

Productivity and labor costs in the OECD countries – elements of comparing analysis

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Key words

economics, labor market, finance, costs of labor, tax wedge

Abstract

The aim of this study is to present, analyze and assess the level and relations of labor costs and productivity in the OECD countries. The analyses of labor markets in European Union states or in the OECD countries show that these markets are characterized by very similar measures regarding the levels of professional activity, unemployment rate and efficiency of labor market policy programs. However, the difference in the level of wages still remains high. Among the reasons for this phenomenon we can indicate the levels of labor costs and productivity, which determine the levels of wages in particular member states. The thesis stated in the study is that the maintained differences in wages in the OECD countries may be explained by differences in the levels and relations of labor costs and productivity, which are discussed in detail in the study.

In the first and in the second part of the elaboration the analysis of productivity was carried out including definition of this subject and special empirical data showing measurement of productivity. In the third part we presented labor costs and tax wedge in the same period of time. The hierarchical clustering algorithm allowed to distinguish many groups of countries with different degree of similarity in terms of compared variables. Finally, the fourth part is devoted to a statistical analysis using measures such as the correlation coefficient between presented variables. The period of analysis are years 2000-2014 and the main source of data is the OECD database available in the Internet.

1. Introduction

The analyses of labor markets in the OECD countries show that these national economies are characterized by very similar measures regarding the levels of professional activity, unemployment rate and efficiency of labor market policy programs. This is especially observed in the Member States of the European Union. However, the difference in the level of wages still remains high. Among the reasons for this phenomenon we can indicate the levels of labor costs and productivity, which determine the levels of wages in particular member states. The thesis stated in the study is that the maintained differences in wages in the OECD countries may be explained by differences in the levels and relations of labor costs and productivity, which are discussed in detail in the study.

2. The subject and measurement of productivity

The concept of productivity is one of the elementary defined issue, which is presented in economics and management sciences. In the theory and in the practice of these sciences there are several terms which are treated as a synonymous in this paper. Among them are the concepts such as "productivity", "effectiveness", "efficiency" which we will present interchangeably.

Broadly, the productivity (efficiency) is understood the ratio (the relationship) manufactured goods to the factors of production expenditures incurred for their production (Kozioł, 2005, p. 63). In particular, sometimes this value is converted to a unit of product manufactured by the company.

As for the types of productivity, this one can point to the productivity cost of property (assets) and equity. These categories can be considered primarily in terms of macroeconomic individual companies, but also slightly wider shots.

Noteworthy here the notion of labor productivity, which is often replaced by the notion of productivity, and is most often understood as the ratio of the volume of marketed production of the total number of employees, it is the social performance; to the organizational unit, this is the performance of a team; to an employee, it is the individual productivity (Kozioł, 2005, p. 65). From the point of view of the development of performance (productivity) work is more macro-economic dimension and concerns of social productivity calculated for the entire national economy.

In the publications, the Central Statistical Office uses primarily the notion of labor productivity in industry, which is understood as the amount of production effects obtained as a result of human labor per unit of work, and work spent on this production in the studied industrial enterprise. In addition, statistical analysis takes the concept of social productivity of labor. The average productivity achieved by having all workers employed in a particular type of industrial activities (GUS).

The literature indicates also on external factors and internal productivity understood more broadly in relation not only to the work. These include market, competition, customer requirements, legal solutions, finance, availability of natural resources and their prices, which are external factors. In addition, mention is made here also factors of an internal nature such as the quality of products, machinery and equipment, processes, staff motivation and productivity and staff qualifications (Jagas, 2001, p. 10). The latter have a clear relationship with the human resources and directly results from this statement, which affects the performance of the same work in the company and the economy.

Given the macroeconomic factors affecting labor productivity can be indicated here that the level of labor productivity in Poland is affected by the level of qualifications of staff, the scope of professional experience, the transfer of labor from abroad, transfer of new technologies and management systems in organizations, the development of modern forms of communication. On the other hand, you can also extract psychological factors affecting the performance of individual employees, and here noteworthy issues such as motivation, remuneration and other income from their work, job satisfaction, self-realization, personal development and advancement - these issues are while interest areas called personnel management.

According to methodology of The OECD research productivity is commonly defined as ratio between the volume of output and the volume of inputs. In other words, we can say, that it measures how efficiently production inputs, such as labor and capital, are being used in an economy to produce a given level of output. Broadly, productivity measures can be classified as single factor productivity measures (relating a measures of output to a single measure of input, e.g. labor productivity) or multifactor productivity measures (relating a measure of output to a bundle of inputs, e.g. multifactor productivity). Productivity is considered a key of economic growth and competitiveness (OECD, 2016).

