



Research Article/Araştırma Makalesi

Türkiye’de İthal Ara Malı Bağımlılığı: İki Farklı IO Yaklaşımı

Dependency on Imported Intermediates in Turkey: Two Different IO Approach

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Öz

İthal ara malı bağımlılığı Türkiye ekonomisi için önemli bir problemdir. Bu nedenle, pek çok ampirik çalışmaya konu olmuştur. Bu çalışmalar çoğunlukla Girdi-Çıktı (IO) tablolarını kullanmaktadır. Bu çalışmada, Türkiye için 2018 GÇ tablosu kullanılarak ithalat bağımlılık oranları (IRR) hesaplanmıştır. Ayrıca, IRR değerleri sektörlerin katma değer katkıları oranında ağırlıklandırılarak (IRR-VA) önceki değerlerle karşılaştırma yapılmıştır. Burada, çoğu sektörün hesaplanan değerler üzerinden sıralamalarının önemli ölçüde değiştiği görülmüştür. Klasik IRR analizi sonuçlarına göre en çok ithal ara malına en çok bağımlı olan sektörler: Kok kömürü ve rafine edilmiş petrol ürünleri imalatı, Elektrikli Aletler, Motorlu kara taşıtı, treyler (römork) ve yarı treyler (yarı römork) imalatı, Kauçuk ve plastik ürünlerin imalatı, Kimyasalların ve kimyasal ürünlerin imalatı ve Makine ve teçhizat olarak belirlenmiştir. IRR-VA sonuçlarına göre ise, sırayla İnşaat, Elektrikli Aletler, Ulaştırma, depolama ve İletişim, Kok kömürü ve rafine edilmiş petrol ürünleri imalatı, Gıda ürünleri, İçecek ve Tütün ürünleri imalatı, Tekstil ürünleri, Giyim eşyaları, Deri ve ilgili ürünlerin imalatı sektörleri bulunmuştur. Bu durum ithal ara malı bağımlılığı incelenirken dikkatli bir analiz yapılması gerektiğini göstermektedir.

Jel Kodları: C67, D57, F10

Anahtar Kelimeler: İthal bağımlılık, Türkiye, Girdi Çıktı analizi.

Abstract (Calibri 12 punto Kalın)

Import dependency on intermediates is an important problem in the Turkish economy. Therefore it is subject to many empirical studies. These studies mostly depend on Input Output (IO) tables. In this study, the import requirement ratio (IRR) are calculated from the 2018 IO Table for Türkiye. Also, the IRR values are weighted by the value-added percentage of the sectors (IRR-VA) and it is compared with the results of the pure IRR values. It is seen that most of the sector rankings change significantly. According to the pure IRR calculations, the sectors that are most dependent on the imported intermediates are Coke and refined petroleum products, Electrical equipment, Motor vehicles, trailers and semi-trailers, Rubber and plastics products, Chemical and chemical products, and Machinery and equipment, nec. On the other hand, IRR-VA calculations result in Construction, Electrical equipment, Transport, storage and communications, Coke and refined petroleum products, Food products, beverages and tobacco, Textiles, textile products, leather and footwear sectors. This indicates that a careful analysis is needed when it comes how to determine the import dependency on intermediates.

Jel Codes: C67, D57, F10

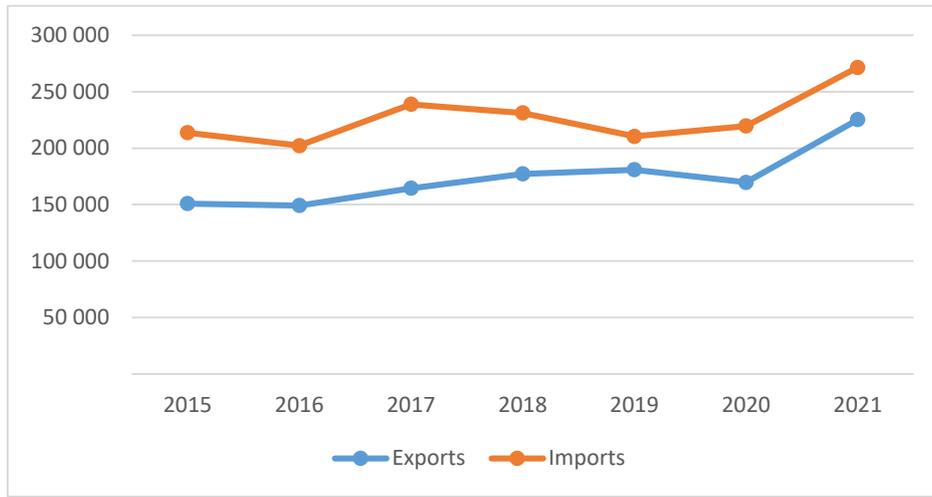
Keywords: Import dependency, Turkey, Input Output analysis.

