (Janský and Kokeš, 2016). Not only can Czech companies gain advantages from using tax havens, Slovak companies connected with tax havens also have significantly lower tax burdens (Khoury et al., 2019). Naturally, any type of scheme would be possible without international relations with a specific operating company. When tax planning is affected by sectors and other specific factors, this brings the literature review to the essential differences between Western European countries and CEE countries.

Naturally, differences in economic development cause not only different economic situations or structures across countries, but also differences in business management, especially among the owners. Kacprzyk and Doryń (2017) present a study on economic growth and innovation that finds there is no single way to ensure economic growth in all EU countries. Nowadays, intangible assets are one of the critical elements of firm performance (Haji and Ghazali, 2018), and there are also considered an essential instrument for tax planning (Griffith et al., 2014; Arcalean, 2017). The importance of intangible assets for tax planning is also confirmed for Czech companies, which face a lower tax burden when they have more valuable intangible assets (Jedlička, 2021). Interestingly, there are lower investments in intangible capital in Central and East EU countries than in old EU member countries (Vrh, 2018). Moreover, there is an inclination to use public support mainly for investment into tangible assets in newer EU countries, whereas the older ones prefer to research and development (Grabowski and Staszewska-Bystrova, 2020).

As for tax competition, the fundamental difference is that Western European countries usually follow the leaders of this group, while interactions between new EU countries are

minimal (Cassette and Paty, 2008). There are also significant differences between countries in terms of companies' approach to tax planning, where national culture plays an important role (Yoo and Lee, 2019). Personality also forms based on national culture, and the individual attitude of each manager is another determinant of tax planning (Dyreng et al., 2010; Christensen et al., 2015; Kubick and Lockhart, 2017).

From international tax planning and tax avoidance it is a short journey to tax evasion, and even determinants of tax evasion are different between old and new EU countries (Yamen et al., 2018). Naturally, companies located in countries of the former Eastern Bloc use tax planning schemes, and there are studies that confirm the significance of profit shifting using internal debt financing via interest payments (Janský and Kokeš, 2016; Ištók and Kanderová, 2019). However, the results related to Czech companies are not as significant (Janský and Kokeš, 2015, 2016; Jedlička, 2019), so there is the potential to study other determinants of tax planning and to compare the results of Western studies with those of CEE countries.

The ownership structure is one possible determinant that can play a different role in different countries. Family companies have a special position because their owners usually have a personal relationship with the firm, and often family companies perform better than their non-family counterparts (Anderson and Reeb, 2003). Badertscher et al. (2013) deal with the concentration of power and ownership and their influence on tax planning, with results that show concentration has a negative effect on the level of tax avoidance. This means that family companies tend to use tax planning less. Involving members of the owners' family in the company's management eliminates the risk of reducing the company's price, and overall, family directors take better care of the future performance of a family-owned company (Jiang et al., 2020).

Chen et al. (2010) studied the tax aggressiveness of (mostly American) family companies. Their dataset is based on companies from S&P indexes, and the results of regressions confirm differences in tax aggressiveness: family companies tend to use tax planning less than non-family ones. Mafrolla and D'Amico (2016) presented similar results for Italian companies, with one addition: companies that excessively involved families used tax planning more, similarly to non-family companies.

McGuire et al. (2014) focused on dual ownership and its connection to tax avoidance, finding that tax planning is present to a lesser extent when there are larger differences between voting rights and profit distribution. Also, a study focusing on Chinese companies shows similar results (Richardson et al., 2016). The effects of owners are also demonstrated by another study focusing on Chinese companies: companies owned by the state have a significantly lower tendency to use tax planning (Chan et al., 2013; Bradshaw et al., 2019).

With these studies, it is important to characterise the economy of China and how it can be compared to post-communist economies in Eastern Europe. The Chinese economy can be defined as "socialism", but with the presence of private ownership (Naughton, 2017). From this perspective, China has a specific position and the results of these studies cannot be transferred to other countries without empirical evidence in the countries studied. In contrast to the situation in China, Spanish state-owned companies have a lower tax burden than their private counterparts (Fernández-Rodríguez et al., 2019).

The specific ownership structure can also lead to a lower tax burden, as in the study of quasi-indexer ownership by Chen et al. (2019). Furthermore, institutional ownership is connected with greater tax avoidance (Khan et al., 2017). The overall preference of the parent company

is also related to the ownership structure (Dischinger et al., 2014). Profit shifting is used not only for tax purposes but also to transfer the profits to the parent company.

The current state of knowledge indicates significant differences between Western and CEE countries, not only in terms of economies as a whole but also within international tax planning. In addition, ownership type and structure seem to be important determinants of tax aggressiveness. It is also important to study the role of ownership structure in tax planning within CEE countries; the concept of ownership has had a significantly different development because of the communist history of these countries, which (among other things) meant ownership restrictions. Nowadays, there are, of course, possibilities of private ownership. However, private ownership is not the tradition as it is in other countries, so there can be differences in attitudes to family business.

