Quality of life and the labour market in Poland

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Abstract

Work is an essential activity in human's life, i.a. due to the amount of time devoted to it, but also because it is a means of meeting both economic and social needs. Having a job or losing it (or lack of employment) is one of the determinants of the level of human welfare, and in recent years dynamic changes on both the supply and demand side have forced multi-faceted research, e.g. related to the quality of employment, cultural diversity or the impact of local factors on the labour market.

The aim of the article is to assess and compare regional (NUTS2) labour markets in Poland in terms of quality of life with the possible spatial effects of this process/relationship. To achieve the research objective, a set of synthetic indicators describing the quality of life in Polish regions was constructed for the needs of the study. The analysis considered processes in the labour market in years 2012–2017 and the tendencies were described with the dynamic Shift-Share Method with spatial modification (SSSA). Within this framework, it was possible to include spatial interactions of regional labour markets between "neighboring" geographic objects (according to the accepted matrix of spatial weights **W**). The approach allowed for an in-depth analysis of labour market conditions in terms of quality of life, as well as verification of hypotheses regarding the regional determinants and spatial differentiation of labour demand and supply, as well as the significant impact of quality of life on labour assets in voivodships.

Keywords: *labour market, regional diversity, social indicator, quality of life*
JEL Classification: *C38, E24, I31, J23, R12*

1. Introduction

It is common for modern societies that people change their place of residence more often in the pursuit of better work and better life quality. However, from the individual's point of view a better life (or job) is defined and interpreted differently, with full regard to the subjective evaluation. It is undeniable that nowadays it is not enough to earn well and have a good job to live happily, have a better life; a wider perspective is crucial and more aspects should be taken into account (Tomkiewicz, 2018).

In 1994 the World Health Organization (WHO) created its Quality of Life section (named WHOQOL), which defined the quality of life term (QOL) as individual perception of one's life, which takes into account cultural conditions and values connected with personal goals, expectations, norms and problems (WHO, 1997). Complexly, quality of life affects physical and mental health, relationships with others and environmental characteristics important for an individual. This definition was the reference point in the proposed study both in theoretical and empirical considerations. It should be also noted that while constructing an indicator of the quality of life, the results should always be interpreted from a subjective perspective. Each person is the

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best judge in his/her case and makes a comprehensive assessment of the quality of life, taking into account personal views and beliefs, which most often result from the place of residence or the hierarchy in the social structures (Hawthorne and Osborne, 2005). Therefore, the presented provinces ratings compiled in the research that compare the quality of life in particular voivodships with the labour market should be perceived as a multidimensional, but a subjective study.

The article analyses the regional results for Polish voivodships in terms of the activity of employees in productive age and the estimated quality of life levels in these regions. As a consequence of the research, in the final part of the paper, spatial units were divided into 4 subgroups. Data on the population's economic activity were sourced from the Labor Force Survey (LFS), whereas the information on the quality of life came from the Central Statistical Office (CSO). The degree of activity was investigated on the basis of collected data for years 2012–2017, with the use of Spatial Shift-Share Analysis (SSSA). The synthetic indicator of the Quality of Life Index (LQI) was estimated to obtain information on the quality of life for every province. The combined and multi-dimensional approach allowed to verify the research objective concerning changes in the professional activity of the population in relation to the population quality of life in given regions.

2. Criteria for building a synthetic index

In order to accomplish the research objective, it was necessary to construct a suitable tool. For this purpose, an LQI measure was constructed that allowed to estimate the quality of life in Polish voivodships. Furthermore, the changes in quality of life indicators were compared with the labour market performance, i.e.: with the tendencies and rates acquired from the SSSA analysis calculated for the total number of professionally active people in the analysed regions.

