

Original Paper

<https://doi.org/10.15826/jtr.2022.8.1.106>



Quo Vadis Tax and Levy Burden of Wages in the Czech Republic? Tax Reform in 2022

M. Krajňák^{1,2}

¹ VŠB-Technical University of Ostrava, Ostrava, Czech Republic

² Moravian Collegue Olomouc, Olomouc, Czech Republic

✉ michal.krajnak@mvsso.cz

ABSTRACT

The article deals with changes in personal income taxation in the Czech Republic in 2022 and their impact on the tax burden. The article also deals with the levy burden represented by payments for social security contributions. An extensive tax reform changing the method of taxation of income from dependent activities took place in the Czech Republic in 2021. Its continuing effects was added with impact of legislation changes after 1 January 2022. The most significant change is the increase in the taxpayer's relief by CZK 3,000. The assessment of how these changes affect the tax burden was made by calculating the effective tax rates. The research methodology includes methods of regression and correlation analysis and methods for time-series analysing. The average wages used by the Czech Social Security Administration for the purposes of calculating social security contributions were used for the analysis. The results show that the tax burden has decreased since 2022 if basic taxpayer relief is applied. For the taxpayer, who, in addition to the taxpayer's relief, also claims a tax credit for children, the tax burden increases slightly. Although in most cases, the income is subject to the nominal linear tax rate, in comparison with the previous year, there is an increase in the progressivity of the personal income tax due to the rise of the tax relief per taxpayer. On the other hand, social security contributions are both nominally and real linear. There are no significant reforms in this area in comparison with the tax burden. Due to the decrease in the tax burden, in some cases, the levy burden of social security contributions is higher, even though their nominal rate is lower than the nominal income tax rate.

KEY WORDS

Czech Republic, effective tax rate, personal income tax, social security contribution, tax burden, tax reform, tax credit, tax relief for taxpayer

JEL C10, H24, K34

УДК 336.226.1

Налоговая реформа 2022 и бремя налогов и платежей с заработной платы в Чешской Республике

M. Крайнак^{1,2}

¹ Остравский технический университет (VŠB), г. Острава, Чешская Республика

² Моравский колледж Оломоуц, г. Оломоуц, Чешская Республика

✉ michal.krajnak@mvsso.cz

АННОТАЦИЯ

В статье рассматриваются изменения в налогообложении доходов физических лиц в Чешской Республике в 2022 г. и их влияние на налоговую нагрузку. Также рассматривается налоговое бремя по взносам на социальное страхование. Обширная налоговая реформа, меняющая метод налогообложения доходов от зависимой деятельности, была проведена в Чехии в 2021 г. Реформа 2021 г. до-

полнена изменениями, вступившими в силу с 1 января 2022 г., наиболее значительным из которых является увеличение вычета для налогоплательщика на 3000 чешских крон. Оценка влияния этих изменений на налоговую нагрузку проведена путем расчета эффективных налоговых ставок. Методология исследования включает методы регрессионного и корреляционного анализа, методы анализа временных рядов. В анализе использованы данные о средней заработной плате, применяемые Управлением социального обеспечения Чехии для расчета взносов на социальное обеспечение. Результаты показывают, что в 2022 г. при применении для налогоплательщика базового налогового вычета, налоговая нагрузка снижается. Для налогоплательщика, который в дополнение к вычету имеет право на налоговый кредит на детей, налоговое бремя незначительно увеличивается. Хотя в большинстве случаев доход облагается номинальной линейной ставкой налога, по сравнению с предыдущим годом наблюдается увеличение прогрессивности налога на доходы физических лиц за счет увеличения налогового вычета на одного налогоплательщика. С другой стороны, отчисления на социальное обеспечение являются как номинально, так и реально линейными. Существенных реформ в этой сфере по сравнению с налоговой нагрузкой нет. В связи со снижением налогового бремени в некоторых случаях бремя отчислений на социальное обеспечение выше, хотя их номинальная ставка ниже номинальной ставки налога на доходы.

КЛЮЧЕВЫЕ СЛОВА

Чехия, эффективная налоговая ставка, налоговое бремя, подоходный налог с физических лиц, взносы на социальное страхование, налоговая реформа, налоговый кредит, налоговый вычет

1. Introduction

The Czech Republic is one of the countries of Central Europe. Since the establishment of the Czech Republic, personal income tax has been regulated by the Income Tax Act. Three major tax reforms can be identified in the context of personal income tax reforms. Firstly, the tax reform in 1993, when a new tax system was created together with the establishment of the Czech Republic. Another important historical milestone was 2008 when a nominal linear rate replaced the nominal progressive tax rate. In addition, tax reliefs have increased, and the method of tax base construction for dependent activity has changed. The third major tax reform of the personal income tax occurred in 2021. From this year, the nominal tax rate is again progressive, at the same time the method of construction of the tax base from dependent activity has changed. The partial tax base from dependent activity has been the most significant share of partial tax bases in the total tax revenue of personal income tax.

Since 2022, there has been another change in personal income taxation. Thus, the trend has continued since 2021, which

has changed the way the tax base is constructed from the dependent activity and implemented a nominal progressive tax rate. This time, the relief per taxpayer is increased from CZK 27,840 to CZK 30,840, i.e. an increase of the CZK 3,000 for the tax period. It should be noted that last year the amount also increased from CZK 24,840 to CZK 27,840, i.e. by the same amount as between 2021 and 2022. The aim of this article is to evaluate how this ongoing reform of the personal income tax affects the tax and levy burden and changes the personal income tax progressivity. The evaluation of the development of the tax burden will be performed for taxpayers receiving below-average income (0.5 times the average wage), average income (corresponding to the value of the average wage), above-average income, which is subject to the nominal linear rate (2.0 times the average wage). Another aim of the article is to evaluate whether a maximum assessment base for social security contributions ensures that the tax burden of natural persons on taxpayers who exceed this limit with their income is degressive.

Not only income tax is a factor influencing an employee's net salary, and an

other amount that affects this is the levy burden represented by social security contributions. The nominal rate of social security contribution is linear. From the employee's point of view, the total amount is in the Czech Republic set at 11% of the assessment base. By the OECD methodology social security contributions are considered tax payments [1].

According to the aim of the article, the following hypotheses are formulated, the validity of which will be confirmed or refuted:

H1: The tax and levy burden from dependent activity decreases due to the increase of the tax relief.

H2: The taxpayer relief is one of the standard deductions that has increased significantly since 2008.

