A STRUCTURAL DECOMPOSITION ANALYSIS OF IMPORTS OF TURKEY (1968-1990)

TEOMAN PAMUKÇU*

PAUL de BOER**

ABSTRACT

Structural Decomposition Analysis is used in order to estimate the impact of the different sources of growth of imports (domestic final demand expansion; export growth; import substitution for final products; import substitution for intermediate products; and technical change). Two periods are distinguished: 1968-1979 (inward-oriented development strategy), and 1979-1990 (outward-oriented strategy). The main findings are: (i) the net effect of the import substitution strategy over 1968-1979 on imports are negative; but this negative effect was largely compensated for by the increase in imports caused by the transformation in the intermediate demand structure (technical change) induced by this strategy; (ii) over the outward-oriented period 1979-1990, the positive effect of technical change vanishes, the effect of import substitution becomes positive; and the export growth increases imports.

* (corresponding author) Free University of Brussels, Department of Economics, CP 135, Av. F.D. Roosevelt, 50, B-1050, Brussels, Belgium (tpamukcu@ulb.ac.be).

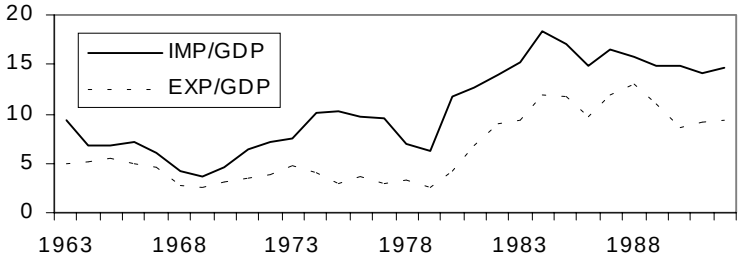
** Econometric Institute, Erasmus University Rotterdam, Rotterdam, The Netherlands.

1. INTRODUCTION

Increase in imports of capital and intermediate goods is a major stylized-fact of economic development that might enable the late-industrializers to catch up with industrialized countries. But at the same time, depending on the development strategy pursued, imports can also be a barrier to the development process. These considerations justify the examination of the determinants of imports during industrialization, so as to shed light on the implications of different development strategies on import growth and, in this way, on the sustainability of these strategies.

In this respect, Turkey is a good case-study for students of economic development : she pursued an import substitution-based development strategy from 1963 to 1980 and a more outward-oriented one from 1980 onward. The « difficult » stage of the import substitution strategy[1], initiated in the late sixties, is considered to have increased the dependency of the growth process on growth of imports which, in the absence of increasing export revenues[2], led to the foreign exchange crisis of the late seventies. This increasing « import-GDP » ratio, together with a stagnating « export-GDP » ratio in the seventies, which is clearly visible in Figure 1 below, is considered to be the main factor that led to the end of this development strategy[3]. This external constraint on the growth process loosened, if not entirely disappeared, with the implementation of more outward-oriented policies in the eighties.

Figure 1 : Evolution of « import-GDP » and « export-GDP » ratios during 1963-1992 (%)



[1] The « easy » stage of the import substitution-based development strategy involves replacement of imports of nondurable consumer goods by local production. The « difficult » stage is concerned with the extension of this process to capital- and skill-intensive industries producing intermediate goods, and consumer and producer durables. The first stage involves replacement of products in which developing countries have a comparative advantage, whereas such a situation does not characterize products involved in the second stage. More on this point in Balassa (1981). For Turkey, see Celasun (1992)

[2] See Balassa (1981) and Pamuk (1987) for a review of main arguments about the negative effects of inward-oriented strategies on export growth.

[3] On the Turkish experience with import substitution-based industrialization, see Keyder (1987), Pamuk (1987), Hansen (1991), and Çeçen et al. (1994).

Source: SIS (1994)

Several questions arise : (i) in spite of the import-replacing nature of the policies implemented during 1963-1980, through which channels did the inward-oriented strategy led to an increase in imports ? ; (ii) how did the outward-oriented policies of the eighties change these channels ; (iii) what are the implications of these changes for the dynamics of development of Turkey ?

In this paper, Structural Decomposition Analysis is used in order to examine these questions. This method will be exposed in detail in Section 2, so we concentrate here on the economic arguments underlying this method.

In Chenery and Syrquin (1986) and Syrquin (1988), the increase in the share of manufactures in GDP, which the authors consider to be the main characteristic of industrialization, are attributed to three complementary explanations :

(i) *demand-based explanation* (Engel's effect leading to a change in the sectoral composition of final demand in favor of non-food producing sectors) ;

(ii) *trade-based explanation* (shifts in comparative advantage in response to the accumulation of capital and skills); and

(iii) *technology-based explanation* (increase in the intermediate use of manufactures per unit of gross output, also called « deepening and widening of interindustry relations »).

