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AUTHORS: Kübra Yildirim Özcan

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Evaluation of Forest Industry in Organized Industrial Zones in Türkiye

Kübra YILDIRIM ÖZCAN[1*]

[1]Ankara Yıldırım Beyazıt Üniversitesi Mimarlık ve Güzel Sanatlar Fakültesi Şehir ve Bölge Planlama Bölümü Bölge Planlama Anabilim Dalı, Ankara

[1]https://orcid.org/0000-0002-8602-6775
*Sorumlu yazar: kubrayildirimozcan@aybu.edu.tr

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ABSTRACT

The increasing production volume and commercial activities with the Industrial Revolution brought about the restructuring of economic relations in space and new spatial formations. Throughout history, regional economic activities have been agglomerated in various places and sectors along with agglomeration economies. Among these, organized industrial zones, as large industrial zones, are of great importance in our country's industrial sector. The aim of this study is; to compare the data of completed organized industrial zones in Turkey between 2008 and 2018 and identify the agglomerations in the field of forest industry. In this context, the literature review was conducted regarding the subject of the study, and face-to-face interviews were conducted with the Ministry of Industry and Trade of the Republic of Turkey (repealed) in 2008 and the Ministry of Industry and Technology of the Republic of Turkey in 2018. LQ Analysis was used as a method within the scope of the study and according to the data obtained; It was observed that the agglomerations within the completed organized industrial zones in our country regarding the forest industry were located in Kayseri in 2008 and in Istanbul and Kayseri Provinces in 2018. According to the results of the LQ Analysis; it can be said that there was a sectoral agglomeration in the forest industry in Kayseri between the years 2008 and 2018.

Türkiye'de Organize Sanayi Bölgelerindeki Orman Endüstrisinin Değerlendirilmesi

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ÖZ

Sanayi Devrimi ile birlikte artan üretim hacmi ve ticari faaliyetler beraberinde mekândaki ekonomik ilişkilerin yeniden yapılanmasını ve yeni mekansal oluşumları gündeme getirmiştir. Tarih içerisinde, yığılma ekonomileri ile birlikte bölgesel ekonomik faaliyetler çeşitli mekanlarda ve sektörlerde yığılma göstermiştir. Bunlar içerisinde, büyük sanayi bölgeleri olarak organize sanayi bölgeleri, Ülkemizin sanayi sektörü içerisinde oldukça önem arz etmektedir. Çalışmanın amacı; Türkiye'de 2008 ile 2018 yıllarındaki tamamlanmış organize sanayi bölgelerine ait verilerin karşılaştırılması ve orman endüstrisi alanındaki yığılmaların tespit edilmesidir. Bu doğrultuda çalışmanın konusu ile ilişkili olarak literatür taraması ve 2008 yılında T.C. Sanayi ve Ticaret Bakanlığı (mülga) ve 2018 yılında T.C. Sanayi ve Teknoloji Bakanlığı ile yüzyüze görüşmeler yapılmıştır. Çalışma kapsamında yöntem olarak LQ Analizi kullanılmış ve elde edilen verilere göre orman endüstrisinde Ülkemizdeki tamamlanmış organize sanayi bölgeleri içerisindeki yığılmalar 2008 yılında Kayseri'de, 2018 yılında ise İstanbul ve Kayseri İllerinde yer aldığı görülmüştür. LQ Analizi sonuçlarına göre ise; Kayseri'de orman endüstrisi alanında 2008 ve 2018 yılları arasında sektörel bir yoğunlaşmanın olduğu söylenebilir.

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1. Introduction

The forest products sector contributes to many sectors such as construction, iron and steel, furniture and transportation. There is a wide range of products in the forest products sector. Although the processing of forest products dates back to ancient times, the processing of logs using mobile force started in the 14th century. In 1575, water whipsaws with saws began to be used in production. Towards the end of the 19th century, rapid developments took place in the forest products industry with the use of steam power and electricity in industry. In our country, in the forest products industry the production made by water and hand whipsaws until the end of the 19th century, and this branch of industry showed a slow development. The production of agricultural tools such as barrels, plows and pitchforks from forest products and small handicrafts date back to the 12th century. The first facilities in our country emerged at the end of the 19th century. The first sawmill was established in Istanbul in 1892, and with the start of the planned period in 1963, the forest products industry began to develop rapidly. In 1944, in order to value the wood that cannot be valued in the market, the General Directorate of Forestry started state management in the forest products industry by purchasing some factories in the private sector. Directorate of Forest Products Industry (ORÜS) was established within the Ministry on 05.01.1970, with the approval of the Ministry of Forestry. With the law numbered 2929 published in the Official Gazette dated 22.10.1983 and numbered 18199, ORÜS General Directorate was given the status of an economic state enterprise with legal personality and autonomy in its activities under the name of Forest Products Industry Institution. The founding purpose of ORÜS is to contribute to the development of the forest industry in our country, to lead the private sector in the implementation of developing technology and product standards, to operate and develop the factories taken over from the General Directorate of Forestry and to establish new facilities when necessary. On 28.02.2000, ORÜS Institution was affiliated with Türkiye Selüloz ve Kağıt İşletmeleri A.Ş. (Seka) with the decision of the Privatization Board of Turkey dated 24.09.1998 and numbered 992. (ORÜS, 1991, TMMOB, 1994, Şahin, 2013, Şahin, 2016, Ağaç İş Sendikası Website, 2021 and Yıldırım and Emiroğlu, 2022).

