PRACE NAUKOWE
Uniwersytetu Ekonomicznego we Wrocławiu

RESEARCH PAPERS
of Wrocław University of Economics

Nr 394

Local and Regional Economy in Theory and Practice

edited by
Elżbieta Sobczak
Beata Bal-Domańska
Andrzej Raszkowski

Publishing House of Wrocław University of Economics
Wrocław 2015

Copy-editing: Marcin Orszulak

Layout: Barbara Łopusiewicz

Proof-reading: Magdalena Kot

Typesetting: Agata Wiszniowska

Cover design: Beata Dębska

Information on submitting and reviewing papers is available on
the Publishing House's website
www.pracenaukowe.ue.wroc.pl
www.wydawnictwo.ue.wroc.pl

The publication is distributed under the Creative Commons Attribution 3.0
Attribution-NonCommercial-NoDerivs CC BY-NC-ND

© Copyright by Wrocław University of Economics
Wrocław 2015

ISSN 1899-3192
e-ISSN 2392-0041

ISBN 978-83-7695-512-4

The original version: printed

Publication may be ordered in Publishing House
tel./fax 71 36-80-602; e-mail: econbook@ue.wroc.pl
www.ksiegarnia.ue.wroc.pl

Printing: TOTEM

Contents

Preface 9

Dariusz Głuszczuk: Regional e-Platform of Proinnovative Online Loans – A model approach 11
Lech Jańczuk: The perennial financial forecasting as a tool for predicting performance-based budgeting 18
Małgorzata Karczewska: The gross expenditures on R&D and the economic growth level in the EU countries 27
Bożena Kuchmacz: Man as a source of local social capital 36
Alina Kulczyk-Dynowska: The spatial and financial aspects of a protected area as exemplified by the Roztocze National Park 45
Liliia Lavriv: Strategic approaches to the management of regional development in Ukraine: Current state and conceptual areas of improvement 54
Joanna Ligenzowska: The impact of innovation on the development of the Małopolska Region 64
Magdalena Łyszkiewicz: The regional differentiation of financial autonomy of Polish communes 72
Grygorii Monastyrskyi, Yaroslav Fedenchuk: Modernization of regional policy of Ukraine in European integration conditions 81
Artur Lipieta, Barbara Pawełek: Comparative analysis of Polish NUTS 2 level regions in terms of their use of EU grants in 2007–2013 91
Dariusz Perło: Clusters and smart specializations 100
Dorota Perło: The soft model of the regional labor market situation of the youth 109
Katarzyna Peter-Bombik, Agnieszka Szczudlińska-Kanoś: Young people on the labor market as a challenge for social policy in selected Polish voivodeships 118
Jan Polski: Gordian knots of the regional development in Eastern Poland 127
Andrzej Raszkowski: The strategy of local development as a component of creative human capital development process 135
Elżbieta Sobczak: Specialization and competitiveness of workforce changes in the sectors grouped according to R&D activities intensity in European Union countries 144
Jacek Sołtys: Typology of low developed non-metropolitan sub-regions in the European Union 153
Edward Stawasz: Determinants of knowledge transfer processes in a region 166

Andrzej Sztando: Workshops as a method of social consultations in the process of local strategic planning 175
Maciej Turała: Equalization of territorial units' incomes – A case study of Poland 187
Alla Vasina: Development of infrastructure as an important factor of regions' economy structuring 196

