TAX WEDGE ON LABOR: SLOVENIA VS. EU AND OECD COUNTRIES

Primož Dolenc[*] and Milan Vodopivec[**]

Abstract

When taxes on labor are introduced the tax wedge between labor costs paid by employer (gross wage) and net wage received by employee appears. At a certain level of wage, higher tax wedge on labor increases unemployment and decreases employment, ceteris paribus. The paper tackles with thee main questions: characteristics of tax wedge on labor, unemployment and employment rate in OECD countries in near past, tax wedge on labor policy in EU15 and new EU members and tax system and its effects on unemployment and employment rate in Slovenia. We found that OECD countries can be classified in two groups of countries if tax wedge on labor, unemployment rate and employment rate are taken into consideration. First group is high tax wedge, high unemployment rate and low employment rate group of countries, whereas the other group has alternative characteristics. European member states (old and new) have on average higher tax burden on labor than OECD average, consequently suffering from higher unemployment rates. Slovenia has unreasonably high tax wedge on labor; in EU only Belgium and Germany have a higher tax burden. According to previous and our empirical findings we suggest that Slovenia could benefit from lowering tax wedge.

Key words: *economic policy, tax wedge, Slovenia, EU, OECD.*

---

[*] University of Primorska, Faculty for Management Koper, and Ministry of Finance, The Treasury. E-mail: primoz.dolenc@fm-kp.si

[**] The Worldbank and University of Primorska, Faculty for Management Koper.

1. Introduction

When taxes on labor are introduced the tax wedge between labor costs paid by employer (gross wage) and net wage received by employee appears. According to OECD (2004) tax wedge on labor is the difference between what employers pay out in wages and social security charges and what employees take home after tax, taken into account also social security deductions and cash benefits.

At a certain level of wage, higher tax wedge on labor increases unemployment and decreases employment, ceteris paribus. Actual effect of tax introduction depends on the elasticity of demand and supply curves and flexibility of labor market. In a perfectly flexible labor market, introduction of taxes would have only "quantitative" effect on employment and there would again be no unemployed, because the quantity of active population would be set at equilibrium gross (and net) wage. But in reality labor markets are not perfectly flexible because of labor unions, mandatory minimum wage, perfectly elastic supply of work curve under a certain level of wage, etc. Therefore Vodopivec (2005) stresses that by creating a wedge between the costs of labor and the real consumption wage, labor taxes reduce the demand for labor and (if demand for labor is not perfectly inelastic) employment, increasing unemployment.

OECD reports that tax wedges on labor have been falling in many OECD countries in recent years. This is helping to reduce a major obstacle to job creation and people's willingness to work (OECD 2004). However, tax wedges are still significantly higher in most European countries compared to USA, Canada, Australia or Asian countries. According to IMF (2003) high unemployment rates in some European countries are attributable to labor-market protections, such as generous unemployment benefits, powerful labor unions and employment protection legislation. On the other hand, Baker and Schmitt (2003) argue that the IMF analysis is not robust enough; they claim that it does not give the same result if time period, sample of countries or econometric specification is changed in reasonable way.

This paper tackles with thee main questions:

1. What are characteristics of tax wedge on labor, unemployment and employment rate in OECD countries in near past?
2. What kind of tax wedge on labor policy is significant for EU15 and new EU members?
3. What kind of tax system is implemented in Slovenia and what are the effects on unemployment and employment rate?

The rest of the paper is organized as follows. The third part of the paper – after description of data sources – discusses characteristics of tax wedge on labor, unemployment and employment rate in OECD countries in near past, the fourth section analyses what kind of tax policy regarding tax wedge on labor is significant for EU15 and new EU members. The fifth section discuses what kind of tax system is implemented in Slovenia and what are the effects of such system on unemployment and employment rate. We sum up with concluding remarks and some policy recommendations.

2. Data sources

The analysis was based on three sources of data:

1. for OECD countries, the data on tax wedge, employment rate and unemployment rate are OECD official data (OECD 2003),
2. for new European Union members the data on tax wedge, employment rate and unemployment rate was obtained from data of Wiener Institut für Internationale Wirtschaftsvergleiche (WIIW),
3. for Slovenia, the tax wedge was calculated on the basis of current tax regulation, whereas data on employment rate and unemployment rate was obtained from reports of Statistical office of Slovenia.

All data is for year 2002. The data on tax wedge is comparable among countries, as they are all calculated for single individual without children at the income level of the average production worker.

3. Characteristics of tax wedge on labor, unemployment and employment rate in OECD countries

OECD is a variety of 30 countries, that differ economically (most of these are developed and minority of them are transition countries) as well as according to their definition of social state. Therefore is not surprising that tax wedge in these countries varies; it ranges from 16% (in Mexico) through as high as 55% in Belgium. OECD mean tax wedge on labor is 35,8% (see Figure 1 and Table 1; data for Slovenia is inserted for comparison).

Table 1 shows a detailed picture about tax burden on labor end employment and unemployment rates in different OECD countries (and Slovenia; for comparison)[1]. In most countries tax wedge on labor consists of income tax and social security contributions, paid usually by employee and employer. Hungary and Poland have also payroll tax of 0,3 and 0,6%, respectively. It is interesting that countries have quite different structures of taxes on labor; coefficients of variation of different components are about 0,60, whereas (relative) variability of tax burden is much lower. This shows countries have a different perspective of what the appropriate structure of tax wedge is; on the gross level, however, differences are not so evident.

