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**THE RELATIONSHIP BETWEEN MANUFACTURING INDUSTRY AND
ECONOMIC GROWTH IN TURKEY**

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ÖZET

TÜRKİYE’DE İMALAT SANAYİ VE EKONOMİK BÜYÜME İLİŞKİSİ

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Bu çalışmanın amacı, Türkiye’de 1980-2020 döneminde imalat sanayi ihracatı ile ekonomik büyüme arasında bir nedensellik ilişkisinin var olup olmadığının araştırılmasıdır. Çalışmada, imalat sanayi ihracatı ile ekonomik büyüme arasındaki ilişki ekonometrik olarak analiz edilmiştir. Yapılan eşbütünleşme testi sonucunda, uzun dönemde, imalat sanayi ihracatından ekonomik büyümeye doğru pozitif yönlü bir ilişki tespit edilmiştir. Uygulanan Granger nedensellik testi sonucunda ise kısa dönemde, imalat sanayi ihracatından ekonomik büyümeye doğru tek yönlü bir nedensellik ilişkisinin var olduğu saptanmıştır. Granger nedensellik testini desteklemek amacıyla yapılan, Toda-Yamamoto nedensellik testi sonucunda da imalat sanayi ihracatından ekonomik büyümeye doğru tek yönlü bir nedensellik ilişkisinin var olduğu tespit edilmiştir. Nedensellik sınamalarının ardından, etkinin işaretini tespit edebilmek adına, durağan seriler kullanılarak oluşturulan ekonometrik model için En Küçük Kareler (EKK) yöntemi uygulanmış ve imalat sanayi ihracatının, ekonomik büyüme üzerinde pozitif anlamlı bir etkisinin olduğu sonucuna ulaşılmıştır.

Anahtar Kelimeler: İmalat Sanayi, Ekonomik Büyüme, İhracata Dayalı Büyüme, İhracat

ABSTRACT

THE RELATIONSHIP BETWEEN MANUFACTURING INDUSTRY AND ECONOMIC GROWTH IN TURKEY

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The aim of the 1980-2020 period, with manufacturing exports in Turkey to investigate whether there is a causal relationship between economic growth. In the study, the transformation relationship between manufacturing industry exports and economics is analyzed econometrically. A positive correlation has been determined from co-testing, long order, manufacturing industry exports to economic growth. The Granger causality test applied has determined that there is a one-way causality relationship from manufacturing industry exports to growth in a short time. To support the Granger causality test, the Toda-Yamamoto causality test has also been found to have a one-way causality relationship from manufacturing industry exports to economic growth. After the causality tests, in order to determine the sign of the impact, the stationary series were tested and the Least Squares (LSS) method was applied for the econometric model and the result of the positive effect of the manufacturing industry exports on economic growth was reached.

Keywords: Manufacturing Industry, Economic Growth, Export Based Growth, Export.

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LIST OF ABBREVIATIONS

ADF	: Augmented DickeyFuller
AIC	: Akaike Information Criteria
CBRT	: Central Bank Republic of Turkey
CPI	: Consumer Price Index
CUR	: Capacity Utilization Rates
EU	: European Union
EUROSTAT	: European Community Statistical Office
EVDS	: Electronic Data Delivery System
FPE	: Final Prediction Error
GDP	: Gross Domestic Product
GNP	: Gross National Product
HQ	: Hannan- Quinn Information Criterion
ISIC	: International Standard Industrial Classification
IMF	: International Money Fund
JJ	: Johansen- Juselius
K	: Fixed Capital Investments
KEG	: Kaldor's Engine of Growth
KPSS	: Kwiatkowski, Phillips, Schmidt, Shin
LR	: Sequentid Modified LR Test Statistic
MX	: Manufacturing Industry Export
OECD	: Organisation for Economic Co-operation and Development
RI	: Real Interest
SC	: Schwarz Information Criteria
SPO	: State Planning Organization
TURKSTAT	: Turkey Statistics Institute
UNIDO	: United Nations Industrial Development Organization

VAR : Vector Autoregression Analysis
VECM : Vector Error Correction Model
WB : WorldBank



CHAPTER I

INTRODUCTION

The importance of trade and the issue of profitability in the history of economics have come to the present day, starting from Adam Smith's theory of absolute advantage and David Ricardo's theories of comparative advantage, and still have not lost its importance in modern foreign trade theories. Two models are applied for developing countries in the industrialization process (Bebun, Gavurova, Tkacova and Kotaskova, 2018). The first of these is the import substitution industrialization model. Turkey has applied the model of import substitution industrialization until the 1980s (Bebun, Gavurova, Tkacova and Kotaskova, 2018). This model is based on the encouragement of the domestic industry in order to ensure that imported products are produced by the domestic industry (Bebun, Gavurova, Tkacova and Kotaskova, 2018). The second model, export-based industrialization, is to remove the obstacles to foreign trade and to take measures to increase exports and to ensure economic growth with industrial exports (Bebun, Gavurova, Tkacova and Kotaskova, 2018).

Turkey, after the import substitution industrialization strategy was followed in 1929 with the right of import customs duty applications. Later, Turkey has followed the basic decisions and export-led growth strategy on 24th January 1980 (Bebun, Gavurova, Tkacova and Kotaskova, 2018). Some of these decisions are aimed at re-establishing the current account balance, reducing inflation, reducing the public deficit and converting the growth rate back to negative values into positive (Bebun, Gavurova, Tkacova and Kotaskova, 2018). With the export- oriented industrialization strategy, industrialization based on public institutions was

abandoned, foreign trade was liberalized, smuggling and black market were tried to be prevented. With the customs union agreement signed with the EU in 1995, customs tariffs were zeroed against EU countries in 1996 for some goods, and a reduction in high tariffs was made for third countries (Bebun, Gavurova, Tkacova and Kotaskova, 2018). Export-promoting industrialization strategies are based on supporting sectors that can gain comparative advantage. Thus, due to the increase in exports, growth rate and industrialization increases. Industry has a significant impact on the economic, social, environmental and institutional dimensions of sustainable development. On the other hand, its status and development are also determined by the development of trade and global competition. These; availability of raw materials and energy and the requirements for their more efficient use, technologies and innovations, qualification and skills of the workforce, etc. (Bebun, Gavurova, Tkacova and Kotaskova, 2018). Determining the sector to be supported is important because choosing the wrong sector causes cost loss and comparative advantage may not be obtained. In the development of a country and gaining international competitiveness, industrial policies, thus the industrial sector, are of great importance (Kundak and Aydoğuş, 2018). Countries increase their industrial production, productivity, added value and technology content can gain competitive power around the world and rapidly increase their national income. Even if countries with the remaining industrial production can find the opportunity to enrich with other GDP components, very few of them can fall into the category of developed countries (Bayar and Tokpunar, 2014).

Turkey's economy in the long term is examined, it is seen that the manufacturing sector is the leading sector (Bayar and Tokpunar, 2014). Manufacturing is the production of merchandise for use or sale using labour, machines, tools, chemical and biological processing or formulation. The term may refer to a range of human activity from handcraft to high tech, but is most commonly applied to industrial production, in which raw materials are transformed into finished goods on a large scale (Adofu, Taiga and Tijani, 2015). By creating a multiplier effect on other sectors with its supply chain, the manufacturing industry supports production and employment in the service sector, leads innovation and provides

faster capital accumulation compared to other sectors (Adofu, Taiga and Tijani, 2015). Innovations originating from the manufacturing industry increase the production capacity of the economy and manufacturing industry products have an important place in the exports of many countries. Again, countries with developed manufacturing industry infrastructure have stable exchange rates and growth rates, and the manufacturing industry sector offers high salaries to its qualified employees (Demirci, 2017). Turkey financial crises of the 2000s was put together so many problems. Contraction in the sectors has also adversely affected employment opportunities. The importance of the industrial sector of Turkey's contribution to growth and employment rate of increase in industries considered if he did not further increase the national income growth (Demirci, 2017). For Turkey, the technology and produce high value-added products and to increase their exports by foreign trade income is another target. At this point, the industrial sector appears again. Thus, the growth in the industrial sector in Turkey will mean growth and development of the country's foreign trade volume of production facilities (Demirci, 2017). It was observed that the share of the industrial goods group in foreign trade increased in the years following the 1980s with the effect of trade liberalization and the policies pursued. The transition to the flexible exchange rate system in 2001 caused an increase in real exchange rates (excessive appreciation of the national currency against foreign currencies) and a more pronounced state, which led to structural transformations in the production and foreign trade sector (Demirci, 2017). It has been determined that firms operating in the manufacturing industry meet their financing needs by borrowing in foreign currency and this increases their dependence on imported inputs. These developments weakened the relationship between the amount of production and employment in the manufacturing industry (Demirci, 2017).

This study investigated the econometric relationship between manufacturing exports and economic growth between the years 1980-2020 for Turkey's economy. It consists of six parts. In the first part is introduction. In the second part, the basic information about industry and manufacturing industry is given. In the third part, the historical development of the manufacturing industry for Turkey (1980-2000 and

2000-2020) is mentioned. In the fourth part, it is given to literature from the world and Turkey. In the fifth part, empirical analysis is made depending on the dates. In the sixth chapter, the result reached is mentioned.



CHAPTER II

MANUFACTURING INDUSTRY

The word industry is of Arabic origin. Its French is *industrie*. The industrial sector, which is called the secondary sector in the economy, generally covered all industrial activities. Industry is the processing of unprocessed (raw) or semi-processed products in factories and workshops and becoming usable. Looking at the scope of the international classification system (ISIC) of the industrial sector, the sum of the sub-sectors of mining (ISIC2), manufacturing industry (ISIC3) and electricity, gas and water (ISIC4) refers to the industrial sector. In our country, the State Planning Organization (SPO) classifies the industrial sector as mining, manufacturing industry and electricity, gas and water. Within this general industrial sector classification, the most important sub-sector in terms of added value and contribution to employment is the "manufacturing industry". For this reason, when the concept of industrial sector is used in the scope of the study, it is meant the manufacturing industry (Şahbaz, 2010). Following the economic structural change process experienced in almost all countries in the years following World War II, the acceleration of globalization with the rapid progress in communication and computer technologies towards the end of the 1990s led to significant changes in the production structure and balance of power in world trade. When the global changes occurring in the sectoral structure during the said process are examined, it is observed that the most important changes are in the manufacturing industry. Especially in the manufacturing industry, the main factor that changed the production parameters was technological development. Advances in transportation networks and technology increase the speed of production and distribution steadily and encourage the manufacturing industry by reducing production and marketing costs. The spread

of industrialization among countries has created significant changes in the structure of production and export and caused the change of major actors in trade. With the development of the manufacturing industry, slow growing economies with low value added began to transform into fast growing economies, and the gap between many developing countries and industrialized countries began to close with the effect of rapid technological change. Manufacturing industry is the branch of industry in which raw materials are processed by machine or manual labor and converted into intermediate goods. The manufacturing industry is divided into two. These are heavy industry and light industry. Heavy industry requires huge investments in hardware and machinery. In addition, it has a very complex work organization and a qualified workforce structure. In the heavy industry branch, investment and intermediate goods are produced and very high amounts of production are made. Oil refining, motor vehicle production, cement production, iron and steel production can be given as examples of heavy industrial production. The goods produced in light industry are not durable. Also, there is no need to make huge investments for equipment and machinery. The workforce can be either skilled or unskilled. A qualified workforce is needed for the production of electronic devices. Weaving, clothing, etc. workers in industries do not need any training. Light industry predominates in less developed countries. The manufacturing industry is the basic building block of our economy as it creates employment and added value. There are three sub-units in the manufacturing sub-sector: consumer goods, intermediate goods and investment goods, which are also divided into industrial branches (Koç, Şenel and Kaya, 2018).

- Within the scope of consumer goods, industries such as food, beverages, tobacco, textiles, ready-made clothing, wood, furniture and shoes are evaluated.

- Intermediate goods include ginning, wood cork products, paper, printing, leather and small processing, rubber, plastic chemistry, petrochemistry, petroleum products, fertilizers, cement, baked clay, ceramics, glass, iron and steel, non-ferrous metals.

