

## LABOR MARKET IN POLAND - ANALYSIS OF DIVERSITY

doi: 10.2478/czoto-2022-0004

Date of submission of the article to the Editor: 15/11/2021

Date of acceptance of the article by the Editor: 05/03/2022

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**Abstract:** The main aim of below consideration is presentation Polish Labor Market and changes inside, along last years. Labor market considerations are extremely important and have a large impact on the daily behavior of entities in this market. The extent, to which we are able to analyze changes taking place in individual areas of the surveyed area will allow us to make appropriate decisions on both – the demand and supply side of this labor. Author would like to present base issues connected with supply and demand taking place at this field in Poland. Getting to know the directions of changes taking place on the Labor Market may allow for an appropriate approach to human resource management. The article consists of short introduction, theoretical part, empirical part and summary at the end. Theoretical part includes base information and definition about Labor Market. Empirical section shows data analyzing, methods, tables and graphs. In the summary author would like to recapitulate analyzing case and draw some conclusions.

**Keywords:** statistic, econometric, analysis, Labor Market

### 1. INTRODUCTION

One of the main market in whole economy of each country is Labor Market. Occurring changes in this field, repeatedly and often imperceptibly have impact at all economy situation of specific country or even group of the countries (for example European Union).

When we want to start making any analysis we have to depict base issues of this case. Like in every market also in Labor Market the main issue are supply and demand of labor. Occurring imbalance which we can see every day at this market, has been the reason of below considerations (Gajdos et al. 2020).

### 2. LABOR MARKET – BASE INFORMATION

Labor Market is define as general forms of employee hire processes and processes as well as negotiating conditions in relation to working conditions and pay (Acemoglu, 2002). The main functions of the labor market are the allocation and reallocation of human resources, ensuring in the long term the balance between supply and demand for work. Labor Market is working very similar beside to others markets, like for

example: Capital Market, Product Market, Finance Market, etc. Similar here like in other markets occurs buyers and sellers, exchange acts are carried out and prices and sizes of transactions are determined (Blakely and Bradshaw, 2002). The buyers on the labor market are employers, while the sellers are employees. It is the employees who offer their labor services or workforce services on the labor market, for which the employer requests. It can be said that employers report the demand for work (they offer jobs), while the employees decide about the supply of labor. As a result of the confrontation of labor demand and supply of labor, its price is determined, i.e. in this case pay (Kwiatkowski et al., 2013).

At below picture we can see smart illustration how Labor Market is working.

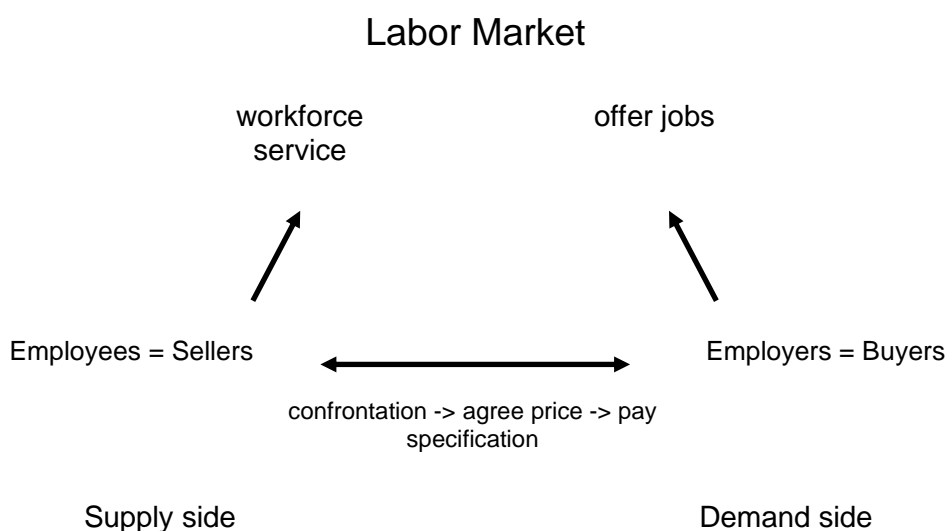


Fig. 1. Scheme of Labor Market, Source: Own study.

### 3. DATA ANALYSIS

Submission of Labor Market analysis can be performed on many levels. In below considerations author would like to focus at professionally active (workforce). At the beginning will be show size of workforce in Poland in years 2001-2018.