The industry of forest products, which is very important for economic development as it provides semi-finished products and raw materials to many industries, is divided into three: primary and secondary manufacturing industry and other forest products industry. Wood is used directly as a rawmaterial in the primary manufacturing industry. This manufacturing industry includes sub-sectors such as timber, chip and fibreboard. The secondary manufacturing industry uses primary manufacturing industry products. The products produced in this manufacturing industry are joinery, furniture and wooden parquet, etc. The products produced in the other forest products industry are; shoe molds, musical instruments, wooden toys, wooden lathe products and pencils, etc. (Ekti, 2013, Üçüncü and Bayram, 2016, Bakır, 2019; Kara et al., 2019; Yıldırım and Emiroğlu, 2022).

When we look at the production of forest products in our country and their import and export values, Turkey ranks 13th among 166 countries in timber production and 70% of timber production is used in the construction sector, 10% in packaging and other manufacturing sectors, and 20% in the furniture manufacturing sector (Kara et al., 2019; Memiş, 2021). The sector with 2.4% added value in the manufacturing industry in our country is wood and wood products. Our country imports and exports to more than 200 countries in the wood and wood products manufacturing industry sector (Koç et al., 2017 and Memiş, 2021). Wood and wood-based products are used especially in the construction, building elements, furniture, paper and wood-based board sectors. On average, 7-8 million m^3 of industrial wood and 7.5 million m3 of firewood are produced annually from state run forests in our country and 3.3 million m^3 of industrial wood and around 1.9 million m^3 of firewood are produced from private forests. In addition, 12–13 million m^3 of round wood is consumed in Turkey and approximately 75% of this is provided by state forests. Approximately 61% of the wood used in the industry is provided by the General Directorate of Forestry (Orman Genel Müdürlüğü) sales and 27% from private sector sales. The remaining approximately 12% is imported (TOBB, 2012).

The importance of the forestry sector in the economy has been expressed from the First Five-Year Development Plan to the Tenth Five-Year Development Plan. In the Eleventh Development Plan Forestry and Forest Products Working Group Report covering the years 2019-2023, it was stated that forestry has an important economic potential for the wood, furniture and paper sectors as well as plant production, pharmaceutical industry, mining and animal husbandry, and also stated that our country is among the top 10 countries in the world in the production of panel products and has the potential to compete with the world in the furniture sector (T.C.Kalkınma Bakanlığı, 2018).

As can be seen in the UN Comtrade statistics, when we look at our country's forest product imports by product groups; veneer and plywood are in the first place as product groups and their value in 2016 is 352,245,000 USD. This is followed by firewood and charcoal with 274,245,000 USD, timber with 236,491,000 USD, particleboard and fiberboard with 200,547,000 USD, other processed products - wood construction products with 137,204,000 USD and industrial wood with 64,322,000 USD. The top five countries that stood out in our country's forestry product imports in 2016 were Ukraine with 220,949,000 USD, the Russian Federation with 220,514,000 USD, the USA with 135,066,000 USD, Romania with 95,965,000 USD and Bulgaria with 82,231,000 USD, respectively. When we look at the amounts of our country's forest product exports according to product groups in 2016, particleboard and fiberboard are in the first place with 379,727,000 USD, other processed products - wood construction products with 241,961,000 USD, veneer and plywood with 39,456,000 USD, timber with 10,461,000 USD, industrial wood with 2,798,000 USD and firewood and charcoal with 1,472,000 USD. Again, the top five countries that stand out in our country's forest product exports in 2016 are; The Islamic Republic of Iran with 170,277,000 USD, Iraq with 64,478,000 USD, Turkmenistan with 44,134,000 USD, Georgia with 32,030,000 USD and Azerbaijan with 19,419,000 USD (T.C.Kalkınma Bakanlığı, 2018). When the forest products industry sector's general export total values are ranked from largest to smallest

on a provincial level in our country, the top five provinces are Istanbul, Bursa, Izmir, Kayseri and Ankara (Memiş, 2021).

In addition to all this information, Ondaral et al. (2023) conducted a SWOT analysis for the forest products sector in their study. In the analysis, the strengths of the sector were stated as; widespread and organized forestry activities throughout the country, geographical location and proximity of facilities to ports, dynamic structure of the sector and low labor costs, and the weaknesses of the sector were stated as; lack of qualified personnel at intermediate and lower levels, variability of the superstructure in forestry management, lack of standards and inspection in raw materials and products, and lack of institutionalization and branding. Within the scope of the analysis, threats were stated as; internal turmoil and war threats in peripheral markets, gray zones of public law, sensitivity of economic stability and climate problems, while opportunities were stated as; restructuring of peripheral countries, encouragement of use of forest products worldwide and continuing increase in domestic demand (Ondaral et al., 2023).