Labor productivity is a key dimension of economic performance and an essential driver of changes in living standards (OECD, 2016). Labor productivity is defined as GDP (gross value added in market prices, based on PPPs) per hour worked. Hours worked reflect regular hours worked by full-time and part-time workers, paid and unpaid overtime, hours works in additional jobs, and time not worked because of public holidays, annual paid leaves, strikes and labor disputes, bad weather, economic conditions and other reasons (OECD, 2016). However, the number of persons employed (i.e. total employment) is often used as a proxy for labor output (OECD, 2015, p. 24).

3. Productivity in economic measurement

The Table 1 shows the level of productivity in different countries of the OECD in 2000-2014 in USD per hour worked. As we can see, the two countries have the highest level of the GDP per hour worked, there are: Luxembourg and Norway, where the level of this measurement was about 77 USD. The rest of member states of OECD had the lower level of productivity.

There are three countries where we observed the lowest level of analyzed measurement, there were: Mexico, Chile and Poland, where the average productivity amounted about 21.38 USD. In Poland and in Chile we can observed the growth of this productivity, but in Mexico this measurement were on the stabile level in analyzed period.

The average GDP per hour worked in the OECD countries in 2000, 2006-2014 was on the level 44.02 USD, and in 2014 in 16 countries this level was still lower than average.

Country	2000	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australia	43.43	47.48	47.80	48.11	49.05	48.91	49.94	51.63	52.52	53.43
Austria	44.44	49.34	50.50	50.54	50.45	51.19	51.59	52.14	52.58	52.54
Belgium	55.64	60.44	61.31	60.93	60.48	61.80	61.52	61.37	61.70	62.24
Canada	42.12	45.07	45.05	45.00	45.40	46.08	46.75	46.84	47.34	48.31
Chile	17.13	20.40	21.24	21.66	21.79	21.67	22.09	23.22	23.78	24.13
Czech Republic	22.52	29.94	31.21	31.27	30.49	31.15	31.75	31.85	31.82	32.13
Denmark	53.27	57.78	57.88	57.04	55.93	58.61	58.54	59.56	58.54	58.78
Estonia	17.56	24.57	26.46	25.46	25.97	27.36	26.99	28.42	28.82	29.53
Finland	43.35	49.38	50.90	50.36	48.02	49.58	50.38	49.59	49.71	49.84
France	52.48	58.06	57.98	57.55	57.19	58.05	58.70	58.85	59.88	59.84
Germany	51.13	55.99	56.84	56.94	55.48	56.86	58.03	58.33	58.71	58.92
Greece	29.77	34.40	35.30	34.81	33.91	33.89	32.78	32.15	32.17	32.93
Hungary	20.52	27.22	27.37	28.10	27.19	30.35	30.99	30.77	31.18	30.69
Iceland	29.22	36.19	38.42	38.59	41.02	40.01	39.83	40.43	40.77	40.47
Ireland	44.74	52.23	53.21	52.99	55.22	58.12	60.70	61.00	60.13	61.97
Israel	29.63	32.40	32.76	32.67	32.41	33.26	34.07	34.16	34.48	34.66
Italy	46.84	47.11	47.07	46.76	45.75	46.79	47.02	46.87	47.29	47.01
Japan	33.52	36.82	37.44	37.53	37.20	38.69	38.70	38.99	39.54	39.39
Korea	18.4	23.83	25.26	26.51	26.94	28.89	30.81	29.91	31.52	31.21
Luxembourg	77.5	80.22	82.55	78.11	75.61	78.39	78.19	75.99	78.39	79.28
Mexico	17.53	18.40	18.83	18.25	18.35	17.45	17.98	18.12	18.05	18.49
Netherlands	54.44	59.32	59.78	59.81	58.38	59.63	60.05	59.93	60.13	60.63
New Zealand	32.52	34.82	35.90	34.74	35.46	35.19	35.65	36.74	36.23	35.89
Norway	72.84	81.00	79.55	77.12	77.39	77.75	77.14	77.75	78.02	78.51
Poland	17.93	22.20	22.81	22.93	23.62	25.23	26.41	26.86	27.27	27.61
Portugal	27.36	29.42	29.88	30.04	29.96	30.92	31.34	31.66	32.05	31.79
Slovak Republic	22.35	30.04	32.31	33.03	32.07	33.75	34.33	34.91	36.04	36.68
Slovenia	27.8	34.81	36.30	36.15	33.83	34.96	36.15	36.10	35.79	36.20
Spain	41.38	42.14	42.64	42.81	43.86	44.89	45.53	46.63	47.36	47.50
Sweden	44.99	53.55	53.71	52.75	51.51	53.21	53.57	53.49	53.96	54.37
Switzerland	48.52	52.65	53.79	54.03	52.91	54.23	54.12	54.43	55.23	55.62
Turkey	21.68	27.54	28.90	28.76	27.57	28.46	29.37	29.22	29.96	29.34
UK	41.16	46.68	47.44	47.44	46.35	46.87	47.57	47.19	47.37	47.48
USA	50.37	57.54	58.10	58.55	60.24	61.78	61.82	62.11	62.24	62.55

