

## ECONOMIC BASE OF OPOLSKIE VOIVODSHIP, 2008-2010

<sup>a</sup>MIROSLAWA SZEWCZYK, <sup>b</sup>AGNIESZKA TLUCZAK

*Opole University of Technology, Faculty of Economics and Management, Waryńskiego 4, 45-047 Opole, Poland*

*Opole University, Faculty of Economics, Ozimska 46a, 45-058 Opole, Poland*

*email: <sup>a</sup>m.szewczyk@po.opole.pl, <sup>b</sup>atluczak@uni.opole.pl*

**Abstract:** This paper reviews the literature and presents empirical results of survey of economic base in Opolskie Voivodship (Poland). To estimate the economic base of Opolskie Voivodship, the location quotient is used. This study uses data from the Central Statistics Office of Poland (CSO). The data by kinds of activity are presented in accordance with the Polish Classification of Activity (PKD 2007). The main purposes of the study are: (1) analysis of diversification and changes in employment in enterprise sector (especially in manufacturing), (2) identification of basic and non-basic sectors in Opolskie Voivodship in 2008-2010 period.

**Keywords:** economic base, employment, Opolskie Voivodship, Poland.

### 1 Introduction

Regions do not exist in isolation. Economic base concepts originated with the need to predict the effects of economic activity on regions. Regions are subject to ongoing flows of goods, ideas, people, products, and services. Therefore, any economic model that seeks to explain regional growth must take these flows into account in its explanation of the sources of growth. Economic base theory views regional economic growth as being driven by exogenous final demands.

Economic base analysis is simple tool that can be used to gain an understanding of the economic structure of regions. It can provide information on the economic status of regions across time periods with respect to employment conditions and trends. Economic base theorists assert that any local or regional economy may be disaggregated into a binary-dichotomous classification system: basic and non-basic. The basic sector is made up of those local businesses that produce goods and services sold to consumers outside the region. The basic sector refers to those industries and services that are largely dependent upon external markets. Basic sector is important driver of regional economic growth. The non-basic sector is composed of those businesses that produce goods and services sold and consumed in the region (Hildebrand and Mace, 1950; Dinc 2002; North, 1955; Polese and Verreault, 1989; Rupasingha and Patrick, 2009; Stabler, 1968; Thomas, 1964).

The aim of this study is to deepen understanding of the factors of at regional level. The main purposes of the study are: (1) analysis of diversification and changes in employment in enterprise sector (especially in manufacturing), (2) identification of basic and non-basic sectors in Opolskie Voivodship in 2008-2010 period. The paper provides detailed findings from the research, as well as methodology, data, and the literature. The data cover the period from 2008 to 2010. The reason for choosing 2008-2010 period were (1) differences in methodology of data collection in past years<sup>1</sup> and (2) availability of data at the time of the research. The given paper presents only some fragments of analysis – results of economic base analysis for the industries in Opolskie Voivodship.

Economic base analysis should use industry output and trade flows to and from the region. However due to data disclosure issues this is not possible for Opolskie Voivodship. The

alternative is to use employment data. Another issue relates to the need for relatively high disaggregation (i.e. the sectoral breakdown must be sufficient) of the employment data. To estimate the economic base of Opolskie Voivodship, the location quotient (LQ) is used (North, 1955; Hildebrand and Mace, 1950; Dinc 2002). A location quotient is the ratio of regional employment in an industry to total regional employment to the ratio of employment in the national industry to total national employment. The location quotient, due to its simple, is widely used by regional development practitioners in economic impact analysis and regional comparisons.

The data by kinds of activity are presented in accordance with the Polish Classification of Activity (PKD 2007)<sup>2</sup>. This study uses data from the Central Statistics Office of Poland (CSO). The data are taken of the free on-line data base of CSO<sup>3</sup>.