2. Agglomeration Economies and New Economic Geography Models

In the literature; it was first demonstrated by Alfred Marshall (1920) that the spatial location of firms close to each other and related institutions and organizations creates significant benefits. From this point of view, the factors that are effective in aggregating economic activities are generally referred to as Marshallian Externalities. These factors are basically; highly specialized labor, mass production (internal economies), the existence of transportation facilities and modern infrastructure and specialized input services (Fujita, 1989; Kıymalıoğlu and Ayoğlu, 2006).

In the agglomeration economies defined by Marshall, economic activities are located in the same geography and this provides advantages to companies in supplying goods, reaching skilled labor, and disseminating technological knowledge. When choosing a location, companies may choose to be located close to raw materials and sectoral agglomerations in order to gain specialization and competitiveness. Taking all this into consideration, companies generally want to locate in organized industrial zones in our country. For industrial production, different factors such as proximity to other facilities, availability of resources and investment costs come to the fore when choosing a facility location (Marshall, 1920; Athawale and Chakraborty, 2010; Üçüncü and Bayram, 2016).

With Marshallian Externalities and agglomeration economies, the major changes experienced in the world economic geography since the 1980s, theories and new approaches such as the new economic geography model have been developed. In the early 1990s, the New Economic Geography Model was put forward by Krugman in the field of regional growth and development, and emphasized the role of agglomeration economies, externalities and transportation costs (Krugman, 1991; Fujita et al., 1999; Fujita and Krugman, 2004; Yavan, 2013). The main purpose of New Economic Geography Models is to explain the formation of economic agglomerations at different scales in geographical space (Fujita and Krugman, 2004; Kum, 2011).

The new economic geography model explains the geographical formation of economic development with centripetal and centrifugal forces. Centripetal forces are the forces that lead to industrial agglomeration among countries and regions; centrifugal forces are the forces that lead to industrial dispersion. While centripetal forces increase the geographical agglomeration of economic activities, centrifugal forces reduce this agglomeration. The basis of this new approach is that due to external economies and agglomeration economies, economic activities are geographically agglomerated in certain regions, especially in metropolises and large cities, and these economies support the growth of urban areas and lead to the emergence of local and regional inequalities within this framework (Yavan, 2013). According to Krugman (1999), the centripetal forces affecting geographical agglomeration are the market scale effect (forward and backward linkages), the intensive labor market, and pure external economies; while the centrifugal forces are immobile production factors, land rents, and pure negative external economies (Kum, 2011).

Centripetal forces are the sources of external economies mentioned by Marshall. A local market can create backward and forward connections. Here, backward connections consist of the location preferences that provide easier access to larger markets in terms of goods production due to economies of scale. Forward connections consist of a market reducing costs for local producers and increasing local production of semi-finished products. Industrial agglomeration also intensifies the labor market based on expertise. Therefore, employers can easily provide their workers and workers can work with the employer they want. Agglomeration of economic activities on a local scale can also create external economies through information transfers. Centrifugal forces consist of negative external economies such as congestion in markets and production due to the agglomeration of economic activities in certain regions (Kum, 2011; Krugman, 1999).

When the characteristics of the New Economic Geography approach are examined, it is seen that diversity, increasing returns to scale (internal economies of scale), imperfectly competitive markets, intra-industry trade (intermediate input mobility), factor mobility and transportation costs are the main factors (Fujita and Krugman, 2004; Tunalı Çalışkan and Kaya, 2018). Among these factors; within the diversity factor, the constant elasticity of substitution function can be considered; within the increasing returns to scale factor, internal scale economies; within the imperfectly competitive markets factor, the Dixit-stiglitz model; within the transportation costs factor, iceberg transportation costs (a certain percentage of the transferred goods); within the intra-industry trade factor, forward-backward linkages; within the factor mobility factor, firm location (they can establish facilities in every profitable location, access to suppliers and the market) and labor mobility (they act according to wage differences) can be considered (Head and Mayer, 2003; Tunalı Çalışkan and Kaya, 2018).

3. The Forest Industry And Organized Industrial Zones In Turkey

In our country, industrial companies are agglomerated especially in organized industrial zones where they have an advantage in ensuring competitiveness. According to the Organized Industrial Zones Law

No. 4562, the Organized Industrial Zone (OIZ) is defined as: To ensure the structuring of the industry in appropriate areas, to prevent distorted industrialization and environmental problems, to direct urbanization, to use resources rationally, to benefit from information and information Technologies and to place and develop industrial types within a certain plan, OIZs are the goods and service production zones targeting efficiency in resource use, and established, planned and operated in accordance with the provisions of this Law, with the necessary common use areas, service and support areas and technology development zones within the proportions in the zoning plans, in a planned manner and within certain systems land parcels with approved boundaries to allocate for the industry.

Today, in addition to organized industrial zones specialized in different areas such as specialized OIZ in leather products, there are also mixed organized industrial zones where companies are operating in different economic fields. One of these economic fields is the forest industry. The only OIZ specialized and in operation in forest products is İnegöl Mobilya Woodworks Specialized OIZ (İnegöl Mobilya Ağaç İşleri İhtisas OSB, which is located in Bursa (OSBÜK Web Sitesi, 12.12.2024).