Celasun (1983) examines the impact of these factors on gross output growth of the Turkish economy over the period 1953-1973, whereas Pamukçu and de Boer (1999) proceed in a similar way for the period 1968-1990, with an emphasis on the impact of technology-based factors on output growth. The aforementioned three factors can be expected to influence the evolution of imports, as well, since in developing countries, imports of intermediate and capital goods are required almost in fixed proportions to gross output in order to carry out production activities. Moreover, in an input-output growth accounting framework, it can be shown that growth in imports depends on gross output growth (see section 2).

In this paper, we consider the following sources of import growth : domestic final demand expansion (DDE) (demand-based explanation, see (i) above), export expansion (EE), substitution of imports of

final goods by domestic production (ISFD), substitution of imported intermediate goods by domestic production (ISID) (trade-based explanations, see (ii) above, caused, among others, by the switch in development strategy), and technological change (TC) (technology-based explanation, see (iii) above). We use input-output tables of Turkey for the years 1968, 1973, 1979, 1985 and 1990. This enables us to compare the sources of growth in imports during the inward-oriented period 1968-1979 with those during the outward-oriented period 1979-1990.

In order to assess the importance of the various sources, we adopt the technique of Structural Decomposition Analysis (SDA), that we present in section 2. Section 3 is devoted to a short description of the data, and of the calculations performed in the framework of SDA, whereas in section 4 we present and discuss our results. Section 5, finally, contains our conclusions.

2. STRUCTURAL DECOMPOSITION ANALYSIS : PRESENTATION

2.1 Notation

First, we define :

X_{ij}^{d} : element (i,j) of the matrix of intermediate deliveries supplied by domestic production ;

M_{ij} : element (i,j) of the matrix of intermediate imports by origin ;

so that

$X_{ij} = X_{ij}^{d} + M_{ij}$: element (i,j) of the matrix of intermediate deliveries.

Then, we define :

DDE_{i}^{d} : element i of the vector of domestic final demand supplied by domestic production ;

DDE_i^m : element i of the vector of imported domestic final demand ;

so that

$DDE_i = DDE_i^d + DDE_i^m$: element i of the vector of domestic final demand.

Next, we define

E_i : element i of the vector of exports.

Then, we have the input-output accounting identities

$$X_i^d = \sum_{j=1}^{n} X_{ij}^d + DDE_i^d + E_i \qquad (1)$$

where X_i^d denotes the i^{th} element of the vector of gross output supplied by domestic production

Now, we define :

$\hat{u}^f$: a diagonal matrix with $\hat{u}_i^f = \dfrac{DDE_i^d}{DDE_i}$ as the i^{th} element on the main diagonal (i.e. $\hat{u}_i^f$ is the domestic supply ratio of domestic final demand for product i) ;

A^d : the matrix of domestic input-output coefficients with $a_{ij}^d = \dfrac{X_{ij}^d}{X_j^d}$ as element (i,j) ;

$R^d = \left(I - A^d\right)^{-1}$: the Leontief domestic inverse matrix ;

A^m : matrix of imported intermediate input coefficients with $a_{ij}^m = \frac{M_{ij}}{X_j^d}$ as element (i,j), and

$A = A^d + A^m$, i.e. the matrix of total (domestic plus imported) input-output coefficients with element (i,j), $a_{ij} = a_{ij}^d + a_{ij}^m$.

Then equation (1), in obvious matrix notation, reads : $X^d = A^d X^d + \hat{u}^f DDE + E$, from which it easily follows that

$$X^d = R^d\left(\hat{u}^f DDE + E\right) \qquad (2)$$

Finally, we define :

$M_i = \sum_{j=1}^{n} M_{ij}$: element i of the vector of total imports, M, and

$\hat{m}^f$: a diagonal matrix with $\hat{m}_i^f = \frac{DDE_i^m}{DDE_i}$ as element i on the main diagonal.

From the definition of DDE_i and of $\hat{u}^f$ it is clear that $\hat{m}^f = I - \hat{u}^f$.

Now, it easily follows that :

$$M = A^m X^d + \hat{m}^f DDE \qquad (3)$$

2.2 Decomposition of import growth (I)[4]

[4] Further discussion on the input-output structural decomposition analysis (SDA) can be found in Kubo (1980), Kubo, Robinson and Syrquin (1986), Skolka (1989), Rose and Casler (1996). For a critical appraisal, see Schumann (1994), and Dietzenbacher and Los (1997).