The most challenging part of obtaining the essential results for LQI was the selection of the most important criteria. Here, the LQI measure was constructed according to the "Better Life Index" described in The Organization for Economic Co-operation and Development documentation (OECD). Therefore, the adopted methodology is convergent with the current recommendations (the 10-step scheme for determining indicators) of the OECD and Joint Research Centre (JRC) of the European Commission (OECD, 2008). However, not all characteristics listed by the OECD were included in presented research,; some of them were omitted intentionally and replaced by other determinants. The research included only objective and available data sources; subjective data, such as results of representative surveys were not included in the study.

Due to the fact that the quality of life is a multidimensional phenomenon, many obvious factors, such as housing conditions and wages, were taken into account for the construction of the indicators. However, an essential element of the analyses was the inclusion of intangible factors, i.e. education, the state of the environment or overall security (Agénor and Lim, 2018). The determinants were generally selected on the basis of recommendations published in reports and studies of the OECD and JRC of the European Commission mentioned already above. The selection of variables was also limited by the availability of reliable Polish regional statistical data. The analysis was based on 58 quantitative characteristics, grouped into 13 thematic cat-

egories, according to the CSO classification illustrating various aspects of the quality of life. Each of the category consisted of 1 to 5 determinants.

The LQI estimating procedure included categories listed below and assumed determination of the impact of groups (with weights values in brackets for indicating the impact of each category):

- Public finances ($w_1 = 0.1103$): revenues of the budgets of the voivodships: revenues of the voivodship budgets in PLN, income per inhabitant; revenues and expenditures of Local Government Units: EU funds for financing programs and projects per 1 inhabitant in PLN, share of investment expenditures of communes and poviats (NUTS4) in total expenditure; expenditure on the budgets of the voivodships: total budget expenditure in PLN, capital expenditure on investment in PLN, expenditure per capita in PLN.
- Security ($w_2 = 0.0357$): state organization and administration of justice: offences identified by the police in completed preparatory proceedings.
- Housing and communal economy ($w_3 = 0.1362$): housing allowances: the number of paid housing allowances, the number of housing allowances paid in PLN; housing resources: housing resources, residential buildings, average usable floor space per apartment, average usable floor area of a flat per 1 person, flat for 10,000 population.
- Trade and gastronomy ($w_4 = 0.1038$): gastronomic establishments: restaurants, bars, canteens and food outlets; shops and petrol stations: shops, petrol stations, the number of inhabitants per store.
- Culture and art ($w_5 = 0.1833$): centers, houses and cultural centers, clubs and common rooms: a total number; stage and exhibition activities: theaters and music institutions; cinemas: permanent cinema, Multiplexes; museums: museums including departments.
- Health protection, social welfare and benefits for the family ($w_6 = 0.0769$): outpatient health care: general clinics (public, non-public), clinics for 10 000 population; pharmacies and pharmacy points: pharmacies, population on a publicly accessible pharmacy; medical staff: doctors with the right to practice a medical profession for 10 000 population, nurses and midwives per 10 000 population; hospitals: population per bed in general hospitals; nurseries: children in wages and children's clubs for 1 000 children aged up to 3 years.
- Industry and construction ($w_7 = 0.0307$): housing construction: apartments put into use per 10 000 population.
- Labour market ($w_8 = 0.0786$): jobs: number of newly created jobs, number of job vacancies.
- Condition and protection of the environment ($w_9 = 0.0304$): emission of air pollutants from particularly disruptive plants: emission of gas pollution, emission of dust pollution – in total, total dust emission (Poland = 100), total dust emission per 1 km sq. area; green areas: parks, green areas of the estate, green areas – the total area, the participation of parks, greens and green areas of the estate in the total area.
- Education ($w_{10} = 0.0677$): primary education; junior high education; secondary education, including general secondary schools, vocational and general vocational schools, basic vo-

cational schools, first-cycle schools and vocational schools special together, post-secondary schools, including colleges: gross scholarization rate for each school type separately; higher education: students of higher schools per 10 000 population.