Table 1: Taxes on labor, employment rates and unemployment rates in OECD countries (and Slovenia) in 2002 (in %)[1]

Country	Taxes on labor[2]					Employment rate	Unemployment rate
	Income tax	Social security contributions employee	Social security contributions employer	Payroll tax	**Total tax wedge on labor[3]**		
Slovenia	**12,4**	**18,2**	**13,2**	**4,4**	**48,2**	**65,8**	**5,9**
Belgium	21	11	24	0	55	59,7	6,9
Germany	17	17	17	0	51	65,3	8,7
France	9	9	29	0	48	62,2	8,9
Sweden	18	5	25	0	48	74,9	5,2
Hungary	13	9	24	0,3	46,3	56,2	5,8
Italy	14	7	25	0	46	55,6	9,1
Austria	8	14	23	0	45	68,2	4,9
Finland	20	5	20	0	45	67,7	9,1
Poland	5	21	17	0,6	43,6	51,7	20,3
Czech Republic	8	9	26	0	43	65,7	7,3
Denmark	32	11	1	0	43	76,4	4,3
Slovak Republic	5	9	28	0	42	56,9	18,6
Turkey	12	12	18	0	42	46,7	10,6
Spain	10	5	23	0	38	59,5	11,4
Norway	19	7	11	0	37	77,1	4,0
Netherlands	6	19	10	0	36	74,5	2,6
Greece	0	12	22	0	35	56,9	9,8
Luxembourg	7	12	12	0	32	63,6	2,6
Portugal	4	9	19	0	32	68,1	5,4
Canada	18	6	7	0	31	71,5	7,7
Switzerland	9	10	10	0	30	78,9	3,0
United Kingdom	14	7	8	0	30	72,7	5,1
United States	15	7	7	0	30	71,9	5,9
Iceland	21	0	5	0	26	82,8	3,2
Australia	24	0	0	0	24	69,2	6,1
Ireland	10	4	10	0	24	65,0	4,3
Japan	6	9	10	0	24	68,2	5,6
New Zealand	20	0	0	0	20	72,4	5,3
Korea	2	6	8	0	16	63,3	3,2
Mexico	2	1	13	0	16	60,1	2,5
Average[4]	12,3	8,4	15,1	0,0	36,0	66,1	6,9
Coefficient of variation[4]	0,6	0,6	0,6	4,0	0,3	0,1	0,6

Notes:

[1] OECD countries sorted in descending order according to total tax burden.

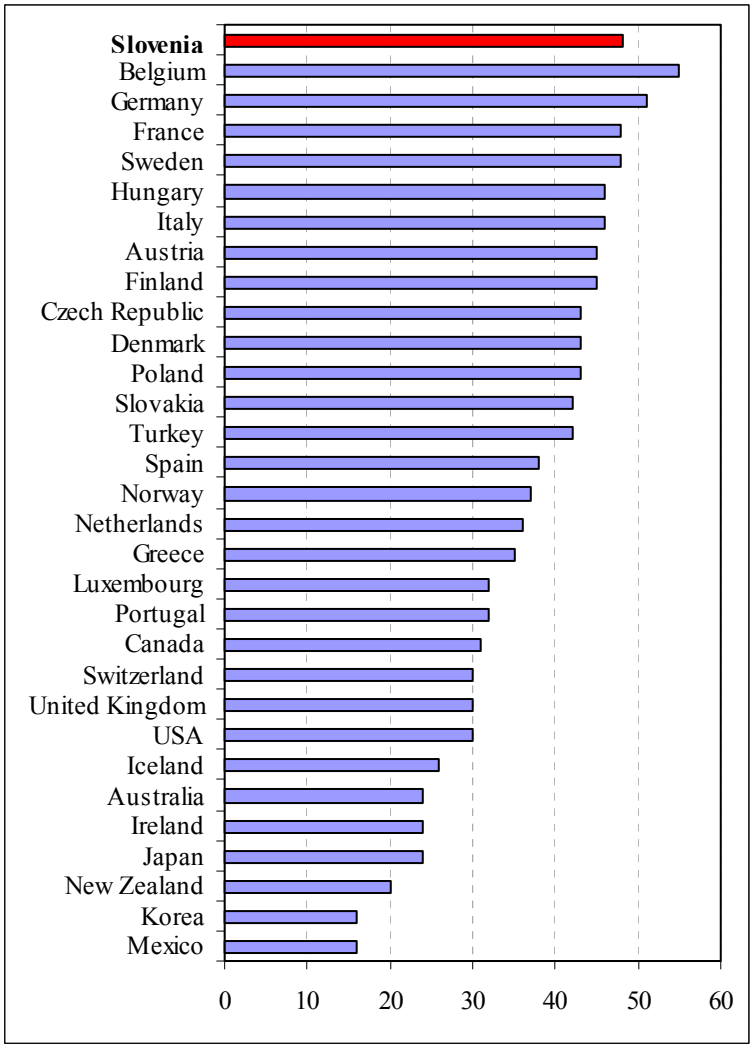
[2] Taxes on labor represent the structure of taxes in employer's costs of an employee.

