THE POSITION OF THE CZECH REPUBLIC IN EUROPEAN CORPORATE TAXATION

Veronika Nálepová[1]

Abstract

The aim of the article is to evaluate the degree of tax burden of corporations in the Czech Republic in the context of the European area of developed countries based on various approximations of corporate taxation. The paper uses data on the size of taxation in 2018 for 24 EU countries, where the tax burden is expressed by statutory tax rate, implicit tax rate, tax quota, effective average and marginal tax rates and world tax index. Cluster analysis is used as a key method for estimating differences in the European area. The results of the cluster analysis did not show significant differences in the taxation of corporations across the monitored countries. Mostly two apparent clusters were identified, where differences are evident between Western and Eastern Europe. However, the level of taxation differs from the point of view of various indicators.

Keywords

Corporate Taxation, Effective Tax Rates, Tax Burden, Cluster Analysis

I. Introduction

At present, all countries, not just the European Union, are facing the consequences of the COVID-19 pandemic, not just economic ones. Economic growth is slowing, and government deficits are growing. Therefore, a change in the structure of taxation can be expected in the future. The question is whether there is room for change in corporate taxation. In this regard, it is necessary to realize that corporate taxation entails costs that are one of the decision-making factors for potential investors and for the overall business environment, which is currently weakened as a result of the "lock down". In addition, the change in corporate taxation is more popular in the conditions of the Czech Republic than in the case of labor taxation. Capital is currently considered to be the most mobile production factor, so potential investors, thanks to open options, carefully consider all costs associated with it, looking for an indicator of the tax burden that best reflects the reality of the corporate environment.

An objective assessment of the corporate tax burden appears to be a relatively complex task. Tax systems across countries are different and statutory tax rates are considered to be a relatively inadequate indicator of the level of the tax burden. Effective tax rates, which are set for this reason, make it possible to better assess the tax burden on corporations. However, the name "effective" is a highly relative term, as the effectiveness of the method of calculating these rates is understood here primarily in the sense of a better indicator than statutory tax rates, and these rates also have their advantages and disadvantages.

It is obvious that this issue needs to be captured in a deeper context, but the primary analysis should lead to the initial municipal definition in the European area. The aim of the article is to evaluate the degree of tax burden on corporations in the Czech Republic in the context of the European area of developed countries based on various approximations of corporate taxation. Based on a cluster analysis, the position of individual countries in terms of several approximations of the corporate tax burden in 2018 will be compared.

[1] PRIGO University, V. Nezvala 801/1, 73601 Havířov, Czech Republic. E-mail: veronika.nalepova@prigo.cz.

II. The importance of corporate taxes

Many published papers have examined the role of taxes in corporate decision-making (eg, Slemrod, 1990; Scholes and Wolfson, 1992; Auerbach and Slemrod, 1997 or Shackelford and Shevlin, 2001), respectively their influence not only on investment decisions, but also on the distribution of financing, dividend policy or organizational structure, etc. The results of this work clearly confirmed the impact of corporate taxation on corporate policy. Tax policy fundamentally determines the method of financing corporations. The acquisition of funds for further investments can be made either through equity, retained earnings or debt. High tax rates reduce corporate profits and thus the possibility of subsequent reinvestment. The international movement of capital allows easy selection of investment allocation. For small open economies, which are mostly investment recipients, high taxation could be a competitive problem. Harberger (1962) argues that high corporate tax rates will discourage investment. The relationship between corporate taxation and foreign direct investment (FDI) was also confirmed by Simmons (2003) in his work, when he constructed an index assessing the country's attractiveness based on corporate taxes. The impact of changes in the tax rate on intensive investments was dealt with by e.g. Devereux (2007) or De Mooij and Ederveen (2003). The works conclude that this type of investment is sensitive to changes in tax laws and the average tax rate and is more elastic than standard investments. Mutti and Grubert (2004) addressed the impact of this type of tax on horizontally integrated international organizations considering investing abroad. They concluded that investment abroad is sensitive to the tax rate in that country, and that this sensitivity is greater in developing than in developed countries and increasing over time.

There are countless works examining the role of corporate taxation, but the main controversy is how best to approximate corporate taxation itself so that the tax effect can be affected.