### 2 Literature revue

The chapter summarizes the literature of economic base. Emerging from international trade theory, economic base models have sought to explain a region's growth through the examination of its inflows and outflows. The economic base theory derives from the early works of Douglas North (1955) on regional economic growth. Under certain working hypotheses, the economic base theory allows to evaluate the level of employment which is induced directly and indirectly by the presence of a given economic activity (Failler 2003). North (1955) argues that regions resemble countries, exploiting their natural resource distributions and comparative advantages to produce goods with a lower opportunity cost. According to this model of economic development, all other economic activity within the region that is not directly tied to this export activity is supported by growth in these exporting industries. These ancillary industries are labeled "non-basic", producing locally-demanded consumer goods and services. The local businesses are assumed to be a consequence of a region's growth. They are not the source of it. The total employment of a local community is driven by the employment growth of "basic" industries.

From this original idea, economic base theory has undergone a series of changes. These revisions include measuring export flows out of a region by identifying the long-run value of its imports (Hoyt, 1961). In addition, other sources of growth have been identified beyond those originally included in traditional economic base models. Such factors as population size, new discoveries, depletions of natural resources, changes in technology and cultural traits, should also be considered because they change and influence a region's economic growth (Thomas, 1964; Stabler, 1968). Thomas points out that export base theory does not predict what will happen if an industry arises which is not dependent on the traditional "basic" industries for growth. These could include the new economy firms who are largely dependent on consumer demand and innovation for industry growth. Finally, economic base models have been created which try to explain how a region can base its exports on a trade of services, not goods (Polese and Verreault, 1989).

### 3 Data and methods

Data (average paid employment in enterprise sector by type of activity) are presented in accordance with the Polish Classification of Activities 2007 (PKD 2007). The data cover the period from 2008 to 2010.

The degree of regional specialization is most commonly determined by location quotient (LQ). An LQ is the ratio of regional employment in an industry to total regional employment to the ratio of employment in the national industry to total

<sup>1</sup> Previously, the classification of economic activity used Employment Survey was NACE REV. 1.1.. An updated classification (NACE Rev. 2) has been implemented in 2008. This publication provides an employment time-series for the period 2008-2010 based on NACE Rev. 2. classification. NACE consists of a hierarchical structure. The structure of NACE is described in the NACE Regulation as follows:

i. a first level consisting of headings identified by an alphabetical code (sections),  
ii. a second level consisting of headings identified by a two-digit numerical code (divisions),  
iii. a third level consisting of headings identified by a three-digit numerical code (groups),  
iv. a fourth level consisting of headings identified by a four-digit numerical code (classes).

<sup>2</sup> Polish Classification of Activities 2007 (PKD 2007) was compiled on the basis of Statistical Classification of Economic Activities in the European Community – NACE Rev. 2. PKD 2007 was introduced on 1st January 2008 by the decree of Council of Ministers to replace the formerly applied PKD 2004.

<sup>3</sup> Available at the following address <http://www.stat.gov.pl>.

national employment. The equation for a location quotient can be written:

$$LQ = (E_{ib}^t / E_b^t) / (E_{ir}^t / E_r^t)$$

$E_r^t$  - total number of employment in the nation at period t

$E_{ir}^t$  - number of employment, nationwide, in sector i at period t

$E_{ib}^t$  - number of regional employment in an sector i at period t

LQ greater than 1 indicates a disproportionately large share of that industry being represented regionally, or that industry is said to have an export orientation. LQ less than 1 indicates that that particular industry is underrepresented relative to national level employment trends. An LQ equal 1 indicates perfect self-sufficiency (no imports, no exports). Location quotient technique has been widely used. Szewczyk, Tłuczak and Ruszczak used location quotients for cluster identifying in Opolskie Voivodship (Szewczyk et al. 2011).

Typically, a "location quotient" is used to distinguish between basic and non-basic industries. In order to get a more detailed and comprehensive picture of economic base in Opolskie Voivodship, location quotients are calculated for manufacturing sub-sectors.

