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Abstract

The objective of this study is to analyze the patterns of structural and technological movements in the post-1980 Turkish economy. This period is known to span the overall transformation of the Turkish economy from domestic demand-oriented import substitutionist industrialization to one with export-orientation and integration with the global commodity and financial markets. What was theoretically expected from the process of outward orientation, was that as the economy would be exposed to more competition and technological know-how in the global markets and rapid gains in productivity would be converted into an engine of growth through technological improvements. It is the purpose of this paper to analytically depict and decompose the output movements in Turkey from 1980 onwards. By doing so, it becomes possible to observe whether trade orientation has been (one of) the major stimulating factors of output growth. To this end, this study uses input-output tables and employs Structural Decomposition Analysis to decompose the output change in the economy into the fraction attributable to changes in technology, the fraction attributable to import penetration in intermediate demand and the fractions attributable to level and composition of final demand, both in terms of its domestic and foreign components.

ملخص

تهدف هذه الدراسة إلي تحليل نماذج الحركات البنيوية والتقانية للإقتصاد التركي في حقبة ما بعد عام 1980. ومن المعروف أن هذه الفتره تمتد خلال التحول الشامل للإقتصاد التركي من إقتصاد محلي ذي توجه شرائي نحو الإستيراد بديلا عن التصنيع إلي إقتصاد ذي توجه تصديري ومتكامل مع الأسواق العالمية للسلع والأموال. ومن الناحية النظرية، كان المتوقع من عملية التوجه الخارجي أن يتعرض الاقتصاد إلي منافسة أكثر ومعرفة تقانية أكبر في الأسواق العالمية وأن المكاسب السريعة في الإنتاجية ستتحول إلي دافع للنمو من خلال التحسينات التقانية. وتاهدف هذه الورقة إلي تصويرحركات الإنتاج في تركيا بداية من عام 1980. ليصبح في الإمكان بعد ذلك ملاحظة هل كان ذلك التوجه التجاري من العوامل الرئيسية المحفزة لنمو الإنتاج. وللوصول إلي هذه النتيجة، إستخدمت الدراسة جداول مدخلات ومخرجات ووظفت تحليل التفكك البنيوي لتحليل تغير المخرجات في الإقتصاد إلي مكوناته المنسوبة إلي تغيرات في التكنولوجيا ومكوناه المنسوبة إلي إختراق الواردات في الطلب المتوسط وكذا مكوناته المنسوبة إلي مستوي الطلب النهائي وتكوينه من حيث المكونات المحلية والأجنبية.

1. Introduction

Turkey initiated its long process of integration with the world commodity and financial markets in 1980, with the announcement of the structural adjustment reform program. Since then, the Turkish has gone through intense waves of economic policy regime —along with institutional changes. During this transformation, first, the existing system of multiple exchange rates was replaced by a managed crawling peg. A wide-ranging subsidization program was initiated to promote exports. Trade regime was liberalized in 1983 when most quota restrictions were removed and tariffs were substantially lowered. In 1984, banks were allowed to accept foreign currency deposits and engage in foreign transactions. The recognition of the full convertibility of the Turkish Lira and the elimination of the controls on foreign transactions in 1989 completed the capital account liberalization and Turkey entered the 1990s under the conditions of a fully open, trade-oriented economy[1].

Throughout the process, we witness the overall transformation of the Turkish economy from domestic-demand oriented, import-substitutionist industrialization, into one with export orientation and integration with the world markets. During the period, the manufacturing industry evolved as the main sector in leading the export-orientation of the economy and also the focal sector where the distribution patterns between wage-labor and capital were reshaped. In theory, expectations from the process of outward orientation was more exposure to competition and technological know-how in the global markets and rapid gains in productivity.

