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The Growth Model of the Automotive Industry in Türkiye: An Input-Output Analysis via the Hypothetical Extraction Method

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ABSTRACT

Purpose: The objective of this research was to ascertain if the portion of the automotive industry that engages in non-tradable goods or export goods is the principal driving force behind the industry's expansion. The purpose of this paper is to fill the gap by focusing on the automotive industry as its principal area of investigation.

Methodology: Productivity growth in the automotive industry was estimated utilizing an innovative hypothetical extraction method (HEM) for both the non-tradable goods sector and the export goods sector. Following that, the weighted multipliers approach is employed to allocate the productivity across the non-tradable goods and export goods of the automotive industry.

Findings: The findings indicate that the automotive industry maintains a strategy of development driven by exports. Production targeted for the domestic market is subject to significant limitations. Multinational automobile corporations tend to employ the strategy of exporting. The growth model of the automotive industry is significantly influenced by various institutional elements, including the Customs Union, taxes, and vertical integration.

Originality: Although the automotive industry is an essential industry for exports, its growth model has not been comprehensively scrutinized. This study primarily focuses on investigating the growth model of the Turkish automotive industry and the institutional factors that influenced its strategic decisions.

Keywords: Automotive Industry, Export-Led Growth, HEM, Institutional Economics, Productivity.
JEL Classification: C67, D57, L62.

Türkiye'de Otomotiv Endüstrisinin Büyüme Modeli: Varsayımsal Çıkarım Yöntemiyle Girdi-Çıktı Analizi

ÖZET

Amaç: Bu araştırmanın amacı, otomotiv endüstrisinin ticarete konu olmayan mallar veya ihracat malları üreten kısmının, endüstrinin genişlemesinin arkasındaki temel itici güç olup olmadığını tespit etmektir. Bu makalenin hedefi, temel inceleme alanı olarak otomotiv endüstrisine odaklanıp araştırma alanı içerisindeki bu boşluğu doldurmaktır.

Yöntem: Otomotiv endüstrisindeki verimlilik artışı, hem ticarete konu olmayan mallar sektörü hem de ihracat malları sektörü için yenilikçi bir varsayımsal çıkarım yöntemi kullanılarak tahmin edilmiştir. Bunu takiben, verimliliği otomotiv endüstrisinin ticarete konu olmayan malları ve ihracat malları arasında dağıtmak için ağırlıklı çarpanlar yaklaşımı kullanılmıştır.

Bulgular: Bu çalışmada elde edilen bulgular, otomotiv endüstrisinin ihracata dayalı bir gelişme stratejisi sürdürdüğünü göstermektedir. İç pazara yönelik üretim önemli kısıtlamalara tabidir. Çok uluslu otomobil şirketleri ihracat stratejisini kullanma eğilimindedir. Otomotiv endüstrisinin büyüme modeli, Gümrük Birliği, vergiler ve dikey entegrasyon dahil olmak üzere çeşitli kurumsal unsurlardan önemli ölçüde etkilenmektedir.

Özgünlük: Otomotiv endüstrisi ihracat için önemli bir endüstri olmasına rağmen, büyüme modeli kapsamlı bir şekilde incelenmemiştir. Bu çalışma öncelikle Türk otomotiv endüstrisinin büyüme modelini ve stratejik kararlarını etkileyen kurumsal faktörleri araştırmaya odaklanmaktadır.

Anahtar Kelimeler: Otomotive Endüstrisi, İhracata Dayalı Büyüme Modeli, Varsayımsal Çıkarım Yöntemi, Kurumsal Ekonomi, Verimlilik.
JEL Sınıflandırması: C67, D57, L62.

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1. INTRODUCTION

Türkiye's automotive sector is well-developed, making it an attractive site for global automotive corporations. Türkiye is a location that is advantageous for manufacturers since it allows them to access Europe, the Middle East, and North Africa. Türkiye was the 21st greatest manufacturer of vehicles in 2002, according to the International Organization of Motor Vehicle Manufacturers (OICA), with a total of 346.565 units of manufacturing coming out of the country. Türkiye rose to the position of 17th greatest producer in 2014, with 1.700.445 units of production, and maintained its position as the 13th largest producer worldwide in 2023, with 1.468.393 units of output. The level of production in Türkiye's automobile sector has risen throughout the years, which has resulted in a significant growth in the country's quantity of exported goods. The automotive industry, which includes both automobile manufacturers and suppliers of parts, is one of the most important sectors in the Turkish industrial sector. One of the most vigorous drivers of economic activity in the nation is the automotive industry. To strengthen its position as a worldwide economic force, the Turkish economy needs to broaden its influence. Therefore, because of its ability to export goods, this sector provides a substantial competitiveness to the nation, which allows it to increase its output. On the other hand, a highly active automotive industry that is not formulated according to its growth model has the potential to result in a trade imbalance in the event that it becomes difficult to access goods in the domestic market. Consequently, this indicates that the majority of firms are concentrating their efforts on exporting, while domestic requirements are met by the importation of intermediate and final goods (Ünal, 2021). In addition, the automotive sector was responsible for bringing a significant amount of foreign direct investment (FDI) into Türkiye, the majority of which came from automobile producers that were controlled by foreign companies (Erbektas and Werner, 2016). According to the Automotive Manufacturers Association (OSD) 2019 report, the total amount of industrial investments that were achieved was 1.13 billion US dollars in 2016, 776 million US dollars in 2017, and 871 million US dollars in 2018. There has been no systematic study of the growth model of the Turkish automotive sector or the types of institutional factors that played a part in its development, despite the fact that the automotive industry in Türkiye is both substantial in terms of its size and its influence. When it comes to defining the growth model of the automobile sector, the Customs Union of the European Union (EU), taxation policy, and vertical integration are the institutional factors that have been excluded from consideration for the most part. Research opportunities are available within the Turkish automobile sector. As part of this investigation, the following inquiries will be investigated: What kind of growth model does the automotive industry in Türkiye follow? In what ways have institutional considerations contributed to the formation of the growth model of the automotive industry in Türkiye?

A variety of studies have been conducted with the purpose of examining the growth model of the Turkish economy in general (Onaran and Stockhammer, 2005; Ozturk and Acaravci, 2010). Ünal (2016) conducted an input-output analysis and concentrated on the growth model of the nation. He stated that the Turkish economy is not working under an export-led growth model due to the fact that it has an overvalued currency rate and a high cost of production. On the other hand, it was implied that the nation had the ability to expand based on the success of its exports. It was argued that in order for an economy to operate as an export-led growth economy, there are two dynamics that are required. The first issue is an exchange rate that is undervalued, and the second issue is that wage growth has to be matched to the rise in productivity of non-tradable goods. Ünal (2018) employed the input-output approach to provide an explanation for the transition of the Turkish economy. It was pointed out that the nation cannot be considered an export-led growth economy. Nevertheless, Türkiye has just been an export growth country since 1980. Köse et al. (2024) implemented a time-varying parameter vector autoregressive with stochastic volatility model to study the effects that the price of gold, the price of oil, and the exchange rate have on imports. The currency rate has been considered to have the potential to have a large effect on imports, in addition to certain commodities. Furthermore, Ünal (2017) highlights the fact that the industries are particularly concerned about the trade deficit that exists between Türkiye and the primary European nations. Türkiye is less competitive than the nations that make up the EU, which is the reason for this. The nations that have a competitive structure are the primary contributors to the trade deficits that Türkiye experiences. The automobile industry is one of the most significant sectors that is adversely affected by the trade imbalance. Ünal (2020) disclosed that not only does the automotive sector have the potential to incur a trade deficit, but it has also experienced an increase in its reliance on imported inputs for the production of motor vehicles. These earlier studies have concentrated on industries in general, and the particular issue that is associated with this primary industry has not yet been thoroughly investigated via research. This is a substantial gap in the existing body of study literature. The purpose of the paper is to address this gap by concentrating on the automotive industry. Additionally, this study establishes a novel approach via the use of input-output analysis to provide guidance on how to arrive at a growth model for an industry. The vast majority of input-output analyses can only be discovered on broad analyses and studies at the national level. Through the utilization of input-output research, this study surpasses that restriction and achieves a new level of comprehension about a certain sector. In spite of the fact that the automotive industry is one of the most important exporting industries, the

growth model of this industry has not been thoroughly examined.

