Assessment of Shift-share Analysis Suitable for Identification of Industrial Cluster Establishing in Regions[1]

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Abstract

The industrial clusters are now the traditional instruments of regional policy in every developed country. There are the complex tools with what the home regions can be promoted and developed. The biggest boom of clusters in Europe is recorded after the turn of the millennium. It is particularly associated with massive support from public budgets as support for new and interesting idea. Once practical experiences have shown neither this instrument (cluster) is not a guarantee of development and effectiveness. Therefore, there are many methods that help uncover the potential of the region for called cluster birth and development. This paper aims to critically assess the suitability of shift-share analysis method for the industrial clusters framework, namely to examine how the method can help determine if there are industrial sectors which are suitable for the formation of clusters.

Keywords: *cluster, industrial cluster, regional policy, effectiveness, potential for cluster birth, shift-share analysis*

JEL Classification: C83, R12, R15, R58

Introduction

The current period of regional policy, dated from about the 70th of the 20 century, is characterized by a completely different concept and targeting. This "institutional" approach views and analyses three areas in particular – the first is technology and innovation as such; and the second is the concept of the firm and

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finally the third are institutions. In particular, the firm theory is being supplemented by an increasingly important element is *cooperation* and its economic context, respectively benefits (Andersson, 2004). Originally, the companies are seen in the neoclassical view as the relatively independent economic entities operating in a market which is true given the unique mechanical and rigid – historically given the rules of supply and demand. The institutions then brought into the economic mechanisms the elements of values, habits and the scope for cooperation, however, anticipating a new and crucial element in establishing confidence between different actors. It seems at first a free good, over time it can be described as an economic good (Nelson, 1998; Andersson, 2004).

This paper will be dedicated to one of the most frequently published methods – shift-share analysis. Therefore aim of this paper is to analyze the applicability of the method in identifying of suitable branch for the establishing clusters. Specific calculations are carried out to date local government regions of the Czech Republic.

1. Theoretical Context and Overview

This fundamental change in the concept of economic entities and their function in the marketplace has given rise to other sub-theories, which the theory of production districts (Marshall, 1920) and later business chaining and networking. Finally, in the early 90 of the 20 century were the foundation of economic prosperity and competitiveness, put the knowledge, skills and ability to learn (Lundvall, 1992; Johnson, 2008; Edquist, 2011). This helped lay the foundation of the knowledge economy, where the learning organizations – namely, learning organization and learning regions play a crucial role (Malmberg, 1997; Maskel, 2001; Asheim and Isaksen, 2002).

The process of learning and knowledge transfer must take place in a favourable economic environment that is characterized by the proximity of subjects, the existing positive relationships and ties and have already mentioned the necessary confidence between the parties. It should be noted that the mere spatial proximity and established links are not a guarantee of the initiation process starting and learning organizations, learning regions respectively the horizontal transfer of knowledge (Fujita and Tabuchi, 1997; Henderson, 2007; Lambooy, 2010).

The new knowledge of knowledge economy has been implemented into an already well-known frameworks, which gradually gave rise to industrial clusters as a holistic concept, which was based on collaboration – proximity (not just geographically) – knowledge and the resulting innovations (Cooke, 2001; Iammarino and McCann, 2006).

Modern industrial clusters are widespread instrument of regional policy since 1990, when their father professor M. E. Porter published the first definition (Porter, 1990). Subsequently, this concept of comprehensive tools of the support competitiveness of regional economies was taken and implemented in almost all countries.

The industrial clusters can help push away from the routine economic behavior the economic element of indifference and selfishness, both individual businesses and the right and territorial governments. They often try to encourage these entities to pro-social conduct and through their attempts to influence the development of the region and managed by the particular economic and social development. Experience shows that the principle of establishing called "up-down" is not a success and therefore effective (Brown, 2000; Bathelt, Malmberg and Maskel, 2004).