It is the purpose of this paper to depict and decompose (at a fairly aggregate level) the structural change of the Turkish economy in the post-1980 period, by means of the Input-Output (I/O) tables of 1985, 1990, 1998 and 2002[2]. By doing so, the aim here is to observe the portion of output growth attributable to changes in the level and composition of final demand (expenditure items) and the portion of output growth attributable to changes in technology (as reflected in the changes in I/O coefficients). The general (vertical) linkage components observed at the degree of aggregation employed in this study also helps to recognize patterns of interdependence among groups of sectors of the economy.

Section 2 introduces the structural decomposition methodology applied in this study. Section 3 presents and discusses the results. Section 4 summarizes and refers to future discussions.

2. Methodology: Structural Decomposition Analysis

The methodology employed here is based on the *Structural Decomposition Analysis(SDA)* to decompose output changes in the economy into the fraction attributable to changes in technology, the fraction attributable to import penetration and intermediate demand and the fraction attributable to changes in the level and composition of final demand in its domestic and foreign components. Such an analysis helps to identify whether it is the technology effect or the demand effect that dominates the characteristics of the most rapidly growing and most rapidly declining sectors. It also summarizes the output changes that can be ascribed to the changes in imports of intermediate inputs, changes in imports of the final goods and changes in exports.

Such a methodology to assess structural change employing I/O tables is established on the method of identifying compositional structural change, an approach based on Chenery (1960,

[1] See Boratav and Türel (1993), Şenses (1994) and Celasun (1994) for overviews of the post-1980 Turkish structural reforms and the related changes in the structure of the economy. Metin-Özcan Voyvoda and Yeldan (2002), Voyvoda and Yeldan (2001) and Filiztekin (2001) provide analyses of structural adjustment during the post-1980 period in Turkish manufacturing industries.

[2] The 2002 I/O table is the latest I/O table published at the time of this study. The previous 1979 and 1973 tables are left out of the scope because of the difficulty to operate a substantially disaggregated set of sectoral prices to work through a transformation of these tables into constant prices. This transformation is especially important for the period under study for the Turkish economy because during these decades the Turkish economy experienced very high rates of inflation.

1979). It is generally defined to be "a method of distinguishing major shifts within an economy by means of comparative static changes in key sets of economic parameters", Skolka (1989)[3]. I/O Tables provide a consistent account of the main output flows of the economy, as well as the interrelations of the industries via their demands for intermediate inputs. Therefore, utilization of the I/O framework at various degrees of aggregation/disaggregation allows for differentiation of the output of different sectors in accordance with various sources of demand[4].

In its simplest form, a demand-driven input-output model of an economy with *n* industries can be described as:

$$x = Ax + y \qquad (1)$$

where, *x* is the *nx1* vector of sectoral gross outputs, *A* is the *nxn* matrix of *Leontieff* (technical) coefficients with each element *aij* denoting the output of sector *i* needed to produce a unit of output of sector *j* (*i, j* = 1…*n*) and *y* is the *nx1* vector of final demands.

The output in this economy can also be written as $x = (I - A)^{-1} y$, vertically integrated output. $(I - A)^{-1}$ is called the Leontieff inverse where the columns are the technical coefficients of the vertically integrated sectors of the economy, indicating direct and indirect uses of the inputs needed to produce the final demand of the industry[5].

In order to turn the idea into a one applicable to a typical open economy framework with differentiated intermediate and final imports, one should assume that the matrix *A* includes import coefficients next to domestic coefficients. One can define *Ad* as the matrix of domestic input coefficients and *Am* as the matrix of imported input coefficients. Under such definitions, in a demand-driven input-output model for an open economy, made up of *n* sectors, one can have:

$$x + m = (A_d + A_m)x + f \qquad (2)$$

where *x* is the *nx1* vector of gross outputs, *m* is the *nx1* vector of total (intermediate and final) imports and *f* is the *nx1* vector of total final demand (including in net exports).