In this section, we introduce the subscript $t=1,2$; where 1 denotes the base period and 2 the comparison period.

Using equation (3), we have :

$$\Delta M = M_2 - M_1 = A_2^m X_2^d + \hat{m}_2^f DDE_2 - A_1^m X_1^d + \hat{m}_1^f DDE_1 \qquad (4)$$

Adding and subtracting the terms :

$$A_1^m X_2^d \,,\ \hat{m}_1^f DDE_2$$

we easily derive from (4) :

$$\Delta M = \Delta A^m X_2^d + A_1^m \Delta X^d + \Delta \hat{m}^f DDE_2 + \hat{m}_1^f \Delta DDE \qquad (5)$$

In this first stage, we will decompose gross output growth, i.e. ΔX^d, into the contributions of different sources presented in the introduction. Using equation (2), we have :

$$\Delta X^d = X_2^d - X_1^d = R_2^d\left(\hat{u}_2^f DDE_2 + E_2\right) - R_1^d\left(\hat{u}_1^f DDE_1 + E_1\right) \qquad (6)$$

Adding and subtracting the terms

$$R_1^d \hat{u}_1^f DDE_2 \ ,\ R_1^d E_2 \ \text{ and } \ R_1^d \hat{u}_2^f DDE_2 \qquad (7)$$

we derive from (6) :

$$\Delta X^d = R_1^d \hat{u}_1^f \Delta DDE + R_1^d \Delta E + R_1^d \Delta \hat{u}^f DDE_2 + \Delta R^d\left(\hat{u}_2^f DDE_2 + E_2\right) \qquad (8)$$

The first term on the right hand side denotes the impact of the change in domestic final demand (supplied by domestic production) (DDE), the second one the impact of the change in exports (EE), and the third one the impact of substitution of imports by local domestic final demand (import substitution of final products, ISFD). The fourth term denotes the impact of the change in the Leontief domestic inverse matrix that will be decomposed below into the impact of substitution of imports of intermediate products by domestic production (ISID) and of technological change (TC).

It is easily verified that $\Delta R^d = R_2^d - R_1^d = -R_1^d\left[\left(R_2^d\right)^{-1} - \left(R_1^d\right)^{-1}\right]R_2^d$. From the definition of the Leontief domestic inverse, it follows that the term between brackets is equal to $\Delta\left(I - A^d\right) = -\Delta A^d$. Consequently,

$$\Delta R^d = R_1^d \Delta A^d R_2^d$$

so that equation (8) can be rewritten to :

$$\Delta X^d = R_1^d \hat{u}_1^f \Delta DDE + R_1^d \Delta E + R_1^d \Delta \hat{u}^f DDE_2 + R_1^d \Delta A^d X_2^d \qquad (9)$$

Since it is clear that ΔA^d is caused by technological change as well as by import substitution of intermediate products, we have to separate these two effects from each other[5].

The ratio $\frac{a_{ij2}}{a_{ij1}} - 1$ is the change in the total technical coefficient which we will take to be the rate of technological change (=T). Consequently, when we multiply a_{ij1}^m by (1+T), we obtain a value of a_{ij}^m in period 2 (denoted by $\tilde{a}_{ij1}^m$) that would have been observed if a_{ij}^m would only have been affected by technological change ; i.e.

$$\tilde{a}_{ij1}^m = \frac{a_{ij2}}{a_{ij1}} a_{ij1}^m \qquad (10)$$

[5] See also Syrquin (1976) and Kubo (1980).

Consequently, $a^m_{ij2} - \tilde{a}^m_{ij1}$ denotes that part of Δa^m_{ij} that is caused by import substitution of intermediate products only. Since $a^d_{ij2} = a_{ij2} - a^m_{ij2}$, $-\left(a^m_{ij2} - \tilde{a}^m_{ij1}\right)$ denotes the same effect on the *domestic* technical coefficients, in matrix notation :

$$-\left(A^m_2 - \tilde{A}^m_1\right)$$

where $\tilde{A}^m_1$ is the matrix with typical element $\tilde{a}^m_{ij1}$.