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1. Introduction

Import dependency is a challenge for the Turkish economy. Some of this dependency is due to limited natural resources such as petroleum, gold, aluminum, copper, natural and synthetic rubber, and cellulose. On the other hand, some goods which can be produced domestically are imported (Palacioğlu, 2018). Export oriented policies led to an increase in exports, but imports increased at a higher rate. The import and export values from 2015 to 2021 are given in Figure 1.

Figure 1: Imports and Exports, 2015-2021 (Million \$)

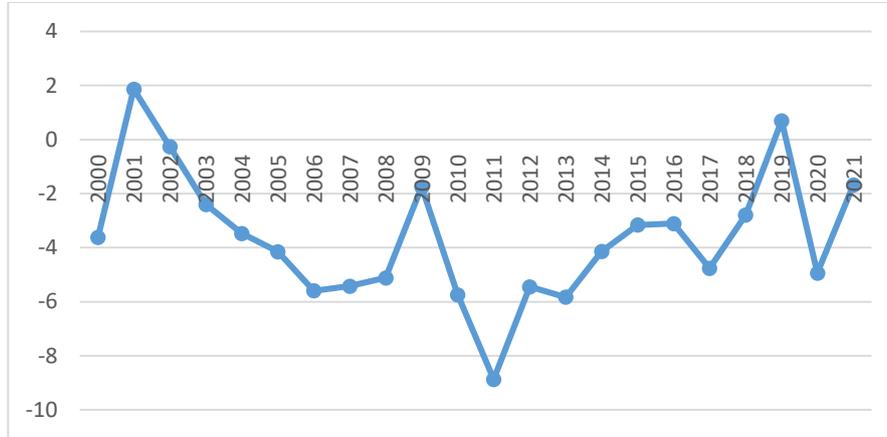


Source: TURKSTAT

The relationship between imports and exports can also be seen from econometric analyses. Karabulut (2020) showed that in the period 1992-2019, there is a two-way causality between imports and exports by applying econometric models. Also, Aydın (2022) found a two-way causality between the intermediates import and exports in the period 2013-2021. Dineri & Işık (2021) specifically considered the manufacturing sector. For the period 2007-2018 they found a long-term cointegration between manufacturing production and imports of intermediate goods.

Import dependency and specifically the import dependence of exports results in ongoing current account deficit (CAD) problems. CAD of Turkey between 2000 and 2021 is given in Figure 2. It can be seen that CAD is negative throughout the period except in 2001 and 2019.

Figure 2: Current Account Balance of Turkey (% of GDP)



Source: World Bank

Considering imports by chapters one can see that although the rankings differ over years, there are seven main chapters of imports (Karakaş, 2012): Machinery, Mechanical Devices, Boilers and Parts, Mineral Fuels, Minerals Oils and Product of Their Distillation, Electrical Machinery and Equipment, Parts Thereof, Iron and Steel, Vehicles other than Railway or Tramway Rolling-Stock, Parts Thereof, Manufacture of Rubber and Plastics Products, and Organic Chemical Preparations. The imports by chapters as a percentage of the total imports are given in Table 1 in descending order according to the scores in 2022.

Table 1: Imports by Chapters (% of the Total Imports)

	2015	2016	2017	2018	2019	2020	2021	2022
Mineral fuels, minerals oils and product of their distillation	18.094	13.584	15.774	18.868	19.839	13.177	18.676	26.901
Manufacture of fabricated metal products except machinery and equipment	18.214	19.428	17.243	17.663	16.329	16.888	18.115	15.184
Iron and steel	6.908	6.280	7.108	8.044	7.155	6.880	10.175	9.344
Manufacture of other non-metal	9.920	9.951	9.133	8.994	9.036	7.884	8.168	8.374
Manufacture of chemicals and chemical products	6.681	6.713	6.628	7.204	7.566	7.119	8.074	7.918
Manufacture of rubber and plastics products	7.019	7.094	6.844	6.909	6.847	6.574	7.799	7.071
Agriculture, forestry and fishing	5.597	5.816	5.747	5.916	6.626	6.628	6.318	6.192
Electrical machinery and equipment, parts thereof	8.602	9.630	8.632	7.477	7.342	7.808	7.355	5.603
Vehicles other than railway or tramway rolling-stock, parts thereof	8.576	9.108	7.504	6.224	4.758	6.966	5.746	4.334
Precious stones, precious metals, pearls and articles thereof	1.963	3.568	7.311	5.437	6.355	12.113	2.606	4.107

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Other manufacturing	3.776	3.802	3.458	3.367	3.199	3.159	2.632	2.088
Manufacture of other transport equipment	2.076	2.339	2.285	1.559	2.160	2.040	1.487	1.365
Pharmaceutical products	2.090	2.107	1.894	1.938	2.335	2.259	2.533	1.272
Tobacco and materials instead of tobacco	0.370	0.377	0.288	0.319	0.357	0.303	0.237	0.207
Railway and tramway locomotives, rolling-stock and parts thereof	0.115	0.204	0.150	0.082	0.097	0.202	0.078	0.040

Source: TURKSTAT

Table 2 shows the content of the imports. The largest share is of intermediate goods. The share of intermediates in the imports increased from 69% in 2015 to about 82% in 2022. Energy payments constitute a large amount within the intermediates. In fact, imports of energy is one of the main determinants of the CAD (Karabalut & Danişoğlu (2006), Demirbaş, Türkey & Türkoğlu (2009), Beşel (2017), Göçer (2013), Yalta & Yalta (2017)).