In order to be able to decompose the contribution of intermediate import demand, as well as the contribution of final import demand to sectoral output growth in full detail, one has to rely on further assumptions on the dependence of import demand to other macroeconomic variables of the economy[6]. Following Albala-Bertrand (1999), the assumption employed here is that at the level of each sector, imports are demanded for the intermediate inputs and for the final use in fixed proportions of total intermediate inputs and domestic demand, $\hat{T}^m$ and $\hat{F}^m$ respectively[7]. Total import demand of the economy then, can be written as:

$$m = (\hat{T}^m)Ax + \hat{F}^m d \qquad (3)$$

where *d* demotes the *nx1* vector of domestic (final) demand, i.e. $d = f - e$ with *e, nx1* vector of foreign demand for the products of different sectors of the economy.

Substituting the assumptions into the definition of sectoral gross outputs, one has:

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[3] Such a definition, apart from decomposition of output growth, allows for the quantification of underlying sources of change for a wide variety of variables such as 'value added' (Oosterhaven and van der Linden ,1997), 'energy demand' (Jacobsen, 2000), 'labor requirements' (Dune and Edwards ,2006) and 'volume of imports' (Kanemitsu and Ohnishi, 1989 and Pamukçu and de Boer, 1999).

[4] Supply factors cannot be easily incorporated, except in a very indirect manner.

[5] The idea of 'Vertically Integrated Sectors of Final Demand' is based on the structure of vertically integrated production (Pasinetti, 1973). For further elaboration, see UN (1999).

[6] Dietzenbacher and Los (2000), starting from an example of decomposition of output growth to incorporate changes in import demand, discuss structural decomposition techniques under the existence of dependent components.

[7] The symbol ^ indicates a diagonal matrix.

$$x = Ax + d + e - (\hat{T}^m)Ax + \hat{F}^m d \quad (4)$$

or

$$x = (I - T^m)Ax + (I - F^m)d + e \quad (5)$$

Defining $\hat{U}^W = I - \hat{T}^m$ and $\hat{U}^F = I - \hat{F}^m$ diagonal matrices:

$$x = (I - \hat{U}^W A)^{-1}(\hat{U}^F d + e) \quad (6)$$

constitutes the I/O model to employ in the SDA analysis in this paper.

Note that the first term on the RHS of the equation 6 is the Leontieff inverse of the domestic intermediates only and the second term includes both domestic and final demands[8].

Let $g = \hat{U}^F d + e$ and $D = (I - \hat{U}^W)$. Let there be two I/O matrices for the economy for two consecutive (analysis) periods: base period 0 and the comparison period 1[9]. One can describe the total decomposition for the absolute growth of gross output as:

$$\Delta x = D_0^{-1}\Delta e + D_0^{-1}\Delta\hat{U}^F d_1 + D_0^{-1}\hat{U}_0^F \Delta d + D_0^{-1}\Delta\hat{U}^W (A_1 x_1) + D_0^{-1}\hat{U}^W \Delta A x_1 \quad (7)$$

According to the definitions above, $x = D^{-1}g$, therefore:

$$\Delta x = \Delta(D^{-1}g) = \mathrm{D}_0^{-1}\Delta g + \Delta \mathrm{D}^{-1}\mathrm{g}_0 + \Delta \mathrm{D}^{-1}\Delta \mathrm{g} \quad (8)$$

Yet, depending on how the last term in equation 8 is eliminated, one can have alternative base periods and different weightings, i.e. $\Delta x = D_1^{-1}\Delta g + \Delta D^{-1} g_0$ or $\Delta x = D_0^{-1}\Delta g + \Delta D^{-1} g_1$. Here, I follow the second approach, which turns out to be analogous to using the *Laspayres* index weighting in differencing terms[10].

The equation above represents the decomposition of gross output growth into direct and indirect parts of the total demand for the gross output of the economy. Each term has the following standard meanings: $D_0^{-1}\Delta e$ (EDE) represents the contribution of the foreign demand (as denoted by the change in exports, weighted by the period zero (domestic) Leontieff inverse). $D_0^{-1}\Delta\hat{U}^F d_1$ (ISF) is the contribution of import substitution of final goods. $D_0^{-1}\hat{U}_0^F \Delta d$ (FDE) denotes the contribution of domestic demand expansion. The final two terms in equation 7, $D_0^{-1}\Delta\hat{U}^W (A_1 x_1)$ (ISW) and $D_0^{-1}\hat{U}^W \Delta A x_1$ (IOC) determine the contribution of import substitution of intermediate goods and contribution of changes in technical (I/O) coefficients, respectively.