- Transport and communication (w_{11} = 0.0948): public roads: public roads in total, roads with a hard surface per 100 km sq., roads with a hard surface of 10 000 population; public transport: rolling stock inventory (buses, trams, trolleybuses), length of public transport lines per 1 000 population; bicycle paths: total bike paths, bicycle paths for 10 000 km sq., bicycle paths for 10 000 population.
- Pre-school education (w_{12} = 0.0258): kindergarten, pre-school points: children in kindergartens and pre-school points for 1 000 children aged 3 to 6 years.
- Earning (w_{13} = 0.0258): remuneration: average monthly gross salary in PLN.

3. Survey method

The factors listed in 2nd Section, have been initially standardized and used to estimate the *LQI* indicator for each province and each period separately. Before calculating the cumulative *LQI*, for each of the 13 categories, individual *iLQI*s were firstly calculated. The procedure was based on the non-pattern method (Łuniewska and Tarczyński, 2006), as follows:

$$iLQI_{it} = \frac{\sum_{j=1}^{k} z_{jt}^{i}}{\sum_{j=1}^{k} \max_{i} \left\{ z_{jt}^{i} \right\}} \tag{1}$$

where: $z_{jt}^{i} = v_{jt}^{j} + \max_{i} \left\{ v_{jt}^{i} \right\}$, $i = 1, 2, \ldots, n$; $t = 1, 2, \ldots, T$, v_{jt}^{i} – variables normalised by formula: $v_{jt}^{i} = \frac{x_{jt}^{i}}{\bar{x}_{jt}}$ if x_{jt}^{i} is a stimulant or $v_{jt}^{i} = \frac{\bar{x}_{jt}}{x_{jt}^{i}}$ if x_{jt}^{i} is a destimulant.

The obtained individual *iLQI* indicators were further weighed according to the non-parametric Spearman's correlation coefficients which allowed to determine the strength and direction of the relationship between selected factors (Gaca and Sawiłow, 2014). In order to obtain information about the group's total impact (the weight of category), individual variables have been standardised as follows:

$$w_j = \frac{|\rho_{m+1\,j}|}{\sum_{j=1}^{m} |\rho_{m+1\,j}|} . \tag{2}$$

Is allowed to omit insignificant correlations which in turn allowed for a reduction in the size of the database. The *iLQI* indicator reaches values between [0; 1] and if it is closer to unity, it indicates a higher weighted quality of life. An attempt was made to estimate the weights and the *LQI* indicator was calculated according to the following formula (3):

$$LQI_{it} = w_j iLQI_{it} , \tag{3}$$

where: w_j – weights for categories.

After calculating the weights and indicators of quality of life, voivodships were additionally grouped into four classes due to the *LQI* values, as follows (Nowak, 1990; Kompa and Witkowska, 2010):

- I – very high quality of life when $LQI_{it} > \overline{LQI} + S_{LQI}$;
- II – a high level of quality of life $LQI + S_{LQI} > LQI_{it} > \overline{LQI}$;
- III – average level of quality of life $\overline{LQI} > LQI_{it} > \overline{LQI} - S_{LQI}$;
- IV – low quality of life $LQI_{it} < \overline{LQI} - S_{LQI}$,

where: LQI_{it} – a synthetic measure according to which classification is made, $\overline{LQI}$ – average value of the indicator, S_{LQI} – standard deviation.

The analysis of the labour market, i.e. professionally active people, included the Spatial Shift-Share Analysis (SSSA). The method was proposed because of the spatial units' inseparability, while a single voivodship does not constitute for a separate area. A single region has an impact on neighboring ones, i.e. their economic development, as well as structural changes or competitive position, due to the *First Law of Geography* (Tobler, 1970) indicating that "*everything is related to everything else, but near things are more related than distant things*". This feature is especially applicable to employment mobility and a search for better life quality of families/households. In the study of the labour market using SSSA, a binary matrix of spatial weights **W** was used for voivodships, according to the direct bordering scheme (Suchecki, 2010). This allowed to construct the equation of decomposition of the growth rate has the following form as follows (Nazara and Hewings, 2004) (4):

$$tx_{ri} = tx.. + (\mathbf{W}tx_i - tx..) + (tx_{ri} - \mathbf{W}tx_i)\ , \tag{4}$$

where: **W** is a standardized matrix of spatial weights, $i = 1, \ldots, S$; $(tx..)$ is the global effect indicator for a given region; $(\mathbf{W}tx_i - tx..)$ is the values of the rates of structural changes, $(tx_{ri} - \mathbf{W}tx_i)$ is the local component, also known as local competitiveness indicators.

