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**The impact of metropolitan areas on internal  
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## **The impact of metropolitan areas on internal migrations in Poland. The case of southern regions.**

**JEL Classification:** *J11, O11, R11, R23*

**Keywords:** *internal migration, metropolitan areas, ratio analysis, synthetic measure*

**Abstract:** Metropolitan areas significantly affect regional development. They attract an inflow of investments, innovations and know-how as well as create domestic population migration flows. Relocation of human resources regulates both a size and structure of population, supports regional labour markets, the demand for goods stimulation, etc. The objective of this paper is to discuss the impact of metropolitan areas on domestic migration flows concentrating on southern area of Poland. The empirical study covers subregions and counties and refers to the period of 2008-2010 corresponding to global financial and economic crisis. Ratio analysis as well as taxonomical analysis was applied in the research. Research results show that southern Polish subregions demonstrate low intensity of intraregional population movements while interregional flows are quite significant, in particular within the territory of southern Poland. The majority of migration flows occur in relation to the city of Wrocław and the city of Cracow, due to their metropolitan capacity.

## Introduction

Metropolitan areas as economic, research, academic, cultural, administrative and political centres constitute one of the most important factors of regional development. Their existing provides a lot of advantages among others well developed transport infrastructure, resilient labour market, extensive economic infrastructure (e.g. technology parks, business incubators, technology transfer centres), high availability of services, e.g. educational, health, cultural services etc. (see Jałowiecki 2007, Markowski and Marszał 2006, Smętkowski, Jałowiecki and Gorzelak 2009, Korcelli-Olejniczak 2007).

Concentration of these functions results in increasing relationships between central area and its neighbours however its scope of action is usually considerably wider. This force of attraction of capital (assets, know-how etc.), development of entrepreneurship and service producing is translated into intensification of domestic migration movements (see Lucas

1997, White and Lindstrom 2006, Kupiszewski, Rees and Durham 1998, Iglicka et al. 2005, Matusik, Pietrzak, Wilk 2012, Pietrzak, Drzewoszewska, Wilk 2012, Pietrzak et al. 2012, Pietrzak, Wilk, Chrzanowska 2013, Pietrzak, Wilk, Matusik 2013a, 2013b, Wilk, Pietrzak 2013 oraz Wilk, Pietrzak, Matusik 2013). The subject of this paper is to determine potential metropolitan areas of southern Poland and consider their influence on internal migration phenomena including its scale and conditions.

### **Methodology of the research**

In the investigation a situation of southern area of Poland covering Dolnośląskie, Opolskie, Śląskie, Małopolskie, Świętokrzyskie and Podkarpackie region<sup>1</sup> (NUTS 2) and its subregions (NUTS 3) was examined. The empirical study refers to a period of time 2008-2010. The specified period corresponds to the world financial and economic crisis which affected slowing down economic growth and development in Poland as well as decreasing of domestic migrations and narrowing down a group of destination (inflow) areas.

Ratio analysis was applied for exploring migration flows. Inter- and intraregional flow ratings were used to serve for analyzing intensity and directions of migration movements between and within 66 Polish subregions (NUTS 3). They were computed as a share of migration flows aggregated for the period of 2008-2010 in average population of destination (place of current registered residence). There were distinguished three groups of intraregional flows – strong, medium and low movements<sup>2</sup> while only the highest values of the interregional flow ratio were considered. They were divided into very strong, strong and medium flows; in the last group three classes of moderate flow intensiveness were additionally distinguished<sup>3</sup>.

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<sup>1</sup> Polish counterpart of “NUTS 2 region” is “voivodship”.

<sup>2</sup> The classification refers to values of specified centiles (min, C<sub>33</sub>), (C<sub>34</sub>, C<sub>66</sub>), (C<sub>67</sub>,max).

<sup>3</sup> The classification refers to values of specified centiles such as very strong flows represent 2% of the most intensive flows within the country (C<sub>98</sub>,max), strong flows (C<sub>96</sub>, C<sub>98</sub>), medium flows of 1st class (C<sub>94</sub>, C<sub>96</sub>), medium flows of 2nd class (C<sub>92</sub>, C<sub>94</sub>) medium flows of 3rd class (C<sub>90</sub>, C<sub>92</sub>).

The analysis is supplemented by considering migration values within counties<sup>4</sup> (LAU 1) of the subregions. Net migration, inflow and outflow ratings as regards counties were calculated and classified as very high, high, medium, low and very low values<sup>5</sup>.