3. Empirical Analysis

3.1. Data

The application of the structural decomposition analysis to the Turkish economy in this study employs four of the I/O tables along with the import and domestic usage matrices produced by Turkish Statistical Institute, TURKSTAT: 1985, 1990, 1998 and 2002. The tables contain different numbers of industries and employ different standards in defining the industries, yet it is possible to construct a homogenous structure following the NACE[11] 1.1 for 39 sectors.

[8] By such an application, we are not interested in internal evolution only, but both the internal and external evolution of the gross domestic output, triggered by domestic and foreign demand components. In the context of sectoral linkages, Riedel (1976) indeed argues that this is the right application for most developing countries.

[9] Subscripts 0 and 1 indicate that variables under concern refer to either period 0 or period 1.

[10] The method has been used by Chenery and Syrquin (1986) and Wyckoff and Sakurai (1992) and has proved to be a good approximation to equation 8 by Dietzenbacher and Los (1998).

[11] Statistical Classification of Economic Activities in the European Community.

Further, in order to be able to trace sectors employing different levels of technology and knowledge, the sectors are aggregated following the classification of Sanchez Choliz and Duarte (2006) based on OECD (2001). Here, each I/O table from different periods is grouped into nine aggregate production and services sectors[12]. Table 1 provides a summary of the industries that compose each aggregate sector, NACE 1.1 and ISIC[13] Rev2. counterparts.

Since the focus of the decomposition analysis is the real output growth, therefore the real evolution of the economy, the original tables at current (producers' and basic) prices have been converted into constant 1990 monetary units utilizing the manufacturing price indices published by TURKSTAT as well as services, industry and overall economy price indices published by State Planning Organization (SPO). At the chosen level of aggregation, we attempt in this study to derive the extent, the components and the direction of compositional structural change over different periods under analysis.

3.2. Structural Change in the Aggregate Sectors of the Turkish Economy

Table 2 show various ratios pertinent to the analysis, to set up the general production structure of the economy for each of the four I/O periods under concern. The first ratio, the value added/gross output ratio is an indicator of the production technology and is also interpretable as an approximation to the degree of vertical integration for each sector. In nature, as the level of technology increases from low-to-medium-to-high, one would expect increased number of stages in the production process, stronger and lengthened intermediate input relationships among the sectors of the economy and lower value-added share in gross output. Such a characterization is indeed observed in Table 2 for the economy in general. We also observe that significant changes in technology (as observed in the value added/gross output ratio) for "energy" and "other services" sectors, which may be indicators of transformation in these sectors from (high) labor intensive production to more complex production structures.

The rest of the indicators listed in Table 2 are selected to trace the characterization of the trade components of the Turkish economy throughout the period. Such indicators are especially of concern in this study for one of the major purposes is to understand the changes in the relative importance of the trade-related components in shaping the productive structure of the economy along with the track of changes in the dependence of the production on intermediate imports.

The results in Table 2, once more confirms what has been a general observation for the Turkish economy, both at macroeconomic and various product levels: the outward-orientation policies of the post-1980 Turkish economy have promoted the export performance throughout[14]. Export ratio to gross output (and total final demand) has almost doubled for "primary" and "energy" sectors, has stayed constant for low-technology sector and has almost tripled for medium-high technology sector between 1985 and 1990. The industries such as consumer electronics categorized under the high-technology sector were non-existent until the mid-1990s. Yet exports/gross output ratio for this category is observed to reach 40% by 2002.