[3] Tax wedge on labor is the coefficient between all taxes and social security contribution payments, paid by employer and employee, and total cost of an employee for employer.

[4] Parameters calculated for OECD countries.

Source: OECD (2003), Statistical office of Slovenia, own calculations.

Figure 1: Tax Wedge on labor in Slovenia and OECD countries in 2002 (in %)

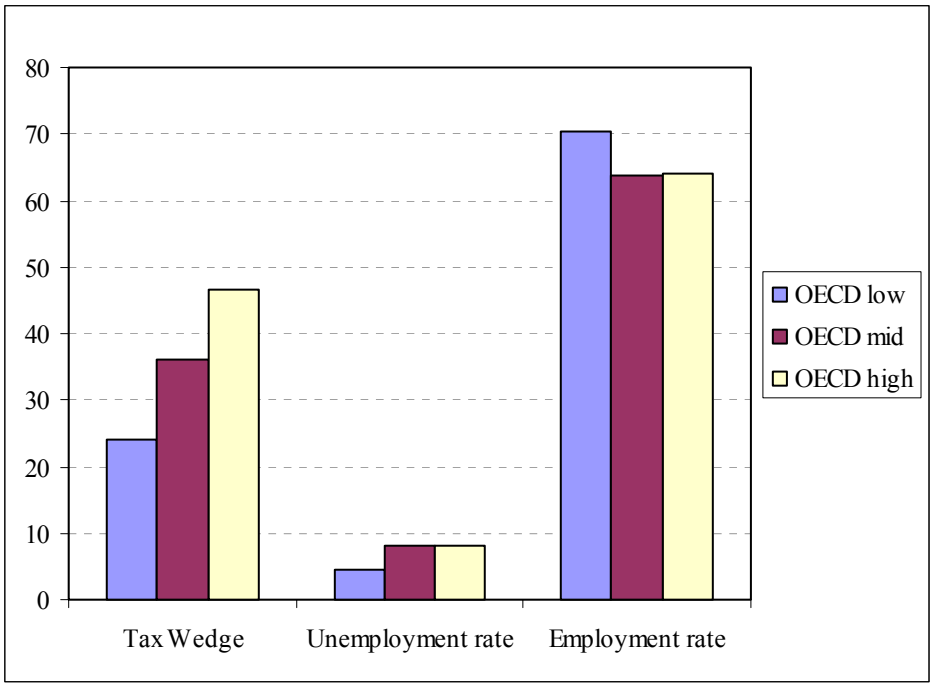


Source: OECD (2003), own calculations.

What are characteristics of countries in the middle of tax burden distribution and the two groups on left and right tail? To answer this question we divided OECD countries in three equal groups (with high, mid and low tax wedge) and calculated average tax wedge, average unemployment rate and average employment rate. For groups' break points 33rd and 66th percentile were taken.

Figure 2 shows that there are no significant differences between unemployment and employment rates in OECD mid and OECD high group. However, statistically significant differences (at P = 0,00) may be found for OECD low group (compared to other two groups). Average unemployment and employment rates in OECD mid and OECD high group of countries are about 8,2 and 63,9%, respectively. In OECD low group of countries, however, average unemployment and employment rates are 4,4 and 70,5%, respectively.

Figure 2: Tax wedge, unemployment rate and employment rate in three groups of OECD countries in 2002 (in %)



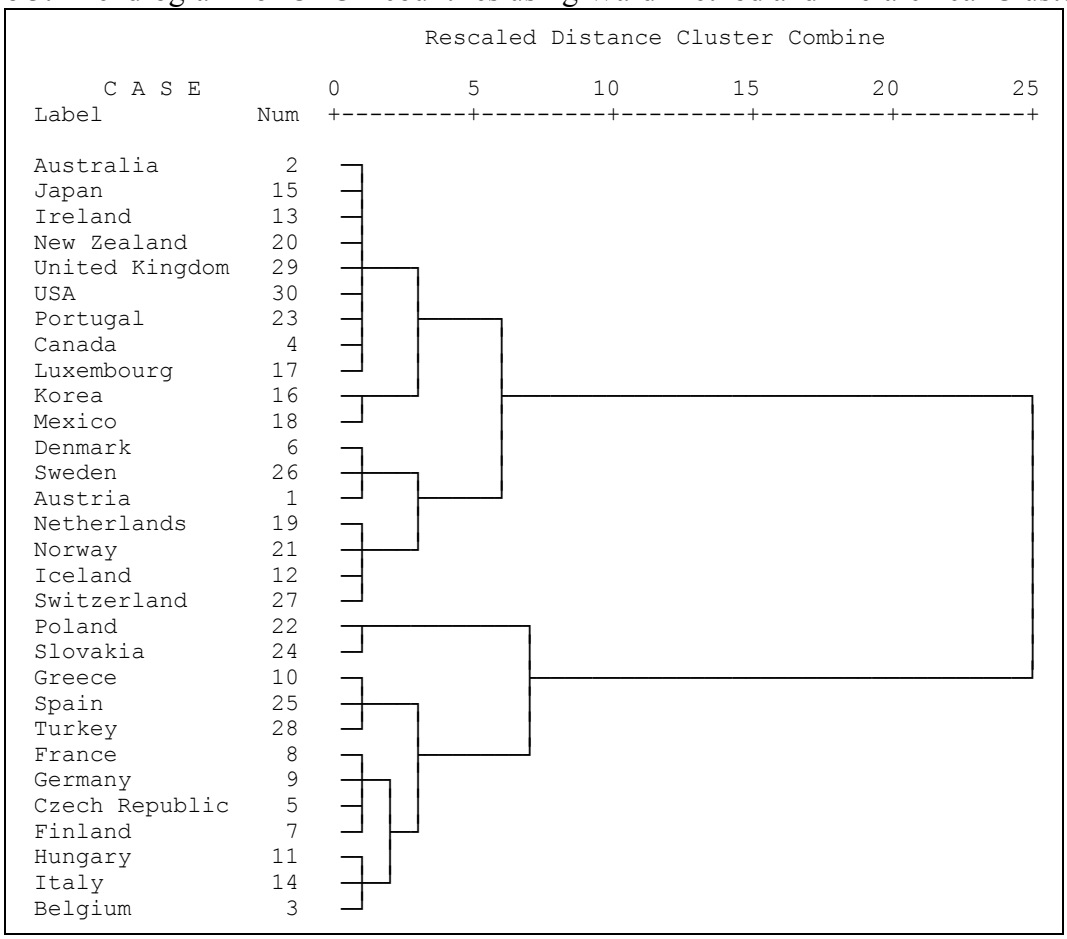
Source: Table 1, own calculations.