Now, we have :

$$\begin{aligned} \Delta A^d &= \Delta A - \Delta A^m \\ &= -\left(A^m_2 - \tilde{A}^m_1\right) + \left[\Delta A - \left(\tilde{A}^m_1 - A^m_1\right)\right] \end{aligned} \qquad (11)$$

The typical element of $\tilde{A}^m_1 - A^m_1$ is : $\tilde{a}^m_{ij1} - a^m_{ij1}$. Since $\tilde{a}^m_{ij1}$ denotes the value of a^m_{ij} that would have been observed in period 2 if a^m_{ij} were only affected by technological change, subtracting a^m_{ij1} from $\tilde{a}^m_{ij1}$ yields the change in a^m_{ij} caused by technological change only.

Substitution of (11) into (9), and substituting the resulting expression into (8) yields :

$$\Delta X^d = R^d_1 \hat{u}^f_1 \Delta DDE + R^d_1 \Delta E + R^d_1 \Delta \hat{u}^f DDE_2 - R^d_1\left(A^m_2 - \tilde{A}^m_1\right)X^d_2 + R^d_1\left[\Delta A - \left(\tilde{A}^m_1 - A^m_1\right)\right]X^d_2$$

(12)

In equation (12), the fourth term at the right-hand side denotes the impact of substitution of imported intermediate products by domestic production (ISID), and the fifth term the impact of technological change (TC).

2.2 Decomposition of import growth (II)

ΔA^m can be expressed as follows :

$$\Delta A^m = A_2^m - A_1^m = \left(A_2^m - \tilde{A}_1^m\right) + \left(\tilde{A}_1^m - A_1^m\right) \tag{13}$$

Then equation (5) can be rewritten to :

$$\Delta M = \left(A_2^m - \tilde{A}_1^m\right)X_2^d + \left(\tilde{A}_1^m - A_1^m\right)X_2^d + A_1^m \Delta X^d + \Delta \hat{m}^f DDE_2 + \hat{m}_1^f \Delta DDE \tag{14}$$

Substituting (12) into (14), and using the fact that $\Delta \hat{u}^f = -\Delta \hat{m}^f$ (recall that $\hat{m}^f = I - \hat{u}^f$), we arrive, after grouping terms containing ΔDDE, $\Delta \hat{m}^f$, $\left(A_2^m - \tilde{A}_1^m\right)$ and $\left(\tilde{A}_1^m - A_1^m\right)$, at :

	Impact on import growth of
$\Delta M = \left(A_1^m R_1^d \hat{u}_1^f + \hat{m}_1^f\right)\Delta DDE$	domestic demand exp ansion (DDE)
$+ A_1^m R_1^d \Delta E$	exp ort exp ansion (EE)
$+ \left(I - A_1^m R_1^d\right)\Delta \hat{m}^f DDE_2$	substituti on of imports of final goods by domestic production (ISFD)
$+ \left(I - A_1^m R_1^d\right)\left(A_2^m - \tilde{A}_1^m\right)X_2^d$	substituti on of imported int ermediate goods by domestic production (ISID)
$+ \left(\tilde{A}_1^m - A_1^m\right)X_2^d + A_1^m R_1^d\left[\Delta A - \left(\tilde{A}_1^m - A_1^m\right)\right]X_2^d$	techno log ical change (TC)

(15)

2.3 Decomposition of import growth : non uniqueness problem

In the derivation of (12) and (15), we have used as base period 1 and as comparison period 2, but we could also have used 2 to be the base period and 1 as the comparison period. In exactly the same way (but changing 1 into 2 and 2 into 1) we obtain :

$$\Delta M = \left(A_2^m R_2^d \hat{u}_2^f + \hat{m}_2^f\right)\Delta DDE + A_2^m R_2^d \Delta E + \left(I - A_2^m R_2^d\right)\Delta \hat{m}^f DDE_1 + \left(I - A_2^m R_2^d\right)\left(\tilde{A}_2^m - A_1^m\right)X_1^d + \left(A_2^m - \tilde{A}_2^m\right)X_1^d + A_2^m R_2^d\left[\Delta A - \left(A_2^m - \tilde{A}_2^m\right)\right]X_1^d$$

(16)

where , the typical element of $\tilde{A}_2^m$ is : $\tilde{a}_{ij2}^m = a_{ij2}^m \dfrac{a_{ij1}}{a_{ij2}}$

As we observe from (15) and (16), the decomposition is not unique, which in structural decomposition analysis, is referred to as the « index number problem ». In the empirical part of our the paper, we solve this problem by taking the average of each corresponding term at the right hand side of (15) and (16)[6].