H3: The increase in the taxpayer's relief affects the progressivity of the personal income tax, even though the nominal tax rate did not change in comparison with 2021.

H4: Suppose the income is subject to a nominal tax rate that is progressive. In that case, the degree of progressivity of the tax liability will be higher than if the income is subject only to the nominal linear tax rate.

The article has the following structure: the hypotheses and goals of the paper are formulated in the introduction. The next part deals with an overview of research studies focused on personal income tax reforms. The following part contains the characteristics of the methodology used. The main part of the text is the fourth part, which is the application part of the article. The final part focuses on summarizing the main findings of this research study.

2. Literature review

Tax reforms change the elements of taxes, such as tax rates, methods of determining the tax base or tax reliefs. Changing these parameters affects the tax burden. According to J. Alm et al. [2] or M. Feldstein [3] many aspects need to be considered in tax reforms, such as the business cycle or unemployment. Other factors include the maturity and openness of the economy or the standard of

living [4; 5]. When planning changes in tax laws, it is essential to consider the aim of the reform [6; 7] – such as raising living standards, reducing the tax burden on a selected group of people, supporting and stimulating citizens to behave or develop international trade. However, these goals are not always successfully met, as mentioned, for example, by V. Fedosov et al. [8], who analysed the effects of tax reforms in Ukraine.

E. Ilzetzki [9] mentions that the most frequently changing aspects of taxes include the tax rate or the method of determining the tax base. According to the results of this study, it is more acceptable to carry out a more significant tax reform of the selected tax once in a more extended period than to make annual partial changes.

R. Frish et al. [10] examined the effects of income tax reform in the context of the wage tax burden in 2003–2009. The study results confirm that the tax burden has decreased in these years. The tax burden was examined using a marginal tax rate, which in some cases decreased by as much as 17 percentage points.

I. Mayburov and A. Kireenko [11] analysed tax reforms in Russia. Their research was divided into several periods. In the last analysed period from 2001 to the present, there has also been a decrease in the tax burden on labour.

The results of other studies examining the effects of tax reforms on the tax burden also provide similar findings. J. Ye et al. [12] examined the effects of tax reform on the tax burden in China. The study results recommend reducing the tax burden, not only personal income tax.

E. Jerkovic [13] mentions that labour is one of the main factors ensuring the functioning of the economy, therefore it is necessary to reduce the tax burden. Croatia, where this study was conducted, is one of the countries of the European Union with a high tax burden on labour. It turns out that the tax burden has also been declining in recent years, but it is still above the average value of the European Union.

The results of the studies also show that tax progressivity is changing.

K. Milligan [14] analysed the development of Canada's tax burden and personal income tax reform. In 1988–2018, the degree of progressivity of taxpayers with above-average incomes increased.

S. Gordon [15] confirms the higher progressivity of above-average incomes. In summary, the results of the studies show that the trend in the world is to reduce the tax burden on wages. This brings growth in the individual's disposable income and stimulates the business environment [16; 17].

Although the trend is to reduce the tax burden on labour, the tax burden may increase temporarily. This is confirmed by the results of M. Karlin et al. [18] when in the case of a progressive tax rate and wage growth there is a shift to bands with a higher tax rate. It is therefore appropriate to valorise the values of deductions or margins of tax bands [19].

The reduction of the tax burden of personal income tax is in many cases offset by an increase in the tax burden on other taxes, especially indirect taxes, as stated by M. Hájek et al. [20] or K. Krzikallová and R. Střílková [21].

Progressivity is a typical feature of a personal income tax [22]. The very high degree of tax progressiveness affects the motivation to work, which is why, for example, in Slovakia or the Czech Republic, the progressive tax rate was replaced by a nominal linear tax rate in the past.

According to the studies of O. Nadirov et al. [23] or J. Janouskova and P. Kirschnerova [24] this nominal linear tax rate did not bring the expected economic effect. Not only tax rate is a factor influencing the degree of tax progressiveness. Deductions are also a factor influencing the progressiveness of the tax – for example, per taxpayer or child [25; 26].

Tax policy trends in advanced Western democracies are to increase the tax burden on consumption through indirect taxes, most often value-added tax. Income tax remains a progressive tax. Developing economies very often follow these trends [27]. Taxpayers try to optimize their tax liability as much as possible, thus paying as little tax as possible. Labour taxation in open econo-

mies tends to decrease to ensure economic growth and increase employment [28].

As already mentioned, it is essential to follow up not only the tax but also the levy burden of wages through social security contributions. Social security contributions make up around a fourth of total tax revenue in OECD countries and are considered a tax payment by the OECD tax classification methodology. M. Neumann [29] mentions that it is a long-term trend to set a maximum assessment base for these payments in some countries. This trend is also being implemented in the Czech Republic [30]. The level of social security contribution does not change significantly in the Czech Republic, as is the case in other countries, as confirmed by the results of studies [31; 32]. It should be noted that both wages and social security contributions are usually accounting and tax-deductible costs of companies [33].

3. Methods

Scientific methods such as description, comparison, analysis, and synthesis are assumed. As the nominal tax rate does not say much about the tax burden [34], the effective tax rate indicator will be used to assess the tax burden. The effective tax rate shows the taxpayer's real tax burden. The construction of the indicator of the effective rate of personal income tax is captured by (1),

$$ETR = \frac{T}{Y}, \quad (1)$$

where Y is the taxpayer's income and T is the tax liability. If social security contributions are also considered a tax payment, the indicator showing the effective tax burden is modified in the form (2),

$$ETR_{T+I} = \frac{T+I}{Y}, \quad (2)$$

where Y is the taxpayer's income and $T+I$ is the tax and levy liability.

The characteristics of the development of time series include the first absolute differences generally defined (3),

$$\Delta y_t = y_t - y_{t-1}, \quad (3)$$

where Δy_t is the absolute difference, y_t is the value of the indicator in the t -th pe-

riod, y_{t-1} the value of the indicator in the period $t-1$ [35].

The relative rate of decline or increase in the value of the tax deduction is expressed as a relative increase using the growth factor k_t defined (4),

$$k_t = \frac{y_t}{y_{t-1}}, \quad (4)$$

where y_t is the indicator's value in the t -th period, y_{t-1} is the indicator's value in the $t-1$ period.

To express the degree of dependence between the characters x and y , the Pearson correlation coefficient r defined according to equation (5) will be used,

$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}}, \quad (5)$$

where \bar{x} and \bar{y} are average value of x resp. y [36].