## 2. Research methodology

The hypotheses that are addressed in the following sections are based on a theoretical background. The first hypothesis focuses on the type of owner and their connection to management; based on current studies, family companies are less tax aggressive than non-family ones. As family companies do not use tax havens to a greater extent, their tax burden in the country studied should be higher.

*H<sub>1</sub>: Family-owned companies have a higher tax burden than non-family companies.*

There are several tax havens from whose presence Czech tax revenues suffer. Czech companies use them for tax avoidance, and because this is a preference of the parent company, it can be assumed that parent companies from the Czech Republic have a higher tax burden than Czech companies which are owned from abroad.

*H<sub>2</sub>: If the parent company is based in a foreign country, the Czech subsidiary has a lower tax burden than other Czech companies.*

The aim of this paper is also to identify differences between tax burden determinants of family-owned companies and other companies. Attention is paid primarily to the relationship between the size of intangible assets and the company's indebtedness in relation to the tax burden of companies. There is not so much evidence focusing on differences between tax determinants in detail, but it can be assumed that tax's usual determinants connected with tax planning do not have as much influence on the tax burdens of family companies as on the tax burdens of non-family companies.

*H<sub>3</sub>: The size of intangible assets and the company's indebtedness are not as significant tax burden determinants for family-owned companies as for non-family companies.*

If a company has a parent company based abroad, there is a potential to use international tax planning. This ability to use international tax planning can have an impact on the value of intangible assets and the indebtedness of Czech companies. Domestic companies cannot use profit shifting activities (or it does not make any sense if the parent company is located also in the Czech Republic); therefore, the connection of determinants typical for identification of tax planning should be not as strong as for the companies with foreign owners.

*H<sub>4</sub>: The size of intangible assets and the company's indebtedness are not as strong tax burden determinants for domestic-owned companies as for companies with a foreign parent company.*

The formulations of the hypotheses show that regression analysis is a suitable method for their verification. When assessing economic dependencies, the regression of panel data is the most appropriate option for this type of analysis. Specifically, this article focuses on tax burdens and their determinants and uses data referring to the financial indicators and activities of companies.

The dataset contains financial and ownership data on the 233 most influential Czech companies. Companies were selected that appear on the list CZECH TOP 100 (czechtop100, 2020) and the list of largest family companies according to Forbes (2015). Further data, which contain items from the financial statements of selected companies for the years 2009-2018 and information about owners and subsidiaries, were obtained from the database Magnusweb (Powered by BISNODE, 2020), partly by exporting them, partly manually.

This study performs panel regression based on the approach used by Greene (2012) and Wooldridge (2013). Thus, the rate of the tax burden, taxes divided by revenues, was selected as a dependent variable. This variable indicates how one unit of revenues is taxed and when the tax planning is assessed. It is more informative than e. g. the effective tax rate of the company; because the effective tax rate is based on the taxes paid and earnings before taxes, tax planning influences both parts of the calculation. On the other hand, revenues are not affected by tax planning when assessed in a country that is not a tax haven, as in this article. The Czech Republic is a country facing lost tax revenue (Tørsløv et al., 2018; Moravec et al., 2019). The model described by formula 1 is used to test hypotheses H<sub>1</sub> and H<sub>2</sub>.

$$TxR = \beta_0 + \beta_1 FAM_i + \beta_2 PTH_i + \beta_3 X_{it} + a_i + u_{it} \quad (1)$$

All variables are defined in Table no. 1.  $X_{it}$  represents a vector of control variables and consists of Int, Deb, ROA, Inv, Siz, and sector dummy variables. Because the data covers several years (2009-2018), it also includes dummy variables that indicate the year, to capture the influence of time effects. Companies with a higher share of intangible assets are expected to have a lower tax burden, and the same counts also for indebtedness. Companies with higher rentability usually face a higher tax burden, so a positive relation to the dependent variable is expected. Greater investments in inventories make companies less flexible within tax planning; therefore, this control variable is expected to have a positive effect on tax burden. Larger companies usually face a higher tax burden, so there is an expectation of a positive relation. Sector dummies are included to cover sector differences, and it is expected that the service sector faces higher tax burden because of lower requirements of tangible assets, which are connected with tax depreciation that helps with lowering tax base.

A modified model is used to test hypotheses H<sub>3</sub> and H<sub>4</sub>. For this purpose, the dataset needs to be split into two parts: family companies and non-family companies for the first run of this model; and domestic-owned companies and foreign-owned ones for the second run of the model. Then, the regressions can be compared, and possible heterogeneities based on the split dataset can be detected.

$$TxR = \beta_0 + \beta_1 Int_{it} + \beta_2 Deb_{it} + \beta_3 Z_{it} + a_i + u_{it} \quad (2)$$

$Z_{it}$  represents a vector of control variables and consists of ROA, Inv, Siz, and sector dummy variables. The control variables have the same expected effect on the dependent variable as in the first model.

