

## **STRUCTURAL CHANGE IN IMPORT DEPENDENCY OF PRODUCTION: TURKEY, 1973 - 1996**

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### **1. Introduction**

This paper assesses the import dependency of production in Turkey in the context of economic policies implemented before and after 1980, by using a new type of input-output model. We determine the leading (origin and destination) sectors of import dependency with data for 1973, 1985 and 1996.

Turkey abandoned the development strategy based on planning with focus on import substitution following a severe economic crisis in the end of 1970's. A liberal strategy with focus on export promotion was introduced instead in 1980, being in effect since then. The outcomes in the following two decades of the new model were remarkably different from the previous one in a variety of aspects. However, besides crises within the recent period, the economy entered the 21<sup>st</sup> century with the most severe crisis of its history. The increased dependence on foreign resources due to two fundamental disequilibrium states, that is domestic savings gap (savings lower than investments) and foreign exchange gap (foreign exchange supply lower than demand) is common to both sub-periods despite differences in the means for compensation. It is obvious that the accumulated cost of this dependency has been posing increasing pressure in both economic and political domains, both internal and external.

In fact, foreign trade deficits have a chronic nature in the Turkish economy since 1947. The pace of exports has been lower than that of imports (Boratav, 1987:89-90). In contradiction to the expectations, the import dependency of production increased in the pre-1980 (import substitution) era. This characteristic has prevailed in the post-1980 (liberal) era. While the source of import dependency was intermediate inputs, mainly petroleum, and investment goods in the pre-1980 era, consumption goods emerged as another source in addition to these in the post-1980 era (Boratav, 1987: 107). The major cause of this transformation is the set of major alterations in the imports regime introduced gradually between 1980-1984 (Boratav and Turkcan, 1993: 39-44).

In this course of import liberalization some measures were introduced towards protection of the domestic industry, interestingly paradoxical. These measures involved prices, that is instead of quantity restrictions, tax rebates and special funds were put into effect (Boratav and Turkcan, 1993: 45). Nevertheless, liberalizing imports in general and without discriminating for import dependent production sectors would be expected to lead to increased dependency on imports of the overall economy (Boratav, 1987: 83-84). In line with the structure of the income

distribution in the import substitution era, sectors producing consumer durables emerged as dominating the production. The nature of import dependency of these differ significantly from that of intermediate input and investment good producing sectors, because large scale production and advanced technology are crucial for the latter group. Needless to say, a prerequisite for sustainable growth pattern is import substitution in these technology sectors, without which the Turkish economy would not be expected to overcome bottlenecks.

In the light of these observations, it would not be realistic to expect that the post-1980 transformations have led to decreased dependency on imports. On the contrary, the scope and scale of import dependency is expected to increase. This paper examines the underlying structure of import dependency in production. The next section presents the methodology proposed for this analysis and describes the data base. Findings with the new methodology for the most import dependent sectors are presented in section 3. The implications of the findings are discussed in the final section.

## 2. Methodology<sup>1</sup>

Intermediate imports in the input-output model are defined with respect to two aspects: by origin and by destination. Intermediate imports by origin involve foreign suppliers (sectors,  $i = 1, 2, \dots, n$ ) and intermediate imports by destination involve domestic buyers (sectors,  $j = 1, 2, \dots, n$ ). In its widely applied form, final demand induced intermediate input requirements (policy sectors  $k = 1, 2, \dots, n$ ) are computed in terms of imports by origin ( $i$ ) only. A version of this form provides information on final demand induced intermediate input requirements in terms of imports by destination ( $j$ ) only. We propose to reconcile these two aspects and hence define final demand induced intermediate input requirements in terms of imports both by origin and destination thus with respect to  $k, i$  and  $j$ .

### 2.1. Imports by origin

$\mathbf{A}^m$  and  $\mathbf{A}^d$  being coefficient matrices, by  $(n, n)$ , of imported and domestic intermediate inputs, respectively,  $\mathbf{A}$ , intermediate input coefficients matrix, is the combination of the two:  $\mathbf{A} = \mathbf{A}^d + \mathbf{A}^m$ . Direct intermediate import requirements by origin are given by

$$\mathbf{m} = \mathbf{A}^m \mathbf{x} \quad (1)$$

where  $\mathbf{x}$  is an  $(n, 1)$  vector of sectoral outputs, Here, the column vector,  $\mathbf{m}$ , captures sectoral totals for intermediate imports by origin (foreign or supplying sectors) and  $\sum_i \mathbf{m}_i = \mathbf{M}_{int}$ , total intermediate imports in the economy.

The common practice for finding total (direct + indirect) intermediate import requirements ( $\mathbf{m}$ ) in response to domestic final demand ( $\mathbf{y}^d$ ) (a vector by  $n, 1$ ) changes involves the definition

$$\mathbf{m} = \mathbf{A}^m \mathbf{x} = \mathbf{A}^m (\mathbf{I} - \mathbf{A}^d)^{-1} \mathbf{y}^d = \mathbf{A}^m \mathbf{R} \mathbf{y}^d = \mathbf{S} \mathbf{y}^d \quad (2)$$

$\mathbf{A}^m \mathbf{R}$  or  $\mathbf{S}$  in short, is usually referred to as the import dependency matrix. The typical element of  $\mathbf{S}$ ,  $s_{ik}$  is interpreted as “imported input requirement from the foreign sector  $i$ , in response to a say, unit increase in the final demand of sector  $k$ . Then  $\sum_i s_{ik}$  shows the total imported input requirement in the economy generated by one unit increase in the final demand of sector  $k$  or in short backward linkages for imports.