Clusters can help complete the positive economic environment and add to it an element of ethics and trust in the ensuing collaboration, social responsibility, then the only region in which the subjects (entities) are located. The very effective cooperation is the possibility of giving rise to many positive externalities that would otherwise not occur. This is especially the cooperation with the sector of research, development and innovation – that is, universities, research centers, scientific research parks, innovation centers and business incubators. There are of course another advantages connected with cluster establishing as you can see in Nemcová (2004). Indeed, the every innovation center is a good example of necessary connection and cooperation generally three different entities – regional actors – in other words businesses wishing to innovate and the research base in the innovation center and public administration authorities, what the creation and operation of these centers often support from public funds. Positive benefits are then obvious – these activities attract new investors who are looking for location incentives (particularly wish to participate in research and development results, to get qualified workforce, gain a competitive advantage through innovation commercialized). Subsequent investments create new jobs to reduce unemployment in the region and the whole activity resulting from the initial idea of "collaboration" to improve the economic situation of the region (Dobkins, 1996; Morosini, 2004).

The whole thus described the substance of clusters and their contribution to the economic situation of the region is not optimal, purely exemplary. In practice, the whole concept should be slightly adjusted according to context and local conditions and regional development objectives in the region (Pinch et al., 2003). However, in order for this to happen the first clusters arise and function. It must not, however, forget the spontaneously arising clusters. Thus formed clusters are usually a guarantee of economic success.

Given that this is a very comprehensive tool for economic development (Pavelková and Dehning, 2009), it must be for the successful emergence of the specific conditions. They should be initiated before the cluster initiating to examine carefully (Gordon and McCann, 2000). A detailed analysis of clusters in the region is a necessary condition for the existence and subsequent successful operation. Extension also ensures that public funds are spent efficiently utilized.

The methods to explore the potential of the cluster in the region are not much (Stejskal, Sekerka and Hrnčířová, 2011; Székely, 2008). There are used various methods of agglomeration analysis, analysis of concentration, specialization and location. Some of them do not provide appropriate results.

2. Methods for Industrial Cluster Identification in Existence Stage

In the existence stage of cluster life cycle is necessary to do an analysis, which identifies the appropriate sector in which there are prerequisites for the emergence of a cluster (cluster potential). The basic premise must be a real competitive advantage.

Given that there is no generally accepted methodology for measuring the potential cluster, there are using many methods that can be used for measurement of agglomerations or specialization in various sectors. The quantitative or qualitative data are useful for analysis. Methods working with quantitative data assessed mainly the number of employees, value added, turnover, or sales. Often this method based on the analysis of shift-share (Rosenfeld, 1997).

Among the frequently cited methods based on the analysis of quantitative data include (Stejskal, 2011, p. 112):
   a) localization quotients (coefficients),
   b) input-output analysis,
   c) shift-share analysis,
   d) Gini coefficient,
   e) Ellison and Glaeser agglomeration index,
   f) Maurel-Sédillot index.

The qualitative methods focus on mapping the relationships and linkages, respectively detecting potential numerically non-formulated potential, respectively competitive advantage. The substance is to understand the ties and relationships in the cluster and its surroundings. This includes expert assessment, surveys and interviews.

In addition, there are methods that are a combination of those approaches. The new method is the Analysis of competitive advantage (CAA) (for more see Stejskal and Hajek, 2012).

The implementation of the various analysis methods is difficult due to the need quality and well-timed input data. It follows that the low explanatory power of each method. Some of the mentioned methods are directly inappropriate for cluster analysis, but can be used for partial analysis of conditions or some indicators what can help to reveal if the cluster potential is in analyzed region. Shift-share analysis is a method for which it is appropriate to verify the explanatory power, which is the aim of this paper as well.

2.1. Shift-share Analysis

This is a simple, fast and relatively cheap method for analysis of regional growth and decline over time. Shift-share analysis allows you to assess the overall performance of the region compared with other regions. In the context of regional employment or output of the industry, this tool has been used widely since 1960 for assessing the relative importance of industry in the region. You can easily identify the problematic industries in the region, which in future may require attention. Shift-share analysis shows how industry structure influences regional and local economies, examines regional economic trends and advises policy makers focused on the industry.

2.1.1. Traditional Shift-share Model

The heart of the analysis is to identify three types of growth (decline) in total employment in the region for a selected time period (Stimson, Stough and Roberts, 2006).

They are: (1) national growth share, (2) industry mix share, (3) local share.