The *Shift-Share* methods are widely used to analyse selected markets, including the labour market. As an example, even the European Commission (Denis et al., 2004; Murtin and Robin, 2018) used a *Shift Share* tool to compare the growth rate of labour productivity in the EU and US economies (labour productivity was determined by the growth rate of productivity of particular industries and changes in the employment structure).

4. Results from the empirical analysis

Looking for links between the quality of life of inhabitants of voivodships in Poland and the situation on the labour market, the quality of life indexes *LQI* were assessed and the pace of tendencies on the labour market with *Shift Share Analysis* was determined. Tab. 1 illustrates the level of quality of life with the assumption of weighing component groups. On this basis, a ranking and classification of spatial objects were created to compare it with the unweighted approach (*uwLQI*).

Table 1. Results of the LQI in 2012–2017 and comparison of classifications

No.	2012	2013	2014	2015	2016	2017	uwLQI	Class
1	MZ	MZ	MZ	MZ	MZ	MZ	MZ	I
2	SL	SL	SL	SL	SL	SL	SL	I
3	DL	DL	DL	DL	DL	DL	DL	II
4	MP	MP	MP	MP	MP	MP	MP	II
5	PO	WP	WP	WP	WP	PO	PODL	II
6	WP	KP	KP	KP	KP	WP	WM	II
7	KP	LBE	LBE	LBE	LBE	KP	WP	II
8	LBE	LBS	LBS	LBS	LBS	LBE	KP	III
9	LBS	LD	LD	LD	LD	LBS	LBE	III
10	LD	PODK	PODK	PODK	OP	LD	LBS	III
11	OP	PODL	PODL	PODL	PODK	OP	LD	III
12	PODK	PO	PO	PO	PODL	PODK	PODK	III
13	PODL	WM	WM	WM	PO	PODL	PO	III
14	WM	ZP	ZP	ZP	WM	WM	ZP	III
15	ZP	OP	OP	OP	ZP	ZP	OP	IV
16	SW	SW	SW	SW	SW	SW	SW	IV

Note: DL – Dolnoslaskie, KP – Kujawsko-Pomorskie, LBE – Lubelskie, LBS – Lubuskie, LD – Lodzkie, MP – Malopolskie, MZ – Mazowieckie, OP – Opolskie, PODK – Podkarpackie, PODL – Podlaskie, PO – Pomorskie, SL – Slaskie, SW – Swietokrzyskie, WM – Warminsko-Mazurskie, WP – Wielkopolskie, ZP – Zachodnio-pomorskie

For comparison, in the table above, the *uwLQI* column contains average *LQI* values in 2012–2017 without weighting processes. The first 4 provinces and the last 3 did not differ in terms of their position in the ranking. For most voivodships, the scaling resulted in a higher position. The exceptions are two provinces, Warminsko-Mazurskie (13th position with weights, 6th without weights) and Podlaskie (11th position with weights, 5th without weights). The results indicate that adjustment by weight variables changes the classification for spatial units in terms of quality of life.

The *Shift Share Analysis* summarizes the processes that took place on the labour market in years 2012–2017. It was assumed that positive changes in the regional market affect the quality of life of citizens. The comparison was presented in the Table 2 below.