Over the last several decades, Türkiye has been successful in attracting direct investments as well as global automobile corporations. In spite of the fact that there is the possibility of an increase in domestic demand in Türkiye, these global automotive corporations find the country as an important geographical position from which they can export the vehicles that are manufactured there to the Middle East, North Africa, and Europe. The growth model of the Turkish automotive industry and the institutional elements that had a role in determining its strategy are the primary topics of investigation in this research. An input-output investigation carried out by means of the HEM was applied to discover the growth model of the automotive industry. The input-output data utilized for this research were obtained from the World Input-Output Database (WIOD) as the previous year's price (PYP) input-output tables that were compiled between the years 2001 and 2014. The HEM was employed to estimate the increase in productivity of the automotive industry in terms of both non-tradable products and export goods. This allowed for the identification of the difference that existed between the growth rates of productivity in the two distinct sectors. As a consequence, the purpose of this study was to determine whether the part of the automotive industry that engages in non-tradable goods or export goods is the primary impetus behind its growth.

Within the scope of this research, the fields are divided into two categories: export goods and non-tradable goods. It can be observed that it is difficult to describe the industry and sector since they are very entwined, reflecting similar notions that make it difficult to differentiate them from one another. This is because the relationship between the two is complex. Every manufacturing unit is considered to be an industry in the tables that include the inputs and outputs. Through their contributions to production, industries play a part in the dynamics of supply and demand. Additionally, there are two sectors: commodities that are non-tradable (for domestic use) and goods that are exported. What is referred to as the non-tradable goods sector is the sector in which the domestic market consumes the products that are produced by industries. The segment of the economy that contributes to international trade is the export goods sector. Through this simple differentiation in definitions, it is feasible to investigate the evolution of industrial productivity in the areas of non-tradable goods and export goods. In order to determine whether an industry is focused on exports or domestic consumption, the contribution of the industry to non-tradable or export products may play a significant role in shaping the growth model of the industry.

A discussion of the research's basis is presented in Section 2, along with the introduction of growth models. An explanation of the methodology behind the calculation of the increase in productivity in the automotive industry can be found in Section 3. A comprehensive analysis of the growth model of the automotive sector is presented in Section 4, which takes into account both the rates of productivity growth and wage increase. Section 5 delves into a variety of institutional factors that have the potential to influence the growth model. The conclusion of the study is presented in Section 6.

2. RESEARCH and GROWTH MODELS

It was Rasmussen (1956), Chenery and Watanabe (1958), and Hirschman (1958) that were responsible for the development of the HEM. After separating industries from input-output tables, which are considered to be standard methodologies, these studies essentially assisted in the analysis of backward and forward linkage effects. The backward and forward linkages may be established in order to evaluate the impact of all of the transactions that take place throughout the manufacturing process. When attempting to assess the consequences of linkage, there are two different approaches that may be employed. The first one is obtained from the implementation of the direct intermediate usage in the output. The procedure here is known as the Cherry-Watanabe method. Under this approach, technology coefficients are utilized in a direct manner in order to establish linkages. For the purpose of determining the direct connectivity between industries, the Cherry-Watanabe approach is implemented. Utilizing the Leontief inverse matrix, the second one is employed in the process of estimating linkages. A combination of direct and indirect linkages is the foundation of the Rasmussen technique. The magnitude of the transactions generated by output may be determined by employing these two ways. In their studies, Dietzenbacher and van der Linden (1997), Dietzenbacher and Lahr (2013), and Arto et al. (2015) all make use of the HEM. After removing industries from the input-output table, these studies reassessed the impact of the removal. These studies, on the other hand, fail to take into account the ways in which an industry might have an effect on non-tradable goods or export goods when it is removed from the tables. Through the application of input-output analysis, research works such as Ünal (2016, 2017, 2018) and Uni (2007, 2012, 2018) investigated the growth models of various nations. The works in question demonstrate how to compute the rate of increase in productivity for the export goods sector and the non-tradable goods sector, respectively. Nevertheless, there are several approaches to growth models that are macroeconomic in nature. It is possible to make use of a HEM approach in the event that an examination of the growth model of a certain industry is required. For the purpose of this investigation, the HEM is employed to estimate the productivity of the automotive industry in the non-tradable goods and export goods sectors. The method that is presented in this work can

be applied to investigate the process of deriving growth models for specific sectors. The automotive industry in Türkiye has not been subjected to a comprehensive analysis in order to structure its growth model and identify institutional factors in the industry. This is despite the fact that the automotive industry is a driving force in the Turkish economy. By concentrating on the automotive industry in terms of its input-output analysis and institutional factors, this work serves to address a gap that has been identified in the existing body of research.

In accordance with its productivity and cost structure, an industry may have a number of different growth models. In the event that an industry of the economy implements a production strategy that is low-cost, it would experience a growth in the productivity of export goods that is greater than the growth of non-tradable goods. Moreover, the productivity growth of export goods would be greater than that of wage growth. This may be because of the strong demand in the market as well as the growing technical innovations. On the other hand, the growth of wages would be considerably lesser than the growth of the productivity of goods that are exported. It is possible to define this structure in Equation 1 as follows:

$$\hat{q}^{A}_{e_{ind}} > \hat{q}^{A}_{n_{ind}} = \hat{w}_{ind}{}^{A} \quad \text{and} \quad \hat{q}^{B}_{e_{ind}} = \hat{q}^{B}_{n_{ind}} = \hat{w}_{ind}{}^{B} \tag{1}$$

The inverse of the $\overline{\Omega}_f$ and $\overline{\Omega}_e$ can give the productivity of non-tradable goods and export goods, respectively. The growth of these rates can be notated by $\hat{q}^{A}_{e_{ind}}$ and $\hat{q}^{A}_{n_{ind}}$ in industry of country A, respectively. $\hat{w}_{ind}{}^{A}$ indicates wage growth in the selected industry. It is the case that the industrial structure of nation B is perfect, with growth rates that are equal to one another. Under conditions of a competitive exchange rate, a high rate of productivity growth in export goods would result in a decrease in export prices and bring about an increase in the competitiveness of international trade. If an industry has this growth model, then it is able to follow the growth model that is driven by exports. The competitiveness of the industry would set it apart in the context of international trade. In addition, this structure would also assist in reducing the trade imbalance. There is a possibility that the export-led growth strategy of the industry may result in a decrease in the price of export goods in international trade. An export-driven growth model is characterized as one in which the growth of the industry's productivity in export goods is greater than the growth of the industry's productivity in non-tradable goods, but wage growth is lower than the growth of the industry's productivity in export goods. In other words, the industry is built on the principle of low production costs in order to maintain a competitive position in international trade.