3. DATA AND CALCULATIONS

The implementation of SDA requires input-output tables in constant prices. We have deflated them by means of the method developed by Celasun (1983). The main advantage of his method is that it takes into account indirect taxes on domestic production and on imports. Since we only dispose of output deflators at a level of disagregation of 26 sectors, all calculations reported upon in this paper

[6]Further discussion of the index-number problem can be found in Kubo (1980), Wang, Sun and Chou (1992), For a critical appraisal of the method used here to circumvent the index number problem, see Fromm (1968), and Dietzenbacher and Los (1997).

have been performed at this level of aggregation (details on the deflation method, on the database used, and on the results of the SDA can be obtained from the corresponding author upon request).

As that level is too detailed for the present purposes, we present in this paper our findings at a level of disagregation of 9 sectors. The aggregation has been based on the nature of the products (consumer goods or producer goods, for which a distinction has been made between intermediate and investment goods). In Table A1 of the appendix, we summarize the original 26 sectors and their aggregation to 9, as well as the evolution of the share of sectors in the imports of the economy. We present our results for two periods : the inward-oriented one, i.e. 1968-1979, and the outward-oriented one, i.e. 1979-1990.

As pointed out in Kubo (1980), the shorter the intervals between input-output benchmark years, the more accurate the measurement of the sources of import growth. Therefore, we have followed his suggestion and measure the growth contributions spanning several intervals separately for each interval and we take the sum of the contribution over those intervals.

To be more precise, we have calculated the contribution according to equations (15) and (16), and have taken the arithmetic average in order to overcome the index-number problem, for the periods 1968-1973 and 1973-1979, separately, and we have summed them in order to arrive at the contributions over the inward-oriented period 1968-1979. Next, we have divided all contributions by ΔM_i (i=1,...,9), and multiplied them by the factor 100 in order to present the percentage of each source of growth (DDE, EE, ISFD, ISID and TC) in total growth of imports. For the outward-oriented period we have calculated the contributions over 1979-1985 and 1985-1990, and we have proceeded in the same way as for 1968-1979.

4. SOURCES OF IMPORT GROWTH : EMPIRICAL FINDINGS

Some remarks are in order before the presentation of the empirical findings :

- Import matrices of the Turkish economy do not contain any information about the sectoral destination of imports of the tertiary sector. Therefore, Structural Decomposition Analysis will not be implemented for

this sector. This should not be a serious drawback since the share of this sector in total imports was less than 10 % over the period 1968-1990. As a consequence, the empirical findings analyzed in this paper concern the remaining seven major sectors. The sectoral classification is shown in Table A1 of the appendix.

- Figures in Tables A3 and A4 of the appendix show that imports of some major sectors declined over the period 1968-1979, as well as over the two subperiods 1968-1973 and 1973-1979 (this is indicated in Table A3-A4 by a negative sign of the average annual growth rate of imports). Therefore, for sectors recording a decline (increase) in their imports, a positive (negative) contribution of a factor means that this factor exerts a positive (negative) impact on their imports (over the period 1979-1990, all growth rates of imports are positive) ;

- Finally, note that imports in Turkish input-output tables are classified by commodity, i.e. by sector of origin, and not by sector of destination. Therefore, throughout this paper, when using the term « imports of sector i », we will refer to « imports of products of sector i » rather than to « imports of intermediates used in the sector i » .

In the remainder of this section, we *first* discuss empirical results at a rather aggregate level, i.e. for the whole economy and for the manufacturing sector. *Secondly*, the results concerning the manufacturing industries will be examined in order to identify which sectors explain our findings obtained for the manufacturing sector. *Finally*, empirical findings relating to the primary sector, and especially to mining, will be presented. Besides the period 1968-1990, results will be reported also for the two subperiods 1968-1979 and 1979-1990 in order to examine the changes in determinants of imports resulting from the switch from an inward-oriented industrialization strategy to an outward-oriented one. Results concerning the four subperiods will be analyzed as well : it will permit us to determine whether trends in opposite directions exist within each of the two main periods.

4.1 Results for the whole economy and for the manufacturing sector

Table 1 below contains empirical findings of the Structural Decomposition Analysis at these two levels of sectoral aggregation and for different periods and subperiods.