As we can see workforce in Poland is strong chain to demographical peak/decline. From 2001 year to 2007 (omitting 2005 year) we can notice decrease almost 500 thousand people however from 2007 to 2015 (omitting 2010 year) there was increase over almost 600 thousand people.

Trying to make deeper analysis we should divide all workforce by level of education. We can find:

- Higher education;
- Post-secondary and secondary education;
- High school education;
- Basic vocational education;
- Secondary school education, primary education and lower.

To eliminate demographical peak/decline, data should be analyzing by share value - not nominal (Green, 2011).

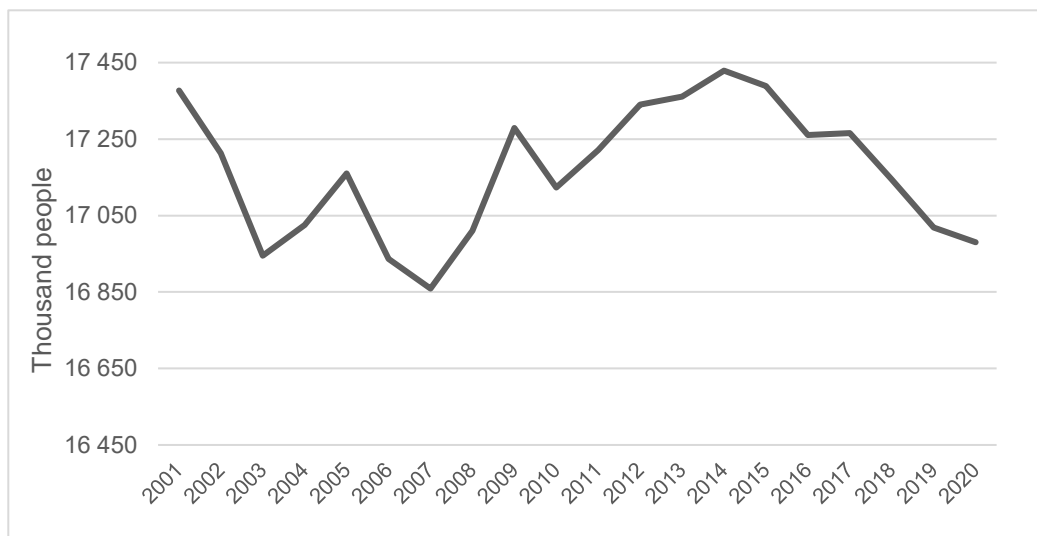


Fig. 1. Workforce in Poland (at all), years 2001-2020

At graph number 2 we can see changes observe in period of research.