III. Measurement of corporate taxes

The level of statutory tax rates is undoubtedly one of the basic options for measuring the tax burden, and not only for corporations. The analysis of the tax system, which is based on statutory tax rates, is simple, but from a factual and structural point of view inadmissible. Most authors agree on this fact, e.g. Blechová (2008), Szarowska (2011) or Kotlán, Machová and Janíčková (2011).

Effective corporate tax rates are used primarily to better reflect the real tax burden on corporate profits and take into account the tax base and the way in which corporate and personal income taxes are integrated. They therefore provide information on the differences in tax approaches to companies with the same characteristics. Three main approaches to effective corporate taxation can be found, namely the micro-backward looking method, the micro-forward looking method and the macro-backward looking method. By micro-view is meant an approach aggregating data eg from reports of individual companies or within industries, macro-view on the other hand processes macroeconomic data, providing an overview of the whole country, usually obtained from national accounts systems, using backward methods using ex-post data, and vice versa forward-looking methods apply ex-ante data.

The micro-forward looking method is based on neoclassical investment theory, where the average effective tax rate depends on the marginal effective tax rate and capital costs. This methodology has been developed in its current form by Devereux and Griffith (1998) and includes effective average (EATR) and effective marginal (EMTR) tax rates. At the same time, these rates are crucial in investment decisions.

The micro-backward looking method uses mainly the financial statements of companies, where the effective tax rate is determined as the ratio between tax liabilities and revenues. Collins and

Shackelford (1995) in particular contributed to the development of this methodology. Buijink et al. (2002), who in their work applied the consolidated financial statements of the member states of the European Union in order to calculate effective tax rates. However, there are currently no data from this source for this indicator.

The macro-backward looking method uses information obtained from national accounting statistics of individual countries. This approach was first applied in the study of Mendoza, Razin and Tesar (1994) and developed, for example, in the study of Martinez-Mongay (1997). The tax quota (TQ) can also be included in this method, so this method is sometimes omitted on a global scale. At the European level, according to this methodology, implicit tax rates (ITRs) are given, which are calculated annually by the European Commission.

As Nicodème (2007) states, all approaches that generate effective tax rates can be used, for example, in econometric studies for further analysis. However, retrospective studies are more appropriate in this area, as effective tax rates from forward-looking studies are skewed by the choice of variables used. However, in terms of the choice of variables used, it appears to be complex. These variants consider not only the statutory tax rates of corporations, but also aggregate personal income taxes, depreciation rates and also take into account other economic indicators, namely interest rates and inflation. In addition, the nature of the calculation makes it possible to abstract from the effects of the economic cycle, which is not possible with other rates. The tax quota corresponds the least to the reality of the actual tax burden, but from the point of view of calculation and finding it seems to be the most available. A more appropriate indicator within this methodology is the implicit tax rates on capital (ICTR), which capture a wide range of taxation effects, but these are accompanied by possible inaccuracies caused by tax delays or the business cycle.

All the above-mentioned calculation methods abstract from no less significant facts, which form a significant indirect cost within not only corporate taxation, namely the administrative costs of taxation, resp. tax collection costs. One of the few indicators that includes administrative burdens is the World Tax Index (*WTI*). The World Tax Index is a new aggregate multi-criteria indicator of the tax burden. This indicator was compiled by Kotlán and Machová (2012), who present the values of this index for 34 OECD countries in their work. The indicator is based on the calculation of secondary data of public databases and primary data, resp. based on a Qualified Expert Opinion, which represents the opinion of an expert on a given tax in a particular country.

IV. Methodology of work and data

The aim of the paper is to define the amount of the tax burden of corporate taxation in the Czech Republic in the context of the European area of developed countries. Assessing only the level of taxation without proper comparison would be somewhat vague. Cluster analysis appears to be the best method for assessing the level of corporate taxation across countries.

The task of cluster analysis is to find its subsets in a given set of objects - clusters of objects - so that the members of the cluster are similar to each other, but are not very similar to objects outside this cluster (Hebák et al., 2007). Given the nature of the data (see Table 1), it seems most appropriate to use the k-means clustering algorithm. The principle is very simple:

1) At the beginning, so-called centroids are inserted between points in space, which are points representing the centers of the resulting clusters.
2) Each point in space is assigned to the centroid closest to it. The first division into clusters takes place.
3) The centroids move so that they are in the middle between the points that belong to their cluster at that moment. Here is the difference between k-means and k-median in

calculating a new position for centroids, where the former uses the average of the point values from the same cluster, while the latter uses the median.

