Geographic Concentration of Economic Activities in Latvia

Zanete garanti

Department of Business and Management, Faculty of Economics,
Latvia University of Agriculture, Svetes Street 18, Jelgava, LV-3001, Latvia

Abstract: Economic activity, both in general and for specific industries, has a tendency to concentrate in certain geographic areas. In this paper, the author investigates the geographic concentration of economic activities in six statistical regions in Latvia, using location Gini coefficients. The findings of the paper show that all industries are concentrated in Latvia, with an average Gini coefficient being equal to 0.54. There are several reasons for such a clustering. Some industries are located in places where the local demand for its products exist, for instance, the enterprises of retail trade, local services, education and healthcare services are geographically distributed in proportion to the number of population. Some industries are located where resources are situated, for example, mining, agriculture, logging and quarrying. Yet, nowadays, the greatest focus has been put on the industries that locate in certain regions owing to regional attractiveness and competitiveness, thus forming regional clusters, for instance, manufacturing, production industries, as well as part of service industries that are export-oriented rather than local demand-oriented. Only 29% of all enterprises are engaged in these industries in Latvia, but they employ 40% of the working population, 40% of the net turnover of enterprises is concentrated and 40% of the nonfinancial investment is attracted there; business cluster enterprises account for 50% of the total exports, 39% of the GDP and 43% of the total value added, besides, wages are 23% higher as well.

Key words: Location Gini Coefficient · Regional Clusters · Agglomeration

INTRODUCTION

Michael E. Porter [1-5] in his early research defined a cluster as a set of related industries, but after developed a well known definition for clusters: a cluster is a geographically proximate group of interconnected companies and associated institutions in a specific field based on commonalities and complementarities. A starting point of clusters is geographical proximity (agglomeration) of companies [6] that locate in a specific region. An agglomeration, also called a spatial concentration of companies, labour and resources [7, 8], from the viewpoint of economists, is a precondition for developing clusters [9-11]. A cluster is an agglomeration in which special cooperation ties emerge among the agglomeration's companies and institutions [3, 12, 13]. A. Malmberg, O. Solvell and I. Zander [14] identified four types of agglomeration based on the agglomeration force, which is effective at the overall level as well as at

the level of interconnection of companies and on the forces that contribute to static efficiency and flexibility or innovation and modernization. According to these authors, companies in a cluster are interconnected with ties that promote innovation and modernization. The emergence and development of regional clusters is a complex process and economic theory assumes that there are several preconditions for the development of regional clusters [15-18], of which the most important are regional social and economic attractiveness, the historical development of industries and business, as well as a "critical mass" of companies and labour that is reached in the particular industry. The present research is the first step towards identifying regional clusters in regions in Latvia. The author of the paper, using location Gini coefficients, identifies those industries in Latvia, the economic activities of which are concentrated in specific regions owing to their competitive advantages, thus indicating the high potential of regional clusters.

Corresponding Author: Zanete Garanti, Department of Business and Management, Faculty of Economics,
Latvia University of Agriculture, Svetes Street 18, Jelgava, LV-3001, Latvia.

The research was conducted in six statistical regions in Latvia at the NUTS 3 level in 2012. After joining the EU in 2004, Latvia experienced fast economic growth, yet, significant social and economic differences among statistical regions are observed. An explicit concentration of population, including the working and economically active population, is observed in Riga region as the capital city. Besides, the proportion of employees with higher education, which results in higher gross wages, is also specific to this region. However, a positive trend has been an average annual gross wage increase of 4% in Latvia's regions since 2011. In Riga region, GDP per capita and nonfinancial investment were almost three times higher than in the other regions, yet, their increase from the base year of 2008 was faster, which indicated slow but stable development in the regions. Economic activity in the regions, which is one of the most important preconditions for the development of regional clusters and which may be measured in terms of the number of enterprises per 1000 capita, rose in all the regions at an average rate of 22% from the base year. Development of regional clusters is a tool for promoting steady regional growth [17, 19-24], thus reducing regional differences.

MATERIALS AND METHOD

There are several popular methods, described in the economic literature, which enable us to identify regional clusters and their related industries [25-27] and these methods are based on two classical concepts of regional economics-regional specialization and spatial concentration of businesses in regions [28]. In this research, the author measures geographic concentration of economic activities by using the location Gini coefficient (G). The location Gini coefficient is a modification of the Gini coefficient method in which individuals are replaced by regions and their weights are set based on the proportion of a region in total unemployment [29]. The location Gini coefficient method was developed by Paul Krugman [12] and this method is a modification of the traditional Gini index. The location Gini coefficient is widely used in research on concentration and unequal location of industries in regions both by researchers [30-32] and by international institutions such as the Food and Agriculture Organization (FAO) [33], the Organization for Economic Cooperation and Development [29, 34]. The critique of this method is based on the fact that the location Gini

coefficient attempts to eliminate the difference between inequality and concentration, even though these are very different terms [35], besides, a small sample of location data can lead to imprecise results [36]. The researchers who used the Gini coefficient in their research came to a conclusion that all industries, to a greater or smaller extent, were concentrated. Based on a methodology developed by scientists [12, 30, 33], the location Gini coefficient is calculated as follows:

- The proportion of every region's unemployment relative to total unemployment:

$$S_i = \sum_j E_{ij} / \sum_i \sum_j E_{ij}$$

- The proportion of a region's employment for every industry:

$$S_{ij} = E_{ij} / \sum E_{ij}$$

Where E- number of jobs,

I- region;
j- industry.