These three types of growth are considered by using three calculated factors:

1. National growth share (NGS) – factor determining growth arising from national factors. To calculate this rate we use the following formula:

$$NGS = Er_{ji} \cdot \left(\sum_i En_{ki} / \sum_i En_{ji} \right) \cdot 100 / 100 \qquad (1)$$

where

Er_{ji} – regional employment in sector i in original year j,

En_{ji} – national employment in sector i in original year j,

En_{ki} – national employment in sector i in final year k.

2. Local share (LS) – factor determining growth arising from the competitiveness of local enterprises. To calculate this rate we use the following formula:

$$LS = Er_{ji} \cdot \left\{ \left[\left(Er_{ki} / Er_{ji} - 1 \right) \cdot 100 / 100 \right] - \left[\left(En_{ki} / En_{ji} - 1 \right) \cdot 100 / 100 \right] \right\} \qquad (2)$$

where

Er_{ki} – regional employment in sector i in final year k.

3. Industry mix share (IMS) – factor determining growth which is based on the differential growth of various sectors. This coefficient can be calculated as:

$$IMS = Er_{ji} \cdot \left\{ \left[\left(En_{ki} / En_{ji} - 1 \right) \cdot 100 / 100 \right] - \left[\left(\sum_i En_{ki} / \sum_i En_{ji} - 1 \right) \cdot 100 / 100 \right] \right\} \quad (3)$$

Total employment established in the region, is the sum of all the above three factors namely: (NGS + LS + IMS). The disadvantage of this method is difficult to select the time frame for analysis.

2.1.2. Process of Traditional Shift-share Model

The first step is to select the period in which we are going to count shift-share analysis. The next step is assembling the data for analysis – ideal to summarize them in the table. Then calculate each rate according to the above formulas. This allows us to identify which sectors contributed most to employment creation in the region under. At the end the interpretation of results is made.

This classic model of shift-share analysis emphasizes not only the role of regional changes in employment in industry, which is typical for the region but also on the regional transportation or competition as part of the scale of the relative performance of a particular industrial sector in the region. Distribution of regional changes in three components – the NGS, LS and IMS – should enable researchers to study the sources of changes separately.

3. Application of Shift-share Analysis (Czech Republic Case)

The calculation of the coefficients of the chosen method is based on data about employment in different 14 regions of the Czech Republic. This is the average registered number of employees: by CZ-NACE. This type of data is provided by the Czech Statistical Office in regularly published yearbooks.
For the method of shift-share analysis is important to choose the appropriate time frame. Given the timeliness of the data we chose in this work period between 2003 and 2007 because more recent data are not currently available. After year 2007 the statistic data about the employment (registered number of employees) by CZ-NACE in second level are not collected and published (the authors reviewed the situation by the Czech Statistical Office). That is the reason for older data in analyses presented in this paper.

The calculation of coefficients itself is not problematic, because we use the data about employment and put them into the equations (1) – (3) marked by star. The calculation is presented in the table 1. In this table is provided the calculation of coefficients for Hradec Králové Region.

Table 1

Calculation of Shift-share Coefficients

Average registered number of employees: by CZ-NACE	CR 2003	HK 2003 *Er$_{ji}$	CR 2007	HK 2007	*NGS	LS	IMS
A – Agriculture, hunting, forestry	160.9	11.0	130.6	9.9	0.376	0.971	−2.448
B – Fishing	1.8	0.1	1.2	0.1	0.003	0.033	−0.036
C – Mining and quarrying	49.2	0.4	41.8	0.6	0.013	0.260	−0.073
D – Manufacturing	1195.6	78.7	1250.9	78.7	2.697	−3.640	0.942
…							
Total	**4020.9** $*\sum_i En_{ji}$	**216.7**	**4158.7** $*\sum_i En_{ki}$	**211.2**	**7.426**	**−11.505**	**−1.420**

Note: Detailed data for the calculations is presented in Appendix 1.

Source: Own processing based on data from Czech Statistical Office.

After calculating the coefficients of shift-share analysis by (1) – (3), we can first discuss individual factors. The resulting values are summarized in Table 2.