Points 2 and 3 are then repeated until equilibrium is reached and the centroid movement stops. Prior to the cluster analysis itself, the suitability of the data used will be verified using the Hopkin test (see Hopkins and Gordon, 1954). The Hopkins test is based on hypothesis testing, where the null hypothesis says, "*Data records have a non-random uniform distribution*" - which means that it would be difficult to find any meaningful clusters in such data. The alternative hypothesis says: "*Data records are generated randomly*" and therefore it is possible to expect clusters. The score takes values between 0 and 1, a score around 0.5 indicates no clustering and a score with a tendency to 0 indicates a high tendency of the clusters. Then it is appropriate to use a dendrogram to identify potential clusters. All data will be processed in Python. 24 European countries and the level of their taxation in 2018 were selected according to the availability of data.

Table 1 Characteristics of input data

Variable	Characteristic	Unit	Source
STR_CIT	Statutory tax rate of corporate income.	%	OECD Revenue Statistics (OECD, 2020)
TQ_CIT	The corporate tax burden expressed by the tax quota.	%	OECD Revenue Statistics (OECD, 2020)
EATR	The corporate tax burden expressed by the effective average tax rate.	%	Spengel et al. (2018)
EMTR	The corporate tax burden expressed by the effective marginal tax rate.	%	Spengel et al. (2018)
ITR_C	The corporate tax burden expressed by the Implicit tax rate of capital accumulation.	%	Eurostat (Eurostat, 2020)
WTI_CIT	The corporate tax burden expressed by the World tax index.	Index	World Tax Index (WTI, 2020)