According to the data received from the T.R.Ministry of Industry and Trade (repealed) in 2008, there were 559 forest industry companies among the total number of 9.399 industrial companies located in the completed organized industrial zones in our country in 2008.

Their distribution is given in Table 2. Based on this, the highest number of forest industry companies is located in Kayseri among the organized industrial zones that were completed in 2008. Also in the same year, there were 1.938 companies in the under-construction organized industrial zones and 63 of them were operating in the forest industry sector.

The forest industry is a sub-branch of the manufacturing industry. As it is known, the raw materials of the forest industry are the products obtained as a result of forestry activities. The forest lands located in the provinces of our country bring the forest products industry to the fore in terms of economic development both regionally and locally.

As seen in Table 1, when we look at the forest assets of the provinces; The province with the most forest area is Antalya; This is followed by Kastamonu and Mersin provinces. However, it is seen that the provinces where forest industry activities are agglomerated are mostly Istanbul and Kayseri. Therefore, it can be stated that proximity to places where the industry branch is agglomerated rather than proximity to raw materials may be more attractive for companies.

4. Materials and Methods

One of the methods used in the literature to measure the spatial agglomeration of economic activities is LQ Analysis (Location Quotient). LQ (Location Quotient) Analysis is a measure that gives the proportional value of the density of the industry in a region to the density in another region or country selected as a reference. The coefficient obtained as a result of the analysis measures the agglomeration or specialization of a certain industrial sector in a region comparatively. In the formula, economic activities in an area are compared with economic activities in a larger area (Karaalp, 2008).

$$LQ = (Ki : Kn) / (Si : Sn)$$

$$LQ = \frac{\text{Employment in The Local Sector}}{\text{Local Total Employment}} \Big/ \frac{\text{Employment in The Sector in The Region}}{\text{Total Employment in The Region}}$$

Explanation:
Ki = Employment in The Local Sector
Kn = Local Total Employment
Si = Employment in The Sector in The Region
Sn = Total Employment in The Region

LQ Analysis can be performed with different data such as employment, export, import, production and value-added data. In the interpretation of the coefficient obtained as a result of LQ Analysis, different threshold values are used in the literature. According to the most general and widely used threshold value of 1, three different interpretations can be made:

1. If LQ<1, the employment rate of the sector in the region is less than the employment rate in the reference region. Therefore, there is no specialization and/or agglomeration in the sector in the region.
2. If LQ=1, the employment rate of the sector in the region is equal to the employment rate in the reference region. Therefore, it can be said that the formation of specialization and/or agglomeration in the sector in the region has just begun.
3. If LQ>1, the employment rate of the sector in the region is greater than the employment rate in the reference region. Therefore, there is specialization and/or agglomeration in the sector in the region; it can be advanced (Karaalp, 2008).

After reviewing the literature, within the scope of the study, the features of organized industrial zones in Turkey between 2008 and 2018 years were compared and LQ Analysis was made with regional employment numbers to try to determine the agglomerations related to the forest industry.

In this study, data about the companies operating in the forest products industry in the organized industrial zones in our country in the years 2008 and 2018 were obtained from the T.R.Ministry of Industry and Trade (repealed). In 2018, employment data by provinces in the forest products industry and Employment Statistics data were obtained from the SGK Website. With these data obtained, LQ Analysis was performed within the scope of the study.

There are comments in the literature regarding the Location Quotient, the coefficient (LQ) threshold value limit of 1 being considered insufficient. For this reason, in many studies, it is stated that the Location Quotient (LQ), the coefficient, being greater than 1.25 indicates that the relevant industry branch is agglomerated in the region. (Yardımcı, 2014; Türkcan and Çelik, 2020; Alkan and Obut Bilim, 2021). Therefore, by referring to the studies and comments in the literature, the threshold value limit of the coefficient (LQ) in this study is considered as 1.25.

5. Findings and Discussion

Between 2008 and 2018 years the features of organized industrial zones in Turkey were compared and LQ Analysis was made with regional employment numbers within the scope of the study, to try to determine the agglomerations related to the forest industry. LQ Analysis was made to determine whether there is any specialization and/or an agglomeration in the sector in the region.

As seen in Table 1, the provinces with the largest forest areas in 2018 are Antalya, Kastamonu and Mersin, and the provinces with the least amount of forest area are Iğdır, Ağrı and Nevşehir, respectively. In addition to this information, as seen in Table 2, the number of companies operating in the forest industry among the completed OIZs in Turkey increased from 559 in 2008 to 1575 in 2018. According to the data obtained, as seen in Figures 1 and 2, the completed organized industrial zones with the highest number of companies operating in the forest industry in 2008 are located in Kayseri Province which is followed by Bursa and in 2018, the largest number of companies operating in the forest industry in completed organized industrial zones was again in Kayseri, followed by Ankara and Bursa. Also, as seen in Figure 3, the ratio of employment in the field of the forest industry to all current employment in the companies in completed organized industrial zones ın Turkiye, Kırıkkale, Kastamonu and Kayseri have the highest ratios (%) in 2018, respectively. In line with this information, it can be said that there was an agglomeration in the field of forest industry in the completed organized industrial zones in Kayseri and Bursa provinces between 2008 and 2018.