#### 4 Analysis and results

The first area of focus is the employment in Opolskie Voivodship (table 1). The employment in enterprise sector in Opolskie Voivodship has changed over the past 3 years. The number of employees was decreasing. In total, there are now less than 3.4 thousand people employed compared to 100 thousand three years previously (a 3.4 per cent decrease).

Table 1. Opolskie Voivodship: employment by selected enterprise sectors#, 2008-2010

Section - Name	2008	2009	2010	2008-2010
Grand total	100,078	98,488	96,636	-3,442
B - Mining and quarrying	954	960	957	3
C - Manufacturing	54,936	51,435	49,496	-5,440
E - Water supply; sewerage, waste management and remediation activities	2,507	2,534	2,599	92
F - Construction	7,117	7,840	8,125	1,008
G - Trade; repair of motor vehicles	13,668	14,065	14,508	840
H - Transportation and storage	5,930	6,399	6,306	376
I - Accommodation and catering	1,258	1,330	1,413	155
L - Real estate activities	1,593	1,564	1,508	-85
N - Administrative and support service activities	4,910	5,150	4,238	-672

# - some of the data may not be published due to the necessity of maintaining statistical confidentiality in accordance with the Law on Public Statistics

Grand Total = A + B + C + D + E + F + G + H + I + J + K + L + M + N + O + P + O + R + S + T + U

Source: Central Statistical Office.

There have been several important changes in Opolskie Voivodship over recent years. The majority of these transitions may be accounted for by a declining employment in manufacturing and an ever-increasingly significant service sector. Data (table 1) shows the growing significance of construction and wholesale trade, as well as transportation, storage, accommodation and catering.

Employment data by sections is presented as a location quotient in table 2, which allows a comparison to be made of the relative concentrations in the employment base between the benchmark areas. Location quotients identify the relative industry's concentration of employment compared with the average for Poland. A score greater than one indicates a relative high concentration of employment, and a score less than one represents a relative scarcity of employment.

Table 2. Opolskie Voivodship: employment Location Quotient by selected enterprise sectors, 2008-2010

Section - Name	LQ 2008	LQ 2009	LQ 2010
B - Mining and quarrying	0.29	0.29	0.30
C - Manufacturing	1.36	1.37	1.37
E - Water supply; sewerage, waste management and remediation activities	1.39	1.37	1.39
F - Construction	0.93	0.97	1.02
G - Trade; repair of motor vehicles	0.69	0.70	0.74
H - Transportation and storage	0.69	0.75	0.76
I - Accommodation and catering	0.71	0.71	0.72
L - Real estate activities	0.95	0.95	0.91
N - Administrative and support service activities	1.00	1.05	0.79

Source: own calculations.

Significant sections with a stronger employment presence in Opolskie Voivodship are: manufacturing (LQ=1.37), and water supply, sewerage, waste management and remediation activities (LQ=1.39). In terms of growth, the construction increased the most during 2008-2010 in relative importance (tables 1-2). In employment terms, Opolskie Voivodship has three basic sectors: (1) manufacturing, (2) water supply, sewerage, waste management and remediation activities, and (3) construction.

Table 3. Economic base results for sections (2010)

Section - Name	Employment	LQ	Assumption
B - Mining and quarrying	957	0.30	Non-basic
C - Manufacturing	49,496	1.37	Basic
E - Water supply; sewerage, waste management and remediation activities	2,599	1.39	Basic
F - Construction	8,125	1.02	Basic
G - Trade; repair of motor vehicles	14,508	0.74	Non-basic
H - Transportation and storage	6,306	0.76	Non-basic
I - Accommodation and catering	1,413	0.72	Non-basic
L - Real estate activities	1,508	0.91	Non-basic
N - Administrative and support service activities	4,238	0.79	Non-basic

Source: own presentation.