Streszczenia

Dariusz Głuszczuk: Regionalna e-Platforma Proinnowacyjnych Pożyczek Internetowych – ujęcie modelowe 11
Lech Jańczuk: Wieloletnie planowanie finansowe jako narzędzie predykcji budżetu zadaniowego 18
Małgorzata Karczewska: Nakłady na badania i rozwój a poziom rozwoju gospodarczego w Unii Europejskiej 27
Bożena Kuchmacz: Człowiek jako źródło lokalnego kapitału społecznego ... 36
Alina Kulczyk-Dynowska: Przestrzenne i finansowe aspekty funkcjonowania obszaru chronionego na przykładzie Roztoczańskiego Parku Narodowego 45
Liliia Lavriv: Podejścia strategiczne w zarządzaniu rozwojem regionalnym na Ukrainie: Stan obecny i koncepcja doskonalenia 54
Joanna Ligenzowska: Wpływ innowacji na rozwój regionu Małopolski 64
Magdalena Łyszkiewicz: Regionalne zróżnicowanie samodzielności finansowej polskich gmin 72
Grygorii Monastyrskyi, Yaroslav Fedenchuk: Modernizacja polityki regionalnej Ukrainy w warunkach integracji europejskiej 81
Artur Lipieta, Barbara Pawełek: Analiza porównawcza polskich regionów szczebla NUTS 2 ze względu na wykorzystanie funduszy unijnych w latach 2007–2013 91
Dariusz Perło: Klastry a inteligentne specjalizacje 100
Dorota Perło: Model miękki sytuacji osób młodych na regionalnym rynku pracy 109
Katarzyna Peter-Bombik, Agnieszka Szczudlińska-Kanoś: Młodzi ludzie na rynku pracy jako wyzwanie dla polityki społecznej wybranych polskich województw 118
Jan Polski: Węzły gordyjskie rozwoju regionalnego w Polsce Wschodniej ... 127
Andrzej Raszkowski: Strategia rozwoju lokalnego jako element procesu kształtowania kreatywnego kapitału ludzkiego 135
Elżbieta Sobczak: Specjalizacja i konkurencyjność zmian zatrudnienia w sektorach wyodrębnionych według intensywności nakładów na B+R w państwach Unii Europejskiej 144

Jacek Sołtys: Typologia nisko rozwiniętych niemetropolitalnych podregionów Unii Europejskiej 153
Edward Stawasz: Determinanty procesów transferu wiedzy w regionie..... 166
Andrzej Sztando: Warsztaty jako metoda konsultacji społecznych w procesie lokalnego planowania strategicznego..... 175
Maciej Turała: Równoważenie dochodów jednostek terytorialnych – studium przypadku Polski 187
Alla Vasina: Rozwój infrastruktury jako ważny czynnik strukturyzacji gospodarek regionalnych 196

PRACE NAUKOWE UNIWERSYTETU EKONOMICZNEGO WE WROCŁAWIU
RESEARCH PAPERS OF WROCŁAW UNIVERSITY OF ECONOMICS nr 394 • 2015

Local and Regional Economy in Theory and Practice

ISSN 1899-3192
e-ISSN 2392-0041

Elżbieta Sobczak
Wrocław University of Economics
e-mail: elzbieta.sobczak@ue.wroc.pl

SPECIALIZATION AND COMPETITIVENESS OF WORKFORCE CHANGES IN THE SECTORS GROUPED ACCORDING TO R&D ACTIVITIES INTENSITY IN EUROPEAN UNION COUNTRIES

SPECJALIZACJA I KONKURENCYJNOŚĆ ZMIAN ZATRUDNIENIA W SEKTORACH WYODRĘBNIONYCH WEDŁUG INTENSYWNOŚCI NAKŁADÓW NA B+R W PAŃSTWACH UNII EUROPEJSKIEJ

DOI: 10.15611/pn.2015.394.16

Summary: The objective of the present paper is to classify European Union countries regarding specialization and competitiveness of workforce changes in the sectors of high and medium high-technology manufacturing, low and medium low-technology manufacturing, knowledge-intensive services, less knowledge-intensive services and other sectors. Workforce structure in the economic sectors grouped based on R&D work intensity in European Union countries in the period of 2008–2012 was the subject of the analysis. The analysis was based on structural and geographical shift-share analysis which enabled a classification of EU countries regarding workforce changes effects and also an assessment of workforce structures related to the reference space, i.e. regional area of the European Union Member States. The performed research also allowed for the identification of workforce structures characterized by specialization and competitiveness in high and medium high-tech manufacturing sectors or knowledge intensive services sector.

Keywords: workforce structure in EU countries, knowledge intensive sectors, shift-share analysis, specialization, competitiveness.