As follows from the formulated hypotheses, the relationship between the value of deductions and the effective tax rate will also be verified. Formally, this can be written in equation (6),

$$Y = b_0 + b_1 \cdot X_1, \quad (6)$$

where Y is the value of the deduction (taxpayer relief, or taxpayer relief and tax credit) and X_1 is the value of the effective tax rate.

The degree of progressivity of the personal income tax will be assessed by the indicator of the progressiveness of the tax obligatory PTO_T [37, 38]. This indicator is interval progressivity indicator and is generally determined by equation (7),

$$PTO_T = \frac{\frac{T_1 - T_0}{T_0}}{\frac{GW_1 - GW_0}{GW_0}}, \quad (7)$$

where GW_0 is the gross wage of the taxpayer in the lower income interval, GW_1 is the gross wage of the taxpayer in the upper income interval, T_0 is the tax liability in the lower income, T_1 is the tax liability in the higher income. The PTO_T indicator can also be slightly modified to form (8) if social security contributions are also considered a tax payment,

$$PTO_{T+I} = \frac{\frac{T + I_1 - T + I_0}{T + I_0}}{\frac{GW_1 - GW_0}{GW_0}}, \quad (8)$$

where GW_0 is the gross wage of the taxpayer in the lower income interval, GW_1 is the gross wage of the taxpayer in the upper income interval, $T + I_0$ is the tax and social security contributions liability in the lower income, $T + I_1$ is the tax and social security contributions liability in the higher income.

4. Results of analysis

The analysis of the tax burden will be presented in a total of 4 situations, which will differ in the scope of applied deductions. The two most frequently applied deductions will be used, i.e. per taxpayer and per child [39; 40] namely situations:

S_0 - deduction per taxpayer,

S_1 - deduction per taxpayer and one child,

S_2 - deduction per taxpayer with two children,

S_3 - deduction per taxpayer and three children.

These situations differ not only in the scope of applied deductions but also in the amount of income - income at the level of the average wage to calculate social security contributions (CZK 35,441 for 2021, CZK 38,911 for 2022¹), income below the level of the average wage (0.5 times, i.e. CZK 17,721 in 2021, CZK 19,456 in 2022) and above the level of the average wage (1.5 times, i.e. CZK 53,162 in 2021, resp. CZK 58,367 in 2022). The use of the average wage to calculate social security contributions is relevant and justified. This wage is also used as a threshold for bands in the case of a progressive tax rate in the Czech Republic.

A comparison of the values of effective tax rates ETR_T is shown in Fig. 1.

¹ Average Wage. Prague: Czech Administration of Social Insurance, 2021. Available at: <https://www.cssz.cz/zalohy-na-pojistne-na-duchodove-pojisteni>

The analysis results lead to the finding that the tax burden represented by the effective tax rate has decreased for taxpayers applying a basic relief for the taxpayer (situation S_0). This fact arises due to the increase of the basic tax relief for taxpayers by CZK 3,000. This finding is valid if the taxpayer receives an average wage, a below-average wage at the level of 0.5 times the average wage and an above-average wage at the level of a multiple of 1.5 times the average wage. However, the opposite is the situation of S_1 , S_2 and S_3 , when the real tax burden on these taxpayers increases slightly. This is because the Income Tax Act, as part of the ongoing reform, only increases the value of the taxpayer's relief, the nominal amount of the tax credit for children remains the same nominal value.

If social security contributions are also considered a tax payment, it captures the

values of ETR_{T+1} Fig. 2. The nominal rate of social security contribution is linearly 11% of gross wages. Here, the results confirm that the nominal and effective rates are the same, compared to the values in Fig. 1 these values are exactly 11% higher.

Therefore, the results confirm that hypothesis H1 is valid only if the basic taxpayer deduction is applied. In other cases, there is a slight increase in the tax burden.

The next part of the analysis focuses on verifying the validity of hypothesis H2 that the taxpayer tax relief is the deduction that has increased most significantly since the penultimate major reform of the personal income tax in 2008. The values of the tax relief for the taxpayer in 2008 and 2022 and the values of the tax credit for the first child, second child and third child are shown in Table 1. In the same table there are the absolute, resp. relative differences of deduction.

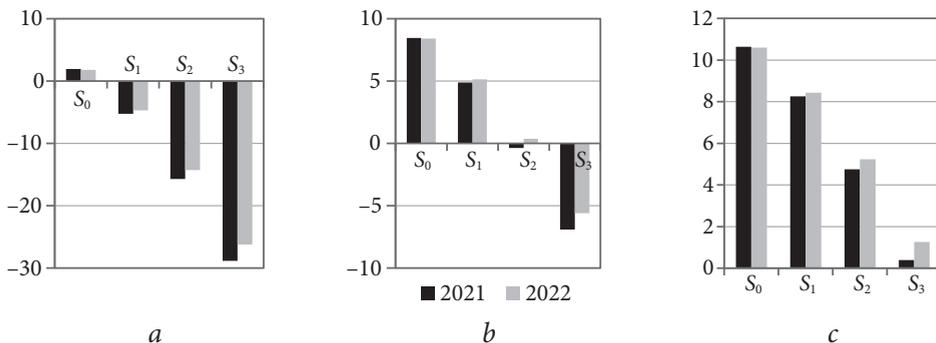


Figure 1. (a) Below average; (b) Average wage; (c) Above average

Source: own calculation

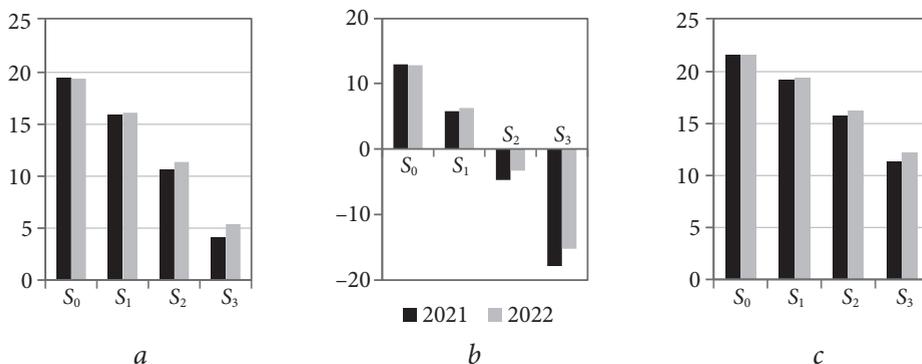


Figure 2. (a) Below average; (b) Average wage; (c) Above average

Source: own calculation

Absolute increases in Δy_i show that compared to 2008 and 2022, the taxpayer’s relief increased by a total of CZK 6,000 due to ongoing reforms amending the provisions of the Income Tax Act. In terms of the absolute amount, this is more than the increase in the tax credit for the one child, which increased by CZK 4,524 in total. However, if the growth coefficients k_i were calculated, the taxpayer’s relief increased to about 124% of the value of 2008, while the tax credit for the first children to about 142% of the value of 2008. It follows that the changes in the Income Tax Act were made in such a way as to reduce the tax burden on families with children. This conclusion is consistent with the results of studies [12; 15; 41]. This is confirmed by analysing the deduction for the second and third children too, where the absolute increase and the growth coefficient are much higher. The amounts of these deductions have more than doubled.