As  $s_{ik}$  in fact equals  $\sum_j s_{i,j,k}$ , that is the total of imports required from  $i$  by domestic sectors,  $j = 1, \dots, n$ , in response to  $\mathbf{k}^{th}$  final demand change, a question like “how much imported input is required in response to an increase in the final demand of  $k$  from foreign sector  $i$  by the domestic sector  $j$ ?” can not be answered in the present context. This question, in short, involves finding intermediate import requirements by destination (domestic or buying sectors). This is

relevant especially for developing economies which are dependent on imported inputs but are constrained by foreign trade deficits.

### 2.2. Imports by destination

The above posed question is partly answered by

$$\mathbf{u} = \langle \mathbf{T} \rangle \mathbf{x} \tag{3}$$

where  $\mathbf{u}$ , a vector of  $(n,1)$ , is the vector of imported intermediate inputs by destination and  $\mathbf{T}$  is a diagonal matrix with its typical element  $t_{jj} = \sum_i a^m_{ij}$  (column totals of  $\mathbf{A}^m$ ).

Overall total of  $\mathbf{u}$  is again equal to total intermediate imports in the economy, that is  $\sum_i u_i = M_{int} = \sum_i m_i$ . Relating intermediate imports by destination to final demands involves,

$$\mathbf{u} = \langle \mathbf{T} \rangle (\mathbf{I}-\mathbf{A}_d)^{-1} \mathbf{y}^d = \langle \mathbf{T} \rangle \mathbf{R} \mathbf{y}^d = \mathbf{V} \mathbf{y}^d \tag{4}$$

The elements of the matrix resulting from  $\langle \mathbf{T} \rangle \mathbf{R}$  or  $\mathbf{V}$  in short show the intermediate import demand of the  $j^{th}$  domestic sector in response to a unit change in  $k^{th}$  final demand, that is associating final demands with imports by destination. The column totals  $\sum_j v_{jk}$  here are identical to the corresponding  $\sum_i s_{ik}$ , as import backward linkages for sectors  $k$  and hence  $\sum_k \sum_j v_{jk} = \sum_k \sum_i s_{ik}$ .

With similar insight,  $v_{jk}$ , the typical element of  $\mathbf{V}$ , equals  $\sum_i v_{i,j,k}$ , that is the total of imports required by the domestic sector,  $j$ , from  $i = 1, \dots, n$ , in response to  $k^{th}$  final demand change, but disguises information on the supplying foreign sector,  $i$ , or on the origin sector.

### 2.3. Imports by origin and destination: the new model

In an attempt to answer the above posed question and thus reconcile the information contents of the two preceding sections, all three dimensions, that is  $i$ ,  $j$  and  $k$ , of import dependency can be captured in the following way: for any policy or final demand sector  $k$ , define

$$\mathbf{G}^k = \mathbf{A}^m \langle \mathbf{R}^{*k} \rangle \tag{5}$$

where  $\langle \mathbf{R}^{*k} \rangle$  is a diagonal matrix of  $(n,n)$ , formed by the  $k^{th}$  column of  $\mathbf{R}$ , that is  $(\mathbf{I}-\mathbf{A}_d)^{-1}$  diagonalized for sector  $k$ . Hence for  $i = \ell$ ,  $\mathbf{r}^{*k}_{i\ell} = \mathbf{r}_{ik}$ .  $\mathbf{G}^k$  can be regarded a certain way of combining information on direct intermediate import demands by origin ( $i$ ) and by destination ( $j$ ) with information on final demand ( $k$ ) induced intermediate imports (direct + indirect) by origin ( $i$ ). A typical element of  $\mathbf{G}^k$ ,  $g^k_{ij}$ , then stands for imported intermediate input requirement (direct + indirect) by the  $j^{th}$  (domestic) sector from the  $i^{th}$  (foreign) sector induced by one unit increase in the  $k^{th}$  sector's final demand.

The row sums of  $\mathbf{G}^k$  give  $s_{ik}$ , import backward linkages in common practice, that is

$$\sum_j g^k_{ij} = s_{ik} \tag{6}$$

and the column sums of  $\mathbf{G}^k$  give  $v_{jk}$ , that is

$$\sum_i g^k_{ij} = v_{jk} \tag{7}$$

Also,  $\sum_i \sum_j g^k_{ij} = \sum_i s_{ik} = \sum_j v_{jk}$ . Thus, with the typical element  $g^k_{ij}$ , we are able to answer the posed question above, in coherence with the common usage of  $\mathbf{S}$  and  $\mathbf{V}$  for assessing import dependency.

Previous work on import dependency structure of Turkey made use of the common methodology outlined in Section 2.1 (for example Senesen (1990) and (1995), Senesen and

Kucukcifci (1991), Yildirim (1978)). By applying the proposed methodology in this section, on previous as well as more recent data, we are able to improve the information content in inter temporal analysis.

Input-output tables for the Turkish economy are available in coherent classification for 64 sectors (industries) for the years 1973, 1985 and 97 sectors for 1996. Imported intermediate input flow matrices are also available. Since sectoral price indices were available only for 24 sectors, the data matrices were aggregated to 24 sectors for all three years. All data are expressed in 1996 prices.