- Investment goods, on the other hand, consist of metal goods, non-electrical machinery, agricultural machinery, scientific and professional measuring instruments, electrical machinery, electronics, road vehicles, railway vehicles,

shipbuilding, aircraft manufacturing and other industries. Industry groups included in the manufacturing industry classification;

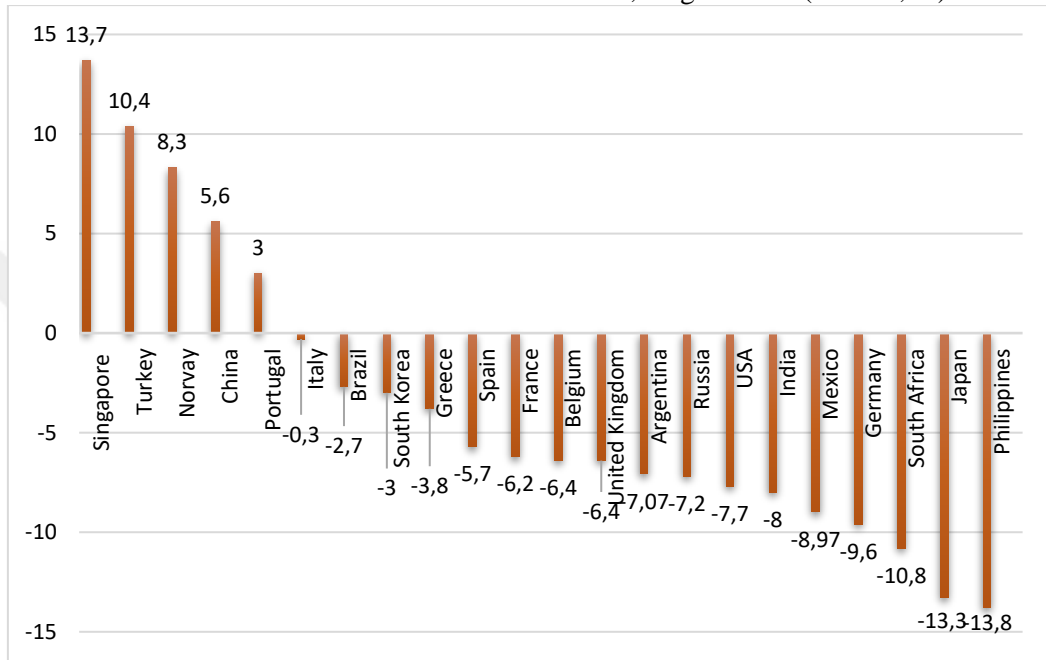
- Food, beverage, tobacco
- Textiles, apparel and leather
- Forest products and furniture
- Paper and paper products, printing-publishing
- Chemical pharmaceutical petroleum rubber and plastic products
- Based on stone and soil
- Main metal industry
- Metal goods machinery electrical equipment and transportation vehicles
- Other manufacturing industry

It is evaluated as (Koç, Şenel and Kaya, 2018).

Export-led growth strategies date back to the 1950s and 1960s (Inotai, 2013). Pioneers were two countries with large local markets but strong industrial backgrounds, the Federal Republic of Germany (the West) and Japan. In the late 60s, and particularly between 1970 and 1984, the four small East Asian economies called "little tigers" moved away from import orientation and home market protection and chose to move towards exports (Republic of Korea, Hong Kong, Singapore and Taiwan). His examples were followed by other countries in the region (Malaysia, Thailand on the one hand, and Philippines and Indonesia on the other). Nowadays, other regions, especially Vietnam, Cambodia and Myanmar are trying to repeat the success of East + South Asian countries. In Latin America, traditionally implementing a development policy based on import substitution, Mexico was the first country to open its market overwhelmingly to US investors who discovered the advantage of the wage differential for competitive production for export (mostly to the USA, "maquiladora"). Similar successful examples can be shown in Europe. The highly developed small European economies have long based their growth on trade openness and exports (Benelux, Sweden, Denmark, Switzerland), Ireland and Finland - by the early 1990s, though largely different industrial structures, traditions and geographic backgrounds. The last and best example of the success in export-oriented growth strategy has been realized by China in the last twenty years. In 2009,

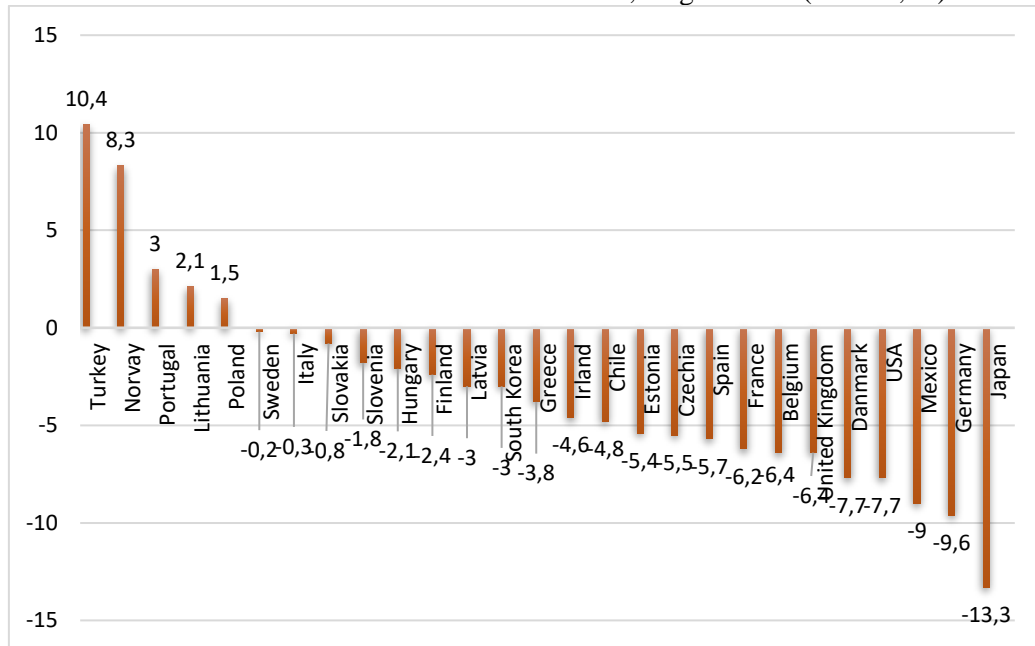
it became the world's largest exporter, ahead of China, Germany and the USA, and increased its leading position between 2009 and 2012. Potentially large local markets used to focus on growth based on domestic demand (Brazil, India, Indonesia, Argentina, Australia, Canada, as well as Russia as the sole exporter of goods) (Inotai, 2013).

Table 1: Industrial Production Index World, August 2020 (Annual, %)



Source: TURKSTAT (Turkish Statistic Institution), 2020.

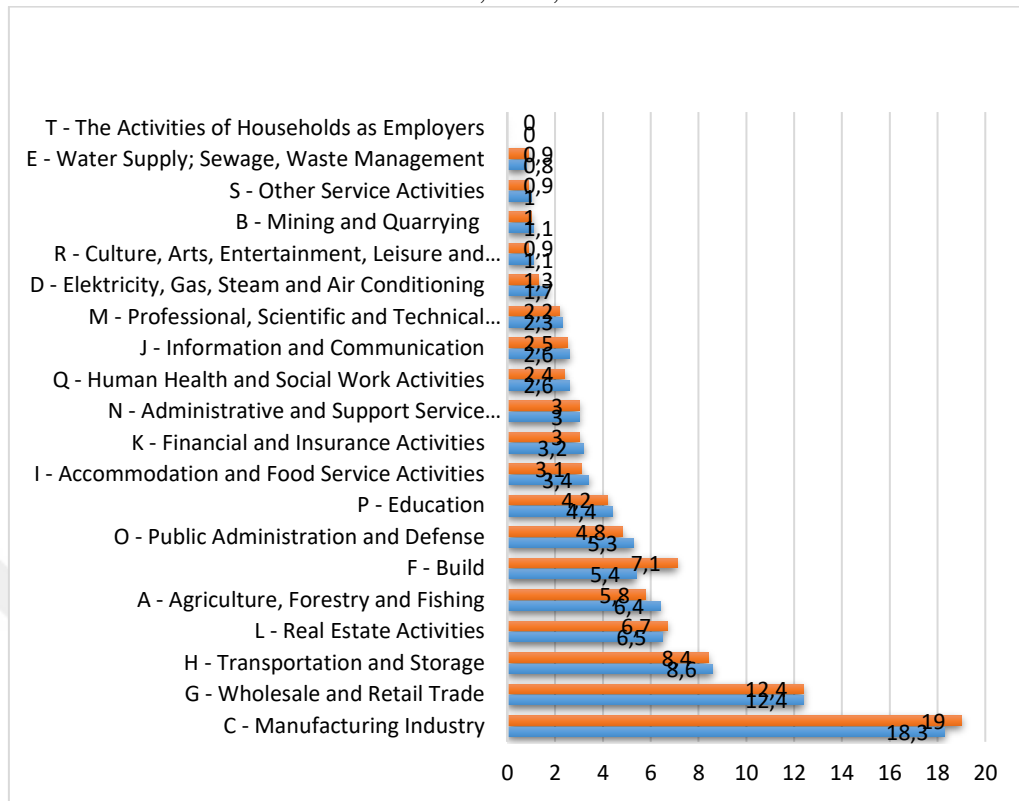
Table 2: Industrial Production Index OECD, August 2020 (Annual, %)



Source: TURKSTAT, 2020.

Industrial production increased 10.4 percent on an annual basis. Turkey ranks second in the world after Singapore grew 13.7 percent in this area, and took first place among OECD countries. This was followed by Norway with 8.3 percent and Portugal with 3 percent.

Table 3: Sectors' Shares in GDP Account According to Production Method, at Current Prices, 2018, 2019.



Source: TURKSTAT, 2020.

It was observed that the independent annual gross domestic product (GDP) calculated on the basis of annual data increased by 0.9% in 2019 compared to the previous year with the chained volume index. According to the production method, GDP at current prices increased by 15.0% in 2019 compared to the previous year and reached 4 trillion 320 billion 191 million TL. Manufacturing industry had the highest share in 2019 with 18.3%, and wholesale and retail trade with 12.4%; the repair of motor vehicles and motorcycles and the transportation and storage sector with 8.6%. In 2019, R- Culture, arts, entertainment, recreation and sports sectors with the highest growth with 18.4%, D-Electricity, gas, steam and air conditioning production and distribution 12.2% and K-Finance and insurance activities 6.9%, has been. F-Construction was 8.6%, C-Manufacturing industry was 2.3%, N- Administrative and support services activities were the sectors that shrank the most with 2.2%.

Table 4: Sectoral Distribution of GDP and Growth Rates (1998=100,%)

Years	AGRICULTURE		INDUSTRY		SERVICES		TAX SUBSCRIPTION
	GDP Share	Growth Rate	GDP Share	Growth Rate	GDP Share	Growth Rate	GDP Share
2000	10,1	53,2	27,9	47,7	55,6	55,1	10
2001	8,8	26,3	26,8	38,2	58,5	51,7	10
2002	10,3	69,8	25,2	37	55	37,2	11
2003	9,9	25,2	24,9	28,4	54,2	27,8	12
2004	9,5	17,4	24,7	22	54,3	23,3	12
2005	9,4	14,6	24,7	15,9	54,1	15,5	12
2006	8,3	3,2	24,8	17,7	55	18,9	12
2007	7,6	2,7	24,8	11,1	57	15,2	11
2008	7,6	12,3	24,4	11	57,9	14,4	11
2009	8,3	9	22,9	-6	59,6	3,2	10
2010	8,4	17,7	23,6	18,6	57,2	10,9	12
2011	8	11,7	24,4	22,1	56,3	16,2	12
2012	7,9	7,8	23,8	6,6	57,5	11,5	11
2013	7,4	3,6	23,6	9,7	57,6	10,9	12
2014	7,1	7,7	24,1	14,1	57,7	11,8	11
2015	7,5	18,1	23,4	8,5	57,4	11	11
2016	6,2	-0,1	27,5	4,5	56,6	5,6	11
2017	6,1	4,7	29,2	9,1	53,3	7,5	10

Source: TURKSTAT- Sectoral GDP Breakdown 1998=100 system, 2018.

Table 4 shows the growth rates of the economic branches that make up the gross domestic product between the 2000-2017 periods and their shares in GDP. It is seen that the largest share in GDP belongs to the services sector. The share of the industrial sector in GDP in 2017 was approximately 29.2%. The sector with the least share in GDP was the agriculture sector. The share of the agricultural sector in GDP declined to 6.1% in the 17-year period. However, although the share of the industrial sector in GDP is constantly changing, while its share in GDP was approximately 27.9% in 2000, it did not change significantly at the end of 2017 and reached 29.2%. It has been observed that the decreasing share of the agricultural sector in GDP has shifted to the services sector. There has not been much change between the years 2000-2017 in the tax subsidies part of the items that make up the GDP.

Table 5: Total Industry Growth Rates (%)

Years	World	EU	Turkey
2000	5	4	7
2001	0,11	1	-11
2002	1	0,38	6
2003	4	0,88	9
2004	6	3	14
2005	4	1	11
2006	5	4	13
2007	5	3	7
2008	1	-2	-0,65
2009	-5	-11	-10
2010	7	5	12
2011	4	2	19
2012	2	-2	5
2013	3	-1	10
2014	3	2	5
2015	3	3	5
2016	3	1	5
2017	3	3,3	6,8

Source: WB (World Bank), 2018; EUROSTAT (European Community Statistical Office), 2018; TURKSTAT, 2018.