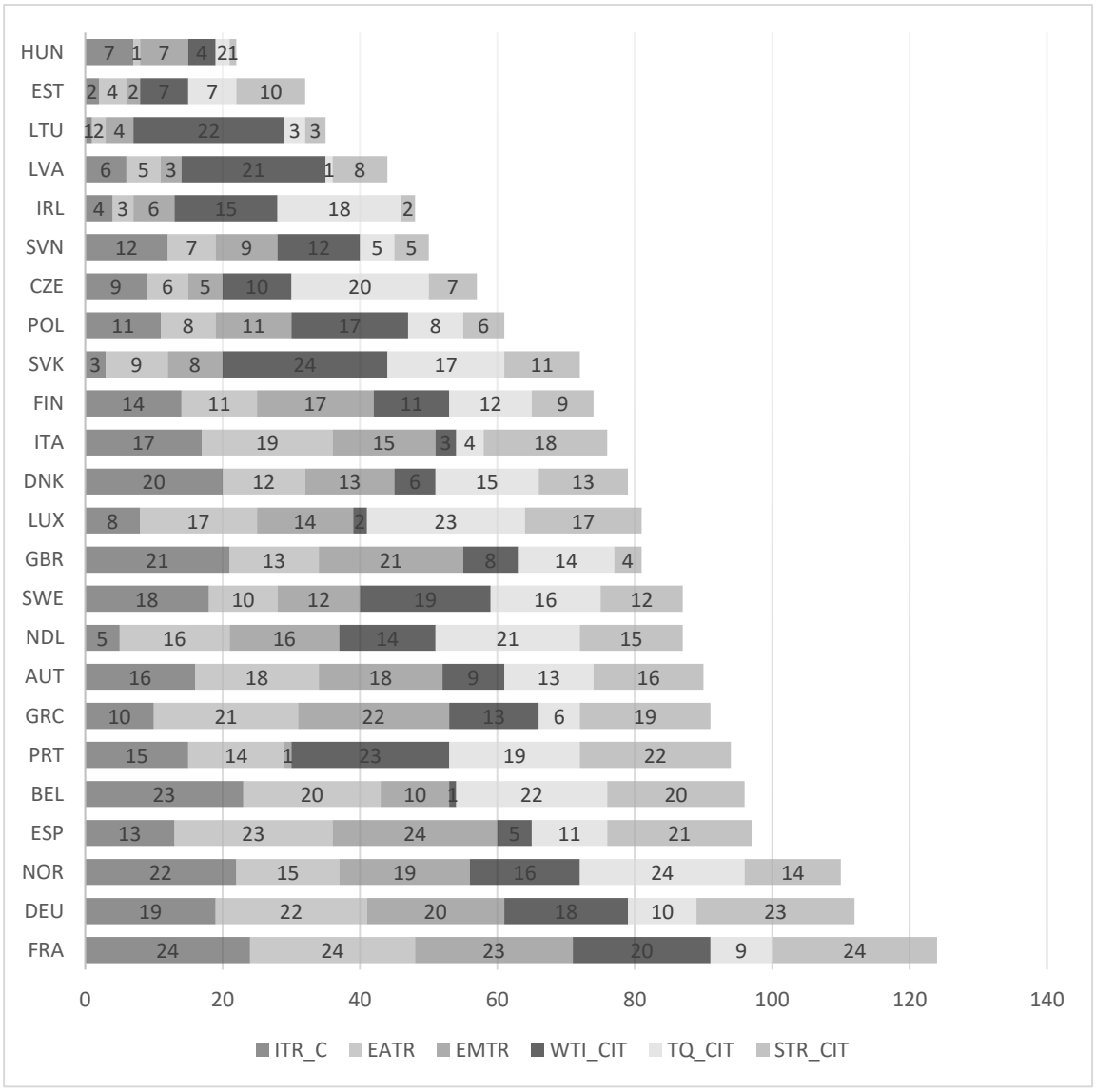
Source: own

V. Taxation of corporations in the Czech Republic and in Europe

Before proceeding to the definition of the distribution of the tax burden, it is necessary to compare the distribution of the tax burden according to the level of individual tax approximators, resp. according to the order of individual variables. The individual taxation indicators were therefore ranked for each country, from the lowest corporate tax rate (1) to the highest corporate tax rate (24).

From Figure 1 below, the differences between taxations are significant. Countries show significant differences in the case of TQ_CIT. An example is the Czech Republic, which from the point of view of the tax quota belongs to the countries with a higher tax burden, which was not confirmed in the case of other tax approximations. From the point of view of effective tax rates, the environment in the Czech investment area appears to be attractive. The same is true in the case of France or Germany, where the effect is the opposite. It is therefore clear that the tax quota causes a significant distortion, which is due to their calculation. Conversely, in the United Kingdom, low statutory tax rates do not indicate a low tax burden. From the overall point of view, taxation in the Czech Republic in the context of corporate space is one of the lower.

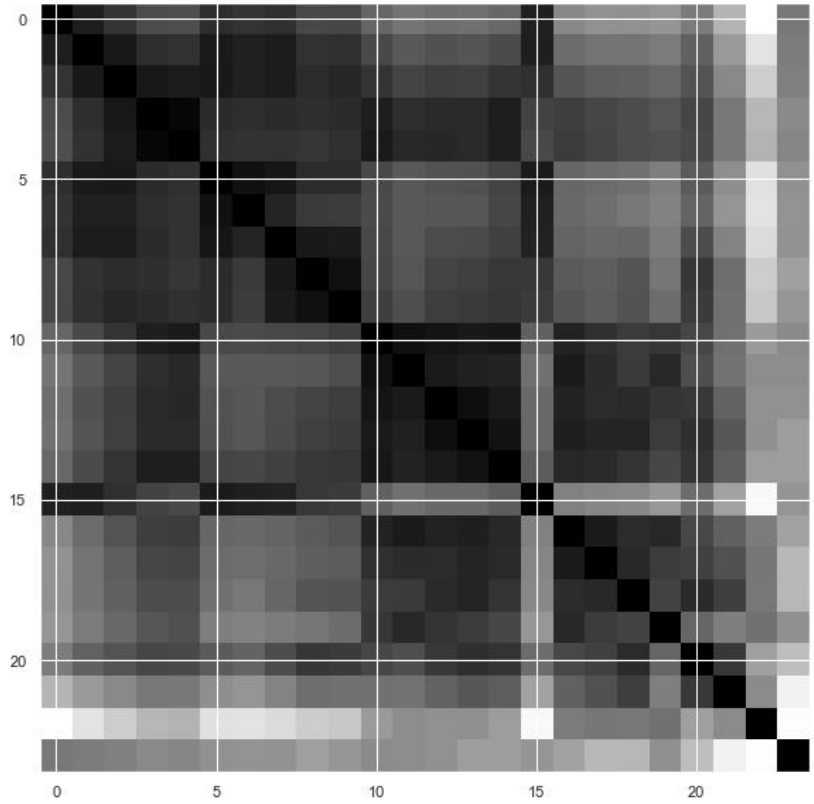
Figure 1 Distribution of the tax burden: The order of individual countries within the given indicators