### 3. Structure of Import Dependency in Turkey: 1973, 1985, 1996

In an attempt to associate the policy periods with input-output data, we assume that the year 1973 represents the planned economy era, 1985 the transformation period towards liberalization of imports and, finally, 1996 the year in which the results of post-1980 policies can be observed. Before proceeding to the changes in policy-origin-destination sector composition of imports, we will first elaborate on the general outlook via **Import dependency backward linkages** ( $\Sigma_i s_{ik}$ ), defined in section 2.1. The box-plots of these policy-origin sector coefficients for 24 sectors are shown in Figure 1.

#### Figure 1 will be inserted approximately here

Two basic characteristics of the structure summarized in Figure 1 are striking. Firstly, the import dependency of production increased in time, especially in the early phase of liberalization. The import dependency of the economy, as a whole, increased significantly, by 33 percent, from 1973 to 1985 and changed little from 1985 to 1996.

Secondly, the Turkish economy is structurally (and fatally) dependent on raw petroleum. Foreign input requirements invoked by the petroleum products sector capture the top place among 24 sectors in each of the three periods. In addition to that, while petroleum products sector was an outlier in 1973, it becomes a far far outlier in 1985.

The findings based on the methodology of section 2.3, reveal the underlying structures of the sectors that constitute the basis for the two general characteristics mentioned above. The elements of  $\mathbf{G}^k$  matrices with the highest values are summarized in several tables below. The cells of these tables display the import dependency structure of each policy sector in terms of both origin and destination. The rightmost column of each table contains the (origin or supplier) values and the bottom cell of this column shows the imports dependency linkages ( $\Sigma_i s_{ik}$ ). These tables exhibit only the most striking components of the  $s_{ik}$  values. Only origin (destination) sectors with row (column) sums greater than 0.01 in  $\mathbf{G}^k$  matrices are reported. In other words, in response to a one unit increase in the final demand of a policy sector, the sectors shown in the tables are either the domestic sectors that buy more than 1 percent of this increase from foreign countries or the foreign sectors that sell more than 1 percent of it to Turkey. If the row or the column sum of a sector is greater than 0.01, but any cell value in the table is less than 0.01, that cell is left empty and only the name of the related sector is shown. The information gains from the new method in section 2.3, are in the columns of these tables. For each destination sector, the most important cell value is highlighted by bold type. We outline the characteristics of leading 17 **policy** sectors in import dependent sectors below.

In the case of **Agriculture**, one unit increase in its domestic final demand induced biggest part (about 2/3) of import requirement by the domestic Agriculture sector from foreign Chemicals in 1973. More than 40 percent of such induced imports was demanded by domestic Petroleum products from foreign Mining in 1985. An additional 1/4 share remained from Chemicals to Agriculture as before. In 1996 we observe that Agriculture emerges among the foreign supplier (origin) sectors. What is more, the imports share of domestic Agriculture from foreign Agriculture increased almost to 1/3 of the total. Import flows from Mining to Petroleum products and from Chemicals to Agriculture, which constitute the other two important shares, are about 1/6 and 1/7 respectively. (See Table 1)

**Table 1 will be inserted approximately here.**

In the case of **Mining**, import requirements were induced in 1973 by Mining from foreign Machinery (about 36 percent) and Electrical Machinery (about 10 percent). Later on the highest shares (51 percent in 1985 and 37 percent in 1996) are for domestic Petroleum products (as destination) and foreign Mining sector (as origin). (See Table 2)

**Table 2 will be inserted approximately here.**

One interesting feature of the **Food-drinks-tobacco** sector is that the pairs of leading origin-destination sectors are different in each period. With a share of  $\sim 1/3$  in each year, the direction of the imports flow in 1973 is from foreign Chemicals to domestic Agriculture, in 1985 from foreign Mining to domestic Petroleum products and in 1996 from foreign Agriculture to domestic Food-drinks-tobacco. Furthermore in the last period, imports were induced by the domestic Food-drinks-tobacco from foreign Food-drinks-tobacco ( $\sim 1/5$ ) and by domestic Petroleum products from foreign Mining ( $\sim 1/10$ ). (See Table 3).

**Table 3 will be inserted approximately here.**

In the case of **Textiles-clothinging**, induced imports were largely demanded by Textiles-clothing sector itself for each of the three years. The foreign suppliers were Chemicals ( $\sim 1/2$ ) in 1973, Textiles-clothinging (almost 40 percent) in 1985 and the same two sectors (each with a share of  $\sim 1/3$ ) in 1996. (See Table 4)

**Table 4 will be inserted approximately here.**

In the case of **Paper-printing**, induced import requirements are related to the same sector, as both buyer and supplier, in each of the three years with 36, 33 and 55 percent shares respectively. The imports of Petroleum products from Mining and of Paper-printing from Chemicals are also significant. The share of induced imports by Paper-printing from foreign Agriculture sector is also above  $1/10$  of the total in 1985. (See Table 5)

**Table 5 will be inserted approximately here.**

In the case of **Chemicals**, induced imports requirements are largely related to the same sector as both origin and destination. (with the shares of  $\sim 4/5$  in 1973,  $\sim 1/2$  in 1985 and  $\sim 3/4$  in 1996). For both 1985 and 1996, the imports of Petroleum products from Mining are also sizeable. (See Table 6)

**Table 6 will be inserted approximately here.**

Almost all of the imports requirements induced by one unit increase in the final demand of **Petroleum products** is demanded by itself from foreign Mining (mainly raw petrolum) sector in each of the three years with the shares of 89, 96 and 98 percent respectively. (See Table 7)