This simple analysis confirms the hypothesis, that lower tax wedge corresponds to lower unemployment rate and higher employment rate. The results are comparable to Vodopivec (2005), Nickell and Layard (1999), Daveri and Tabellini (2000), Haltiwanger, Scarpetta, and Vodopivec (2003). It seems that for OECD countries the threshold of tax wedge is about 30%.

Not to be misled by descriptive statistics cluster analysis has been applied to identify groups of OECD countries that are similar to each other with respect to tax wedge, unemployment and employment rates. Taking all three variables[2] into consideration the (statistical) distance between countries shows which countries are near or apart. Note that variables were standardized to avoid different averages influence the relative importance of a variable.

Graphical representation of hierarchical clustering is presented by dendrogram (Figure 3). The observations are listed on the vertical axis, and the horizontal axis represents the Euclidean distance between the centroids of the clusters (i.e. group averages). Large Euclidean distance between the centroids of the clusters is interpreted as a large difference between clusters; in this case observations are not supposed to be joint in one cluster.[3] In our case it's obvious that there are two groups of OECD countries, which confirms (however statistically firmly) our previous speculation. The characteristics of these two groups of countries are shown in Table 2.

Figure 3: Dendrogram for OECD countries using Ward Method and Hierarchical Clustering



Source: Table 1, own calculations.

Table 2: Characteristics of two groups of OECD countries clustered with respect to tax wedge, unemployment and employment rates

Group		Tax wedge	Unemployment rate	Employment rate
1	(n = 18)	30,2 ± 9,2	4,5 ± 1,4	71,0 ± 5,9
2	(n = 12)	44,5 ± 5,4	10,5 ± 4,4	58,7 ± 6,1
Total	(n = 30)	35,9 ± 10,5	6,9 ± 4,2	66,1 ± 8,5

Source: Table 1, own calculations.

The first group is low tax wedge, low unemployment rate and high employment rate group of OECD countries, whereas the second group is the alternative one (high tax wedge, high unemployment rate and low employment rate group of OECD countries). Our empirical evidence shows, that (at least in OECD countries) countries with low tax wedge have low unemployment rate and high employment rate, and the other way around.

If the empirical results are to be applicable for other countries, e.a. Slovenia, we developed a rule to classify countries in these two groups. For this purpose two-group discriminant analysis has been used.

Equation 1: Estimated discriminant function

$$\hat{Z} = 3{,}668 + 0{,}101TW + 0{,}142UR - 0{,}125ER$$

Notes: 1. Cut-off value for Z is 0. Countries with positive Z are high tax wedge, high unemployment rate and low employment rate group of countries.
1. The analysis has predicted group membership with 100% accuracy (for OECD countries).

Legend: *TW* – tax wedge,
UR – unemployment rate and
ER – employment rate.

The likelihood of a country to be classified as high tax wedge, high unemployment rate and low employment rate country rises if tax wedge increases (which, according to theoretical and empirical expectations, causes also the increase of unemployment and decrease of employment, pushing up the likelihood even more).