**Table no. 1. Description of variables**

Variable	Description
<b>TxR</b>	Taxes divided by the revenues.
<b>Fam</b>	Dummy variable, which indicates if the company can be marked as family.
<b>PTH</b>	Dummy variable, which indicates if the company has a parent company abroad.
<b>Int</b>	Share of intangible assets in total assets.
<b>Deb</b>	Share of debt in total liabilities and owners' equity.
<b>ROA</b>	Return on assets.
<b>Inv</b>	Share of inventories in total assets.
<b>Siz</b>	Natural logarithm of assets.
<b>Trade</b>	Dummy variable, which indicates if the company belongs to the trade sector.
<b>Manu</b>	Dummy variable, which indicates if the company belongs to the manufacturing sector.
<b>Services</b>	Dummy variable, which indicates if the company belongs to the service sector.

Table no. 2 presents the descriptive statistics of the variables. Variable Fam provides information on whether the company is family or not. This variable is constant over time and by binary number system indicates if the original founding family members own the company.

**Table no. 2. Descriptive statistics of variables**

Variable	Mean	Median	St. deviation	Minimum	Maximum
<b>TxR</b>	0.0152	0.0067	0.0256	0.0000	0.3253
<b>Int</b>	0.0187	0.0016	0.0788	0.0000	0.8767
<b>Deb</b>	0.5255	0.5283	0.2751	0.0000	4.3228
<b>ROA</b>	0.0564	0.0136	0.1081	0.0000	1.0989
<b>Inv</b>	0.1447	0.0961	0.1538	0.0000	0.8010
<b>Siz</b>	14.9336	14.9162	1.6341	5.3181	20.1241

The following table shows the content of the sample (Table no. 3). As a small open economy, the most influential companies in the Czech Republic have ownership connections to foreign companies, and the majority can be considered non-family companies.

**Table no. 3. Structure of dataset**

	Family	Non-family	Foreign parent	Domestic	Trade	Manu	Services	Others
<b>Companies</b>	54	179	146	87	63	85	48	37
<b>Share</b>	23.18%	76.82%	62.66%	37.34%	27.04%	36.48%	20.60%	15.88%

Panel regression with fixed effects (FE) is the most common regression model for panel data when the independent variables are selected wisely. On the other hand, other models can also help to find valuable dependencies in special cases, because fixed effects contain all constant variables and their influences remain hidden. Because several variables are constant over time, there is a special emphasis on the random effects (RE) model in the sections of this paper that present results and discussion. Naturally, the pooled OLS was also run, and the interpretation of the results' significance is based on additional tests (Breusch-Pagan test for the suitability of the pooled OLS and Hausman test for the suitability of panel regression with RE).



### 3. Research results

For the first time, this study includes a pooled OLS and panel regression with RE to test the influence of variable FAM. Panel regression with FE was not used because the aim is to assess a dummy variable (FAM) as a determinant and the FE model eliminates constant variables over time (Wooldridge, 2013). Because with the standard model, problems of heteroskedasticity and autocorrelation occurred, HAC estimators were selected for estimation. According to additional tests, the RE panel regression provides more relevant results (Table no. 4). The results show that family companies do not face a higher tax burden. The coefficient itself is positive (and it was predicted to be), but the FAM variable is not statistically significant and does not help improve the model; therefore, hypothesis H<sub>1</sub> was not confirmed.

**Table no. 4. Regression with Fam variable**

	Pooled OLS (HAC estimators)					RE panel regression (HAC estimators)			
	Coefficient	Std. error	t-share	p-value	VIF	Coefficient	Std. error	z	p-value
const	-0.0079	0.0141	-0.5596	0.5763		-0.0127	0.0082	-1.5510	0.1209
Fam	0.0016	0.0031	0.5193	0.6040	1.2840	0.0018	0.0031	0.5748	0.5654
Int	-0.0026	0.0122	-0.2106	0.8334	1.0820	0.0121	0.0100	1.2120	0.2255
Deb	-0.0207	0.0055	-3.7440	0.0002***	1.2170	-0.0125	0.0053	-2.3760	0.0175**
ROA	0.0410	0.0106	3.8520	0.0002***	1.3340	0.0138	0.0072	1.9240	0.0543*
Inv	-0.0011	0.0044	-0.2618	0.7937	1.6720	-0.0006	0.0036	-0.1512	0.8798
Siz	0.0023	0.0009	2.6760	0.008***	1.3160	0.0023	0.0005	4.6180	<0.0001***
Trade	-0.0063	0.0022	-2.8670	0.0045***	2.6260	-0.0074	0.0023	-3.2000	0.0014***
Manu	-0.0030	0.0023	-1.3150	0.1898	2.2940	-0.0029	0.0025	-1.1440	0.2528
Services	0.0166	0.0057	2.9270	0.0038***	1.8820	0.0169	0.0054	3.1290	0.0018***
Time_1	-0.0010	0.0014	-0.6802	0.4970	1.8190	-0.0009	0.0014	-0.6815	0.4956
Time_2	0.0010	0.0019	0.5269	0.5988	1.8410	-0.0001	0.0017	-0.0541	0.9568
Time_3	-0.0018	0.0019	-0.9174	0.3599	1.8410	-0.0022	0.0018	-1.2290	0.2189
Time_4	-0.0019	0.0021	-0.9113	0.3631	1.8690	-0.0026	0.0019	-1.3550	0.1753
Time_5	-0.0010	0.0028	-0.3674	0.7136	1.8770	-0.0006	0.0023	-0.2724	0.7853
Time_6	-0.0050	0.0023	-2.2130	0.0279**	1.9630	-0.0030	0.0020	-1.5170	0.1292
Time_7	-0.0046	0.0028	-1.6350	0.1034	1.9330	-0.0027	0.0026	-1.0450	0.2961
Time_8	-0.0065	0.0024	-2.7510	0.0064***	1.9760	-0.0047	0.0021	-2.2460	0.0247**
Time_9	-0.0066	0.0028	-2.3770	0.0183**	1.8930	-0.0037	0.0025	-1.4560	0.1453
Wald test of heteroskedasticity: chi-squared(230) = 2.86896e+006, with p-value = 0 Wooldridge test for autocorrelation in panel data: t(227) = 10.433 with p-value = P( t  > 10.433) = 4.53054e-021 Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Breusch-Pagan test statistic: LM = 1354.22 with p-value = prob(chi-squared(1) > 1354.22) = 1.86303e-296 Hausman test statistic: H = 38.2794 with p-value = prob(chi-squared(14) > 38.2794) = 0.000470877						Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Wooldridge test for autocorrelation in panel data: F(1, 217) = 4.16605 with p-value = P(F(1, 217) > 4.16605) = 0.0424521			

