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AN ANALYSIS OF INDUSTRIAL CHANGE IN TURKEY. II: SECTORAL DEVELOPMENT AND VALUE ADDING

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Abstract

The success of companies in each sector is related not only with the performance of the company but also with the sectoral development. The value adding level in each sector also creates extra gains that make companies successful. In this paper, regional distribution of the largest companies in Turkey is analyzed. The annual data of the largest companies in the country based on the company performances, sectoral changes, ownership structure and value adding levels are examined below. Trend analysis for sectoral development is made and sectors are classified as rising and falling based on their performances. The data illustrates that the country replaces high value adding sectors with the low value adding ones. The value adding analysis confirms these results. It is also interesting to see that the share of the state rapidly decreases over time while the share of the private ownerships and foreign companies rise rapidly. A trend analysis is also employed for the changes in ownership structure and the results are presented. The overall results depict that the country is becoming a more industrialized; however, new policies and incentives are needed to increase the value adding in each sector.

Keywords: The largest companies, trend analysis, value adding, sectoral analysis, ownership distribution

1. Introduction

The rapid technological development, automation, communication and globalization also affect industrial change. Industrialized regions such as the European Union (EU) and United States of America (USA) work on new policies to manage the change. The EU has a Consultative Commission on Industrial Change (CCMI) that operates under the European Economic and Social Committee (EESC). The main objective of CCMI is to control the industrial change across sectors and provide added value to member states; especially, for those currently undergoing industrial change [1].

The sectoral development is accepted as a main element of industrial change. Authors analyze the industrial change in Germany and they classify a region as pro-trend, anti-trend and featureless growth [2]. They conclude that regional growth and industrial change are related with initial size and, import and export exposure of the local manufacturing sectors. (Antenolli, 2012) analyzes the role of sectors in industrial change [3]. The author claims that change is unevenly distributed across sectors and over time, some sectors are the main providers of innovations and other sectors play the role of users. The innovative sectors provide productivity, employment, investment and innovations that rejuvenate traditional sectors. Authors present an analysis for technological change and innovation in industrial dynamics [4]. According to the analysis, innovation and diffusion affect growth and survival chances of companies. Knowledge accumulation changes competitive abilities and industrial structure of firms. They also analyze the sector-specific characteristics of technologies. (Cimoli et al., 2009) analyze the industrial development and the role of policies and institutions [5]. They point out that sectors play an important role in technological development while resource allocation affects where technical skills will be accumulated, and the potential influence of these variables differs widely between technologies and sectors. They also point out that, in many countries industries produce products with low value added due to lack of innovation as protectionism stifled innovation and competition. Authors present an analysis for direct foreign investment and output relationship in Pakistan for the period of 1981-2008 [6]. They use Granger causality and panel cointegration and show that the effect of foreign investment on growth varies significantly across sectors; it causes growth in the primary and service sectors, while growth causes foreign investment in manufacturing sectors. (Oregaan and Sims, 2008) use standard industrial classification to classify high and low technology firms [7]. They derived criteria for the evaluation and classification of firms in different sectors. The researchers have shown that financial development positively affects the manufacturing and agricultural sectors but the impacts differ across regions [8]. The impacts experienced in developing countries such as Asia, Latin America, Mena and SSA are greater than those in advanced countries.

Authors present an analysis of the influence of Turkish trading partners' growth rates on Turkish export in different sectors [9]. Upon modelling the export demand of each sector separately they conclude that sectors such as motor vehicles, basic metal and radio-television have the highest income elasticity, whereas food products sector has the lowest. (Koopman et al. 2008) propose a method to compute domestic value addition in exports from China [10]. They estimate that the share of domestic value addition rises to 60% and there are variations across sectors where relatively sophisticated sectors have low domestic value (30%). A similar research is presented in [11]. Authors use input-output and bilateral trade data to compute the value added content in [12]. They find out that the value addition in manufactures is low relative to services across sectors. The information is given on the current value addition in manufacturing industry and new plans developed by EU, USA and China in [13]. They propose "Manufutureroad" to increase the value addition and have a competitive strategy especially in the EU. There are also researches on foreign investment, value addition and industrial development (Ramasamy et al., 2012) [14], (Qui, 2015) [15], (Zhou, 1998) [16], (Narula, 2018) [17].

Turkey, a long time EU candidate, has a similar industrial and sectoral infrastructure with the European countries. The country has been a close ally of the EU and one of its largest trade partners [18], and the sectoral development and value adding levels of them have similarities. Sezen (2002) claims that the government had interfered in the economic processes of the country as an active player during the 1960s by implementing five-year economic plans [19].

The state planned, organized and controlled the economy. The state-controlled enterprises and/or institutions constituted the core of the economic life. The state controlled enterprises and/or institutions were operated in coordination with state-implemented five-year development plans. He points out that 24th January 1980 is a significant date both in political and economic life and the future of the country, since new regulations were launched for Turkish economy. The 24th January 1980 decisions have also been the corner stone of the neo-liberal transformation in the country's economy from the 1980s onwards. The 24th January decisions have changed all the economic processes, systems, and strategies which were in force until that time. This time, the 'outward-oriented growth and development' model was adopted. The model was planned to be implemented in line with the 'export-oriented industrialization model'.

According to Altunisik and Tur (2005), the Turkish Lira (TRY) was devalued by 32.7% against the United States Dollar in 1994. The government's plan to trigger exportation activities and increase the level of export was the reason behind the devaluation [20]. The government also aimed to keep the inflation movements under control and obtain a steady and sustainable economic growth in the country with the 24th January decisions. In addition to these, state involvement in economic life was reduced. The role of the state-controlled enterprises that have lost their importance with the new economic policies and strategies were also questioned and they started to be sold to private sector players. Thus, the private sector had become the main focus of the economic performance. In turn, the government had launched new strategies in order to incentivize and attract both internal and external investors and/or entrepreneurs. The doors of the Turkish market had been opened to international and/or global trading and investment powers.

As Kazgan (2002) emphasizes, while Turkey accepted and applied the common customs tariff and opened its market to other countries with which the European Union had concessional trade agreements, these countries did not respond in the same or even in a similar way [21]. This had affected negative outcome on Turkey's economic performance and/or attraction in the global and/or international markets. All those factors had also caused a recession in the export growth of the country. The economic crisis that sprang in the last quarter of 2000 had partially been caused by these incidents and, it continued for a quite long period of time. The changes in policies and, efforts to become a full member of the EU influenced the growth and industrial development of the country. In this paper, we focus on sectoral development and value adding based on the data for largest companies. In section 2, we delineate the data and the method. Section 3 provides the analysis for sectoral development, while section 4 outlines the changes in the ownership structure of the largest companies. Section 5 and 6 present the discussion and conclusion, respectively.