It is interesting to note that the basic tax relief increased in absolute terms more

than the percentage increase in the value of the tax credit per one child. Therefore, in the following section, these connections will be examined in more detail because of the taxpayer’s relief, resp. tax credits for children are amounts whose value has changed several times since 2008, for other tax reliefs (e.g. student relief, for the other spouse, for partial or full disability pension), these amounts have been unchanged since 2008.

The development of the effective tax rate values for taxpayers receiving income at the level of the average wage to calculate social security contributions is shown in Fig. 3. The values from 2008 to 2022 are presented in situations differing in the scope of applied deductions, namely:

- ETR0 – deduction per taxpayer,
- ETR1 – deduction per taxpayer and one child,
- ETR2 – deduction per taxpayer with two children,
- ETR3 – deduction per taxpayer and three children.

Table 1

Tax relief and tax credit

Year	Taxpayer relief	Tax credit – first child	Tax credit – second child	Tax credit – third child
2008	24,840 CZK	10,680 CZK	10,680 CZK	10,680 CZK
2022	30,840 CZK	15,204 CZK	22,320 CZK	27,840 CZK
Δy_i	6,000 CZK	4,524 CZK	11,640 CZK	17,160 CZK
k_i	1.241546	1.423596	2.089888	2.606742

Source: own calculation

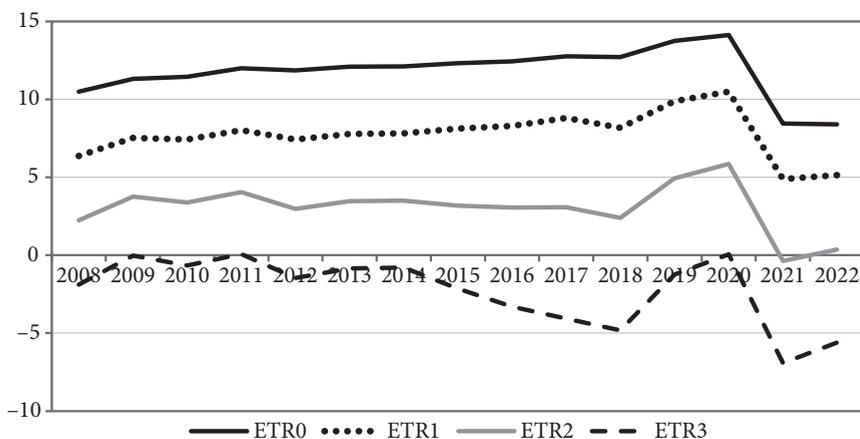


Figure 3. Development of ETR in the years 2008–2022

Source: own processing

In the comparison of 2008 and 2022, the tax burden decreases in all cases, while with the increasing number of applied deductions, the tax burden decreases more. If only the basic deduction per taxpayer is applied, the tax burden increased until 2020. The tax reform in 2021 significantly reduced this tax burden, there is also a slight decrease between 2021 and 2022.

In the case of applying the deduction to children, there is a different trend when the deduction is applied to one child and two children versus in the situation of using the deduction to three children. The reason is that the amount per child has been graduated since 2015 according to the number of children. As the number of children increases, the amount increases progressively, which is reflected in a different development trend since 2015. In contrast to ETR0, ETR1 to ETR3 have increased compared to the last two years analysed, i.e. 2021 and 2022.

To what extent is the development of ETR values, resp. the development of deductions for taxpayers and children is examined using correlation analysis, specifically Pearson's correlation coefficient r . The results are shown in the correlation matrix in Table 2 for deductions (for taxpayer – T and for children – first child 1CH, second child – 2CH, third child – 3CH) and in Table 3 (for effective tax rates – ETR).

Table 2

Correlation matrix for deductions

	T	1CH	2CH	3CH
T	1			
1CH	0.461	1		
2CH	0.613	0.900	1	
3CH	0.584	0.874	0.994	1

Source: own calculation

Table 3

Correlation matrix for ETR

	ETR0	ETR1	ETR2	ETR3
ETR0	1			
ETR1	0.978	1		
ETR2	0.895	0.916	1	
ETR3	0.580	0.567	0.845	1

Source: own calculation

In both cases, it follows from the values of the table between the analysed quantities of the positive dependence. In the case of deductions, the highest degree of direct dependence is between the deduction for the second and third child. On the contrary, there is a moderate direct dependence between the taxpayer's relief and the tax credit for children. The reason is that the value of the taxpayer's relief did not change until the tax reform in 2021, while the amount of the tax credit for children has changed several times by that time.

There is the lowest direct dependence between the tax credit amount per one child and the amount of the tax relief per taxpayer. It is interesting to note that, on the contrary, the degree of dependence is the highest between the effective tax rate for a taxpayer applying only the basic deduction and using the basic deduction and the deduction per child. What is the reason for this? In particular, the government's trend is to tax fewer families with a higher number of children. As confirmed by the previous analysis results, the tax credit for the first child did not increase as significantly as the credit for the second or third child. The increase in these credits was smaller than the increase in average wages, causing a higher tax burden.

In this analysis, the presentation of results was omitted if the social security contribution was also considered a tax payment. This is due to the nominal and real linear tax rate, which causes the results in the correlation matrix in Table 2 and 3 to be entirely identical.

Therefore, based on the analysis results, the formulated hypothesis H2 is rejected that the taxpayer's relief is one of the standard deductions that has increased most significantly since 2008. The deduction for children is among the standard deductions that increased the most in the Czech Republic due to tax reforms.