Table 2: Imports Content for Turkey, 2013-2022 (% of total imports)

	2015	2016	2017	2018	2019	2020	2021	2022
Capital goods	17	18	14	13	12	14	13	10
Intermediate goods	69	67	73	76	77	74	77	82
Consumption goods	14	15	13	11	10	11	9	8

Source: TURKSTAT

Ünlü & Yıldız (2019) analyzed the concentration in imports of Turkey with respect to the technological structure during 1996-2017. They concluded that Turkish foreign trade is mainly concentrated in medium-intense technology chapters. In terms of production, value added and exports, it can be seen that Türkiye is not able to move to a high-tech level. Moreover, 80% of employment is concentrated in low and medium-low level productions (Avcı et al., 2016). As of April 2022 for the Manufacturing sector, the high-technology production share in exports is only 3.6% and medium-high, medium-low and low technology products' shares are close to each other with values 32.4%, 32.3% and 32.8%, respectively (TURKSTAT, 2022). On the other hand, within the imports, the largest share (44.4%) is of high-medium technology products. High-technology products consist of only 10.1% of the imports. The difference between imports and exports in terms of high and medium-high products contributes to the CAD.

This structure in foreign trade has to be analyzed carefully. Not only should trade figures be considered but also interactions between the sectors should be taken into consideration. Which sectors feed other sectors the most, which sectors are fed by the other sectors the most, which imported intermediates are used for domestic production, which are used for exported goods, are all important questions. Tracing the flow of the intermediates in this way, will guide the policy makers as they form their strategies.



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One way of examining the intersectoral flows is to use Input Output (IO) tables. Multipliers obtained from IO tables can clarify the structure of the system. Separating the domestic and imported parts can further enable us to analyze the import dependencies of the sectors. There are many studies for Turkey which analyze the import dependency in Turkey by using IO tables. In this study we used the latest IO table available, which is for 2018, to analyze the dependence on imported intermediates by applying two different approaches. To our knowledge, there is no study that apply these two approaches to the same data and compare the results. In the next section, examples from the literature are given. Then, in the following section the data and methodology is explained. In the last section the results and discussions are given.

2. Literature Review

The IO Tables for 1973, 1985 and 1996 are analyzed by Şenesen & Günlük-Şenesen (2003). They compared the structure before and after 1980. They concluded that the import dependency before 1980 persisted after 1980. The most dependent sectors are the technology and energy intensive sectors. Also, they found that in the post-1980 era sectors such as agriculture, textiles and food which are leading export sectors became import dependent as well. Ersungur & Kızıltan (2007) also compared pre and post 1980s for manufacturing sector. They used the 1973, 1979, 1985, 1990, 1996 and 1998 IO Tables and showed that the manufacturing sector as a whole had high import dependency mostly after 1980. Although the import dependency of the manufacturing sector declined in 1998, compared to the beginning of the period an important increase was observed. Eşiyok (2008) also showed that in the 1990-1998 period the import dependency increased significantly.

Ersungur et al. (2011), used the 2002 IO Table and concluded that “Extraction of Crude Petroleum and Natural Gas; service activities incidental to oil and gas extraction excluding surveying”, “Manufacture of Office Machinery and Computers”, “Forestry, Logging and related service activities” are those that have the largest backward linkages. The largest forward linkages are observed for the “Manufacture of Chemicals and Chemical Products”, “Manufacture of Basic Metals”, “Manufacture of Machinery and Equipment n.e.c” sectors.

Both Erduman, Eren & Gül (2020) and Aydın (2021) analyzed the 2002 and 2012 IO tables. The former further extended their analysis to the 2002-2018 period. They showed that higher capital and technology intensive sectors have higher import dependency. The top three is shared by “Petroleum Products”, “Basic Metals”, and “Motor Vehicles” sectors. Also, their estimates indicate that these sectors together with the “Electric Equipment” show an increasing trend in imported intermediate dependence. On the other hand, “Furniture and the other Manufactured Goods”, “Wood and Wood Products”, “Paper and Paper Products”, and “Textiles, Wearing Apparel and Leather Products” sectors show a decreasing trend in IRR. Aydın (2021) showed that for both years the highest import dependence is for the “Coke-Refined Oil” sector. “Manufacture of Wood, Cork and Furniture” was in the second place in 2002, whereas “Manufacture of Rubber and Plastics Products” was in the second place in 2012. “Manufacture of Wood, Cork and Furniture” sector falls to 8th place in 2012. “Textiles,

Wearing Apparel and Leather Products” sector was in 3rd place in 2002 but fell to 7th place in 2012. In 2012, the “Basic Metals” sector held 3rd place.

