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THE TAX WEDGE AS THE DETERMINANT OF UNEMPLOYMENT: A COMPARATIVE OVERVIEW OF OECD COUNTRIES AND SERBIA

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***Abstract:** The tax wedge is a significant part of labor costs and represents the difference between the gross wage and the net take-home pay. The tax wedge gets great attention in academic circles, after a major global economic and financial crisis, when the empirical research has discovered the positive correlation between unemployment and the tax wedge. This relationship can be described in the following way: the more elastic the labor supply curve or demand curve is, the more negative is the impact of the tax wedge on employment. The aim of this paper is to investigate the implications of the tax wedge on unemployment in OECD countries and Serbia and to analyze Serbian tax policy in international perspective. The cluster analysis was conducted on a sample of 36 countries, resulting in three groups of countries classified according to their tax wedge and unemployment rate. Serbia belongs to the first group of clusters, which comes right after the group of countries with the highest tax wedge and rate of unemployment. Interestingly, the results showed that the tax wedge has a significant impact on employment in OECD countries and Serbia.*

***Keywords:** tax wedge, labor costs, unemployment rate, hierarchical cluster analysis.*

1. Introduction

„Persistent unemployment has been a major blot on the economic and social record of most OECD countries, during the past two decades or more“ (Elemeskov et al., 1998, p. 207). By extending the global economic crisis (2008), taxation of labor, together with the

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phenomenon of unemployment, becomes an open question in all countries. The need to reduce the economic and financial crisis has sparked an expansive fiscal policy. Some of the OECD countries have opted for tax cuts, while some countries, more burdened by the crisis (Spain, Greece, Portugal, the Baltic countries and Great Britain) have preferred to increase taxes. In a large number of cases, fiscal policy implied an increase in tax incentives, not a reduction in tax rates. The repercussions of so conceived fiscal systems were high tax burden or tax wedge.

There are several definitions for the tax wedge phenomenon. In most papers, the tax wedge is calculated as the sum of income tax for individuals and all social contributions as a percentage of total labor costs, and does not include consumption tax rates. The OECDs Taxing wages publications define the tax wedge as the sum of personal income tax plus employers' social security contributions together with any payroll tax less cash transfers, expressed as a percentage of labor cost. The tax wedge can be calculated as the difference between gross labor costs and net take-home pay in relation to the gross labor costs. Simplified, the tax wedge is the difference between the gross labor costs borne by the employer and the net salary of employees. The tax wedge represents the total tax burden on labor. The tax burden on the workforce is an important instrument of the tax policy, because of the fact that it affects employment accordingly. By increasing the tax wedge, the cost of labor employed by the employer is increased as well. Such circumstances directly determine the employer's decision for employment. So, there is an increase in unemployment. This generally accepted assumption on the positive correlation between tax wedge and unemployment has been empirically investigated by numerous scientists. On the basis of the results by eminent researchers, this study analyzes the causal consequence link between the two phenomena mentioned above. The paper starts from the assumption that the tax wedge is inherently important factor which negatively affects the employment. The purpose of this paper is the distillation of lessons for labor market reforms. The subject of this paper is the analysis of the tax wedge and the unemployment rate in the OECD countries and Serbia. The main goal of this paper is to investigate the implications of the tax wedge on the unemployment rate among the analyzed countries and to answer the question in which countries the highest tax burden exists.

The paper gives an overview of current theoretical literature and current empirical research of the tax wedge. It emphasizes the effects of tax burden on the labor market. The cluster analysis was conducted using data from the statistical databases of OECD countries and Serbia. Data of the unemployment rate and tax wedge for the OECD member countries are taken from OECD official data (OECD, 2018). For Serbia, the same data were incorporated on the basis of the current data base of the Statistical Office of the Republic of Serbia. The research will divide the countries into certain groups with common characteristics. The last section of the paper gives a review of Serbia and the fiscal burden of labor in Serbia. Finally, the paper contains recommendations for the reform of fiscal policy and the conclusions relevant to the conducted research.

2. Theoretical framework

Although, the tax wedge has begun to attract academic attention over the past few years, there are a number of theoretical, empirical and experimental studies that examine personal income taxation. "The income taxation is the most significant source of tax

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revenue in developing and developed economies” (Đurović Todorović, Đorđević, 2008, p. 73). The tax wedge extensively becomes a part of the research circles as a very important element that affects the country's competitiveness in its "competition" on the international labor market.