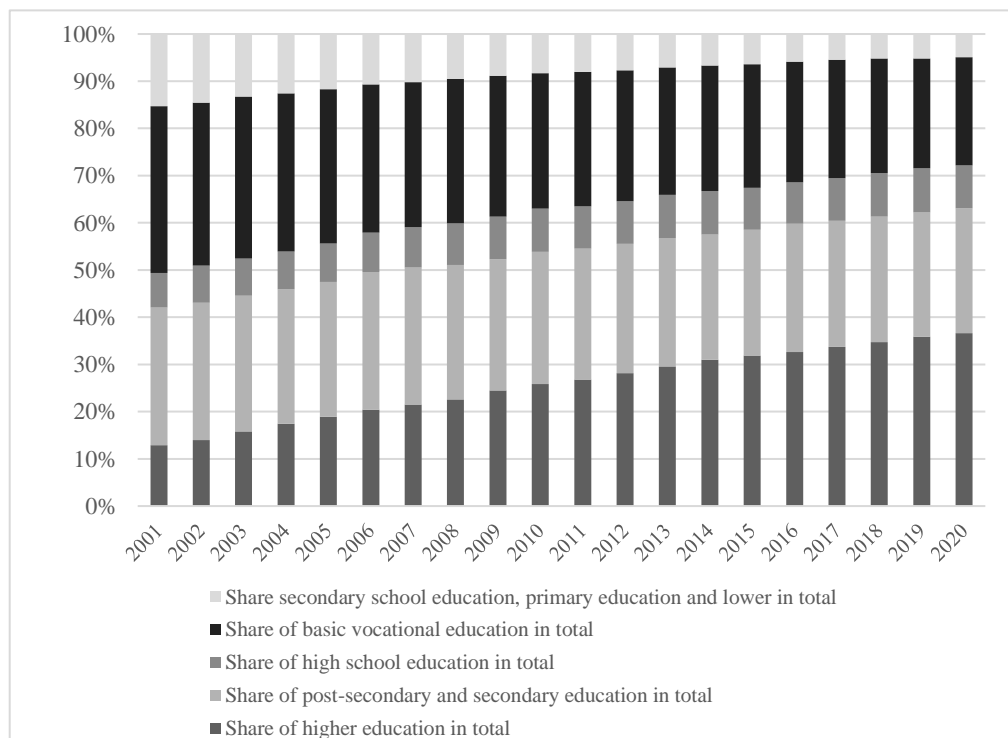


Fig. 2. Changes in shares by level of education in Poland years 2001-2020

Analyzing period shows increase share of higher education from 12.9% to 36.6% (almost 3 times more). However share post-secondary and secondary education and

high school education was almost at the same level. Basic vocational education share and secondary school education, primary education and lower share decrease respectively from 35.3% to 22.9% and from 15.2% to 4.8%. All this changes represent considerable increase need whole economic system for qualified staff and are manifestation economic grown (Gajdos et al. 2017).

#### 4. TRENDS IN INDIVIDUAL EDUCATION GROUPS

Trying to show next analysis, author focus at individual education group. For each of group was counting and drawing trend, factors of trend and R square measure which shows fitting the trend to empirical data (Gajdos and Źmurkow-Poteralska, 2014).

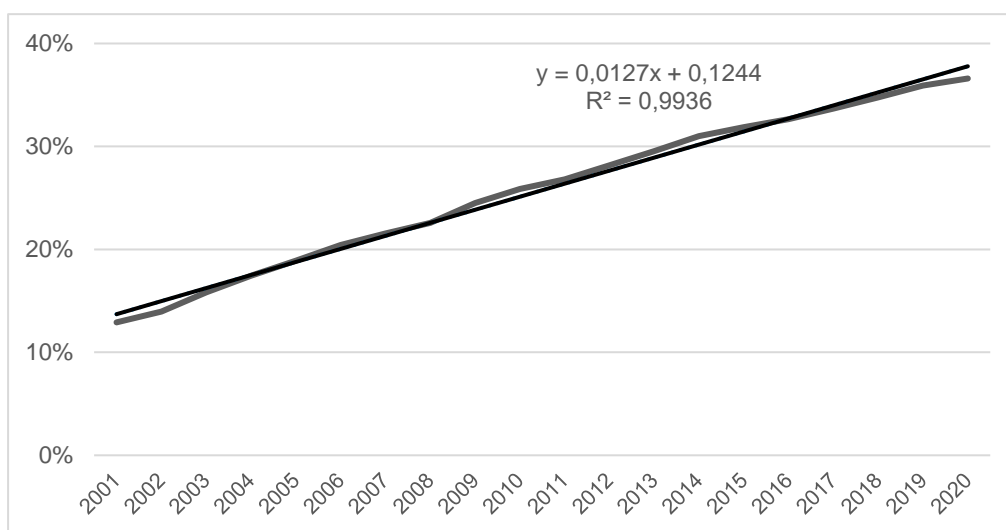


Fig. 3. Changes in the share workforce with higher education

Above graph illustrate trend of the share workforce with higher education. There can be see that trend is growing and every year - average - this ,share' grown up 1.27%. Measure  $R^2$  at the level 99.36% inform about almost linear trend.

Next graph shows trend of the share workforce with post-secondary and secondary education. Here trend is decreasing and  $R^2$  is also at high level 89.43%.