Manufacturing remains a key sector for Opolskie Voivodship, in terms of its total presence in the local economy (table 1). The employment in manufacturing in Opolskie Voivodship has changed over the past 3 years. The number of employees was decreasing. In total, there were less than 5.4 thousand people employed in 2010 compared to 55 thousand three years previously (a 10 per cent decrease).

There are three large manufacturing sub-sectors, together accounting for about 40% of employment in Opole Voivodship. These are: manufacture of food products, manufacture of metal products, and manufacture of motor vehicles, trailers and semi-

trailershipment. Each of these sectors contributes over 10% of manufacturing employment (table 4).

Table 4. Opolskie Voivodship: employment in manufacturing (divisions - by two digit code), 2008-2010

Division - Name	2008	2009	2010	2008-2010
Section C - Manufacturing	54,936	51,435	49,496	-5,440
10 - Manufacture of food products	7,492	7,363	7,502	10
16 - Manufacture of products of wood, cork, straw and wicker	1,962	1,940	2,139	177
17 - Manufacture of paper and paper products	938	903	945	7
18 - Printing and reproduction of recorded media	402	484	464	62
20 - Manufacture of chemicals and chemical products	2,869	2,875	2,767	-102
22 - Manufacture of rubber and plastic products	1,522	1,362	1,660	138
23 - Manufacture of other non-metallic mineral products	3,672	3,508	3,555	-117
24 - Manufacture of basic metals	2,359	2,132	2,212	-147
25 - Manufacture of metal products	6,434	6,262	6,640	206
27 - Manufacture of electrical equipment	2,842	2,683	2,751	-91
28 - Manufacture of machinery and equipment n.e.c.	4,306	4,200	3,971	-335
29 - Manufacture of motor vehicles, trailers and semi-trailers	5,750	4,943	5,176	-574
31 - Manufacture of furniture	4,436	3,987	3,836	-600

Source: Central Statistical Office.

Significant divisions (the top-3 leading) with a stronger employment presence (measured as LQ) in Opolskie Voivodship are: manufacture of chemicals and chemical products (LQ=2.26), manufacture of motor vehicles, trailers and semi-trailers (LQ=2.06) and manufacture of basic metals (LQ=2.05). In terms of growth, the manufacture of products of wood, cork, straw and wicker division and the manufacture of machinery and equipment n.e.c. increased the most during 2008-2010 in relative importance (table 5).

Table 5. Opolskie Voivodship: location quotient results (divisions - by two digit code), 2008-2010

Division - Name	2008	2009	2010
Section C - Manufacturing	1.36	1.37	1.37
10 - Manufacture of food products	1.12	1.12	1.16
16 - Manufacture of products of wood, cork, straw and wicker	1.08	1.21	1.31
17 - Manufacture of paper and paper products	1.12	1.09	1.14
18 - Printing and reproduction of recorded media	0.80	0.97	0.92
20 - Manufacture of chemicals and chemical products	2.24	2.32	2.26
22 - Manufacture of rubber and plastic products	0.56	0.53	0.64
23 - Manufacture of other non-metallic	1.66	1.76	1.80

mineral products			
24 - Manufacture of basic metals	1.90	1.95	2.05
25 - Manufacture of metal products	1.65	1.66	1.77
27 - Manufacture of electrical equipment	1.63	1.67	1.76
28 - Manufacture of machinery and equipment n.e.c.	1.59	1.66	1.80
29 - Manufacture of motor vehicles, trailers and semi-trailers	1.97	1.97	2.06
31 - Manufacture of furniture	1.72	1.66	1.65

Source: own calculations.

In employment terms, Opolskie Voivodship has a big number of basic activities in manufacturing – 12 out of 14 divisions have LQ greater than 1 (table 6). Basic divisions are: manufacture of food products; manufacture of products of wood, cork, straw and wicker; manufacture of paper and paper products; manufacture of chemicals and chemical products; manufacture of other non-metallic mineral products; manufacture of basic metals; manufacture of metal products; manufacture of electrical equipment; manufacture of machinery and equipment n.e.c.; manufacture of motor vehicles, trailers and semi-trailers and manufacture of furniture. Non-basic divisions are: printing and reproduction of recorded media and manufacture of rubber and plastic products.