Streszczenie: Celem artykułu jest klasyfikacja państw Unii Europejskiej ze względu na specjalizację i konkurencyjność zmian zatrudnienia w sektorach przemysłu przetwórczego wysokiej i średnio wysokiej techniki, niskiej i średnio niskiej techniki, usług opartych na wiedzy, usług mniej wiedzochłonnych i innych. Przedmiotem analizy jest struktura pracujących w sektorach wyodrębnionych wg intensywności nakładów na B+R w państwach Unii Europejskiej w latach 2008–2012. Podstawę analizy stanowiła strukturalno-geograficzna analiza shift-share pozwalająca na klasyfikację państw Unii Europejskiej ze względu na efekty

zmian zatrudnienia, a także ocenę struktur pracujących na tle obszaru odniesienia, za jaki uznano przestrzeń regionalną państw Unii Europejskiej. Przeprowadzone badania pozwoliły również na identyfikację struktur pracujących charakteryzujących się specjalizacją i konkurencyjnością w sektorach przemysłu przetwórczego wysokiej i średnio wysokiej techniki oraz w sektorze usług opartych na wiedzy.

Słowa kluczowe: struktura pracujących w krajach UE, sektory zaawansowane technologicznie, analiza shift-share, specjalizacja, konkurencyjność.

1. Introduction

One can perform an analysis of specialization and competitiveness having taken into consideration the sector structure of economy. Economic structure is one of the crucial, endogenous factors responsible for the development of the economy [vide Chojnicki, Czyż 2004; Gorzelak 2003; Moole, Cappelin 1988]. Currently the significance of economy sectors, based on the implementation of knowledge and innovation, keeps growing. In 2010 the European Union adopted Europe 2020 development strategy, which defined goals facilitating EU Member States in ensuring, among others, smart growth consisting in the development of knowledge and innovation based economy [*Europe 2020*..., 2010]. In the traditional approach, the structural analyses cover four most important economy sectors among which the following are included: agriculture, industry, market and non-market services [Aslesen, Isaksen 2007; Bishop 2008; Włodarczyk 2011]. This study focuses on analyzing workforce structure in the economy sectors classified according to the intensity of research and development activities, also referred to as technological intensity defined as the relation of expenditure on R&D against added value or the total value of manufacturing sector [*Science and Technique 2007*, 2009; Wojnicka (ed.) 2006; Zielińska-Głębocka 2012].

2. Information source and the applied research methods

The subject of the research is workforce structure in the sectors selected in line with technological intensity, based on the European Classification of Economic Activities NACE from 1997, updated and amended in 2008. Due to the fact that in 2008 the definitions of high-tech industry sectors and knowledge-intensive services were also changed, the comparability of statistical data was lost. Therefore, the adopted time range of conducted research covers the period 2008–2012 (according to Rev. 2 classification) [Hatzichronoglou 1996]. The structure of workforce in the cross-section of the listed below R&D intensity sectors, prepared by Eurostat and OECD, constitutes the basis for the performed analyses: high and medium high--technology manufacturing (HMH), low and medium low-technology manufacturing (LML), knowledge-intensive services (KIS), less knowledge-intensive services (LKIS) and other sectors (OTHER).

The analysis covers 28 European Union countries. The necessary statistical information was obtained from Eurostat database.

Structural and geographic workforce analysis in terms of R&D intensity was conducted in EU Member States by using classical and dynamic shift-share analysis and the Esteban-Marquillas model using allocation effect [Barff, Knight 1988; Dunn 1960; Esteban-Marquillas 1972; Perloff et al.1960; Malarska, Nowakowska 1992; Suchecki (ed.) 2010]. Shift-share analysis represents a research tool that allows determining the rate of changes related to total employment and R&D intensity sectors in each EU country at the background of reference area, i.e. the EU area. Shift--share analysis of workforce changes rate in the EU countries allowed for specifying structural and competitiveness effects of workforce number changes in the sectors grouped according to R&D intensity, classification of EU countries by positive and negative change effects values, as well as by specialization and competitiveness – the components of allocation effects.