Table 5 from across the globe, is seen in the annual growth rates of industrial production in the EU and in Turkey. Growth rates in the industrial sector did not change significantly in the world in the 17-year period, except for the 2001-2003 and 2008-2010 periods, compared to the previous years. In the European Union, serious decreases are seen in the industrial growth rates after 2000. While the industrial growth rate in the EU was 4% in 2000, this rate resulted in an increase of 1% in 2016 compared to the previous year. However, according to 2017 provisional data, industrial production in the EU grew by 3.3%. Industry growth rate in Turkey grew by 7% in 2000, decreased by 11% in 2001. While it grew by 7% in 2007, it shrank by 10% in 2009. Overall growth in the emerging industry sector in Turkey is located in a country status rates it is similar to the world average. Periods of increase and decrease in industrial growth rates move almost together with increases and decreases worldwide. Turkey 2001 growth in the industrial sector showed a decline due to the crisis. The decreases in 2008 and 2009 are due to the effect of the global

crisis that started in the USA and spread to the world as the 2008 Global Crisis. After the crisis the industry growth rate in 2010 and 2011 in Turkey as well as throughout the world has increased exponentially. Considering the past 6 years, the growth rate of the industrial sector in Turkey is located on top of the world and the EU average. Industrial production in Turkey in 2017 showed a growth of 6.8%.

Table 6: Growth Rate of Manufacturing Industry and Its Share in GDP (1998=100, %)

Years	GDP Share	Growth Rate
2000	18,8	48,8
2001	17,8	36,1
2002	16,9	39,5
2003	17,1	31,9
2004	16,9	22
2005	16,9	16,5
2006	17,1	18,3
2007	16,8	9,9
2008	16,3	9,4
2009	15,2	-6,5
2010	15,1	15,7
2011	16,5	31,2
2012	15,9	8,5
2013	16,2	17,9
2014	16,8	16,8
2015	16,7	13,8
2016	16,6	10,8
2017	17,5	8,8
2018	19,3	8,7

Source: TURKSTAT- Sectoral GDP Breakdown 1998=100 system, 2019

Table 6 shows the share of the manufacturing industry in GDP and its growth rate. In the 17-year period, the share of the manufacturing industry in GDP has partially decreased. While this ratio was 18.8% in 2000, the share of the manufacturing industry in GDP decreased to 17.5 in 2017. With the effect of 2001 and 2008 economic crises, there has been a decrease in the growth rates of the manufacturing industry. If we look at this example, in 2009 the manufacturing industry contracted by 6.5%. Generally, the growth rates in the manufacturing

industry have been over 10%. In 2017, the growth rate of the manufacturing industry was approximately 9%.

Although export-oriented industrialization has an accelerating effect on growth, it has some disadvantages (Güzel, 2015). These:

- Due to the continuous increase in domestic demand in developing countries with a high population growth rate, the export-oriented industrialization strategy may tend to meet domestic demand and deviate from its purpose.

- Not collecting taxes from newly established industries for a while and granting export incentives to these industries may cause economic problems for developing countries.

- Developing countries sell their labor-intensive and agricultural products, and buy industrial goods in return, since the comparative advantages are based on export-oriented industrialization. This situation is against the development of the developing country in terms of development.

- Consumption preferences and habits in developing countries are mostly about imitating developed countries. Even if this situation is a capital product for developing countries, it creates a picture that increases imports. In order to meet imports, the way of increasing the exports of labor-intensive and agricultural products is generally preferred. However, since the demand elasticities of these goods are low, demand increases do not increase as much as supply, and this causes the terms of trade to be shaped against the developing country (Güzel, 2015).

2.1. INDUSTRIALIZATION STRATEGIES

In an economy, the increase in the weight of the industrial sector in the national income created and the increase in the use of machinery in the production of finished goods is expressed in the most general way with the concept of "industrialization" (Şahbaz, 2010). The way to achieve national independence and high living standards is seen as industrialization for underdeveloped and developing countries. It can be said that the fast-growing countries today have a large manufacturing industry. To increase the foreign trade income is important for developing countries such as Turkey. For this, it is important at this point to transform the industrial structure into a manufacturing industry structure focused on

technology and innovation, rapidly increasing productivity and producing high added value. Manufacturing industry is the most important and dynamic sub-sector within the industrial sector. The manufacturing industry is the sector with the largest share in almost all countries in terms of both production value and employment volume. As foreign trade increases in our globalizing world, concerns have started to arise in terms of the competitiveness of the industry. While globalization has a disadvantage in terms of competitiveness for developing and undeveloped countries, it provides an advantage for developed countries. As a result of this situation, states have developed different strategies and policies in order to create and strengthen the manufacturing industry, increase competitiveness and ensure stable economic growth during the industrialization process. These strategies consist of two main groups, namely industrialization based on import substitution and export-oriented industrialization.

2.1.1. Import Substitution Industrialization Strategy

In this strategy, the production of imported goods domestically is essential to meet domestic demand. Import substitution is industrialization that results in a decrease in imported demand, while at the same time the volume and composition of domestic demand remains unchanged. The main purpose here is to save foreign currency. However, with the industrialization, the demand for foreign currency increases. Imports cannot be financed with traditional export products, as exports and foreign exchange increase transactions are not supported. In order for this strategy to be implemented, the domestic market must be of a certain size. In countries with a small internal market and a small population at the same time, this policy is unrealistic and causes a waste of resources. Import-substitute capital, which initially provided rapid growth, has negative factors in itself. These; It is a problem of domestic market orientation, dependence on imported inputs and lack of foreign exchange. In general, states support domestic production as much as possible because this strategy is introverted. Therefore, in order to be successful, it is necessary to know well how long and with what kind of precautions the industry branches will be protected.

Advantages of Import Substitution Industrialization:

- A rapid success is achieved in industrialization.
- The fact that a previously imported product will be produced domestically allows foreign exchange savings.
- Dependence on outside decreases.
- Employment increases and unemployment decreases.
- It plays an important role in the development and improvement of the country.

2.1.2. Export-Led Industrialization Strategy

If the focus is on foreign trade in a country, the foreign firm will be open to competition and the domestic firm will be forced to produce cheaper and quality goods. In this strategy, it is aimed to produce for the foreign market rather than the domestic market. In this case, it is natural that the share of industry-related products in the exports of the underdeveloped economy increases. Therefore, the products required for the domestic market will be imported to a large extent. The main purpose of this strategy is to transform the industrial formation in the country into a structure that exports to foreign markets, to establish a structure based on free market and private enterprise, to open up to foreign markets and to encourage foreign trade policy to export.

Advantages of Export-Led Industrialization:

- It supports opening up to international competition and thus prevents monopolies.
- It attaches importance to R & D expenditures in order to ensure high quality of manufactured goods.
- As a result of increasing foreign exchange inflows, it contributes to the closing of the deficit in the balance of payments.
- The problem of unemployment is reduced for developing countries.

2.2. THEORETICAL FRAMEWORK OF THE MANUFACTURING INDUSTRY AND ECONOMIC GROWTH RELATIONSHIP

The relationship between exports and economic growth has been among the topics studied for many years. Four different results have been obtained in studies on this subject. The first is that exports increase economic growth (export-led growth), the second is that economic growth increases exports (growth-based exports), the third is that exports and economic growth mutually affect each other (bidirectional causality between exports and growth) and the last is that exports and economic growth do not have an effect on each other (independence between exports and economic growth). Therefore, as a result of these studies, a common conclusion could not be reached on the direction of the relationship between exports and economic growth. It is observed that the results obtained in these studies vary according to the economic differences between countries, the method used, the period in question, and the selected countries. It is possible to explain these four approaches as follows (İlbeyli, 2020).

a. Export-Led Growth:

The Export- Led Growth approach is a hypothesis based on Neoclassicals. In the light of the hypothesis, it is accepted that the direction of causality is from export to growth. The reason for this is that the increase in exports increases productivity and economies of scale occur with the increase in productivity. Thanks to the increase in exports, higher quality products will be produced compared to the previous ones. Technological development in the field of export, at the rate of accumulation in capital by increasing, more production and technology will be obtained. If there is a labor surplus in the economy, a rapid increase in employment and real wages will be observed in that country with export-led growth. Another feature of exports is that it enables the elimination of foreign exchange restrictions.

b. Growth Based Exports:

Contrary to the export- led growth hypothesis, the increase in the growth rates can lead to exports. The amount of supply and demand in the country triggers the growth. In the Growth Based Export approach, the prevailing view is that causality is

from economic growth to exports. In this approach, it is argued that the technical skills and technology level will increase thanks to the economic growth. This, in turn, has a positive effect on the productivity level, causing an increase in exports. According to this approach, growth is from factor equipment to efficiency of export supply. In other words, the increase in productivity causes a decrease in unit costs, and this decrease in unit costs causes an increase in exports. Economic growth will cause an increase in exports if the emerging technological innovations lead to the formation of developed markets that increase export performance in the trade sector.

c. Bidirectional Causality between Exports and Growth:

Bidirectional causality approach is a mixture of the first and the second approach. It is stated here that the direction of causality between exports and growth is two-way. With this approach, gaining efficiency because of the economies of scale, it is argued that there will be an increase in exports. On the other hand, with the increase in exports, costs will tend to decrease, which will naturally result in production gains. In addition, increasing foreign trade will create more income and this increase in income will increase foreign trade volume. In short, with the cycle between exports and income, income will increase depending on the increase in trade, and with the increase in income, trade will increase again and more trade will be made.

d. Independence between Exports and Economic Growth:

This approach accordingly, there is no causality relationship between exports and growth. The reason is that export and economic growth are a result of the structural change and development process in the country's economy (İlbeyli, 2020).

CHAPTER III

MANUFACTURING INDUSTRY IN TURKEY

In this section, the manufacturing industry in Turkey has been under investigation in two periods. The first term is the 1980-2000 period and the second term is the 2000-2020 period. Industrialization strategies and economic policies adopted before and after 1980 showed great differences. Until 1980, the import substitution policy was implemented; after 1980, with the introduction of export-oriented industrialization, significant progress has been made in developing the principles and principles of the market economy. These reforms contributed significantly to enhancing the dynamism of the private sector and increased the adaptability of the Turkish economy against internal and external influences. Thus, the investments and dynamism of the private sector have been the source of industrial growth in recent years. Except for the years of economic crises, industry has shown a great development until 2000. With the beginning of the 2000s and the crises experienced afterwards, the break occurred. In order to analyze in detail this process that has been going on until today, the study has been examined under two periods.

3.1. 1980-2000 PERIOD

Turkey's economy before 1980 because of the oil crisis and structural problems was in economic distress. During the import-substitution industrialization period, which was implemented until 1980, as export revenues could not meet the import, the import burden increased and as a result, a new way was sought. As a

result of this situation, economic measures and export- oriented industrialization strategy started to be implemented on January 24, 1980. Some of these decisions are liberalizing imports, switching to a flexible exchange rate system, encouraging exports, encouraging foreign capital, and implementing a real interest rate policy (Güzel, 2015). With this decision, the economic targets aimed at reducing and slowing down the effect of inflation, increasing the foreign exchange supply and reducing the foreign exchange expenditures to a low level other than imports can be listed. As a result of the stand-by agreement signed with IMF on June 18, the decisions taken in this strategy were implemented for three years (Güzel, 2015). After 1984, the liberalization period in import started. In this period, with the completion of the IMF audit, credit credibility increased and the money supply expanded. With the decrease in tax refund in 1988, there was a decrease in exports. On the other hand, the inflation did not decrease, the income distribution became unbalanced, and the depreciation of the Turkish Lira and the increase in short-term debts were observed (Güzel, 2015). An important step was taken on the way to capital with the “Decree No. 32 on protecting the Value of Turkish Currency”, which entered into force in 1989. Thus, the Turkish lira and the dollar were substituted in the domestic market and an integration with international markets was initiated (Güzel, 2015).

Table 7: Sector Shares and Development in GNP between 1980-2000

Year	Sector Shares in GNP (%)			GNP Sectoral Growth Rates (%)			
	Agriculture	Industry	Services	GDP	Agriculture	Industry	Services
1980	24,2	20,5	55,4	-2,8	1,3	-3,6	-4,1
1990	16,3	25,9	57,9	9,4	7,0	9,3	10,1
2000	13,1	27,7	59,1	6,3	4,0	6,2	7,0

Source: TURKSTAT, 2001

In the years when the economy was expanding, the growth rates of the manufacturing sector were higher than the growth rates of GNP. During the crisis years, the manufacturing sector's response to the contraction in the economy has changed over time. During the 1979-1980 and 1994 crises, the contraction in the manufacturing sector occurred more than the total contraction in the economy. On

the other hand, in the crises of 1999 and 2001, the situation reversed and the contraction in the manufacturing sector remained at a lower level compared to the entire economy. Depending on this evaluation, it is seen that there is a strengthening in the structure of the manufacturing industry. As seen in the table above, the industry values given mostly include manufacturing industry data.