2. The method and the data

Istanbul Chamber of Commerce (ISO) prepares and announces a report for the 500 largest companies based on their annual revenue [22]. These companies operating in Turkey are classified based on their public sector rank, private sector rank, production based sales, sales turnover, gross value added, equity capital, net assets, period profit, exports, average number of workers, sector code and capital distribution. The capital ownership of the companies include state-owned, private and foreign types. The economic activities in sectors are coded according to the UN ISIC Rev.2 [23].

The companies in the list might change from year to year based on their revenue. In order to track the companies each year, we assign a unique number to companies and track their performance over the years. Since a sector code is assigned to each company, we are able to track the total number of companies in each sector. The total numbers of companies in each sector in 2002-2015 are used to assess the sectoral development within the analysis period. The coup attempt on 16th July 2016 affected the natural business process in Turkey. However, we have not waited for the list of 2016 to be announced since that list might mislead the results because of the ongoing emergency decree in the country. It is possible to analyze the rising and declining sectors using the data for the period of 2002-2015.

The capital ownership of companies presents precise information. One can analyze the change in capital ownership distribution of companies as well as partnerships within the analyzed period. Below, the capital ownership through the analysis period is examined and annual changes are compared.

The sector codes are developed by UN statistics department. The codes are widely accepted to define and evaluate economic activities in each sector in the international platform. They can also be used for comparative analysis. It is obvious that each company in a sector has an output or a product of which they add a value to make revenue. However, not all the sectors have the same value adding activities. Some sectors require high value adding activities whereas some of them can be defined as low value adding sectors. In order to evaluate the total value adding activities, we classify the sectors as high value adding, moderate value adding and low value adding. We assume that high value adding sectors need to use more sophisticated technology and know-how requiring methods to create their products. Hence high value adding sectors are represented with the value of 3, moderate value adding sectors are represented with the value of 2 and low value adding sectors are represented with the value of 1. Note that these are numeric values and they will be used to assess the change in the total value adding activity. Table 1 summarizes the codes and sectors that are also used by ISO for evaluating the 500 largest companies. The table also shows the value adding level determined the evaluation of companies in each sector.

Table 1. Sector Codes

| Code | Sector | Value adding |
|------|---|--------------|
| 210 | Mining and Quarrying | 2 |
| 311 | Manufacture of food products | 3 |
| 312 | Manufacture of food products not elsewhere classified (NEC) | 1 |
| 313 | Beverage industries (alcoholic and non-alcoholic) | 1 |
| 314 | Manufacture of tobacco processing | 1 |
| 321 | Manufacture of textiles | 1 |
| 322 | Manufacture of wearing apparel, except footwear | 1 |
| 323 | Tanning and dressing of leather; manufacture of substitutes | 1 |
| 324 | Manufacture of footwear | 1 |
| 331 | Manufacture of wood and products of wood and cork | 1 |
| 332 | Manufacture of wooden furniture | 1 |
| 341 | Manufacture of paper and paper products | 1 |
| 342 | Printing and publishing | 1 |

| | | |
|-----|--|---|
| 351 | Manufacture of basic chemicals | 3 |
| 352 | Manufacture of other chemical products | 2 |
| 353 | Manufacture of petroleum products | 2 |
| 354 | Oil and coal derivatives | 1 |
| 355 | Manufacture of rubber goods | 2 |
| 356 | Manufacture of plastic products NEC | 2 |
| 361 | Manufacture of pottery, china, earthenware and porcelain | 1 |
| 362 | Manufacture of glass and glass products | 1 |
| 369 | Manufacture of other nonmetallic mineral products | 2 |
| 371 | Manufacture of basic iron and steel | 3 |
| 372 | Manufacture of non-ferrous products | 3 |
| 381 | Manufacture of metal products | 3 |
| 382 | Manufacture of machinery, except electrical | 3 |
| 383 | Manufacture of electrical machinery, apparatus and appliances | 3 |
| 384 | Manufacture of motor vehicles | 3 |
| 385 | Professional, scientific and medical instruments and equipment | 3 |
| 390 | Other manufacturing | 1 |
| 400 | Power production and distribution | 3 |

It is worth mentioning that evaluation of each sector in terms of value adding and assigning a value requires in depth analysis. We have evaluated each sector and the companies in these sectors. In order to classify the sectors, we have analyzed the production methods, differences of their technological infrastructure and research and development efforts. Below is the notation used in the analysis.

Table 2. Notations used for the analysis

| | | |
|--------------------|---|--|
| s | : | Sector index |
| t | : | Year index |
| j | : | Company index (each company is assigned a unique code) |
| S | : | Total number of sectors |
| J | : | Total number of companies |
| V _{s,t} | : | The value adding level of sector s in year t |
| C _{j,s,t} | : | 1 If company j belongs to sector s and is in the largest companies list in year t 0 Otherwise |
| N _{s,t} | : | Total number of companies in sector s in year t |
| P _{s,t} | : | Percentage of sector s in year t |
| VAs _{s,t} | : | Total value adding contribution of sector s in year t |
| TVA _t | : | Total value adding in year t |
| R | : | Trend analysis value or slope |

Given that there is data for 500 companies in each year of 14 years, we first assign a unique code to each company to track the companies. Some companies might go out of the list for some years and return later. It is also possible for companies to change their names. We

carefully track the performance of the each company through the years and calculate $N_{s,t}$ as below:

$$N_{s,t} = \sum_{j=1}^J \sum_{s=1}^S \sum_{t=2002}^T C_{j,s,t} \quad (1)$$

It is now possible to compute the ratio of each sector in each year and the value adding contribution of each sector and total value adding in each year using Eq. (2), (3) and (4), respectively.

$$P_{s,t} = \frac{N_{s,t}}{J} \quad (2)$$

$$VA_{s,t} = V_{s,t} P_{s,t} \quad (3)$$

$$TVA_t = \sum_{s=1}^S VA_{s,t} \quad (4)$$

The total value adding in year t, TVA_t , is expected to have a value between 1 and 3, while a figure close to level 3 is considered as high value adding activity. The algorithm first finds $C_{j,s,t}$, then computes the total number of companies in each sector for each year. Then it is possible to compute $P_{s,t}$, $VA_{s,t}$, TVA_t , and R values for a period. The pseudo-code of the analysis is given below.

```

0: Start
1: Set t=2002, s=1, j=1, get  $V_{s,t}$ 
3: For t=2002 to 2015 do
4:   For s=1 to S do
5:     For j=1 to J do
6:       Find  $C_{j,s,t}$ 
7:     End for
8:   End for
9:   Compute  $N_{s,t}$ 
10: End for
11: Compute  $P_{s,t}$ ,  $VA_{s,t}$ ,  $TVA_t$ , R
12: End