$$\hat{w}_{ind}{}^{A} = \hat{q}^{A}_{e_{ind}} > \hat{q}^{A}_{n_{ind}} \quad \text{and} \quad \hat{q}^{B}_{e_{ind}} = \hat{q}^{B}_{n_{ind}} = \hat{w}_{ind}{}^{B} \tag{2}$$

The Balassa-Samuelson growth model might perhaps be applied to the structure of an industry. There is the potential for this approach to have a high wage growth that is indexed with the productivity growth in the export goods of the chosen industry. It is anticipated that these growth rates are expected to be greater than the growth in productivity of non-tradable goods (Balassa, 1964; Samuelson, 1964). Under these circumstances, the domestic market would have a high level of production costs, but its export competitiveness would be in a more balanced structure. This structure can be defined in Equation 2.

$$\hat{w}_{ind}{}^{A} > \hat{q}^{A}_{e_{ind}} > \hat{q}^{A}_{n_{ind}} \quad \text{and} \quad \hat{q}^{B}_{e_{ind}} = \hat{q}^{B}_{n_{ind}} = \hat{w}_{ind}{}^{B} \tag{3}$$

When attempting to establish the growth model of an industry, it is necessary to take into consideration the industry's productivity as well as its wage structure (Hicks, 1963). Within the scope of this study, the growth model of an industry is defined by a number of assumptions. As seen in Equation 3, it is possible to assert that an industry employs an export growth model if the rate of productivity growth in export goods is greater than the rate of productivity growth in non-tradable goods, and if wage growth in the industry continues to be higher than the rate of productivity growth in export goods. However, the industry is not driven by low-cost production costs; rather, it is growing as a result of exports. It is inevitable that high production costs will result from wage increase that is greater than the growth of productivity. In the event that the industry places a greater emphasis on domestic consumption, it would be subject to a high cost of production due to a high wage growth rate that is greater than the productivity growth of goods that are exported. The industry would be operating under an open economic system in this scenario, which would result in the increase of its productivity for export goods being larger than the rise of its productivity for non-tradable goods. On the other hand, if there is a significant degree of dependence on imports, then the industry would be a contributor to the trade deficit under this structure. For the purpose of supplying less expensive goods to the domestic market, this approach requires the use of currency that is overvalued.

$$\hat{q}^{A}_{n_{ind}} > \hat{w}_{ind}{}^{A} = \hat{q}^{A}_{e_{ind}} \quad \text{and} \quad \hat{q}^{B}_{e_{ind}} = \hat{q}^{B}_{n_{ind}} = \hat{w}_{ind}{}^{B} \tag{4}$$

In the event where the industry experiences a rise in productivity of non-tradable goods that is greater than that of export goods, then it is possible to assert that the domestic markets are the primary drivers of the

sector's development, while the significance of exports is ranked in the second place. This growth model can be characterized as domestic consumption-led growth, and Equation 4 can be employed to describe this phenomenon. With this particular industrial structure, wage growth has the potential to be a key dynamic.

3. METHOD of CALCULATING PRODUCTIVITY GROWTH in the AUTOMOTIVE INDUSTRY

Globalization and technological advancements have altered the notions of produced items in an economy. In general, non-tradable goods were defined as those that were dependent on the service sectors, while tradable goods were defined as those that were not dependent on the service sectors. Nevertheless, the recent economic progress suggests that these differences might be deeply interconnected. Input-output tables classify final goods into two distinct categories. These are goods for both domestic demand and international demand. Ünal et al. (2023) investigated the impact of uniform CO_2 emissions on emissions efficiency and analyzed which trading partner of China had the capacity to increase emissions in the nation. It was noted that the sectors were separated using a commodity-based methodology. Non-tradable goods sector refers to items that are consumed inside the domestic market and are not involved in international trade. The items that are involved in international trade were classified as the export goods sector. Therefore, in this paper, non-tradable goods are defined as items that are consumed in domestic markets. Items that are demanded from other countries are classified as export goods. The non-tradable goods industries were identified as those whose products are consumed domestically, whereas the export goods industries were defined as those whose products are exported. In previous works, a major challenge in determining productivity was how to distribute homogeneous inputs across different sectors. Goldstein and Officer (1979) provided a scenario of how inputs might be distributed between non-tradable goods and export goods by treating inputs as uniform. Pasinetti (1973) employed a weighted multipliers method to estimate efficiency by using a vertical integration technique to determine productivity. Dietzenbacher et al. (2002) utilized uniform labor to examine the productivity of industrial labor in Western European countries. Uni (2012) categorized non-tradable goods and export goods, and utilized vertical integration of uniform labor to estimate productivity growth in sectors for East Asian and Western European nations. By taking into account the competitiveness in international trade, Uni (2018) expanded the methodology and concepts. In addition, Ünal (2017, 2018) made a contribution to the body of literature by including uniform labor into the works via the use of the weighted multiplier technique. This was accomplished by taking into consideration the classification of sectors to estimate the development of productivity in each sector. However, these investigations were limited in scope since they primarily examined productivity within certain sectors and did not prioritize the industrial productivity under each sector. The HEM can be utilized in this scenario to determine the productivity of the chosen industry in both the non-tradable goods and export goods sectors. This method was employed to estimate the productivity coefficients in both sectors of non-tradable goods and export goods (Ünal, 2021, 2023). The coefficients before and after the HEM were utilized to estimate the impact of the chosen industry on the productivity coefficient. The industrial productivity growth in each sector was determined by using the direct and indirect productivity coefficient of the chosen industry in non-tradable goods and export goods sectors.

The formulation of total productivity coefficients is accomplished by the use of the methodology presented by Ünal (2016, 2018). After that, the productivity coefficients for the automotive sector are obtained by applying a hypothetical extraction procedure, which involves eliminating the automotive industry from the input-output tables. Due to the fact that the WIOD PYP input-output tables have been deflated, it is reasonable to suppose that the basket price cannot be affected by the removal of the automotive industry from the data. In this paper, the term "automotive industry" refers to the production of motor cars, trailers, and semi-trailers, which are all included in the input-output tables. When it comes to this investigation, one of the most essential questions to consider is how to divide the industrial productivity between export goods and non-tradable goods. It is clearly evident that the manufacturing process makes utilization of uniform labor, despite the fact that the products that are consumed on the home market and those that are exported are different. To put it another way, there is no information about the number of labors that is devoted to the manufacture of products that are non-tradable or products that are exported. Production for home consumption and production for export both make utilization of the same labor force. The distribution of productivity across the various sectors can thus be accomplished via the application of a weighted multipliers technique (Uni, 2012, 2018; Ünal, 2016, 2018). The process of allocating labor between non-tradable goods and export goods is straightforward. However, when it comes to a specific sector, the labor allocation process may be much more complicated. The HEM is applied to determine the level of productivity that an industry has in terms of both export goods and non-tradable goods. Nevertheless, to estimate the initial productivity, it is necessary to employ HEM both before and after the extraction process. Through the process of assessing the differences between them, it is possible to derive industrial productivity and to distribute productivity between the sectors of export goods and non-tradable goods. Following is a step-by-step explanation of the process.