Ayas (2017) used 17 National Turkish Input-Output Tables published in World Input Output Database (WIOD) from 1995 to 2011. Average Direct Backward Linkage Coefficients (DBLC) were calculated and the results indicate that food, petrol, cork, metal, plastic and textile sectors are sectors that have the highest scores. Calculations concerning the total import effects show that while energy and petrol sectors decreased considerably after 2008 when compared to 1995, the transportation sector increased significantly after 2007.

Ünal (2020) examined the import dependency in Turkey by using IO analysis using the IO tables for 2002, 2007 and 2014 taken from World Input-Output Database (WIOD). He concluded that, in general, import dependency on intermediate goods in medium- and high-tech industries was much higher when compared to the low- and medium-tech industries. Specifically, the highest import dependency was in the computer, electronic and optical products and automotive industries. He also compared the domestic and export use of the intermediates and showed that over the period domestic use increased. He further analyzed the allocation of import dependency on intermediates between the domestic consumption goods and export goods. Also, he made a productivity analysis.

Nas (2021) used the values for 2000-2014 and concluded that during the period the sectors with capital intensive and medium-high technology sectors have high import intermediate dependence. Specifically, manufacturing, energy and construction sectors have high dependency. Among the sub-sectors “Manufacture of coke and refined petroleum products” have the highest dependency in 2000 and 2008. In 2014, the largest shares are observed for the sectors: “Manufacture of computer electronic and optical products”, “Manufacture of basic metals”, “Manufacture of motor vehicles trailers and semi-trailers”, “Manufacture of fabricated metal products except machinery and equipment”, “Manufacture of furniture”, and “other Manufacturing”. The least dependent sectors are labor-intensive sectors such as agriculture and services in general.

There are some sector specific studies. İnançlı & Konak (2011) examine the import dependency of the automobile industry in Turkey after 1998. They used 1998 and 2002 IO Tables for Türkiye. Then they extended their analysis to the period 2003-2010 by using shares of imports and exports in total production and total supply. They showed that the import dependency of the sector increased from 1998 to 2002. Dependence of exports to imports increased more than tripled for the same years, whereas import dependency followed a fluctuating course between 2003-2010.

Dikici (2020), analyzed the textile sector for the years 1998, 2002, and 2012 and showed that dependency of the textile sector on imports increased throughout the period. The import dependency of exports decreased from 1998 to 2002 and increased from 2002 to 2012. They also analyzed all the sectors and showed that overall import dependency increased over the years concerned with the largest increase observed in “public services”, “manufacturing”, and “mining” sectors.

In all these studies the multipliers obtained from the import inverse matrix are used to measure the import dependency. Duman & Ertan-Özgüzer (2010) suggest that the shares of

the sector in value added are also important. So, they weighted the multipliers with the value-added share of the sectors. They used the 1998 and 2002 IO tables, then they further extend their analysis to 2007 by extrapolation with the assumption that the growth trend of IRRs 1998 and 2002 would continue in the same manner. They found that for 1998 the largest value of IRR is for the Manufacturing sector. This is followed by “Electricity, gas and water supply” and Construction sectors. In 2002, the most import dependent sector is the Electricity sector followed by the Manufacturing and Construction sectors.

3. Data and Methodology

Import dependency can be calculated by the Import Requirement Ratio (IRR). IRR gives the imported intermediate goods used to produce one unit of production in each sector. In this way, the industrial dependency of the sector is calculated on imported intermediate goods (Ünal, 2020). To obtain IRR, first the technical coefficient matrix A will be disaggregated into domestic A_d and imported A_m matrices:

$$A = A_d + A_m \quad (25)$$

By the following formula, the import inverse matrix will be obtained:

$$R = A_m (I - A_d)^{-1} \quad (26)$$

IRR for each sector i is calculated as the i th column sum of the matrix R . Each element of R , r_{ij} , gives the amount of imported intermediates required by the sector i from the sector j to meet one unit of increase in the final demand for goods produced in the sector i . For Turkey, empirical studies show that in general the sectors that have high IRR scores are those which are capital-intensive and high technology using sectors such as, “Coke and Refined Petroleum Products”, “Motor Vehicles”, and “Basic Metals” sectors. The row sums of the matrix R give the forward linkages. Forward linkage corresponds to the amount of sector i ’s good to be imported to meet a one unit increase in the final demand of goods produced in all sectors.

Duman & Ertan-Özgüzer (2012) suggest that findings from the IRR calculation have to be weighted by the value added share of the corresponding sectors. They argue that with an increase in final demand the sectors will increase their imports according to their share in total value added. In fact, by comparing 1998 and 2002 data, they showed that the most import dependent sector in 2002 with respect to the IRR calculation, the Electricity sector, has a very small contribution to the upsurge in imports. On the other hand, the manufacturing sector, having a large value added share, has a high contribution to the rise in imports.