Taxonomical analysis was also conducted to determine economic situation of Polish subregions with using of synthetic measure (see Grabiński, Wydymus and Zeliaś 1989). A set of variables selected to describe business profile, productivity, entrepreneurship, foreign capital, investment, financial condition of entities and absorptivity of regional labour market is presented in Table 1.

**Table 1.** Set of variables

| Name of variable   | Variable preference |
|--|---------------------|
| Gross added value per employed person (PLN)  | stimulant           |
| <i>Natural person conducting economic activity per 100 working-age persons (entity)</i>                    | stimulant           |
| Share of commercial companies with foreign capital per 100 national economy entities in private sector (%) | stimulant           |
| Investment outlays in enterprises <i>per capita</i> (PLN)  | stimulant           |
| Share of persons employed in service sector in employed persons (%)  | stimulant           |
| Average monthly gross wages and salaries (PLN)   | stimulant           |
| Share of registered unemployed persons in working-age persons (%)  | destimulant         |

Source: Authors' estimation based on data provided by Local Data Bank of the Central Statistical Office in Poland.

Firstly a character of variables (stimulant, destimulant) and values of pattern object were determined. Upper pattern object served as a point of reference with maximum value of stimulant and minimum value of

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<sup>4</sup> Polish counterpart of "county", "LAU 1" and "administrative district" is "powiat".

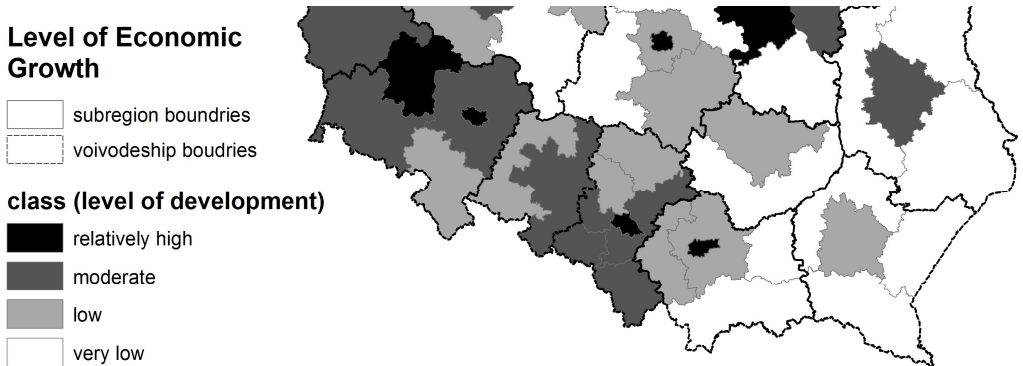
<sup>5</sup> For net migration ratio the classes of "medium", "low" and "very low" flows refer to negative balance of migration movements.

destimulant riched in 2008. The variables values were normalized with using of unitarization with zero minimum. A destimulant (unemployment level) was transformed into a stimulant through subtracting their values from one.

In the next step distances between objects (subregions) and pattern object were determined with using of euclidean distance. For each subregion a value of synthetic measure with using of Hellwig's method (see Hellwig 1968) was calculated. On the basis of its values [0, 1] a situation of subregions was defined as relatively high, moderate, low and very low economic development level (see Fig. 1).

The most economically developed subregion of Poland (synthetic measure value: 0.987) is the city of Warsaw (Mazowieckie region) which performs a role of metropolitan area (see Gawryszewski, Korcelli and Nowosielska 1998, Markowski and Marszał 2006) while the weakest situation (0.086) is presented by Chełmsko-zamojski subregion of Lubelskie region. The city of Wrocław (0,590), the city of Cracow (0,523) and also Katowicki (0,484) and Legnicko-głogowski (0,444) subregion represent relatively high level of regional development within subregions of southern Poland (see Fig. 1) but majority of south-east subregions is economically backward.

**Figure 1.** Economic situation of subregions (NUTS 3)



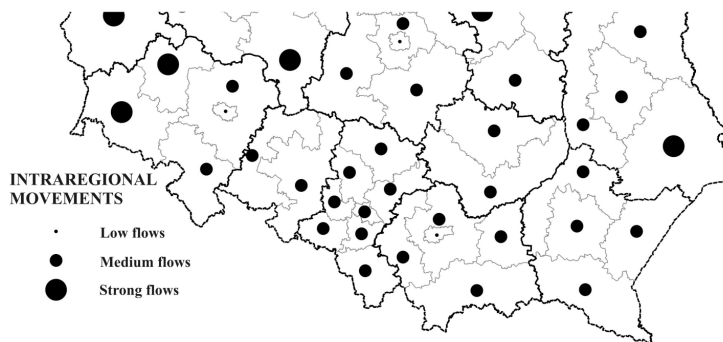
Source: Authors' elaboration based on data provided by LDB of the CSO in Poland.