3. Shift-share analysis of workforce in the economy sectors grouped according to R&D intensity

The assessment of regional specialization and competitiveness in economy sectors requires specifying a reference structure, i.e. the one constituting the required reference basis. In the discussed framework this role will be played by workforce structure in the space of 28 European Union Member States.

The information provided in Table 1 indicates that in European Union countries in the period 2008–2012, the largest average workforce share was definitely characteristic for the knowledge-intensive services sector, to be followed by the less knowledge--intensive services sector. The lowest workforce share was observed in high and medium high-technology sectors. The changes occurring in the course of five analyzed years were insignificant, which seems natural, since economic structures are most frequently characterized by slow and evolutionary type of changes over time.

Table 1. Workforce structure in the economic sectors grouped according to R&D activities intensity in UE countries in the period 2008–2012 (in %)

Year	Economic sectors by R&D activities intensity				
	HMH	LML	KIS	LKIS	OTHER
2008	5.9	11.1	36.8	30.5	15.7
2009	5.7	10.5	38.0	30.4	15.4
2010	5.6	10.3	38.5	30.4	15.2
2011	5.6	10.1	38.9	30.6	14.8
2012	6.0	10.0	38.0	31.0	15.0

Source: author's own compilation based on Eurostat database.

Table 2 presents the effects of workforce structure changes which allow identifying the economy sectors exerting key impacts on the European Union countries' economic growth in the period 2008–2012. Net structural effects were defined by means of decreasing gross effects in terms of workforce growth rate in the EU. Employment changes in the knowledge-intensive services sector in 2012 resulted in higher workforce number in all EU countries, on average by 6.18%. Employment growth rate in less knowledge-intensive services sector in 2012 influenced the slight growth of workforce size (0.75%). Employment in other sectors was related to the drop of employment in the analyzed countries. The largest employment rate occurred in low and medium low-technology manufacturing sector (−9.84%).

Table 2. Results of classic shift-share analysis with regard to the effects of employment changes in the sectors grouped according to R&D intensity

Effects of employment changes in EU countries (in %)		2012/2008
Total effect (growth rate of employment in the EU)		−2.67
Net structural effect	1. High and medium high-technology manufacturing (HMH)	−4.54
	2. Low and medium low-technology manufacturing (LML)	−9.84
	3. Knowledge-intensive services (KIS)	6.18
	4. Less knowledge-intensive services (LKIS)	0.75
	5. Other sectors (OTHER)	−7.23

Source: author's own compilation based on Eurostat database.

Table 3. Classification of EU countries by positive and negative aggregated effect values: structural and competitive (dynamic shift-share analysis 2012/2008)

Class	Criterion of division	Countries	Number of countries
I	effects: structural (+) competitive (+)	Belgium, Germany, France, Cyprus, Luxembourg, Malta, Netherlands, Finland, Sweden	9 EU15 7 EU13 2
II	effects: structural (+) competitive (−)	Denmark, Ireland, the United Kingdom	3 EU15 3 EU13 0
III	effects: structural (−) competitive (+)	The Czech Republic, Italy, Hungary, Austria, Poland, Romania	6 EU15 2 EU13 4
IV	effects: structural (−) competitive (−)	Bulgaria, Estonia, Greece, Spain, Croatia, Latvia, Lithuania, Portugal, Slovenia, Slovakia	10 EU15 3 EU13 7

where: EU15 – so-called "the old European Union" 15 countries, EU13 – countries from the so-called new accession.

Source: author's own compilation based on Eurostat database.

Table 3 and Figure 1 illustrate the classification of EU countries with regard to aggregated structural and competitive effects.

The first class covered those countries in which sectoral workforce structure has a positive impact on employment rate growth and economic sectors are characterized by higher dynamics of workforce size fluctuations compared to other countries. This group includes seven countries from EU15 and 2 countries from EU13. In this class Luxembourg stands out as characterized by very strong positive effects, both structural and competitive ones, definitely higher than in the other countries covered by this class. The second class characterized by a positive value only of the structural factor lists three countries from EU15 and does not include any country from UE13. The most favorable chances in employment structure observed in this class in the analyzed period occurred in Great Britain. This country was characterized by the highest structural effects and by slight, negative competitive effects.