A noteworthy remark in export performance of the Turkish economy is that such significant increases in export ratios are observed to occur during 2000s. Indeed, the ratios are almost

[12] SDA is also employed at the disaggregated level to have further detailed information. Yet, for an easy illustration of the results, all tables are prepared in the aggregated format.

[13] International Standard Industrial Classification of All Economic Activities.

[14] See Togan (1996), Yeldan (2001).

constant through 1985-1990-1998 episodes. Such an observation in fact suggests minimal structural change in the trade-orientation of the economy throughout 1980s and 1990s[15].

Yet, there is considerable indication to suspect on the rising import-dependence of the economy, a phenomenon which has also been put forward by many researchers[16]. The final imports/total final demand ratio has been on the order of 10% for the economy as a whole in 1985 and 1990. The ratio is observed to increase to 12.4% in 1998 and 14.2% in 2002. The same ratio has been on average 40% in medium-high technology sectors, as Turkey seems to specialize in low-technology and medium-low technology sectors in production and exports. Yet, the final imports/total final demand ratio triples (from 7.4% in 1985 to 20.9% in 2002) in medium-low technology sectors. Likewise, the "energy" sector is observed to be highly dependent on imports in terms of final products in 2002.

A highly related observation, regarding structural change of the economy towards higher import-dependence is spotted in the intermediate import demand. The ratio of intermediate imports in total intermediate import demand has stayed especially high throughout the period under inspection; it almost doubled for medium-low technology sector and increased by almost five-folds in low technology sector. For high-exporting (medium0low technology) and medium-high technology sectors, the intermediate dependence is observed to rise, intermediate imports/total intermediate usage staying on average around 40% and 25% throughout 1980s and 1990s, respectively. The situation is similar for export-booming high technology sectors in much recent years. The share of imports in total intermediaries for this category is 35.5% in 1998, rises to 45.0% in 2002.

Table 3 illustrates the results of the SDA as described in equation 7. the table helps one further analyze whether the change in the progress of the economy (as embodied in sectoral gross output growth rates) has been revealed in real change in production technology or is based on re- dimensioning of the sectors through changes in final and intermediate demands.

At the level of aggregation Table 3 employs, the structural change is identified to be relatively more significant in 1998-2002 and 1985-1990 periods. The satisfactory real growth performance of "primary", "energy", "low technology", "medium-high technology" and "services" sectors appear to be mostly led by contributions of changes in technology as well as contributions of domestic demand expansion. Import substitution of intermediate demand is also observed to play a considerable role in the gross output growth rate in the 1998-2002 period. Such an observation is in line with the results displayed in Table 2, where payment to intermediate imports/ total intermediate demand ratio shows a decrease from 1998 to 2002. Here, one should suspect the effect of the 2001 crises, leading to a depreciation of the Turkish Lira by 114.2% in nominal terms. The increase in export demand and increased demand to substitute imports of final production for "high technology" sector in this period seems to be unable to compensate for the sharp fall in domestic demand after the crisis. The "high technology" sector displays a cumulative 22.5% contraction in gross output in 1998-2002 period.

Overall, the gross output movements in the "primary" sector as well as the "services" sectors come about to be significantly fed by the contributions of final domestic demand as opposed to the other components of gross output; an expected outcome. The improvement in intermediate input usage in these sectors is especially relevant for the 1998-2002 period.

[15] For a discussion on the anomaly of export-oriented investments and export performance of the Turkish economy in a period where outward orientation was supposedly directed to increased manufacturing exports through significant price and subsidy incentives, see Barlow and Şenses (1995), Boratav (2003), and Yeldan (2001).

[16] One may refer to, for instance Yükseler and Türkan (2008) and BSB (2008).