OECD Total	38.68	43.18	43.81	43.79	43.90	44.68	45.22	45.33	45.73	45.91
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Table 1: GDP per hour worked, Total, US dollars, 2000–2014

Source: <https://data.oecd.org/lprdy/gdp-per-hour-worked.htm>, [Accessed February 2016]

In the Table 2 we can observe the productivity of labor in OECD countries in 2000, 2006–2014. In this case it is visible that in most of countries such measured productivity dropped after the crisis in 2008. This drop can be seen even in countries where the productivity in GDP per hour worked was on high level. In 2012–2014 the dynamic of productivity was more stable what means that the period of crisis went to the end. Of course we can also observe the lower dynamics of this measure especially in high developed countries. In developing countries we can see the productivity of labor which grows quite quickly in some years of analyzed period.

Country	2000	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australia	1.71	0.85	0.68	0.64	1.95	-0.27	2.10	3.38	1.72	1.73
Austria	2.38	2.61	2.35	0.08	-0.18	1.46	0.80	1.07	0.84	-0.09
Belgium	0.80	0.92	1.43	-0.62	-0.74	2.19	-0.47	-0.23	0.53	0.87
Canada	2.91	1.10	-0.05	-0.09	0.89	1.49	1.45	0.19	1.08	2.05
Chile	3.95	3.51	4.11	1.97	0.63	-0.54	1.94	5.09	2.42	1.46
Czech Republic	5.04	6.51	4.22	0.22	-2.50	2.17	1.91	0.32	-0.12	0.97
Denmark	2.33	1.25	0.17	-1.45	-1.93	4.78	-0.11	1.75	-1.71	0.40
Estonia		5.53	7.68	-3.75	1.99	5.34	-1.35	5.32	1.38	2.47
Finland	4.28	2.44	3.08	-1.06	-4.66	3.26	1.60	-1.56	0.23	0.26
France	3.73	2.86	-0.15	-0.73	-0.64	1.52	1.12	0.25	1.74	-0.06
Germany	2.53	1.92	1.52	0.19	-2.56	2.47	2.06	0.52	0.66	0.36
Greece	3.44	4.30	2.59	-1.37	-2.60	-0.04	-3.29	-1.91	0.05	2.35
Hungary	3.58	3.54	0.53	2.70	-3.26	11.62	2.11	-0.70	1.31	-1.55
Iceland	1.99	-0.15	6.14	0.44	6.32	-2.47	-0.43	1.49	0.84	-0.72
Ireland	6.00	1.85	1.88	-0.42	4.20	5.25	4.45	0.50	-1.42	3.06
Israel	4.69	3.59	1.10	-0.26	-0.81	2.62	2.45	0.27	0.93	0.54
Italy	2.80	0.01	-0.08	-0.65	-2.18	2.27	0.50	-0.32	0.88	-0.57
Japan	2.38	0.69	1.7	0.22	-0.87	4.01	0.03	0.74	1.40	-0.36
Korea	3.78	4.08	5.99	4.96	1.63	7.23	6.64	-2.91	5.38	-0.97
Luxembourg	3.15	1.14	2.91	-5.38	-3.21	3.68	-0.26	-2.81	3.16	1.14
Mexico	7.55	3.72	2.29	-3.07	0.55	-4.90	3.06	0.75	-0.39	2.45
Netherlands	3.30	1.55	0.77	0.05	-2.39	2.14	0.71	-0.20	0.33	0.83
New Zealand	3.51	1.63	3.09	-3.22	2.07	-0.74	1.31	3.06	-1.39	-0.94
Norway	3.88	-0.79	-1.80	-3.06	0.35	0.47	-0.78	0.79	0.34	0.62
Poland	6.15	2.84	2.74	0.50	3.04	6.80	4.68	1.70	1.52	1.25
Portugal	1.04	1.79	1.56	0.53	-0.27	3.22	1.36	1.01	1.23	-0.83
Slovak Republic	3.26	5.98	7.55	2.23	-2.90	5.23	1.73	1.70	3.23	1.79
Slovenia	3.73	5.84	4.25	-0.41	-6.40	3.34	3.40	-0.15	-0.86	1.16
Spain	0.49	0.58	1.19	0.40	2.45	2.33	1.43	2.42	1.57	0.28
Sweden	3.64	3.33	0.30	-1.77	-2.37	3.32	0.67	-0.15	0.88	0.75