In this study, 2018 IO Table for Turkey obtained from OECD is used and aggregated into 36 sectors. Sectors and their abbreviations are given in Appendix 1. The backward linkages are calculated from the import inverse matrix. Moreover, the modification suggested by Duman & Ertan-Özgüzer (2012) is applied. Accordingly, the calculated linkages are weighted by the



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value added of the corresponding sectors, giving the weighted IRR value (IRR-VA). Two results are compared to have a more comprehended analysis.

4. Empirical Findings

IRR calculations are given in Table 3. Data indicate that the sectors with the highest scores are: “Coke and refined petroleum products” (Coke), “Electrical equipment” (Electr), “Motor vehicles, trailers and semi-trailers” (Motor), “Rubber and plastics products” (Rubber), “Chemical and chemical products” (Chem), and “Machinery and equipment, nec” (Machine).

Table 3: IRR Scores

Rank	Code	Sector	Backward Substitution (IRR)
1	9	Coke	0.644252
2	16	Electr	0.354922
3	18	Motor	0.318358
4	11	Rubber	0.314535
5	10	Chem	0.279564
6	17	Machine	0.262716
7	13	Metal	0.250978
8	21	Electric	0.243633
9	7	Wood	0.238225
10	14	FabrMetal	0.233652
11	8	Paper	0.230537
12	15	Comp	0.228086
13	20	Repair	0.216565
14	2	MinEn	0.211866
15	12	OtherNonMet	0.199374
16	22	Const	0.194105
17	6	Textile	0.188518
18	5	Food	0.168722
19	24	TSC	0.165066
20	1	Agr	0.161893
21	3	MinNoE	0.157317
22	26	Publish	0.117869
23	36	Other	0.111991
24	19	OtherTransp	0.107586
25	30	RealEstate	0.105765
26	35	Health	0.105405
27	4	MinSer	0.098168
28	25	Accom	0.086186
29	27	Commun	0.085635
30	23	Wholesale	0.081442



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31	33	PubAdm	0.078473
32	31	PST	0.076404
33	29	Finance	0.071098
34	32	Admin	0.067443
35	34	Educ	0.025205
36	28	IT	0.023318

Considering the previous studies it can be seen that the energy dependence remains to be the main problem. While in some studies the Electric sector is in second place as shown in our results, in some studies this sector falls to 6th place (Erduman, Eren & Gül, 2020) and 8th (Aydın, 2021) place. On the other hand, Motor, Rubber and “Basic Metal” (Metal) sectors are coming forward in many studies. It is seen that, Coke, Motor, Machine, Rubber, and Metal sectors’ import dependencies persist over a long period.

Considering the value added contribution of the sectors, the table changes (see Table 4). While the Construction sector is in 16th place in the IRR calculation, it takes the first place when we consider the sector’s value added contribution followed by the “Electrical equipment” and “Transport, storage and communications” (TSC) sectors. When comparing with the pure IRR calculation, while the Electrical equipment sector holds its rank, the Transport, storage and communications sector changes its rank significantly from 19 to 3.

Table 4: Weighted Backward Import Linkages

Rank	No	Sector	IRR-VA
1	22	Const	0.02772
2	21	Electric	0.02050
3	24	TSC	0.01791
4	9	Coke	0.01773
5	5	Food	0.01406
6	6	Textile	0.01309
7	1	Agr	0.01233
8	13	Metal	0.01197
9	18	Motor	0.00959
10	16	Electr	0.00783
11	11	Rubber	0.00652
12	23	Wholesale	0.00617

Considering the top ten sectors obtained from two approaches, it can be see that five sectors are common in both cases: Coke, Electric, Motor, Metal, and “Electricity, gas and water supply” (Electric) with different rankings. On the other hand, consideration of value added shares brings “Construction” (Const), “Transport, storage and communications” (TSC), “Food products, beverages and tobacco” (Food), “Textiles, textile products, leather and footwear” (Textile), and “Agriculture, hunting and forestry” (Agr) sectors. In the literature, Textile and



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Agr sectors are shown to recede over time, while in our study we see the sectors in 6th and 7th place, respectively.

The Food and Textile sectors are only mentioned in Şenesen & Günlük-Şenesen (2003) and Ayas (2017). In the former study, these sectors are noted to become import dependent over time, but the time range ends in 1996. Among the studies using more recent data only Ayas (2017) founded high import dependency for these sectors. However, in this study a weighted version of IRR values are used. IRRs are weighted not by value added values of the sectors but by their output share in the total output. The manufacturing sector as a whole is the most import dependent sector in all previous studies. Among the manufacturing sectors the Food sector has the highest value added. Therefore, it seems that the results with weighted IRR values needed to be examined carefully. Having these sectors in upper ranges may be due to their large value added contribution only. On the other hand, recent economic conjuncture increased the importance of the Food and TSC sectors, and these can be determined by the weighted IRR values. The Construction sector is mentioned in only a few studies, but this sector has an important place in Türkiye’s economy, and unfortunately the sector has import dependencies. At this stage it is worth examining the import dependencies of the Food, Textile, Agr, TSC, and Construction more closely.