The contribution of growth in export demand is observed to be especially relevant for the high-exporting manufacturing sectors in 19980-1998 period. Along with the contribution of growth in domestic final demand, final demand components (domestic and foreign) seem to govern the positive growth rates of "low technology", "medium-low technology" and "medium-high technology" sectors of the Turkish economy in this period. Yet, the contribution of technological change displays rather diverse results. The contribution of changes in I/O coefficients is positive (explaining 12.1% and 42.2% of gross output growth respectively) for "low technology" and "medium-low" technology sectors, yet the indicator is slightly negative for "medium-low technology" sector. Likewise, the import-substitution components display separate results. Overall, it is understood that with positive sizeable contributions from import substitution in both final and intermediate demands as well as significant contribution from changes in I/O coefficients, the "medium-low technology" sector displays a major structural shift in production during 1990-1998 period. The transformation seems to continue over in the next analysis period. The only reduction in demand for output for this sector comes from the domestic final demand component in 1998-2002.

The gross output changes in the energy sector have been mostly governed by import substitution of final goods in 1985-1990 and 1990-1998 periods. The energy supply policies, especially in coal mining and electricity industries should be accountable for generating such results. Yet, from the mid 1990s on, the policy seems to have been reversed. We observe a negative contribution of ISF (-5.3%) in 1998-2002 episode. Yet, the positive contribution of ISW (68.2) to overall output growth of the sector indicates an inclination towards import substitution in intermediation in the production process as opposed to higher import dependence in final demand.

The most inward-oriented sector of 1980s in Table 3 is the "construction" sector (along with highly non-tradable "services" sectors), for which the output growth is fully associated with the trend in domestic demand expansion. Yet, with the advent of many construction companies opening up especially to ex-Soviet Union economies, the output growth of this sector evolves to be equally associated with foreign demand, especially in later episodes of 1990-1998 and 1998-2002.

Table 4, is meant to provide some broad idea on the integration of the (aggregated) sectors of the economy. Each entry in Table 4 is constructed by summing up the elements in the related sector's column of the domestic Leontieff inverse matrix. It simply measures the total output from all sectors (including the own-sector and the others) generated from one unit final demand of the related sector's output. A unitary increase in "primary" sector's output, for instance, requires 1.485 units in increased output for the economy as a whole, consisting of one unit in primary sector's output plus both direct and indirect inputs. That is functioning as the output multiplier measuring the effects of one monetary unit change in the final demand for each sector on total output of all sectors (including the sector itself)[17].

Regarding this indicator, the sectors that present, on average, the highest figures are "low technology", "medium-high" technology and "construction". Overall, the increase observed in this linkage indicator reflects a dynamism among the sectors of the economy in general. The significant increase in the indicator of the "energy" sector is very much in line with the parallel decrease in the value added/ gross output ratio and the rising importance of intermediation for this sector as outlined in the SDA. The lowest linkage components belong to "primary" and "services" sectors, where the value added ratio is high, and the number of steps in production processes is low.

[17] Such a multiplier reflects the backward linkage of the related sector. See Rasmussen (1956).

4. Concluding Comments

In this paper, a preliminary analysis of the patterns of structural and technological movements in the post-1980 Turkish economy is provided. Overall, the period under study, 1985–2002, is a period during which transformation of the Turkish economy from domestic demand-oriented import substitutionist industrialization to one with export-orientation and integration with the global commodity and financial markets was completed. What was theoretically expected from the process of outward orientation, was that as the economy would be exposed to more competition and technological know-how in the global markets and rapid gains in productivity would be converted into an engine of growth via significant technological improvements.

For the purpose of examining such a hypothesis, the method pursued in this paper seeks to analytically depict and decompose the output movements in Turkey from 1980 onwards. By doing so, it would also be possible to observe whether trade orientation has been (one of) the major stimulating factors of output growth.

Overall, from the results of a first-order aggregated SDA employed in this paper, one may conclude that the evolution of the sectoral output changes are mostly volatile, very much suspected to reflect the ever-changing macroeconomic conditions of the economy, through cycles of boom and bust. Non-existence of consistent and significant improvements in technology indicators (I/O coefficients) also contribute to the proposal that it is mostly the macroeconomic, rather than sound industrial policy that dominate the output growth movements of the Turkish economy. Therefore a major implication from the analysis in this study is that one should search for the macroeconomic policy shifts in the Turkish economy throughout the period under analysis, and provide a better linkage to understand the effects of macroeconomic policies on the structural transformation of the productive sectors.