- The coefficient R is calculated for every industry:

$$R = S_{ij} / S_i$$

- Industries are arranged in ascending order based on the coefficient R value,
- Cumulative value p is calculated for S_i,
- Cumulative value q is calculated for S_{ij},
- By depicting p and q values graphically, a Lorenc curve is obtained. In the case of equal distribution of employment, the Lorenc curve will match a 45 degree angle. The more unequally employment is distributed, the more the Lorenc curve moves away from the 45 degree angle.
- The location Gini coefficient may be obtained from the Lorenc curve:

$$G= 1-2Z$$

Where Z- a concentration area under the Lorenc curve.

- The Gini index may be calculated as follows:

$$G = 1 - \sum [(q_i + q_{i-1})(p_i - p_{i-1})]$$

The developer of the method, Paul Krugman [12], points out that the location Gini coefficient ranges from 0 to 1. If employment in every region is evenly proportional to overall employment in the particular industry, the industry does not tend to concentrate in a certain region and the coefficient will be equal to 0. If the industry's employees are located only in one region, the coefficient will be equal to 1, indicating full equality. Porter assumed a Gini coefficient of 0.3 to be a sufficient indication of concentration that indicates traded cluster industries [17].

RESULTS

Finding 1: All Industries in Latvia Are Somewhere Concentrated: The location Gini coefficients computed for groups of industries are presented in Table 1.

The average location Gini coefficient for industries in Latvia is equal to 0.54 (Table 1), which indicates high inequality for industries' employment across the regions. There are significant differences between the location Gini coefficients for industries-the coefficient ranges from 0.15 to 1, therefore, the average variation coefficient is

34%. On average, employment in the USA is similarly distributed among the regions as in Latvia, i.e. the average values of location Gini coefficient do not significantly differ from those in Latvia. In the USA, this coefficient for agriculture is, on average, equal to 0.6, mining-0.5 and services-0.3 [12. 30], while in Latvia it is 0.4 for agriculture, manufacturing-0.7, production industries-0.5 and service industries-0.5. The location Gini coefficient indicates industrial differences which affect the formation of clusters.

Finding 2. Some Industries Are Distributed Proportional to Population: M.E. Porter [17], mapping clusters in the USA in cooperation with Harvard Business School and O. Solvell [18], mapping clusters in the EU, grouped industries as local industries in which employment is evenly and proportionally distributed among regions and their population. These industries ensure local demand for goods and services, for instance, state administration, health care, retail trade, local services (electricity and water supply) and education. For these industries in Latvia, the location Gini coefficient ranges from 0.26 to 0.54.

Table 1: Location Gini coefficients for industries in 2012

Industries	Average and dispersion indicators					
	Average value	Minimal value	Maximal value	Dispersion	Standard deviation	Variation coefficient, %
Agriculture, Forestry and Fishing	0.37	0.27	0.54	0.02	0.15	42
Mining and quarrying	0.70	0.36	1.00	0.11	0.33	46
Manufacturing	0.50	0.15	0.76	0.03	0.18	37
Electricity, gas, steam and air conditioning supply	0.41	-	-	-	-	-
Water supply, sewerage, waste management and remediation activities	0.43	0.24	0.67	0.04	0.19	43
Construction	0.40	0.37	0.44	0.00	0.04	9
Wholesale and retail trade; repair of motor vehicles and motorcycles	0.50	0.42	0.62	0.01	0.11	21
Transportation and storage	0.70	0.47	0.82	0.02	0.15	21
Accommodation and food service activities	0.51	0.48	0.54	0.00	0.05	9
Information and communication	0.73	0.65	0.77	0.00	0.05	6
Financial and insurance activities	0.79	0.74	0.83	0.00	0.05	6
Real estate activities	0.51	-	-	-	-	-
Professional, scientific and technical activities	0.62	0.44	0.71	0.01	0.09	14
Administrative and support service activities	0.65	0.58	0.70	0.00	0.05	8
Public administration and defence; compulsory social security	0.54	-	-	-	-	-
Education	0.26	-	-	-	-	-
Human health and social work activities	0.30	0.22	0.44	0.01	0.12	40
Arts, entertainment and recreation	0.41	0.21	0.73	0.05	0.23	57
Other service activities	0.58	0.56	0.61	0.00	0.03	4
ON AVERAGE IN THE INDUSTRIES	0.54	0.15	1.00	0.03	0.19	34