Food and Agr sectors are closely related. These are the two sectors between which the intersectoral flow is the highest. Recently, food security became a critical issue for all countries. Especially, the grain supply is seriously affected by the war between two main suppliers, Russia and Ukraine. This also stirred up the debate on the wheat imports of Türkiye. In “2021 Foreign Trade Data”, Federation of Food and Drink Industry Associations of Türkiye (TGDF) indicates that in the Food sector wheat is the top imported product, with \$2.3 billion worth of imports. Wheat is followed by soy beans (\$1.5 billion) and raw vegetable oil (\$1.1 billion) (TGDF, 2021).

In wheat import Türkiye is third after Egypt and Indonesia (OECD/FAO, 2022). This was seriously criticized because of the high production potential of Türkiye. The Ministry of Agriculture and Forestry pointed out the TURKSTAT data indicating that in 2020-2021 Türkiye’s adequacy ratio of bread wheat was 89.2%, adequacy ratio of durum wheat was 259%, and in general adequacy ratio of wheat in total was 102.3%. The imported wheat, by means of inward processing mode, is used in the food industry for export purposes. In fact, in 2021, the wheat import was \$2.44 billion while the export was \$3.23 billion. Türkiye is the largest flour exporter (24.5%) (TRIDGE, 2022), and the fourth largest pasta exporter (6.3% of total pasta exports) after Italy (29.2%), China (7.6%), and South Korea (7.2%) (WTE, 2022).

Comparing the first nine months’ import values of 2021 and 2022, the largest increase in imports is seen in the Animal Feed Sector. The second and the third positions are for the Vegetable Oil Industry and the Flour Industry. As mentioned above, the most imported agricultural raw materials are wheat, soy beans, and raw vegetable oil. Soy beans and raw vegetable oil are mainly used in animal feed and vegetable oil industries, respectively.

In the vegetable oil sector, in 2021, imports were \$3.08 billion while exports were \$1.72 billion, indicating that the sector is a net importer (TGDF, 2021). In the first nine months of 2022, there was approximately a \$1.3 billion trade deficit. In sunflower yields there was a general



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decline in the world due to both climatic conditions and Russia-Ukraine war. This was important for Türkiye as she is a net importer of sunflowers. In fact, in the 2020/21 period Türkiye was the number one importer of sunflower with a share of 37% (TEPGE, 2021). Table 5 shows that while production increases by 7.7% imports increased by 20.2%. The imported sunflower is mostly for domestic use, and the surplus is used for export purposes. In general, approximately 70% of Türkiye’s vegetable oil demand is met by imported seeds and oil (Gül et al., 2016).

Table 5: Sunflower (thousand tones) (September-August)

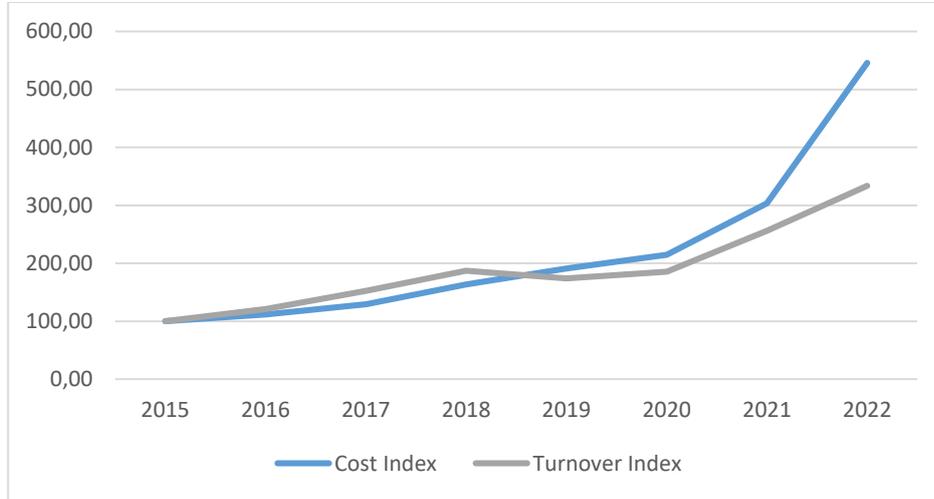
	2015/16	2016/17	2017/18	2018/19	2019/20	Change (%)
Production	1681	1671	1964	1949	2100	7.7
Domestic Use	2112	2589	3032	2914	3466	19
Imports	2362	2864	2166	2747	3301	20.2
Exports	1833	1975	1203	1619	1939	19.8

Source: TEPGE (2021)

The Construction sector is related to about 200 other sectors (Bayrak & Telatar, 2021). In fact, administrations usually pay special attention to the sector. In many discussions about the sector, the sector is mentioned to be a “key sector”. However, generally, this is not reflected in IRR analysis. In some studies the Construction sector is not mentioned at all and in some studies its rank is low. Yet, it can be seen that public authorities from time to time give different supports for the sector. Through Housing Development Administration of the Republic of Turkey (TOKİ), the state builds houses for both middle and low income citizens, builds facilities and constructs houses in the aftermath of natural disasters. Also, sometimes favorable credit options are given by commercial banks. Recently, the government attempts to boost the Construction sector by a social housing project in order to reinvigorate the economy. The target is to build 500,000 social housing, and 50,000 workplaces within five years. At the same time, one million residential land plots will be provided.