```

Figure 1. Pseudo-code for sectoral analysis and value adding

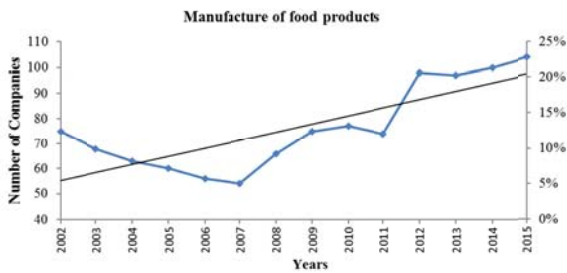
We calculate $N_{s,t}$ to be used in the sectoral development analysis and present the results in section 3.

3. Analysis of the sectoral development

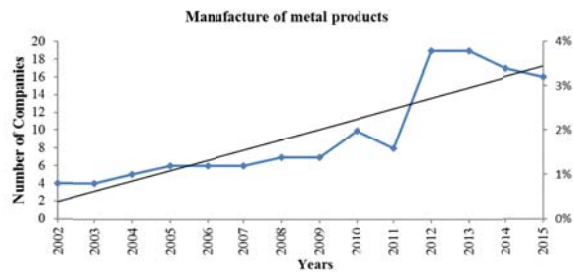
We analyze the data for the 500 largest companies based on the unique company code and sector codes and track their development to observe their performance in 2002-2015. Basically we find the total number of companies in sector s in year t, $N_{s,t}$, and track their

change over the years. In order to determine the trend we utilize a linear regression method to analyze the long term change. We summarize the results for each sector and present a trend analysis based on the data. We group the sectors based on the increasing and decreasing trends.

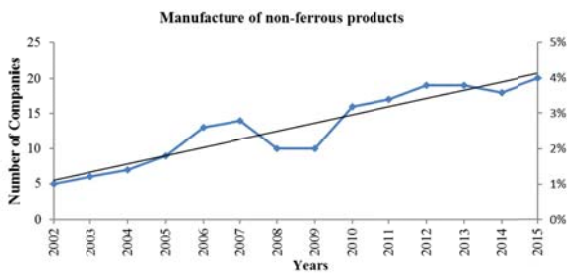
The Figure 2 a-r demonstrates the change of $N_{s,t}$ for the number of companies in the rising sectors. It is true that the rising and decreasing figures might be due to price changes or related demand. However, we assume that the long term trend should reflect a useful picture regarding the changes in each sector.



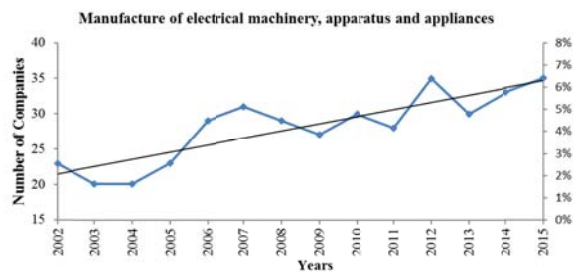
a. Change in the food products companies



b. Change in the metal products companies



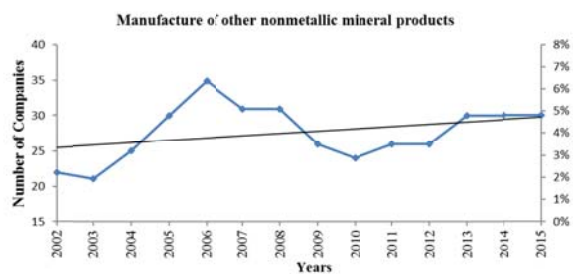
c. Change in the non-ferrous products companies



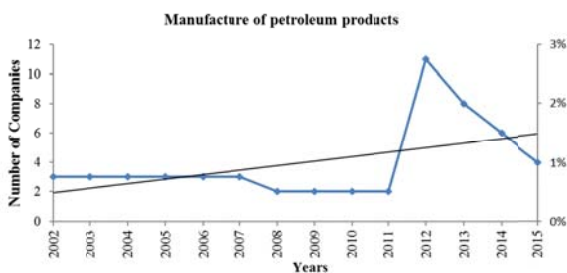
d. Change in the machinery-appliances companies



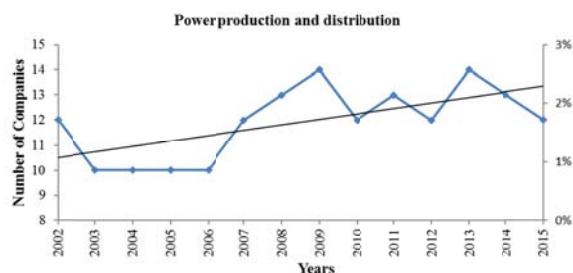
e. Change in the mining companies



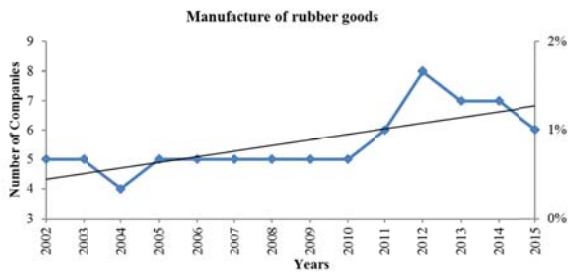
f. Change in the nonmetallic mineral comps



g. Change in the petroleum product companies



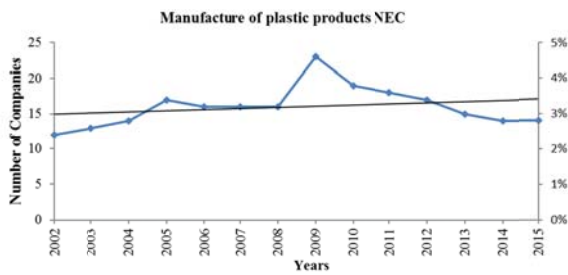
h. Change in the power production companies