One general conclusion from the results discussed in this study is that the intense institutional and policy changes in Turkey over the period, have delivered mixed benefits and disadvantages for shaping the structure of the economy.

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Table 1. Sectoral Classification and Aggregation

No.	*Aggregate Sector*	*Activities*	*NACE 1.1*	*ISIC Rev.2*
1	Primary	Agriculture, livestock	01, 02, 03, 04, 07	
2	Energy	Coal, crude oil, natural gas, electricity energy	08, 09, 69, 70, 40	
3	High-Technology	Computers, electrical, electronic and optical goods	76, 66, 69, 42, 33	3845, 3825, 3832, 3522, 385
4	Medium-High Technology	Chemical, machinery and automobiles	24, 29, 31, 34, 35	3843, 838-3832, 351+352-3522, 3842+3844+3849, 382-3825
5	Medium-Low Technology	Cement, metallic products, plastic products	23, 25, 26, 27, 28, 35, 37	355+356, 3841, 39, 372, 36, 381, 351+354, 371
6	Low-Technology	Dairy products, textiles, paper and recycling	13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 27, 36	34, 32, 31, 33
7	Construction		45	
8	High-Quality Services	Communications, bankin, education and health	83, 84, 85, 88, 89, 91,92	
9	Other Services	Commerce, transport, public serv.	69, 70, 71, 73, 74, 75, 76, 77, 78, 79, 80, 81	

Table 2. Structure of the Turkish Production Sectors, 1985-2002 (%)

Year		Primary	Energy	Low Technology	Medium-Low Technology	Medium-High Technology	Construction	Other Services	High-Qualification Serv.	High Technology	Tukish Economy
1985	*Value Added/Gross Prod. Value*	67.421	60.638	33.047	33.849	40.167	45.117	71.755	79.462		53.932
	Final Imports/Total Final Demand	1.569	13.269	2.325	7.389	34.594		0.035			9.863
	Intermediate Imports./Tot. Intermediate Demand for Sector's Output	1.375	60.791	9.950	13.322	22.796		0.688			18.154
	Payments to Intermediate Imports./Payments to Total Intermediates	0.147	5.885	6.688	44.408	18.716	9.708	3.033	2.513		11.387
	Exports/Total Final Demand	5.168	0.218	26.757	24.922	8.623	0.649	16.814	19.629		12.848
	Exports/Gross Prod. Value	3.214	0.057	19.373	10.072	9.246	0.626	12.267	4.613		7.434
1990	*Value Added/Gross Prod. Value*	67.705	67.497	31.865	34.752	36.008	42.354	71.766	69.083		52.629
	Final Imports/Total Final Demand	0.524	2.948	3.635	14.734	25.771					9.523
	Intermediate Imports./Tot. Intermediate Demand for Sector's Output	4.895	50.060	9.781	16.120	36.130		0.611			19.600
	Payments to Intermediate Imports./Payments to Total Intermediates	5.463	0.837	7.721	41.354	21.930	8.052	4.382	7.090		12.104
	Exports/Total Final Demand	4.211	2.277	22.076	17.852	5.795	4.786	12.587			9.941
	Exports/Gross Prod. Value	2.692	0.590	15.485	6.917	6.568	0.809	9.017			6.011
1998	*Value Added/Gross Prod. Value*	65.516	60.890	35.542	43.955	35.536	47.649	70.138	68.055	47.263	53.410
	Final Imports/Total Final Demand	3.678	8.596	7.208	18.823	44.869	0.654	4.569	10.483	59.123	12.360
	Intermediate Imports./Tot. Intermediate Demand for Sector's Output	8.477	35.536	16.747	23.952	54.911		5.533	4.557	62.455	21.388
	Payments to Intermediate Imports./Payments to Total Intermediates	11.678	34.276	14.681	37.248	30.090	14.396	12.439	11.756	35.281	20.821
	Exports/Total Final Demand	9.497	0.899	33.984	37.200	12.300	8.524	21.941	13.268	12.327	17.202
	Exports/Gross Prod. Value	6.324	0.226	23.801	15.252	16.152	8.384	17.189	7.543	24.401	11.859
2002	*Value Added/Gross Prod. Value*	62.336	35.152	26.515	25.495	30.259	43.214	59.727	61.806	22.519	43.063
	Final Imports/Total Final Demand	1.731	29.321	4.757	20.897	39.423		0.983	1.897	49.997	14.144
	Intermediate Imports./Tot. Intermediate Demand for Sector's Output	6.587	34.444	12.433	25.829	42.368		3.473	3.934	68.655	18.438
	Payments to Intermediate Imports./Payments to Total Intermediates	6.918	24.731	15.097	31.946	25.980	12.315	10.541	7.976	44.994	16.938
	Exports/Total Final Demand	9.709	0.433	25.046	74.220	26.762	4.222	10.109	5.318	26.021	19.477
	Exports/Gross Prod. Value	4.572	0.138	16.306	19.167	23.281	3.880	6.348	3.258	39.683	9.619