The challenge is that Construction sector is subject to high costs. The cost index and turnover index is given in the Figure 3. It can be seen that both indices are increasing over time but the increase in cost index is larger. In fact, after 2018 costs surpassed turnovers.

Figure 3: Construction Cost Index and Turnover Index, 2015-2022 (2015=100)

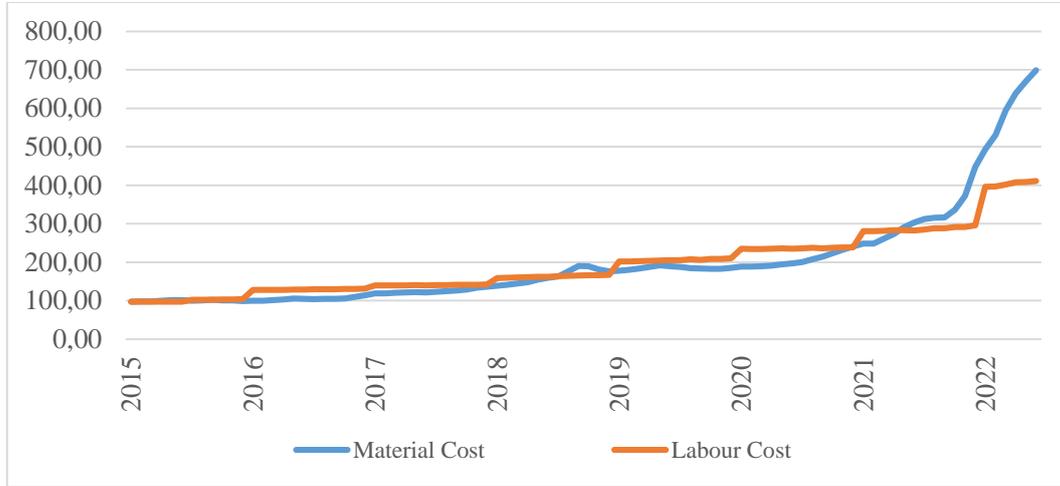


Source: TURKSTAT, Construction Cost Index, June 2022

Considering the components of the cost index as material and labor cost indices it is observed that both values are close to each other up to 2019 (Figure 4). The labor cost index exceeded the turnover index to the end of 2020 when the cost index increases sharply. In 2021 input costs increased up to 150%. The primary inputs’ prices increased more than 130% during the period June 2021-April 2022 (TMB, 2022). TURKSTAT announced that, as of August 2022, annual increase in the cost index was 116.98%. Material cost index increased by 129.61% and labor cost index increased by 83.84%.

According to the 2021 sector report of the Association of Turkish Construction Material Producers (İMSAD), in 2021 construction material import increased by 22.2%. Among the 36 subgroups, imports increased for 31 and decreased for 5 groups. 13.6% of the domestic demand is met by imports. For the same year exports increased by 45.7%. In August 2022 exports decreased in quantity by 11.5% while exports increased in value by 5.5%. On the other hand, imports are increased by 24.5% in value.

Figure 4: Construction Material Cost Index and Labor Cost Index, 2015-2022 (2015=100)



Source: TURKSTAT, Construction Cost Index, June 2022

IRR-VA scores puts another sector which does not mentioned in most of the studies into third place: TSC. The importance of Türkiye’s geographical location once more gained importance with the Covid-19 pandemic and the Russian invasion of Ukraine. Issues regarding the Global Value Chain and logistics are discussed in detail. The Middle Corridor is an important alternative route connecting Central Asia to Europe. The Grain Corridor Agreement between Russia and Ukraine was signed in Istanbul. Recently, Russia offered to make Türkiye a gas hub to meet the E.U.’s energy demand. These developments increase the importance of the TSC sector.

Table 6 shows the Revealed Comparative Advantage (RCA) indices. Values greater than one indicates that the country has a relative advantage in the related sector. Within the service sector TSC has the largest RCA index score, indicating that Türkiye is competitive in this area. As of 2019, the next largest value is for Travel Services, followed by Insurance Services and Maintenance/Repair Services (Eken & Yazıcı, 2021).