Table 8: Classification of Manufacturing Sectors

Years	Exporting Sectors ($Z < -0.2$)			Competing Sectors ($-0.2 < Z < 0.4$)			Importing (non-competing) Sectors ($0.4 < Z$)		
	Relative Size	Real Wage Index	Mark-up Ratio	Relative Size	Real Wage Index	Mark-up Ratio	Relative Size	Real Wage Index	Mark-up Ratio
1980	0.079	80.58	0.25	0.798	102.61	0.31	0.068	107.50	0.39
1981	0.062	80.09	0.27	0.762	1007.69	0.37	0.074	109,33	0.33
1982	0.180	92.94	0.28	0.646	101.96	0.33	0.078	106.96	0.36
1983	0.173	89.46	0.27	0.658	97.32	0.32	0.078	105.07	0.32
1984	0.189	78.19	0.23	0.671	86.27	0.31	0.086	94.19	0.31
1985	0.214	74.59	0.41	0.653	84.98	0.30	0.063	94.90	0.36
1986	0.074	59.72	0.30	0.752	81.15	0.47	0.096	73.34	0.49
1987	0.059	60.69	0.30	0.759	91.44	0.40	0.099	84.17	0.45
1988	0.069	65.05	0.38	0.769	85.25	0.47	0.075	91.44	0.42
1989	0.060	71.16	0.31	0.761	111.76	0.43	0.083	88.86	0.42
1990	0.057	83.28	0.31	0.781	144.78	0.44	0.066	99.24	0.43
1991	0.062	119.86	0.29	0.783	204.87	0.45	0.072	131.20	0.40
1992	0.061	112.16	0.30	0.764	203.77	0.45	0.086	155.99	0.43
1993	0.063	123.95	0.27	0.762	218.26	0.48	0.090	179.81	0.38
1994	0.101	110.81	0.33	0.722	164.53	0.50	0.087	130.53	0.57
1995	0.092	87.29	0.32	0.699	155.51	0.49	0.118	144.48	0.54
1996	0.097	86.30	0.36	0.676	161.42	0.46	0.133	126.12	0.42
1997	0.113	90.45	0.32	0.618	161.77	0.48	0.186	150.26	0.44
1998	0.097	92.27	0.32	0.605	155.89	0.47	0.223	188.46	0.38
1999	0.114	107.77	0.29	0.641	185.30	0.35	0.164	221.59	0.43
2000	0.089	106.52	0.29	0.575	185.76	0.39	0.263	219.49	0.32

Source: TURKSTAT, 2001

Table 8 shows that price increases vary between 30 and 50 percent in importing and competing industries. After 1986, the range decreased by an overall increase to 40 to 50 percent. There is no observable difference between these two sectors in terms of shaping rates. On the other hand, as in real wages, increases in

export sectors are clearly below the average of manufacturing. According to the data, the rate of increase is systematically higher in sectors competing with imports compared to exporting sectors that are less open to foreign competition. The export-led growth in Turkey, for example, after 1980 reveals that encourage specialization in low value-added activities.

Table 9: Selected Indicators of Turkish Economy: 1979- 2000

Years	Real GNP Growth (% Change)	Real Industrial Growth (% Change)	PSBR/GNP	CPI (% Change)	Foreign Trade Deficit/ GNP	Mnfc. Real Wage Ind.
1979	-0,5	-5	7,2	56,81	3,4	(-)
1980	-2,8	-3,6	8,8	115,6	7,3	100
1981	4,8	9,9	4	33,91	7,5	100,37
1982	3,1	5,1	3,5	21,91	4,8	95,05
1983	4,2	6,7	4,9	31,39	5,8	91,75
1984	7,1	10,5	5,4	48,4	6,1	80,98
1985	4,3	6,5	3,6	44,95	5,1	78,51
1986	6,8	13,1	3,7	34,62	4,9	74,59
1987	9,8	9,2	6,1	38,85	4,6	90,28
1988	1,5	2,1	4,8	73,7	3	89,92
1989	1,6	4,9	5,3	63,27	3,9	111,47
1990	9,4	9,3	7,4	60,3	6,1	138,95
1991	0,4	2,9	10,2	66	4,9	194,4
1992	6,4	6,2	10,6	70,1	5,1	216,56
1993	8,1	8,3	12	66,1	7,7	235,83
1994	-6,1	-5,7	7,9	125,5	3,9	185,93
1995	8	12,5	5	89,1	8,2	147,51
1996	7,1	6,8	8,6	80,37	11,1	146,91
1997	8,3	10,2	7,7	85,73	11,7	156,64
1998	3,9	2	9,4	84,6	9,3	167,85
1999	-6,1	-5	15,5	63,61	7,5	195,29
2000	6,3	6	11,8	53,93	11,2	204,05

Source: TURKSTAT, 2001.

Policies designed to create an exportable surplus by suppressing domestic demand had their results in the early 1980s. The foreign trade deficit continued to decrease until 1988. Public Sector Borrowing Requirement (PSBR) and inflation

rates also experienced a downward trend. However, with the return to electoral democracy in 1987, all economic variables started to approach their initial values.

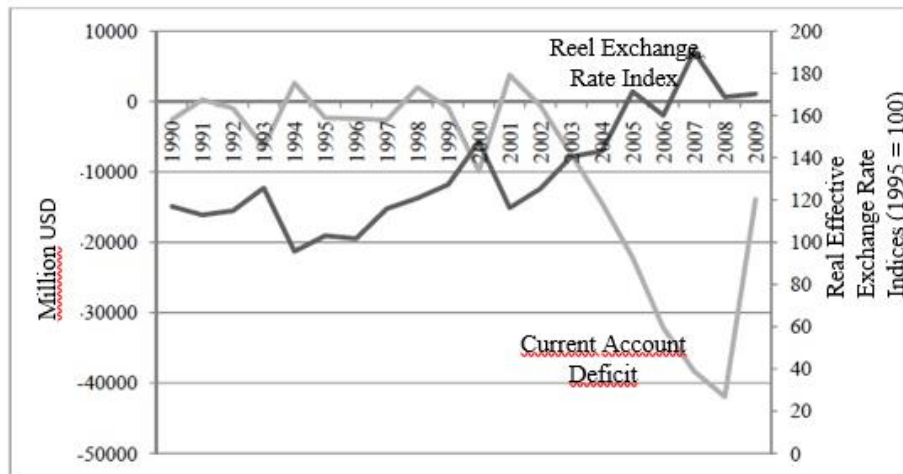
Until the 2000s, a turbulent economy was experienced and deep crises emerged. In times of economic expansion, the growth rate of the manufacturing sector exceeded the GDP growth rate (Şahbaz, 2010). In the last thirty years, the economy has entered a difficult period due to various crises that have occurred. The Gulf crisis in 1991 increased the foreign currency and oil prices increased. Therefore, the rate of growth has decreased and the private sector borrowing abroad at the end of 1993 caused a serious crisis in 1994. Between 1995 and 1998, the country's economy grew rapidly and stabilized. During this time, in 1996, Turkey has been a member of the Customs Union. The Southeast Asian crisis in 1997 and the Russian crisis in 1998 slowed economic growth. It was observed that the contraction in the manufacturing sector as a result of the crises experienced in 1999 and 2001 remained at a lower level compared to the entire economy (Güzel, 2015).

3.2. 2000-2020 PERIOD

Export-led growth policies adopted in Turkey in 1980, the Customs Union in 1996 and developed further after the crisis in 2001, a variety of configurations. Afterwards, in the 2000s the completion of the Customs Union and the International Monetary Fund (IMF) under the influence of economic policy has continued under the supervision of the sustainable development of the manufacturing industry in Turkey (Şahbaz, 2010). It is observed that the Customs Union has preserved its influence against the structural changes in the country since its completion. In the structural change in the manufacturing industry, it is seen that low-wage industry branches are given importance and the understanding of the sector based on production and export is emphasized in the assembly of imported intermediate goods (Şahbaz, 2010). Countries that are parties to the Customs Union should give up an independent foreign trade policy. Turkey has tried to encourage the independent foreign trade policy of the possibility of lost trade followed by the exchange rate policy. The overvalued TL policy, which is generally followed after corrective devaluations during crisis periods, has been adopted as the main instrument in the

industrial sector's orientation towards exports. However, this situation made imports cheaper and caused both an increase in the dependence of the sector on imports and an asymmetrical growth, in other words, a structural deterioration (Şahbaz, 2010). As it is known, after the 2000 and 2001 financial crises, exchange rates were left to fluctuate. Turkey's current account deficit increased rapidly after the 2001 crisis. The reason for this is the rapid increase in imports with the increase in exports (Şahbaz, 2010). In this case, the use as a factor in Turkey's imports of intermediate goods and imported machinery and equipment use is said to be cheaper. In this way, the abundant capital inflow in the country changed the foreign exchange prices and the national currency started to appreciate (Şahbaz, 2010).

Graph 1: Current Account Deficit and Developments in Real Exchange Rates (1990-2009)

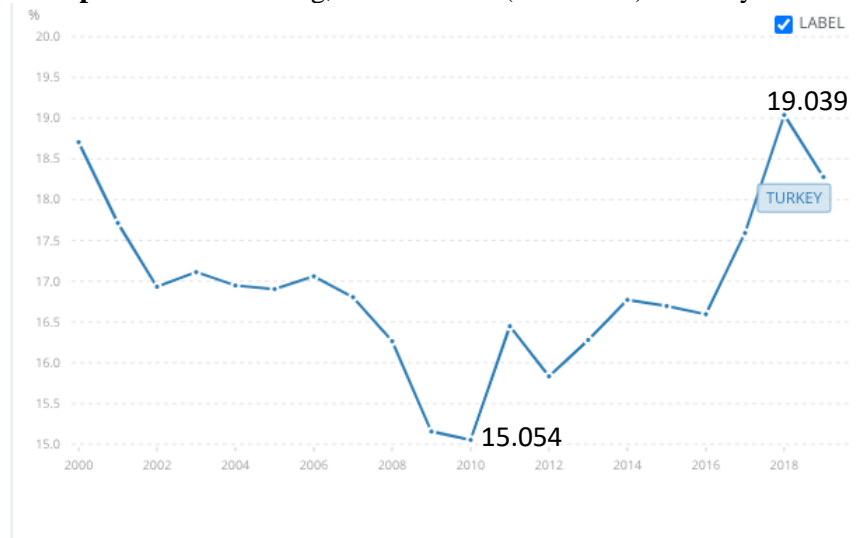


Source: The Central Bank of the Republic of Turkey (CBRT), Electronic Data Delivery System (EVDS), 2009

Graph 1 shows the increase in the real exchange rate index after 2001. While the real exchange rate index increased after the crisis in 2001, it is observed that after reaching the peak in the current account deficit, it started to decrease until 2008 and then started to increase again.

In order to overcome the crisis, the Transition to a Strong Economy Program was put into practice in 2001. The main goal of this program has been to restore macroeconomic balances by eliminating unsustainable debt dynamics (Şahbaz, 2010).

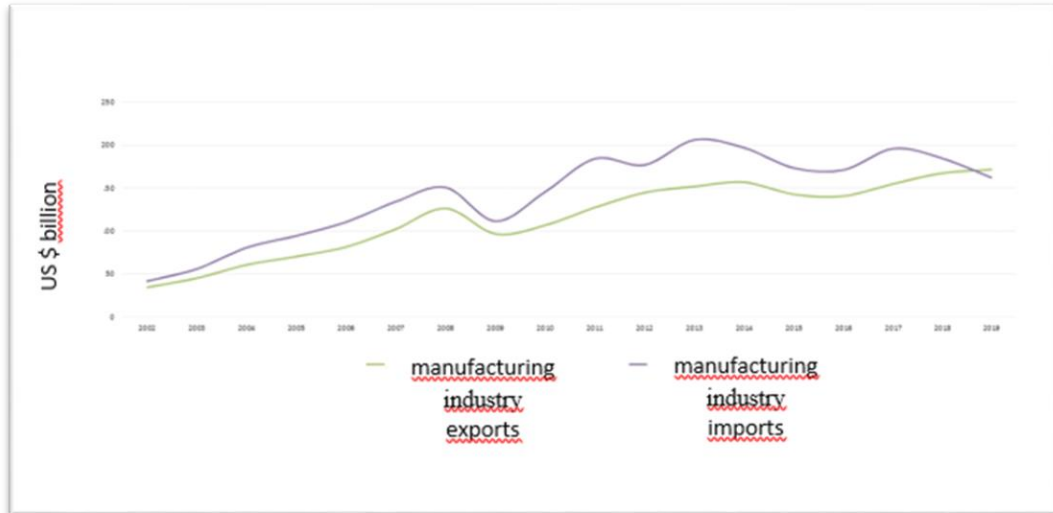
Graph 2: Manufacturing, Value Added (% of GDP) - Turkey



Source: World Bank, National Accounts Data and OECD National Accounts Data Files, 2019

Graph 2 shows the percentage GDP values by years. While the lowest GDP value was seen in 2010 with %15.054, the highest GDP value was observed in 2018 with %19.039. The gross domestic product (GDP) represents the sum of the added value of all its producers. Value added is the value of the producers' gross output minus the value of intermediate goods and services consumed in production before taking into account fixed capital consumption in production. Both valuations do not include shipping charges billed separately by manufacturers. Total GDP is measured at buyer prices. Value added by industry is normally measured at basic prices. Value added is the net output of a sector after collecting all outputs and subtracting intermediate inputs.