Within the context of Equation 5, neither A nor y include imports (m). Indicators of domestic components are denoted by the subscript d.

$$A_d x + y_d = x \quad (5)$$

In Equation 6 and Equation 7, the technological coefficients' matrix is shown in the letter A_d. The final demand vector is denoted by y_d, while the output vector is denoted by x by this equation.

$$y_d = x - A_d x \quad (6)$$

$$x = (I - A_d)^{-1} y_d \quad (7)$$

The Leontief inverse matrix is represented by the letter $(I - A_d)^{-1}$ (Leontief, 1936, 1949).

$$y_d = (I - A_d)x \quad (8)$$

$$\varepsilon x = \Pi \quad (9)$$

In Equations 8 and Equation 9, the letter x represents a column vector that displays the overall quantity of output for each commodity. The expression Π is a scalar that represents the total number of individuals that are involved in the production process. Across all industries, the row vector denoted by ε represents the amount of labor that is necessary to create output.[4] It is derived via $\varepsilon_{ind} = {\Pi_{ind}}/{x_{ind}}$. Subscript ind indicates each industry in the system.

$$\varepsilon(I - A_d)^{-1} = \lambda \quad (10)$$

In Equation 10, the row vector denoted by λ displays the amount of labor demand that must be provided in each industry, both directly and indirectly, in order to create one unit of each product. It is also known as the labor inducement coefficient or the vertically integrated labor coefficient for commodities (Pasinetti, 1973).

$$\lambda y_d = \lambda(F + E) = \Pi \quad (11)$$

F and E represent, respectively, goods that are non-tradable and goods that are exported in Equation 11. The column vectors f and e represent the weights of each commodity that is included in this total. This allows for the derivation of weighted multipliers.

$$\sum_{i=1} f_i = 1 \quad \text{and} \quad \sum_{i=1} e_i = 1 \quad (12)$$

It is applicable that the total of f is equal to one, and the same is true for the sum of e. Derivation of the coefficients of necessary labor per unit of production in non-tradable goods and export goods is accomplished via the utilization of Equation 12.

$$\lambda_f = \sum_{i=1} \lambda_i f_i \quad \text{and} \quad \lambda_e = \sum_{i=1} \lambda_i e_i \quad (13)$$

In Equation 13, λ_f and λ_e correspond to the amount of direct and indirect labor that is needed for each unit of output in the production of export goods and non-tradable goods, respectively. When the coefficients are reduced, there is an improvement in productivity. To put it another way, the amount of labor that is needed for each unit of output lowers. The production ratio per unit of labor can be calculated by taking the inverse of these coefficients. Utilizing this strategy results in sectoral productivity. The HEM is necessary in order to estimate the level of productivity in the automotive industry.

The automotive industry should be extracted from the table at this stage of estimation. After extracting it, the $n\ x\ n$ matrix table would be $(n-1)\ x\ (n-1)$ matrix table. The column vector y_d changes from $(n\ x\ 1)$ to $(n-1\ x\ 1)$ form and would be shown as $\overline{y}_d$ in Equation 14. Also, x changes from an $(n\ x\ 1)$ to an $(n-1\ x\ 1)$ by extracting the automotive industry and its intermediate goods from its total. That is expressed as $\overline{x}$. Then, similar steps are followed as explained in Equations 6 and 7.

$$\overline{y}_d = \left(I - \overline{A}_d\right)\overline{x} \quad (14)$$

$$\overline{\varepsilon}\,\overline{x} = \overline{\Pi} \quad (15)$$

The automotive industry, which has adopted a new type of labor, is represented by the letter $\overline{\Pi}$ in Equation 15. In the absence of the automobile industry, the row vector denoted by $\overline{\varepsilon}$ represents the amount of labor that would be necessary to create output. $\overline{\varepsilon}_{ind} = {\overline{\Pi}_{ind}}/{\overline{x}_{ind}}$ is the formula that is used to estimate the required the amount of labor for each unit of production. This formula is obtained by dividing each amount

[4] Labor statistics can be obtained from the socio-economic accounts that are provided by WIOD.

of labor by each industrial output.

$$\overline{\varepsilon}\,(I-\overline{A}_d)^{-1}=\overline{\lambda} \tag{16}$$

The labor that would be required in the absence of the automotive industry is represented by the row vector $\overline{\lambda}$ in Equation 16. It illustrates the amount of labor that is necessary in each industry, both directly and indirectly, for one unit of output.

$$\overline{\lambda}\,\overline{y}_d=\overline{\lambda}\left(\overline{F}+\overline{E}\right)=\overline{\Pi} \tag{17}$$

In Equation 17, non-tradable goods are represented by $\overline{F}$, while export goods are represented by $\overline{E}$, with the automotive industry excluded.

$$\sum_{i=1}\overline{f}_i = 1 \quad \text{and} \quad \sum_{i=1}\overline{e}_i=1 \tag{18}$$

In the absence of the automotive industry, the weights of non-tradable goods and export goods are represented by the column vectors $\overline{f}$ and $\overline{e}$, respectively. In Equation 18, both the sum of $\overline{f}$ and the sum of $\overline{e}$ are equal to one.

$$\overline{\lambda}_f=\sum_{i=1}\overline{\lambda}_i\overline{f}_i \quad \text{and} \quad \overline{\lambda}_e=\sum_{i=1}\overline{\lambda}_i\overline{e}_i \tag{19}$$

In Equation 19, the terms $\overline{\lambda}_f$ and $\overline{\lambda}_e$ refer to the amount of direct or indirect labor that is needed per unit of production for non-tradable items and export goods, respectively, in the absence of the automotive industry. It is necessary to reduce the productivity of the automobile industry from the overall productivity in this way in order to make a precise estimation of the productivity of the automotive industry:

$$\overline{\Phi}_f=\overline{\lambda}_f-\lambda_f+2\,(\lambda_{ind}f_{ind}) \quad \text{and} \quad \overline{\Phi}_e=\overline{\lambda}_e-\lambda_e+2\,(\lambda_{ind}e_{ind}) \tag{20}$$

Coefficients of the automotive industry can be shown by λ_f and λ_e. It is necessary to remove λ_f and λ_e from $\overline{\lambda}_f$ and $\overline{\lambda}_e$ to get at the coefficients with which the automotive industry is associated. On the other hand, the coefficients of the automotive industry would be converted into a negative form following the subtraction process. In order to transform them into positive coefficients, the equation needs be modified by adding two times the coefficients of the automotive industry, as indicated in Equation 20. The coefficients of the automotive industry can be calculated by multiplying λ_{ind} by f_{ind} and e_{ind}. Utilizing this method, it is possible to determine the coefficients that represent the growth in productivity of the automotive industry. Following is the last phase in the process of determining productivity in the industry. The coefficients should be divided by the sectoral weights:

$$\overline{\Omega}_f=\frac{\overline{\Phi}_f}{f_{ind}} \quad \text{and} \quad \overline{\Omega}_e=\frac{\overline{\Phi}_e}{e_{ind}} \tag{21}$$

A division is made between $\overline{\Phi}_f$ and $\overline{\Phi}_e$ based on the weights of the automotive industry. $\overline{\Omega}_f$ and $\overline{\Omega}_e$, respectively, represent the levels of productivity in the non-tradable goods and export goods sectors of the economy in Equation 21. If the coefficients in the automotive industry fall, this indicates that the industry's overall productivity is increasing. The production obtained per unit of labor can be calculated by taking the inverse of the coefficients. During the process of assessing industrial productivity, it is possible for cycles to cause significant changes. Consequently, while determining the growth rate, it is important to take into consideration both the peak and the trough periods. This issue is mitigated by the use of logarithmic increments in the estimation of the growth rate.

$$\Delta\overline{\Omega}_f=\frac{\ln(\overline{\Omega}_f^{\theta}/\overline{\Omega}_f^{t})}{t-\theta} \text{ and } \quad \Delta\overline{\Omega}_e=\frac{\ln(\overline{\Omega}_e^{\theta}/\overline{\Omega}_e^{t})}{t-\theta} \tag{22}$$

Years t and θ are selected for the purpose of estimating the increase in productivity. The Equation 22 provides an approximation of the long-term increase in productivity in the automotive industry.