Switzerland	3.22	2.45	2.15	0.45	-2.07	2.51	-0.21	0.57	1.47	0.71
Turkey	8.36	4.65	4.94	-0.49	-4.13	3.21	3.18	-0.50	2.52	-2.06
UK	3.39	1.99	1.62	0.00	-2.30	1.13	1.49	-0.79	0.37	0.24
USA	2.76	0.80	0.99	0.77	2.89	2.55	0.07	0.47	0.21	0.49
OECD Total		1.58	1.48	-0.06	0.26	1.78	1.21	0.24	0.88	0.41

Table 2: Labor productivity annual growth rate %

Source: <https://data.oecd.org/lprdy/labour-productivity-and-utylisation.htm#indicator-chart>
[Accessed February 2016].

4. Labor costs and tax wedge in the OECD countries

The most industrial countries, especially in continental Europe, struggle with the problem of unemployment. Unemployment is determined by many reasons, one of which is particularly easy to identify: higher taxes on labor and in the result – higher labor costs. The consequences of labor taxes are not the same in every countries. They depend, among other factors, also on the wage setting institutions. The variety in labor market institutions across the OECD countries is substantial. In continental Europe, other than in the Anglo-Saxon or Nordic countries, labor markets are dominated by powerful trade unions. Consequently in the countries of continental Europe, unemployment is strongly positively correlated with labor tax rates, not present in the Anglo-Saxon or Nordic countries (Daveri and Tabellini, 2000).

In this study we want to compare labor costs and tax wedge across the OECD countries. And the aim of the next step is to examine correlation between labor costs and productivity in these countries. Labor costs include gross wage earnings with income tax plus employee social security contributions and also employer social security contributions with contributions on some public funds. In the international comparative analysis labor costs correspond to gross wage plus social security contributions paid by the employer. The tax wedge is a measure of the difference between labor costs to the employer and the corresponding net take-home pay of the employee. It is calculated by expressing the sum of personal income tax, employee and employer social security contributions together with any payroll tax, minus benefits as a percentage of labor costs. It is worth noting that this measure may be less than the true labor costs faced by employers because, for example, employers may also have to make non-tax compulsory payments. Similarly employees' take home may be reduced if they have to pay such non-tax payments.

Country*	Total tax wedge**	Income tax	Social security contributions		Labor costs****
			employee	employer***	
Belgium	55.6	21.8	10.8	23.0	71 686
Switzerland	22.2	10.5	5.9	5.9	70 663
Germany	49.3	16.0	17.1	16.2	68 735
Luxembourg	37.6	15.7	11.0	11.0	67 557
Norway	37.0	18.3	7.3	11.5	67 072
Netherlands	37.7	14.6	13.9	9.2	65 303
Austria	49.4	12.8	14.0	22.6	65 046
France	48.4	10.6	10.2	27.7	61 040
Sweden	42.5	13.2	5.3	23.9	60 951
Finland	43.9	18.3	6.5	19.1	57 061
Australia	27.7	22.1	0.0	5.6	56 335
United Kingdom	31.1	13.0	8.4	9.7	56 317
United States	31.5	15.7	7.0	8.9	54 977
Japan	31.9	6.6	12.3	12.9	53 855

Iceland	33.5	26.1	0.4	7.1	53 796
Italy	48.2	16.7	7.2	24.3	53 395
Denmark	38.1	35.6	2.8	0.0	52 161
Korea	21.5	4.6	7.6	9.3	51 466
Spain	40.7	12.8	4.9	23.0	50 699
Ireland	28.2	14.9	3.6	9.7	46 468
Canada	31.5	13.9	6.8	10.8	44 188
Greece	40.4	7.1	12.7	20.6	40 912
New Zealand	17.2	17.2	0.0	0.0	37 226
Portugal	41.2	13.1	8.9	19.2	36 884
Slovenia	42.5	9.6	19.0	13.9	34 549
Israel	20.5	8.3	7.4	4.8	34 540
Czech Republic	42.6	9.1	8.2	25.4	30 898
Estonia	40.0	13.2	1.5	25.4	30 199
Hungary	49.0	12.5	14.4	22.2	29 726
Turkey	38.2	10.6	12.8	14.9	28 264
Poland	35.6	6.0	15.3	14.4	27 331
Slovak Republic	41.2	7.2	10.2	23.8	26 974
Chile	7.0	0.0	7.0	0.0	19 071
Mexico	19.5	7.8	1.2	10.5	13 821
Max	55.6	35.6	19.0	27.7	71 686
Min	7.0	0.0	0.0	0.0	13 821

Table 3: Income tax plus employee and employer social security contributions as % of labor costs in the OECD countries in 2014

Note: Single individual without children at the income level of the average worker.