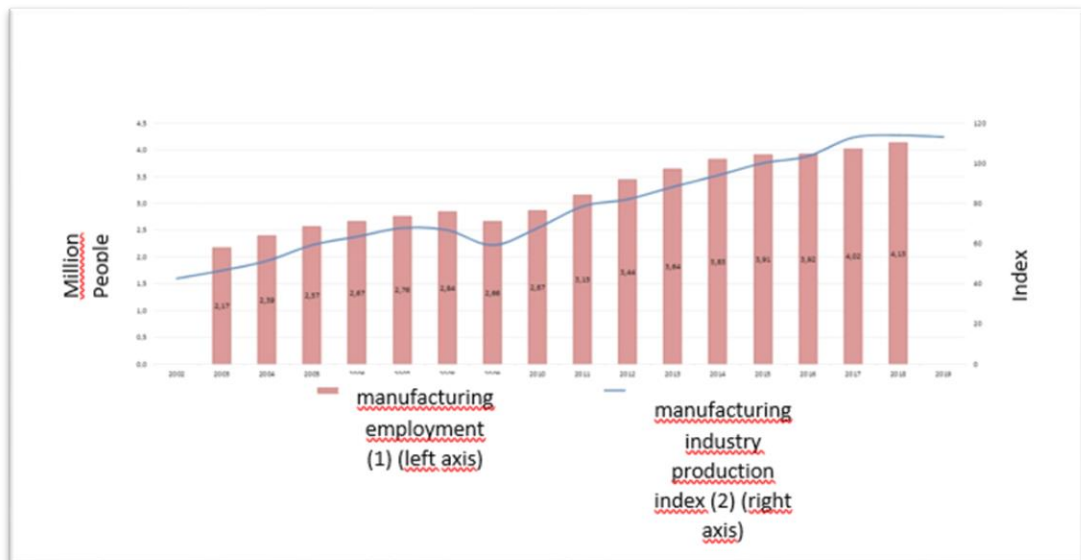
Graph 3: Manufacturing Industry Export and Import



Source: TURKSTAT, 2020. (Foreign Trade According to ISIC rev4 Classification According to the General Trade System of 2013 and after).

According to the TURKSTAT General Trade System data for 2019, the exports of the manufacturing industry were 171.22 billion dollars and the imports were 162.14 billion dollars. While the ratio of exports to imports in the manufacturing industry was 90.6% in 2018, it increased to 105.6% in 2019.

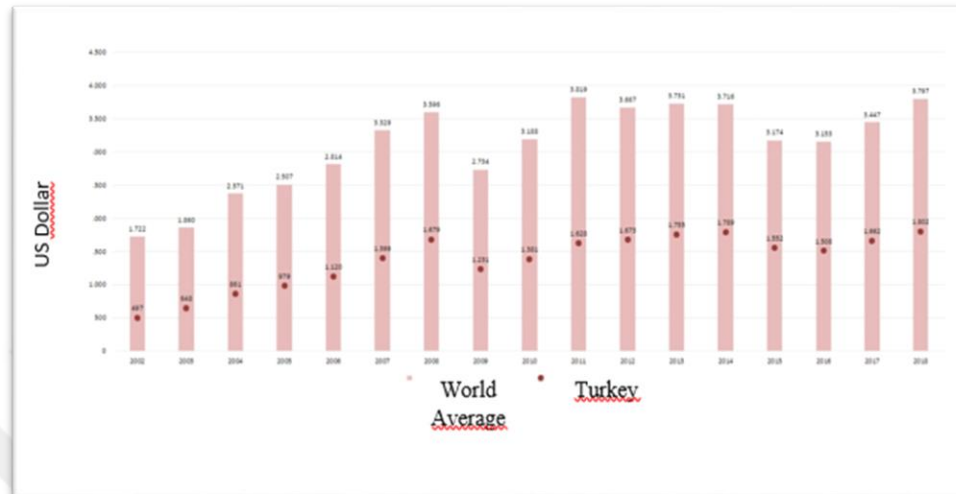
Graph 4: Manufacturing Industry Production Index and Employment



Source: (1) Number of Employees According to TURKSTAT, NACE Rev 2 Classification (2) TURKSTAT, Industrial Production Index according to NACE Rev 2 Classification (2015 = 100), Unregulated.

Production Index and employment continue the general increasing trend of 2002-2018. 2020 UNIDO "Competitive Industrial Performance Index" According to the data, Turkey was ranked 29 in 152 countries.

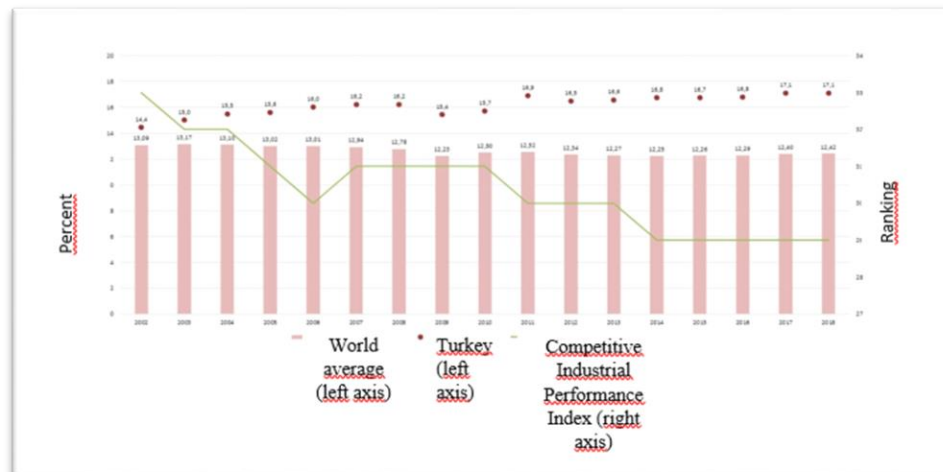
Graph 5: Per Capita Manufacturing Industry Exports



Source: UNIDO Competitive Industrial Performance (CIP) 2020 Database

Manufacturing industry exports per capita continued its course parallel to the world average in the 2002-2018 period.

Graph 6: The Share of Manufacturing Industry Value Added in GDP

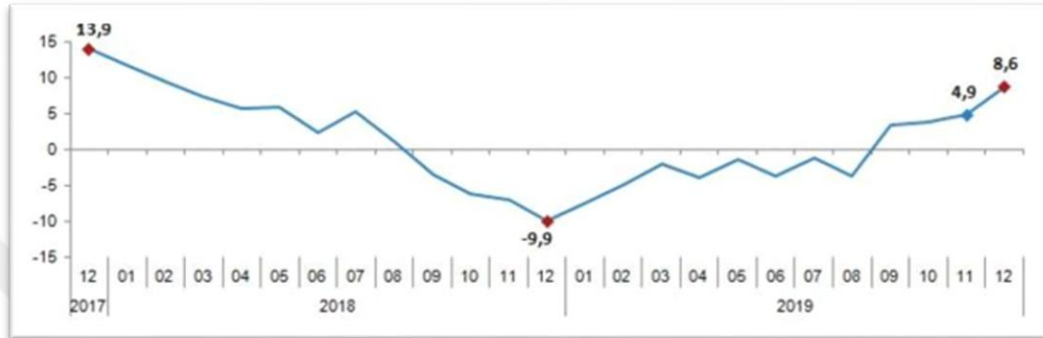


Source: UNIDO Competitive Industrial Performance (CIP) 2020 Database

The share of manufacturing industry value added in GDP continued to be above the world average and reached 17.1% in 2018.

In 2010, a two-year medium-term program was implemented. In this plan, there are general objectives such as reducing the effects of the global crisis, bringing the economy back to the growth band and keeping inflation in a single digit. After this crisis, the economy did not reach the desired level, the GDP did not rise and industrial production fell.

Graph 7: Industrial Production Index Annual Rate of Change (%), December 2019



Source: TURKSTAT, 2020.

Industrial production data is considered as the leading data of growth. Turkey Statistical Institute (TUIK), in December, data showed industrial production to rise by 8.6 percent compared to the same month of the previous year. This situation is the fastest increase since February 2018. Thus, industrial production increased for four consecutive months on an annual basis. In 2019, industrial production decreased by 0.6 percent compared to the previous year. Calendar adjusted industrial production increased by 5.8 percent in the fourth quarter of 2019 compared to the same quarter of the previous year. Seasonal and calendar adjusted industrial production increased by 1.5 percent compared to the previous quarter.

CHAPTER IV

LITERATURE REVIEW

Until today, many empirical studies have been conducted examining the effects of exports on economic growth. The findings of the studies belonging to these studies, selected from national and international literature, are summarized in Table 10. Different methods were used in the empirical studies in terms of data set, analysis methods used and sample group. When the studies investigating the causality relationship between export and economic growth are examined; in some of the studies, sample groups of countries in which Turkey is located (Sharma and Dhakal, 1994), while the other part was only seen that Turkey is evaluated (Yigit and Kose, 1997; Ozmen et al., 1999; Floor and Transfer, 2005; Yapraklı, 2007). As in the entire literature of Turkey addressed areas of study in different results: Kotil and Threads (2010), Floor and Transfer (2005), Demirhan (2005), Lamellar (2007), and Halicioğlu (2007) wherein the work of export-led growth in support of the hypothesis, studies conducted by Yiğidim and Köse (1997), Tuncer (2002) and Yapraklı (2007b) have found evidence to support growth-based exports. In the studies conducted by Bahmani-Oskooe and Domac (1995), Ay, Erdoğan and Mucuk (2004) and Erdoğan (2006), a two-way relationship between exports and growth was found.

Table 10: Literature Review (Summary)
Examples of Empirical Studies from Turkey

Author	Country	Period	Method	Finding
Taymaz (1997)	Turkey	1985-1992	ISIC-4-digit level EKK	Estimation results show that technological change has a very important (indirect) effect on employment due to some problems in the analysis is the employment effects of technological change even been overestimated, though, as seen in this article, the importance for Turkey of technological change shows that clearly needs to be done the work to develop this analysis.
Özmen vd. (1999)	Turkey	1987: I- 1997: II	Johansen cointegration	No relationship
Filiztekin (2000)	Turkey	1970-1996	Granger-causality tests.	After the economy is opened to free trade there are significant improvements in productivity growth and increasing share of trade contributes significantly and positively to the performance of the economy with more contribution is through increased imports rather than exports.
Yalçın (2000)	Turkey	1983-1994	4-digit ISIC level Fixed Effect and Random Effect Models. TSLS (Two Stage Least Square) estimation.	The excess profits resulted from oligopolistic market structure have been removed significantly in the public sector under the pressure of imports and export expansion, whereas they have increased to some extent in the private sector.
Kaya, Üçdoğruk (2002)	Turkey	1981-1997	4-digit ISIC level	Entry and exit rates in an industry is largely determined by the variables that represent the concentration level, profitability, the capital requirements and the cost structure and lastly the growth rate of the industry.

Table 10 (Continued)

Akgüngör (2003)	Turkey	-	4-digit driver industries.	Each geographical region in Turkey is specialized in at least one cluster, and in general such clusters' employment in the regions' total employment is greater than 50%. The spatial distribution of the highpoint clusters and their driver industries indicate that each region has unique characteristics with respect to development priorities.
Filiztekin (2004)	Turkey	1981-1999	Campa and Goldberg Model	Devaluation of the Turkish Lira hurts both employment and wages in Turkey significantly. The elasticity of both employment and wages also shows significant variation across industries as their external exposure varies. Wages are found to be more sensitive to movements in exchange rates than employment.
Taban ve Aktar (2005)	Turkey	1923-1979 1980-2003	Engle-Granger Causality Johansen cointegration.	Export-led growth hypothesis (Export→growth)
Erdoğan (2006)	Turkey	1923-2004	Granger Causality	Export-led growth hypothesis (Export→growth) growth-based export hypothesis (growth→export)
Tanrıseven (2007)	Turkey	1980-2005	Balanced Panel Data Method Ordinary Least Squares Estimation	In the evaluation made with Balanced Panel Data Analysis, the result is showing that the openness is affecting the economical growth positively. And in the other method, the results according to the sectors are come out as positive and negative points.