4. GROWTH MODEL in the AUTOMOTIVE INDUSTRY

As was described in the assumptions presented in Section 2, the Turkish automotive sector is characterized by a growth model that is driven by exports. There were periods when it had to deal with high production costs throughout the 2000s and 2010s, but there were additional occasions when the power that was driven by exports was increased. It is an industry that is primarily concerned with exporting its products, and the domestic market functions as a secondary concern. Figure 1 illustrates the level of productivity that the automotive industry achieves in the non-tradable goods and export goods sectors. That is to say, it demonstrates the amount of output produced for each unit of labor. With regard to the export goods sector, the automobile industry had a significant rise in productivity over the decade of the 2000s, as was observed.

Between the years 2001 and 2014, the amount of goods that were produced per unit of labor in export goods went from 7.8 units to 17.5 units. However, over the course of years, the automotive industry's productivity in the production of non-tradable goods decreased. In 2001, the labor productivity per unit was around 5.8, but by 2014, it had dropped to 0.7 units. What this indicates is that the automotive industry has increased its focus on exporting and has adopted a growth strategy that is based on export-driven growth model.

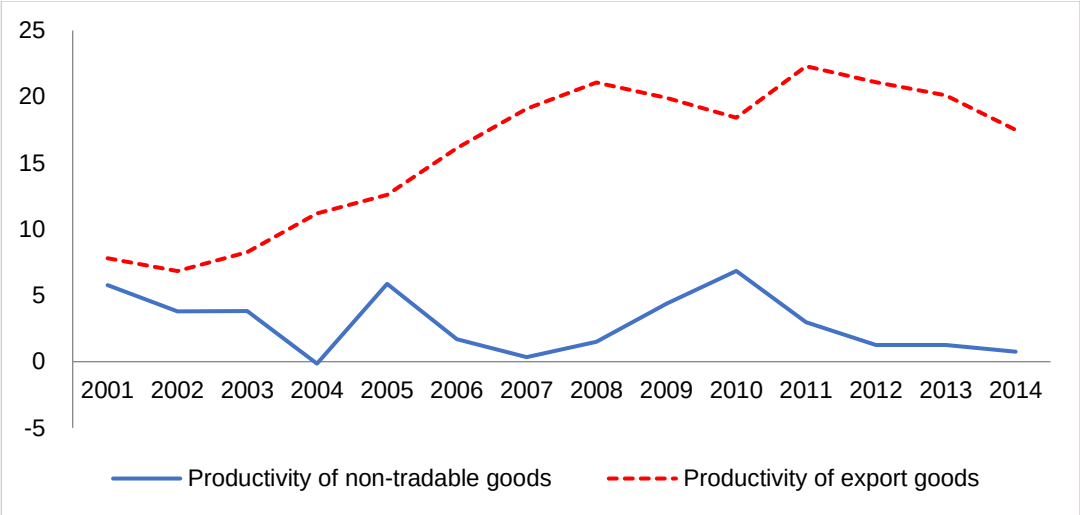

Figure 1. Productivity of non-tradable goods and export goods sectors (2001-2014) (Source: Author's estimation. The source of the data is the WIOD PYP input-output tables)

The automotive industry's productivity in export goods increased by around 7.8% between the years 2002 and 2014, whereas the productivity of the industry in non-tradable goods decreased by 13.5% over the same time period.[5] Despite the fact that the production of vehicles and automotive components for the domestic market in Türkiye is quite limited, the Turkish automotive industry is a favorable industry for the export sectors. The export-driven growth model is indicated to be the foundation of the automotive industry in Figure 1. The non-tradable goods sector continues to be regarded a secondary entity.

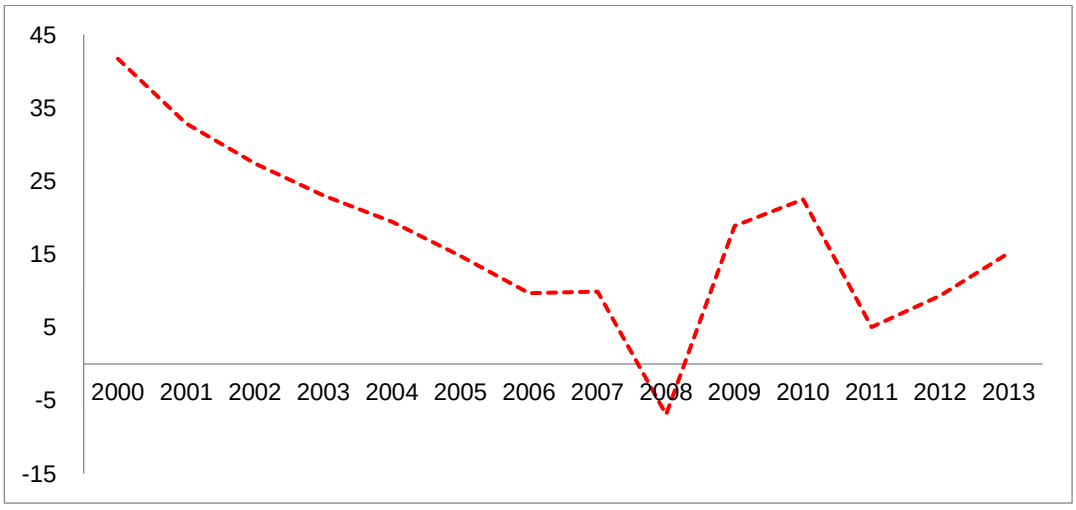

Figure 2. Wage growth in automotive industry (annual, unit: %) (Source: The WIOD Socio Economic Accounts are the source of the wage growth)

The typical patterns of wage increase in the automotive industry are presented in Figure 2. One of the most essential aspects of the growth model is wage growth. According to Ünal (2016), if wage growth is established in a market that is competitive, the growth model has the potential to be molded as export-led growth under a competitive exchange rate. The growth of productivity and the pace of that growth in comparison to wage growth is the most critical factor that has to be taken into consideration in this context.

[5] Since 2001 encompasses the years of the economic crisis that occurred between 2000 and 2001, it was not taken into consideration when calculating the growth of productivity.