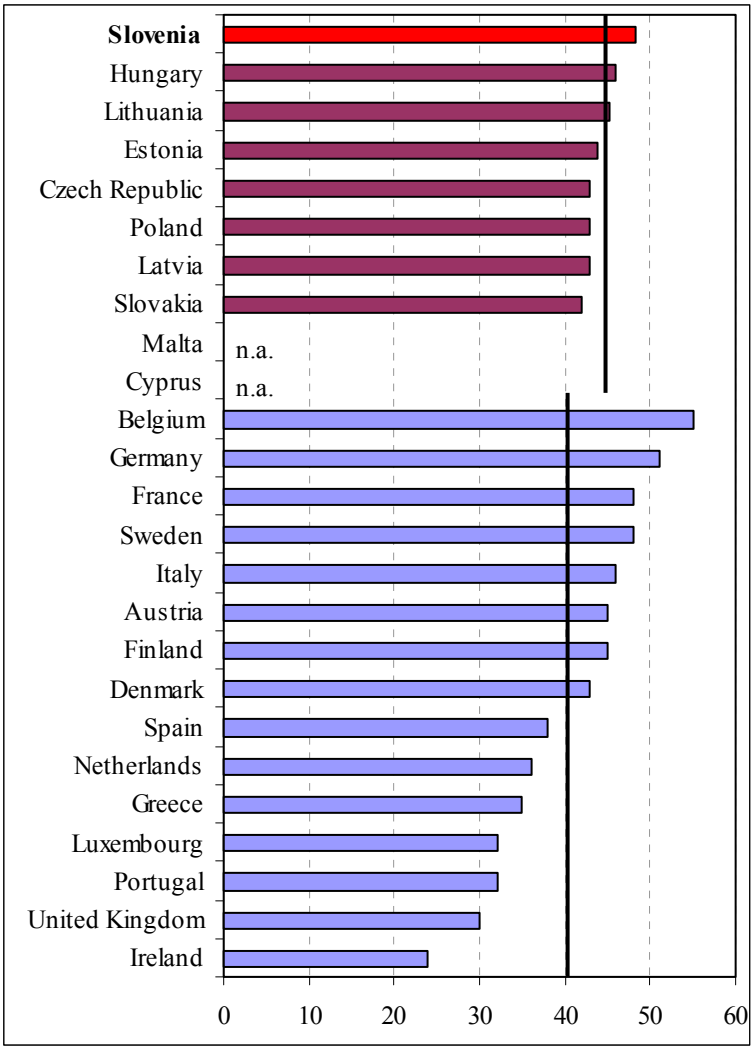
Here it should be stressed that the causality is obviously not a clear-cut. If all countries had the same ratio between sum of employed and unemployed with respect to active population, only number of employed and unemployed should be used to form groups. In this case the tax wedge would be considered an instrument, not an outcome!

4. Characteristics of tax wedge on labor in EU15 and new EU members

The above analysis shows that EU15 countries (old EU members) are almost equally distributed in the first and the second group. High tax wedge, high unemployment rate and low employment rate group of countries are Greece, Spain, France, Germany, Finland, Italy and Belgium, whereas other countries belong to the alternative group.

On average, European Union member states have higher tax burden than OECD average. Average tax wedge in EU15 countries is 40,5% (4%pts higher than OECD average) and for new EU members the figure is even a bit higher 44,3% (see Figure 4). The difference between tax burden in European Union member states and OECD countries is, we believe, the result of different factors, e.g. different definition of social state, different demographic characteristics, etc.

Figure 4: Tax Wedge on labor in EU15 countries and new EU members 2002 (in %)



Source: Table 1, WIIW, own calculations.

We mentioned above the difference between average tax wedge on labor in EU15 countries and new EU member states. The difference, however, is not statistically significant (P = 0,14). The insignificance is probably due to high variability of tax wedge on labor in EU15 countries,[4] whereas the (relative) variability of tax wedge on labor in new EU member states is much smaller.[5]

But when comparing EU (old and new member states) with non-EU OECD countries we found that tax wedge is higher in EU member states; the difference is more than 15 percentace points and significant at negligible significance. The difference in employment rate are not significant, probably due to extremely high variance in non-EU OECD countries, but the difference in unemployment rate is obvious – EU member states have significantly higher unemployment rate (see Table 3).

Table 3: Comparison of EU member states and non-EU OECD countries with respect to tax wedge on labor, and employment and unemployment rate

Group	Tax wedge	Unemployment rate	Employment rate
EU member states	41,3 ± 7,8	7,6 ± 4,6	64,9 ± 7,4
Non-EU OECD countries	25,9 ± 7,9	5,3 ± 2,5	68,5 ± 10,1
t-test	-5,15	1,48	1,11
P	0,00	0,05	0,14

Source: Table 1, own calculations.

Here it is worthwhile to stress also that unemployment rate is quite high (on average) in new EU member states, even though not entirely caused by high tax burden, but also (or mostly) by other factors that "squeeze" all transition economies.