Table 10 (Continued)

Bozkurt (2007)	Turkey	1980-2001	GMM- system dynamic panel data method	While it is seen that there is a positive and significant relationship between the growth trend of the manufacturing industry in the short term, the fact that a positive and meaningful relationship cannot be detected between the fixed capital investments and the growth trend of the manufacturing industry reveals an extremely important and thought-provoking result. A positive and meaningful relationship has not been found between sectoral A&G expenditures, the most important indicator of technological development, and the growth trend of the Turkish manufacturing industry.
Keçeli (2007)	Turkey	-	Kaldor's Growth Model, KEG Hypothesis of Kaldor	In Turkey, from the beginning of the republican era, there seems to be a relatively stable increase in manufacturing industry and services sector's share of output and employment in contrary with the agricultural output and employment and this stability is confirmed by Kaldor's Laws and some other functions derivated from Kaldor's Laws though some terms of economic stagnancy.
Kurt and Terzi (2007)	Turkey	1989:1-2003:04	VAR models ADF test	Export-led growth hypothesis (Export→growth)
Akal (2008)	Turkey	1982-2000	Durbin-Watson test Dickey-Fuller Test (LQXM and LQMM models)	There is not a significant Granger causal simultaneity between the manufacturing export and its prices, between the manufacturing impority and its prices. There is no causality between the manufacturing export and domestic output; between the manufacturing import and world output even the Pearson correlation coefficients between these variables were estimated high.
Kızılca and Özcan (2008)	Turkey	1980-2000	4-digit	There is a significant and negative correlation between export performance and mark-up ratios. Export performance in Turkish manufacturing is historically based on keeping wage costs low, non-taxation of and/or providing government subsidies to exporting sectors and low level of mark-up ratios.

Table 10 (Continued)

Saraçoğlu and Suiçmez (2008)	Turkey	1987-2007	Cointegration Analysis.	There is a negative relationship (correlation) between the productivity and employment and positive relationship (correlation) between productivity and the wages. Another important finding is that especially after 1997 while production and productivity were increasing, employment and the wages were decreased.
Terim and Kayalı (2009)	Turkey	2000-2007	Least Squares Method (EKKY)	Findings of positive and economically significant firm size variables support the theory of balancing and representation costs theory in the same direction as expectations in many studies on developed and developing countries.
Taymaz, Voyvoda and Yılmaz (2009)	Turkey	1988-1993	Granger-causality approach.	Findings provide support for the 'Democracies pay higher wages' hypothesis. Demands for higher wages do not leave room for complacency among plant managers. It also provides an explanation for why countries that went through an orderly transition from autocracy to democracy achieved rapid productivity gains during the transition period.
Soyyigit (2010)	Turkey	1990-2008	Toda-Yamamoto causality approach.	Export of manufacturing industry and GDP is dependent on import of intermediate goods and investment goods.
Şahbaz (2010)	Turkey	-	Root test, cointegration, causality and error correction methods	Positive changes in imports cause growth in manufacturing production and improvements in exports. However, same improvements are not seen in employment.
Polat (2011)	Turkey	After 1980	TUIK indicators analysis.	It is seen that the manufacturing industry sector, which constitutes an important part of GDP, is mostly foreign-dependent in terms of inputs used in production, causing it to be very sensitive in terms of employment and foreign trade against the economic crises affecting exchange rates.
Bayat, Aydın, Kayhan and Adgüzel (2011)	Turkey	1960-2005	Dickey Fuller and Dickey Fuller-GLS unit root test Toda-Yamamoto and Dolado-Lütkepohl causality tests Lee-Strazicich unit root test	It is clear that there is no relationship between electricity consumption and employment in manufacturing industry. Economic growth increases electricity consumption in manufacturing industry.

Table 10 (Continued)

Balaylar (2011)	Turkey	1996-2009	Indicator Analyses	While the dependence rates of production and exports on imports have increased, it has been determined that production increases are realized in sectors that are relatively technology intensive and have high dependency rates on imports. It has been determined that the companies operating in the manufacturing industry meet their financing needs mainly by borrowing in foreign currency and this situation increases the dependency of imported inputs. These developments, which have created the ground for high real exchange rates, weakened the relationship between the amount of production and employment in the manufacturing industry.
Özutku (2012)	Turkey	-	ANOVA and MANOVA analyses.	It has been found that there is a significant difference between intrinsic and extrinsic rewards in terms of their effect on people results performance indicators. The use of intrinsic reward practices exhibited a significantly positive effect on people results performance indicators. However, it has been determined that effect of extrinsic reward practices on people results is not significant.
Altıok and Tuncer (2012)	Turkey	1980-2008	Conventional Shift-share analysis.	Structural change is unimportant in explaining productivity growth for the period 1981- 1990 and 1991-2000. Moreover, the structural change seems to bring a drag on productivity rather than a bonus during 1981-2000.
Ateş (2012)	Turkey	1963-1998	VAR models ADF unit root test Granger-causality test	Turkey in any sector of the private manufacturing sector, long-term positive shock units for the Total Factor Productivity Growth Rate indicates whether the growth effects occur.
Uzay, Demir and Yıldırım (2012)	Turkey	1995-2005	Levin-Lin-Chu (LLC) EKK Durbin-Watson (DW) Jarque-Bera (JB)	Exchange rate and exchange rate volatility, as envisaged in theory, Turkey has an effect on the export performance of the manufacturing industry. This finding implies the importance of exchange rate policies and policies that will stabilize the exchange rate can contribute to exports.

Table 10 (Continued)

Yavuz (2012)	Turkey	1949-2010	ADF unit root test Granger causality test EG cointegration test	Export-led growth hypothesis (Export→growth)
Saraç (2013)	Turkey	1989:2-2011:4	Lee-Strazicich unit root test.	Exports and imports effect economic growth positively during the contraction and expansion periods of economy.
Manavkat (2014)	Turkey	-	Panel data analysis Breughsh-Pagan Test LM Hausman Model Test	The provision of structural transformation from a very competitive price in increasing the international competitiveness of Turkey has emerged as a necessity.
Bayar and Tokpunar (2014)	Turkey	2005Q1-2011Q1	Augmented Mean Group-AMG	Regression results show that, sectoral exports and imports, total investment expenditures, sectoral productivity and GDP of trade partners of Turkey affects manufacturing sectors' production positively, as expected. On the otherhand, appreciation of the real exchange rate harms industrial production. An increase in interest rates also has a dampening effect on industrial production
Orhunbilge and Kuzu (2014)	Turkey	January 1989-March 2013	Co-integration analysis Dynamic Ordinary Least Square	There was no relationship between Manufacturing Industry Production with Cointegration Analysis and the import and export of this industry. It has been determined that there is a long-term relationship between Manufacturing Industry Imports and Exports. Manufacturing Industry foreign trade deficit was found to be sustainable.
Önder and Hatırlı (2014)	Turkey	1994-2009	Granger-causality test Hausman test 3AEKK	Export-led growth hypothesis (Export→growth) growth-based export hypothesis (growth→export)
Güzel (2015)	Turkey	1998(Q1)-2015(Q1)	Kruskal-Wallis Test ADF (Augmented Dickey-Fuller), PP (Phillips-Perron), KPSS unit root test Engle-Granger cointegration test	Growth based export (growth→export)

Table 10 (Continued)

Abdiođlu and Yamak (2016)	Turkey	2005:01-2016:01	Dickey-Fuller Philips Perron ADF and Akaike Information Criterion (AIC)	Verdoorn law only for the manufacture of tobacco products is valid from nine sectors in Turkey.
Alvan (2016)	Turkey	1990-2000	Deflator Growth Accounting Approach	Raw labor's contribution to manufacturing industry's output growth (RLC) is negative; therefore, human capital's contribution to output growth (HCC) explains most of the contribution of labor. Furthermore, main explanatory variable in human capital's contribution to output growth (HCC) comes from the quality improvement of human capital (QIHC) component.
Çetintaş and Bicil (2016)	Turkey	1998-2016	ARDL model and error correction model	Export-led growth hypothesis (Export→growth)
Ünlü and Bozdağ (2016)	Turkey	2001: Q1- 2015: Q2	Lee and Strazicich unit root test Gregory and Hansen	Export-led growth hypothesis (Export→growth) growth-based export hypothesis (growth→export)
Yükseler (2016)	Turkey	1997-2015	TUIK NACE Rev.2 indicator review	In the analyzed period, the export profit margin index, which was calculated based on the nominal unit fee, export prices and the change in the dollar exchange rate, generally showed a positive development. The desired level of manufacturing industry technology level could not be reached.
Demirci (2017)	Turkey	1999-2015	Johansen cointegration test VECM based Granger causality test.	Production and bank credits in the manufacturing industry sector are cointegrated, there is a positive relationship between these variables and causality from production to bank credits in the long run. Turkish manufacturing industry sector support the demand following view stating that financial sector follows real economy.

Table 10 (Continued)

Gezici, Walsh and Kacar (2017)	Turkey	-	Geographically Weighted Regression Analysis (GWR) ANOVA Test	Two models not only emphasize that the relationships vary across the space, but also highlights that the factors of manufacturing agglomerations are dominated by neo-liberal forces (international trade and availability of financial capital).
Kundak and Aydoğuş (2018)	Turkey	1996-2011	Levin, Lin&Chu (LLC), Im, Pesaranad Shin (IPS) and Philips Peron (PP), Breitung (BR), Pedroni Panel Cointegration Method	According to research results, the parameters in long term, Exchange rate, fixed capital investments, in GDP, a rise in wages of reduce import dependency was found. Short-Term parameters in the Exchange rate and a rise in GDP of reducing import dependency was found.
Aslan and Topçu (2018)	Turkey	2000-2015	LLC and IPS tests. Pedroni cointegration test. (panel v, panel rho, panel PP and panel ADF, group rho, group PP and group ADF)	Export-led growth hypothesis (Export→growth)
Güngör and Yıldırım (2018)	Turkey	2003-2015	Panel Data Analysis	Employment elasticity of exports is higher in capital intensive sub-sectors of manufacturing industry than labor intensive sub-sectors.
Ekşi (2019)	Turkey	-	Indicator Analysis	The production of the manufacturing sector, which exports almost all of Turkey's economy is dependent on the amount of imported intermediate inputs while performing create and again reached the conclusion that the largest amount of imports.
Hacievliyagil and Ekşi (2019)	Turkey	-	Cointegration test Toda Yomamoto causality test	Financial sector leads and causes economic growth

Table 10 (Continued)

Kozhan (2019)	Turkey	1990-2017	Indicator Analysis	Employment in the manufacturing industry has increased steadily over the coming years, but it has not been at a level to prevent it from lagging behind these sectors. The increase in costs prevents the manufacturing industry capacity utilization rate to reach the desired level.
Tekkeli (2019)	Turkey	1996-2018	Johansen cointegration Granger causality Toda-Yamamoto causality tests	No Relationship
Tüzemen and Tüzemen (2019)	Turkey	2005: Q1-2017: Q4	Hacker and Hatemi-J and Hatemi-J methods Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) unit root tests	The direction of the causality is from the negative shocks of the unemployment rate to the negative shocks of the manufacturing industry. The results support the jobless growth phenomenon for the manufacturing sector in Turkey.
İlbeyli (2020)	Turkey	2002Q1-2018Q4	Toda Yamamoto causality test	Export-led growth hypothesis (Export→growth) growth-based export hypothesis (growth→export)
Examples of Empirical Studies from The World				
Tsen (2005)	Malaysia	1980-2002	Dickey and Fuller test and Phillips and Perron test Johansen co-integration method Fully modified least squares (FMLS)	Education, infrastructure, market size and current account balance have a positive impact on FDI in Malaysia. Inflation and exchange rate are found to have a negative impact.
Jeon (2006)	China	1979-2004	Hausman specification test	Export-led growth hypothesis (Export→growth)

Table 10 (Continued)

Lean (2008)	Malaysia	1980-2005	Granger causality test The Phillips- Peron unit root test (PP)	The empirical findings suggest that the FDI and the growth in the manufacturing sector are independent.
Libanio (2009)	Latin America	1985-2001	Feasible Generalized Least Squares Two-stage Least Squares (G2SLS)	Results support Kaldor's views on the importance of manufacturing industry for economic growth.
Kılavuz and Topçu (2012)	22 developing countries	1998-2006	Fully Modified OLS (FMOLS) Panel unit root tests The Ordinary Least Squares (OLS), Random Effects (RE), Fixed Effects (FE) and Panel Corrected Standard Errors (PCSE)	Export-led growth hypothesis (Export→growth)
Adofu, Taiga and Tijani (2015)	Nigeria	1990-2013	Ordinary Least Square Method	The average production capacity utilization rate has contributed positively and is in a significant relationship with the growth of real gross domestic product; the exchange rate and interest rate did not contribute to the increase in gross domestic product, indicating macroeconomic instability; inflation rate contributed positively to the increase in gross domestic product.
Su and Helian (2015)	China	-	VAR Model ADF method Granger causality Test	One-way Granger causality exists between the equipment manufacturing industry and GDP, which indicates the stimulating effect of equipment manufacturing industry on GDP is stronger (though not obviously) than vice versa.