In the TR72 Region 2014-2023 Current Situation Analysis prepared by the Middle Anatolia Development Agency, it is stated that the total forest area in Kayseri is 107.937 hectares. 22.982 hectares of this area is normal forest area; and the area of 84.955 hectares constitutes degraded forest area. In the same Analysis, it was stated that Kayseri's exports, especially in the furniture manufacturing sector, constitute 17,61% of the total country's exports (Orta Anadolu Kalkınma Ajansı, 01.01.2025). Additionally; according to The Prominent Sectors Report in the TR72 Region (2021), also prepared by the Middle Anatolia Development Agency, the 8 sectors with the highest average market agglomeration in the region are; iron and non-ferrous metals, furniture, paper and forest products, electrical and electronics, textile and raw materials, steel, chemicals and products, mining products and air conditioning industry (Orta Anadolu Kalkınma Ajansı, 2021).

Table 1. Forest Areas in Provinces in Türkiye in 2018

Provinces	Area (Hectare)	Provinces	Area (Hectare)
İstanbul	240.688	Yozgat	272.772
Tekirdağ	101.174	Zonguldak	194.074
Edirne	103.014	Karabük	278.830
Kırklareli	254.463	Bartın	135.437
Balıkesir	632.038	Kastamonu	873.651
Çanakkale	480.465	Çankırı	192.120
İzmir	475.779	Sinop	367.096
Aydın	326.605	Samsun	388.821
Denizli	588.672	Tokat	478.379
Muğla	829.309	Çorum	441.394
Manisa	542.480	Amasya	220.681
Afyonkarahisar	278.836	Trabzon	181.842
Kütahya	646.552	Ordu	202.896
Uşak	223.496	Giresun	258.140
Bursa	485.636	Rize	178.949
Eskişehir	410.057	Artvin	403.695
Bilecik	240.252	Gümüşhane	239.577
Kocaeli	143.227	Erzurum	256.882
Sakarya	208.226	Erzincan	212.223
Düzce	124.216	Bayburt	29.793
Bolu	531.802	Ağrı	5.905
Yalova	47.570	Kars	34.441
Ankara	452.058	Iğdır	161
Konya	492.857	Ardahan	30.757
Karaman	243.351	Malatya	189.340
Antalya	1.146.062	Elazığ	169.892
Isparta	386048	Bingöl	264.934
Burdur	331.711	Tunceli	245.536
Adana	593.660	Van	45.141
Mersin	835.534	Muş	78.426
Hatay	208.067	Bitlis	180.237
Kahramanmaraş	521.413	Hakkari	179.847
Osmaniye	158.679	Gaziantep	112.617
Kırıkkale	70.286	Adıyaman	158.581
Aksaray	23.469	Kilis	27.032
Niğde	56.238	Şanlıurfa	14.850
Nevşehir	11.195	Diyarbakır	325.359

Kırşehir	43.668	Mardin	154.804
Kayseri	132.582	Batman	88.896
Sivas	387.281	Şırnak	266.947
Siirt	232.264	Türkiye	22.621.935

Source: Republic Of Turkiye, Ministry Of Agriculture and Forestry General Directorate of Forestry, 2018.

Table 2. Number Of Companies Operating In The Forest Industry Field In The Completed Organized Industrial Zones In Turkey Between 2008 and 2018

Provinces Where Organized Industrial Zones Are Located	Number Of Companies Operating In The Field Of Forest Industry 2008	Number Of Companies Operating In The Field Of Forest Industry 2018	Ratıo Of Parcels In Which Productıon Is Made Within The Number Of Allocated Parcels
Adana	15	34	0,79
Adıyaman	1	18	0,73
Afyonkarahisar	13	16	0,89
Aksaray	**	23	0,67
Amasya	7	13	0,75
Ankara	14	148	0,90
Antalya	8	30	0,77
Aydın	**	10	0,19
Balıkesir	6	16	0,10
Bartın	4	4	1,00
Batman	2	1	0,85
Bilecik	1	6	0,83
Bingöl	**	2	0,81
Bolu	19	27	0,71
Burdur	6	5	0,75
Bursa	38	140	0,88
Çanakkale	4	14	0,70
Çankırı	4	7	0,84
Çorum	7	9	0,61
Denizli	**	4	0,87
Diyarbakır	6	20	0,76
Düzce	2	10	0,86
Edirne	**	1	0,58
Elazığ	13	14	0,67
Erzincan	6	8	0,64
Erzurum	5	7	0,89

Eskişehir	27	38	0,81
Gaziantep	4	3	0,81
Giresun	**	3	0,38
Gümüşhane	**	3	0,73
Hatay	1	6	0,80
Iğdır	**	1	0,23
Isparta	14	13	0,91
İstanbul	5	50	0,99
İzmir	6	33	0,63
Kahramanmaraş	**	4	0,97
Karabük	1	1	0,57
Karaman	1	9	0,64
Kars	7	7	0,59
Kastamonu	1	22	0,54
Kayseri	176	398	0,82
Kırıkkale	4	14	0,71
Kırklareli	**	6	0,74
Kırşehir	8	6	0,59
Kocaeli	*	21	0,82
Konya	14	65	0,86
Kütahya	2	11	0,71
Malatya	3	31	0,87
Manisa	5	14	0,67
Mardin	2	6	0,67
Mersin	6	25	0,86
Muş	**	1	0,58
Nevşehir	**	3	0,56
Niğde	10	15	0,82
Ordu	10	17	0,98
Osmaniye	2	6	0,78
Sakarya	1	10	0,62
Samsun	6	9	0,87
Sinop	**	1	0,71
Sivas	28	23	0,77
Şanlıurfa	**	8	0,73
Şırnak	**	2	0,24
Tekirdağ	3	40	0,79
Tokat	13	17	0,74
Trabzon	11	24	0,63

