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Does political orientation affect economic indicators in the Czech Republic?

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Abstract

The article evaluates the relationship between the tax burden on labor and magic quadrangle indicators in the Czech Republic in the years 1993 through 2020. The article examines whether indicators such as the effective rate or tax rate on labor affect the macro-economic indicators of the magic quadrangle. The originality of this study lies in the fact that it deals with the influence of political factors. The analysis shows the strongest correlation between the growth of gross domestic product and the implicit tax rate on labor. Moreover, the study finds that the factor with the most significant – and surprising – bearing on the findings is that fact that right-wing Parliament behaved like left-wing parties. The conclusions reached by this study further underline the significance of the tax burden on labor on the selected magic quadrangle indicators.

Subject classification codes: C01; E62; H24

Keywords: Personal income tax; Effective tax rate; Magical quadrangle; Implicit tax rate on labor; Political orientation

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1. Introduction

A country's economic policy is determined by the government. This affects the level of inflation, the unemployment rate, gross domestic product and the share of the current account balance on gross domestic product. These indicators make up the so-called 'magic quadrangle'. The country's political direction influences not only these indicators but also the tax burden, which is most often expressed as the personal income tax rate. According to OECD methodology the tax rate includes all payments to the state – not only personal income tax, but also health insurance and social security contributions. To enable standardized international comparison this OECD-defined tax rate is calculated from the average income of unmarried childless taxpayers (OECD, 2021). The overall personal tax rate – the implicit tax rate – describes the proportion of payroll expenditure on personal income tax and social security contributions. The overall tax burden is defined as the rate of personal income tax and mandatory social security contributions. Tax and social levies increase employer costs (Bingley & Lanot, 2002). As these levies increase, the competitiveness of the domestic labor market decreases (Nielsen & Smyth, 2008).

High labor taxation may affect macroeconomic indicators such as the unemployment rate or economic growth rate. As stated by Surugiu et al. (2012), high marginal taxes reduce output; the substitution effect results in the taxpayer prioritizing their leisure time at the expense of working time which has an impact on the unemployment rate. At high levels of unemployment, one cannot expect economic output to be high, which negatively affects gross domestic product and therefore economic growth. Low domestic output affects imports thus influencing the current account of the balance of payments. The inflation rate, whose relationship with unemployment is shown by the Philips curve (Nedomlelová, 2008) also gains significance.

Therefore, all macroeconomic indicators (inflation, unemployment, economic growth rate and the ratio of the current account balance to gross domestic product) can be affected by the overall personal tax burden. At the same time, it follows (from the 'magic' in the magic quadrangle) that meeting one objective often results in failure to achieve other objectives.

These indicators can thus be influenced by the country's political orientation. Is this the case in the Czech Republic? Is it true that governments implement economic policy according to their political leanings, or are their situations where a right-wing government can be characterized by left-oriented economic policy and vice versa?

The main aim of this article is to evaluate the relationship between political orientation and the above-mentioned economic indicators (the effective tax rate, implicit tax rate on labor, and magic quadrangle indicators) in the Czech Republic in the years 1993 through 2020.

Comprehensive study evaluating the interrelationship between personal income tax rates, magic quadrangle indicators and political orientation has not been carried out in the Czech Republic, therein lies the value of this paper. Selected studies, for example, Bokrošová (2005) and Kuric (2015), only evaluated the economy based on the relationship between the macroeconomic indicators of the quadrangle.

This article specifically deals with the Czech Republic, where fiscal policy is often implemented inconsistently: the differing agendas of successive ruling parties lead to frequent changes to the tax code concerning income tax rates, personal allowances and tax relief, with implications for the taxpayer's net wage. Payroll costs, including income tax, have an impact on the employer's total costs and the entire production process (Bingley & Lanot, 2002). Tax rates thus have an effect on economic growth, unemployment, inflation, and foreign trade.

The paper is structured as follows: the introduction is followed by an outline of the theoretical background (Section 2) with focus on personal income tax. Section 3 includes the data we used for the analysis. Section 4 presents the research methodology. The main part of the article is Section 5 where we present the results of our analysis. The last section of the paper summarizes the results of our research topic.