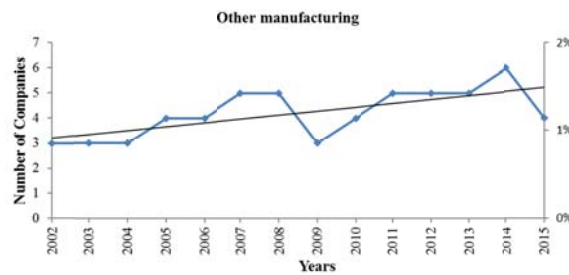
i. Change in the rubber goods companies



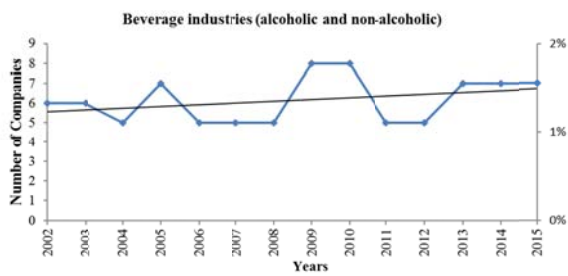
j. Change in the instrument companies



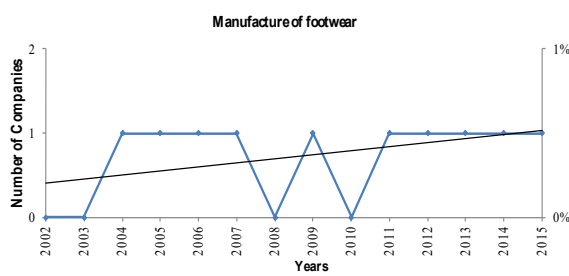
k. Change in the plastic products companies



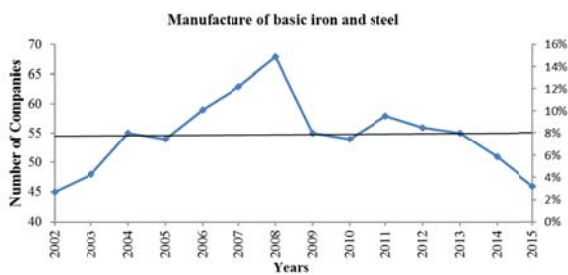
l. Change in the other manufacturing comp



m. Change in the beverage products companies



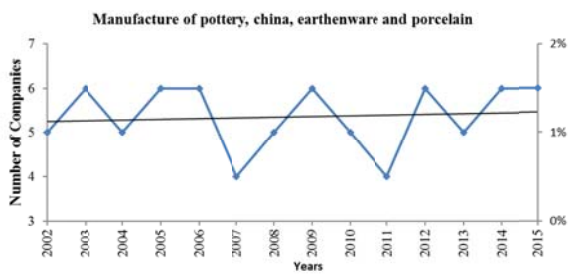
n. Change in the footwear companies



o. Change in the basic iron and steel companies



p. Change in the wood product companies

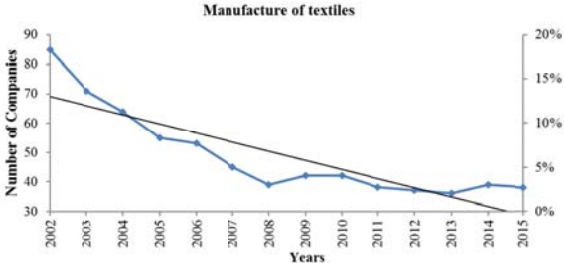


r. Change in the pottery and china product companies

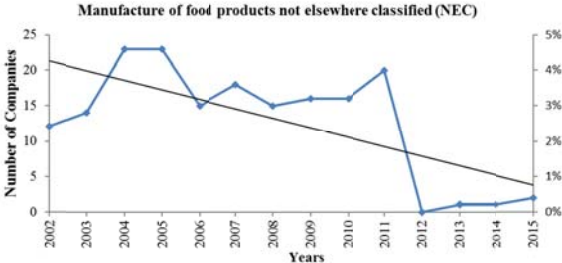
Figure 2 a-r. The rising sectors based on the number of companies in the list

One common characteristic of the rising sectors is that they produce more technology requiring products related with moderate and high value adding activities. The outputs include construction and infrastructure products, commodities used by heavy industry and exportable products. Manufacture of non-ferrous products, manufacture of metal products, manufacture of basic iron and steel, mining and quarrying, manufacture of plastic products, manufacture of petroleum products, power production and distribution, manufacture of other nonmetallic mineral products and manufacture of rubber goods can be included in this group. Industrial products in these sectors require technology based processing and value adding activities. Manufacture of electrical machinery, apparatus and appliances and manufacture of machineries and manufacture of professional, scientific and medical instruments and equipment sectors require high technology and engineering processes. It shows that the country replaces some sectors with high value products which is a good indicator for development. Manufacture of food products is the sector with the highest trend. The country is known with its agriculture capacity. It shows that the country is able to transform the agricultural products to process value added food products and gain revenue. It should be noted that, the demand for energy was in rise during the analysis period. Consequently, it is observed that the manufacture of petroleum products and power production and distribution show a rising pattern during this time.

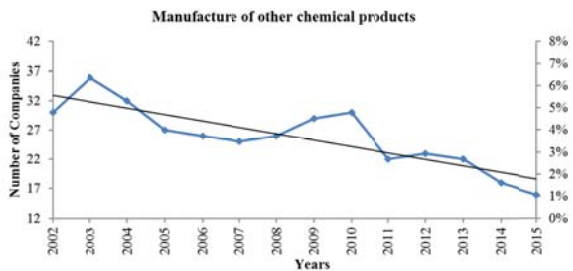
The sectors with a decreasing trend pattern are also analyzed. Figure 3 a-n shows the sectors with a decreasing number of companies each year. A general characteristic of the sectors in the list is that they do not have high value adding activities. They do not require sophisticated manufacturing methods, technology and engineering. Manufacture of textiles; wearing apparel and other chemical products; food products not elsewhere classified; paper and paper products; wooden furniture; tobacco; and glass; as well as tanning and dressing of leather can be considered as low value adding sectors. The increasing global competition, the development in transportation and logistics along with the communication opportunities severely affected traditional sectors. It became possible to reach to low cost products provided by cheap suppliers especially in China during that period. Particularly, numerous textile companies could not compete with cheaper suppliers and had to change sectors. The data show that the country replaces the traditional low value adding sectors with high value adding ones. Turkey has been a base preferred for international brands to produce their motor vehicle production. Manufacture of motor vehicles can be considered as an exception and the change in this one is due to the low cost production opportunity in other countries.