**Table 7 will be inserted approximately here.**

In the case of **Rubber-plastics**, the largest buyer of the induced imports is Rubber-plastics while the largest seller is the Chemicals in each of the three periods. The shares are  $\sim 1/2$ ,  $\sim 2/5$  and  $\sim 3/4$  respectively. Also, the shares of imports of domestic Chemicals from foreign Chemicals in every year and of domestic Petroleum products from foreign Mining are also noticable. (See Table 8)

**Table 8 will be inserted approximately here.**

For **Glass-cement**, almost 30 percent of the induced imports was demanded by Glass-cement from foreign Chemicals in 1973, more than 40 percent by Petroleum products from foreign Mining in 1985 and above 20 percent by Glass-cement from foreign Mining in 1996. Other sizeable shares are related to the imports by Petroleum products from Mining in 1973, by Glass-cement from Mining, from Chemicals and from Glass-cement in 1985 and by Petroleum products from Mining, by Glass-cement from Chemicals in 1996. (See Table 9)

**Table 9 will be inserted approximately here.**

For **Basic metals**, a very large part of the induced imports (4/5 in 1973, ~2/3 in both 1985 and 1996) are demanded by itself from foreign Basic metals. In the last two periods imports by Petroleum products from Mining emerge as significant. (See Table 10)

**Table 10 will be inserted approximately here.**

In the case of **Metal products**, more than half of the induced import requirements were demanded by domestic Metal products sector from its foreign counterpart. The imports shares of Basic metals from Basic metals, of Metal products from Metal products in 1973, of Petroleum products from Mining and of Basic metals from Basic metals in 1985 and of Basic metals from Basic metals, of Metal products from Chemicals, of Petroleum products from Mining and of Metal products from Machinery in 1996 should also be mentioned. (See Table 11)

**Table 11 will be inserted approximately here.**

For **Machinery**, a sizeable part of the induced imports were demanded and supplied by the Machinery sector in each year (60 percent in 1973, almost 30 percent in 1985 and approximately 40 percent in 1996). Imports of Machinery in 1973 constituted nearly 30 percent of the induced total. Other sizeable import flows were from Basic metals to Basic metals and to Machinery in 1973, from Mining to Petroleum products and from Basic metals to Basic metals in 1985 and finally from Basic metals to Basic metals and to Machinery in 1996. (See Table 12)

**Table 12 will be inserted approximately here.**

For **Electrical machinery**, large proportions of the induced imports are related to the same sector in every year. The respective shares were ~2/3 in 1973, ~2/5 in 1985 and more than 1/2 in 1996. The imports shares of Electrical machinery sector from Basic metals in each year should also be mentioned. (See Table 13)

**Table 13 will be inserted approximately here.**

For **Transportation vehicles**, the highest share of the induced imports in each of the three years relate to the purchases made by the same sector from its foreign counterpart. These shares were ~2/3 in 1973 and ~2/5 in 1985 and in 1996. (See Table 14)

**Table 14 will be inserted approximately here.**

For **Construction**, the highest share of induced imports are related to the flow from Basic metals to Construction sector in 1985 and 1996. In addition to that the imports by Basic metals from Basic metals, by Construction from Basic metals, from Metal products and from Machinery in 1973, by Petroleum products from Mining, by Basic metals from Basic metals in 1985 and in 1996 are also important. (See Table 15)

**Table 15 will be inserted approximately here.**

In the case of **Trade**, there was no row sum or column sum greater than 0.01 in 1973 and in 1996. However in 1985 the imports share demanded by Petroleum products from Mining was more than half of the total induced imports requirements. (See Table 16)

**Table 16 will be inserted approximately here.**

Finally for **Transportation-communication**, the largest shares of induced imports requirements in each of the three years are related to purchases by Petroleum products from Mining. The shares were almost 2/5, 4/5 and 1/2 in respective years. Furthermore the imports by Transportation vehicles from Mining in 1973, by Transportation-communication from Petroleum products and from Transportation-communication in 1996 are also sizeable. (See Table 17)

**Table 17 will be inserted approximately here.**

There are some common characteristics for the production sectors for the whole period. Firstly, the main buyer/destination sector is the same policy sector. In other words, one unit increase in  $y^d$  of sector  $k$  induces the highest imported intermediate input demand again by the same sector  $j$  (that is  $j = k$ ). This implies that the increases in the final demands of these production sectors mainly depend on the supply of (direct + indirect) imported intermediate inputs to them.

Secondly, for Paper-printing, Chemicals, Basic metals, Machinery, Electrical machinery and Transportation vehicles sectors, the same origin sector  $i$  (that is  $i = j = k$ ) is among the leading supplier sectors. This emphasizes the rather permanent dependency of main domestic production sectors on their foreign counterparts. Furthermore, a fact not observed in 1973, but rather important after 1980 for traditional exporting sectors of Turkey is also striking. Both Agricultural and Food-drinks-tobacco sectors have started to induce demand for intermediate inputs from the foreign Agriculture sector. In addition to that Textiles-clothing sector has begun to induce demand for intermediate inputs from foreign Textiles-clothing sector.

Thirdly, the final demand increases in all sectors, except Mining, Petroleum products, Basic metals and Transportation - communication, induce demand for intermediate inputs from foreign Chemicals sector.