* Countries ranked by decreasing labor costs.

** Due to rounding, the total in column may differ by one or more percentage points from the sum of next columns. For Denmark, the Green Check (cash benefit) contributes to the difference as it is not included in next columns.

*** Includes payroll taxes where applicable.

**** Dollars with equal purchasing power.

Source: (OECD, 2015).

In 2014 the highest annual labor costs were in Belgium and Switzerland – over \$70 000 and the lowest ones traditionally were in Mexico – below \$14 000. Thus, the difference between the highest and lowest costs amounted to almost \$60 000. In nine European countries labor costs exceeded \$60 000. The huge differences were also in the high and structure of the tax wedge. The highest tax wedge was in Belgium (55.6%) and the lowest one in Chile – 7.0%. Shares of personal income tax, social security contributions paid by the employee and employer in labor costs differed respectively by 35.6, 19.0 and 27.7 percentage points (see Table 3).

A conducted analysis focused on identification of similarities between countries as described in Table 3. It has produced hierarchically organized groups of mutually similar countries according to following procedure. At the beginning, data from Table 3 (describing particular countries) have been standardized. It is necessary requirement for the clustering algorithm quality and equal treating of considered attributes. Applied standardization procedure took the mean as the center and the standard deviation as the scaling factor. Thereafter, the hierarchical clustering algorithm was applied. It agglomerated countries according to complete link method what ensured high mutual similarity of countries within group. At this step, similarities between countries was calculated from standardized values using Euclidean distance. This measure underscores overall similarity between

clustered objects. Technically, the data were processed in R environment using hclust algorithm (R Core Team, 2014) and visualized using (Galili, 2015).

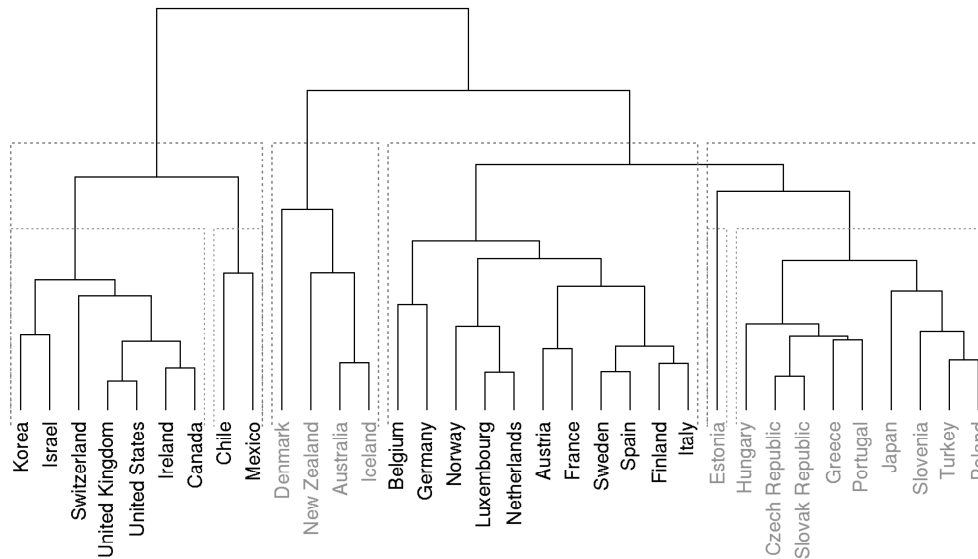


Figure 1: Hierarchical clustering of the OECD countries according to the labor costs and tax wedge

Source: data from Table 3.

The hierarchical clustering algorithm allowed to distinguish many groups of countries with different degree of similarity in terms of compared variables (see Figure 1). The further analysis includes four groups of states corresponding to the geographical location and conducted socio-economic policies. The first two groups include primarily the Anglo-Saxon and non-European countries, the next one includes the most developed European countries and the last one includes most of all the Central and Eastern European countries.

The first group consists of nine countries – four Anglo-Saxon countries, four non-European countries and Switzerland. These countries are characterized by different labor costs – from \$13 821 in Mexico to \$70 663 in Switzerland. But their tax wedge is rather low – from 7.0% in Chile to 31.5% in United States and Canada. The most similar pairs in this cluster formed: United Kingdom – United States and Ireland – Canada.

The second group consists of four countries – two Nordic countries (Denmark and Iceland) and two Anglo-Saxon countries (New Zealand and Australia). Labor costs are relatively high and tax wedge is relatively average in these countries. They are characterized also by high personal income tax and low social security contributions paid by the employee and employer.