Further regressions address the testing of the hypothesis H<sub>2</sub> – if the Czech companies with foreign parent companies have a lower tax burden. In this case, the pooled OLS and RE panel regression were also used because the aim was to test the significance of the constant dummy variable (PTH). Whereas the model has problems with heteroskedasticity and autocorrelation, the robust HAC estimators were used to provide relevant coefficient belonging to the explanatory variable. Also, in this case, the investigated determinant is not

significant (Table no. 5). The coefficient has a negative value (as it was predicted) in both the pooled OLS and the RE panel regression. Still, the p-value is relatively high, so the second hypothesis was not confirmed.

**Table no. 5. Regression with PTH variable**

	Pooled OLS (HAC estimators)					RE panel regression (HAC estimators)			
	Coefficient	Std. error	t-share	p-value	VIF	Coefficient	Std. error	z	p-value
const	-0.0079	0.0141	-0.5596	0.5763		-0.0127	0.0082	-1.5510	0.1209
Fam	0.0016	0.0031	0.5193	0.6040	1.2840	0.0018	0.0031	0.5748	0.5654
Int	-0.0026	0.0122	-0.2106	0.8334	1.0820	0.0121	0.0100	1.2120	0.2255
Deb	-0.0207	0.0055	-3.7440	0.0002***	1.2170	-0.0125	0.0053	-2.3760	0.0175**
ROA	0.0410	0.0106	3.8520	0.0002***	1.3340	0.0138	0.0072	1.9240	0.0543*
Inv	-0.0011	0.0044	-0.2618	0.7937	1.6720	-0.0006	0.0036	-0.1512	0.8798
Siz	0.0023	0.0009	2.6760	0.008***	1.3160	0.0023	0.0005	4.6180	<0.0001***
Trade	-0.0063	0.0022	-2.8670	0.0045***	2.6260	-0.0074	0.0023	-3.2000	0.0014***
Manu	-0.0030	0.0023	-1.3150	0.1898	2.2940	-0.0029	0.0025	-1.1440	0.2528
Services	0.0166	0.0057	2.9270	0.0038***	1.8820	0.0169	0.0054	3.1290	0.0018***
Time_1	-0.0010	0.0014	-0.6802	0.4970	1.8190	-0.0009	0.0014	-0.6815	0.4956
Time_2	0.0010	0.0019	0.5269	0.5988	1.8410	-0.0001	0.0017	-0.0541	0.9568
Time_3	-0.0018	0.0019	-0.9174	0.3599	1.8410	-0.0022	0.0018	-1.2290	0.2189
Time_4	-0.0019	0.0021	-0.9113	0.3631	1.8690	-0.0026	0.0019	-1.3550	0.1753
Time_5	-0.0010	0.0028	-0.3674	0.7136	1.8770	-0.0006	0.0023	-0.2724	0.7853
Time_6	-0.0050	0.0023	-2.2130	0.0279**	1.9630	-0.0030	0.0020	-1.5170	0.1292
Time_7	-0.0046	0.0028	-1.6350	0.1034	1.9330	-0.0027	0.0026	-1.0450	0.2961
Time_8	-0.0065	0.0024	-2.7510	0.0064***	1.9760	-0.0047	0.0021	-2.2460	0.0247**
Time_9	-0.0066	0.0028	-2.3770	0.0183**	1.8930	-0.0037	0.0025	-1.4560	0.1453
	Wald test of heteroskedasticity: chi-squared(230) = 2.86896e+006, with p-value = 0 Wooldridge test for autocorrelation in panel data: t(227) = 10.433 with p-value = P( t  > 10.433) = 4.53054e-021 Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Breusch-Pagan test statistic: LM = 1354.22 with p-value = prob(chi-squared(1) > 1354.22) = 1.86303e-296 Hausman test statistic: H = 38.2794 with p-value = prob(chi-squared(14) > 38.2794) = 0.000470877					Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Wooldridge test for autocorrelation in panel data: F(1, 217) = 4.16605 with p-value = P(F(1, 217) > 4.16605) = 0.0424521			

