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THE BASIC RELATIONS IN THE LABOUR MARKET IN THE EU-15 AND EU-13 MEMBER STATES. A COMPARATIVE STUDY OF THE EMPLOYMENT AND UNEMPLOYMENT STRUCTURES AFTER 2004

Summary: The aim of this study is to arrange the member states of the European Union in order of their labour market potential. The data used for research were provided by the European Statistical Office. Therefore, it was possible to provide reliable comparisons of individual countries. Based on the unemployment rate, the employment rate and other macroeconomic indicators, including GDP, the inflation rate, labour costs and amount of remuneration, a synthetic indicator was developed. Account was also taken of those elements of the economic environment of the labour market which theoretically demonstrate material interrelations with its structures. The results achieved prove the potential of the labour market, as well as its innovative and development abilities. The research is based on the Perkal synthetic index. The research findings were used to classify the member states of the European Union and to identify the countries with the highest and the lowest labour market potential.

Key words: labour market, EU member states, employment, unemployment.

1. INTRODUCTION

This study is based on building an index synthesising the elements of employment and unemployment. For this purpose, the Perkal synthetic index has been applied. In this case, the variables are features determining the labour market. These features denote the operating environment of the labour market and, through the mutually balancing mechanisms, they influence the situation on the labour market. The said index combines the elements of the labour market and of its economic environment, and, thereby, defines the potential of the labour market, its development abilities, the ability to change, as well as its efficiency and performance. The results achieved made it possible to classify the EU member states and arrange them in order of their labour market development potential in each year of the analysed period. The data were normalised by way of standardisation, which is necessary for further building of the index and maintaining the

additivity postulate, i.e. the comparability of data with different denominations. This resulted in obtaining a countable answer to the question what the employment and unemployment structures in the European Union are and what elements have the strongest impact on them. The classification of the EU member states made it possible to identify the countries with the highest and the lowest labour market potential.

2. BASICS OF THE PERKAL INDEX BUILDING

In order to classify the EU member states and arrange them in order according to the specified criterion, a synthetic index shall be built, which shall be made up of the statistical data presented so far. In order to classify the EU member states according to a specific set of variables, the basic taxonomic method has been used, which is based on the construction of synthetic measures. The **Perkal method** is a method of linear ordering, and, thus, it makes it possible to arrange and illustrate the variability of selected statistics in a given group of entities in the period of one year. As a result of the calculations performed one value is received, and this value is assigned to a specific country and it takes account of the impact of set features. The measures form the basis for creating a sequence for a given year [Nowakowska 2009]. The **method of linear ordering** is applied to describe a selected problem with the use of at least two features [Dziekański 2013]. A very important element of procedure is the choice of variables making up the set of features determining the variability of the analysed phenomenon. In this case, the analysis shall cover the quality of the economic environment and the operating conditions of the labour market. The selection of diagnostics variables should be representative of the analysed phenomenon so that it covers reliable and significant data constituting the grounds for drawing correct conclusions [Dziekański 2014]. The variables selected for building the synthetic index shall be as follows:

- x_1 – unemployment rate
- x_2 – employment rate
- x_3 – inflation rate
- x_4 – GDP per capita
- x_5 – tax wedge.

These features determine the labour market efficiency and adaptability, as well as its operating conditions. This combination of features shall allow the arrangement of countries in terms of the conditions and economic reality of the labour market operation. Based on the above-mentioned data, a classification shall be prepared for each period analysed. The next stage of building the index synthesising the employment and unemployment factors shall be calculating the arithmetic mean and the standard deviation for each of the features and each period analysed. This is necessary for the execution of the next stage, i.e. normalisation. Variables are normalised by way of standardisation. In the most general

terms, standardisation allows you to omit the units of data and to compare and process variables as part of further procedures. Consequently, values are turned into a form which provides a real and clear basis for creating a synthetic indicator made up of different features. After being normalised, each of the features is characterised by an **arithmetic mean equal to zero and the standard deviation equal to one**. The next stage is determining whether a given variable is a stimulant or a destimulant, as well as applying appropriate transformations. This is the main division of variables. A stimulant means that an increase of a given feature brings a positive effect. An example of such a feature is GDP per capita. A destimulant is a feature the increase of which has a negative impact on the analysed phenomenon. For example, destimulants include the unemployment rate [Czyż 2016]. Next, the EU member states shall be classified and the rules of assessing the scores shall be unified.