2. Theoretical background

In the field of economic policy, the direction and thus the program of left- and right-wing political parties often differ greatly from one another. The Czech Republic was established in 1993 after the division of the Czechoslovak Republic. ODS, a right-wing party, was the first to come to power following democratic elections in this new state. In his analysis, Šimoník (1996) found that in the first years of the independent Czech Republic there was a slight shift in voter preference away from right-wing politics, mainly due to centrist voters moving to the left, which was the reason why a left-wing party won the next election. Overall however, the centre-right prevails in Central and Western European politics.

According to a study by Choma et al. (2010), left-wing parties do not always have to pursue purely left-wing politics and right-wing parties do not necessarily follow a purely right-wing agenda. On the contrary, there are two dimensions: social left-right and economic left-right. Political orientation in Central European countries is partially changing, as evidenced by certain steps in economic policy as shown in the studies of Hlousek and Kaniok (2021), and Hooghe et al. (2002), for example.

The state's fiscal policy aims to ensure economic growth, full employment, price stability and external economic balance by influencing aggregate supply and aggregate demand. According to Buettnerr and Krause (2021), fiscal policy instruments include a progressive income tax.

The general principles of personal income tax are stated by du Prezz and Stiglingh (2018), among others. The main goal of progressive personal income tax is to ensure the redistribution of income in the economy. The level of government revenue and expenditure impacts aggregate demand and supply which affects economic growth, employment, price stability and external economic balance. The amount of government revenue is also affected by the extent of the tax gap. (For more about the definition and methodology concerning the tax gap and its determination see, for example, Moravec et al., 2018). Personal income tax can be defined as progressive in most countries (Sanz-Sanz, 2020). Tax progressivity ensures an automatic countercyclical effect: in a period of economic growth, income and tax increases, but because of the progressiveness the tax growth is higher than the growth of income; in a period of recession the opposite is true: the tax burden decreases faster than incomes do (Chen, 2019; Oddou, 2020).

The effects of political orientation on tax policy, economic growth and employment have not been discussed in specialist studies. In the cited studies, only individual magic quadrangle indicators were examined. The fact that this topic has not been discussed in the context of the Czech Republic, and only minimally regarding other countries, contributes to the uniqueness of the research included in this article.

The relationship between the tax burden and economic growth in 35 countries of the Organization for Economic Cooperation and Development (OECD) was the subject of a study by Andrasic et al. (2018). It determined that if tax revenues increase by 1%, gross domestic product increases by 0.29%. Similar positive correlation between these variables is confirmed by Nguyen (2019), and Bleaney et al. (2001). A combination of appropriate fiscal policy tools can therefore affect economic growth (Surugiu et al., 2012). Labor taxation in relation to

economic growth does not always positively correlate, especially between median- and high-income households, as mentioned by Biswas and Chakraborty (2017). If labor taxation is high, a further increase in the tax burden can, on the contrary, reduce the degree of economic growth. Kotlán and Machová (2013), and Izák (2011) found that taxation has a negative impact on economic growth.

An increase in unemployment and thus the slowdown of economic growth are the consequences of the excessively rapid growth of labor costs. The reason for the increase in labor costs in the European Union in particular are higher labor taxes. An increase in the tax rate on labor by 14% would result in an increase in unemployment by 4% and the reduction of economic growth by 0.4% per year in EU countries (Daveri & Tabellini, 2000). The growth of labor costs led companies to replace labor with capital, which in turn slows down an economic growth.

Tax policy can be an effective instrument for reducing unemployment and increasing economic growth (Michaelis & Birk, 2006), while Bohringer et al. (2005) states that taxation as a tool for reducing unemployment does not have a significant effect. In the long term, an increase in the tax rate leads to a rise in the natural rate of unemployment (Neverauskiene Okuneviciute et al., 2017).

The increase in prices puts increased pressure on employees to increase wages. If the tax rate is progressive, there is an increase in the tax burden. Unless the range of particular bands of personal income tax base area are adjusted according to prices, the taxpayer's higher income is subject to a higher tax rate. Therefore, it is possible that, despite the growth of gross wages, the real net wage is lower after taxation (Nam & Zeiner, 2016). The tax burden therefore becomes more progressive (Gerber et al., 2020). For more about tax progressivity and the method of measuring see, for example, Wisniewska-Kuzma (2020), and Kristjansson and Lambert (2015).