Source: own

As already mentioned in the part of the methodology for spatial consideration of differences in tax rates, it is appropriate to use cluster analysis. First, however, it is necessary to verify the suitability of the data for clustering using the Hopkins test. The result of the Hopkins test is early 0.40, which results in a not very significant clustering in the data. Therefore, the visualization of potential clusters was started with the help of visual assessment of tendency (VAT). VAT creates a visualization of the distances of individual records and displays them as a color matrix. The closer the color is to black, the smaller the distance between individuals. Therefore, the probable number of clusters and their hierarchy can be read from the figure. Figure 2 also shows considerable fragmentation in the data, indicating homogeneity in the observed sample of data with a slight two clusters.

Figure 2 VAT data



Source: own

Despite the not very clear results of the Hopkins test and VAT, two apparent clusters were identified according to the dendrogram. Which are presented according to Figure 3 in the following matrix. From the given clusters and according to Table 2 below it is clear that the division can be identified mainly from the geographical distribution, ie into the countries of Eastern and Western Europe, with the exception of Luxembourg, which is considered a tax haven.

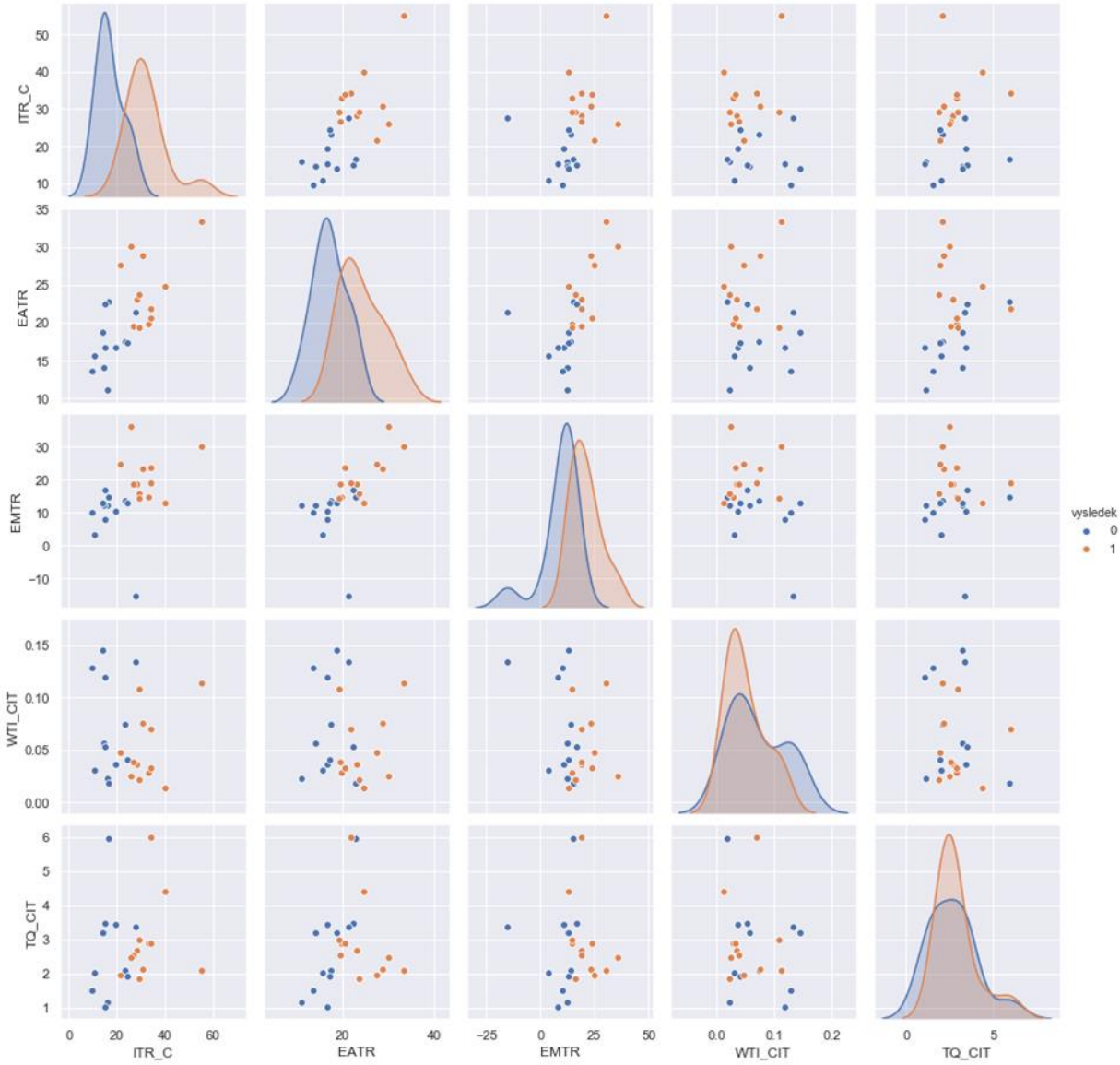
Table 2 Assignment of countries to identified clusters