Tunceli	**	1	0,75
Uşak	**	5	0,95
Van	1	3	0,93
Zongudak	6	13	0,74
Total	559	1.575	0,77

** Data could not be accessed.

Source: T.R. Ministry of Industry and Trade (Repealed), 2008 and 2018.

The table was prepared by the author with data received from T.R. Ministry of Industry and Trade (Repealed).

Table 3. LQ Analysis Results by Provinces

Provinces Where Organized Industrial Zones Are Located	Employment In Companies In The Field Of Forest Industry In Completed Organized Industrial Zones In Turkiye	The Ratio Of Employment In The Field Of Forest Industry To All Current Employment In The Companies In Completed Organized Industrial Zones In Turkiye (%)	LQ (Location Quotient)
Adana	1.978	0,06	1,699
Adıyaman	638	0,10	3,353
Afyonkarahisar	314	0,04	1,664
Aksaray	540	0,05	1,823
Amasya	448	0,09	2,436
Ankara	4.931	0,03	0,844
Antalya	2.318	0,19	3,697
Aydın	250	0,03	1,643
Balıkesir	1.030	0,13	3,429
Bartın	293	0,08	2,388
Batman	28	0,01	0,949
Bilecik	313	0,06	1,091
Bingöl	40	0,08	4,154
Bolu	518	0,10	2,193
Burdur	85	0,03	0,563
Bursa	9.870	0,06	0,971
Çanakkale	264	0,13	3,503
Çankırı	237	0,06	0,702
Çorum	255	0,05	1,254
Denizli	431	0,02	1,014
Diyarbakır	686	0,10	7,081
Düzce	933	0,12	2,698
Edirne	10	0,01	0,473

Elazığ	322	0,11	6,024
Erzincan	256	0,21	16,291
Erzurum	172	0,04	3,207
Eskişehir	1.871	0,05	0,800
Gaziantep	265	0,31	10,783
Giresun	93	0,05	1,780
Gümüşhane	30	0,06	2,023
Hatay	66	0,04	1,635
Iğdır	80	0,31	92,308
Isparta	389	0,13	2,656
İstanbul	2.043	0,03	0,909
İzmir	3.683	0,08	2,041
Kahramanmaraş	45	0,01	0,226
Karabük	17	0,01	0,389
Karaman	398	0,03	1,621
Kars	70	0,12	35,000
Kastamonu	1.018	0,42	4,907
Kayseri	28.886	0,41	3,416
Kırıkkale	1.079	0,49	19,725
Kırklareli	723	0,06	2,056
Kırşehir	180	0,19	7,676
Kocaeli	2.409	0,04	0,913
Konya	3.873	0,08	3,862
Kütahya	337	0,03	1,493
Malatya	739	0,04	2,000
Manisa	1.007	0,02	0,748
Mardin	76	0,02	2,420
Mersin	551	0,03	0,985
Muş	10	0,06	19,617
Nevşehir	37	0,02	0,866
Niğde	209	0,04	1,739
Ordu	632	0,08	2,811
Osmaniye	262	0,02	0,951
Sakarya	1.660	0,08	1,711
Samsun	188	0,03	0,693
Sinop	5	0,00	0,028
Sivas	859	0,12	0,962
Şanlıurfa	347	0,02	1,278
Şırnak	38	0,20	23,231

Tekirdağ	4.069	0,03	1,125
Tokat	242	0,05	1,234
Trabzon	889	0,17	5,732
Tunceli	10	0,02	1,280
Uşak	240	0,02	0,818
Van	25	0,01	2,236
Zongudak	418	0,16	4,881
Total	87.228		

Source: T.R. Ministry of Industry and Trade (Repealed), 2008 and T.R. Ministry of Industry and Technology 2018.

The table was prepared by the author with the data received from T.R. Ministry of Industry and Trade (Repealed) in 2008 and T.R. Ministry of Industry and Technology 2018, SGK Website, Eployment Statistics, https://www.sgk.gov.tr/Istatistik/Yillik/fcd5e59b-6af9-4d90-a451-ee7500eb1cb4/, 11.10.2018 and TÜİK Web Sitesi, https://biruni.tuik.gov.tr/medas/?locale=tr, 08.09.2023.