3. CLASSIFICATION OF COUNTRIES BASED ON THE PERKAL INDEX SYNTHESISING THE DIAGNOSTIC FEATURES OF THE LABOUR MARKET IN THE EU MEMBER STATES

The presented formula made it possible to obtain values that synthesise the factors shaping the labour market regulations. The formula was applied to a data set covering the years 2006-2016, and a separate table with the countries being arranged in descending order was created for each year.

Table 2. The Perkal index for 2006

Country:	2006
Ireland	0,797
Luxembourg	0,784
Holland	0,730
Denmark	0,728
United Kingdom	0,451
Sweden	0,307
Finland	0,213
Austria	0,186
France	-0,449
Portugal	-0,464
Germany	-0,478
Italy	-0,556
Belgium	-0,662
Spain	-0,716
Greece	-0,869

Source: own work.

The table above presents the index values from the highest to the lowest one. In general, the index values are between 1 and -1. Any exceptions are caused by a country's specificity or particular changes occurring in a country in a given period. Having analysed the obtained values of the Perkal index, it can be stated that, over the period analysed, the situation in individual countries changed, and they ranked in different positions in different years, but there was no definite leader. At the beginning of the period analysed, in 2006, the leader in the EU-15 group was Ireland. In comparison with other years, in 2006, the member states achieved high values of the index, with as many as four of them achieving values of more than 0.7. This means that the operating conditions and the economic environment favour the labour market development and balance in Ireland, Luxembourg, the Netherlands and Denmark. The next four countries, i.e. the United Kingdom, Sweden, Finland and Austria, achieved positive values of the index, and their labour markets were characterised by satisfactory ratios of unemployment to employment, and, at the same time, the economic environments did not cause very high fluctuations in the operation of this mechanism. The remaining countries demonstrated negative values of the Perkal index. A high inflation was accompanied by a high unemployment rate, a low employment rate and rather high, in comparison with other countries of the EU-15 group, labour costs (tax wedge). The following table presents the values of the Perkal index for the next three years.

Table 3. The Perkal index for 2007-2009

No.	Country:	2007	Country:	2008	Country:	2009
1	Holland	0,848	Holland	1,062	Luxembourg	1,165
2	Luxembourg	0,759	Luxembourg	0,675	Holland	0,596
3	Denmark	0,703	Ireland	0,645	Ireland	0,552
4	Ireland	0,579	Denmark	0,511	Denmark	0,281
5	Sweden	0,419	United Kingdom	0,323	Austria	0,173
6	United Kingdom	0,351	Sweden	0,281	Portugal	0,039
7	Finland	0,215	Austria	0,204	United Kingdom	0,012
8	Austria	0,017	Portugal	-0,065	Germany	-0,012
9	France	-0,336	Germany	-0,069	Sweden	-0,085
10	Belgium	-0,483	France	-0,378	Finland	-0,138
11	Portugal	-0,483	Finland	-0,053	France	-0,317
12	Italy	-0,507	Italy	-0,638	Belgium	-0,345
13	Germany	-0,518	Greece	-0,726	Greece	-0,549
14	Spain	-0,625	Spain	-0,878	Italy	-0,610
15	Greece	-0,942	Belgium	-0,894	Spain	-0,762

Source: own work.

Over the next three years, there were changes in the position of the group's leader. In 2007, the most favourable economic conditions for the employment and unemployment structures were in the Netherlands, Luxembourg and Denmark. Ireland was ranked forth. The last in the ranking were Spain and once more Greece. During the next two years, the leader was the Netherlands, with a substantial increase of the Perkal index in 2008. In 2009, it was Luxembourg that came first. This was caused by a significant increase of the employment rate and a decrease of the harmonized inflation rate from 4.1% in 2008 to 0 in the following year. The countries which were in the lead over the years analysed so far were Ireland, Luxembourg, the Netherlands and Denmark.

During the next two years, the operating conditions of the labour market in Greece improved, but it kept being ranked in one of the last positions within the group. In 2009, the worst situation was in Spain, Italy and Greece, but the values presented were less negative than in the previous years. At the turn of 2007 and 2008, the operating conditions of the labour market in Belgium deteriorated, and, in 2008, the Perkal index was -0.894. The year 2008 in Belgium was marked by a considerable increase in the general level of prices, which affected the unemployment rate. In the following year, the inflation rate dropped, which was also visible in the case of the indices calculated with the use of the Perkal method.