### **Intensity and directions of migration flows in southern Poland**

The highest intensity of intraregional migration flows within territorial units of southern Poland is recognized only in Legnicko-

głogowski and Jeleniogórski subregion while majority of southern subregions prove moderate population flow accumulation (see Fig. 2).

**Figure 2.** Intensity of intraregional migration flows within subregions<sup>6</sup>



Source: Authors' elaboration based on data provided by LDB of the CSO in Poland.

However as illustrated on Fig. 3 southern subregions significantly contribute in interregional population movements. Majority of the most intensive flows seems to be bilateral and does not exceed the area of southern Poland. There is no considerable migration outflow and inflow into remaining areas of the country with the exception of the city of Wrocław and the city of Cracow. People migrate in short distances, mostly between nearest neighbouring subregions.

**Figure 3.** Intensity and directions of interregional migration flows between subregions (NUTS 3)

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<sup>6</sup> Wrocław and Cracow subregions represent the cities with the rights of a county. According to the LDB methodology the population movements within their surroundings are not considered as migration flows because they do not correspond with crossing an administrative frontier of the city territory (LAU 2).



Source: Authors' elaboration based on data provided by LDB of the CSO in Poland.

Large population relocation in the area of Dolnośląskie region (located in the south-east part of the considering territory) can be seen between Legnicko-głogowski subregion and its neighbours (in particular Jeleniogórski subregion) with bilateral relationships. Despite being important regional economic centre, there have been no symptoms of creating metropolitan area within its boundary.

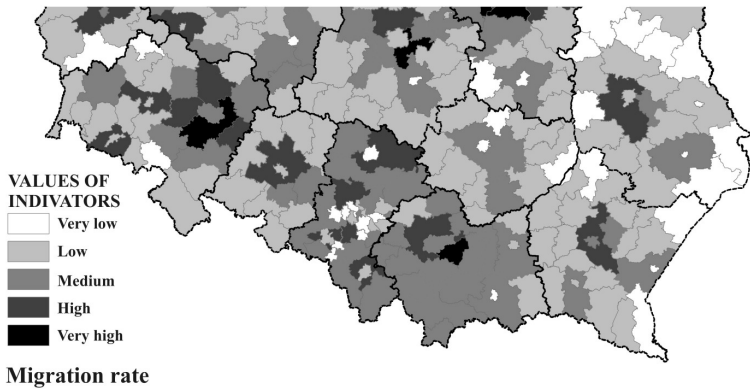
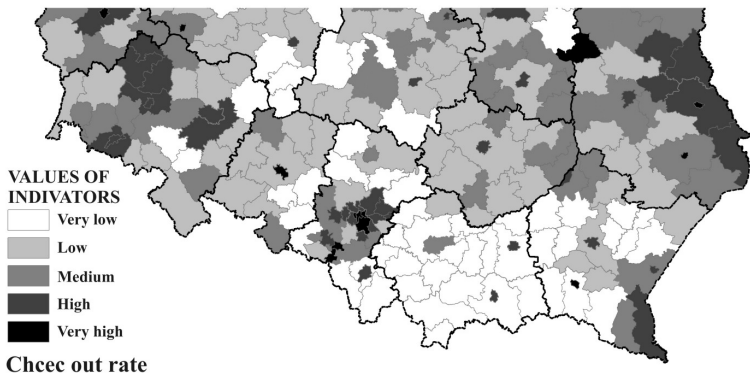
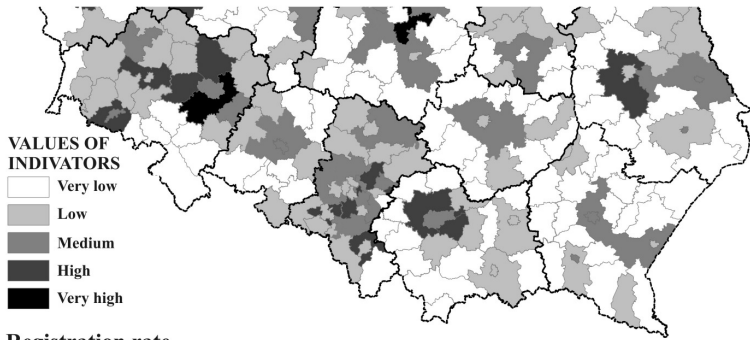
An economic centre significantly affecting regional development of south-west Poland is the city of Wrocław (4th position in the ranking just hereafter Trójmiejski subregion). Its economic situation considerably differs from the city of Warsaw however the city of Wrocław can be defined as one of the most evolving regions in Poland and its scope of impact is getting wider. These implications suggest that the city has very



high economic potential and constitutes developing metropolitan area which is translated into intensifying population movements, in particular migration inflows to the city and also its surroundings.