Fourthly, a striking but not surprising feature is that with the exception of a few sectors, final demand increases induce demand for imported raw petroleum inputs by Petroleum products more and more every year. In other words, this sector emerges as an increasingly significant destination sector (and mining as a significant origin sector) for most of the sectors.

**4. General Assessment**

Turkey has long suffered from balance of payments deficits, which has exerted severe pressure on the functioning of the economy in times of foreign exchange shortages, relieved only with inflow of foreign borrowing. Another noteworthy characteristic of the economy is the drifting away, in 1980 from the import substitution strategy of two decades to the export promotion strategy. Our analysis has focused on the production aspect of import dependency and its sectoral pattern in a comparative perspective. Although the rather high degree of data aggregation poses limitations on the implications of the findings, several striking features of the transition in time can be outlined.

Production has become more dependent on intermediate imports of an increased variety. The related outstanding origin sectors are basically technology and energy intensive sectors. Policy sectors emerge as significant destination sectors of these induced intermediate imports. The import dependent nature of production created in the pre-1980 planning era seems to have become persistent in the post-1980 liberal era. Although the scope of protection and hence import substitution in these sectors was rather limited in the planning era, large scale public investments were the moving force (Turel, 1981:579). The rapid decline in public investments in the post-

1980 era along with privatization programs have obviously moved the economy away from initiating indigenous technology production.

One rather unexpected outcome for the post 1980 era is the emergence of leading export sectors like agriculture, textiles and food as cases of significant import dependent sectors, obviously contrary to the expectations of the export promotion policy. This is a rather significant transformation from 1973 to 1996. A similar trend was also observed in Pamukcu and de Boer (2000) whereby the determinants of Turkish imports are studied for 1968-1990.

So far, our assessment of the import dependency structure of the Turkish economy covers the period 1973-1996. Since the latest input-output table is available for 1996, more recent developments regarding inter industrial structure could not be incorporated. One such recent turning point is the Customs Union between the European Union (EU) and Turkey, which came into effect in January 1996. Although the effects of this further stage of import liberalization cannot be studied with an input-output model yet, findings for imports in some recent research reveal the route of production structure in the aftermath of the Customs Union. For example, Kucukahmetoglu (2000) reports that by 1998, Turkey's imports are dominated by capital and thus technology intensive goods. On the other hand, Seyidoglu and Kemer (2002) report that by 1999, Turkey's final good imports from the EU has accelerated, implying a less motivating environment for advancements in domestic production. Bayar (2000:24) expects adverse effects of the Customs Union mainly on the domestic Chemicals, Transportation vehicles and Tobacco sectors.

Obviously, import dependency in production would be regarded less crucial for an economy with competitive advantages in the international markets, and thus with foreign exchange earnings from exports to finance the import bill. In Turkey's case however, the opposite prevails. Moreover the prospects for the decline in the heavy dependence of production on imported energy and technology are dim. The implication would be that the less stable growth pattern of the economy and its increased vulnerability to foreign resource availability in the post 1980 era is bound to subsist in the future.

In consequence, the rather permanent nature of recent economic crises has its roots in the production structure. It seems highly unlikely to switch from present state without transforming the production sector into a technologically competitive one. A straightforward policy proposition would be that, since transformations in the economic policy/development strategy might produce counter effects on the production structure, these policies should divert their focus to the production structure itself.

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Table 1. Policy sector is **Agriculture**

SUPPLIER	BUYER		<b>1973</b> Total
	<b>Agriculture</b>		
<b>Chemicals</b>	<b>0.0172</b>		0.0186
Total	0.0198		<b>0.0253</b>

SUPPLIER	BUYER		<b>1985</b> Total
	Agriculture	<b>Oil refinery</b>	
<b>Mining</b>		<b>0.0215</b>	0.0220
Chemicals	0.0127		0.0170
Total	0.0198	0.0222	<b>0.0504</b>

SUPPLIER	BUYER		<b>1996</b> Total
	<b>Agriculture</b>	Oil refinery	
<b>Agriculture</b>	<b>0.0219</b>		0.0228
Mining		0.0109	0.0127
Chemicals	0.0136		0.0215
Total	0.0436	0.0110	<b>0.0713</b>

Table 2. Policy sector is **Mining**

SUPPLIER	BUYER		<b>1973</b> Total
	<b>Mining</b>		
Basic metals			0.0125
<b>Machinery</b>	<b>0.0367</b>		0.0379
Electrical machinery	0.0118		0.0139
Total	0.0745		<b>0.1014</b>

SUPPLIER	BUYER		<b>1985</b> Total
	Mining	<b>Oil refinery</b>	
<b>Mining</b>		<b>0.0424</b>	0.0439
Basic metals			0.0139
Total	0.0229	0.0437	<b>0.0833</b>

SUPPLIER	BUYER		<b>1996</b> Total
	Mining	<b>Oil refinery</b>	
<b>Mining</b>		<b>0.0170</b>	0.0207
Total	0.0137	0.0172	<b>0.0460</b>

Table 3. Policy sector is **Food-drink-tobacco**

SUPPLIER	BUYER		<b>1973</b> Total
	Agriculture		
Chemicals			0.0145
Total	0.0113		<b>0.0339</b>

SUPPLIER	BUYER		<b>1985</b> Total
	Food-drink-tobacco	Oil refinery	
<b>Mining</b>	<b>0.0228</b>		0.0239
Chemicals			0.0154
Total	0.0244	0.0234	<b>0.0684</b>