Table 6: RCA Scores for Service Sectors

Type of Services	2013	2014	2015	2016	2017	2018	2019
Transport Services	1.93	1.97	2.00	2.55	2.44	2.45	2.34
Travel Services	1.95	1.99	2.00	1.68	1.74	1.79	1.98
Insurance Services	0.48	0.62	0.72	0.79	1.01	0.9	1.18
Maintenance/Repair Services	2.29	1.08	1.09	1.07	1.17	1.07	0.92
Construction Services	0.58	0.66	0.68	0.54	0.61	0.56	0.39
Man. Services on physical Inputs	0.3	0.32	0.33	0.44	0.34	0.31	0.25
Other Services in Trade	0.26	0.25	0.27	0.26	0.25	0.21	0.2
Telecom./info. Services	0.23	0.22	0.2	0.22	0.21	0.22	0.2
Cultural Services	0.24	0.2	0.22	0.22	0.19	0.17	0.15
Financial Services	0.14	0.14	0.13	0.09	0.11	0.12	0.08
intellectual Property	0.03	0.02	0.02	0.03	0.03	0.02	0.02

Source: Eken & Yazıcı (2021)



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Eken & Yazıcı (2021) examined the Trade Complementarity Index (TCI). This index measures the similarity between the export structure of one country and the import structure of a targeted country. High index value refers to high similarity. TCI ranges between 0 and 100 so, the value of 100 corresponds to a perfect overlap of export and import structures of the countries that are considered. TCI scores indicate that Uzbekistan, Iraq, China and Ukraine are countries for which Türkiye has a high potential for services export. If further GDP values are considered together with TCI values, China, Russia, South Korea, Germany and Italy also have high export potential for Türkiye (Eken & Yazıcı, 2021).

5. Conclusion

Dependence on imported intermediates affects Türkiye’s export performance negatively. Moreover, it feeds the chronic trade deficit problem of Türkiye. Therefore, it is important to determine which sectors need the imported intermediates the most. In this way the policy makers may try to protect the sectors from the negative effects of this dependence.

In this study two different ideas for determining the import intermediate dependences of the sectors are applied. Two methods in general give us different rankings of the sectors. Pure IRR results are consistent with the literature. Findings show that energy dependency remains the major problem. High IRR values are observed for the medium and high-technology sectors. These results are also seen in previous studies, indicating that the critical import dependences persisted over time. This threatens the recent export-oriented growth policies therefore, policy makers should seriously consider import dependencies.

Findings show that when comparing the results of IRR calculations with the weighted IRR values, among the top ten sectors, five sectors are common in both cases (“Coke and refined petroleum products”, “Electrical equipment”, “Motor vehicles, trailers and semi-trailers”, “Basic Metals”, and “Electricity, gas and water supply” sectors) with different rankings while other five sectors differ. Interestingly, the “Food products, beverages and tobacco”, “Agriculture, hunting and forestry”, and “Textiles, textile products, leather and footwear” sectors which are shown to have the lowest IRR values in many studies have large IRR-VA scores. Moreover, the “Construction”, and the “Transport, storage and communications” sectors which are mentioned in a few studies, come forward with IRR-VA calculation. When analyzing these sectors more closely, these sectors have strategic positions in the economy and their import dependencies are quite high.

Results show that considering both methods together give a better understanding of import dependency. Moreover, different perspectives pointing out different sectors indicate that import dependency is not just about a few sector’s problem but a more widespread problem for Türkiye’s economy.



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APPENDIX

Appendix 1: Sectors and Their Abbreviations

No	Sectors	Abbreviations
1	Agriculture, hunting and forestry	Agr
2	Mining and quarrying, energy producing products	MinEn
3	Mining and quarrying, non-energy producing products	MinNoE
4	Mining support service activities	MinSer
5	Food products, beverages and tobacco	Food
6	Textiles, textile products, leather and footwear	Textile
7	Wood and products of wood and cork	Wood
8	Paper products and printing	Paper
9	Coke and refined petroleum products	Coke
10	Chemical and chemical products	Chem
11	Rubber and plastics products	Rubber
12	Other non-metallic mineral products	OtherNonMet
13	Basic metals	Metal
14	Fabricated metal products	FabrMetal
15	Computer, electronic and optical equipment	Comp
16	Electrical equipment	Electr
17	Machinery and equipment, nec	Machine
18	Motor vehicles, trailers and semi-trailers	Motor
19	Other transport equipment	OtherTransp
20	Manufacturing nec; repair and installation of machinery and equipment	Repair
21	Electricity, gas and water supply	Electric
22	Construction	Const
23	Wholesale and retail trade; repair of motor vehicles	Wholesale
24	Transport, storage and communications	TSC
25	Accommodation and food service activities	Accom
26	Publishing, audiovisual and broadcasting activities	Publish
27	Telecommunications	Commun
28	IT and other information services	IT
29	Financial and insurance activities	Finance
30	Real estate activities	RealEstate
31	Professional, scientific and technical activities	PST
32	Administrative and support services	Admin
33	Public administration and defense; compulsory social security	PubAdm
34	Education	Educ
35	Human health and social work activities	Health
36	Other service activities	Other