AUT	BEL	DNK	FIN	FRA	DEU	GRC	ITA	NOR	ESP	SWE	GBR
1	1	1	1	1	1	1	1	1	1	1	1
CZE	**EST**	**HUN**	**IRL**	**LVA**	**LTU**	**LUX**	**NDL**	**POL**	**PRT**	**SVK**	**SVN**
0	0	0	0	0	0	0	0	0	0	0	0

Source: own

From the matrix in Figure 3, it is also possible to trace outliers that could indicate the existence of third separate clusters, which, however, was not confirmed by the Hopkins test.

Figure 3 How different is the corporate tax in the EU?



Source: own

IV. Conclusion

The aim of the paper was to evaluate the degree of tax burden on corporations in the Czech Republic in the context of the European area of developed countries on the basis of various approximations of corporate taxation. To achieve the goal, the method of comparing taxation according to various approximations was used. In this context, it was found that, based on the micro-forward looking method, the level of the tax burden is relatively low, which means a relatively favourable environment for investment. Similar conclusions can be found in the case of implicit tax rates determined according to the macro-backward looking method, which are commonly used to reveal the level of taxation at the international level. The results also showed that the methods based on the use of a tax quota are not appropriate. Here, on the other hand, the position of corporate taxation in the Czech Republic appears to be higher. Similar conclusions were also confirmed in other countries in the surveyed sample. The question, then, is whether there is room for change in corporate taxation. From the resulting initial analysis, it could be said that yes. But it is necessary to examine this issue in a broader context. It is certainly necessary to keep in mind the fact that within the Czech Republic, the biggest cost for the corporate sector is the taxation of labour, respectively. contributions to the state employment

policy paid by the employer. It is also necessary to keep in mind the fact that corporations are shifting the tax burden. However, this shift is difficult to quantify.

Furthermore, the position of corporate taxation in the European area was revealed in the work of cluster analysis. Cluster analysis confirmed two apparent clusters, but their confirmation based on the Hopkins index is not clear. However, there are significant differences between the countries of Western and Eastern Europe, which corresponds to the policy of Eastern countries and the stimulation of foreign investment. The change in the tax burden on corporations should also depend on the change in the tax system of neighbouring states. These steps should therefore be implemented in a broader context with the likely consequences of stimulating economic growth. In the future, therefore, it will be a difficult task, on the one hand it will be necessary to deal with the growing public budget deficit and on the other hand the need to stimulate the economic environment. Although European states found themselves in such a situation already in 2008 during the global economic crisis, now the situation is different, as the number of other necessary "lock downs" cannot be expected. According to current approaches to behavioural economics, it is also appropriate to keep in mind the fact that according to the validity of Prospectus theory, loss is perceived worse than the additional return. Individual government steps should also be implemented in the sense of knowledge of behavioural economics, as effectively as possible.

This article is part of a larger study dealing with corporate taxation and its contribution is mainly in the sense of the initial definition of the position of the Czech Republic in the context of corporate taxation and other ideas of research direction.

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