3. Data used for the analysis

For the purposes of analysing the relationship between tax burden and magical quadrangle indicators and political orientation in the Czech Republic (see Table 1) the following data has been gathered:

- the unemployment rate (UNEM), inflation rate (INFL), gross domestic product growth (GDP) and the ratio of the current account balance of payments to gross domestic product (CA/GDP) have been sourced from the Czech Statistical Office (Czech Statistical Office, 2020),
- the effective tax rate (ETR) determined in general terms (1),
- the implicit tax rate on labor (ITR_L) determined in general terms (2),
- data on political orientation and election results were obtained from the portal Volby operated by the Czech Statistical Office (Volby, 2022).

In the Czech Republic the employer's payroll costs consist of gross wages and social security contributions. Average gross wages in the analysed period are obtained from the database of the Czech Statistical Office (Czech Statistical Office, 2020). Social security contributions are calculated in accordance with the legislation governing this insurance. The overall personal tax rate is defined as the rate of personal income tax and social security contributions as a percentage of gross wages.

Table 1
The political orientation in the Czech Republic.

Year	Orientation	Prime Minister	Predominance
1993	right	Václav Klaus (ODS)	0.25
1994	right	Václav Klaus (ODS)	0.25
1995	right	Václav Klaus (ODS)	0.25
1996	right	Václav Klaus (ODS)	0.08
1997	right	Václav Klaus (ODS)	0.08
1998	left	Josef Tošovský (non-party)	-0.08
1999	left	Miloš Zeman (ČSSD)	-0.08
2000	left	Miloš Zeman (ČSSD)	-0.08
2001	left	Miloš Zeman (ČSSD)	-0.08
2002	left	Vladimír Špidla (ČSSD)	-0.23
2003	left	Vladimír Špidla (ČSSD)	-0.23
2004	left	Stanislav Gross (ČSSD)	-0.23
2005	left	Jiří Paroubek (ČSSD)	-0.23
2006	left	Mirek Topolánek (ODS)	-0.09
2007	left	Mirek Topolánek (ODS)	-0.09
2008	left	Mirek Topolánek (ODS)	-0.09
2009	left	Jan Fischer (non-party)	-0.09
2010	right	Petr Nečas (ODS)	0.06
2011	right	Petr Nečas (ODS)	0.06
2012	right	Petr Nečas (ODS)	0.06
2013	left	Jiří Rusnok (non-party)	-0.14
2014	left	Bohuslav Sobotka (ČSSD)	-0.14
2015	left	Bohuslav Sobotka (ČSSD)	-0.14
2016	left	Bohuslav Sobotka (ČSSD)	-0.14
2017	center	Andrej Babiš (ANO)	0.12
2018	center	Andrej Babiš (ANO)	0.12
2019	center	Andrej Babiš (ANO)	0.12
2020	center	Andrej Babiš (ANO)	0.12

Source: own calculations.

4. Research methodology

In order to analyse the data mentioned in the previous chapter, we specify the methodology used to conduct the analysis. Firstly, we define in general the method of calculating the personal tax rate. Subsequently, we formalize methods for assessing the relationship between selected indicators of the magic quadrangle, formalized tax burden indicators and political orientation.

4.1. Tax burden on labor indicators

The effective tax rate ETR is calculated according to the formula (1),

$$\mathrm{ETR} = \frac{\mathrm{IT}}{\mathrm{Y}} 100\% \tag{1}$$

where IT is personal income tax, and Y is total gross salary.

The implicit tax rate on labor $\mathrm{ITR_L}$ is determined according to the formula (2),

$$ITR_L = \frac{LT}{LC} 100\% \tag{2}$$

where *LT* represents labor taxes, and *LC* labor costs (Friedrich et al., 2012).