Table 2

Coefficients of Shift-share Analysis

	Region	LS	IMS	NGS
HK	Hradec Králové Region	−11.5	−1.4	7.4
JM	South Moravian Region	5.8	1	15.2
PZ	Pilsner Region	2.2	−1.4	7.6
UN	Ústí Region	−4.5	−2.6	9.7
MS	Moravian-Silesian Region	−4.1	−3.5	15.3
PC	Pardubice Region	1.3	−1.5	6.5
KV	Karlovy Vary Region	−8.4	−1.1	3.8
JC	South Bohemian Region	−7.0	−3.0	8.3
LI	Liberec Region	−6.0	0.6	5.4
OC	Olomouc Region	−0.8	−1.8	7.8
SC	Central Region	5.4	−1.4	13.3
VY	Vysočina Region	−10.9	−4.0	6.7
ZL	Zlín Region	−10.9	0.8	7.4

Note: It is also not relevant to assess the value of the capital city of Prague, as the region with its characteristics dramatically different from others because it is not usually included in the analysis.

Source: Own processing based on data from Czech Statistical Office.

NGS coefficient reflects the overall national growth. The values of this coefficient are in the range of positive values, we can say that in the reference period therefore between 2003 and 2007 were created new jobs in all the sectors of the economy.

Furthermore, we can say that firms in the region, which is found a negative coefficient LS, recorded in the period of slower growth than was identified at a national level. However, if the LS factor varies in positive terms, one can assume that in these regions is accelerating the pace of growth sectors of the economy.

Based on the coefficient of IMS we can detect the existence of comparative advantage for the growth sectors of the economy. The rate of this coefficient in the period around zero or even negative values, indicating that in the period did not exist in most regions significant comparative advantage.

The results of analysis, which is in Appendix 2, show that the highest increase in employment is mostly in the manufacturing, where we can certainly trace some conditions for creation clusters. Other sector in which there was a significant shift in employment is real estate, renting and business activities. There it is very unlikely that a cluster may be established.

For comparison with the reality of the Czech Republic is used in the following Table 3, from which they are noticeable differences between the results of shift-share analysis and the actual situation in the Czech Republic.

T a b l e 3

Comparing Results of the Method

Region	Established clusters	Result of shift-share
HK	Pharmaceutical Cluster Nanomedic Cluster packaging manufacturers Omnipack Czech Stone Cluster	DL, DM
JC	Wood Processing Cluster Cluster of Wastewater Treatment Technology EKOGEN – cluster involved in the processing of fine inorganic waste materials in construction Food Cluster	G, DK
JM	Water treatment alliance Clothing Cluster BREHARDT Cluster of Czech Furniture Manufacturers	D – DH, DL, G, K
KV	Cluster of Musical Instruments Cluster Tableware – everything for table	There is no important shift.
LI	The Cluster of Technical Textiles	D – DM, K
MS	Moravian-Silesian Automotive Cluster* Wood Cluster ICT Cluster* Engineering Cluster Hydrogen Cluster HYDROGEN-CZ	D – DL*, DM*
OC	Cluster of manufacturers of trailers and superstructures*	D – DJ*, K, L
SC	No cluster established yet	D – DH, DJ, DL, DM, G, K
UN	No cluster established yet	D – DK, DM
VY	Wood Cluster Engineering Cluster*	D – DH, DJ, DK*, DM
ZL	The Footwear Cluster Plastic Cluster	F, DH, DJ
PC	Electronics cluster (with Hradec Kralove Region) Cluster of Technical Plastics	D – DJ, DK
PZ	Mechatronics Cluster*	D – DK*, DM*, K
PH	No cluster established yet	D – DE, DL, F, G, I, K

Source: Self-processing based on Table 1, abbreviations see table in Appendix 2.

In the above table, there are marked by stars results by the shift-share analysis, consistent with the current situation in the Czech Republic. Date of creation of clusters corresponding to the period between 2003 and 2007.

From the table is apparent that the method shift-share analysis does not give very reliable results. It can be concluded that compliance with the current state is rather random. Interpretation of different results can be showed on the situation in the SC region. There is currently based one cluster in this region. But the shift-share method provides information that here was possible to observe the increasing potential in the manufacture of rubber and plastic products, manufacture of basic metals and fabricated metal products, manufacture of machinery and equipment, last but not least, manufacture of transport equipment. One could therefore assume that at least in one of these sectors there will be cluster based. In the SC region was some indication of possible negotiations about establishing the automobile cluster, but this cluster has not been established yet.