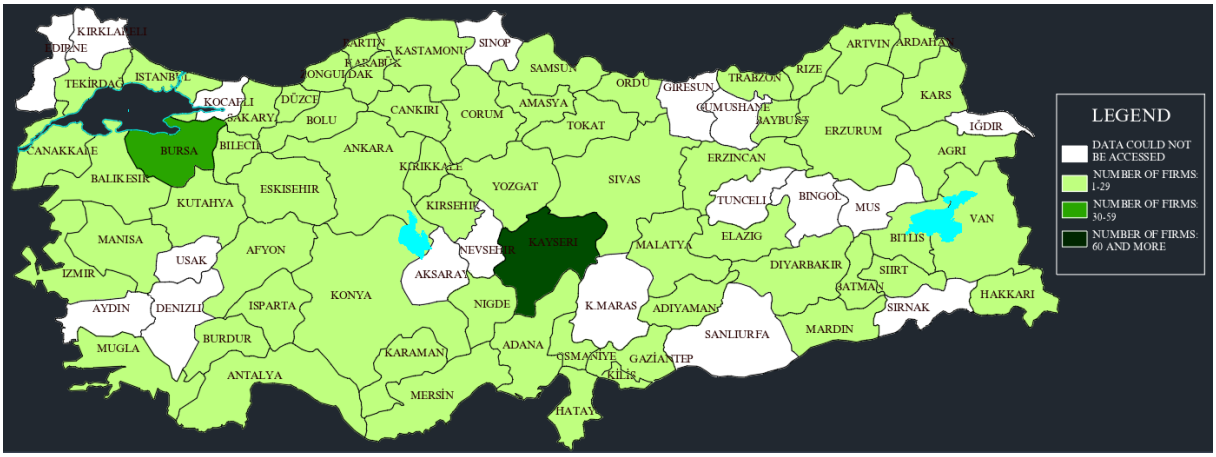

Figure 1. Number of Companies Operating in The Forest Industry Field in The Completed Organized Industrial Zones in Turkey in 2008.

Source: T.R. Ministry of Industry and Trade (Repealed), 2008.

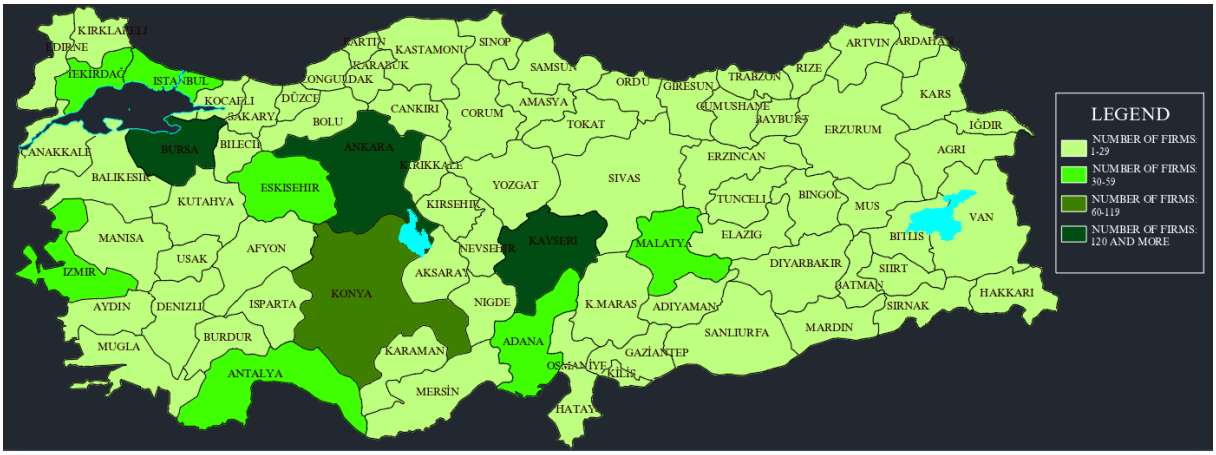

Figure 2. Number of Companies Operating in The Forest Industry Field in The Completed Organized Industrial Zones in Turkey in 2018.

Source: T.R. Ministry of Industry and Technology, 2018.

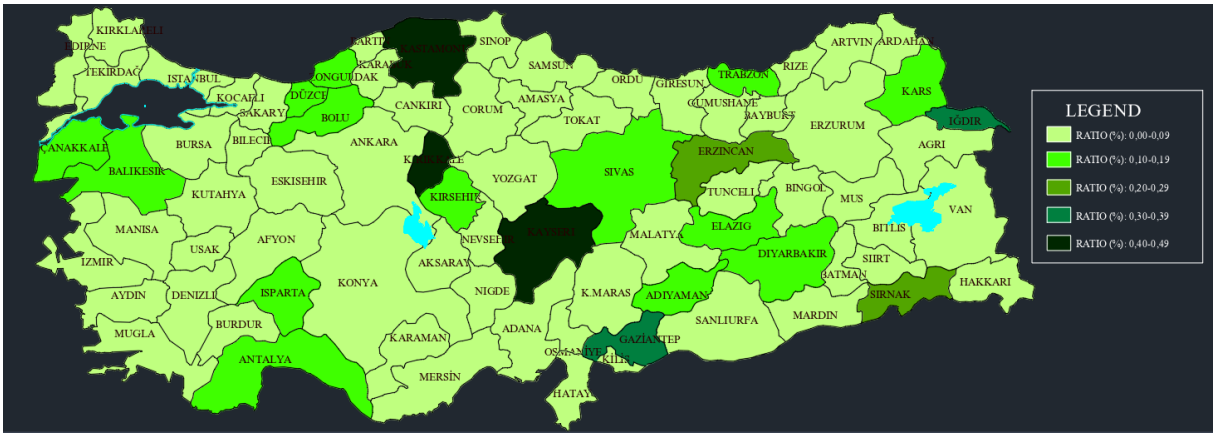

Figure 3. The Ratio of Employment in The Field of Forest Industry To All Current Employment in The Companies in Completed Organized Industrial Zones in Turkiye (%)

Source: T.R. Ministry of Industry and Technology, 2018.