4.2. Methods

Correlation analysis was used to evaluate the dependence of quantitative variables. The Pearson correlation coefficient *r* is a measure of the strength of a linear association between two variables, for example *X* and *Y*. It is calculated using the formula (3),

$$r = \frac{S_{XY}}{S_X S_Y} \tag{3}$$

where s_{XY} is covariance between *X* and *Y*, s_X is standard deviation of *X*, and s_Y is standard deviation of *Y*.

The formula returns a value between − 1 and 1, where $r = 1$ indicates a maximal (linear) positive relationship, and $r = -1$ indicates a maximal negative relationship. A result of $r = 0$ indicates no relationship at all. If the absolute value of *r* is higher than 0,5, the association between *X* and *Y* is considered strong (Field, 2013).

The statistical significance of the correlation coefficient is determined by *t*-test. The test statistic (*t* value) is calculated as (4),

$$t = \frac{r}{\sqrt{1 - r^2}} \quad \sqrt{n - 2} \tag{4}$$

where *n* is the number of values of variables *X* and *Y*.

Statistics *t* has a Student's distribution with $df = n$ - 2 degrees of freedom (Pearson, 1931).

Linear discriminant analysis is a method of multidimensional statistical classification. It is used to classify a statistical unit into one of the groups based on the values of several quantitative variables based on the similarity of their values (Klecka et al., 1980). A test statistic called Wilks's lambda is used to evaluate the differences in the values of the variables in the individual classes. It is calculated as (5),

$$\mathrm{A} = \frac{\det \mathbf{W}}{\det(\mathbf{W} + \mathbf{B})} \tag{5}$$

where *W* is the matrix of variability within classes and *B* is the matrix of variability between classes.

The value of Wilks's lambda is in the range 0–1, where $\Lambda = 0$ represents absolute discrimination of objects and $\Lambda = 1$ means that the objects cannot be distinguished based on the observed variables.

The output of discrimination analysis can be expressed using discrimination functions and scores, which allows the probability that a given statistical unit belongs to a given class to be expressed. Thus, for each unit, the sum of the probabilities is equal to 1 (Everitt & Dunn, 2001).

The graphical representation of the results of discrimination analysis are biplots called (canonical) discriminant charts (Lipkovich & Smith, 2002). In these graphs, the individual units are displayed in two-dimensional space, with the distance between the units representing their similarity. Units belonging to the same group form clusters in the graph.

In the discrimination chart, boundaries between individual groups represented by lines and half-lines can be created. Each group is then represented by a given polygonal area. Such graphs are also called territorial maps.

4.3. Political data

To determine political orientation in the Czech Republic, members of the Chamber of Deputies of the Parliament of the Czech Republic were monitored according to the political parties and movements they belonged to and subsequently classified as left, center, or right.

Two variables were created for statistical analysis. The first variable was a nominal variable with values of left, center and right that determined the prevailing political orientation in Parliament (modal value).

The second variable P is a quantitative variable that expresses the predominance of the left or right political wing in the Chamber. The value of this variable is calculated as (6),

$$P = \frac{-L + R}{N} \tag{6}$$

where P is predominance, L is number of left-oriented deputies, R is number of right-oriented deputies and N is the number of members of the Chamber.

The value of P ranges from -1 (100% predominance of the left wing) to $+1$ (100% predominance of the right wing). It is a weighted average where left-wing members of the Parliament have a value of -1, center 0 and right-wing $+1$.

The values of both variables for the period 1993–2020, supplemented by the names and political parties of the Prime Ministers, are given in Table 1. Predominance was calculated according to (6).

Since the members of the Chamber of Deputies are elected (with a few exceptions) based on proportional representation, there is concordance between parliamentary predominance and the political orientation of the Prime Minister (head of government). In other words, there is consistency between the executive and the legislature. The exceptions are the period 2006–2008, when, although the Chamber of Deputies was predominantly left oriented, the right-wing government of Mirek Topolánek was in power, but for most of its term without confidence; and the period 2016–2020, when Andrej Babiš's central-oriented government operated in a predominantly right-wing Parliament.

5. Results and discussion

In table 2, the selected characteristics of the analysed variables are listed first. For each variable, the minimum and maximum value, the mean value, median, and standard deviation is stated.