The analysis starts with an influential work that investigates a negative influence of the tax wedge, presented by Vork et al. (2006), which finds influences of the tax wedge on employment rates, activity rates, work hour, unemployment rates and the share of part-time workers. A survey conducted by Behar (2009) included the analysis of new members of the European Union. The paper examines the differences in the outcomes of the labor market, tax wedges and the advantages of the member states of the European Union. The relationship between taxes, benefits and employment was examined using data from statistically transparent databases of new members of the European Union (10). Within the new members, author's non-parametric analysis finds that the tax wedges and the duration of benefits (not the replacement ratio) are associated with poor labor market outcomes. Tvrdon (2011) found out a negative correlation between tax wedge and employment rate in OECD countries. Most studies find a negative relationship between marginal effective tax indicators and activity and employment rates, particularly for the youth (Behar, 2009; Dolenc and Laporšek, 2010). The paper of Gabrilo (2016) studied the tax wedge in Croatia, Belgium, Estonia, Germany and Slovakia. The work gives the decomposition of a net average tax wedge using the OECD's methodology, and the results indicate the progressiveness of taxation. The progressivity of taxation is absent only in Germany, and as a consequence, the high base of social security contributions is stated in this country. The results of the survey show that the lowest tax burden (single person, no children) is in Croatia, followed by Estonia, Slovakia, Germany and Belgium. Tax wedge in Croatia, Austria, Hungary, Poland and Greece was studied by Onorato (2016). The work provides a comparative overtake of tax burden of labor income in analyzed countries in 2013. Using the OECD's Taxing Wages methodology, the author made a calculation of the net average tax wedge, net average tax rates and other indicators for hypothetical units with different gross wages. The results of the survey show that Croatia has the lowest tax wedge on wages below the average gross salary, and for salaries above the average the lowest wedge is in Poland. Šimović and Škrbić (2015) provide an analysis of changes in tax rates on income tax and contributions in Croatia. The authors give an analysis of the impact of the tax rate projection on the total tax burden and tax wedge in Croatia. The results of their research show that the bulk of the overall tax burden relates to social contributions. In addition, according to the authors, the most balanced distribution of tax burden can be achieved with a lower number of tax rates or with lower tax rates.

According to Tripeski and Tashevska (2012), OECD and EU countries can be classified into two groups, one with high tax wedge, high unemployment rate and low employment rate, and the other one with the opposite characteristics. This study emphasized that the high tax wedge has detrimental effects on labor market outcomes. A cluster analysis performed on 43 countries (member of OECD, EU and EU candidates) showed that higher tax wedge usually corresponds to higher levels of unemployment and lower levels of employment. Dolenc and Vodopivec (2005) deal with the following issues: the tax wedges, unemployment rates and employment in the OECD countries in the past; a tax wedge policy in old and new EU members; tax laws in Slovenia and their impact on unemployment. The results of their research have ranked the OECD countries in two

groups. The first is made up of countries with a high tax wedge and high unemployment rates, and the second whole involves countries with low tax wedges and low unemployment rates. The authors came to the conclusion that the EU member states have more tax-exempt work compared to the OECD countries, and, moreover, higher unemployment rates. How the tax wedge affects the unemployment rate in Croatia, Šeparović (2009) gave in his research. The author emphasized that the tax wedge should be reduced if country wants to solve the problem of unemployment.

3. The effects of fiscal labor burden on the labor market

Tax, as public revenue, has a negative connotation since its introduction. Namely, the high tax levies have created negative reactions to this economic phenomenon. The tax wedge creates the deviation when employers pay more and workers receive less. In line with this conclusion, the positive effects of fiscal burden on the labor market are a capricious issue.

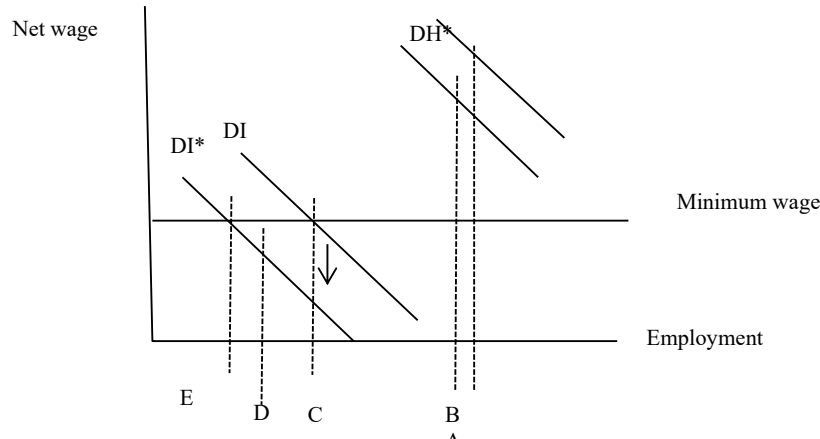
The fiscal burden of labor is determined by the income tax and social security contributions. Such fiscal burden is divided between participants, in the current labor market, while the distribution of tax burden is closely related to the situation on the market. If the fiscal burden is transferred to employees, there will be an effect on the side of labor supply. Otherwise, the burden will be distributed to employers and will result in labor-side effects. Guided by the unwritten rule, that a greater tax burden is borne by a market participant whose side shows lower elasticity, the highest burden is borne by employees. The solution for such a distribution of fiscal burden is inevitably the consequence of a less elastic supply than the demand for labor. The distribution, however, is not strictly determined solely on the basis of elasticity. There is a number of factors that can further affect the distribution of fiscal burden. The significance of the unemployment rate is emphasized. It is widely known that high unemployment rates are a basic feature of all developing countries. High unemployment rates can affect the fiscal burden to be transferred to employees.