SUPPLIER	BUYER			<b>1996</b> Total
	Agriculture	Food-drink-tobacco	Oil refinery	
<b>Agriculture</b>	<b>0.0289</b>			0.0353
Mining				0.0155
Food-drink-tobacco	0.0227			0.0234
Chemicals				0.0171
Total	0.0124	0.0631	0.0112	<b>0.1099</b>

Table 4. Policy sector is **Textiles**

SUPPLIER	BUYER		<b>1973</b> Total
	Textiles		
<b>Chemicals</b>	<b>0.0325</b>		0.0431
Total	0.0483		<b>0.0687</b>

SUPPLIER	BUYER		<b>1985</b> Total
	Textiles	Oil refinery	
Mining	0.0187		0.0199
Food			0.0105
<b>Textiles</b>	<b>0.0484</b>		0.0484
Chemicals	0.0222		0.0303
Total	0.0922	0.0192	<b>0.1284</b>

SUPPLIER	BUYER		<b>1996</b> Total
	Textiles	Oil refinery	
Mining	0.0113		0.0177
<b>Textiles</b>	<b>0.0591</b>		0.0591
<b>Chemicals</b>	<b>0.0588</b>		0.0681
Total	0.1344	0.0114	<b>0.1754</b>

Table 5. Policy sector is **Paper-printing**

SUPPLIER	BUYER		<b>1973</b>
	<b>Paper-printing</b>	Oil refinery	Total
Mining		0.0102	0.0106
<b>Paper-printing</b>	<b>0.0526</b>		0.0526
Chemicals	0.0496		0.0624
Total	0.1108	0.0106	<b>01453</b>

SUPPLIER	BUYER		<b>1985</b>
	<b>Paper-printing</b>	Oil refinery	Total
Agriculture	0.0204		0.0214
Mining		0.0468	0.0498
<b>Paper-printing</b>	<b>0.0633</b>		0.0634
Chemicals	0.0298		0.0394
Total	0.1215	0.0482	<b>0.1947</b>

SUPPLIER	BUYER		<b>1996</b>
	<b>Paper-printing</b>	Oil refinery	Total
Mining		0.0126	0.0181
<b>Paper-printing</b>	<b>0.0886</b>		0.0897
Chemicals	0.0232		0.0313
Total	0.1213	0.0127	<b>0.1600</b>

Table 6. Policy sector is **Chemicals**

SUPPLIER	BUYER		<b>1973</b>
	<b>Chemicals</b>		Total
<b>Chemicals</b>	<b>0.1575</b>		0.1611
Total	0.1750		<b>0.1909</b>

SUPPLIER	BUYER		<b>1985</b>
	<b>Chemicals</b>	Oil refinery	Total
Mining		0.0594	0.0701
<b>Chemicals</b>	<b>0.0945</b>		0.0983
Total	0.1175	0.0611	<b>0.1933</b>

SUPPLIER	BUYER		<b>1996</b>
	<b>Chemicals</b>	Oil refinery	Total
Mining		0.0160	0.0401
<b>Chemicals</b>	<b>0.1930</b>		0.1984
Total	0.2245	0.0162	<b>0.2628</b>

Table 7. Policy sector is **Oil refinery**

SUPPLIER	BUYER		<b>1973</b> Total
	Mining	<b>Oil refinery</b>	
<b>Mining</b>		<b>0.3385</b>	0.3387
Oil refinery			0.0117
Total	0.0173	0.3529	<b>0.3801</b>

SUPPLIER	BUYER		<b>1985</b> Total
		<b>Oil refinery</b>	
<b>Mining</b>		<b>0.8081</b>	0.8085
Total	0.8314		<b>0.8400</b>

SUPPLIER	BUYER		<b>1985</b> Total
		<b>Oil refinery</b>	
<b>Mining</b>		<b>0.3480</b>	0.3490
Total	0.3513		<b>0.3553</b>

Table 8. Policy sector is **Rubber-plastics**

SUPPLIER	BUYER		<b>1973</b> Total
	Chemicals	<b>Rubber-plastics</b>	
Agriculture		0.0411	0.0417
Paper-printing		0.0393	0.0395
<b>Chemicals</b>	0.0116	<b>0.1110</b>	0.1251
Total	0.0128	0.1969	<b>0.2199</b>

SUPPLIER	BUYER			<b>1985</b> Total
	Chemicals	Oil refinery	<b>Rubber-plastics</b>	
Agriculture			0.0316	0.0324
Mining		0.0275		0.0295
<b>Chemicals</b>	0.0106		<b>0.0730</b>	0.0863
Rubber			0.0172	0.0174
Total	0.0131	0.0283	0.1316	<b>0.1865</b>

SUPPLIER	BUYER		<b>1996</b> Total
	Chemicals	<b>Rubber-plastics</b>	
Mining			0.0140
<b>Chemicals</b>	0.0135	<b>0.2412</b>	0.2571
Rubber		0.0262	0.0264
Basic metals			0.0140
Total	0.0157	0.2836	<b>0.3287</b>

Table 9. Policy sector is **Glass-cement**

SUPPLIER	BUYER			<b>1973</b> Total
	Mining	Oil refinery	<b>Glass-cement</b>	
Mining		0.0336		0.0343
<b>Chemicals</b>			<b>0.0404</b>	0.0488
Basic metals				0.0120
Electrical machinery				0.0175
Total	0.0108	0.0350	0.0676	<b>0.1394</b>