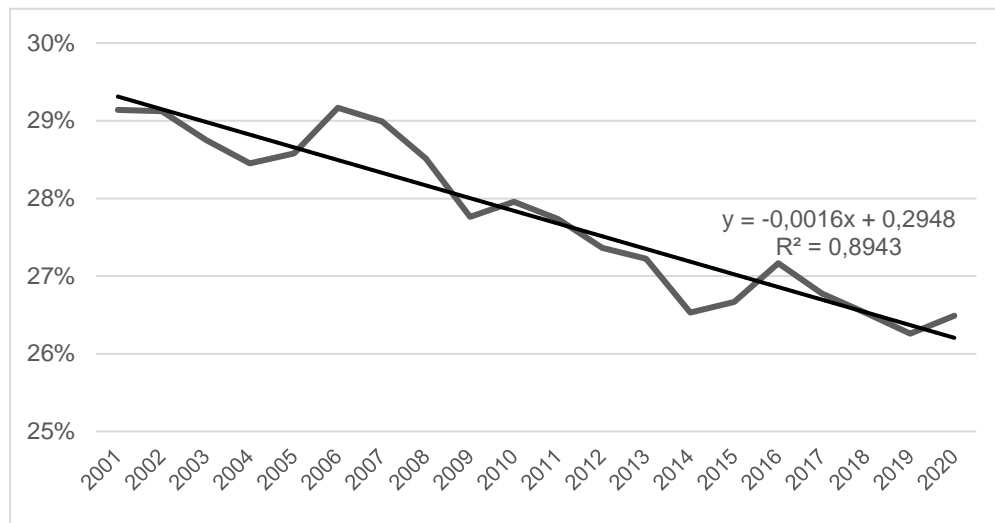


Fig. 4. Changes in the share workforce with post-secondary and secondary education

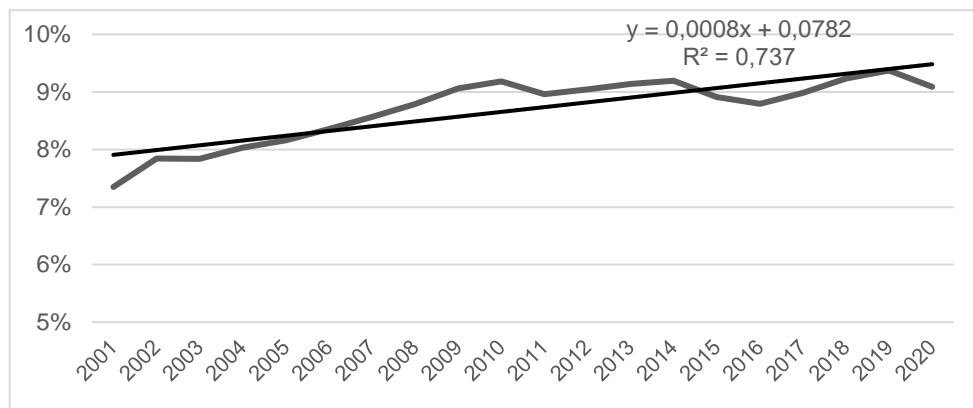


Fig. 5. Changes in the share workforce with high school education

Above graph illustrate changes in the share workforce with high school education. Here trend is almost constant (factor equal 0.0008) and in this group there is not visible change. Measure  $R^2$  73.7% is at the little lower level than earlier groups.

Below graph illustrate changes in the share workforce with basic vocational education. There can be see that trend is decreasing. Every year - average - this group decrease 0.65% (factor -0.0065). Measure  $R^2$  at the level 99.38% inform about almost linear trend.