5.1. Research results

The influence of political orientation in the Czech Republic on macroeconomic indicators of the magic quadrangle (UNEM, GDP, INFL, and CA/GDP) and selected tax rates (ETR and ITR_L), was evaluated by correlating these indicators with political predominance in the Chamber of Deputies. The results are shown in Table 3.

The tax progressivity indicators (ETR and ITR_L) are not significantly dependent on the prevailing political orientation in the Chamber of Deputies. Of the magic quadrangle indicators, a statistically significant and strong dependence was found between the unemployment rate (UNEM) and inflation (INFL).

Table 2
Descriptive statistics of indicators for analysis.

Variable	Minimum	Maximum	Mean	Median	Std. deviation
Y_1 - ETR	8.64	14.00	11.04	11.08	1.38
Y_2 - ITR_L	41.96	43.95	42.83	42.75	0.52
X_1 - UNEM	2.00	8.80	5.87	6.50	1.99
X_2 - GDP	-4.80	6.85	2.65	2.68	2.60
X_3 - INFL	0.10	20.80	4.25	2.50	4.56
X_4 - CA/GDP	-6.15	1.56	-2.25	-2.11	2.25

Source: own calculations.

As the correlation coefficients show, in periods when the right wing in Parliament is stronger, unemployment in the Czech Republic is lower and inflation is higher; in years when the political left has a stronger influence, higher unemployment and lower inflation are more likely.

These seemingly surprising results can have two causes. Firstly, macroeconomic indicators tend to have higher inertia, reacting to changes with a delay (sometimes several years). It is therefore not uncommon for governments to be criticized for negative outcomes whose roots need to be traced back to their predecessors.

Secondly, the political scene in the Czech Republic (and historically in the Czech lands) tends to be more left-oriented. This means that even parties that present themselves as right-wing are rather more center-right and have many left-wing elements in their manifestos. The exception is the ODS party led by Václav Klaus in the 1990 s, which strongly espoused Reaganomics and Thatcherism. At present, such 'far right' parties (as labeled by political scientists and journalists) are in the minority and outside the political mainstream.

In addition, the political movement ANO (originally ANO 2011) has a specific character in the Czech political scene. It was founded by businessman and multimillionaire Andrej Babiš as a centrist, catch-all protest movement in opposition to the established left and right parties. ANO's agenda features elements of both left- and right-wing politics so the movement has been willing to cooperate with other parties regardless of their political orientation. It participated in government from 2013 to 2021. In 2017 it won the election and Babiš became Prime Minister.

Linear discriminant analysis was used to verify the stability of the perception of the political left and right in the Czech Republic. The previously-mentioned magic quadrangle indicators were again used as inputs and the state policy in the Czech Republic was evaluated as left-wing, central, or right-wing for each year of the period from 1993 to 2020.

Wilks's lambda reached a value of 0.238 (p-value < 0.001), indicating that the resulting discrimination of units into three groups called left, center and right is significant.

Table 3
Correlation between economic indicators and political predominance.

Indicator	Correlation	p-value
UNEM	-0.643	< 0.001
GDP	-0.153	0.436
INFL	0.597	< 0.001
CA/GDP	0.307	0.112
ETR	-0.124	0.538
ITR_L	-0.042	0.836

Source: own calculations.

The results of the discriminant analysis are shown in Table 4.

It turns out that in most years the government's economic policy, as expressed by macroeconomic indicators (last column in Table 4), coincides with the prevailing political orientation of the Chamber (column 2). Over the entire 1993–2020 study period there are only two periods when there is significant deviation from this trend.

The first of these is 2007–2008 when the right-wing government of Mirek Topolánek ruled without confidence, despite a left-wing majority in Parliament. As the discriminatory analysis shows, this period nevertheless displays the characteristics of a right-wing government. This government introduced the flat tax in the Czech Republic. Paulus and Peichl (2009) have pointed out the success of flat tax implementation in Eastern Europe, and Magnani and Piccoli (2020) document the positive effects of income tax reform in France stemming from a shift from progressive taxation and existing benefits to universal basic income scheme with a flat tax. On the other hand, the results of a study made in Russia by Duncan (2014) show that in developing economies, where tax evasion is widespread, this kind of reform is failing.