As already mentioned in the text, the basic relief for taxpayers has been increasing by a total of CZK 3,000 since 2022. The question is whether and how this increase affects the progressiveness of the personal income tax. This also corre-

sponds to the formulated hypothesis H3 based on the essence that increasing the taxpayer's relief increases the degree of tax progressivity. To make this phenomenon more interesting, progressivity will be calculated using an interval indicator of tax progressiveness, but at income intervals where the nominal tax rate is linear (for both 2021 and 2022).

In this research study, from various aspects, the situations are analysed when the deduction for the taxpayer (S_0) is applied or to the taxpayer and children (S_1 – one child, S_2 – two children, S_3 – three children). The same trend will be maintained for this part of the analysis. The values of the tax progressivity indicators PTO_T and PTO_{T+1} are shown in Table 4 and Table 5.

In all situations, according to the values in Table 4, income tax is a progressive tax despite the existence of a nominal linear tax rate. Even though the nominal tax rate is linear at 15% and the tax base is always the employee's gross salary, there is tax progressivity. In the conditions of the Czech legislation, the reason is deductible items such as tax reliefs and tax credit for children. The existence of deductible items causes the progressivity of the personal income tax, although the nominal tax rate, which is subject to income in the analysed income intervals, is linear.

In the case of the values in Table 5, where social security contributions are also considered a tax, the same conclusions are drawn: the tax and levy burden develops progressively. However, the

nominal linear rate of these levies reduces the degree of progressivity.

The values of the progressivity indicator confirm that the increase in the taxpayer tax relief in 2022 compared to 2021 affected the degree of progressivity of the personal income tax. The existence of tax deductions, whether in the form of a non-taxable part of the tax base or tax reliefs, is not uncommon in the case of personal income tax. On the contrary, tax deductions are highly desirable in society [42]. By these deductions, it is possible to reduce the taxpayer's tax burden in a specific preferred social group – for example, a lower tax burden for families with children or following the preferences of the government supporting behaviour of taxpayers. Examples of this are deductions in the form of non-taxable parts of tax bases for gratuitous services provided to hospitals, deductions from taxpayers' contributions to life or pension insurance.

The deductions cause the income tax to be progressive despite the nominal tax rate. However, this is not the only factor these deductions cause in personal income tax. The fact that deductions positively impact the taxpayer's tax liability is also evidenced by the results of a regression analysis examining the relationship between the value of the deduction and the effective tax rate. These results are shown in Table 6. Also, in this case, the trend is maintained as in the previous analysis, i.e. examining a total of 4 situations differing in the scope of applied deductions (S_0 –

Table 4

 PTO_T values in 2021 and 2022

Situation	S_0		S_1		S_2		S_3	
	2021	2022	2021	2022	2021	2022	2021	2022
0.5-1.0	7.874	8.399	8.842	9.125	9.526	10.501	9.874	10.057
1.0-1.5	1.775	1.786	2.859	3.174	3.284	3.987	3.917	4.671

Source: own calculation

Table 5

 PTO_{T+1} values in 2021 and 2022

Situation	S_0		S_1		S_2		S_3	
	2021	2022	2021	2022	2021	2022	2021	2022
0.5-1.0	2.014	2.033	4.517	4.144	5.481	7.914	5.457	8.709
1.0-1.5	1.336	1.340	1.630	1.617	2.446	2.288	2.371	2.818

Source: own calculation

deduction per taxpayer, S_1 – deduction per taxpayer and one child, S_2 – deduction per taxpayer and two children and S_3 – taxpayer deduction and three children). The coefficient of determination R^2 expresses the quality of a regression model. Testing the significance of the regression model is by F-test [43].

The equations have the following form,

$$Y_0 = -826.1 X_1 + 35,069, \tag{9}$$

$$Y_1 = -656.4 X_1 + 43,843, \tag{10}$$

$$Y_2 = -1,964.9 X_1 + 60,755, \tag{11}$$

$$Y_3 = -4,537 X_1 + 62,897, \tag{12}$$

Negative values for the coefficients X_1 in equations (9) to (12) prove the negative effect of the relief on the taxpayer, resp. tax credit on the taxpayer’s tax burden. The higher number of deductions the higher decrease in the effective rate.

The conclusions of the analysis verifying the validity of the third hypothesis confirm its wording, i.e. an increase in the tax relief for the taxpayer affects the progressiveness of the personal income tax. Due to the increase in tax relief, tax progressivity is increasing. At the same time, however, tax reliefs have been shown to affect the effective tax rate and, as the amount deducted from the tax liability increases, the real tax burden decreases.

The study deals with the evaluation of the degree of tax progressiveness also for highly above-average incomes, i.e. incomes that in the past were subject to a solidarity tax surcharge, resp. income, subject to a nominal progressive tax rate since 2021. The formulated hypothesis $H4$ assumes that income tax is more progressive in years when the nominal progressive tax rate was also applied. The analy-

sis is based on situation S_0 , where only the relief per taxpayer is applied.

From the public finance reform in 2008 until the end of 2012, the nominal income tax rate was linear. Income that exceeded 48 times the average wage was subject to a solidarity tax surcharge in the period 2013–2020. Since 2021, this part of the income has been subject to a nominal progressive tax rate.

Using the PTO indicator, the development of the degree of progressivity from 2008 to 2022 will be examined. This will be examined from two perspectives to make the study unique. The first point of view is based on the assumption that only personal income tax is considered a tax payment. The PTO_T indicator is thus calculated using equation (7).

The social security contribution is also considered a tax payment by the OECD methodology. Therefore, the second part will examine the degree of progressivity in the case where income tax and social security contribution are considered a tax payment. Formally, calculating this indicator is specified using equation (8). The social security contributions rate is linear throughout the analysed period and is 11% of the assessment base.

The resulting values of PTO_T and PTO_{T+i} were calculated for the income is subject to a solidarity tax surcharge, resp. The progressive tax rates are shown in Fig. 4.

If the value of the PTO indicator is higher than 1, the tax is progressive in this interval. The results show that in the years 2008 to 2012, the tax liability developed digressively, when, on the contrary, as the income grew, the tax burden decreased.