The third group includes the eleven most developed European countries, which – except of Norway – belong to the European Union. These countries are characterized by the highest labor cost – above \$50 000 and very high tax wage – above 37.0%. In this group countries apply both the high personal income tax and high social security contributions. The most similar couples formed: Luxembourg – Netherlands, Austria – France and Sweden – Spain.

The last group consists of ten countries, which – except of Japan and Turkey – belong to the European Union. Six of them joined the EU in May 2004. These countries are characterized by low labor costs – about and below \$40 000 (except of Japan, where labor costs amount almost \$54 000) and high tax wedge – above 31% with domination of the social security contributions.

Over the period 2000-2014 the average tax wedge in the 34 OECD countries amounted to 35.8% (see Table 4). In 20 European countries plus Turkey this average was higher, whereas in 13 mainly the Anglo-Saxon and non-European countries it was lower. The differences in terms of average tax wedge between countries in continental Europe and other industrial countries (like the Anglo-Saxon or non-European countries) are significant. The difference between the highest average tax wedge – 55.9% in Belgium and the lowest one – 7.0% in Chile amounted to 48.9 percentage points. It is worth noting that in every year of the period 2000-2014 the highest tax wedge was just in Belgium, whereas the lowest one – in Chile.

The lowest average tax wedge in the OECD countries amounted to 35.1% in 2009 and 2010. It was mainly the result of tax wedge reduction in the countries of continental Europe. Because of the global economic and financial crisis, many European countries, for example Poland, decided to reduce income taxes and increase indirect taxes, especially VAT.

Country*	2000	2006	2007	2008	2009	2010	2011	2012	2013	2014	Average	2014-2000 (in pp.)
Belgium	57.1	55.5	55.6	55.9	55.7	55.9	56.1	56.0	55.7	55.6	55.9	-1.5
Hungary	54.7	51.9	54.5	54.1	53.1	46.6	49.5	49.5	49.0	49.0	51.2	-5.7
Germany	52.9	52.3	51.8	51.3	50.8	49.1	49.7	49.6	49.2	49.3	50.6	-3.6
France	50.4	49.7	49.7	49.8	49.8	49.9	50.0	50.1	48.9	48.4	49.7	-2.0
Austria	47.3	48.5	48.8	49.0	47.9	48.2	48.5	48.8	49.2	49.4	48.6	2.1
Italy	47.1	46.1	46.4	46.6	46.8	47.2	47.6	47.7	47.9	48.2	47.2	1.1
Sweden	50.1	47.8	45.3	44.8	43.2	42.8	42.8	42.9	43.0	42.5	44.5	-7.6
Finland	47.5	44.0	43.9	43.8	42.5	42.3	42.3	42.5	43.1	43.9	43.6	-3.6
Slovenia	46.3	45.3	43.3	42.9	42.2	42.5	42.6	42.5	42.4	42.5	43.2	-3.8
Czech Republic	42.6	42.5	42.9	43.4	42.0	42.1	42.6	42.5	42.5	42.7	42.6	0.1
Greece	39.1	42.3	42.1	41.5	41.3	40.1	43.2	42.9	41.6	40.4	41.4	1.3
Denmark	44.1	41.0	41.1	40.9	39.5	38.3	38.4	38.5	38.2	38.1	39.8	-6.0
Estonia	41.3	39.0	39.0	38.4	39.2	40.1	40.3	40.4	39.9	40.0	39.8	-1.3
Spain	38.6	39.1	39.0	38.0	38.3	39.7	40.0	40.6	40.7	40.7	39.5	2.1
Slovak Republic	41.9	38.3	38.4	38.8	37.7	37.9	38.8	39.6	41.1	41.2	39.4	-0.7
Turkey	40.4	42.7	42.7	39.9	37.4	37.4	37.4	37.4	37.6	38.2	39.1	-2.2
Netherlands	40.0	38.4	38.7	39.2	38.0	38.1	38.0	38.8	37.0	37.7	38.4	-2.3
Portugal	37.3	37.5	37.3	36.9	36.5	37.1	38.0	37.6	41.4	41.2	38.1	3.9
Norway	38.6	37.4	37.5	37.6	37.3	37.3	37.6	37.4	37.3	37.0	37.5	-1.6
Poland	38.2	39.0	38.2	34.7	34.1	34.2	34.3	35.5	35.6	35.6	35.9	-2.6
Luxembourg	37.1	35.3	36.3	34.7	33.9	34.3	36.3	36.0	37.2	37.6	35.9	0.5
OECD-Average	36.7	36.1	36.1	35.7	35.1	35.1	35.6	35.7	35.9	36.0	35.8	-0.7
United Kingdom	32.6	34.0	34.1	32.8	32.4	32.6	32.5	32.1	31.4	31.1	32.5	-1.5
Iceland	28.8	31.8	30.5	30.9	30.5	33.4	34.1	33.8	34.1	33.5	32.2	4.7
Canada	32.9	31.8	31.3	31.3	30.5	30.4	30.7	30.8	31.0	31.5	31.2	-1.4
United States	30.4	29.9	30.3	29.8	30.1	30.5	29.7	29.8	31.4	31.5	30.3	1.1
Japan	24.7	28.8	29.3	29.5	29.2	30.2	30.8	31.3	31.6	31.9	29.7	7.2
Australia	31.0	28.3	27.7	26.9	26.7	26.8	26.7	27.2	27.4	27.7	27.6	-3.3
Ireland	28.9	23.0	22.2	22.3	24.7	25.8	25.8	25.9	27.1	28.2	25.4	-0.7