Does the reduction of taxes, and therefore the tax wedge, lead to a reduction of unemployment? The demand for labor shows greater elasticity in relation to the offer, and due to tax cuts all effects would be directed to employers. Explicitly, there would be a reduction in the cost of labor. This is particularly important for developing countries, where the crucial factor of unemployment is on the side of demand. According to empirical research carried out in the Republic of Serbia, but also on the basis of retrospective analysis of the Serbian population, the main cause of social exclusion and poverty is unemployment. Statistics show that status in the current labor market is in high correlation with poverty. The global financial crisis (2008) revealed that, by then, the greatly praised the "invisible hand of the market" as the best architect of a market economy, could not carry out the reforms to the end. The same situation could be seen on the example of Serbia, according to which the crisis put an end to this economic doctrine, and the economic policy makers assured that the model of Serbia's economic growth and development is unsustainable. Even then, it was crystallized that the unemployment determined the cause of an inherent importance, and which is on the demand side for labor, as well as that the reforms of fiscal reducing burden are necessary.

The theoretical representation of labor demand, presented in Graph 1, shows the direction of the demand curve for labor force due to tax burden. The increase in the tax levy affects the fall in the demand curve.

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Graph 1. Theoretical analysis of tax wedge and labor demand and supply



DH - demand for skilled labor,
 DH* - demand for skilled labor after tax wedge,
 DI - demand for unskilled labor,
 DI* - demand for unskilled labor after tax wedge,
 AB - employment reduction among skilled workers due to tax wedge,
 CD - employment reduction among unskilled workers due to tax wedge without binding minimum wage,
 CE - employment reduction among unskilled workers due to tax wedge binding minimum wage (World Bank EU-8, Quarterly Economic Report, p. 5).

It is clear from Graph 1 that the more elastic is the labor demand curve, the more harmful is the tax wedge for employment. Apodictically, due to an increase in tax burden, there is a fall in demand for labor. Large tax burden, expressed by the tax wedge, also affects the fall in labor productivity. „A high labor taxation measured by the tax wedge may result in reducing labor demand and increasing unemployment with slow productivity growth, also because workers are less motivated to increasing their working effort“ (Festa, 2015, p. 2).

In accordance with the above-mentioned alarming problem, which showed its destructive character, the countries opened the issue of the tax wedge. Accordingly, the starting point for the unemployment problem is to observe the unemployment rate in a certain time zone.

Table 1. shows that all countries, with the exception of Germany, have faced the trend of rising unemployment rates. Cyclical trends in unemployment rates can be seen in most countries, while no country has recorded a drastic reduction in unemployment.

Table 1. Unemployment rate in OECD countries and Serbia (in %), 2006-2017.