The results of the first two models show that predictive dependencies do not work within Czech companies. On the other hand, a dummy variable determinant always brings only a strict scale with two values, which is usually not ideal for the regression model. Therefore, the study continues by splitting the dataset based on dummy variables from the first two hypotheses. The following table shows the results of the pooled OLS and panel regression with RE for part of the dataset containing only family companies (Table no. 6). One of the variables (Siz) was omitted from the model because it caused collinearity among the variables. Additional tests show that the best model is the panel regression with RE. According to the hypotheses, only indebtedness is a significant variable.

Necessary for interpretation is also to run the model for non-family companies. The pooled OLS and the RE panel regression were also used. Unlike regression for family companies, FE panel regression is more suitable for non-family ones. Even this difference can be seen as an important result because it demonstrates significant differences between data from family and non-family companies. Moreover, the preference for the RE model usually means that other important

variables are not included. This problem proves that there are significant differences between family and non-family companies when the tax burden determinants are studied.

Table no. 6. Regression – family companies

	Pooled OLS (HAC estimators)					RE panel regression (HAC estimators)			
	Coefficient	Std. error	t-share	p-value	VIF	Coefficient	Std. error	z	p-value
const	0.0156	0.0053	2.9330	0.005***		0.0136	0.0061	2.233	0.0256**
Int	-0.0739	0.0379	-1.9490	0.0566*	1.0580	0.0124	0.0316	0.3908	0.6959
Deb	-0.0298	0.0100	-2.9840	0.0043***	1.1790	-0.0209	0.0097	-2.158	0.0309**
ROA	0.0498	0.0305	1.6350	0.1080	1.5980	0.0386	0.0221	1.752	0.0799*
Inv	0.0155	0.0080	1.9340	0.0584*	1.7890	0.0058	0.0085	0.6834	0.4944
Trade	-0.0011	0.0029	-0.3747	0.7094	3.6730	-0.0025	0.0034	-0.7299	0.4655
Manu	0.0032	0.0031	1.0250	0.3100	3.8580	0.0020	0.0037	0.5612	0.5746
Services	0.0309	0.0104	2.9630	0.0046***	3.6360	0.0262	0.0106	2.459	0.014**
Time_1	0.0016	0.0036	0.4329	0.6668	1.7910	0.0015	0.0034	0.4403	0.6597
Time_2	0.0033	0.0039	0.8455	0.4016	1.7940	0.0033	0.0039	0.8644	0.3873
Time_3	0.0004	0.0040	0.0927	0.9265	1.7710	0.0022	0.0042	0.5188	0.6039
Time_4	0.0027	0.0049	0.5496	0.5849	1.7820	0.0031	0.0046	0.6842	0.4938
Time_5	0.0023	0.0072	0.3180	0.7518	1.8750	0.0051	0.0056	0.9132	0.3611
Time_6	0.0051	0.0058	0.8673	0.3897	1.9300	0.0051	0.0047	1.076	0.2819
Time_7	0.0006	0.0077	0.0794	0.9370	1.9570	0.0012	0.0067	0.1772	0.8593
Time_8	-0.0019	0.0064	-0.2898	0.7731	1.9480	-0.0024	0.0054	-0.4413	0.659
Time_9	-0.0027	0.0067	-0.3936	0.6955	1.8570	-0.0024	0.0072	-0.3383	0.7351
	Wald test of heteroskedasticity: chi-squared(54) = 877624, with p-value = 0 Wooldridge test for autocorrelation in panel data: t(53) = 5.86054 with p-value = P( t  > 5.86054) = 3.01557e-007 Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Breusch-Pagan test statistic: LM = 310.19 with p-value = prob(chi-squared(1) > 310.19) = 1.98568e-069 Hausman test statistic: H = 17.5277 with p-value = prob(chi-squared(13) > 17.5277) = 0.17629					Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Wooldridge test for autocorrelation in panel data: F(1, 51) = 10.8136 with p-value = P(F(1, 51) > 10.8136) = 0.00182966			

RE panel regression was selected to compare coefficients for family and non-family companies. While autocorrelation did not occur in the panel regression, PCSE estimators targeting only heteroskedasticity were chosen. It is important to mention that different estimates have also affected results, so they must be interpreted carefully. The following table presents the results of the regressions for non-family companies (Table no. 7). Compared to family companies, the share of intangible assets can play a significant role as a tax burden determinant. Interestingly, the coefficient of indebtedness is not as high as that of family companies. Altogether it can indicate that family companies do not use intangible assets in tax planning activities and non-family ones do. Debt is an important tax burden determinant, and higher debt can help reduce tax liabilities. The difference in coefficient can be caused by the interest rate differential between loans for family and non-family companies. Non-family companies can have better loan conditions with lower interest rates; therefore, the effect of higher debt does not have to be so strong.