5. Tax wedge on Labor in Slovenia

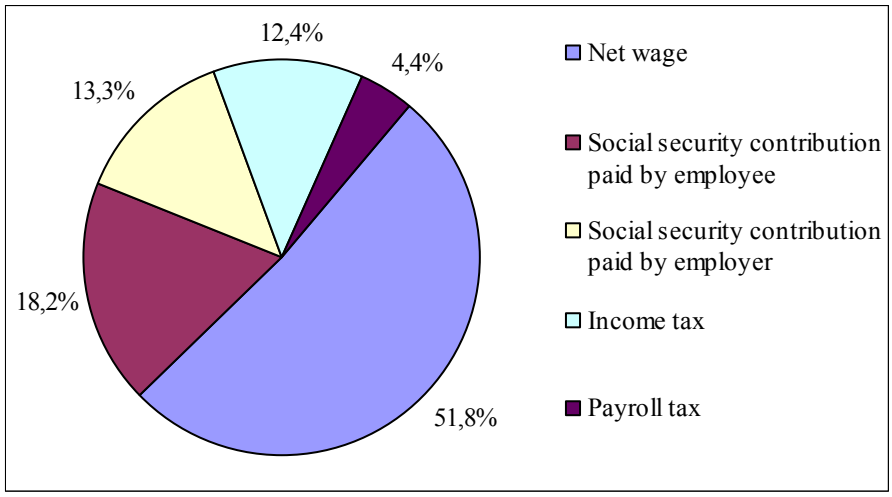
In Slovenia tax wedge on labor is composed of personal income tax (paid by employee) and social security contributions (paid both by employer and employee). Unusually, Slovenia has introduced also payroll tax (paid by employer). Among OECD and EU countries such tax is used only in Hungary and Poland; it is, however significantly lower than in Slovenia (see Table 1). According to OECD methodology the tax wedge for single individual without children at the income level of the average production worker was estimated at 48,2%[6] in 2002 (see Equation 2 and Figure 5). Regarding the fact that tax system has not changed much since early 1990's, time dimension of tax wedge on labor in Slovenia does not show any significant trends or characteristics. In fact, the estimated tax wedge on labor for the same category of a worker in 2003 accounted for 48,1%. This is due to the fact that taxes and benefits are mainly connected to average wages rather to be fixed or connected to e.g. GDP. Any significant change of tax wedge on labor would be caused only by a significant change of tax system.

Equation 2: Calculation of tax wedge in Slovenia in 2002 (according to OECD methodology; for single individual without children at the income level of the average production worker)

$$\text{tax wedge} = \frac{\text{income tax} + \text{social security contributions (total)} + \text{payroll tax}}{\text{gross wage} + \text{social security contributions of employer} + \text{payroll tax}} = 48{,}2\%$$

Slovenia has the highest tax wedge on labor among new EU members (see Figure 5) and compared to EU25 countries tax wedge on labor is higher only in 2 countries (Germany and Belgium). Using both methods, i.e. discriminant function, which has been estimated for OECD countries, and cluster analysis (recluster OECD countries with Slovenian data attached) we can classify Slovenia in high tax wedge, high unemployment rate and low employment rate countries (Equation 3 and Figure 6). According to cluster analysis, Slovenia is most similar to Austria, France, Germany, Finland and Czech Republic when compared simultaneously with three parameters: tax wedge on labor, employment rate and unemployment rate. All these countries have one of the highest tax wedge on labor and above average unemployment rate amongst all OECD countries.

Figure 5: The composition of gross cost of work in Slovenia in 2002 (for single individual without children at the income level of the average production worker



Source: Statistical office of Slovenia, own calculations.

This fact was stressed also by European Commission in latest Joint Employment Report (see European Commission 2005). It was explicitly pointed out that Slovenia still has above average tax burden on labor, although some progress has been achieved through the recent tax reform package.

Equation 3: Estimated discriminant score for Slovenia (estimate for 2002)

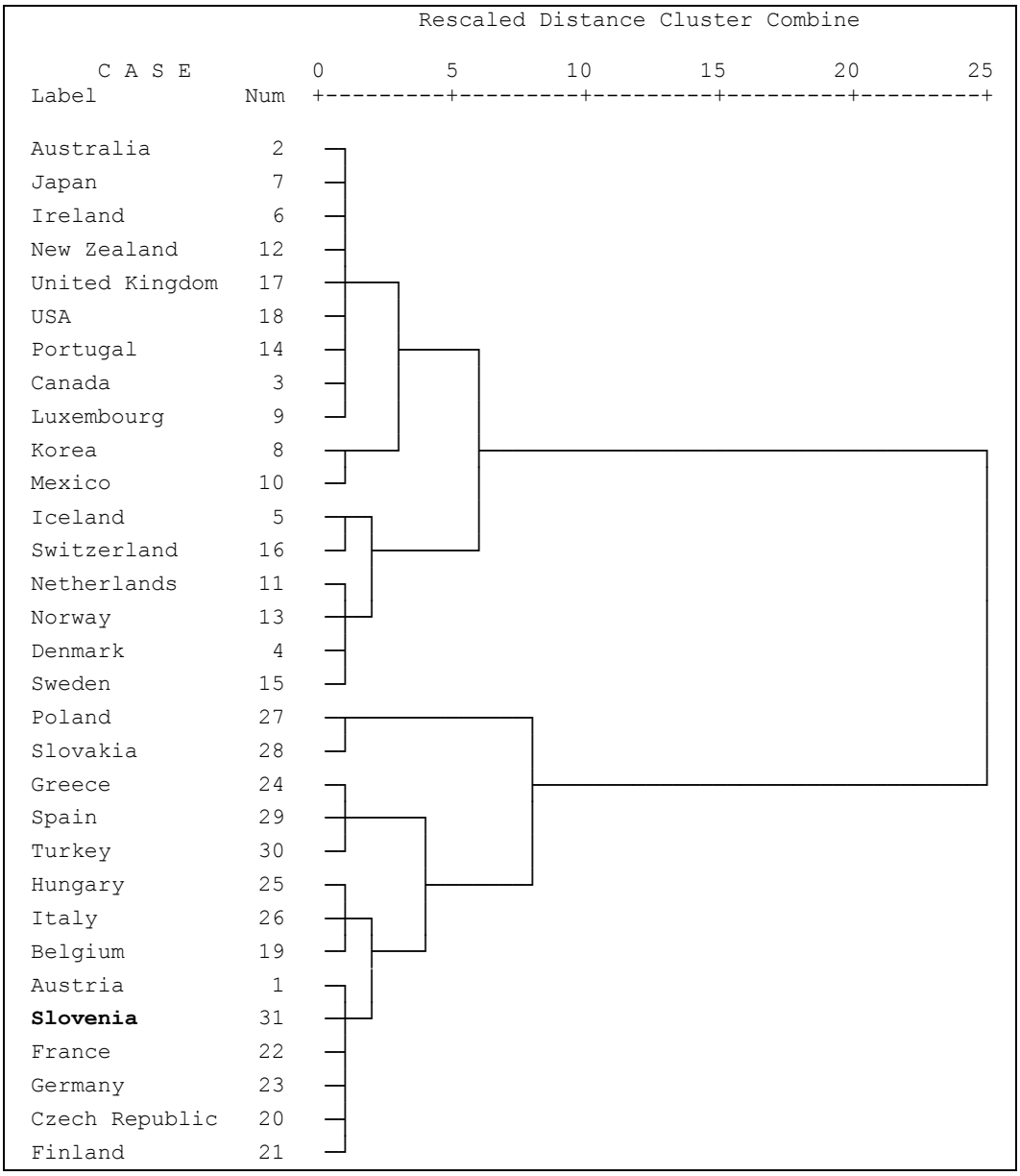
$$\hat{Z} = 3{,}668 + 0{,}101 \cdot 48{,}2 + 0{,}142 \cdot 5{,}9 - 0{,}125 \cdot 65{,}8 = 1{,}15$$