	2006	2010	2011	2012	2013	2014	2015	2016	2017
Australia	4.8	5.2	5.1	5.2	5.7	6.1	6.1	5.7	5.6
Austria	5.3	4.8	4.6	4.9	5.4	5.6	5.7	6.0	5.5
Belgium	8.3	8.3	7.2	7.6	8.5	8.5	8.5	7.9	7.1
Canada	6.3	8.1	7.5	7.3	7.1	6.9	6.9	7.0	6.3
Chile	7.8	8.2	7.1	6.4	5.9	6.4	6.2	6.5	6.7
Czech Republic	7.1	7.3	6.7	7.0	7.0	6.1	5.1	4.0	2.9
Denmark	3.9	7.5	7.6	7.5	7.0	6.5	6.2	6.2	5.7
Estonia	5.9	16.7	12.4	10.0	8.6	7.4	6.2	6.8	5.8
Finland	7.7	8.4	7.8	7.7	8.2	8.7	9.4	8.8	8.6
France	8.8	9.3	9.2	9.8	10.3	10.3	10.4	10.1	9.4
Germany	10.3	7.0	5.8	5.4	5.2	5.0	4.6	4.1	3.8
Greece	9.0	12.8	17.9	24.5	27.5	26.6	25.0	23.6	21.5
Hungary	7.5	11.2	11.1	11.0	10.1	7.7	6.8	5.1	4.2
Iceland	2.9	7.6	7.1	6.0	5.4	5.0	4.0	3.0	2.8
Ireland	4.8	14.6	15.4	15.5	13.8	11.9	9.	8.4	6.7
Israel	8.4	6.6	5.6	6.9	6.2	5.9	5.2	4.8	4.2
Italy	6.8	8.4	8.4	10.6	12.1	12.7	11.9	11.7	11.2
Japan	4.1	5.1	4.6	4.4	4.0	3.6	3.4	3.1	2.8
Korea	3.5	3.7	3.4	3.2	3.1	3.5	3.6	3.7	3.7
Latvia	7.0	19.5	16.2	15.0	11.9	10.9	9.9	9.6	8.7
Luxembourg	4.6	4.6	4.8	5.1	5.9	6.1	6.5	6.3	5.6
Mexico	3.6	5.4	5.2	5.0	4.9	4.8	4.4	3.9	3.4
Netherlands	5.0	5.0	5.0	5.8	7.2	7.4	6.9	6.0	4.9
New Zealand	3.9	6.2	6.0	6.4	5.8	5.4	5.4	5.1	4.7
Norway	3.4	3.7	3.4	3.3	3.8	3.6	4.5	4.8	4.2
Poland	14.0	9.7	9.7	10.1	10.3	9.0	7.5	6.2	4.9
Portugal	8.9	12.0	12.9	15.8	16.5	14.1	12.7	11.2	9.0
Slovak Republic	13.5	14.5	13.7	14.0	1.2	13.2	11.5	9.7	8.1
Slovenia	6.0	7.3	8.2	8.9	10.1	9.7	9.0	8.0	6.6
Spain	8.5	19.9	21.4	24.8	26.1	24.5	22.1	19.7	17.2
Sweden	7.0	8.6	7.8	8.0	8.0	7.9	7.4	7.0	6.7
Switzerland		4.8	4.4	4.5	4.7	4.8	4.8	4.9	4.8
Turkey	8.8	10.7	8.8	8.2	8.7	10.0	10.3	10.9	10.9
United Kingdom	5.4	7.8	8.1	4.9	7.6	6.1	5.3	4.8	4.4
United States	4.6	9.6	9.0	8.1	7.4	6.2	5.3	4.9	4.4
Serbia	20.8	19.2	23.0	23.9	22.1	19.2	17.7	15.3	13.5

Source: A Harmonized unemployment rates in OECD countries, OECD Employment Outlook 2018; Bulletin Public Finances of the Republic of Serbia.

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**4. Empirical analysis of the relations between tax wedge
and labor market outcomes**

If the tax wedge is large and net wages are too low, workers may be discouraged from participating in the regulated part of the labor market, finding outside options – unemployment or unregistered, informal work which is more attractive. The tax wedge on labor provides a measure of which the social protection and tax systems can discourage employment.

How can we express tax wedge? According to Festa (2015), the real labor cost (RLC) can be expressed as the following equality:

$$RLC = \frac{W(1+\tau f)}{P} \quad (1)$$

The real consumption wage (RCW), received by the worker, has the following expression:

$$RCW = \frac{W(1-\tau w)\cdot(1-ti)}{P\cdot(1+tc)} \quad (2)$$

Where W is nominal gross wage; P stands for GDP deflator, τf is the social security contribution rate paid by the employer, τw is the social contribution rate paid by the worker, ti is the tax rate on labor income and tc is the consumption rate on goods and services.

When we summarize the equation (1) and (2), we have the measure of tax wedge:

$$TW = \frac{(1+\tau f)\cdot(1+tc)}{(1-\tau w)\cdot(1-ti)} \quad (3)$$

Equivalently, $RLC = \lambda \cdot RCW$ (4)

$$\text{Where, } \lambda = \frac{(1+\tau f)\cdot(1+tc)}{(1-\tau)\cdot(1-ti)} \text{ (Festa, 2015).}$$

Accordingly, an increase in the personal income tax and social security contributions is expressed by the tax wedge. An increase in consumption tax is a capricious issue, since some authors consider that the tax on consumption should be seen as a determinant of the tax wedge, while another group of authors does not agree with it. In this paper, we excluded the effect of the consumption tax rate.

In accordance with the previous tax wedge calculation methodology, the complete picture of the tax wedge in the OECD countries and Serbia is shown in the table below (Table 2.). The table also provides a parallel overview of the unemployment rate in the analyzed countries in the period 2015-2017.

Table 2. gives a picture of the tax burden on work in the OECD countries and in the Republic of Serbia. For a single worker, who earns average income, the tax wedge in Serbia in 2017 was 27.4%. The largest tax wedge among OECD countries in 2017 was in Belgium (53.7%), while the smallest tax wedge was recorded in Chile (7%). The highest unemployment rate was recorded in Greece by 2017, while the lowest rate was recorded by Japan and Ireland, followed by the Czech Republic. Tax wedge, in most countries, involves income tax and social security contributions paid by employers and employees. The structure of labor taxation is given in Table 3.

Table 2. Total tax wedge on labor and unemployment rate in OECD countries and Serbia (in %), 2015-2017.