The situation with the dummy variable Service is similar to that of indebtedness. This variable is significant for family and non-family companies, with a positive effect on tax burden, but the coefficient is higher for family companies. A similar situation also occurs for another control variable: ROA. Overall, it can be concluded that family and non-family

companies have similar tax burden determinants, but the weight of each is different. For non-family companies, the share of intangible assets is also important, which is the main difference between family and non-family companies.

**Table no. 7. Regression – non-family companies**

	Pooled OLS (HAC estimators)					RE panel regression (PCSE estimators)			
	Coefficient	Std. error	t-share	p-value	VIF	Coefficient	Std. error	z	p-value
<b>const</b>	0.0296	0.0044	6.6760	<0.0001***		0.0244	0.0033	7.2930	<0.0001***
<b>Int</b>	0.0071	0.0118	0.6013	0.5484	1.0860	0.0171	0.0078	2.1780	0.0294**
<b>Deb</b>	-0.0213	0.0065	-3.2550	0.0014***	1.1970	-0.0108	0.0023	-4.6570	<0.0001***
<b>ROA</b>	0.0377	0.0103	3.6730	0.0003***	1.3160	0.0116	0.0047	2.4930	0.0127**
<b>Inv</b>	-0.0058	0.0048	-1.2030	0.2306	1.7250	-0.0024	0.0074	-0.3250	0.7452
<b>Trade</b>	-0.0075	0.0025	-2.9580	0.0035***	2.5740	-0.0099	0.0041	-2.4280	0.0152**
<b>Manu</b>	-0.0035	0.0027	-1.2630	0.2082	2.0720	-0.0038	0.0036	-1.0470	0.2951
<b>Services</b>	0.0112	0.0066	1.6960	0.0917*	1.6540	0.0125	0.0041	3.0400	0.0024***
<b>Time_1</b>	-0.0012	0.0015	-0.7917	0.4296	1.8280	-0.0012	0.0018	-0.6264	0.5311
<b>Time_2</b>	0.0011	0.0020	0.5231	0.6015	1.8540	-0.0004	0.0018	-0.2427	0.8083
<b>Time_3</b>	-0.0017	0.0021	-0.7810	0.4358	1.8650	-0.0024	0.0018	-1.3460	0.1782
<b>Time_4</b>	-0.0024	0.0022	-1.1200	0.2640	1.8980	-0.0035	0.0018	-1.9320	0.0534*
<b>Time_5</b>	-0.0011	0.0029	-0.3683	0.7131	1.8850	-0.0017	0.0018	-0.9030	0.3665
<b>Time_6</b>	-0.0068	0.0023	-2.9150	0.004***	1.9830	-0.0045	0.0019	-2.3690	0.0178**
<b>Time_7</b>	-0.0047	0.0029	-1.6130	0.1085	1.9370	-0.0028	0.0019	-1.4220	0.1550
<b>Time_8</b>	-0.0061	0.0023	-2.7020	0.0076***	1.9950	-0.0041	0.0019	-2.1460	0.0318**
<b>Time_9</b>	-0.0059	0.0027	-2.1800	0.0305***	1.9100	-0.0028	0.0019	-1.4420	0.1493
	Wald test of heteroskedasticity: chi-squared(176) = 1.21014e+006, with p-value = 0 Wooldridge test for autocorrelation in panel data: t(173) = 10.6422 with p-value = P( t  > 10.6422) = 1.15264e-020 Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Breusch-Pagan test statistic: LM = 1011.02 with p-value = prob(chi-squared(1) > 1011.02) = 7.22302e-222 Hausman test statistic: H = 44.2754 with p-value = prob(chi-squared(13) > 44.2754) = 2.76246e-005					Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Wooldridge test for autocorrelation in panel data: F(1, 165) = 1.25518 with p-value = P(F(1, 165) > 1.25518) = 0.264194			

Other interesting results were expected when the dataset would be split based on the home country of the parent company. For other models, the size of the company and year dummy variables were omitted because they caused problems with collinearity. The following table presents the results of the pooled OLS and RE panel regression for companies with a foreign parent company (Table no. 8). In this case, the HAC estimators were used for the Pooled OLS and PCSE estimators for the RE panel regression because the autocorrelation did not occur. For this part of the dataset, the FE model is more suitable, but the RE model was selected because of its preference of it for domestically owned companies (Table no. 9).

Regarding the explanatory variables, both Int and Deb are statistically significant. A higher share of intangible assets leads to a higher tax burden for the company. It is an interesting result, but it corresponds to tax planning schemes. When the intangible assets are transferred to another country to reduce tax liabilities via royalties, a subsidiary in the Czech Republic has a lower share of intangible assets. Interpretation of this result means that companies with a lower share of intangible assets also have a lower tax burden, and tax planning should be the reason. Indebtedness has a negative coefficient, and this determinant is statistically significant across companies with a foreign parent company.