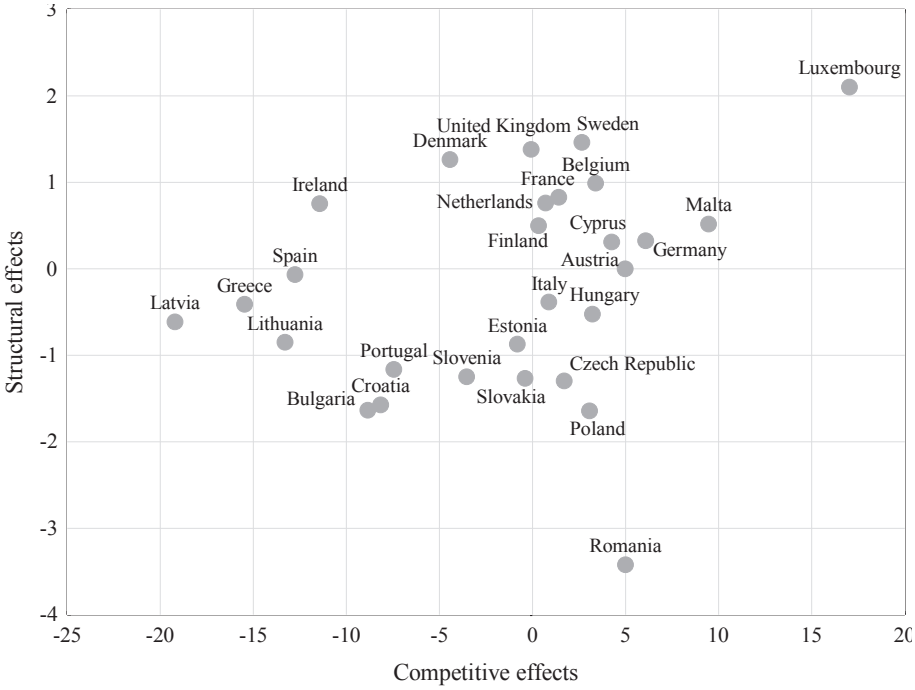

Figure 1. Aggregated structural effects vs. aggregated competitive effects

Source: author's own compilation based on Eurostat database.

The third class, featuring positive influence of only the competitive factor, covered four new EU countries. In this class of countries Romania was characterized by definitely the least favorable changes in workforce structure. The fourth class covers the countries in which both employment structure and internal competitive development

determinants exerted negative impacts. This is the largest class including seven countries of EU13 and three countries of EU15. The most unfavorable competitive effects of employment changes were observed in this class with reference to Latvia, whereas the least favorable structural changes were recorded in Bulgaria and Croatia.

Figure 2 presents the values of aggregated structural and competitive effects arranged according to the decreasing values calculated for 2008–2012. As it can be observed, in the analyzed period competitive factors exerted a much larger impact on employment changes than the structural ones. The most favorable structural effects of changes occurred definitely in Luxembourg, to be followed by Sweden, Great Britain and Denmark. The largest negative influence of workforce structure on employment changes was observed in Romania, Poland, Bulgaria and Croatia.