If the rate of wage growth is greater than the rate of productivity growth, this indicates that the levels of production costs are high. The most crucial approach for a sector that wants to become more competitive in international trade is to maintain wage growth at a pace that is lower than the productivity growth of exports. This can allow the industry to continue to be in a position where its production costs are much lower. This is an export-led growth strategy for an industry. That is, exports are its main source of driving force. Throughout the 2000s, the wage growth in the Turkish economy was at a very high level. It was 41.7% in the year 2000. Over the course of years, wage growth began to slow down in order to combat inflation and achieve the targeted inflation objective in the economy. The state of the global financial crisis resulted in a decline in wage growth to –6.9%. Nevertheless, between the years 2002 and 2014, the average growth in wages was 14%, which was much more than the growth in productivity of goods exported from the country. It might be deduced from this that the automotive industry experienced a significant increase in production costs. Because of the way that costs were structured, the automotive industry followed a strategy that was characterized by export growth. In general, the industry was expanding through exports but it was not being powered by low wages. In the industry, wage growth continues to be at an extremely high level. As a consequence, the industry is confronted with high production costs. When it comes to wage-setting policies, significant wage growth is the outcome. The rate of inflation in the nation is employed as the basis for wage setting policies. In other words, inflation is the source of wage growth, rather than productivity growth. Therefore, when inflation is greater, wage growth can also be higher. Because of this, the Turkish automotive industry encounters consistently high production costs. In addition, the majority of the production that is released into the market is exported. Not just domestic manufacturers, but also global automobile corporations have placed a significant emphasis on growing their export business. Figure 3 illustrates the proportion of the automotive industry's production that is comprised of exports. It is evident that this ratio was significantly low in 2000, at approximately 28.4. Beginning in the middle of the 2000s, the ratio began to progressively climb. 2006 was the year when it surpassed 94.3, while 2014 was the year that it ultimately achieved a record high of 97.3. The decade of the 2010s was marked by the automotive industry's practically complete concentration on manufacturing for export. This growth was significantly influenced by the investment that was poured into Türkiye as well as the institutional changes that occurred in the wake of the economic crisis that occurred in 2000-2001.

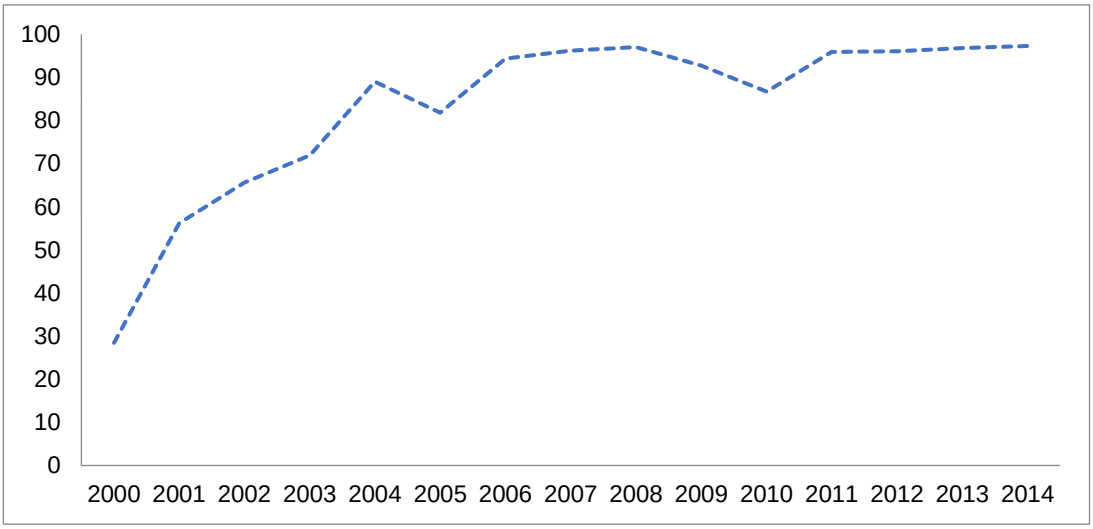

Figure 3. Ratio of export to output (annual, unit: %) (Source: Author's estimation. The source of the data is the WIOD PYP input-output tables)

5. INSTITUTIONAL FACTORS BEHIND the STRATEGY of the AUTOMOTIVE INDUSTRY

Institutional economics elucidates the mechanisms and operations of market dynamics via the analysis of institutional structures. The use of innovative regulations is one of the ways that institutional economics works to identify solutions for maintaining economic stability. The norms governing institutional forms should be designed with the aim of eradicating conflicts in the market (Commons, 1934). The assumption is that institutional changes conducted throughout history can be utilized to monitor economic issues and growth performance in the market. There is a wide variety of concepts that are included in an institutional perspective. In general, there are five fundamental institutional forms that are the primary focus in studies. These forms involve the function of the government, the mode of competition, the method of international insertion, wage and labor relations, and bank and credit connections (Boyer, 1990: 38-39; 2005; Boyer and Hollingsworth, 1997: 49-54; Boyer and Yamada, 2000: 10; Boyer and Saillard, 2002: 44). To give an explanation for macroeconomic phenomena that occur inside an economy, these forms may commonly be

used in order to provide an explanation. It is possible to provide an explanation for industrial growth models by using input-output analysis and the institutional approach. As a result of rules and regulations, this strategy might clarify whether a sector relies on exports or domestic consumption. In this paper, the institutional forms that are taken into consideration are the Customs Union, the tax policy, and the policy of vertical integration in the industry.

The institutional economics of the automobile industry placed substantial emphasis on the notions of accumulation regimes, such as Fordism, post-Fordism, and Toyotism. By taking into consideration rules, norms, laws, and regulations, these notions are taken into consideration to define accumulation regimes. An institutional framework emerges that integrates the growth models and their new forms to operate in a complementary way. However, over the course of time, the institutional changes that are implemented in order to enhance economic performance has the potential to give rise to a variety of economic issues. After that point, new institutional reforms are required in order to arise and mitigate the obstacles that occur in the economy. In contrast to industrialized nations, Türkiye lacks its own accumulation regime in the automotive industry. There is a significant degree of dependence on the country on the global automobile corporations. Through the application of input-output analysis, it is possible to describe the growth model of an industry, as well as to examine the growth model from the perspective of institutional factors. To provide an explanation for the growth models of the automobile industry, this paper implemented both input-output analysis and institutional economics. The institutional approach and growth models operate in an integrated manner (Ünal, 2021). The growth pattern and economic issues can be better understood by taking this feature into account. An input-output analysis is a quantitative method that involves offering information about a certain industry. Nevertheless, this is basically one viewpoint on the methods employed in analysis. If institutional forms are not taken into consideration, the research may be susceptible to limitations and incompleteness, and it may also lack political consequences. In the field of institutional economics, an attempt is made to explain the functions that lie behind technical features and to trace these functions back to the fundamental issues that exist within the economy. To provide an explanation of the technical specifics, input-output analysis needs to collaborate with the institutional approach. Hence, this is the appropriate method for this nation to define its growth model in the automotive industry at this time. The input-output analysis creates the way for the conceptualization of a growth model in the automotive industry, and the institutional approach paves the way for the definition of the rules, norms, and regulations that shape the growth model in the nation.