Table no. 8. Regression – companies with foreign parent company

	Pooled OLS (HAC estimators)					RE panel regression (PCSE estimators)			
	Coefficient	Std. error	t-share	p-value	VIF	Coefficient	Std. error	z	p-value
const	0.0258	0.0041	6.2950	<0.0001***		0.0231	0.0032	7.1770	<0.0001***
Int	0.0083	0.0133	0.6291	0.5302	1.13	0.0177	0.0063	2.7950	0.0052***
Deb	-0.0143	0.0054	-2.6580	0.0087***	1.149	-0.0068	0.0019	-3.6020	0.0003***
ROA	0.0328	0.0085	3.8720	0.0002***	1.049	0.0071	0.0033	2.1900	0.0285**
Inv	-0.0124	0.0061	-2.0180	0.0454**	1.544	-0.0063	0.0070	-0.8934	0.3716
Trade	-0.0097	0.0031	-3.0820	0.0025***	2.483	-0.0129	0.0042	-3.0980	0.0019***
Manu	-0.0048	0.0034	-1.4300	0.1548	2.261	-0.0062	0.0036	-1.6950	0.0901*
Services	0.0053	0.0079	0.6707	0.5035	1.675	0.0046	0.0044	1.0350	0.3005
	Wald test of heteroskedasticity: chi-squared(144) = 4.55276e+006, with p-value = 0 Wooldridge test for autocorrelation in panel data: t(142) = 8.17729 with p-value = P( t  > 8.17729) = 1.47137e-013 Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Breusch-Pagan test statistic: LM = 1341.02 with p-value = prob(chi-squared(1) 1341.02) = 1.37638e-293 Hausman test statistic: H = 32.5438 with p-value = prob(chi-squared(4) > 32.5438) = 1.48095e-006					Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Wooldridge test for autocorrelation in panel data: F(1, 135) = 0.926911 with p-value = P(F(1, 135) > 0.926911) = 0.337388			

In Table no. 9, results of regression from domestically owned companies are presented (table no. 9). In this case, for both regressions, the HAC estimators are used. The share of intangible assets is not an important regressor of the tax burden of domestically owned companies. It is evident that domestic companies cannot use this tax planning scheme because they do not have any international connection to transfer their intangible assets.

Table no. 9. Regression – domestic-owned companies

	Pooled OLS (HAC estimators)					RE panel regression (HAC estimators)			
	Coefficient	Std. error	t-share	p-value	VIF	Coefficient	Std. error	z	p-value
const	0.0283	0.0046	6.1130	<0.0001***		0.0238	0.0048	4.9450	<0.0001***
Int	0.0066	0.0323	0.2034	0.8393	1.0280	-0.0118	0.0388	-0.3052	0.7602
Deb	-0.0386	0.0080	-4.8550	<0.0001***	1.2880	-0.0293	0.0086	-3.4130	0.0006***
ROA	0.0237	0.0156	1.5200	0.1322	1.0160	0.0091	0.0172	0.5297	0.5963
Inv	0.0157	0.0065	2.4190	0.0177**	1.9550	0.0097	0.0072	1.3420	0.1797
Trade	-0.0066	0.0029	-2.3050	0.0236**	2.7560	-0.0045	0.0029	-1.5340	0.1250
Manu	-0.0041	0.0027	-1.5030	0.1365	2.2240	-0.0020	0.0028	-0.7094	0.4781
Services	0.0226	0.0070	3.2430	0.0017***	2.1070	0.0241	0.0070	3.4650	0.0005***
	Wald test of heteroskedasticity: chi-squared(186) = 2.79911e+006, with p-value = 0 Wooldridge test for autocorrelation in panel data: t(84) = 7.37213 with p-value = P( t  > 7.37213) = 1.07829e-010 Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Breusch-Pagan test statistic: LM = 334.553 with p-value = prob(chi-squared(1) 334.553) = 9.79615e-075 Hausman test statistic: H = 3.10281 with p-value = prob(chi-squared(4) > 3.10281) = 0.54077					Belsley-Kuh-Welsch collinearity diagnostics: no strong collinearity for the explanatory variable was detected. Wooldridge test for autocorrelation in panel data: F(1, 81) = 7.43491 with p-value = P(F(1, 81) > 7.43491) = 0.0078395			

Indebtedness is an essential variable for both groups of companies, with a higher coefficient for domestically owned companies. The previously discussed issue can cause the coefficient differential. Domestic-owned companies cannot use tax planning using royalties; therefore, the weight of other factors is higher.

#### 4. Discussion

The results of this study, which addresses the most influential Czech companies, show that the companies' tax burdens do not depend on the ownership structure, but the determinants are involved with different intensities. First, the analyses did not show that the family companies have a different level of the tax burden. This is an unexpected result, in contrast to the studies by Chen et al. (2010) or Badertscher et al. (2013). The question thus arises as to what the reasons are for this different result. Chen et al. (2010) studied mostly American companies, which can be considered in comparison to those from Europe. Mafrolla and D'Amico (2016) have also presented similar results, that family companies use tax planning less than do others. However, their study brings the important additional result that companies in which families are involved to a larger extent tend to use tax planning similarly to their non-family counterparts. A similar explanation can be used for Czech companies, while also taking into account the historical development of the Czech Republic. Ownership and business were restricted until 1989, and property restitution and the possibility to start one's own business generated a large number of family companies. Naturally, when people start a new business or get their property back, they are often very involved in managing the company. Because these possibilities are relatively young in the Czech Republic, most family owners are part of the first or second generation after the revolution. It is obvious that when a family member is closer to the original owner (or to the recipient of restitution), they tend to care more about the management and performance of the company. Overall, family companies are managed similarly to non-family ones in terms of tax planning in the Czech Republic if the owners and managers have such a possibility.