Source: author's calculations

Table 2: Contribution of traded cluster industries to Latvia's national economy in the period 2008-2012, %

Industries	Indicators and their percentage distribution by year				
	2008	2009	2010	2011	2012
Number of enterprises					
Traded cluster industries	28	29	29	30	31
Other industries	72	71	71	70	69
Number of employees					
Traded cluster industries	42	39	39	40	42
Other industries	58	61	61	60	58
Net turnover					
Traded cluster industries	41	41	39	39	40
Other industries	59	59	61	61	60
Nonfinancial investment					
Traded cluster industries	43	34	42	42	43
Other industries	57	66	58	58	57
Exports					
Traded cluster industries	46	48	48	47	49
Other industries	54	52	52	53	51
Gross domestic product					
Traded cluster industries	40	40	39	37	38
Other industries	60	60	61	63	62
Value added					
Traded cluster industries	45	45	44	41	42
Other industries	55	55	56	59	58

Source: author's calculations

Finding 3. Some Industries Locate Close to Natural Resources: According to Porter [17], there are resource dependent industries in which businesses are located where necessary resources are available, for instance, part of agriculture, mining, logging and quarrying. In Latvia, each region has specific natural resources, e.g. Riga region has a coastline, where fishing industry is located, Latgale is rich of forests, Zemgale-productive agriculture lands, so industries working with natural resources locate in these regions.

Finding 4. Some Industries Locate in the Regions Because of the Competitive Advantage: There are enterprises located in certain regions not owing to the availability of resources, but owing to their competitive advantages. According to Porter [17], these are called traded industries. Among traded industries, the highest coefficients were identified for financial and insurance activities (0.79) and information and communication (0.73) and the lowest standard deviation (0.05), which indicated a low dispersion from the average for industrial subgroups, were also observed for these industries. Construction, manufacturing, transportation and storage, accommodation and food service activities, information

and communication and professional, scientific and technical activities are also traded industries. In analyses of regional clusters, the most important are traded industries selling goods and services across regions and countries.

Finding 5. Traded Industries Have Large Impact on Economy: Porter proves that traded industries are the industries in which strong regional clusters emerge and wages, productivity and patent capacity are higher. Traded industries' share in employment, number of enterprises and other economic indicators is calculated in Table 2.

In the period of analysis, on average, 29% of all enterprises were engaged in the traded cluster industries, employing 40% of all employed individuals (Table 2), thereby one can conclude that larger enterprises operated in the traded cluster industries than in the other industries-37 and 24 employees per enterprise, respectively. In Latvia, less than one third of all enterprises operate in the traded cluster industries, however, 40% of the net turnover and 40% of the nonfinancial investment are concentrated at the enterprises of these industries, besides, they account

for 50% of the total export, 39% of the GDP and 43% of the total value added. According to the US study [17], traded industries employed 32% of all employees and average wages were 33% higher in these industries than in other industries. According to data, in 2012 in Latvia, the average gross wage was 24% and the average net wage was 23% higher in the traded cluster industries than in the other industries [37-39].

Finding 6. Traded Industries Form Regional Clusters:
Clusters established in Latvia since 2009 with EU funding and government support are are found in traded industries:

- Wood processing and furniture,
- Logistics and distribution,
- Machinery and heavy industry,
- IT,
- Apparel and light industry,
- Food production.

More traded industries have high potential to form clusters in reïions of Latvia.

CONCLUSION

Industries in Latvia are geographically concentrated, with the dispersion of location Gini coefficient ranging within 0.15-1.0 and the average coefficient being equal to 0.54.

Using the location Gini coefficient, the author identified the local industries in Latvia-education, health care and local service industries-which ensure the local demand for goods and services. For these industries, the location Gini coefficient was very low, ranging within 0.26-0.54.

The present research identified resource dependent industries that were located in the regions where natural resources were available-quarrying, agriculture, logging, etc. For some resource dependent industries, the location Gini coefficient might be very high, for instance, 0.7 for mining, which might be explained by the location of these resources in several regions.

The present research reveals that manufacturing and part of service industries, which are located in the regions that ensure their competitive advantages, are the industries that form regional clusters. The location Gini coefficient is 0.6 for these industries. The wages, export capacity and contribution to GDP and value added are higher in these industries.

The present research is the first step towards a more extensive identification of regional clusters in the statistical regions of Latvia. The research results reveal those industries that have a high potential for the development of regional clusters, thereby the research findings are significant and may be used in policy-making for elaborating cluster support programmes and in further empirical studies for identifying clusters.

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