Between the city of Wrocław and the other subregions considerable relocation of human resources especially strong inflow from neighbouring subregions (Jeleniogórski, Legnicko-głogowski, Wałbrzyski and Wrocławski subregion) of Dolnośląskie region may be observed. The most intensive movements are related to Wrocławski subregion surrounding the city. Large population inflow and high positive values of net migration in counties located in its territory prove an occurrence of suburbanization processes (see Fig. 4).

**Figure 4.** Inflow, outflow and net migration rate for counties



Source: Authors' elaboration based on data provided by LDB of the CSO in Poland.

The city of Wrocław also affects second order neighbours<sup>7</sup>, in particular nearest subregions of Lubuskie, Wielkopolskie and Opolskie voivodship and also further territories of the country among others Sieradzki and Piotrkowski subregion of Łódzkie voivodship, Częstochowski (Śląskie region) and even the city of Warsaw (Mazowieckie region).

A territorial unit distinguishing with very good economic situation located in Małopolskie is the city of Cracow. It is located into 5th position in conducted ranking hereafter the city of Wrocław but in respect of metropolitan functions does not differ very much from the city of Warsaw (see Markowski and Marszał 2006). Its influence on the other regions is significant and effects in very high migration flows, also within borders of Oświęcimski subregion. Its scope of action covers subregions of Małopolskie as well as other territorial units of Poland which are not its immediate neighbours. Counties located near to the city display high positive net migration (Fig. 4) which can be seen as evolving suburbanization process.

High territorial mobility represents Śląskie region in particular its central (Bytomski, Katowicki) and southern (Tyski and Bielski) subregions. Between these subregions and their neighbours (especially nearest surroundings) bilateral relationships occur. Human resources relocation between second order neighbouring regions can be mostly seen in relation to Katowicki subregion but at relatively short distances. Despite being strong economic centre the functional urban area of Upper Silesia does not prove a scope of action typical for metropolitan areas but by ESPON is classified as weak metropolitan European growth area (IV level) as well as the city of Wrocław and the city of Cracow.

Bilateral interactions within the area of Opolskie region relate mostly to its two (Nyski and Opolski) subregions. However relatively large migration flows in relation to Dolnośląskie (in particular outflow from Nyski subregion to the city of Wrocław and its neighbours) and Śląskie (e.g. inflow from subregions of Śląskie to Opolski subregion) region can be seen.

Similar situation represents Świętokrzyskie region in which significant migration movements between two its subregions as well as outflows from Kielecki subregion to the city of Warsaw and the city of Cracow are made. Moderate flows refer to the nearest subregions of Śląskie, Łódzkie and Mazowieckie region.

The weakest territorial mobility shows Podkarpackie region. The objective of relatively intensive population inflows and outflows constitutes

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<sup>7</sup> The two areas are adjacent in  $n$ -th order if the need arises to cross at least  $n$  administrative borders to move from one to the other (see e.g. Suchecki 2010).

Rzeszowski subregion. However there are short-distance bilateral movements especially between neighbouring (in particular Krośnieński and Przemyski) subregions and also relatively high population migration inflow from Puławski subregion of Lubelskie region.

## Conclusions

Subregions of southern Poland demonstrate low intensity of intraregional population movements while interregional flows are significant. Relocation of human resources concerns in particular within the territory of southern region and there are no considerable outflows into remaining areas of the country. Therefore the southern Poland represents self-sufficient and well organized structure of colonial areas.

Significant population movements (in particular bilateral interactions) occur between neighbouring subregions. Kielecki and Krakowski subregion and also the city of Cracow and the city of Wrocław participate also in long-distance flows, in relation to second order or higher neighbourhood regions, e.g. the city of Warsaw. There are three main areas of migration flows in the southern Poland such as the city of Wrocław, the city of Cracow and Upper Silesian Industrial Basin as the biggest economic centers of the region. Nevertheless among recipients of the majority of migration flows are the city of Wrocław and the city of Cracow due to their metropolitan capacity.

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