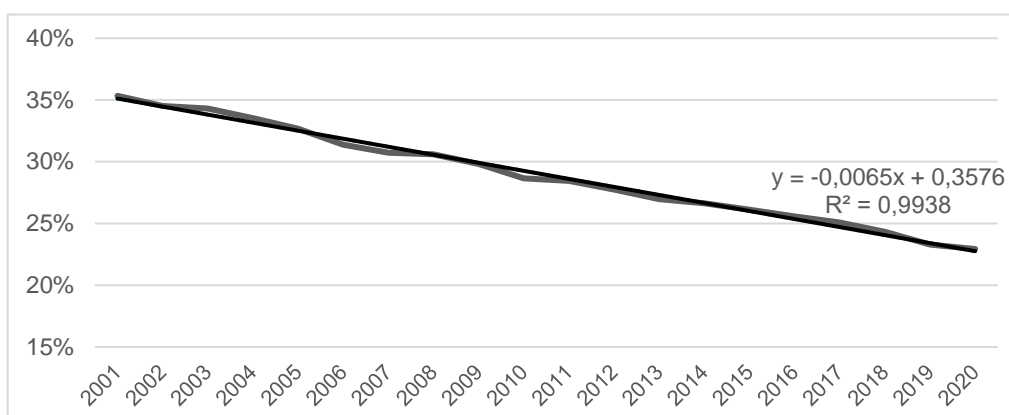


Fig. 6. Changes in the share workforce with basic vocational education

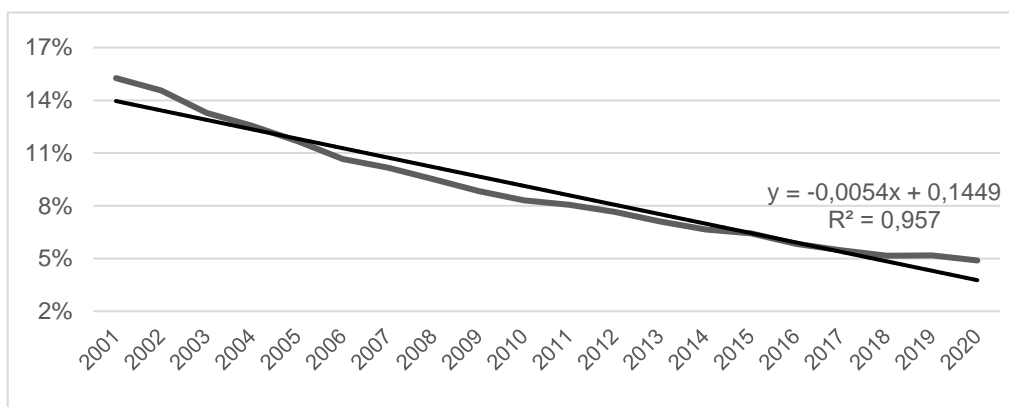


Fig. 7. Changes in the share workforce with secondary school education, primary education and lower

Group with secondary school education, primary education and lower also characterize decreasing trend. Every year - average - this group decrease 0.54% (factor -0.0054). Measure  $R^2$  also is at the high level 95.7%.

## 5. SPATIAL ANALYSIS LABOR MARKET

Through analyzing Labor Market data, focus at the level of education can be see that workforce is also strong diversity because spatial. The cause of this situation can be differences in sections of economy sectors each voivodeship and also the level of economic development.

The highest share workforce in group with higher education in 2020 year was in voivodeships: wielkopolskie, kujawsko-pomorskie and podlaskie. However lowest was in voivodeships: łódzkie, małopolskie and śląskie. For group with post-secondary and secondary education highest share was in voivodeships: lubuskie, pomorskie and warmińsko-mazurskie but lowest in: wielkopolskie, kujawsko-pomorskie and podlaskie. In voivodeships: łódzkie, zachodniopomorskie and śląskie can be see highest share workforce with high school education and in voivodeships: opolskie, pomorskie and kujawsko-pomorskie this share is lowest. Voivodeships: podkarpackie,

łódzkie and opolskie characterized by highest share workforce with basic vocational education but voivodeships: wielkopolskie, dolnośląskie and lubuskie characterized by lowest share. The last group is group with secondary school education, primary education and lower and here in voivodeships: mazowieckie, pomorskie and łódzkie the share workforce was highest but in voivodeships: wielkopolskie, warmińsko-mazurskie and kujawsko-pomorskie was lowest.

Table 1

Workforce shares in each education level by voivodeship in Poland year 2020

VOIVODESHIP	Higher education	Post-secondary and secondary education	High school education	Basic vocational education	Secondary school education, primary education and lower
DOLNOŚLĄSKIE	37.49%	27.71%	8.73%	21.19%	4.89%
ŁÓDZKIE	27.79%	27.08%	9.91%	27.43%	7.79%
PODKARPACKIE	32.60%	27.35%	8.40%	27.42%	4.23%
ŚLĄSKIE	31.37%	26.89%	10.14%	26.65%	4.95%
LUBUSKIE	33.54%	29.92%	9.61%	21.21%	5.71%
ŚWIĘTOKRZYSKIE	36.94%	26.11%	9.18%	23.30%	4.46%
WIELKOPOLSKIE	47.61%	22.44%	8.55%	17.41%	4.00%
KUJAWSKO-POMORSKIE	41.45%	25.08%	8.15%	22.20%	3.12%
MAŁOPOLSKIE	31.19%	26.03%	8.76%	28.87%	5.15%
LUBELSKIE	34.65%	27.24%	8.36%	25.21%	4.54%
POMORSKIE	34.93%	28.69%	8.11%	21.41%	6.86%
PODLASKIE	38.18%	25.98%	9.86%	21.29%	4.69%
WARMIŃSKO-MAZURSKIE	36.53%	28.40%	8.89%	23.09%	3.09%
OPOLSKIE	34.61%	28.30%	7.27%	25.43%	4.40%
MAZOWIECKIE	31.61%	26.44%	8.85%	26.44%	6.67%
ZACHODNIOPOMORSKIE	33.48%	27.30%	11.35%	21.84%	6.03%

Source: Own study base at ([www.stat.gov.pl](http://www.stat.gov.pl) and Gajdos A., 2014)

This analysis shows differences in voivodeships by level of education workforce. Simply analysis can illustrate how strong are these differences and also how diverse are regions in Poland.