SUPPLIER	BUYER		<b>1985</b> Total
	<b>Oil refinery</b>	Glass-cement	
<b>Mining</b>	<b>0.0951</b>	0.0331	0.1319
Chemicals		0.0213	0.0309
Oil refinery		0.0121	0.0156
Glass-cement		0.0107	0.0108
Basic metals			0.0183
Total	0.0978	0.0909	<b>0.2328</b>

SUPPLIER	BUYER		<b>1996</b> Total
	Oil refinery	<b>Glass-cement</b>	
<b>Mining</b>	0.0164	<b>0.0267</b>	0.0537
Chemicals		0.0223	0.0275
Total	0.0166	0.0694	<b>0.1165</b>

Table 10. Policy sector is **Basic metals**

SUPPLIER	BUYER		<b>1973</b> Total
	<b>Basic metals</b>		
Mining			0.0158
<b>Basic metals</b>		<b>0.1409</b>	0.1421
Total		0.1566	<b>0.1750</b>

SUPPLIER	BUYER		<b>1985</b> Total
	Oil refinery	<b>Basic metals</b>	
Mining	0.0350	0.0268	0.0632
<b>Basic metals</b>		<b>0.1502</b>	0.1520
Total	0.0360	0.1849	<b>0.2298</b>

SUPPLIER	BUYER		<b>1996</b> Total
	Oil refinery	Basic metals	
Mining	0.0193	0.0396	0.0695
<b>Basic metals</b>		<b>0.1455</b>	0.1480
Total	0.0195	0.2035	<b>0.2483</b>

Table 11. Policy sector is **Metal products**

SUPPLIER	BUYER		1973 Total
	Basic metals	<b>Metal products</b>	
<b>Basic metals</b>	0.0316	<b>0.0707</b>	0.1028
Metal products		0.0129	0.0137
<b>Total</b>	<b>0.0351</b>	<b>0.0907</b>	<b>0.1355</b>

SUPPLIER	BUYER			1985 Total
	Oil refinery	Basic metals	<b>Metal products</b>	
Mining	0.0136			0.0199
<b>Basic metals</b>		0.0315	<b>0.0945</b>	0.1269
<b>Total</b>	<b>0.0140</b>	<b>0.0388</b>	<b>0.1112</b>	<b>0.1715</b>

SUPPLIER	BUYER			1996 Total
	Oil refinery	Basic metals	<b>Metal products</b>	
Mining	0.0107			0.0253
Chemicals			0.0149	0.0220
<b>Basic metals</b>		0.0238	<b>0.1066</b>	0.1326
Machinery			0.0128	0.0162
<b>Total</b>	<b>0.0108</b>	<b>0.0332</b>	<b>0.1397</b>	<b>0.2101</b>

Table 12. Policy sector is **Machinery**

SUPPLIER	BUYER		1973 Total
	Basic metals	<b>Machinery</b>	
Basic metals	0.0113	0.0225	0.0362
<b>Machinery</b>		<b>0.0978</b>	0.0981
<b>Total</b>	<b>0.0126</b>	<b>0.1348</b>	<b>0.1629</b>

SUPPLIER	BUYER			1985 Total
	Oil refinery	Basic metals	<b>Machinery</b>	
Mining	0.0189			0.0142
<b>Basic metals</b>		0.0159	<b>0.0441</b>	0.0666
<b>Machinery</b>			<b>0.0438</b>	0.0442
<b>Total</b>	<b>0.0112</b>	<b>0.0196</b>	<b>0.1062</b>	<b>0.1541</b>

SUPPLIER	BUYER		1996 Total
	Basic metals	<b>Machinery</b>	
Mining			0.0161
Chemicals			0.0107
Basic metals	0.0145	0.0544	0.0726
<b>Machinery</b>		<b>0.0667</b>	0.0681
<b>Total</b>	<b>0.0203</b>	<b>0.1289</b>	<b>0.1798</b>

Table 13. Policy sector is **Electrical machinery**

SUPPLIER	BUYER		<b>1973</b> Total
	Basic metals	<b>Electrical machinery</b>	
Basic metals		0.0198	0.0304
<b>Electrical machinery</b>		<b>0.0916</b>	0.0920
Total	0.0109	0.1201	<b>0.1360</b>

SUPPLIER	BUYER		<b>1985</b> Total
	<b>Electrical machinery</b>		
Basic metals		0.0209	0.0290
<b>Electrical machinery</b>		<b>0.0289</b>	0.0291
Total		0.0550	<b>0.0735</b>

SUPPLIER	BUYER		<b>1996</b> Total
	Basic metals	<b>Electrical machinery</b>	
Mining			0.0125
Chemicals		0.0110	0.0172
<b>Basic metals</b>		0.0417	0.0546
<b>Electrical machinery</b>		<b>0.1194</b>	0.1197
Total	0.0129	0.1782	<b>0.2189</b>

Table 14. Policy sector is **Transport vehicles**

SUPPLIER	BUYER		<b>1973</b> Total
	Basic metals	<b>Transport vehicles</b>	
Basic metals	0.0127	0.0279	0.0413
<b>Transport vehicles</b>		<b>0.1128</b>	0.1130
Total	0.0141	0.1535	<b>0.1750</b>

SUPPLIER	BUYER		<b>1985</b> Total
	<b>Transport vehicles</b>		
Mining			0.0102
Basic metals		0.0626	0.0702
Electrical machinery		0.0122	0.0134
<b>Transport vehicles</b>		<b>0.0755</b>	0.0757
Total		0.1625	<b>0.1895</b>