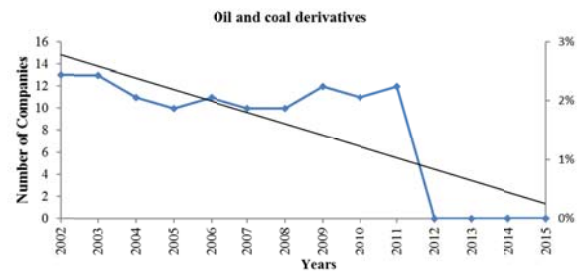
a. Change in the textile companies



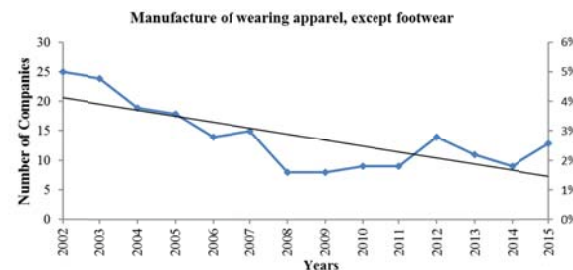
b. Change in the other food product companies



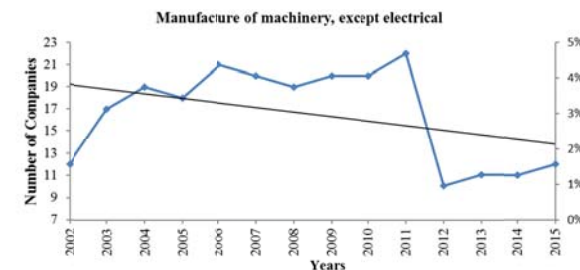
c. Change in the other chemical companies



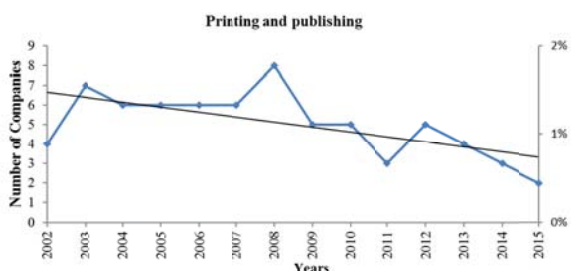
d. Change in the oil and coal derivative c.



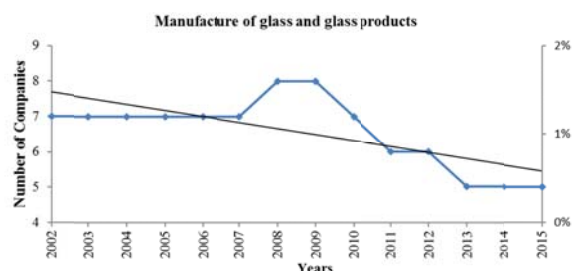
e. Change in the wearing companies



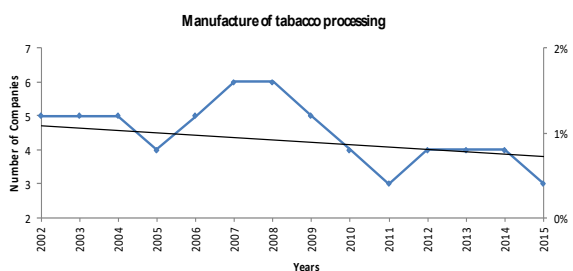
f. Change in the machinery companies



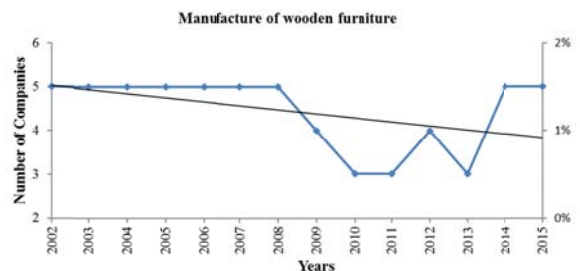
f. Change in the printing and publishing companies



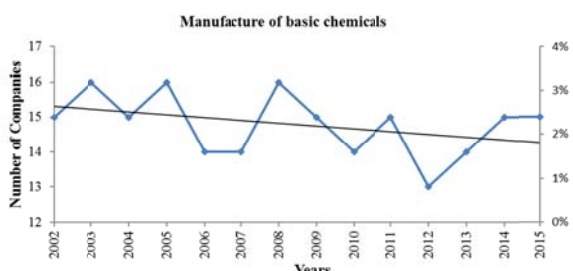
h. Change in the glass product companies



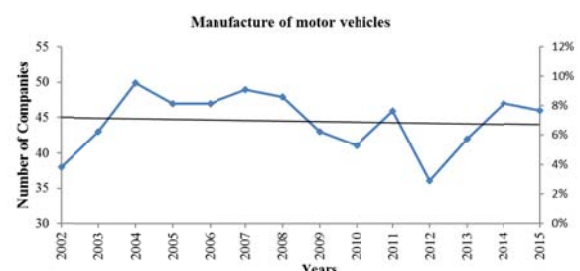
i. Change in the tobacco companies



j. Change in the wooden furniture



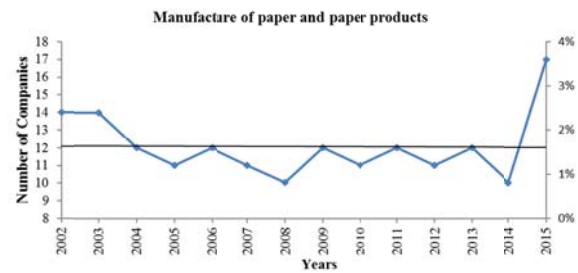
k. Change in the basic chemical companies



l. Change in the motor vehicle companies



m. Change in the leather product companies



n. Change in the paper products companies

Figure 3 a-n. The falling sectors based on the number of companies in the list

Manufacture of food products in sectors that are not classified elsewhere include the companies which directly sale agricultural products and the results reflect the importance of value adding on products. The value is low when agricultural products are sold without any process and value addition such as tomato, wheat, grain and fig. The country is an important supplier of figs and hazelnuts (Turkstat, 2017). Most of the companies in oil and coal derivatives sector deliver natural gas thanks to the locations where there is no link to natural gas pipelines. The infrastructure for natural gas pipelines had seen a rapid change in the analysis period and the 70% of the population can reach to natural gas pipeline. The revenue for the companies dropped due to growing distribution opportunities during the analysis period.