Secondly, in the years 2010–2012, the right-wing government of Prime Minister Petr Nečas had the support of Parliament, in which there was a slight right-wing dominance. Nevertheless,

Table 4
The discriminant analysis results.

Year	Orientation	Probability			Result
		Left	Center	Right	
1993	right	0.07	0.00	0.93	right
1994	right	0.11	0.00	0.89	right
1995	right	0.09	0.00	0.91	right
1996	right	0.10	0.00	0.90	right
1997	right	0.18	0.00	0.82	right
1998	left	0.45	0.00	0.55	right
1999	left	0.82	0.00	0.18	left
2000	left	0.84	0.00	0.16	left
2001	left	0.77	0.00	0.23	left
2002	left	0.71	0.00	0.29	left
2003	left	0.82	0.00	0.18	left
2004	left	0.90	0.00	0.10	left
2005	left	0.89	0.00	0.11	left
2006	left	0.60	0.00	0.40	left
2007	left	0.33	0.00	0.67	right
2008	left	0.26	0.02	0.72	right
2009	left	0.71	0.00	0.29	left
2010	right	0.81	0.00	0.18	left
2011	right	0.80	0.00	0.20	left
2012	right	0.82	0.00	0.18	left
2013	left	0.82	0.00	0.18	left
2014	left	0.71	0.01	0.28	left
2015	left	0.44	0.23	0.33	left
2016	left	0.09	0.77	0.14	center
2017	center	0.00	0.99	0.01	center
2018	center	0.00	1,00	0.00	center
2019	center	0.00	1,00	0.00	center
2020	center	0.00	1,00	0.00	center

Source: own calculations.