Table 6

	Model S_0		Model S_1		Model S_2		Model S_3	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
X_1 - ETR	-826.1	0.000	-656.4	0.216	-1964.9	0.009	-4537	0.001
Constant	35069	0.000	43843	0.000	60755	0.000	62897	0.000
Observation	15		15		15		15	
R^2	0.560		0.339		0.443		0.750	
F test	18.82	0.000	1.68	0.216	3.18	0.009	16.95	0.001

Source: own calculation

The reason for this was how the tax base was constructed, which was a super-gross wage. The tax base was only the gross wage from the amount exceeding the maximum assessment base for the social security contribution. Thus, despite the nominal linear rate, there was a real decrease in the tax burden. The increase in the tax's regressive character was even more pronounced if the social security contribution was also considered a tax payment. This payment is no longer paid from the salary when the maximum assessment base is exceeded (which in 2008, 2009 and 2012 was 4 times the average annual wage, in 2010 and 2011, a total of 6 times the average annual wage). In 2008–2012, the typical character of the personal income tax – progressivity – was not met in all taxpayers in the Czech Republic. The main reason was the already mentioned support for families with children, where the aim was to reduce the tax burden on these families and not increase social benefits more. Another reason for this step was to motivate people to work [45].

The solidarity tax surcharge, which lasted from 2013 to 2020, led to the fact that if only income tax is considered a tax payment, the tax burden progresses even when the maximum assessment base for social security contributions is exceeded. If social security contributions are also considered to be a tax payment, there is again a situation where the tax burden of dependent activity develops digressively.

Although part of the income was subject to a so-called solidarity tax surcharge of 7%, this situation occurs.

The same conclusions are drawn for 2021 and 2022 if income tax is considered a tax payment. However, according to E. Szabone or E. Bonifert [46; 47] the aim of tax reforms not only in the area of income tax is to simplify the principle of operation and legislative regulation in this area. Here it can be observed that the degree of progressivity increases significantly. However, the tax burden develops progressively even when social security contributions are considered a tax payment. This is although the maximum assessment base for social security contributions still exists.

The results of this analysis confirm the validity of hypothesis H4 that the progressiveness of tax liability also increases significantly for taxpayers receiving highly above-average incomes that exceed the maximum assessment base for social security contributions.

5. Conclusion

The aim of this article was to evaluate how the ongoing reform of the personal income tax in 2022 affects the tax, resp. levy burden and changes the tax progressivity. Another aim was to evaluate the effect of social security contributions as a tax payment to the progressivity. The stated goal of the work corresponded to the formulated hypotheses, the validity of which was either confirmed or refuted. The first

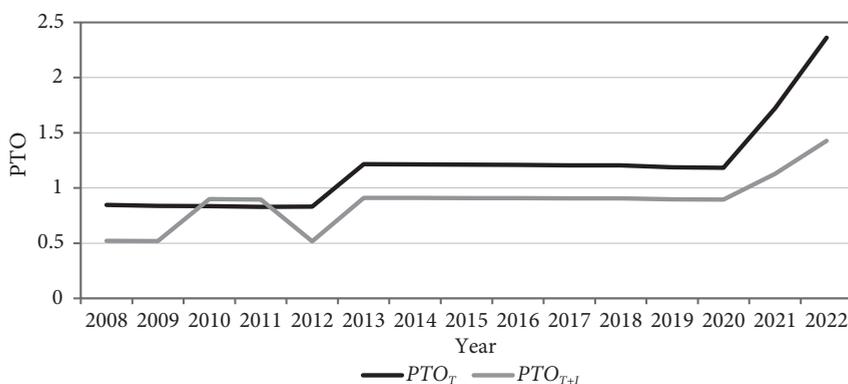


Figure 4. Comparison of PTO_T and PTO_{T+I}

Source: own processing

hypothesis was based on the assumption that the tax burden of dependent activity is reduced by CZK 3,000 due to increased tax relief. The effective tax rate was an indicator of the tax burden. The analysis results showed that only those employees who apply only the basic taxpayer relief will pay less on personal income tax compared to 2021 if it is assumed that they will still receive a gross wage corresponding to the average wage, resp. specified multiples of the average wage. If the taxpayer also applied the tax credit to children and received an amount corresponding to the average wage, resp. the same multiple, the tax burden of these taxpayers increases slightly. This is the first year in a long time that this increase has taken place, as families with children have significantly reduced the tax burden in recent years, although the average wage has risen. Especially for taxpayers with below-average incomes, the levy burden is significantly higher than the tax burden. The nominal linear rate of social security contributions is the same as the real rate, as there are no reliefs or credits.

A total of CZK 3,000 increased the taxpayer's relief compared to 2021 and 2022. This relief also increased by the same amount between 2020 and 2021. The trend of this development was the idea to formulate the second research hypothesis that the taxpayer's relief has increased the most in the analysed period. This hypothesis was rejected, the amounts of tax credits for children were increased most significantly for the analysed period 2008–2022. While the tax relief per taxpayer has increased, reducing the tax burden, the levy burden remains unchanged.

The nominal personal income tax rate in the Czech Republic is linear in 2022 if the taxpayer's annual income is not higher than 48 times the average wage. From this limit, the nominal progressive tax rate is then applied. However, as the results of the progressivity analysis show, income tax is progressive even when only one nominal rate is used for taxation. A deduction such as tax relief is a reason for this progressiveness, which is confirmed by the regression analysis results. Increa-

sing the taxpayer's relief is one of the main reasons why tax progression has increased between 2021 and 2022.

Increasing the progressivity of the personal income tax also continues for taxpayers with incomes higher than the maximum assessment base for social security contributions. The progressive nature of the development of the tax burden can be observed even when the social security contribution is considered a tax payment. This conclusion can be surprising because when the amount of the maximum assessment base is exceeded, the social security contribution is no longer paid.

The Income Tax Act is a legal regulation in the Czech Republic that constantly changes. In December 2021, a new government took power in the Czech Republic, whose representatives are more right-wing than the previous government. Due to this fact, further reforms of the personal income tax can be expected during 2022 and in the following years, which may become new topics for research in this area in the future. Tax reforms of personal income tax affect the tax burden and a typical feature of personal income tax, which is progressivity. A different trend in development and reform is in social security contributions. Here, these levies' nominal and real rate has remained unchanged for a long time. Especially for taxpayers with below-average incomes, the levy burden is higher than the tax burden on wages. If only income tax is considered a tax payment, it can be stated that the tax burden is below the average of the values of European countries. Still, if the social security contribution is also considered a tax payment, these levies exceed the average of the values of the European Union countries. Concerning the availability of data, the average wages used by the Czech Social Security Administration for the purposes of calculating social security contributions were used for the analysis. On the one hand, this may seem to be a limitation of this study. However, this is not the case, as the threshold is based on this wage when the nominal progressive tax rate is applied and when the nominal rate is linear.