4. Analysis of the ownership structure of the companies

It is also important to classify the companies based on their ownership structures. In this article, the companies are categorized as state-owned companies; private Turkish companies; foreign companies; companies owned by state and private partnership and; companies owned by private and foreign partnership.

The analysis of lists reveals that in 2002 there were 25 state-owned companies with 5% share in the list. State-owned companies had a volatile decreasing trend in 2002-2015 and number of companies decreased to 9 in 2015, thus their share decreased by 1.8%. Figure 4 presents the change in state-owned companies. The country has privatized some state-owned companies especially after 2001. The electric power plants, sugar production facilities, mines and petroleum refinery companies are among the privatized ones. The share of the state is decreasing over the years and being replaced by private companies.

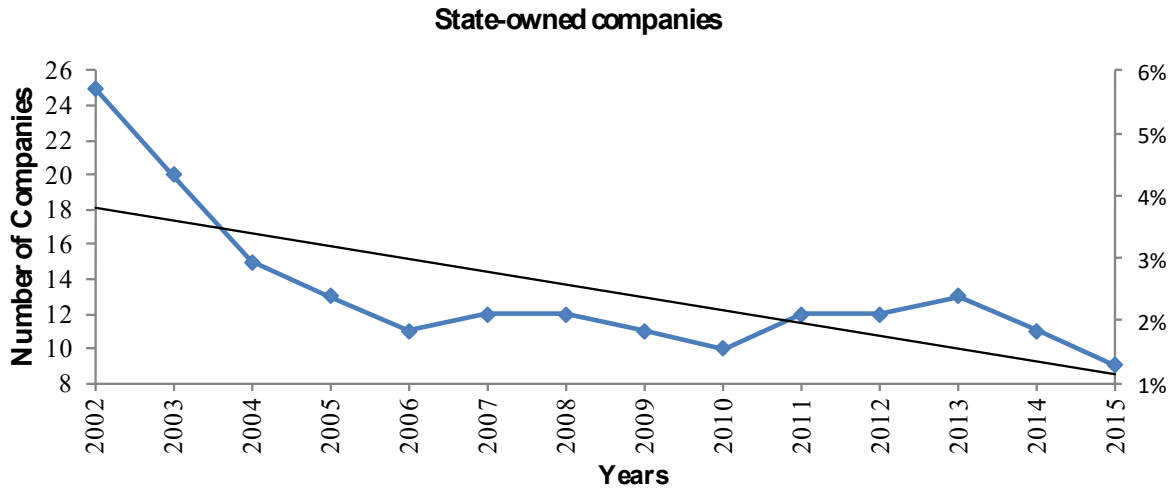


Figure 4. Change in the number of state-owned companies

The private-owned companies has the largest share in the total list. Figure 5 shows the change in the number of private companies over the years. The analysis shows that in 2002 there were 319 private companies with 63.8% share in the list. Private companies had an increasing trend in 2002-2015 and the number of companies increased to 359 in 2015, thus their share increased to 71.8%. The effect of privatized companies can be observed within this change. As a result of a more decentralized country, the share of the private industry is likely to increase.

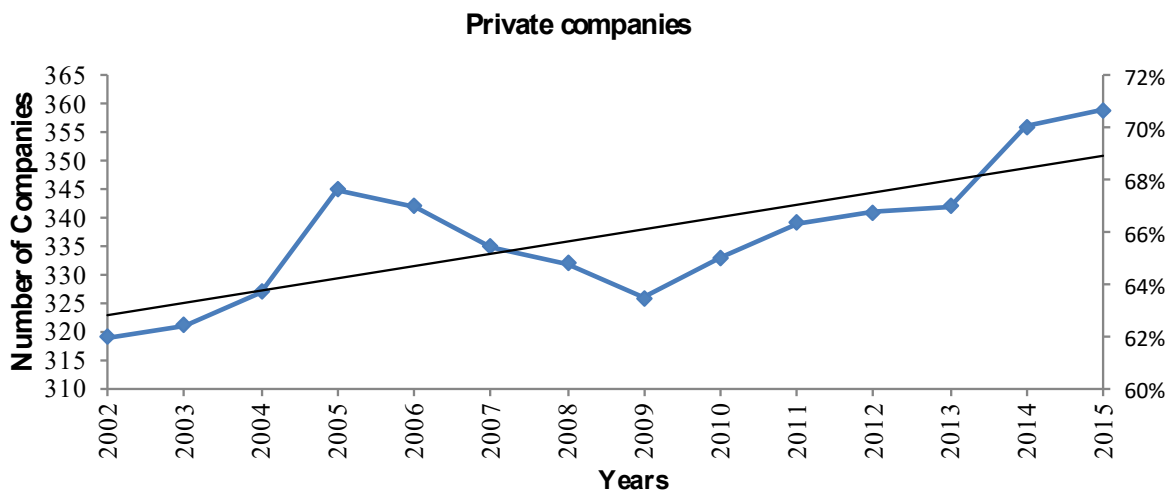


Figure 5. Change in the number of private companies

The foreign investment is also a significant factor for development. Figure 6 shows the change in the number of foreign companies over the years. There were 25 foreign companies in 2002 with a 5% share in the list. Foreign companies had an increasing trend in 2002-2015 and their number went up to 43 in 2015, and their share increased to 8.6%. This rise can be regarded as a positive outcome of the efforts for membership to European Union and the consequent reforming of the regulations in line with the European standards, since the major investors in Turkey are European companies.