Country	Tax wedge*			Unemployment rate		
	2015	2016	2017	2015	2016	2017
Australia	28.35	28.58	28.6	6.1	5.7	5.6
Austria	49.62	47.33	47.4	5.7	6	5.5
Belgium	55.28	53.95	53.7	8.5	7.9	7.1
Canada	31.54	31.37	30.9	6.9	7	6.3
Chile	7	7	7	6.2	6.5	6.7
Czech Republic	42.8	43.01	43.4	5.1	4	2.9
Denmark	36.44	36.38	36.3	6.2	6.2	5.7
Estonia	39.05	38.99	39	6.2	6.8	5.8
Finland	43.51	44.1	42.9	9.4	8.8	8.6
France	48.39	48.03	47.6	10.4	10.1	9.4
Germany	49.45	49.54	49.7	4.6	4.1	3.8
Greece	39.14	40.49	40.8	25	23.6	21.5
Hungary	49.03	48.25	46.2	6.8	5.1	4.2
Iceland	34.26	33.96	33.2	4	3	2.8
Ireland	27.33	26.96	27.2	9.9	8.4	6.7
Israel	21.76	22.31	22.1	5.2	4.8	4.2
Italy	47.85	47.79	47.7	11.9	11.7	11.2
Japan	32.29	32.45	32.6	3.4	3.1	2.8
Korea	22.03	22.31	22.6	3.6	3.7	3.7
Latvia	42.51	42.61	42.9	9.9	9.6	8.7
Luxembourg	38.39	38.5	36.7	6.5	6.3	5.6
Mexico	19.8	20.11	20.4	4.4	3.9	3.4
Netherlands	36.95	37.25	37.5	6.9	6	4.9
New Zealand	17.56	17.89	18.1	5.4	5.1	4.7
Norway	36.78	36.25	35.9	4.5	4.8	4.2
Poland	35.73	35.58	35.6	7.5	6.2	4.9
Portugal	42.15	41.62	41.4	12.7	11.2	9
Slovak Republic	41.37	41.52	41.6	11.5	9.7	8.1
Slovenia	42.57	42.69	42.9	9	8	6.6
Spain	39.39	39.38	39.3	22.1	19.7	17.2
Sweden	42.61	42.84	42.9	7.4	7	6.7
Switzerland	21.84	21.79	21.8	4.8	4.9	4.8
Turkey	38.19	38.24	38.7	10.3	10.9	10.9
United Kingdom	30.81	30.92	30.9	5.3	4.8	4.4
United States	31.44	31.58	31.7	5.3	4.9	4.4
OECD Average	36.09	36.05	35.9	6.8	6.3	5.8
Serbia	27.33	27.37	27.4	17.7	15.3	13.5

*Note: Tax wedge for single person at 100% of average earnings, no child is taken into account.

Source: OECD (2018); database of Statistical Office of the Republic of Serbia; Bulletin Public Finances of the Republic of Serbia, April 2018. Author's calculations.

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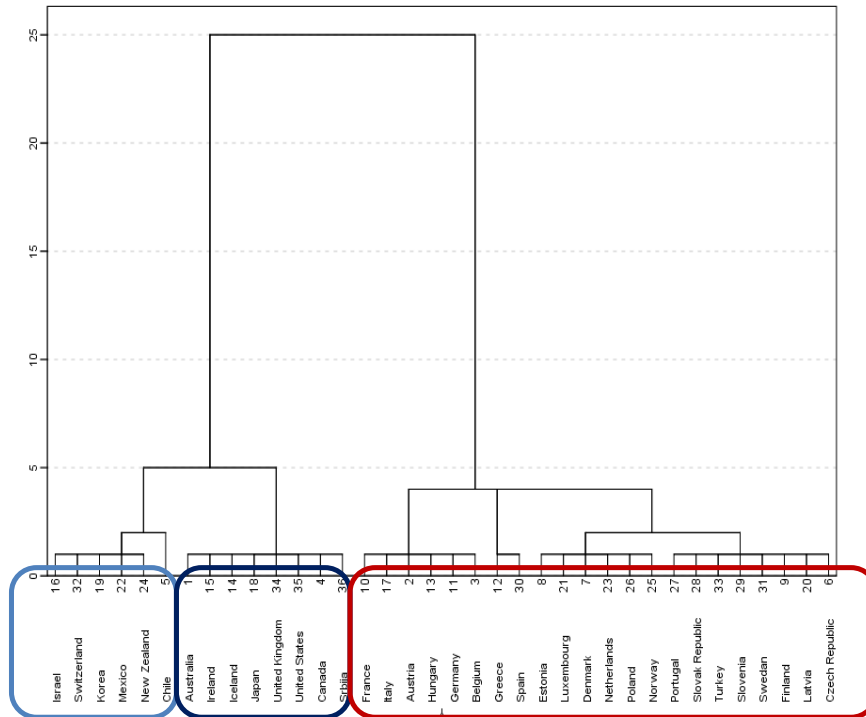
Table 3. Tax burden structure in OECD countries and Serbia (in %), 2017.