Even though Slovenia has the highest tax wedge on labor among new EU countries, its employment and unemployment rate is not critical, compared to data from other new EU countries. Slovenia has much lower unemployment rate and higher employment rate than Slovakia or Latvia, for example, even though its tax wedge on labor is 5%pts higher. Compared to Hungary Slovenia has similar tax wedge on labor (only 2%pts higher than Hungary) and unemployment rate, but significantly higher employment rate. Compared to new EU members Slovenia is highly ranked economy despite relatively high tax wedge on labor. However, according to European Commission (2005) low employment rate (compared to EU15 countries), especially for persons over 55, is still a challenging problem in Slovenia.

When comparing to OECD countries Slovenia's estimated discriminant score is 1,15, whereas mean in the group of countries with high tax wedge, high unemployment rate and low employment rate is 2,31. This suggests that Slovenia is not far the cut-off point (i.e. not far from low tax wedge, low unemployment rate and high employment rate group of countries). In fact, with respect to employment and unemployment rate Slovenia is somewhere in between, but high tax wedge on labor pushes it up.

These results suggest that Slovenia is on boundary; it has relatively low unemployment rate and relatively high employment rate with respect to tax wedge on labor. However, it would probably be difficult to lower unemployment rate and raise employment rate without significant change in tax wedge on labor. This could reduce a major obstacle to job creation and increase people's willingness to work resulting in expectedly higher employment and lower unemployment rates.

Figure 6: Dendrogram for Slovenia and OECD countries using Ward Method and Hierarchical Clustering



Source: Table 1, own calculations.

6. Concluding remarks

OECD and IMF tudies have shown that higher taxes on labor, including unemployment benefit contributions, significantly increase unemployment (see OECD 2004 and IMF 2003). This was confirmed also in this study; our empirical evidence shows, that (at least amongst OECD countries) countries with lower tax wedge have lower unemployment rate and higher employment rate, and the other way around.

European countries have higher tax wedge, compared to OECD average. Average tax wedge in EU15 countries is 40,5% (4%pts higher than OECD average) and for new EU members the figure is even a bit higher 44,3%. Differences between EU15 countries and new EU members were not found to be statistically significant.

In Slovenia tax wedge on labor is composed of personal income tax (paid by employee), social security contributions (paid both by employer and employee) and payroll tax (paid by employer). The later is also used only in Hungary and Poland, but here tax rate is 5-10 times lower than in Slovenia. Compared to OECD countries, EU15 countries and new EU members Slovenia has almost the highest tax wage on labor (for single individual without children at the income level of the average production worker the tax wedge was estimated at 48,2% in 2002). In our opinion this hinders more effective battle with unemployment.

According to Vodopivec (2005), Nickell and Layard (1999), Daveri and Tabellini (2000), Haltiwanger, Scarpetta, and Vodopivec (2003) tax reduction could increase demand for labor and employment and lower unemployment. Nickell and Layard (1999), Daveri and Tabellini (2000), Haltiwanger, Scarpetta, and Vodopivec (2003) argue that higher taxes on labor, including unemployment benefit contributions, significantly increase unemployment. Nickell and Layard (1999), for example, report that a 5 percentage point decrease in the aggregate tax wage (which includes payroll, income, and consumption taxes) would reduce the unemployment rate by 13 percent (for example, from 8 percent to 7 percent). They also argue that different types of taxes have the same effect on unemployment. If we apply Nickell and Layard's analysis to Slovenia, a 5%pts decrease in the aggregate tax wage (that is from approximately 48 to 43) could reduce the unemployment rate by about 13 percent (that is from 5,9 to 5,1 in 2002).