Table 10 (Continued)

<p>Kaya, Yalçınkaya (2016)</p>	<p>BRICS+ (Turkey, South Korea, Mexico, Indonesia)</p>	<p>1992-2012</p>	<p>Panel unit root test (Levin, Lin, Chu, Im, Pesaran, Shin, Maddala and Wu) Pedroni Cointegration analysis Kao cointegration analysis Johansen-Fisher cointegration analysis FMOLS tests</p>	<p>Other countries are catching a sustainable growth rate of Turkey to the infrastructure needed for a sustainable growth of its economic performance have not yet seen that.</p>
<p>Oburota and Okoi (2017)</p>	<p>Nigeria</p>	<p>1981-2013</p>	<p>The Augmented Dickey-Fuller (ADF) tests The Johansen co-integration test</p>	<p>Findings from the research showed that production, capital and technology are the main determinants of economic growth. The results also confirm that the quality of the institutions and the workforce have no impact on economic growth.</p>
<p>Bebun, Gavurova, Tkacova and Kotaskova (2018)</p>	<p>EU 22 Countries (Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, UK)</p>	<p>Q1:2000-Q4:2016</p>	<p>Seasonal adjustment of time series (seasonal indexes) Elimination of trend (Hodrick-Prescott filter) Cross correlation and Pearson correlation coefficient</p>	<p>The results of analyses indicate that the manufacturing industry is a sector with significant cyclical behavior.</p>

CHAPTER V

EMPIRICAL ANALYSIS, DATA AND METHOD

5.1. DATA

The aim of this study was to investigate whether there is a causal relationship between economic growth with manufacturing exports in Turkey. In the study, the relationship between manufacturing industry exports and economic growth is analyzed econometrically. In the estimation of the relationship in question, the annual time series of the 1980-2019 period has been used for Turkey. The reason for using annual time series in the study is the lack of data. Explanations regarding the variables are included in Table 11.

Table 11: Variables Included in the Model

MX	Manufacturing Industry Export (Value, Billion TL)
GDP	Gross Domestic Product (Value, Billion TL)
RI	Real Interest
K	Fixed Capital Investments (Value, Billion TL)
CUR	Manufacturing Industry Capacity Utilization Rates

The aim of this study is to reveal the relationship between manufacturing industry exports and economic growth by using econometric methods. The variables of real interest, fixed capital investments, manufacturing industry capacity utilization rates other than manufacturing industry exports (MX) and GDP are used as control variables in the empirical model established in the study. The manufacturing industry exports used in the study (MX) series is expressed in terms of US dollars before being included in this variable model Central Bank of the Republic of Turkey

(CBRT) has been converted into TL using the monthly average exchange rate. GDP (1998 fixed by expenditure method) refers to economic growth. In addition, the unit value indices of the manufacturing industry exports used in the study and GDP and fixed capital investments were realized with the GDP deflator. All of the variables discussed in practice are seasonally adjusted. Eviews 10 econometric program was used in the estimation of the model. In the compilation of the data, CBT, Turkey Statistical Institute (TURKSTAT), Turkey has benefited from President of the Republic of Strategy and Budget Department of Statistics.

5.2. METHOD

First of all, it is determined whether the series are stationary or not. Augmented Dickey-Fuller (Augmented DickeyFuller-ADF) (1981) and Phillips-Perron (PP) (1988) unit root tests were used to analyze the stationarity of the series. Table 12 shows the ADF and PP unit root test results of the variables used in this study. Schwarz Information Criteria (SC) was used to determine the optimal lag number (Lutkepohl, 1985). The values given in parentheses in Table 12 indicate the lag lengths.

Table 12: ADF and PP Unit Root Test Results

Variable	ADF Test Statistics		Phillips-Perron Test Statistics		Result
	Statistic	P-value	Statistic	P-value	
MX	-2.512193 (1) Constant	P= 0.1206	0.760203 (4)* Constant, trend	P=0.9608	Have a unit root
GDP	-0.364818 (0) Constant, trend	P= 0.9855	-0.380701 (2)* Constant, trend	P= 0.9849	Have a unit root
RI	-2.480948 (0) Constant, trend	P=0.3352	-2.483800 (1)* Constant, trend	P=0.3339	Have a unit root
CUR	-3.296871 (0) Constant, trend	P= 0.0918	-3.179660 (1)* Constant, trend	P= 0.1033	Have a unit root
K	3.119524 (2) Constant	P= 0.9918	8.169934 (1)* none	P= 0.9989	Have a unit root
DMX	-3.445457 (0) Constant	P=0.0153	-3.396150 (3)* Constant	P=0.0173	Not have a unit root
DGDP	-4.731942 (0) Constant	P= 0.0005	-4.746964 (2)* Constant	P=0.0004	Not have a unit root

Table 12 (Continued)

DRI	-5.727192 (0) Constant	P= 0.0000	-5.727503 (1) Constant	P= 0.0000	Not have a unit root
DCUR	-8.348033 (0) Constant	P= 0.0000	-8.494461 (2)* Constant	P=0.0000	Not have a unit root
DK	-4.299416 (0) Constant, trend	P= 0.0082	-4.291884 (1)* Constant, trend	P=0.0083	Not have a unit root

Note: As a result of the tests, if the p-value is found to be higher than 0.05, it is decided that there is unit root, otherwise, it is decided that there is no unit root. * Bandwidth (Newey-West using Bartlett kernel) Phillips-Perron. The "D" used in front of the variables indicates that the first difference is taken.

ADF and PP unit root tests were applied to the levels of the variables, and it was seen in the test results that the variables were not stationary at their level. The findings obtained by applying the same tests to the first-order difference of the variables indicate that the first-order differences of the variables are stationary at the 5% significance level. Kwiatkowski, Phillips, Schmidt, Shin (KPSS) (1992) test of trend stability was conducted to support that the series are difference-stationary. KPSS test results are included in Table 13.

Table 13: KPSS Test Results

Variable	LM-Stat	Constant, Trend	Asymptotik Critical Value (%5)	Result
MX	0.212729	constant, trend	0.146000	not stationary (unit root exists)
GDP	0.195628	constant, trend	0.146000	not stationary (unit root exists)
RI	0.167528	constant, trend	0.146000	not stationary (unit root exists)
CUR	0.156952	constant, trend	0.146000	not stationary (unit root exists)
K	0.628046	constant	0.463000	not stationary (unit root exists)
DMX	0.452066	constant	0.463000	stationary (no unit root)
DGDP	0.068903	constant, trend	0.146000	stationary (no unit root)
DRI	0.298368	constant	0.463000	stationary (no unit root)
DCUR	0.184554	constant	0.463000	stationary (no unit root)
DK	0.454534	constant	0.463000	stationary (no unit root)

According to Table 13, it was concluded that the LM test statistics belonging to the levels of the variables are absolutely greater than the critical values of the

KPSS test at the 5% significance level, so they are not stationary and they contain unit root. Findings obtained from the first order difference of variables indicate that the difference of variables is stationary. The findings obtained from the KPSS test support the results obtained from ADF and PP unit root tests. *As a result, the maximum degree of integration (dmax) of the variables was found to be 1.*

The fact that all of the variables in the study were first-order stationary, enabled the cointegration analysis to be performed together with the Vector Autoregression Analysis (VAR). The most important condition when establishing the VAR model is the correct estimation of the VAR lag length determined by the information criteria. The determination of the optimum lag length in the VAR model is reported in Table 14.

Table 14: Determination of Optimum Lag Length in VAR Model

Lag	LR	FPE	AIC	SC	HQ
0	NA	4.57e+45	119.3250	119.5426	119.4017
1	375.5391*	9.81e+40*	108.5621*	109.8683*	109.0226*
2	24.30955	1.61e+41	108.9785	111.3731	109.8227
3	34.39770	1.49e+41	108.6919	112.1749	109.9198

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

In the study, the lag length was determined as 1 according to the information criteria of LR, FPE, AIC, SC and HQ. As a result of the identification tests, it was concluded that there was no autocorrelation and variance problem in the VAR model, which was established considering 1-lag at a significance level of 5%. Accordingly, it was decided that the optimal lag number (k) is 1.

Later in the study, cointegration analysis was approved. Johansen- Juselius (JJ) (1990) cointegration analysis results are given in Table 15.

Table 15: Cointegration Test Results

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.597152	74.92212	69.81889	0.0185
At most 1	0.405447	40.37268	47.85613	0.2094
At most 2	0.244618	20.61476	29.79707	0.3821
At most 3	0.145358	9.954542	15.49471	0.2842
At most 4 *	0.099575	3.985766	3.841466	0.0459
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.597152	34.54944	33.87687	0.0415
At most 1	0.405447	19.75792	27.58434	0.3581
At most 2	0.244618	10.66022	21.13162	0.6811
At most 3	0.145358	5.968776	14.26460	0.6172
At most 4 *	0.099575	3.985766	3.841466	0.0459
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

According to Table 15, the null hypothesis claiming that there is no cointegration was rejected by the trace and maximum eigenvalue test statistics, and it was found that there was only one cointegration relationship in the model. In other words, it can be expressed that there is a long-run relationship between manufacturing industry exports and GDP, which is used to represent economic growth.

Normalized cointegrated equations obtained from the analysis are as follows:

$$\text{GDP} = 97.474 \text{ MX} - 53.993 \text{ RI} + 10.727 \text{ CUR} - 6.208 \text{ K}$$

t-value [2.253] [1.058] [0.121] [2.685]

$$\text{MX} = 0.011 \text{ GDP} + 55.392 \text{ RI} - 11.005 \text{ CUR} + 0.006 \text{ K}$$

t-value [0.223] [10.666] [-1.057] [0.071]

According to the obtained normalized cointegrated equations, it is seen that there is a positive relationship between manufacturing industry exports and GDP in the long run from manufacturing industry exports to GDP (t-value = 2.253). According to this result, it can be stated that an increase in the exports of the manufacturing industry increases the GDP rate in the long run.

In the long-run:

MX \uparrow \rightarrow GDP \uparrow

The finding of a long-run relationship between the variables made it possible to create a Vector Error Correction Model (VECM), including the error correction term obtained from cointegration regressions, to determine the source of causality. The test result of VECM is shown in Table 16.

Table 16: Vector Error Correction Model Test Results

	(1)	(2)	(3)	(4)	(5)
	D(GDP)	D(MX)	D(CUR)	D(K)	D(RI)
ECT(-1)	0.033347	2.37E-05	-3.28E-09	0.076858	6.64E-10
	[1.41757]	[1.65522]	[-1.14912]	[4.61780]	[0.14894]
D(GDP(-1))	-0.361916	-0.000251	-6.82E-08	-0.216780	4.63E-08
	[-1.23602]	[-1.40816]	[-1.91728]	[-1.04641]	[0.83483]
D(MX(-1))	-482.1950	0.649960	-0.000101	141.3568	4.89E-05
	[-1.09899]	[2.43526]	[-1.90239]	[0.45536]	[0.58840]
D(CUR(-1))	1673088.	1458.902	-0.272142	2127547.	0.207153
	[1.14237]	[1.63757]	[-1.53041]	[2.05322]	[0.74650]
D(K(-1))	0.569711	0.000414	1.34E-07	0.095752	-6.88E-08
	[0.97094]	[1.16014]	[1.87599]	[0.23065]	[-0.61845]
D(RI(-1))	-1315561.	-239.0162	0.046852	-1143012.	0.086744
	[-1.35932]	[-0.40600]	[0.39871]	[-1.66928]	[0.47305]

Table 16 (Continued)

C	43274396	9136.987	1.294053	32133621	-1.139135
	[4.28476]	[1.48725]	[1.05528]	[4.49698]	[-0.59528]
R-squared	0.309373	0.846475	0.244024	0.746985	0.061975
Adj. R-squared	0.175703	0.816760	0.097706	0.698015	-0.119579
F-statistic	2.314459	28.48685	1.667763	15.25376	0.341358

[] The values in it represent the t-statistic.