References

1. Goudswaard K., Caminada K. Social Security Contributions: Economic and Public Finance Considerations. *International Social Security Review*. 2015;68(4):25–45. <https://doi.org/10.1111/issr.12086>
2. Alm J., Dronyk-Trosper T., Sheffrin M. What Drives State Tax Reforms? Introduction. *Public Finance Review*. 2017;45(4):443–457. <https://doi.org/10.1177/1091142116675028>
3. Feldstein M. The Tax Reform Legislation of 2017. *Journal of Policy Modeling*. 2018;40(3):503–508. <https://doi.org/10.1016/j.jpolmod.2018.02.010>
4. Gngangnon S. Effect of Development Aid on Tax Reform in Recipient-Countries: Does Trade Openness Matter? *Journal of International Commerce Economics and Policy*. 2020;11(1):205001. <https://doi.org/10.1142/S1793993320500015>
5. Gngangnon S. Tax Reform and Trade Openness in Developing Countries. *Journal of Economic Integration*. 2019;34(3):498–519. <https://doi.org/10.11130/jei.2019.34.3.498>
6. Bierbrauer F., Boyer P., Peichl A. Politically Feasible Reforms of Nonlinear Tax Systems. *American Economic Review*. 2021;111(1):153–191. <https://doi.org/10.1257/aer20190021>
7. Gao P. China's 40 Years of Fiscal and Tax Reform: A Basic Trajectory. *China & World Economy*. 2018; 26(2):94–106. <https://doi.org/10.1111/cwe.12238>
8. Fedosov V., Tymchenko O., Babichenko V. Tax Transformations Effects. *Financial and Credit Activity-Problems of Theory and Practice*. 2019;2(29):462–475. <https://doi.org/10.18371/fcactp.v2i29.172216>
9. Ilzetzki, E. Tax Reform and the Political Economy of the Tax Base. *Journal of Public Economics*. 2018;164:197–210. <https://doi.org/10.1016/j.jpubeco.2018.06.005>
10. Frish R., Zussman N., Igladov S. The Wage Response to a Reduction in Income Tax Rates: The Israeli Tax Reform. *B E Journal of Economic Analysis & Policy*. 2020;20(2). <https://doi.org/10.1515/bejeap-2019-0043>
11. Mayburov I., Kireenko A. Tax Reforms and Elections in Modern Russia. *Journal of Tax Reform*. 2018;4(1):73–94. <https://doi.org/10.15826/jtr.2018.4.1.046>
12. Ye J., Guo X., Luo D., Jin X. The Heterogeneous Tax Burden: Evidence from Firm-Level Data in China. *Singapore Economic Review*. 2018;63(4):1003–1055. <https://doi.org/10.1142/S0217590817420073>
13. Jerkovic E. Legal Challenges of Reduction of The Tax Burden on Labour in the Republic of Croatia. *International Scientific Conference on EU and Member States – Legal and Economic Issues*. 2019:1008–1029.
14. Milligan K. Average Tax Rates in the Canadian Personal Income Tax. *National Tax Journal*. 2021;74(2):513–527. <https://doi.org/10.1086/714386>
15. Gordon S. The Incidence of Income Taxes on High Earners in Canada. *Canadian Journal of Economics-Revue Canadienne d'economique*. 2020;53(2):437–459. <https://doi.org/10.1111/caje.12433>
16. Muellbacher S., Nagl W. Labour Supply in Austria: an Assessment of Recent Developments and the Effects of a Tax Reform. *Empirica*. 2017;44(3):465–485. <https://doi.org/10.1007/s10663-017-9373-7>
17. Aganbegyan A. On Tax Reform. *Ekonomicheskaya Politika*. 2017;12(1):114–133. (In Russ.) <https://doi.org/10.18288/1994-5124-2017-1-05>
18. Karlin M., Tsymbaliuk O., Prots N. Features Tax Reform and Mechanism of Hiding Taxes in Ukraine. *Financial and Credit Activity – Problems of Theory and Practice*. 2018;1(24):123–130.
19. Apps P., Rees R. Optimal Family Taxation and Income Inequality. *International Tax and Public Finance*. 2018;25(5):1093–1128. <https://doi.org/10.1007/s10797-018-9492-5>
20. Hájek M., Zimmermannová J., Helman K. Environmental Efficiency of Economic Instruments in Transport in EU Countries. *Transportation Research Part D-Transport and Environment*, 2021;100:103054. <https://doi.org/10.1016/j.trd.2021.103054>
21. Krzikallová K., Strílková R. Labour-Intensive Services and Changes in Value Added Tax Revenue. *Journal of Competitiveness*. 2016;8(1):5–18. <https://doi.org/10.7441/joc.2016.01.01>
22. Burkhauser R., Hahn M., Wilkins R. Measuring Top Incomes Using Tax Record Data: a Cautionary Tale from Australia. *Journal of Economic Inequality*. 2015;13(2):181–205. <https://doi.org/10.1007/s10888-014-9281-z>
23. Nadirov O., Dehning B., Pavelková D. Taxes and the Incentive to Work under Flat and Progressive Tax Systems In Slovakia. *Economics & Sociology*. 2021;14(2):40–55. <https://doi.org/10.14254/2071-789X.2021/14-2/2>
24. Janousková J., Kirschnerová P. Tax Policy of the Czech Republic and Securing Funds for Retirement. *Ekonomický časopis*. 2018;66(9):888–908.