Israel	29.6	24.3	24.9	22.9	21.3	20.7	20.8	20.4	20.4	20.5	22.6	-9.1
Switzerland	22.9	22.1	22.4	21.9	22.0	22.1	22.3	22.1	22.1	22.2	22.2	-0.7
Korea	16.4	18.2	19.7	20.0	19.5	20.1	20.5	21.0	21.3	21.5	19.8	5.1
New Zealand	19.4	20.4	21.1	20.5	18.1	17.0	15.9	16.4	16.9	17.2	18.3	-2.2
Mexico	12.4	15.0	15.9	15.1	15.3	15.5	18.7	19.0	19.2	19.5	16.6	7.1
Chile	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	0.0

Table 4: Tax wedge as a % of labor costs, single persons without children, in OECD countries in 2000-2014

pp. – percentage points.

* Countries ranked by decreasing average tax wedge.

Source: (OECD, 2015).

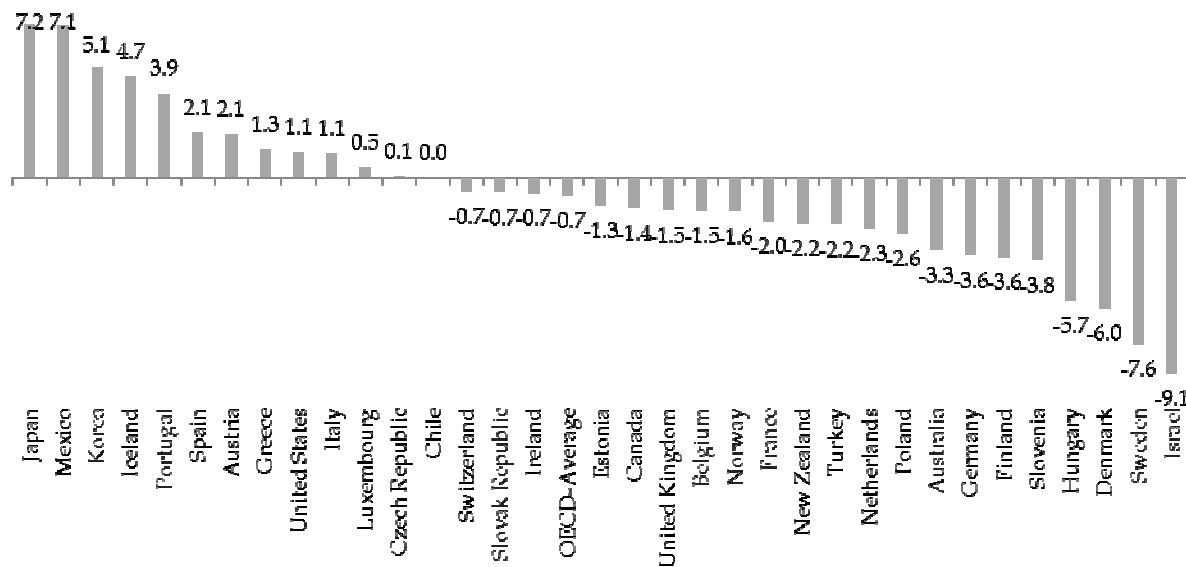


Figure 2: Differences of the tax wedge in the OECD countries between 2000 and 2014 (in percentage points)

Source: data from Table 4.

The average OECD tax wedge declined by 0.7 percentage points from 36.7% in 2000 to 36.0% in 2014 (see Figure 2). There were declines in 21 OECD countries over the same period and increases in 12. In Chile the tax wedge remained at the same level – 7.0. The largest decline was for 9.1 percentage points in Israel. There was also a decline of over 7 percentage points in Sweden. There was a reduction in the tax wedge of more than 5 percentage points in 2 other countries – Denmark and Hungary. Between 2000 and 2014 the largest increases were in Japan and Mexico – over 7 percentage points. There was also an increase of over 5 percentage points in Korea.