By contrast, there is any important shift in employment in KV region, which we can see as a result of shift-share analysis. But there are established two clusters during chosen period. The clusters are Cluster of Musical Instruments and Cluster Tableware engaged in manufacturing and production of consumer goods in the household, which combines porcelain, ceramic, glass, textile and wood industries, as well as metal-working industry.

This inconsistency of results can be seen in each region. In this situation it is possible to draw conclusions regarding the applicability of the method of shift--share analysis to identify clusters in the Czech Republic.

4. Results Discussion and Conclusions

To verify the results obtained by the shift share analysis was used data on gross value added of individual sectors of the economy. The most important sectors in gross value added in the region were chosen on the basis of results which are listed in the Competitiveness Yearbook Czech Republic 2006 – 2007 (Kadeřábková, 2007). These results were compared to the industry sectors, which had the most significant shifts in employment on the basis of shift share analysis results in the period. The comparison is done in Table 4.

The results show that there is a consensus at least one of the industries in seven of the fourteen regions. The line is mostly in the individual categories of the manufacturing industry which are subcategories D group according to CZ--NACE. If we followed a basic division, it can be seen that the agreement would be in almost all regions, because manufacturing is important in all regions. The results further show that the most important industry is manufacture of transport equipment. There is a match in four regions of seven with identical results.

T a b l e 4

Comparison of the Results

Region	Key sectors according to gross value added	Results of shift-share analysis	Identical results
SC	D – DM; K; F	D – DH, DJ, DL, DM; G; K	DM, K
JC	A; B; D – DA, DM	G; D – DK	–
PZ	F; D – DA, DJ, DL; E; A	D – DK, DM; K	–
UN	E; D – DG, DH, DI; CA	D – DK, DM	–
LI	D – DM, DN, DN, DD, DL	D – DM; K	DM
HK	D – DM, DJ; A	D – DL, DM	DM
PC	D – DK, DJ; A	D – DJ, DK	DK
VY	D – DM; A	D – DH, DJ, DK, DM	DM
JM	F; G; D – DK, DA	D – DH, DL; G; K	G
OC	D – DA, DK, DB; A	D – DJ; K, L	–
ZL	D – DH, DK	F, D – DH, DJ	DH
MS	D – DJ; CA	D – DL, DM	–

Note: For the purpose of evaluating the method of shift share analysis cannot use the results from the Karlovy Vary region, because there was no significant shift in employment during this period.

Source: Own processing based on Table 1.

The comparison of results show that there are no significant similarities, so the method of shift share analysis can be used only as a reference method for the detection of economically important industry in the region. According to results of shift-share analysis we can see from the table that in the Czech Republic there are very important shifts in DM – manufacture of transport equipment, DK – manufacture of machinery and equipment, DJ – manufacture of basic metals and fabricated metal products and DH – manufacture of rubber and plastic products. We can say that these kinds of manufacturing industry are the most important in the Czech Republic according to increasing employment in these industries in reporting period. On the other hand just because shift-share analysis outcome, this method is not unambiguous in the Czech Republic and this method cannot be used to determine the appropriate industry sector for the emergence of clusters separately, but only in combination with other methods.

The only positive of the method is a very simple application, because the calculation of its components is not time-consuming. Another benefit of this method is the clarity of results. Here however may encounter a problem with interpretation of results. It is not clear what is considered as an important growth and what is merely a slight change.

The first big problem is the lack and lag of obtaining relevant data, which are necessary for the calculation. In reality of Czech Republic are not available actual data of average registered number of employees: by CZ-NACE 2nd level (CZ-NACE 1st level data is not suitable for shift-share analysis at all), therefore, the results of this method are highly distorted (the calculations can be made only ex post several years). Second: it is very important to choose the appropriate

time frame in which the method will be applied to avoid distortion of results. This problem is also related to the space of the Czech Republic with and well-timed data.