Research confirmed that the high values of the quality of life indicator are not necessarily accompanied by dynamic changes in the labour market. The highest positive changes in the situation on regional labour markets characterized spatial objects classified previously into the 2nd or 3rd group in terms of the *LQI* indicator. Moreover, voivodships ranked as the highest were

characterised by negative changes on the labour market, which would confirm the assumptions concerning the stronger impact of other factors than having an employment on the quality of life of residents. The changes in the labour market in Swietokrzyskie, Lodzkie and Lubuskie voivodeships should also be assessed negatively. For the most part, negative changes in regional labour markets should be identified with local factors and unfavourable neighbouring scheme with other regions, e.g.: Lodzkie and Mazowieckie.

Table 2. Results of the LQI in 2012–2017 and comparison of classifications

Provinces	Class of LQI	Summary of SSSA effects results		
		net	structural	local
Mazowieckie	I	–2.36%	–1.45%	–0.91%
Slaskie	I	–6.05%	0.29%	–6.33%
Dolnoslaskie	II	8.41%	–2.71%	11.12%
Malopolskie	II	5.06%	1.61%	3.45%
Podlaskie	II	0.01%	–1.02%	1.03%
Warminsko-Mazurskie	II	4.58%	4.71%	–0.13%
Wielkopolskie	II	12.31%	–0.24%	12.55%
Kujawsko-Pomorskie	III	3.96%	–3.64%	7.60%
Lodzkie	III	–12.60%	1.35%	–13.95%
Lubelskie	III	0.23%	0.08%	0.15%
Lubuskie	III	–10.69%	4.79%	–15.48%
Podkarpackie	III	–0.03%	–1.02%	0.99%
Pomorskie	III	11.95%	4.20%	7.75%
Zachodniopomorskie	III	18.01%	2.08%	15.94%
Opolskie	IV	6.29%	–3.81%	10.10%
Swietokrzyskie	IV	–15.88%	–4.86%	–11.02%

Conclusions

The analysis gave information on the overall quality of life and the labour market performance in Polish provinces. Because of the construction, it should be noted that the proposed indicator of the quality of life LQI should be treated as information point due to limitations related to its nature and subjectively included components in the design phase. Although the indicator is based on reliable information, it cannot perfectly reflect the quality of life in voivodships, because of the multidimensional characteristic of the phenomenon.

However, it should be also emphasised that it is possible to make the results more reliable by, for instance, adding certain weighting of structure components. In this scenario, it is more

likely to reduce or even avoid the compensativeness effect which means that a relatively high score for some categories can compensate for low scores for most other categories. As an example, one can imagine a city with a highly developed economy, where it is easy to get an attractive job, but at the same time the location is also characterized by a very poor environmental conditioning, which makes it troublesome to live there. It was also observed in the research sample when proper scaling (weighting) boost more regions, which are usually classified as bad conditions (especially economical). Fig. 1 comperes the ratios of weighted and unweighted estimates of LQI indicators, in a way that when the ratio exceeds unity than the weighted measure gives better, accurate results.

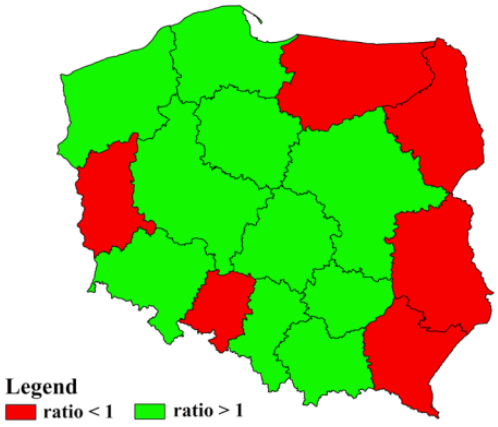

Fig. 1. Weighted or unweighted – spatial comparison

Positively, one should interpret the connections of quality of life indicators and the situation (the tendencies) on the labour market. Although the results may raise some doubts, the lack of clear connections of spatial units with higher levels of quality of life of the inhabitants with the situation on the labour market, indicates that it is not only the professional situation, such as having a good job, that affects the situation of the residents (compare in Table 2 *Class of LQI* and *net effect*).

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