Thorough analysis of the influence of tax wedge on labor on employment and unemployment rates in Slovenia should maybe base on time series data for Slovenia. However, the fact that tax system has not changed much in last 15 years and there's no relevant information for the period before 1990's (because of incomparable economic system), our analysis could base only on cross section data. This analysis shows that only abolition of Slovenian particularity (payroll tax) would lower tax wedge for 2,4%pts. But budget income of this tax accounted 93 billion in 2002, which is approximately 8% of yearly budget. This is evident figure, why the government hesitates in abolition of payroll tax although employers and labor unions are constantly warning, that this tax (in combination with other taxes on labor) cause unreasonable pressure on labor market. Nevertheless, loss in budget incomes due to abolition of payroll tax would be compensated with savings on unemployment insurance and unemployment assistance payments due to (expected) lower unemployment and additional budgetary income from newly employed, probably also moved from undeclared work.

One could argue that due to strong labor unions the reduction of tax wedge on labor would be passed on to net wages without any effect on employment. This could be the case of there would not be existing also a strong social partnership (represented in Economic and Social Council), therefore it is really unlikely that only labor unions (or already employed) would gain the positive effect; due to cooperation of social partners it is very likely that the effect would be also or primarily on employment. Besides that the social dialog in Slovenia usually prefers employment prior to the level of wages.

Keeping the above figures in mind, Slovenia could reach low tax wedge, low unemployment rate and high employment rate group of OECD countries with the reduction of tax on labor for approximately 9%pts. This would, ceteris paribus, reduce unemployment rate to the mean of low tax wedge, low unemployment rate and high employment rate group of OECD countries (4,5%). However, this tax reduction would not be sufficient to increase employment rate to the group's average. For this to happen, not only the unemployed should be

reactivated, but also others, who are capable but not willing to work, should be encouraged to join (official) employment.

To sum up, Slovenia should follow the trend, which is significant for OECD countries in recent years, where tax wedges on labor are falling, helping to reduce a major obstacle to job creation and people's willingness to work (OECD 2004). However, only tax reduction probably would not be sufficient. In Slovenia (similar to many European countries as reported by (IMF 2003)) high unemployment rate is attributable to labor-market protections, such as generous unemployment benefits, powerful unions and especially employment protection legislation.

Notes

1. For the purpose of further analysis also employment rates and unemployment rates are shown.
2. Variables were standardized to avoid different averages influence the relative importance of a variable.
3. For detailed interpretation of cluster analysis and dendrogram see Sharma (1996, p. 185-232).
4. Coefficient of variation is 0,21.
5. Coefficient of variation is 0,04.
6. We calculated the figure on our own, because officially published data from different sources (note that OECD data for Slovenia is not available) is not necessary comparable directly to OECD methodology.

References

Baker, D., and J. Schmitt. 2003. Labor Market Protections and Unemployment: Does the IMF have a Case? *Briefing Paper* 11(2003). London: Center for Economic and Policy Research.

Calmfors, L., and J. Drifill. 1988. Bargaining Structure, Corporatism, and Macroeconomic Performance. *Economic Policy* 6 (3): 14-61.

Daveri, F., and G. Tabellini. 2000. Unemployment, Growth and Taxation in Industrial Countries. *Economic Policy* 15 (30): 49-104.

Elmeskov, J., J.P. Martin, and S Scarpetta. 1998. Key Lessons from Labor Market Reforms: Evidence from OECD Experiences. *Swedish Economic Policy Review* 5 (2): 205-252.

European Commission, 2005. *Draft Joint European Commission Report 2004/2005.* Brussels: Council of the European Union.

Haltiwanger, J.C., S. Scarpetta, and M. Vodopivec. 2003. How Institutions Affect Labor Market Outcomes: Evidence from Transition Countries. Paper presented at the World Bank Economist Forum, April 10.

IMF (International Monetary Fund). 2003. *World Economic Outlook, April 2003.* Washington, DC: IMF.

Nickell, S., and R. Layard. 1999. "Labor Market Institutions and Economic Performance." In *Handbook of Labor Economics*, Vol. 3, eds. Orley Ashenfelter and David Card, 3029-3083. Amsterdam: North Holland.

OECD (Organization for Economic Cooperation and Development). 2003. *Employment Outlook.* Paris: OECD.

_____. 2004. *Taxing Wages 2002/2003.* Paris: OECD.

Sharma, S. 1996. *Applied Multivariate Techniques.* New York: John Willey & Sons.

Statistical office of Slovenia. *Statistical Office Annual Report*, various issues.

Vodopivec, M. 2005. *Income Support for the Unemployed. Issues and Options.* Washington, DC: World Bank.

WIIW (Wiener Institut für Internationale Wirtschaftsvergleiche). *The Vienna Institute Monthly Report*, various issues.