In 2010-2012, the country with the highest score was still Luxembourg. This was caused by the constant and high level of its gross domestic product. In terms of GDP, Luxembourg was the leader in comparison with other member states of the whole European Union. A high level of production meant that people were needed to work, which was translated into a high employment rate and a low unemployment rate. The maintenance of such a high level of GDP required a considerable use and involvement of the labour factor, i.e. human capital. The production requirements had a significant impact on the labour market structure, and, thus, it was highly assessed in quantitative and qualitative terms. In 2012, the situation in Sweden improved, and it remained so in the following year. Sweden was ranked second at that time. The Netherlands was still in the lead, but a slow decline of Denmark could be observed, with the Perkal index of 0.293 in 2012, which was still a positive value. In 2011/2012, the greatest dynamics and scale of change could be observed in the United Kingdom. At that time, this country was ranked higher by five positions.

Table 5. The Perkal index for 2013-2015

No.	Country:	2013	Country:	2014	Country:	2015
1	Luxembourg	0,931	Luxembourg	0,952	Luxembourg	0,888
2	Denmark	0,545	Holland	0,443	United Kingdom	0,671
3	Sweden	0,460	Ireland	0,402	Ireland	0,660
4	Ireland	0,447	Denmark	0,397	Holland	0,375
5	United Kingdom	0,245	Sweden	0,336	Denmark	0,337

cd. Table 5.

No.	Country:	2013	Country:	2014	Country:	2015
6	Holland	0,186	United Kingdom	0,307	Finland	0,118
7	Germany	0,114	Germany	0,086	Germany	0,170
8	Austria	-0,020	Finland	-0,138	Sweden	0,026
9	Finland	-0,059	Portugal	-0,132	Austria	-0,230
10	France	-0,194	Austria	-0,194	France	-0,292
11	Portugal	-0,226	France	-0,324	Spain	-0,468
12	Belgium	-0,298	Belgium	-0,370	Portugal	-0,469
13	Italy	-0,568	Italy	-0,503	Italy	-0,571
14	Greece	-0,662	Greece	-0,604	Belgium	-0,601
15	Spain	-0,902	Spain	-0,659	Greece	-0,613

Source: own work.

Luxembourg kept on being the leader. In this regard, the classification remained unchanged because of a high level of gross domestic product in this country and a simultaneous low level of other macroeconomic indicators. In 2013-2014, a general deterioration of the labour market performance could be observed in all the member states of the European Union. These were the first years when more than half of the member states recorded a negative value of the Perkal index. There was a very large gap between the first and the second place in the classification. Even if the Perkal index was positive, the values achieved were not high. Moreover, in 2015, a decrease in the value of the Perkal index could be observed in the leading country, Luxembourg, and the last country classified represented the lowest value of this index for the whole analysed period. Germany was stably ranked the seventh.

In 2016, Belgium was ranked relatively low. This was caused by a rather high unemployment rate, an average employment rate and a high tax wedge. Employment was encumbered with high costs. During the last year of the analysed period, Luxembourg remained the leader, and this was the country with the best economic conditions for the labour market operation. Because of its high potential, the labour market was well developed both in terms of quantity and quality. The leading countries with a high Perkal index also included Ireland and the Netherlands. The most unfavourable situation was in Greece, Belgium and Spain. In the analysed period of time, Greece had an unfavourable economic situation. The unemployment rate was around 25%, which meant that every fourth citizen was unemployed.

The next group for which the Perkal index was calculated is the EU-13. The macroeconomic indicators presented in the study indicated a different level of economic growth than in the EU-15 member states. Some of the indicators showed considerable disproportions. The analyses of these two groups are separated in order to enable an objective assessment of individual EU-13 member states.

Table 7. The Perkal index for 2006-2008

No.	Country	2006	Country	2007	Country	2008
1	Cyprus	1,582	Cyprus	1,577	Cyprus	1,612
2	Slovenia	0,547	Malta	0,456	Slovenia	0,591
3	Czech Republic	0,455	Slovenia	0,451	Czech Republic	0,461
4	Malta	0,429	Czech Republic	0,419	Malta	0,323
5	Estonia	0,339	Estonia	0,287	Estonia	0,149
6	Lithuania	0,089	Lithuania	0,064	Poland	-0,185
7	Latvia	-0,268	Slovakia	-0,248	Slovakia	-0,187
8	Hungary	-0,319	Latvia	-0,348	Lithuania	-0,228
9	Croatia	-0,443	Croatia	-0,360	Croatia	-0,384
10	Slovakia	-0,449	Bulgaria	-0,473	Bulgaria	-0,423
11	Poland	-0,542	Poland	-0,496	Romania	-0,464
12	Bulgaria	-0,700	Romania	-0,531	Latvia	-0,599
13	Romania	-0,719	Hungary	-0,797	Hungary	-0,667

Source: own work.