Table 3. Location quotient results for divisions (by two digit code)

Division - Name	Employment	LQ	Assumption
10 - Manufacture of food products	7,502	1.16	Basic
16 - Manufacture of products of wood, cork, straw and wicker	2,139	1.31	Basic
17 - Manufacture of paper and paper products	945	1.14	Basic
18 - Printing and reproduction of recorded media	464	0.92	Non-basic
20 - Manufacture of chemicals and chemical products	2,767	2.26	Basic
22 - Manufacture of rubber and plastic products	1,660	0.64	Non-basic
23 - Manufacture of other non-metallic mineral products	3,555	1.80	Basic
24 - Manufacture of basic metals	2,212	2.05	Basic
25 - Manufacture of metal products	6,640	1.77	Basic
27 - Manufacture of electrical equipment	2,751	1.76	Basic
28 - Manufacture of machinery and equipment n.e.c.	3,971	1.80	Basic
29 - Manufacture of motor vehicles, trailers and semi-trailers	5,176	2.06	Basic
31 - Manufacture of furniture	3,836	1.65	Basic

Source: own presentation.

## 5 Conclusions

With a transitioning economy, some emergent service sectors will take precedence over old manufacturing functions. Also, differential regional endowments, workforce skills, and historical-economic development trajectories tend to cumulatively determine regional specialization. The main purposes of the study were: (1) analysis of employment in

enterprise sector in Opolskie Voivodship (especially in manufacturing), (2) identification of basic and non-basic sectors in 2008-2010 period. To estimate the economic base of Opolskie Voivodship, the location quotient (LQ) was used.

There are the findings:

1. In relation to the year 2008 and 2009, in 2010 in Opole Voivodship, there was a slight change in sectors' composition. The majority of transitions in employment may be accounted for by a declining manufacturing base and an ever-increasingly significant service sector. Data shows the growing significance of construction and wholesale trade, as well as transportation, storage, accommodation and catering. In essence, manufacturing is in fact declining but the sector still remains strong relative to other local and regional sectors.
2. In employment terms, Opolskie Voivodship has three basic sectors: (1) manufacturing, (2) water supply, sewerage, waste management and remediation activities, and (3) construction.
3. Manufacturing remains a key sector for Opolskie Voivodship, in terms of its total presence in the local economy. In total, there were 50 thousand people employed in manufacturing in 2010.
4. The manufacture of food products, manufacture of metal products, and manufacture of motor vehicles, trailers and semi-trailers contributed 40% of employment of manufacturing in 2010 in Opole Voivodship. This ratio have remained relatively steady over the last three years.
5. Significant divisions (the top-3 leading ) with a stronger employment presence (measured as LQ) in Opolskie Voivodship are: manufacture of chemicals and chemical products (LQ=2.26), manufacture of motor vehicles, trailers and semi-trailers (LQ=2.06) and manufacture of basic metals (LQ=2.05).
6. In employment terms, Opolskie Voivodship has a big number of basic activities in manufacturing – 12 out of 14 divisions have LQ greater than 1 (table 6). Basic divisions are: manufacture of food products; manufacture of products of wood, cork, straw and wicker; manufacture of paper and paper products; manufacture of chemicals and chemical products; manufacture of other non-metallic mineral products; manufacture of basic metals; manufacture of metal products; manufacture of electrical equipment; manufacture of machinery and equipment n.e.c.; manufacture of motor vehicles, trailers and semi-trailers and manufacture of furniture. Non-basic divisions are: printing and reproduction of recorded media and manufacture of rubber and plastic products.
7. It seems to be necessary to carry out a comparative research for the consecutive years.

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