When we look at the number of employment in companies operating in the field of forest industry in 2018, Kayseri Province comes to the fore firstly with the highest number of employment and has a share of approximately 33% in proportion to employment in Turkey, in this field. Also, as seen in Table 3, according to the LQ Analysis results, it can be said that there is a significant agglomeration in the completed OIZs in Kayseri in the forest industry field related to employment numbers, LQ Analysis results, and the company numbers in this field. In addition to this information, the other two provinces with the highest employment in companies operating in the field of forest industry are respectively; Bursa and Ankara.

The reason for the high LQ values in provinces like Iğdır is that, as can be seen from the number of parcels allocated, not all parcels in the completed organized industrial zones have been filled and production has not started in these parcels, and therefore, full capacity employment is not available in the organized industrial zones in these provinces, and the ratio of employment in the forest and forest products industry to total employment on a provincial and regional level is very low. In addition to these, the majority of companies operating in the forest products sector are located in especially the organized industrial zones in the province.

It can also be said that, when looking at Table 1, Table 2 and Table 3, the specializations in the sector and the spatial agglomerations in the region do not depend only on the forest presence in the region. Specializations and spatial agglomerations in the sector and region may also occur depending on the other factors such as sectoral developments and logistics opportunities that have developed over the years.

When we look at the number of companies and employment in the forest products industry within organized industrial zones; it is seen that the highest number of companies operating in the forest industry is in the organized industrial zones in Kayseri, among the completed organized industrial zones in 2008 in our country, In 2018, among the completed organized industrial zones in our country, it is

seen that the highest number of companies operating in the forest industry is in Istanbul and followed by Kayseri. And according to the results of LQ Analysis in this study, it can be said that there is an agglomeration in the forest industry in Kayseri and İstanbul among the completed organized industrial zones in our country in 2018.

In the forest products industry in Kayseri, the furniture sector comes to the forefront. The reason for this is that the big furniture brands known in our country make their production in Kayseri. In addition, there are thousands of furniture production and sub-industry manufacturers of different scales in the province. According to the data prepared by the Kayseri Chamber of Industry and Commerce, as of the end of 2007, the furniture sector is the second sector with the highest exports with 259.553.058 FOB dollars; bedroom, sitting group, bathroom furniture, dining room, youth and children's rooms, office furniture, kitchen cabinets, armchairs, sofas, bases, tables, chairs, armchairs, beds, cabinets and furniture accessory materials constitute the furniture product groups exported from Kayseri (Karaduman, 2009). When we look at the export shares in the furniture manufacturing industry, İnegöl ranks third after Kayseri and Istanbul. (Çolak and Ulucan, 2012; Memiş, 2021).

As a result, in line with the LQ Analysis and the data obtained, in Kayseri, the spatial agglomeration in the forest products industry, especially in the furniture sector, can be considered as agglomeration economies and increasing returns to scale, transportation costs, factor mobility (Firm Location and Labor Mobility), which are among the basic factors of the New Economic Geography approach, as effective factors. In addition, it can be said that Kayseri's geographical location, transportation connections and benefiting from public incentives and supports during the industrialization process have also been effective in the development of the industrial sector and the agglomeration of firms here. In the context of the literature, it is seen that the advantages of agglomeration economies and Marshall externalities and the factors of the new economic geography model with centripetal forces still exist in Kayseri, therefore with the results of the LQ Analysis, an OIZ specialized in the forest products industry can be established in the coming years.

6. Conclusion

Looking at the data obtained from TradeMap, our country's export values are quite high in the wood, paper and furniture sectors, where the most activity is carried out among forest products; most exports are made in the furniture sector (Trade Map Website, 2023). Therefore, considering the promotion of the use of forest products worldwide and the continuing increase in domestic demand, for a balanced economic development, it is important to establish facility areas that will provide training and inspection for the sector, to eliminate the lack of qualified personnel at intermediate and lower levels, lack of institutionalization and branding, and lack of standards and inspection in products in the sector and to support and encourage widespread and organized forestry activities throughout the country in other regions and provinces with potential, considering the dynamic structure of the sector.

Finally, When we look at the organized industrial zones completed in our country in 2018, the number of companies operating in the forest products industry sector and the number of employment in these zones and according to the results of the LQ Analysis in this study, it can be said that, especially in Kayseri, there is a spatial agglomeration in the forest products industry sector.

However, the locations of the agglomerations, the number of companies and employment within the completed organized industrial zones may change in the coming years as the incomplete and still in project organized industrial zones are completed and put into operation. In this context, it is expected that the study will contribute to the literature.

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