Although this study did not reveal any significant difference in the tax burden of family and non-family companies, it shows that there are several heterogeneities regarding the determinants of the tax burden. First, additional tests show that the equation for family companies should include an additional variable. Whereas the model consists of every critical predicted variable, the manager person may be the key to this heterogeneity. In family companies, managers are closely related to the owners (or there are the same), and different approaches to entrepreneurship can also make huge differences within tax planning and tax burden. Non-family companies are usually managed by professionals who care primarily about company performance. The managers of family companies can be very different in terms of their values, and it can also mirror in these results.

It is important to distinguish companies with links to foreign parent companies. Such companies have a better ability to reduce tax liabilities and can use royalties for the use of transferred intangible assets as a part of international tax planning. Although this study did not reveal any impact of foreign owners on tax burden, results show several heterogeneities across companies according to the ownership structure, and a link to a foreign parent company seems to be an important factor. The share of intangible assets is the tax burden determinant only for the companies with foreign parent companies, so only companies with such a link can use this international tax planning scheme. Domestically owned companies are not able to transfer intangible assets to different countries; therefore, they cannot use this tax planning scheme. Based on the results of this study, these other abilities are not causing different tax burdens, but they manifest themselves in different determinants of the tax burden.

The lack of the influence of the foreign parent company on the tax burden is surprising because it is in contrast to the study by Dischinger et al. (2014) that presents the preferences of the parent company, and this study also brings different results than other studies that emphasise the importance of tax havens (Desai et al., 2006; Davies et al., 2018; Khouri et al.,

2019). All these results contrast with several studies which show that the Czech Republic suffers from tax avoidance (Tørsløv et al., 2018; Moravec et al., 2019). Whereas this study did not reveal any difference in the tax burden between family and non-family companies or between foreign-owned and domestically owned companies, it can be concluded that all types of companies are able to reduce their tax liabilities to a similar extent, even if they lack some tax planning scheme options. This study also reveals different tax burden determinants, so further research should also address this issue with other variables that are more connected with the managers of the companies.

Because one of the most important determinants is debt, this study has similar results to other studies covering the Visegrád countries (Janský and Kokeš, 2016; Ištók and Kanderová, 2019). Recent studies and the results presented confirm that the debt ratio is a crucial determinant of the tax burden. However, it cannot be stated that debt financing is used only for tax avoidance. Many companies are in debt but do not use tax planning, and interest decreases their tax burden. Indebtedness is an important tax burden determinant for all studied types of companies; it does not matter whether a company is family or not if it has a foreign parent company. Nevertheless, intragroup debt, in addition to interest payments, is the most effective tool for tax avoidance because indebtedness is its only statistically significant determinant, which can be relatively easily managed.

## **Conclusions**

International tax planning is part of modern management, and managers try to gain advantages from the use of tax havens. A special group of companies is family companies, where the families are not only the owners, but also the managers. The non-free past of Czech citizens influenced the current situation of tax planning by Czech family companies. Whereas the family owners have been in business for a relatively short time, they are widely involved in the management and tend to use tax planning similarly to non-family companies.

This study did not confirm that foreign relations contribute to lowering the tax burden. On the other hand, the results show differences between tax burden determinants across companies divided according to the ownership structure. The main difference can be seen in the ability to use the transfer of intangible assets and connected royalties as a tax planning scheme. This can be used only by companies with links to foreign companies; therefore, domestic-owned companies are not able to manage this tax planning scheme.

Managers should focus on tax planning schemes that use debt and interest payments because indebtedness is one of the most important determinants that can also be easily managed. From the managers' perspective, the finding that the ownership structure has no influence on tax burden is also important because it shows that the tax planning is present in all types of companies. As the economy moves toward a digital model, managers should also consider relocating intangible assets and royalty payments as part of international tax planning. Governments and international organisations have already reacted to these changes because special digital taxation has been widely discussed.

This study covers the most influential companies in the Czech Republic and has several limitations. First of all, the most influential companies are also the biggest, so it is important to be careful when the results are transferred to another group of companies. A limitation can also be seen in the presence of only Czech companies.

Further research should continue to investigate tax planning in post-communist countries. A similar study with data from another Visegrád country would be beneficial to verify if the results transfer to other CEE countries. Further studies should also focus on other specific determinants of the tax burden. This study reveals one of them: the ownership structure has a different impact than in other countries. Because of different historical development in CEE countries, which is also reflected in the structure of their economies, it can be assumed that there are also differences in the attitudes of managers to tax planning.

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