Analysing all the member states of the European Union together would cause an increase of the arithmetic mean, and, therefore, the countries which joined the EU after 2004 would be ranked as belonging to the 2nd and 3rd quality groups. The EU-13 member states were subject to exactly the same transformations and research processes as the previous group. During the first three years, the highest value of the Perkal index was recorded by Cyprus. This country has a specific type of economy, as it is largely based on income derived from tourism. The labour market is highly determined by the economic model of the country. Cyprus is characterised by the highest GDP. Moreover, during the years analysed, the lowest unemployment rate within the group and one of the highest employment rates were recorded. In the lead there were also Malta, the Czech Republic and Slovenia.

Table 8. The Perkal index for 2009-2011

No.	Country	2009	Country	2010	Country	2011
1	Cyprus	1,730	Cyprus	1,504	Cyprus	1,407
2	Slovenia	0,682	Czech Republic	0,619	Czech Republic	0,832
3	Czech Republic	0,640	Slovenia	0,523	Malta	0,792
4	Malta	0,365	Malta	0,512	Slovenia	0,662
5	Estonia	0,059	Slovakia	0,060	Poland	-0,069
6	Slovakia	0,048	Poland	-0,074	Estonia	-0,177
7	Bulgaria	-0,047	Croatia	-0,214	Slovakia	-0,236
8	Croatia	-0,176	Bulgaria	-0,324	Croatia	-0,356

cd. Table 8.

No.	Country	2009	Country	2010	Country	2011
9	Poland	-0,254	Estonia	-0,350	Lithuania	-0,430
10	Lithuania	-0,657	Latvia	-0,414	Bulgaria	-0,435
11	Romania	-0,733	Lithuania	-0,417	Hungary	-0,572
12	Hungary	-0,787	Romania	-0,666	Romania	-0,675
13	Latvia	-0,870	Hungary	-0,758	Latvia	-0,744

Source: own work.

The table above presents the next three years of the period analysed. The highest value of the Perkal index was again recorded in Cyprus, exceeding substantially the average labour market potential for this group of countries. Other member states with a favourable structure of unemployment and employment were still Slovenia, the Czech Republic and Malta. A stable middle-ranking position was occupied by Estonia, Slovakia, Poland and Croatia. With every period, there was a larger number of countries with negative values of the synthetic index. In 2011, only four member states of the whole group recorded positive values of the Perkal index, although these were high values. According to the Perkal index, the lowest potential and performance of the labour market structure were in Romania, Latvia and Hungary. In 2009-2011, these three countries were by turns ranked the last. The negative changes in the values of indicators used for synthesising the labour market situation were translated into the deterioration of their ranking positions. Similarly to the previous years analysed, Poland was ranked higher and higher year by year. Its labour market potential increased because of the economic recovery.

In 2012-2014, there was a change in the first place of the ranking. In 2014, Cyprus was ranked third and Malta became the leader with an index of 0.633. This was the most efficient labour market with favourable economic conditions in 2014. Throughout the whole period, the Czech Republic was ranked in the same spot with slight upward or downward deviations. This seems to be the most balanced labour market with stable economic structures supporting the develop-ment of employment. The changes in Cyprus were gradual and they occurred year after year. Attention should be paid to the positive change in Lithuania and its considerable advancement in the ranking, to the fifth place in 2014. The member states occupying a stable middle-ranking position were still Estonia, Slovenia, Slovakia and Poland. Latvia demonstrated the highest labour market potential in 2013, which was followed by a significant drop by four places in the ranking in the next period. It is worth paying attention to the 2012 change and the advancement of Romania. In this period of time, numerous changes took place, mostly unfavourable ones, and the last places in the classification were high negative value of the index. This denoted a serious decrease in the labour market potential, much below the average value for the group. This situation was of particular importance for Croatia.