Table 3. Decomposition of Production, 1985-2002 (% share in gross output growth)

	1990-1985						1998-1990						2002-1998					
	Gross Output Growth Rate	FDE	EDE	ISF	ISW	IOC	Gross Output Growth Rate	FDE	EDE	ISF	ISW	IOC	Gross Output Growth Rate	FDE	EDE	ISF	ISW	IOC
Primary	49.36	99.00	2.41	4.11	-3.89	-1.64	-13.70	63.34	-18.37	-7.62	34.05	28.61	53.44	15.03	1.98	6.48	61.81	14.70
Energy	40.34	-109.16	-2.49	161.89	34.15	15.62	12.33	-133.23	2.39	248.64	-8.68	-9.13	140.38	29.69	0.03	-5.25	68.19	7.34
Low Technology	36.85	77.08	5.98	4.02	6.21	6.71	50.68	27.04	32.93	6.98	20.92	12.14	55.42	75.11	3.41	-5.53	27.65	-0.64
Medium-Low Technology	29.17	-14.48	1.28	-3.25	54.64	61.81	39.28	6.95	10.52	11.51	28.84	42.19	-8.19	97.09	-8.69	-55.52	-35.01	102.14
Medium-High Technology	49.51	86.62	0.70	11.31	-5.89	7.26	22.15	82.06	26.15	20.63	-26.42	-2.42	112.56	16.83	13.82	14.37	46.13	8.85
Construction	141.25	100.46	-0.45	-0.01			13.07	26.48	73.25		0.27		-3.79	54.89	48.30		-2.90	-0.29
Other Services	82.87	55.63	4.24	-0.26	11.25	29.14	12.77	236.24	375.76	-6.23	-152.78	-352.99	78.10	24.89	-3.63	0.00	46.55	32.19
High-Qualification Serv.	134.33	127.82	-12.28	-81.94	49.71	16.69	193.10	63.65	10.33	1.79	17.23	7.00	628.17	33.97	1.41	-0.72	43.57	21.79
High Technology													-22.45	148.57	-9.99	-40.43	3.97	-2.11

Table 4. Vertically Integrated Production, Turkey, 1985-2002

	1985	1990	1998	2002
Primary	1.485	1.468	1.465	1.597
Energy	1.578	1.361	1.390	2.024
Low Technology	1.958	1.993	1.727	2.340
Medium-Low Technology	1.505	1.483	1.413	1.991
Medium-High Technology	1.748	1.732	1.627	1.845
Construction	1.782	1.804	1.842	2.121
Other Services	1.376	1.368	1.399	1.822
High-Qualification Serv.	1.210	1.279	1.414	1.234
High Technology			1.386	1.834