Interpretation of the results will only answer the question of which sector in the region is most developed. But it does not answer the question of which reasons lead to a growth of industry. Also the results of the method cannot deduce whether the increase of employment is permanent or will fall back, so this method cannot purge the influence of economic cycles.

The method is only suitable for the primary mapping of the dominant sector in the region. This is based on conducted research. In the Czech Republic from the above reasons that the results of Shift-share analysis cannot taken as a relevant basis for identifying suitable sectors for the formation of the cluster.

For a more detailed analysis would be more appropriate to use some of the qualitative methods such as questionnaire or direct contact with individuals firms in dominant industries.

References

ANDERSSON, Th. et al. (2004): The Cluster Policies Whitebook. IKED, 266 pp. Available at: <http://www.clusterplattform.at/fileadmin/user_upload/clusterbibliothek/916_TheClusterPolici esWhitebook.pdf>. ISBN 91-85281-03-4.

ASHEIM, B. T. – ISAKSEN, A. (2002): Regional Innovation Systems: The Integration of Local, "Sticky" and Global "Ubiquitous" Knowledge. Journal of Technology Transfer, *27*, No. 1, pp. 77 – 86.

BATHELT, H. – MALMBERG, P. – MASKELL, P. (2004): Clusters and Knowledge: Local Buzz, Global Pipelines and the Process of Knowledge Creation. Progress in Human Geography, *28*, No. 1, pp. 31 – 56.

BROWN, R. (2000): Cluster Dynamics in Theory and Practice with Application to Scotland. [Regional and Industrial Policy Research Paper.] Glasgow: European Policies Research Centre.

COOKE, P. (2001): Regional Innovation Systems, Clusters, and the Knowledge Economy. Industrial and Corporate Change, *10*, No. 4, pp. 945 – 974.

DOBKINS, L. H. (1996): Location, Innovation and Trade: The Role of Localization and Nation-based Externalities. Regional Science and Urban Economics, *26*, No. 6, pp. 591 – 612.

EDQUIST, C. (2011): Design of Innovation Policy through Diagnostic Analysis: Identification of Systemic Problems (or failures). Industrial and Corporate Change, *20*, No. 6, pp. 1725 – 1753.

FUJITA, M. – TABUCHI, T. (1997): Regional Growth in Postwar Japan. Regional Science and Urban Economics, *27*, No. 6, pp. 643 – 670.

GORDON, I. R. – McCANN, P. (2000): Industrial Clusters: Complexes, Agglomeration and/or Social Networks? Urban Studies, *37*, No. 3, pp. 513 – 532.

HENDERSON, J. V. (2007): Understanding Knowledge Spillovers. Regional Science and Urban Economics, *37*, No. 4, pp. 497 – 508.

IAMMARINO, S. – McCANN, P. (2006): The Structure and Evolution of Industrial Clusters: Transactions, Technology and Knowledge Spillovers. Research Policy, *35*, No. 7, pp. 1018 – 1036.

JOHNSON, B. (2008): Cities, Systems of Innovation and Economic Development, Innovation: Management. Policy and Practice, *10*, No. 2 – 3, pp. 146 – 155.

KADEŘÁBKOVÁ, A. a kol. (2007): Ročenka konkurenceschopnosti České republiky 2006 – 2007. [The Yearbook of Czech Republic Competitiveness 2006 – 2007.] 1st ed. Praha: Linde. 557 pp. ISBN 80-86131-64-5.

LAMBOOY, J. G. (2010): Knowledge Transfers, Spillovers and Actors: The Role of Context and Social Capital. European Planning Studies, 18, No. 6, pp. 873 – 891.

LUNDVALL, B. A. (ed.) (1992): National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning. London: Pinter.

MALMBERG, A. (1997): Industrial Geography: Location and Learning. Progress in Human Geography, 21, No. 4, pp. 573 – 582.

MARSHALL, A. (1920): Principles of Economics. 8th ed. London: Macmillan.

MASKEL, P. (2001): Towards a Knowledge-Based Theory of the Geographical Cluster. Industrial and Corporate Change, 10, No. 4, pp. 921 – 943.

MOROSINI, P. (2004): Industrial Clusters, Knowledge Integration and Performance. World Development, 32, No. 2, pp. 305 – 326.