Table 1 : **Sources of import growth at the economy-wide level (Econ.) and for the manufacturing sector (Manuf.)**

(%)	DDE	EE	ISFD	ISID	TC
	Econ. / Manuf.	**Econ. / Manuf.**	**Econ. / Manuf.**	**Econ. / Manuf.**	**Econ. / Manuf.**
1968-1990	**66,8 / 79,3**	**7,8 / 7,5**	**2,7 / 0,1**	**8,7 / -11,4**	**13,8 / 24,2**
1968-1979	**83,0 / 119,1**	**4,7 / 8,8**	**-5,1 / -20,3**	**-32,4 / -89,1**	**48,6 / 80,5**
1968-1973	82,9 / 91,5	3,5 / 3,3	10,7 / 8,5	-24,9 / -19,9	26,2 / 15,1
1973-1979	83,2 / 180,1	7,5 / 21,0	-42,2 / -84,2	- 49,9 / -242,3	101,5 / 225,4
1979-1990	**60,5 / 63,3**	**9,0 / 7,0**	**5,7 / 8,3**	**24,5 / 19,8**	**0,3 / 1,6**
1979-1985	39,6 / 45,3	10,1 / 9,4	43,9 / 54,8	- 7,1 / -10,8	13,6 / 1,3
1985-1990	73,8 / 72,6	8,3 / 5,7	- 18,5 / -15,6	44,6 / 35,6	- 8,2 / 1,7

Sources : Tables A2-A4 of the appendix For the abbreviations, see section 1.

1968-1990

Over the period 1968-1990, domestic demand expansion (DDE) is the most important source of import growth at both the aggregate level (66,8 %) and the manufacturing sector (79,3 %). Technological change (TC) is the second most important factor explaining changes in imports ; its contribution to imports of manufacturing products being much larger than the corresponding impact at the aggregate level (24,2 % and 13,8 % respectively). Next comes the contribution of import substitution of intermediate products (ISID) with a positive effect at the economy-wide level (8,7 %) and a negative one for the manufacturing sector (-11,4 %). Export expansion (EE) rises imports by 7,8 % and 7,5 % respectively at these two levels of sectoral aggregation. The lowest contribution is that of the import substitution of final goods (ISFD), with an impact of 2,7 % at the economy-wide level and 0,1 % for the manufacturing sector.

A somewhat different picture arises, however, when the main two subperiods are examined separately.

1968-1979 & 1979-1990

From 1968-1979 to 1979-1990, a reduction is observed in the contribution of domestic demand expansion (DDE) to import growth at the aggregate level (from 83 to 60,5 %) and for the manufacturing sector, the decline for this last sector being especially important (from 119,1 to 63,3 %).

The reversal in the sign of the impact of import substitution on import growth from 1968-1979 to 1979-1990 shows that the import-reducing effect of the inward-oriented policies came to an end with the trade liberalization policies of the eighties : the contribution of import substitution of intermediate products (ISID) goes from -32,4 % to 24,5 % from 1968-1979 to 1979-1990 at the aggregate level, whereas the corresponding evolution for the manufacturing sector is from -89,1 % to 19,8 % over the same period. The corresponding figures for the contribution of import substitution of final goods (ISFD) are -5 ,1 % for 1968-1979, and 5,7 % for 1979-1990 for the economy as a whole, and -20,3 % and 8,3 % for the manufacturing sector.

The reduction of the impact of technological change (TC) from the first to the second period is also substantial : this impact changes from 48,6 to 0,3 % for the whole economy and from 80,5 to 1,6 % for the manufacturing sector.

At the aggregate level, the positive effect of export expansion (EE) on imports increases from 1968-1979 (4,7 %) to 1979-1990 (9,0 %), but decreases slightly for the manufacturing imports : from 8,8 % to 7,0 %. This is an unexpected result since the substantial increase in manufacturing exports during 1979-1990 must have pulled upwards manufacturing imports more heavily than over the period 1968-1979. The explanation of this finding, and a more informative analysis of the findings pertaining to other sources of import growth, can be obtained by analyzing the four subperiods of the period 1968-1990.

Subperiods

1968-1973 & 1973-1979

The contribution of domestic demand expansion (DDE) to import growth at the aggregate level increases slightly from 1968-1973 (82,9 %) to 1973-1979 (83,2 %), but goes from 91,5 % to 180,1 % as far as the growth of manufacturing imports is concerned.

The contribution of import substitution of intermediate products (ISID) is negative for both subperiods 1968-1973 and 1973-1979 and increases - in absolute terms - from the first to the second period (note that this increase is much more important for the manufacturing sector than for the economy as a whole). This result for the period 1968-1973 is important because it reveals that polices

aimed at the substitution of imports by local production implemented during the « difficult » stage of the import-substitution strategy *did* reduce imports of the Turkish economy, even after the *indirect* effects of these policies on imports are taken into account. However, the results of the Structural Decomposition Analysis do not indicate, in our opinion[7], a similar success for the implementation of the import-substitution policies for the period 1973-1979 : the negative contribution of import substitution of intermediate products to import growth during this period is mainly due to the foreign exchange crisis that occurred in the late seventies in Turkey and which caused a severe reduction in imports. Since imports of manufactures represented 80,2 % of total imports in 1973, it was to be expected that this crisis hit more severely the imports of this sector than imports at the aggregate level. Therefore, when identifying the extent to which import-substitution policies loosened the external constraint on the growth of the Turkish economy[8], our attention should be focused on the period 1968-1973. Consequently, we conclude that efforts to substitute imported intermediates by local production have been successful at the level of the manufacturing sector as well as at the aggregate level.