The strategies that corporations in any nation choose to implement are significantly influenced by the institutional factors that are present in that country. The dynamics that are affected by regulations are significant because they have the potential to alter the roles that corporations perform. When it comes to enticing multinational automobile corporations to select a certain country to invest in, institutional considerations serve a role in the decision-making process. There is a possibility that these institutional factors can differ from country to country. In recent years, emerging economies have made necessary adjustments to their institutional features in order to become more appealing sites for multinational corporations. During the 2000s, Türkiye began to play this role, which is one of the primary reasons why the automotive industry had a large growth in output. Furthermore, multinational corporations originating from East Asia selected Türkiye as a site that is advantageous for reaching neighboring nations as well as the EU. For other global automobile corporations, Türkiye continues to be an appealing location for the beginning of production.

The Turkish economy underwent a transformation in the 1980s in order to facilitate the expansion of exports, which followed efforts at deregulation. Export became a key part of the country's economy, which contributed to the establishment of new institutional factors that helped shape the economy. The institutional changes that have taken place in the Turkish economy are the primary reason why automotive corporations are concentrating their efforts on exporting their products. Institutional reforms include vertical integration, special consumer tax policy, and incorporation into the Customs Union of the EU.

5.1. Customs Union

Since the beginning of the EU, Türkiye has been making efforts to become part of the union as a member. The nation joined the Customs Union in 1996, despite the fact that it has not yet integrated into the EU. The implementation of this institutional transformation made it possible to access the markets of the EU without any restrictions. Because of this, the production of automobiles in Türkiye became advantageous for vehicle manufacturers. In light of this, the incorporation of Türkiye into the Customs Union of the EU was one of the institutional elements that had a role in shaping the strategies employed by automobile corporations. Türkiye became a destination that attracted global automobile corporations when it became a member of the Customs Union because of its favorable business environment.

Türkiye had both a trade creation impact and a trade diversion effect once it became a member of the

Customs Union during this time period. It is possible for both consumers and producers to reduce their costs as a consequence of the elimination of tariffs and quotas, which leads in a trade creation impact. Therefore, it is anticipated that the prices of goods that are exported would decline. Consequently, in terms of the automotive industry, the overall trade (which includes both imports and exports) between Türkiye and the EU rose inside the Customs Union. There is also a trade diversion impact that occurs as a result of the removal of barriers. This effect takes place when trade is redirected away from low-cost and more efficient suppliers located outside of the trade zone and towards suppliers located inside the zone that are less efficient (Viner, 1950). It is possible that a diversion effect would not be economically advantageous, as was shown in Türkiye after the introduction of the Customs Union agreement (Berzin, 2010). With a tariff of zero percent on automobiles made in the European Free Trade Area, the Customs Union had an immediate influence on the Turkish automotive market, which resulted in a considerable rise in vehicle imports. The percentage of automobiles imported into Türkiye increased to 36% in 1997, up from 22% in 1996. It was not a short-term instant impact, but rather one that lingered for a longer period of time. As an instance, during the first half of 2006, more than 70% of passenger vehicles that were sold were imported automobiles. The domestic automobile manufacturers were faced with a challenge brought on by the growing number of automobile imports, which compelled them to enhance their efficiency and focus on export markets (Darby, 2009). This resulted in consumers focusing on imported automobiles, which had a negative impact on the trade balance. This was due to the fact that vehicle makers in Türkiye are not eager to create for domestic markets. In spite of the fact that the Customs Union seems to have enhanced both the level of competitiveness in the Turkish automotive industry as well as its potential for exports, Türkiye continues to import an increasing quantity of vehicles because to the growing local demand for automobiles. In accordance with the Customs Union agreement, Turkish manufacturers operating in the automotive industry, particularly those of medium and large size, have enhanced their level of competitiveness. Additionally, suppliers in Türkiye have raised their quality standards and acquired new capabilities (Özatağan, 2011; Bekmez and Komut, 2006). Taking into account the overall impact of the Customs Union on the Turkish automotive industry, it appears that the Turkish automotive industry has benefited from the agreement and fully integrated with the European market. This is attributed to the fact that the industry has gained access to a significant market and has been subjected to competitive pressure from producers located outside of Türkiye (Taymaz and Yılmaz, 2017). An increase in automotive manufacturing for the European market was facilitated by the agreement. These exports of vehicles were pushed by the institutional component that was responsible for this growth. These nations had lower taxes and more ownership of automobiles per person than Türkiye.

5.2. Tax Policy

When it comes to domestic consumption, the two primary factors that drive sales of automobiles are a rise in the average income per person and tax rates. During the 2000s, Türkiye had a growth in its per capita income, which led to an increase in the country's domestic sales, particularly in the automotive industry. A high tax rate on automotive products is still a significant concern, according to the stakeholders in the sector, and it is preventing domestic vehicle sales from rising any further. However, based on the World Bank's data on motor vehicles per 1000 people, it is evident that Türkiye has a lower rate of automobile ownership compared to industrialized nations, especially countries in the same income bracket. This indicates potential for future growth in automobile sales in Türkiye. Additionally, the development potential of the Turkish automotive industry is even larger when taking into consideration the growing trend toward vehicle ownership and the expectation of future economic rise in Türkiye.

Table 1. Taxation in the Turkish automotive industry (annual, unit: %)

Engine size	*Tax (2004)*	*Tax (2014)*
cc < 0.25L	n.a.	8%
0.25L ≤ cc	n.a.	37%
cc ≤1.6	30%	45%
1.6L ≤ cc < 2.0L	52%	90%
2.0L ≤ cc	75%	145%
cc < 3.0L*	10%	10%
3.0L ≤ cc < 4.0L	52%	52%
4.0L ≤ cc	75%	75%

Source: The data is derived from the Department of Revenue. * shows taxation for trucks.

Automobiles are subject to a substantial amount of taxation in Türkiye, which is referred to as the Special Consumption Tax. Despite the fact that taxes vary according to the size of the engine, it continues to be very expensive when coupled with other forms of taxation that are either directly or indirectly associated with the automotive industry, such as the value-added tax or the taxation associated with oil. The domestic market is becoming less appealing as a result of the heavy taxes that are placed on vehicles. As an outcome,

global automobile corporations concentrate their efforts on exporting. Table 1 presents the special consumption tax rates for the years 2004 and 2014, broken down according to the size of the engine. The table demonstrates that the already high tax rates that were in place in 2004 have experienced an even more significant rise. That domestic market development is restricted for automobile manufacturers is due, in large part, to the fact that this is one of the most significant factors. The value of the automobile is another factor that affects the current tax rate, which is varied accordingly. In 2014, the taxes were substantially higher, and they continue to be quite expensive. In an effort to boost sales of new automobiles, the government lowered the Special Consumption Tax rates for the majority of automobiles by 15% in 2019. This was done in response to a notable decline in new automobile sales.

Automobiles with engine capacity of less than 1.6L were subject to a tax rate of 30%, but this rate raised to 45% in 2014. Those passenger automobiles that have engine size capabilities that are larger continue to be subject to higher special consumption taxes. According to the table, taxation on automobiles remains quite high for passenger cars with engine sizes usually between 1.6L ≤ cc < 2.0L. In 2004, the tax rate for cars that had engine sizes between 1.6L ≤ cc < 2.0L was 52%; towards 2014 the rate rose to 90%. The tax rate for automobiles with engine capacities more than 2.0L was 75% in 2004, and it increased to 145% in 2014. Taxation for engines of other capacities remained consistent throughout the years. The domestic market is restricted as an outcome of the exceptionally high taxes that is placed on vehicles, as can be seen in the table. Automobile manufacturers, in other words, prefer not to produce cars for sale to domestic consumption. An important factor that contributes to the limitation of output for the domestic market is taxation. To put it another way, corporations that manufacture automobiles prioritize export rather than manufacturing goods for domestic consumption. Despite the fact that the Turkish economy is still growing in terms of the number of people who own vehicles, the percentage of people who own automobiles in Türkiye is still lower than in other European nations (Ünal, 2017). There is still a significant role for the institutional aspect of taxes in the process of encouraging the export of automobiles.