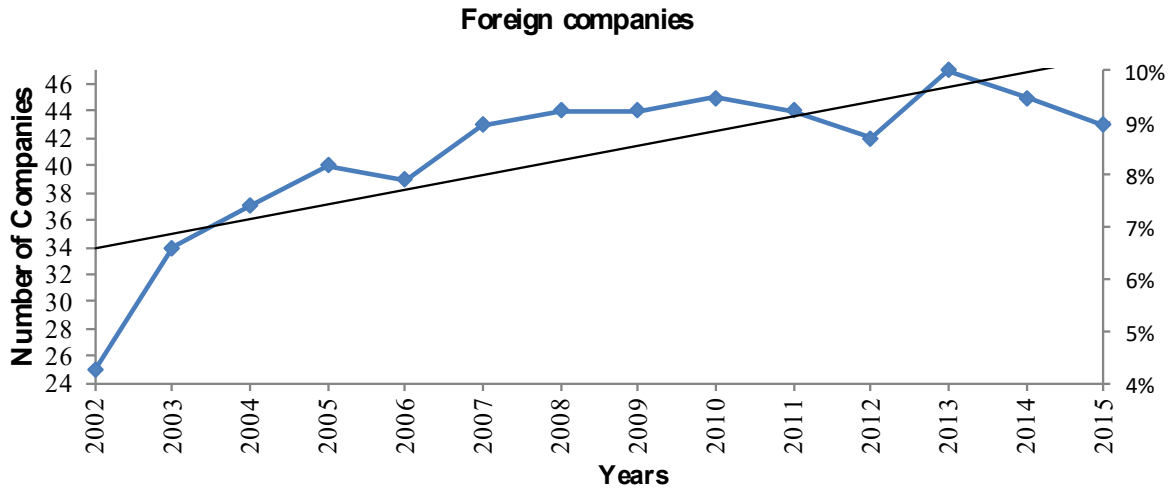


Figure 6. Change in the number of foreign companies

In an ideal business environment partnerships are desired. According to the analysis, in 2002 there were 14 companies owned by state and private partnership, with a 2.8% share in the list. Companies owned by state and private partnership had a decreasing trend in 2002-2015 and their number went down to 7 in 2015 with a share decreasing to 1.4%. Figure 7 shows the change in the number of companies owned by state and private partnership over the years, demonstrating that the share of the state is decreasing in state owned companies. The decrease in the partnerships can also be evaluated within the same framework.

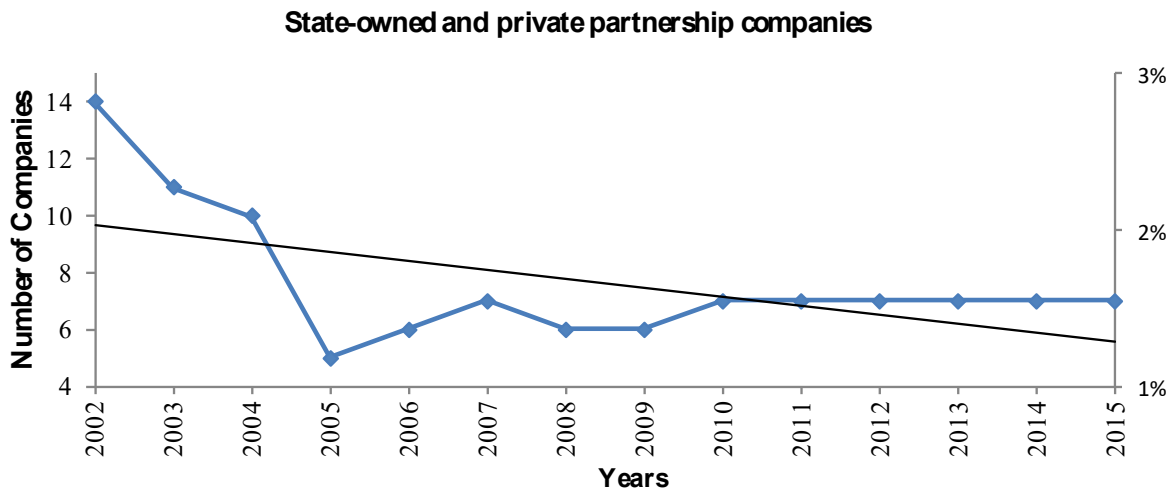


Figure 7. Change in the number of companies owned by state and private partnership

It is also possible to analyze the trends in private domestic and foreign partnerships. The partnerships were 98 in 2002 with a 19.6% share in the list. The partnerships had a decreasing trend in 2002-2015 and the number of these companies decreased to 69 in 2015, with a share that decreased to 13.8%. Figure 8 shows the change in the number of private domestic and foreign partnerships over the years. It seems that the private and foreign partnerships have been losing their popularity.

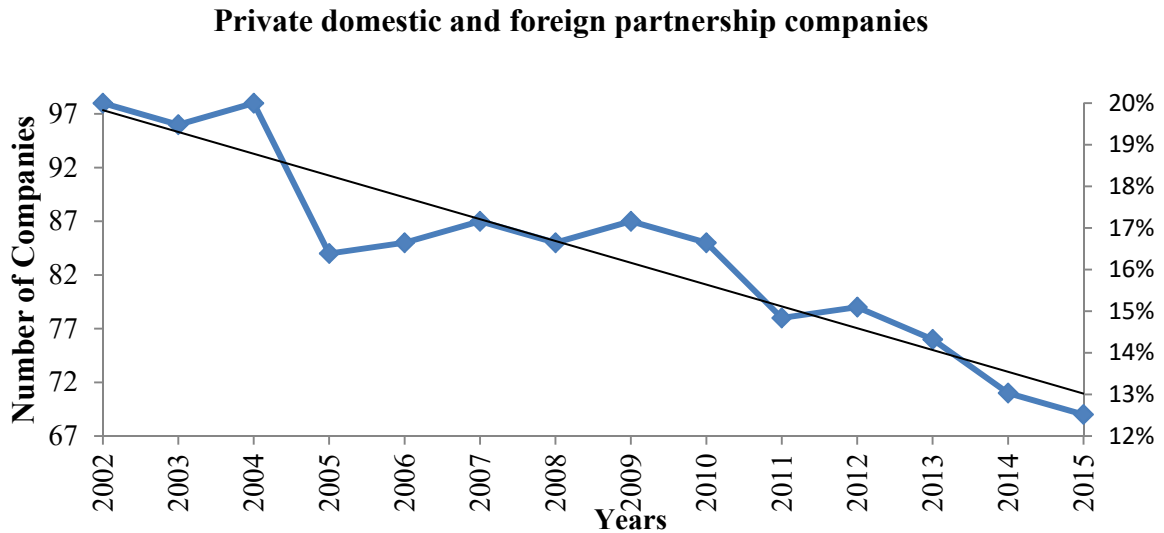


Figure 8. Change in the number of private domestic and foreign partnerships

5. Discussion

The analysis of the sectoral development shows that 17 sectors are rising, while 14 sectors are falling, based on their performance in 2002-2015. We have developed a trend analysis and Table 3 provides the results of the analysis in which the sectors are sorted based on their trend values. It seems that manufacture of food products has the steepest positive trend while manufacture of textile has the steepest negative trend. The statistical analysis reveals that not all the analysis are statistically significant. However, a large share of the sectors had required sample number to have an acceptable statistical result. It is not likely to comment for the sectors with a trend value close to 0 as there are no statistically significant results. However, their figures suggest that they have a long-term decreasing or increasing trend.