A different picture arises as far as the contribution of import substitution of final goods (ISFD) is concerned : indeed, a positive contribution is observed for this factor during 1968-1973 for both the economy (10,7 %) and the manufacturing sector (8,5 %), indicating probably that replacement of imports of final goods by local production increased - indirectly - imports necessary to produce this local production. Once again, the negative impact of this factor for period 1973-1979 is caused by the foreign exchange crisis.

The combined contribution of import substitution of intermediate and final goods by local production is a reduction of the imports of the Turkish economy over 1968-1973 (-14,2 %) as well as over 1973-1979 (-92,1%).

However, in the light of the findings pertaining to the impact of technological change on imports over the period 1968-1979, it can not be asserted that import substitution policies of the inward-oriented period have been successful. Indeed, as indicated in section 1, the phenomenon of deepening and widening of interindustry relations - i.e. technological change - occurs as economic

[7] See also Hansen (1991), pp. 365-369, for a similar point of view.
[8] i.e. increased the availability of foreign exchange necessary to finance importations of intermediate and capital goods by foreign exchange savings.

development proceeds ; moreover its direction and extent can be influenced by the industrialization strategy pursued, as pointed out in Kubo, de Melo and Robinson (1986), and Deutsch and Syrquin (1989). Empirical findings of the Structural Decomposition Analysis show that import substitution policies transformed the structure of the Turkish economy so as to increase heavily its imports. Furthermore, this increase in imports offsets the reduction in imports caused by the aforementioned combined import-substitution effect over the subperiods 1968-1973 and 1973-1979.

This last point seems to have been neglected in discussions of the sustainability of the inward-oriented strategy since the focus has been placed almost exclusively on the following question : « *did the indirect effects of import substitution policies compensate their - direct - import-decreasing effects ?* » Our analysis shows that in Turkey, the purely « import substitution » side of these policies was successful but that, because of the transformation of the intermediate demand structure it caused (and which largely eliminated the first effect), this was not sufficient *per se* in loosening the external constraint on growth.

At both levels of sectoral aggregation, export growth (EE) exerts a positive effect on imports during both 1968-1973 and 1973-1979. A substantial increase in this effect is observed for the manufacturing sector from the first (3,3 %) to the second period (21 %). This rise in the contribution of exports to imports is presumably due to the introduction of export subsidies for manufacturing products at the beginning of the year 1979 and to the rapid increase in manufacturing exports it caused[9]. Consequently, in order to identify the impact of export expansion on import growth during the inward-oriented strategy period, we should concentrate on the results pertaining to the period 1968-1973 : then, the contribution of 3,3 % over this period is an indication of the low import-intensity of Turkey's export oriented production during this period[10].

1979-1985 & 1985-1990

At the aggregate level, as well as for the manufacturing sector, the reduction in the contribution of domestic demand expansion (DDE) to import growth from 1968-1979 to 1979-1990 occurs mainly

[9] For an analysis of the period 1978-1980, see Balassa (1981b), Dervis et al. (1982), p. 381 and Hansen (1991), pp. 367-368.

[10] Celasun (1983) finds that export expansion increases manufacturing imports by 2,3 % during 1963-1968. As reported in Celasun (1983), the corresponding economy-wide figure for South Korea over the period 1955-1973 - the only period for which data is available - is 32,7 %.

during 1979-1985 : the impact of this factor to the growth of manufacturing imports drops from 180,1 % over 1973-1979 to 45,3 % over 1979-1985, and from 83,2 % to 39,6 % at the economy-wide level over the same period.

At both levels of sectoral aggregation, the impact of import substitution of intermediate products (ISID) on import growth remains negative over the period 1979-1985, but diminishes - in absolute value – as compared to its contribution over the periods 1968-1973 and 1973-1979, and becomes positive for the period 1985-1990. The negative effect observed during 1979-1985 is probably due to the termination of public sector investment projects that were initiated in the late seventies but had to be stopped because of the balance of payment crisis of the late seventies[11].