5.3. Vertical Integration

Vertical integration is one of the most important institutional factors that plays a role in determining the strategy that automotive corporations decide to implement. There is no restriction on the amount of capital that may be shared between domestic and international businesses in the Turkish economy. Considering that the domestic market in Türkiye has a lesser potential in comparison to more nearby areas such as the European market, the primary reason why multinational corporations relocate to Türkiye is to export their goods. The taxation on passenger automobiles has typically remained at a fairly high level and has consistently climbed greatly throughout the years, as was detailed in the preceding section. The manufacturing of trucks, buses, and minibuses is often included within the activities of local producers. It has been observed that multinational corporations have a preference for manufacturing passenger automobiles and have focused their efforts on exporting via a strategy that is more vertically integrated (Ülengin et al., 2014; Taymaz and Yılmaz, 2008; Wasti et al., 2006).

Table 2 indicates the exports that global automotive corporations contributed to the Turkish economy. The data indicates that the majority of corporations are concentrating their efforts on exporting their goods. Türkiye served mostly as a convenient location from which they could access nations in the surrounding area, including those that are members of the EU. The corporations are ranked according to the level of output they had achieved. In terms of both its manufacturing capacity and its overall output, Ford has consistently ranked among the most successful corporations in the Turkish economy. In general, the global automobile corporations concentrated their efforts on exports, as can be seen in the table. When it comes to exports, for instance, Toyota typically allocates a significant portion of its output. In terms of production, exports accounted for 83.4% of the total, and it has a capital share of 100% from foreign sources. In the case of Hyundai Assan, this was 89.3%. Consequently, this indicates that East Asian corporations make advantage of Türkiye as a site. Moreover, the percentage of exports for the other top producers, such as Renault and Fiat, was estimated to be 75.3% and 72.3%, respectively.

In addition, in 2014, the proportion of exports to total production was 96.3% for multinational automobile suppliers such as Bosch, which maintains a capital stake of one hundred percent. For Delphi, which likewise holds 100% of the capital share, the percentage of exports was 83.8%. For Yazaki, the proportion of exports to total production was 64%, and the company retained one 100% of the capital share. 100% of the capital share is held by Gates Powertrains, which exports 92.7% of its total production. According to the OSD, a total of 73.8% of Maxion Inci Jant's production is exported, and the company controls 60% of the foreign capital share. The domestic market is the primary focus of Turkish corporations that possess 100% of the domestic capital share. A hundred percent of the capital share is held by Otokar, Temsa, BMC, and Karsan, all of which are classified as local enterprises. The percentage of production that was contributed by exports was 25.3% for Otokar, 31.3% for Temsa, 9.9% for BMC, and 26.3% for Karsan. In the case of multinational automobile corporations, vertical integration has been the determining factor in their strategy. Companies

that have a significant amount of foreign capital often concentrate their efforts on exporting their products. On the other hand, the local automobile corporations mostly concentrated their efforts on domestic consumption. In spite of this, the largest manufacturers are global automobile corporations. Therefore, vertical integration has been a factor in the development of the growth model of the automotive industry, which is one that is based on the expansion of exports.

Table 2. Export and capital share of multinational automobile companies (2014)

Company	*Export ($)*	*Export/Output (%)*	*Foreign Capital Share (%)*
Ford	3.464.635.000	71.96	41.0
Oyak-Renault	3.020.379.000	75.32	51.0
TOFAŞ-Fiat	1.983.572.000	72.35	37.9
Mercedes-Benz	652.677.000	29.94	85.0
Hyundai Assan *	1.870.580.027	88.49	89.3
Toyota	1.599.436.000	83.47	100
Türk Traktör	332.048.000	34.45	37.5
Otokar	110.729.000	25.34	0
Temsa	103.105.000	31.34	0
BMC	49.839.000	9.94	0
Karsan	113.969.000	26.33	0
Anadolu-Isuzu	42.863.000	15.21	29.8
MAN	226.252.000	88.20	100
Honda	35.522.000	15.93	100

Source: Automotive Manufacturers Association (Türkiye). Note: *Data is derived from Automotive Industry Monthly Report of OSD. BMC is derived from 2011 and Karsan's data is from the year of 2013.

6. CONCLUSION

In this paper, an input-output technique and an institutional approach are used in order to conduct an analysis of the automotive industry in Türkiye. In the first place, the HEM is employed to develop the industrial growth model related to the automotive industry. After that, the reasons why the automotive industry favors an export growth plan are addressed in terms of the institutional factors that are involved. Customs Union, taxes, and vertical integration are the three primary institutional elements that are taken into consideration. The findings of the input-output analysis suggest that the automotive industry has a model for export growth. This is due to the fact that the growth in productivity of export goods was larger than that of non-tradable goods. In spite of the high cost of manufacturing, the automobile sector continues to develop via exports, despite the fact that wage growth was much larger than the productivity growth of goods that are exported. Institutional factors, on the other hand, played a part in the formation of the industrial strategy that emphasizes exporting. The automotive industry was not able to establish a strong presence in the domestic market.

There are three primary institutional reasons why automotive corporations consider exporting to be their primary focus. The first step was to become a member of Customs Union. A trade creation impact is implied by the fact that the automotive industry is able to connect to a significant market inside the Customs Union without encountering any impediments. Because of this, they have been able to have their goods exported to the European market, which continues to be more appealing than the domestic market. With the implementation of this institutional transformation in 1996, the automotive industry shifted its focus to the expansion of its export strategy. Multinational corporations perceive Türkiye as a crucial geographical manufacturing site from which to access the European market, which is another significant effect of the Customs. The second point is that the special consumption taxes that are levied on automobiles are already rather high in the market. It is one of the main causes for restricted productivity growth in the domestic market since the overall tax rate is much more substantial when both the special consumption tax and the indirect tax are taken into consideration. Due to the high level of taxes, the domestic market becomes less appealing. Because of this, the automotive industry places a significant emphasis on exports. There is also the strategy of vertical integration, which is the third factor. Türkiye provided the global car corporations with the opportunity to keep a significant portion of their foreign capital share. As a consequence, they were able to concentrate on exports without having to collaborate with local producers. Local corporations, on the other hand, concentrated their efforts primarily on the domestic market.

Author Contributions
Emre Ünal: Literature Review, Conceptualization, Methodology, Data Curation, Analysis, Writing-original draft, Modelling, Writing-review and editing
Ali Yavuz Polat: Literature Review, Conceptualization, Analysis, Writing-original draft
Nezir Köse: Conceptualization, Analysis, Writing-original draft

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It was declared by the authors that the tools and methods used in the study do not require the permission of the Ethics Committee.

Ethical Statement
It was declared by the authors that scientific and ethical principles have been followed in this study and all the sources used have been properly cited.

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