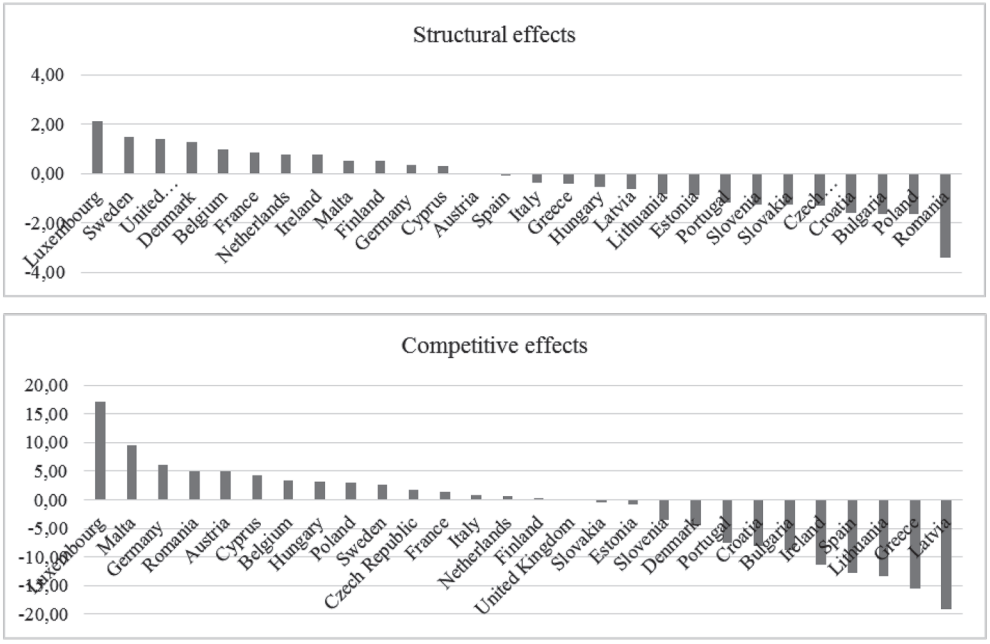

Figure 2. Aggregated structural and competitive effects for EU countries in the period 2008–2012

Source: author's own compilation based on Eurostat database.

The most favorable internal competitive factors responsible for changes in workforce number occurred in Luxembourg and Malta. The least favorable situation was observed in Latvia, Greece, Lithuania and Spain, i.e. those countries which struggled with economic crisis in the analyzed period.

Table 4 presents the classification of EU countries with regard to allocation component effects: specialization or its absence as well as the advantage or disadvantage of competitiveness in high and medium high-technology manufacturing and knowledge-intensive services sectors, respectively.

A particular country is characterized by workforce structure featuring specialization in the high and medium high-technology manufacturing sector (knowledge-intensive services) if workforce shares in this sector is higher than the EU average. On the other hand, competitive advantage in the high and medium high-technology manufacturing sector (knowledge-intensive services) is present in a country in which the employment changes rate in this particular sector is more favorable than the sectoral changes rate in the EU.

Table 4. Classification of EU countries with regard to allocation component effects in high and medium high-technology manufacturing and knowledge-intensive services sectors in 2012

Typology of EU countries	HTM		KIS	
Specialization Competitive advantage	The Czech Republic, Germany, Hungary, Austria, Italy	EU15 3 EU13 2	Belgium, Germany, Luxembourg, Malta, Finland, Sweden, the United Kingdom	EU15 6 EU13 1
Specialization Competitive disadvantage	Slovenia	EU15 0 EU13 1	Denmark, Ireland, France, Netherlands	EU15 4 EU13 0
Absence of specialization Competitive advantage	Estonia, Ireland, Cyprus, Luxembourg, Slovakia	EU15 2 EU13 3	The Czech Rep., Estonia, Cyprus, Hungary, Austria, Poland, Romania, Slovenia,	EU15 1 EU13 7
Absence of specialization Competitive disadvantage	Belgium, Bulgaria, Denmark, Greece, Spain, France, Croatia, Latvia, Lithuania, Malta, Poland, Netherlands, Portugal, Romania, Finland, Sweden, the United Kingdom	EU15 10 EU13 7	Bulgaria, Greece, Spain, Croatia, Italy, Latvia, Lithuania, Portugal, Slovakia	EU15 4 EU13 5

Source: author's own compilation based on Eurostat database.

In the analyzed period, specialization and competitive advantages in processing industry sector of high and medium high-technology were characteristic for five EU countries, i.e.: the Czech Republic, Germany, Hungary, Austria and Italy. Specialization and competitive advantage in knowledge-intensive services were identified in seven EU countries, with only Malta representing the new EU Member States.

4. Conclusions

The conducted research covering specialization and competitiveness of changes in workforce number in the sectors grouped according to R&D expenditure intensity in European Union countries in the period 2008–2012 allows for presenting the following conclusions:

1. During the economic downturn EU countries recorded a drop in workforce number by 2.67%. However, the changes in workforce number in knowledge-intensive services resulted in an average employment rate growth by 6.18%. The knowledge--intensive services sector turned out to be the key one responsible for economic growth.