Country	Income tax	Social contributions	
		Employee	Employer
Germany	16	17.4	16.3
Switzerland	10	5.9	5.9
Belgium	20.7	10.9	22.2
Austria	11.2	14	22.2
Luxembourg	14.9	11	10.8
Netherlands	15.5	11.8	10.1
Iceland	26.5	0.3	6.4
France	11	10.6	26
Norway	17.2	7.3	11.5
Sweden	13.7	5.3	23.9
Japan	6.9	12.5	13.2
United Kingdom	12.6	8.5	9.8
Finland	17.1	7.6	18.2
Australia	23	0	5.6
Korea	5.5	7.6	9.4
United States	16.9	7.1	7.7
Italy	16.5	7.2	24
Denmark	35.8	0	0.8
Spain	11.3	4.9	23
Ireland	13.9	3.6	9.7
Canada	13.8	6.6	10.4
Greece	8	12.8	20
Israel	9.2	7.6	5.3
New Zealand	18.1	0	0
Portugal	13.3	8.9	19.2
Czech Republic	9.8	8.2	25.4
Slovenia	10	19	13.9
Estonia	12.5	1.2	25.3
Turkey	11	12.8	14.9
Poland	6.2	15.3	14.1
Hungary	12.1	15	19
Slovak Republic	7.7	10.2	23.6
Latvia	15.3	8.5	19.1
Chile	0	7	0
Mexico	8.8	1.2	10.4
OECD AVERAGE	13.5	8.2	14.2
Serbia	10	17.9	19.9

Source: OECD (2018); database of Statistical Office of the Republic of Serbia.
Author's calculations.

The highest personal income tax rate in 2017 is calculated by Denmark (35.8), while the lowest rate, equal to 0, is calculated by Chile. Countries that calculate low rates of income tax generally rely more on social security contributions. In terms of labor taxation, Serbia relies heavily on social security contributions. The personal income tax rate in 2017 is 10%, while the rates of social contributions are set at a higher level (17.9% and 19.9%). Based on the analysis of statistical data, it can be concluded that countries with high unemployment rates coherently have a higher tax wedge in comparison to the countries with low unemployment rates. However, in order that descriptive statistics would not give wrong conclusions, cluster analysis was conducted through appropriate statistical tools and groups of analyzed countries with similar characteristics were defined. Two variables are taken into account: unemployment rate and tax wedge. The analyzed variables are tax wedge at 100% average wage level and unemployment rate in the period 2015-2017. The cluster analysis was run on a sample of 36 countries. In order to calculate the distance of the data, the squared Euclid distance measure was used. We used Ward's method to calculate the similarity of the data. The analysis produced three clusters, presented graphically by a dendrogram (Graph 1.). The characteristics and basic descriptive statistics of the three clusters are presented in Table 4. The third cluster shows best labor market performance. Namely, the lowest unemployment rate and the lowest tax wedge. The average unemployment rate in 2017 is 4.58% and the average tax wedge is 18.66%. It consists of 6 countries.

Figure 1. Dendrogram using hierarchical clustering with Ward's method and squared Euclidean distance



Source: Own calculations using SPSS.

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**Table 4. Characteristics of the three groups of countries obtained
by hierarchical clustering**

Group	Tax wedge			Unemployment rate		
	2015	2016	2017	2015	2016	2017
Cluster 1 (n = 8)	30.41±2.5	30.39±2.5	30.31±2.3	7.32±4.63	6.52±3.98	5.81±3.42
Cluster 2 (n = 22)	42.60±5.27	42.47±4.94	42.27±4.87	9.45±5.15	8.80±4.77	7.84±4.40
Cluster 3 (n = 6)	18.33±5.81	18.56±5.91	18.66±5.94	4.93±0.89	4.81±1.00	4.58±1.17
Total (n = 36)	35.84±10.52	35.80±10.31	35.68±10.19	8.23±4.83	7.63±4.41	6.84±3.99

Source: Own calculations using SPSS.

The characteristics of the second cluster are high tax wedge and high unemployment rates, compared to the Cluster 1 and Cluster 3. The highest unemployment rate in this group is registered in Greece – 21.5%. Belgium stands out as one of the countries with the highest tax wedge -53.95%. The starting assumption is empirically proved. Analyzed countries with a high tax wedge have a high unemployment rate.

5. Does tax wedge affect unemployment? Serbian tax policy in international perspective

“During the crisis, some variables even recorded alarming values in Serbia, so that the government was forced to undertake a series of measures to consolidate public finances” (Đurović Todorović, Đorđević, 2015, p. 111). Personal income tax, as we have seen, is very plentiful income in OECD countries. It provides a quarter of tax revenues in the OECD countries. In Serbia, the average personal income tax for the last 6 years is 9.33% of total public revenues. Additionally, the share of this tax form has a downward trend.