NELSON, R. (1998): The Agenda for Growth Theory: A Different Point of View. Cambridge Journal of Economics, 22, No. 4, pp. 497 – 520.

NEMCOVÁ, E. (2004): Klastre a ich úloha v rozvoji regiónu. [The Clusters and their Role in Regional Development.] Ekonomický časopis/Journal of Economics 52, No. 6, pp. 645 – 780.

PAVELKOVÁ, D. – DEHNING, B. (2009): Využití modelu založeného na přístupu residual income pro měření výkonnosti klastrů a firem v klastrech. [The Using of Model Based on the "Residual Income" for the Efficiency Measuring of Clusters and Firms Involved in Clusters.] Journal of Economics, 57, No. 3, pp. 211 – 306.

PINCH, S. – HENRY, N. – JENKINS, M. – TALLMAN, S. (2003): From 'Industrial Districts' to 'Knowledge Clusters': A Model of Knowledge Dissemination and Competitive Advantage in Industrial Agglomerations. Journal of Economic Geography, 3, No. 4, pp. 373 – 388.

PORTER, M. E. (1998): On Competition. Boston: Harvard Business School.

PORTER, M. E. (1990): The Competitve Advantage of Nations. New York: The Free Press.

ROSENFELD, S. A. (1997): Bringing Business Clusters into the Mainstream of Economic Development. European Planning Studies, 5, No. 1, pp. 3 – 23.

STIMSON, R. J. – STOUGH, R. R. – ROBERTS, B. H. (2006): Regional Economic Development: Analysis and Planning Strategy. 2nd ed. Berlin – New York: Springer, 452 pp. ISBN 978-3-540-34826-9.

STEJSKAL, J. (2011): Průmyslové klastry a jejich vznik v regionech. [The Industrial Clusters and Their Foundation in Regions.] 1st ed. Praha: Linde, 247 pp.

STEJSKAL, J. – HAJEK, P. (2012): Competitive Advantage Analysis: A Novel Method for Industrial Clusters Identification. Journal of Business Economics and Management, 13, No. 2, pp. 344 – 365.

STEJSKAL, J. – SEKERKA, B. – HRNČÍŘOVÁ, P. (2011): Použití Ellisonova-Glaeserova indexu aglomerace pro potřeby průmyslového klastrování. [The Ellison-Glaeser Agglomeration Index Usage for Industrial Clusters Needs.] Ekonomický časopis/Journal of Economics, 59, No. 9, pp. 942 – 953.

SZÉKELY, V. (2008): Regionálne priemyselné klastre a problémy (nielen) s ich identifikáciou. [The Regional Industrial Clusters and their Problems (not only) with their Identification.] Ekonomický časopis/Journal of Economics, 56, No. 3, pp. 221 – 330.