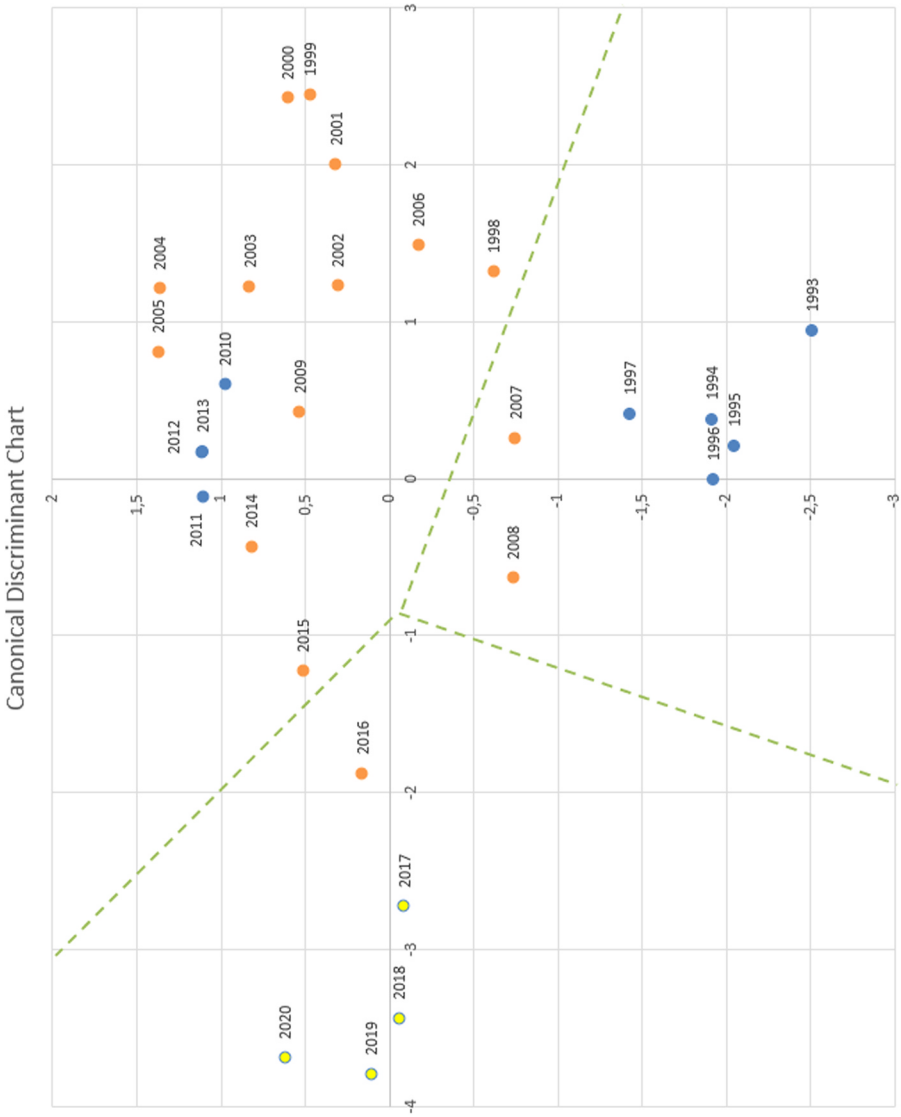

Fig. 1. Canonical Discriminant Chart.

indicators show that the government's behavior was rather left-wing. It is a period when, after Václav Klaus left the Civic Democratic Party (ODS) in 2008, the character of this initially strongly right-wing conservative party became more center-right and liberal.

This fact is also illustrated by the graph in Fig. 1, which expresses the result of the discriminant analysis. The dashed lines divide the area into three territories, which represent the areas of left (top), left (bottom right) and center (left) policies. The colors of the individual points in the graph show the predominant political orientation in Parliament.

6. Conclusions

This article evaluated the dependency between the effective, or implicit tax rate (as dependent variables), magical quadrangle indicators (as independent variables), and political orientation in the Czech Republic between the years 1993 through 2020. For the purposes of standardized international comparison, the overall personal tax rate is calculated from the average income of unmarried childless taxpayers.

Statistical analysis demonstrated correlation between the effective or implicit tax rate and at least 1 magical quadrangle indicator. Our analysis found that the highest degree of dependence is between economic growth and ITR_L. No significant correlation could be confirmed between the ETR alone and economic growth indicators, which is contrary to the findings of Piketty et al. (2014). Similarly, we found that the personal tax rate as represented by ETR does not correspond to the economic cycle. In other words, it does not increase in a period of growth, nor does it decrease during a recession. ETR increases when the inflation rate is lower and decreases when inflation is higher. Neither could we prove that unemployment has an influence on the personal income tax rate represented by ETR, unlike for example, Hutton and Ruocco (1999).

Analysis of political orientation found out that Czech government economic policy is in accordance with the political orientation of the Chamber. This conclusion was not valid in the 2007–2008 and 2010–2012 periods when the right-wind Parliament behaved like the left wing or vice versa. On the other hand, tax indicators like ETR or ITR_L are not significantly dependent on political orientation.

The analysis confirms that the Czech Republic's unstable economic environment is due to frequent legislative changes implemented by successive ruling political parties with differing agendas and social attitudes. This low stability is apparent not only in fiscal policy but in the country's economic policy.

One apparent limitation of this study may be the fact that the ETR and ITR_L were only calculated with basic tax deductions applied. However, as previously mentioned, this method is used for international comparison of the tax burden in accordance with OECD methodology, therefore we do not consider this to be a major limitation of the study. Additionally, despite the apparent connection between magical quadrangle and labor tax burden indicators, it is necessary to take into account the Czech-specific nature of the study; a similar study of another EU or OECD country could serve as a basis for comparison. A topic for further research may be the super-gross wage, which was abolished in the Czech Republic on 1 January 2021 thus reducing the overall payroll tax rate.

In our opinion, the main issue is the temporal disconnect between tax legislation and economic policy – not only regarding personal income tax rates being in accordance (or otherwise) with macro-economic indicators. While income tax legislation is implemented even before the effective tax period, macroeconomic performance indicators are available only retrospectively. Therefore, in terms of practical economic policy, it is necessary to take into account a certain

time delay between fiscal policy implementation and its effect on macroeconomic indicators. This time lag can diminish or even negatively impact the effect of economic policy instruments.

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