ECT (-1) is an error correction term obtained from the long-term cointegrated relationship and indicating the extent of the past imbalance. In practice, the error correction coefficient is expected to be negative and statistically significant. Considering the results obtained from the error correction model, it is seen that the sign of the ECT (-1) coefficient is positive and insignificant when equations 1 and 2 are taken into account, since the main objective is to examine the relationship between manufacturing industry exports and economic growth. In this respect, it was concluded that VECM was not applicable in this study. Therefore, instead of a Granger causality test that includes error terms obtained from the cointegration analysis, the standard Granger causality test was applied in this study.

The lag lengths in the Granger causality test were determined as "1" according to the Schwarz (SC) information criterion. Granger causality test results are reported in Table 17.

Table 17: Granger Causality Test Results

Null Hypothesis:	F-Statistic	Prob.
DGDP does not Granger Cause DMX	1.02665	0.3953
DMX does not Granger Cause DGDP	2.99347	0.0470
DCUR does not Granger Cause DMX	0.78779	0.5105
DMX does not Granger Cause DCUR	0.27913	0.8400
DK does not Granger Cause DMX	0.78660	0.5112
DMX does not Granger Cause DK	5.30457	0.0049
DRI does not Granger Cause DMX	0.35235	0.7877
DMX does not Granger Cause DRI	0.41790	0.7415
DCUR does not Granger Cause DGDP	0.43193	0.7317
DGDP does not Granger Cause DCUR	1.37662	0.2696
DK does not Granger Cause DGDP	0.70482	0.5569
DGDP does not Granger Cause DK	0.97165	0.4195
DRI does not Granger Cause DGDP	1.26673	0.3042
DGDP does not Granger Cause DRI	1.02856	0.3945
DK does not Granger Cause DCUR	0.52721	0.6671
DCUR does not Granger Cause DK	1.09717	0.3661
DRI does not Granger Cause DCUR	2.55977	0.0743
DCUR does not Granger Cause DRI	2.05649	0.1279
DRI does not Granger Cause DK	1.01455	0.4005
DK does not Granger Cause DRI	0.15160	0.9278

According to Table 17, it is seen that there is a unidirectional causality relationship between manufacturing industry exports and economic growth in the short-run, at a significance level of 5%, from manufacturing industry exports to economic growth.

In the short-run:

MX \uparrow \rightarrow GDP \uparrow

Looking at the other results obtained from the Granger causality test, it is seen that, at the 5% significance level, manufacturing industry exports (DMX) and fixed capital investments (DK) are the Granger cause; at the 10% significance level, it has been concluded that real interest rates (DRI) and manufacturing industry capacity utilization rates (DCUR) are Granger reasons.

In empirical analysis, Granger (1969) causality test is generally preferred because of its high applicability (Çalışkan & Karabacak, 2017). However, in order for the Granger causality test to be applicable, the series whose causality will be tested are expected to be stationary (Granger, 1969). On the other hand, Granger causality test is very sensitive to lag length (Çalışkan & Karabacak, 2017). Therefore, determining the number of lags is also very important in terms of Granger causality test. Therefore, instead of the Granger causality test, Toda-Yamamoto (1995) causality test has been used frequently. In this analysis, a causality analysis can be performed for the integrated series of the same or different degrees without the need for the existence of a cointegration relationship (Büyükakın, Bozkurt, & Cengiz, 2015). In the Toda-Yamamoto analysis, the modified Wald test (Modified Wald Test-MWALD) showing the X^2 distribution is applied to the restricted parameters of the VAR model with lag length k . This analysis is a two-step method. In the first step, the optimal lag length (k) of the VAR model that gives results sensitive to the lag length and the maximum integration levels ($dmax$) of the variables in the model is determined. In the second stage, the lag length ($k + dmax$) is estimated at the level of the developed VAR model. In this study, it was concluded that the ($k + dmax$) level required for Toda-Yamamoto causality analysis was 2. The results obtained by considering the relevant situation are shown in Table 18.

Table 18: Toda-Yamamoto Causality Test Results

Null Hypothesis:	F-Statistic	Prob.
MX does not Granger Cause GDP	3.33505	0.0480
GDP does not Granger Cause MX	0.82452	0.4473
CUR does not Granger Cause GDP	0.80629	0.4551
GDP does not Granger Cause CUR	0.05989	0.9420
K does not Granger Cause GDP	0.66625	0.5204
GDP does not Granger Cause K	2.00038	0.1514
RI does not Granger Cause GDP	2.45044	0.1018
GDP does not Granger Cause RI	2.03453	0.1468
CUR does not Granger Cause MX	0.85989	0.4325
MX does not Granger Cause CUR	0.07059	0.9320
K does not Granger Cause MX	1.28044	0.2914
MX does not Granger Cause K	6.25089	0.0050
RI does not Granger Cause MX	0.90135	0.4158
MX does not Granger Cause RI	1.01160	0.3746
K does not Granger Cause CUR	0.24083	0.7873
CUR does not Granger Cause K	1.08214	0.3506
RI does not Granger Cause CUR	0.12171	0.8858
CUR does not Granger Cause RI	1.17699	0.3208
RI does not Granger Cause K	2.48612	0.0987
K does not Granger Cause RI	0.52077	0.5989

According to Table 18, it is seen that there is a unidirectional causality relationship between manufacturing industry exports and economic growth, from manufacturing industry exports (MX) to economic growth (GDP) at the 5% significance level. This result is consistent with the result obtained from the Granger causality test. According to the other results of the Toda-Yamamoto causality test, at the 5% significance level, manufacturing industry exports (MX) are the cause of fixed capital investments (K); at the 10% significance level, it was concluded that real interest rates (RI) are the cause of fixed capital investments.

In conclusion, as a result of econometric analysis, it has been determined that there is a unidirectional causality relationship from manufacturing industry exports to economic growth in both the long and short run.

Finally, after the causality tests, the Ordinary Least Squares (OLS) method was applied for the econometric model created using stationary series in order to

determine the sign of the effect. At this stage, DUM1 (Price Stability Dummy Variable, the value of transition to February 2001 floating exchange rate system is 0 before 2001, 1 for the period after 2001) and DUM2 (The Economic Crisis Dummy Variable is 1 for financial and economic crisis periods and 0 for other periods.) dummy variables are added.

The econometric model created in the study is as follows:

$$\begin{aligned}
 DGDP_t = c + \sum_{i=1}^m \alpha_i DGDP_{t-i} + \sum_{j=0}^m \beta_j DMX_{t-j} \\
 + \sum_{j=0}^m \alpha_j DRI_{t-j} + \sum_{j=0}^m \phi_j DCUR_{t-j} + \sum_{j=0}^m \phi_j DK_{t-j} + \delta_i DUM1 \\
 + \theta_i DUM2 + u_{1t}
 \end{aligned}$$

The "D" used in front of the variables expresses the first order difference of the variable from the stationary, as stated before. The final model was reached by removing the nonsense variables, which were initially determined as 3 for all variables, from the model. Table 19 shows the OLS estimation results of this model.

Table 19: OLS Estimation Results

Dependent Variable: DGDP			
Variable	Coefficient	t-Statistic	Prob.
DMX	4.124320	3.725073	0.0008
DCUR	141.8500	1.652126	0.1083
DK	0.892918	6.316384	0.0000
DRI	-49.77901	-0.755143	0.4557
DUM1	15.80686	0.145037	0.8856
DUM2	-29.854916	-2.293462	0.0285
C	2.2112777	4.048428	0.0003
R-squared	0.831948	F-statistic	14.56330 P = 0.000000
Adjusted R-squared	0.781688	Jarque-Bera	1.618119 P = 0.445277
Durbin-Watson stat	2.393556	ARCH (1 lag)	0.180413 P = 0.6735
Breusch-Godfery Serial Corr. (2 lag)	1.201122 P = 0.3149	White	1.528115 P = 0.2008

As a result of the OLS method for this model, R^2 and Corrected R^2 values are $R^2 = 0.831948$ and Corrected $R^2 = 0.781688$, respectively. These values indicate that the model's explanatory power is high. When the F statistic of the model is evaluated, it is seen that the explanatory variables of the model together can explain the dependent variable significantly. When the definition tests of the estimation equation in Table 19 are performed, there is no internal correlation problem (Durbin-Watson Stat = 2.393556, Breusch-Godfery Serial Corr., P (Probability) = 0.3149), ARCH (P = 0.6735) problem It is seen that the terms are normally distributed (Jarque-Bera, P = 0.445277) and there is no variance problem (White, P = 0.2008). In this respect, it can be said that the hypothesis tests are reliable.

According to the OLS estimation results, at the 5% significance level, it is seen that the manufacturing industry exports (DMX) have a positive significant effect on economic growth. According to this result, an increase in manufacturing industry exports increases economic growth. When this result obtained from the EKK estimation and the results obtained from the Granger and Toda-Yamamoto causality tests are evaluated together, it can be stated that an increase in manufacturing industry exports accelerates economic growth in the short run. In addition, according to other results obtained from the EKK estimate, it is concluded that the effects of increases in manufacturing industry capacity utilization rates and real interest rates on economic growth are not significant according to the 5% significance level. On the other hand, it is observed that an increase in fixed capital investments (DK) accelerates economic growth.

CHAPTER VI

CONCLUSION

In this study for Turkey's economy, especially in the last century, the growing popularity of the concept of industrialization was examined. The concept of industrialization has been studied specifically for the manufacturing industry. We can explain the change in the production structure of the manufacturing industry over time, together with the change in the structure of the economy. In today's manufacturing industry in Turkey since 1980 there have been very important developments and structural transformations. Many internal and external factors have caused these developments. The manufacturing industry was seriously affected by the crisis periods of 1994, 1999, 2001 and 2008-2009. During these periods, a decline was observed in real revenues in all sub-sectors of the manufacturing industry and in the main industrial groups. January 24, 1980 Economic Stabilization Program, the EU entering the Customs Union in 1996, China, India and other emerging countries to participate in globalization effectively 2001, manufacturing in line with rising competition in many industrial goods that Turkey exporter with crisis after a Strong Economy Transition Program structural arrangement within the scope of the development of industry and foreign trade of industrial goods was significantly affected. In this study, the data on Turkish manufacturing industry for the period 1980-2020 was used. Industrialization efforts began with the proclamation of the republic accepted in Turkey as in many world states have started with the import substitution industrialization policy. The import substitution industrialization strategy, which was implemented with strict policies especially during the Great Depression and war periods, gave its place to export-based industrialization since January 24, 1980. After the said period, increases were observed in the exports of the

manufacturing industry. Another important step of ensuring that the analysis results are healthy is to question whether the studied series contain unit root or not. Because working with series containing unit roots will also pose a risk of spurious regression, the series should be stationary, that is, the variances and averages of the series should not change much over time and the expected value should move around the mean. ADF, PP and KPSS unit root tests, which are frequently used in the literature, were used for stationarity analysis. The use of more than one stationarity analysis has been a factor that strengthens this stage. For the stationarity analysis, tests performed with three tests indicate that all variables have unit root in their level values. The first differences of the series were taken after the presence of unit root, that is, the series were not stationary, and it was seen that all series were stationary in their first differences. However, the study is also compatible with Kaldor's analysis (Kaldor, 1968). Kaldor tested the KEG (Kaldor's Engine of Growth) hypothesis, which he sees as the engine of growth, in the developed western countries in the 1950s and 60s with the help of some equations (Kaldor, 1968). The first of these equations predicts that there is a strong relationship between the growth in the manufacturing industry and the growth in the total domestic product. Kaldor also suggests that there will be a strong link between growth in the manufacturing industry and productivity growth in the economy (Verdoorn equation) or employment growth in the economy (Kaldor, 1975). Kaldor, with the help of the results obtained from another important equation he established, defends the assumption that increases in manufacturing industry employment will affect productivity positively and increases in employment outside the manufacturing industry will affect productivity negatively (Kaldor, 1975). The study results, to ensure a sustainable growth environment, the manufacturing industry export performance of policies to provide in Turkey is an important factor, the increase in manufacturing exports is one of the main determinants of economic growth and Turkey, the interiors also of the real GDP growth occur depending on the dynamics of real manufacturing export industry. It indicates that it has an enhancing mechanism. As a result, the export-led growth strategies applied since the beginning of the 1980s in Turkey, manufacturing exports showed a big improvement, although still not reached the desired level. This situation led to the low level of coverage of exports to imports and to grapple with the current account deficit and the foreign

trade deficit, which has been at high rates for years. These problems have brought many solutions. One of the suggestions made to increase exports, and even the most important, is to go for both product diversification and geographical diversification. In this direction, in order for the Turkish economy to be effective at international level, it has a competitive advantage in two important factors such as quality and cost, establishes the necessary infrastructure and gives the necessary value especially to human resources, develops investment, production and marketing strategies worldwide, and adapts to changing conditions with its businesses and institutions. It needs to be changed and restructured to provide.



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