25. Heathcote J., Storesletten K., Violante G. Optimal Tax Progressivity: An Analytical Framework. *Quarterly Journal of Economics*, 2017;132(4):1693–1754. <https://doi.org/10.1093/qje/qjx018>
26. Farfan-Portet M., Hindriks J., Lorant V. Progressivity of Childcare Tax Policies in Belgium. *Recherches Economiques De Louvain-Louvain Economic Review*. 2008;74(2):143–149. <https://doi.org/10.3917/rel.742.0143>
27. Genschel P., Seelkopf L. Did they Learn to Tax? Taxation Trends Outside the OECD. *Review of International Political Economy*. 2016;23(2):316–344. <https://doi.org/10.1080/09692290.2016.1174723>
28. Sokolovska O. Current Trends in Labor Taxation in an Open Economy. *Vestnik Sankt-Peterburgskogo Universiteta-Ekonomika = St Petersburg University Journal of Economic Studies*. 2018;34(1):77–94. (In Russ.) <https://doi.org/10.21638/11701/spbu05.2018.104>
29. Neumann M. Earnings Responses to Social Security Contributions. *Labour Economics*. 2017;49:55–73. <https://doi.org/10.1016/j.labeco.2017.10.001>
30. Tepperová J. Personal Income Tax and Social Security Coordination in Cross-Border Employment – a Case Study of the Czech Republic and Denmark. *European Journal of Social Security*. 2019;21(1):23–41. <https://doi.org/10.1177/1388262719833766>
31. Mueller K., Neumann M. Who Bears the Burden of Social Security Contributions in Germany? Evidence from 35 Years of Administrative Data. *Economist-Netherlands*. 2017;165(2):165–179. <https://doi.org/10.1007/s10645-017-9298-3>
32. Adam S., Roantree B., Phillips D. The Incidence of Social Security Contributions in the United Kingdom: Evidence from Discontinuities at Contribution Ceilings. *Economist-Netherlands*. 2017;165(2):181–203. <https://doi.org/10.1007/s10645-017-9295-6>
33. Paseková M., Kolářová, E., Otrusínová, M. Assessment of Accounting Spheres as Viewed by Accountants of Czech Enterprises. *International Advances in Economic Research*. 2018;24(2):295–296. <https://doi.org/10.1007/s11294-018-9693-9>
34. Marks S. Non-tariff Trade Regulations in Indonesia: Nominal and Effective Rates of Protection. *Bulletin of Indonesian Economic Studies*. 2017;53(3):333–357. <https://doi.org/10.1080/00074918.2017.1298721>
35. Wang G., Zhu K., Shao X. Testing for the Martingale Difference Hypothesis in Multivariate Time Series Models. *Journal of Business & Economic Statistics*. 2021. <https://doi.org/10.1080/07350015.2021.1889568>
36. Coscia M. Pearson Correlations on Complex Networks. *Journal of Complex Networks*. 2021;9(6):cnab036. <https://doi.org/10.1093/comnet/cnab036>
37. Splinter D. US Tax Progressivity and Redistribution. *National Tax Journal*. 2020;73(4):1005–1024. <https://doi.org/10.17310/ntj.2020.4.04>
38. Stroup M. An Index for Measuring Tax Progressivity. *Economics Letters*. 2005;86(2):205–213. <https://doi.org/10.1016/j.econlet.2004.06.017>
39. Festa A. Tax Relief, Tax Wedge and Regional Employment: Evidence from Italy. *European Journal of Law and Economics*. 2005;38(1):117–137. <https://doi.org/10.1007/s10657-012-9358-8>
40. Matejka L. Judicial Review of Tax and Tax Attribution Relief in the Czech Republic. *E & M Ekonomie a Management*. 2009;12(1):57–67.
41. Rodgers L. Give Credit Where? The Incidence of Child Care Tax Credits. *Journal of Urban Economics*. 2018;108:57–71. <https://doi.org/10.1016/j.jue.2018.10.002>
42. Ayers B., Li, O., Robinson J. Tax-Induced Trading around the Taxpayer Relief Act of 1997. *Journal of the American Taxation Association*. 2008;30(1):77–100. <https://doi.org/10.2308/jata.2008.30.1.77>
43. Mertler C. *Advanced and Multivariate Statistical Methods*. 2013. Glendale: Pyczak Publishing.
44. Daniels J., VanHoose, D. Openness, Income-tax Progressivity, and Inflation. *Journal of Macroeconomics*. 2009;31(3):485–491. <https://doi.org/10.1016/j.jmacro.2008.10.003>
45. Azmat G. Incidence, Saliency, and Spillovers: The Direct and Indirect Effects of Tax Credits on Wages. *Quantitative Economics*. 2019;10(1):239–273. <https://doi.org/10.3982/QE319>
46. Szabone E. Opportunities for Simplification in the Personal Income Tax Systems of the Visegrad Countries. *Public Finance Quarterly-Hungary*. 2020;65(4):531–553. https://doi.org/10.35551/PFQ_2020_4_6
47. Bonifert E. Missed Opportunities of Simplification Regarding Personal Income Tax Systems in Hungary. *Public Finance Quarterly-Hungary*. 2021;66(3):337–358. https://doi.org/10.35551/PFQ_2021_3_2

Acknowledgements

This paper is an output of the science project SGS SP2022/1.

Information about the author

Michal Krajiňák – doc., Ing., Ph.D., MBA, LL.M. – Business Economy and Management, Associate Professor, Department of Accounting and Taxes, Faculty of Economics, VŠB-Technical University of Ostrava (Sokolská třída 33, 702 00) Czech Republic; Associate Professor, Department of Business Economy and Management, Moravian Colleague Olomouc (Třída Kosmonautů 1, 709 00) Czech Republic; ORCID: <https://orcid.org/0000-0003-4924-3583>; email: michal.krajnak@vsb.cz

For citation

Krajiňák M. Quo Vadis Tax and Levy Burden of Wages in the Czech Republic? Tax Reform in 2022. *Journal of Tax Reform. 2022;8(1):25–39*. <https://doi.org/10.15826/jtr.2022.8.1.106>

Article info

Received *January 2, 2021*; Revised *February 6, 2022*; Accepted *April 2, 2022*

Благодарности

Данная статья является результатом научного проекта SGS SP2022/1.

Информация об авторе

Крайнак Михаил – Ing., Ph.D., MBA, LL.M. – экономика и менеджмент, доцент кафедры бухгалтерского учета и налогообложения экономического факультета Остравского технического университета (VŠB) (70200, Чешская Республика, г. Острава); доцент кафедры экономики бизнеса и менеджмента Моравского колледжа Оломоуц (70900, Чешская Республика, г. Оломоуц); ORCID: <https://orcid.org/0000-0003-4924-3583>; e-mail: michal.krajnak@vsb.cz

Для цитирования

Krajiňák M. Quo Vadis Tax and Levy Burden of Wages in the Czech Republic? Tax Reform in 2022. *Journal of Tax Reform. 2022;8(1):25–39*. <https://doi.org/10.15826/jtr.2022.8.1.106>

Информация о статье

Дата поступления 2 января 2022 г.; дата поступления после рецензирования 6 февраля 2022 г.; дата принятия к печати 3 апреля 2022 г.