A p p e n d i x 1

Summarization of Data and Coefficients of Shift-share Analysis

CZ-NACE	ČR 2003	HK 2003	ČR 2007	HK 2007	NGS	LS	IMS	CZ
A – Agriculture, hunting, forestry	160.9	11.0	130.6	9.9	0.37698	0.971473	–2.44845	–1.1
B – Fishing	1.8	0.1	1.2	0.1	0.003427	0.033333	–0.03676	0
C – Mining and quarrying	49.2	0.4	41.8	0.6	0.013708	0.260163	–0.07387	0.2
D – Manufacturing	1195.6	78.7	1250.9	78.7	2.697123	–3.64011	0.942983	0
E – Electricity, gas and water supply	66.0	3.6	53.6	2.7	0.123375	–0.22364	–0.79974	–0.9
F – Construction	253.6	12.3	264.1	12.4	0.421532	–0.40927	0.087734	0.1
G – Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods	490.2	23.6	531.7	25.3	0.808794	–0.29796	1.189166	1.7
H – Hotels and restaurants	121.1	5.9	123.1	5.5	0.202199	–0.49744	–0.10476	–0.4
I – Transport, storage and communications	313.8	15.1	306.9	9.8	0.517491	–4.96797	–0.84952	–5.3
J – Finanční zprostředkování	66.4	2.3	69.2	2.2	0.078823	–0.19699	0.018165	–0.1
K – Real estate, renting and business activities	318.8	10.1	391.0	10.0	0.346136	–2.38739	1.941254	–0.1
L – Public administration and defence; compulsory social security	300.4	17.0	296.7	17.6	0.582606	0.809387	–0.79199	0.6
M – Education	299.3	16.0	295.1	15.2	0.548335	–0.57548	–0.77286	–0.8
N – Health and social work	258.6	15.2	269.1	15.8	0.520918	–0.01717	0.096251	0.6
O – Other community, social and personal service activities	125.2	5.4	133.7	5.4	0.185063	–0.36661	0.18155	0
Total of above categories	**4020.9**	**216.7**	**4158.7**	**211.2**	**7.426511**	**–11.5057**	**–1.42085**	**–5.5**
DA – Manufacture of food products	135.9	7.3	122.7	6.5	0.250178	–0.09095	–0.95923	–0.8
DB – Manufacture of textilies and textilie products	93.8	13.0	65.3	8.8	0.445522	–0.25011	–4.39542	–4.2
DC – Manufacture of leather and leather products	12.3	0.6	8.1	0.4	0.020563	0.004878	–0.22544	–0.2
DD – Manufacture of wood and products of wood products, except furniture	46.0	2.4	46.1	2.6	0.08225	0.194783	–0.07703	0.2
DE – Manufacture of pulp, paper and paper products; publishing and printing	52.6	3.0	55.5	2.6	0.102813	–0.5654	0.062586	–0.4
DF – Manufacture of coke. refined petroleum products and nuclear fuels	3.1		2.7	0	0	0	0	0
DG – Manufacture of chemicals. chemical products and man-made fibres	42.4	1.5	39.7	1.9	0.051406	0.495519	–0.14693	0.4
DH – Manufacture of rubber and plastic products	67.2	6.2	86.4	6.4	0.21248	–1.57143	1.558949	0.2
DI – Manufacture of other non–metallic mineral products	74.2	3.0	69.9	3.2	0.102813	0.373854	–0.27667	0.2
DJ – Manufacture of basic metals and fabricated metal products	188.5	10.1	204.6	10.7	0.346136	–0.26265	0.516516	0.6
DK – Manufacture of machinery and equipment n.e.c.	144.2	8.5	164.0	8.7	0.291303	–0.96713	0.875826	0.2
DL – Manufacture of electrical and optical equipment	157.4	11.8	180.4	13.8	0.404397	0.275731	1.319872	**2**
DM – Manufacture of transport equipment	110.1	5.7	142.6	9.0	0.195344	1.617439	1.487217	**3.3**
DN – Manufacturing n.e.c	67.9	5.6	62.9	4.0	0.191917	–1.18763	–0.60429	–1.6
Total of category D	**1 195.6**	**78.7**	**1 250.9**	**78.6**	**2.7**	**–1.9**	**–0.9**	**–0.1**

Source: Own processing based on data from Czech Statistical Office.

A p p e n d i x 2

Summarization of Results of Shift-share Analysis

CZ–NACE/Region	HK	JM	PZ	UN	MS	PC	JC	LI	OC	PH	SC	VY	ZL
D – Manufacturing		×	×	×	×	×		×	×	×	×	×	
F – Construction										×			×
G – Wholesale and retail trade. repair of motor vehicles, motorcycles and personal and household goods		×					×			×	×		
I – Transport, storage and communications										×			
K – Real estate, renting and business activities		×	×					×	×	×	×		
L – Public administration and defence; compulsory social security									×				
DE – Manufacture of pulp, paper and paper products; publishing and printing										×			
DH – Manufacture of rubber and plastic products		×									×	×	×
DJ – Manufacture of basic metals and fabricated metal products						×	×		×		×	×	×
DK – Manufacture of machinery and equipment n. e. c.			×	×		×						×	
DL – Manufacture of electrical and optical equipment	×	×			×					×	×		
DM – Manufacture of transport equipment	×		×	×	×			×			×	×	

Note: In the Table there are not all categories of industry according to CZ-NACE. There are only categories in which some changes are appeared other categories are eliminated. Eliminated categories are: A, B, C, E, H, J, M, N, O, DA, DB, DC, DD, DF, DG, DI, DL, DM, DN.

Source: Own processing.