## 6. QUOTIENT LOCATION

More deeper structure analysis Labor Market by level of education and spatial can shows conclusions about specialization (despecialization) or location (delocation) using quotient location measure. Quotient location  $LQ_i$  names also regional specialization factor for spatial unit (region) is ratio factor measure economic or social activity  $S_i$  in spatial unit  $i$  (region  $i$ ) by value this factor  $A$  in unit higher level (country).  $LQ_i$  factor shows regions with „overrepresentation” activity which are measuring ( $LQ > 1$ ) or regions with „deficiency” ( $LQ < 1$ ). The „overrepresentation” can be read like positive - like regional specialization (Gajda, 2001). To detailed analysis are subject factors from interval  $0,8 < LQ < 1,2$ .

$$LQ_i = \frac{S_i}{A} \quad (1)$$

Table 2

Quotient location factor by level of education in voivodeships in Poland year 2020

VOIVODESHIP	Higher education	Post-secondary and secondary education	High school education	Basic vocational education	Secondary school education, primary education and lower
DOLNOŚLĄSKIE	1.12	0.95	0.91	0.97	0.67
KUJAWSKO-POMORSKIE	0.85	1.00	0.99	1.16	1.44
LUBELSKIE	1.01	1.05	0.98	0.93	1.06
LUBUSKIE	0.85	1.01	1.14	1.16	1.07
ŁÓDZKIE	0.91	1.13	1.08	0.93	1.23
MAŁOPOLSKIE	1.00	0.99	1.03	1.02	0.96
MAZOWIECKIE	1.28	0.85	0.96	0.76	0.86
OPOLSKIE	0.84	0.98	0.98	1.26	1.11
PODKARPACKIE	0.93	1.03	0.94	1.10	0.98
PODLASKIE	0.94	1.08	0.91	0.94	1.48
POMORSKIE	1.03	0.98	1.11	0.93	1.01
ŚLĄSKIE	0.99	1.07	1.00	1.01	0.67
ŚWIĘTOKRZYSKIE	0.93	1.07	0.81	1.11	0.95
WARMIŃSKO-MAZURSKIE	0.75	1.02	1.11	1.20	1.68
WIELKOPOLSKIE	0.88	1.03	0.94	1.20	0.91
ZACHODNIOPOMORSKIE	0.90	1.03	1.27	0.95	1.30

Source: Own study base at ([www.stat.gov.pl](http://www.stat.gov.pl)) and Gajda, 2001)

In our case we can see that in voivodeship mazowieckie are located workforce with higher education ( $LQ_i=1.28$ ) and relocation workforce with basic vocational education ( $LQ_i=0.76$ ). Workforce with high school education occur in voivodeship zachodniopomorskie ( $LQ_i=1.27$ ) however relocation in voivodeship świętokrzyskie ( $LQ_i=0.81$ ). Workforce with basic vocational education are locate in voivodeships: opolskie ( $LQ_i=1.26$ ) and mazowieckie ( $LQ_i=0.76$ ).

At the end workforce with secondary school education, primary education and lower are located in voivodeships: kujawsko-pomorskie, podlaskie, łódzkie, warmińsko-mazurskie, zachodniopomorskie at the other hand strongest relocation in this group are in voivodeships: dolnośląskie and śląskie.

## 7. SUMMARY

Analysis Labor Market in Poland is really interesting. Research trends of share in education groups illustrate significant increase workforce with higher education along analyzing period. At the other hand trend concerting workforce with secondary school education, primary education and lower is decreasing what can be considered very optimistic occurrence. However spatial analysis show appreciable diverse in regions in Poland (voivodeships). Making exploration Quotient Location factor we can find



regions which concentrate workforce with higher education (mazowieckie) or secondary/primary school education and lower (quite big group - voivodeships: kujawsko-pomorskie, lubelskie, lubuskie, warmińsko-mazurskie, zachodniopomorskie). Occurring difference may be caused the diverse in sections of economy sectors each voivodeship and also different level of economic development. This knowledge allows for more efficient management of human resources. Informations on the trends taking place on the Labor Market may become helpful in the company personnel management process.

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