Table 5. Share of personal income tax in total revenues in Serbia, 2012-2017.

	Public revenues (in millions of dinars)	Personal income tax	
		In millions of dinars	Share in public revenues (in %)
2012	1472118.2	165261.6	11.22
2013	1538053.8	156084.8	10.14
2014	1620752.1	146484.4	9.03
2015	1694831.1	146775.3	8.66
2016	1842651.8	155065.4	8.41
2017	1973402.7	167881.6	8.50

Source: Bulletin Public Finances of the Republic of Serbia. Author’s calculations.

Explicitly, in Serbia, a much smaller amount of money is collected through personal income tax in comparison to OECD member countries. The importance income tax in Serbia is smaller, and as the most important reason in the professional literature, the state relies on indirect taxes. Additionally, a mixed income tax system is applied in Serbia, which implies taxation of each type of income individually and annual taxation of total income exceeding the statutory amount and having a corrective character. “The use of personal income tax in the tax system in Serbia has not given the expected results, and the main cause is current taxation system” (Đorđević, 2015).

In spite of significantly less personal tax revenues, compared to OECD member countries, the tax wedge in Serbia is considerably higher. The calculation of the tax burden starts from the gross wage of a worker. In Serbia, gross income of worker’s is taxed with several tax forms:

Table 6. Income tax and social contributions in Serbia (in %), 2018.

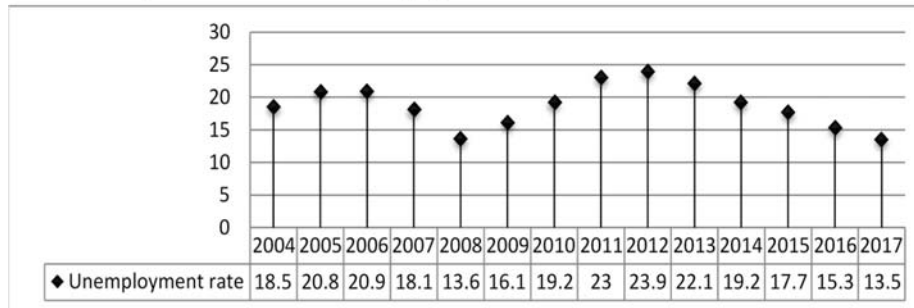
	Rate (in %)
1. Personal income tax	10
2. Contribution at the expense of workers for compulsory social security	19,90
a. Pension and disability insurance at the expense of the worker	14,00
b. Health insurance at the expense of the worker	5,15
c. Unemployment Insurance	0,75
3. Contributions at the expense of employer for compulsory social security	17,90
a. Pension and disability insurance at the expense of the employer	12,00
b. Health insurance at the expense of the employer	5,15
c. Unemployment insurance at the expense of the employer	0,75

Source: Statistical Office of the Republic of Serbia.

The structure of tax forms in Serbia abounds with numerous weaknesses. The tax rate is lower than the average of OECD countries, and contributions are well above average (Table 3). Serbia, among OECD countries, is classified in the first cluster (Table 4). The first group of clusters is right after the group of countries with the highest tax wedge and rate of unemployment. Subsumed under first cluster, Serbia must initiate a fiscal relaxation process. The economic environment is the most critical determinant of the labor market outcomes. The period after the major economic and financial crisis resulted in capital consequences for Serbia. Serbia started reforms that aimed at a propulsive and rapid transition to a market economy. One of the first tasks of the government was to achieve macroeconomic stability, price liberalization, and improve the regulatory framework that will define the business environment. In the past few years, social security contributions have risen, while the rate of personal income tax has been reduced. However, despite the reduction of the personal income tax rate, the tax burden is significant and has great repercussions on the labor market. Great contributions have shown negative reflections on competitiveness and economic growth (Dolenc, Laporsek, 2010, p. 346; Ederveen, Thissen, 2004, p. 11). Large labor costs were reportedly followed by high unemployment rates. The unemployment rate in Serbia is much higher than the average of OECD member countries. Namely, according to the unemployment rate, Serbia is right behind Greece and Spain. So, it is listed among the countries that have the highest unemployment rates.

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Graph 2. Movement of unemployment rate in Serbia (in%), 2004-2018.



Source: Bulletin Public Finances of the Republic of Serbia.

Graph 2. shows the negative reflections of the economic and financial crisis on employment. The years that followed the crisis were also followed by a rapid increase in the unemployment rate.

By reducing the tax wedge, there would be an explicit reduction in the barriers to job creation and an increase in the human tendency to work. Accordingly, there would be a reduction in the unemployment rate. Research by the OECD and the IMF has shown that high labor taxes are the main determinant of high unemployment (OECD, 2004; IMF, 2003). „The tax wedge represents the deviation from the equilibrium employment level on the labor market“ (Trpeski, Tashevska, 2012, p. 572). By creating a wedge between labor costs and real net wage, labor taxes reduce the demand for labor and employment (Dolenc, Vodopivec, 2005, p. 230). While both demand and supply effects do matter, in labor markets with high unemployment and large labor surpluses, such as the Serbian labor market, the labor demand effects matter more.