5. Correlation between labor costs and productivity in the OECD countries

Correlation between annual labor costs for single persons without children and GDP per hour worked (productivity) in the OECD countries over the period 2000-2014 is shown in Figure 3. As expected, overall included variables are strongly positively correlated. However we can distinguish three groups of countries of varying strength of the correlation between labor costs and productivity. For the first group consisting of twenty seven countries the correlation is strong. In the second group consisting of six countries the correlation is moderate and weak. Only in Luxembourg the correlation is none or very weak.

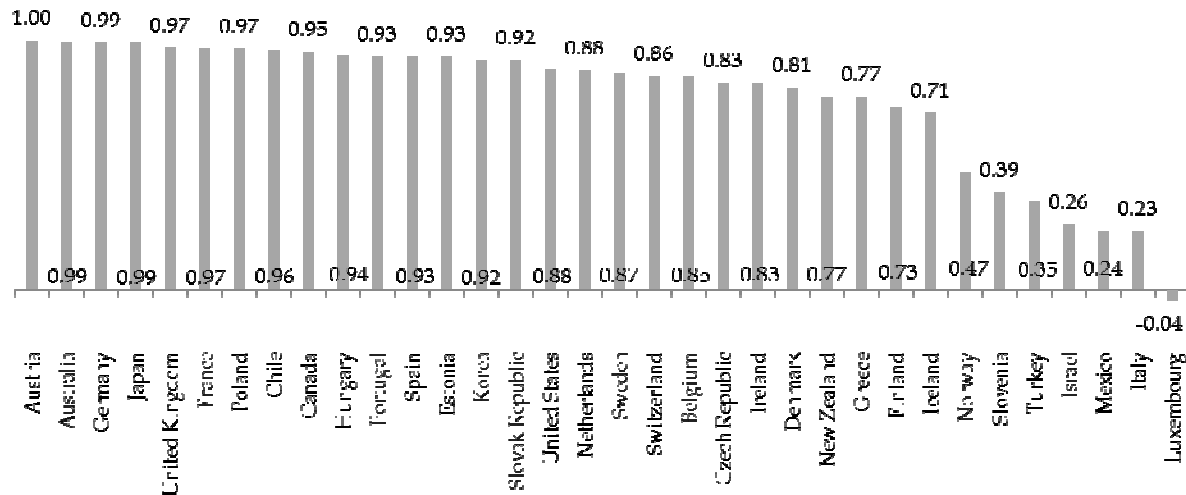


Figure 3: Correlation between annual labor costs for single persons without children and GDP per hour worked in the OECD countries in 2000-2014 (USD)

Source: (OECD, 2002, OECD, 2007, OECD, 2008, OECD, 2009, OECD, 2010, OECD, 2011, OECD, 2013, OECD, 2014, OECD, 2015).

We can observe in Luxembourg a steady increase in nominal wages, partly related to the automatic indexation of wages and a fall in productivity in more recent years (European Commission, 2016). Luxembourg is the center of banking and financial services. Banking is the largest sector in the Luxembourg economy. It is worth noting that the Luxembourg economy is characterised by a sizeable divergence of labor productivity across economic sectors, with productivity in the financial sector twice as high as that in the non-financial sectors. This means that greater variation in sectoral real wages, in line with sectoral labor productivity, could support the reallocation of labor towards emerging competitive sectors or sectors that are suffering from cost-competitiveness losses. In this situation the European Commission has given the recommendations addressed to Luxembourg concerning reform the wage-setting system, in consultation with the social partners and in accordance with national practices, with a view to ensuring that wages evolve in line with productivity, in particular at sectoral level (European Commission, 2015).

6. Conclusions

The analysis can provide us to some main conclusions connected with functioning of national economies in the OECD member states. There are different groups of countries where the productivity is on the high level, where the productivity is on low level but is rising, and where the productivity is on stable low level. In case of labor costs we can also divide countries in group where the level of this costs is comparable. Very important is to stress that the analysis related to single individual without children at the income level of the average worker, especially in part concerned on labor cost and tax wedge, where it is important what type of household we take into account.

Otherwise, in analysis of labor costs and tax wedge the hierarchical clustering algorithm was used. This algorithm allowed to distinguish many groups of countries with different degree of similarity in terms of compared variables.

In further studies we can include analysis based on labor costs and productivity in a shorter sub-periods to reflect the changes in the economy and economic policy pursued.

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