2. The most favorable structural effects of changes in workforce number occurred in Luxembourg, Sweden, Great Britain and Denmark, so in the countries characterized by a high share of workforce in the knowledge-intensive services sector presenting the level of respectively about 57%, 52%, 48%, 49% in 2012. Definitely the least favorable structural effects were observed in Romania, where workforce share in knowledge--intensive services amounted to about 20% in 2012. In the countries featuring positive structural effects workforce share in KIS ranged from 36% in Cyprus to 57% in Luxembourg in 2012.

3. The most favorable competitive effects took place in Luxembourg, whereas the least favorable ones in the countries covered by deep economic crisis which, in the analyzed period, included Latvia, Greece, Lithuania and Spain.

4. Specialization and competitive advantage in both high-tech sectors were, in 2012, characteristic only for Germany.

5. Two-sectoral absence of specialization and absence of competitive advantage occurred in Bulgaria, Greece, Spain, Croatia, Latvia, Lithuania and Portugal.

6. Poland was included in the group of countries which featured the absence of specialization in the high-tech industry sector and in knowledge-intensive services.

Shift-share analysis proved to be a useful method in identifying changes related to structure and employment dynamics in European Union countries covering the economy sectors grouped according to R&D activities intensity.

References

Aslesen H.W., Isaksen A., 2007, *New perspectives on knowledge-intensive services and innovation*, Geografiska Annaler Series B-Human Geography, 89B, pp. 45–58.

Barff R.A., Knight III P.L., 1988, *Dynamic shift-share analysis*, Growth and Change, no. 19/2.

Bishop P., 2008, *Spatial spillovers and the growth of knowledge intensive services*, Tijdschrift Voor Economische en Sociale Geografie, vol. 99(3), pp. 281–292.

Chojnicki Z., Czyż T., 2004, *The main aspects of the regional socio-economic development*, [in:] Parysek J.J. (ed.), *Regional and Local Development in Poland in the Years 1989–2002*, Bogucki Scientific Publishers, Poznań.

Dunn E.S., 1960, *A Statistical and Analytical Technique for Regional Analysis*, Papers of the Regional Science Association, no. 6, pp. 97–112.

Esteban-Marquillas J.M., 1972, *Shift and Share analysis revisited*, Regional and Urban Economics, vol. 2, no. 3.

Europe 2020. The Strategy for Smart and Sustainable Growth Facilitating Social Inclusion, 2010, The Communication by the Commission, The EU Commission, Brussels.

Gorzelak G., 2003, *The wealth and poverty of regions. Assumptions, hypotheses, cases*, Regional and Local Studies, vol. 1(11), pp. 37–58.

Hatzichronoglou T., 1996, *Revision of the High-Technology Sector and Product Classification*, OECD, Paris.

Malarska A., Nowakowska B., 1992, *Metoda przesunięć udziałów w analizie dynamiki zmian strukturalnych*, Przegląd Statystyczny, nr 1

Moole W., Cappellin R., 1988, *Regional Impact of Community Policies*, Aldershot, Avebury.

Perloff H.S., Dunn E.S., Lampard E.E., Mutha R.F., 1960, *Regions, Resources and Economic Growth*, John Hopkins Press, Baltimore.

Science and Technique in 2007, 2009, Statistical information and studies, Central Statistical Office, Warsaw.

Suchecki B. (ed.), 2010, *Ekonometria przestrzenna. Metody i modele analizy przestrzennej*, C.H. Beck, Warszawa.

Włodarczyk R., 2011, *Comparative analysis of employment sectorial structure in Euro zone countries*, Transformations in Business & Economics, vol. 10, no. 2A(23A), pp. 292–302.

Wojnicka E. (ed.), 2006, *High-tech SME Development Perspectives in Poland till 2020*, Polish Agency of Enterprise Development, Warsaw.

Zielińska-Głębocka A., 2012, *Contemporary Global Economy. Transformations, Innovations, Crises, Regional Solutions*, Wolters Kluwer Poland, Warsaw.