The capital consequences of the tax wedge, not only on the labor market, but also on Serbia's economic growth, emphasize the importance of reforming in all tax rates and contributions. Namely, OECD countries that have reduced the tax wedge in tax reforms have significantly reduced unemployment rates (Elmeskov et al., 1998). Based on the analysis of the observed variables, Serbia should, in addition to the reducing rate of personal income tax, also should reduce contributions, that can also negatively affect employment.

5. Conclusion

The paper emphasizes the seriousness of the problem of structural unemployment, which is present in all countries. The task of reforms, which are necessary in the OECD countries and Serbia, is to improve economic efficiency. Among the economic policymakers and theoreticians, the attitude is that, when designing a tax structure the creation of tax distortions must be avoided.¹ Prescribing appropriate tax rates can, undoubtedly, influence the economic behavior of taxpayers. Prescribing high tax rates can initiate the emergence of the so-called wedge between the profitability of certain activities before tax and income after tax

¹ There are numerous discussions about the impact of taxation on economic growth. The most severe impact on economic growth, immediately after the corporate tax, is income tax (Johansson, 2008).

(OECD, 2006). The aim of this overview is to underscore the role of the tax wedge on the labor market. In regard to the link between tax wedge and unemployment rate, the existing research generally fails to find evidence even because there are few studies that investigate this link. Namely, there are no widely accepted results and further research is needed. The paper analyzes the OECD countries and Serbia. The paper is based on a descriptive analysis of the unemployment rate and the quantitative tax wedge calculation in analyzed countries for the period 2015 to 2017. We conducted a cluster analysis that divided the analyzed countries into three groups based on common characteristics. The variables we observed were the tax wedge and the unemployment rate. The results are as follows. The first and third clusters show similar characteristics and a more favorable economic environment than the second cluster. The second cluster is a set of eight countries with the highest tax wedges and the highest unemployment rates. Belgium is the country with the highest tax wedge. Serbia belongs to the first group of clusters, which is right after the group of countries with the highest tax wedge and rate of unemployment. The theoretical analysis was supported by an empirical analysis which confirmed the starting assumption in the paper, positive correlation between the tax wedge and the unemployment rate. Tax system reforms are necessary in all analyzed countries. Despite the fact that many factors affect the performance of the labor market, such as political and institutional factors, the degree of flexibility of labor markets, diversion to informal economy, international developments, etc., research has shown that the tax wedge effect is crucial. High rates of taxes and contributions inefficiently affect the redistribution of income and wealth. Additionally, such sustainable rates directly lead to unfavorable business conditions and impact on the labor market. Tax burden creates a tax wedge that determines the rate of unemployment and negatively impacts economic growth, making the markets uncompetitive. Also, there is a decrease in productivity in one country. Positive effects of reforms can also be expected in terms of increasing work effort. Reduced tax rates can influence the increase in the income effect and hence the individual need for work. Therefore, it is necessary to provide a fiscal environment that will be in the function of economic growth. Such an environment, in conditions of globalization, can be created by reducing tax rates, especially in small open economies.

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PORESKI KLIN KAO DETERMINANTA NEZAPOSLENOSTI: KOMPARATIVNI PREGLED ZEMALJA OECD-a I SRBIJE

Rezime: Poreski klin je značajan deo troškova radne snage koji predstavlja razliku između bruto plate i neto dohotka. Veliku pažnju u akademskim krugovima, poreski klin dobija posle velike svetske ekonomske i finansijske krize, nakon što empirijska istraživanja otkrivaju pozitivnu korelaciju između nezaposlenosti i poreškog klina. Ova veza može biti izražena na sledeći način: što je elastičnija kriva ponude ili tražnje za radnom snagom, negativni efekat poreškog klina na zaposlenost je veći. Cilj rada je da istraži implikacije poreškog klina na nezaposlenost u zemljama OECD-a i Srbiji, i da analizira srpsku poresku politiku u internacionalnoj perspektivi. Sprovedena je klasterka analiza na uzorku od 36 zemalja, koja je za rezultat imala tri grupe zemalja klasifikovane prema poreskom klinu i stopi nezaposlenosti. Srbija pripada prvoj grupi klastera, koja je odmah iza grupe zemalja sa najvišim poreskim klinom i najvišom stopom nezaposlenosti. Zanimljivo, rezultati su pokazali da poreski klin ima značajan uticaj na zaposlenost u zemljama OECD-a i Srbiji.

Ključne reči: poreski klin, troškovi radne snage, stopa nezaposlenosti, hijerarhijska klaster analiza.