SUPPLIER	BUYER			<b>1996</b> Total
	Basic metals	Metal products	<b>Transport vehicles</b>	
Mining				0.0152
Chemicals				0.0140
Basic metals		0.0112	0.0296	0.0573
Electrical machinery			0.0130	0.0147
<b>Transport vehicles</b>			<b>0.0849</b>	0.0860
Total	0.0136	0.0147	0.1404	<b>0.2024</b>



Table 15. Policy sector is **Construction**

SUPPLIER	BUYER		<b>1973</b>
	<b>Basic metals</b>	Construction	Total
Basic metals	<b>0.0200</b>	0.0174	0.0394
Metal products		0.0148	0.0162
Machinery		0.0132	0.0146
<b>Electrical machinery</b>		<b>0.0199</b>	0.0254
Total	0.0222	0.0690	<b>0.1168</b>

SUPPLIER	BUYER			<b>1985</b>
	Oil refinery	Basic metals	<b>Construction</b>	Total
Mining	0.0353			0.0416
<b>Basic metals</b>		0.0194	<b>0.0454</b>	0.0672
Total	0.0363	0.0238	0.0543	<b>0.1321</b>

SUPPLIER	BUYER			<b>1996</b>
	Oil refinery	Basic metals	Construction	Total
Mining	0.0139			0.0262
Chemicalssal maddeler				0.0163
<b>Basic metals</b>		0.0114	<b>0.0475</b>	0.0636
Machinery				0.0105
Total	0.0140	0.0160	0.0726	<b>0.1381</b>

Table 16. Policy sector is **Commerce**

SUPPLIER	BUYER	<b>1985</b>
	<b>Oil refinery</b>	Total
<b>Mining</b>	<b>0.0126</b>	0.0131
Total	0.0129	<b>0.0248</b>

Table 17. Policy sector is **Transportation-communication**

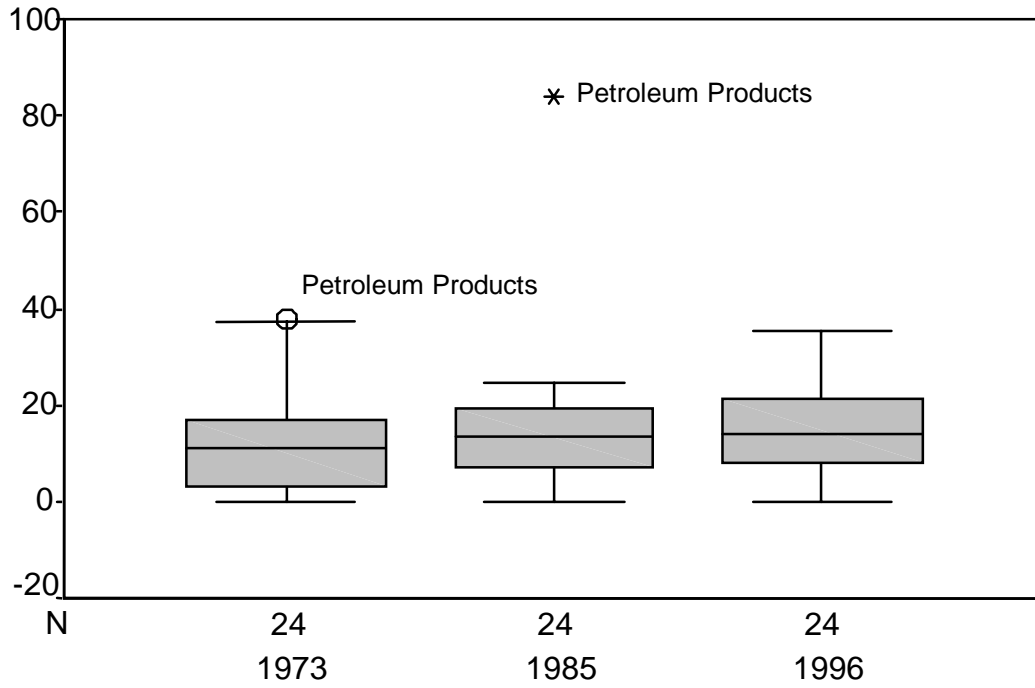
SUPPLIER	BUYER			<b>1973</b> Total
	<b>Oil refinery</b>	Transport vehicles	Transportation-communication	
<b>Mining</b>	<b>0.0304</b>			0.0305
Transport vehicles		0.0109		0.0168
Total	0.0317	0.0148	0.0138	<b>0.0771</b>

SUPPLIER	BUYER		<b>1985</b> Total
	<b>Oil refinery</b>	Transportation-communication	
<b>Mining</b>	<b>0.1075</b>		0.1079
Total	0.1106	0.0102	<b>0.1381</b>

SUPPLIER	BUYER		<b>1996</b> Total
	<b>Oil refinery</b>	Transportation-communication	
<b>Mining</b>	<b>0.0478</b>		0.0494
Oil refinery		0.0154	0.0157
Transportation-communication		0.0121	0.0129
Total	0.0483	0.0366	<b>0.0994</b>

Figure 1. Import dependency, Turkey,  $\sum_i s_{ik}$ 

(in 1996 prices)



<sup>1</sup> This methodology section relies on Gunluk-Senesen and Senesen (2001). Further references in the input-output literature will not be listed and theoretical aspects will not be discussed here for space considerations.