Table 10. The Perkal index for 2015-2016

No.	Country	2015	Country	2016
1	Cyprus	0,573	Malta	0,605
2	Czech Republic	0,461	Czech Republic	0,497
3	Estonia	0,392	Cyprus	0,487
4	Malta	0,375	Estonia	0,103
5	Lithuania	0,274	Slovenia	0,078
6	Slovenia	0,227	Poland	0,009
7	Poland	0,084	Lithuania	-0,040
8	Slovakia	-0,210	Slovakia	-0,073
9	Bulgaria	-0,226	Romania	-0,098
10	Latvia	-0289	Bulgaria	-0,137
11	Romania	-0,299	Hungary	-0,257
12	Hungary	-0342	Latvia	-0,302
13	Croatia	-1,021	Croatia	-0,872

Source: own work.

The level of the gross domestic product remained unchanged, so it did not discourage the operation of the labour market in Croatia. Hungary recorded an increase of the unemployment rate, a decrease of the employment rate and a simultaneous increase of the tax wedge, that is, the overall tax and insurance premium encumbrances on remuneration. The table above presents the last two years of the period analysed. In 2015, Cyprus was ranked first, but the Perkal index was not as high as the values achieved by the ranking leading countries in the previous years. In the following year, Cyprus was ranked the third place with an index of 0.487. The leader was Malta. The Czech Republic still occupied a stable position with a slight increase in the value of the Perkal index. Throughout the analysed period, the Czech Republic did not record any substantial fluctuations and changes [Muster 2017]. Therefore, it can be stated that, in terms of the labour market potential, this country has the most stable and balanced labour market in the whole group analysed. In 2015, the majority of member states recorded positive results, and, thus, the labour markets were stimulated by other economic mechanisms. The years 2015-2016 should be associated with an improvement of the labour market structure for the whole group, as no very high negative values of the Perkal index were recorded. The exception was Croatia. Similarly to the previous group of EU-15 member states, also in the EU-13 group there are the leaders and countries with a lower labour market potential. Some of the countries demonstrated high deviations from the accepted norms.

4. SUMMARY

Unemployment is a serious economic and social problem. A real challenge for modern economies is how to control and reduce its volume. Simultaneously, a very importance issue is adjusting employment, in quantitative and qualitative terms, to the economic needs of a given country. The European Union is an institution, which broadly determines the changes in the labour markets of its member states. The labour market is not a separate structure, but one of the elements making up the economic mechanism. The changes taking place in the labour market are connected to other macroeconomic indicators. This study presents a number of factors which, according to theoretical assumptions and the research and practical implementations conducted, have an influence on the labour market structures. Throughout the analysed period, we can distinguish countries which are in the lead of the classification presented and keep on occupying these positions in the following years. This proves favourable operating conditions for the labour market and appropriate qualitative and quantitative development of employment and unemployment structures. The member states with the highest values of the Perkal index in the EU-15 group are Luxembourg, Ireland and the Netherlands, and those with the lowest Perkal index include Greece, Italy and Spain. The situation in Greece is alarming, as, according to the data for 2016, practically every fourth Greek is unemployed. As regards the EU-13 group, special attention should be paid to the Czech Republic, which did not record the highest value of the Perkal index in any of the periods, but it maintained its stable and high position showing no significant fluctuations in terms of the labour market structure.

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PODSTAWOWE RELACJE NA RYNKU PRACY
W KRAJACH UE-15 I UE-13. STUDIUM PORÓWNAWCZE
STRUKTUR ZATRUDNIENIA I BEZROBOCIA PO 2004 ROKU

Streszczenie: Celem tego badania jest uporządkowanie państw członkowskich Unii Europejskiej w zależności od ich potencjału na rynku pracy. Dane wykorzystane do badań dostarczył Europejski Urząd Statystyczny. W związku z tym możliwe było zapewnienie wiarygodnych porównań poszczególnych krajów. W oparciu o stopę bezrobocia, wskaźnik zatrudnienia i inne wskaźniki makroekonomiczne, w tym PKB, stopę inflacji, koszty pracy i wysokość wynagrodzenia, opracowano syntetyczny wskaźnik. Account was also taken of those elements of the economic environment of the labour market which theoretically demonstrate material interrelations with its structures. The results achieved prove the potential of the labour market, as well as its innovative and development abilities. The research is based on the Perkal synthetic index. The research findings were used to classify the member states of the European Union and to identify the countries with the highest and the lowest labour market potential.

Słowa kluczowe: rynek pracy, państwa członkowskie UE, zatrudnienie, bezrobocie.

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