Table 3. Trend analysis for the sectors

| Code | Sector | Trend | P-value |
|------|---|-------|---------|
| 311 | Manufacture of food products | 3,23 | <0.05 |
| 381 | Manufacture of metal products | 1,18 | <0.05 |
| 372 | Manufacture of non-ferrous products | 1,17 | <0.05 |
| 383 | Manufacture of electrical machinery, apparatus and appliances | 1,02 | <0.05 |
| 210 | Mining and Quarrying | 0,58 | <0.05 |
| 369 | Manufacture of other nonmetallic mineral products | 0,33 | 0,22 |
| 353 | Manufacture of petroleum products | 0,31 | 0,08 |
| 400 | Power production and distribution | 0,22 | <0.05 |
| 355 | Manufacture of rubber goods | 0,19 | <0.05 |
| 385 | Manufacture of professional, scientific and medical instruments and equipment | 0,16 | <0.05 |
| 356 | Manufacture of plastic products NEC | 0,16 | 0,42 |
| 390 | Other manufacturing | 0,16 | <0.05 |
| 313 | Beverage industries (alcoholic and non-alcoholic) | 0,09 | 0,27 |
| 324 | Manufacture of footwear | 0,05 | 0,12 |
| 331 | Manufacture of wood and products of wood and cork | 0,03 | 0,70 |
| 371 | Manufacture of basic iron and steel | 0,03 | 0,94 |
| 361 | Manufacture of pottery, china, earthenware and porcelain | 0,02 | 0,77 |
| 341 | Manufacture of paper and paper products | -0,01 | 0,96 |
| 323 | Tanning and dressing of leather; manufacture of leather substitutes | -0,05 | <0.05 |
| 384 | Manufacture of motor vehicles | -0,08 | 0,79 |
| 351 | Manufacture of basic chemicals | -0,08 | 0,18 |
| 332 | Manufacture of wooden furniture | -0,09 | 0,10 |
| 314 | Manufacture of tobacco processing | -0,14 | <0.05 |
| 362 | Manufacture of glass and glass products | -0,17 | <0.05 |
| 342 | Printing and publishing | -0,25 | <0.05 |
| 382 | Manufacture of machinery, except electrical | -0,41 | 0,16 |
| 322 | Manufacture of wearing apparel, except footwear | -1,02 | <0.05 |
| 354 | Oil and coal derivatives | -1,04 | <0.05 |
| 352 | Manufacture of other chemical products | -1,10 | <0.05 |
| 312 | Manufacture of food products not elsewhere classified (NEC) | -1,35 | <0.05 |
| 321 | Manufacture of textiles | -3,13 | <0.05 |

We have classified the sectors based on their value adding activities as presented in Table 1. The total value adding for each year t , $TVAt$, is calculated and the value adding levels are given in Figure 9. The results delineate that the value adding level started around 2.08 and ended up around 2.4 in 2015. The value is almost same for the period of 2012-2015. It is obvious that the value adding activity converges to 2.4 after 2012 and has a stable performance for the past three years. The government and policymakers should develop new incentives and plans to increase the value adding activities for the future.

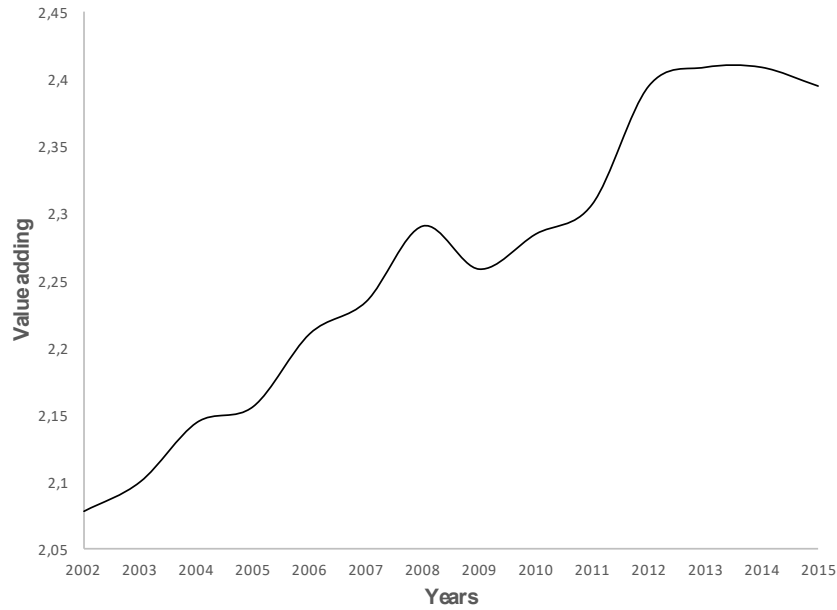


Figure 9. The total value adding levels for sectoral development

The companies are also analyzed for their capital distribution in 2002-2015. Results of the statistical analysis are given in Table 4. The figures depict that the private and foreign companies are in rise; while state owned, state owned-private partnerships and private-foreign partnerships are in decline. According to the ownership analysis, foreign and private companies are the fastest growing in terms of the capital type.

Table 4. Analysis for the ownership structure

| Capital | Trend | p-value |
|---------------------|-------|---------|
| State owned | -0,73 | <0.05 |
| Private | 2,16 | <0.05 |
| Foreign | 1,08 | <0.05 |
| State owned-private | -0,31 | <0.05 |
| Private-foreign | -2,03 | <0.05 |

6. Conclusion

Industrial change is important for economic growth and innovation. Sectoral development and value adding in each sector need to be analyzed for managing the industrial change more efficiently. In this paper, the 500 largest company list of Turkey for the 2002-2015 period is analyzed in order to observe the sectoral development and value adding. Each sector is classified as high value adding, moderate value adding and low value adding, upon the analysis of the companies in each sector along with the know-how and sophisticated methodologies they use for production. We have shown that the value adding had started at 2.08 and converged to 2.4 starting in 2012.

A trend analysis of sectors is performed to determine the rising and falling sectors based on the number of companies in each year. It is shown that 17 sectors are rising, while 14 sectors are falling, based on their performance in 2002-2015. We also note that not all of the results show statistically significant conclusions. However, many of the sectors statistically show a decreasing or increasing trend. A similar analysis is presented to evaluate the ownership structure of the companies. According to this analysis, private and foreign companies are rapidly rising and state owned, state owned-private partnerships and private-foreign partnerships are decreasing. It is obvious that the share of the state decreases and is being replaced by private or foreign companies.

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