Import substitution of final goods (ISFD) increases imports during the period 1979-1985 at both levels of aggregation as a consequence of the trade liberalization policies of the eighties. However, at both levels, this factor exerts a negative effect during the second half of the eighties although the liberalization of the import regime was pushed forward. As no foreign exchange crisis occurred during this period, this means that substitution of imports by local production of final goods took place. We will come back to this finding when analyzing the results of the Structural Decomposition Analysis for the seven major manufacturing industries.

The switch from an inward-oriented industrialization strategy to an outward-oriented one puts an end to the upward pressure exerted by the transformation of the intermediate demand structure on import growth during 1968-1979 : over the period 1979-1985, imports at the economy-wide level are increased by 13,6 % due to technological change, and by 1,3 % for the manufacturing sector while the corresponding figures over the period 1985-1990 are respectively -8,2 % and 1,7 %. This is probably a - less known - way by which development policies of the eighties loosened the external constraint on economic growth, the other way being the increase in exports.

With respect to its contribution to import growth during 1968-1973, the impact of export expansion is multiplied by almost three during the period 1979-1985 at both levels of sectoral aggregation. However, this is still far below the results observed for South Korea in the aftermath of its switch to

[11] See SPO (1985).

an export-oriented industrialization strategy in the sixties. Moreover, the positive contribution of this factor is reduced over the period 1985-1990.

4.2 Results for manufacturing industries

Results of the Structural Decomposition Analysis for the five manufacturing industries are given in Tables A2 - A4 of the appendix.

- ***Food processing***

Like imports of agricultural products, food imports have a low share in total imports over the period 1968-1979. Import substitution of final goods does not exert any negative effect on food imports over this period, a finding that confirms those obtained by other authors : in Turkey, the « easy » phase of the import substitution strategy came to an end by the late sixties.

The average annual growth rate of 28 % of food imports over the period 1979-1990 is caused mainly by the import liberalization policies, as indicated by the positive contribution of import substitution. By the end of this period, the share of food imports in total imports rises to 6,5 %.

- ***Textiles***

Imports of textiles represent less than 2 % of total imports and grow at an average annual growth rate of 0,4 % over the period 1968-1979. Import substitution policies exert a positive effect on imports of this sector : this is another indication of the end of the « easy » phase of the import-substitution strategy.

The annual rate of growth of imports of textiles increases from 18,5 % during 1979-1985 to 19,1 % during 1985-1990. The reduction of the positive impact of domestic demand expansion to imports of textiles from 1973-1979 (200 %) to 1979-1985 (1,5 %) is substantial. The main explanation is presumably to be found in the economic stabilization policies, implemented during the first half of the eighties, that severely reduced the purchasing power of consumers, leading to a fall of their demand for textiles products. The positive contribution of import substitution, and especially that of the intermediate products (75,7 %), is the main source of the rapid increase of imports of textiles

during 1979-1985 : this is clearly induced by the trade liberalization policies of the eighties. Technological change also exerts a relatively important effect on these imports and contributes for 10,4 % to their growth (this is the second most important source of growth during 1979-1985). The contribution of export expansion, however, is low ; it amounts to 3,8 % during this period.

Over the period 1985-1990, import substitution of intermediate products remains the most important source of import growth for this sector, but, at the same time, the relative importance of other sources increases : (i) the rise in the effect of import substitution of final goods shows that trade liberalization policies increase the imports of finished textiles products ; (ii) the figures for domestic demand expansion may reflect the effect of real wage increases that took place in 1989 and, consequently, increased imports of textiles ; and (iii) economy-wide export growth during 1985-1990 increases imports of textiles inputs for the production of exportable goods by 11,7 %, which is the most important contribution of export expansion to import growth in our five manufacturing sectors. As most of these imported inputs are likely to be used in the textiles sector itself, we conclude that exports of this sector was more heavily based on imported textiles inputs than in the preceding period[12]. The overall result of these developments has been an increase in the share of imports of textiles in total imports from 1,4 to 4,3 % during 1979-1990.

- ***Light intermediates***

Imports of light intermediates grow at an average annual growth rate of -5,1 % and 3,1 % during 1968-1973 and 1973-1979, respectively. Over the first period, the contribution of import substitution and of technological change is negative while domestic demand expansion increases these imports. Over the period 1973-1979, the negative effect of import substitution continues, but the positive contribution of technological change offsets largely this negative effect.

Imports of light intermediates grow steadily over the period 1979-1990 and relative contributions of different sources of import growth are now much more balanced than during 1968-1979 : (i) the contribution of export expansion diminishes from 10,9 % to 1,9 % from 1979-1985 to 1985-1990 ; (ii) the positive impact of import substitution - a reduction in the effect of import substitution of

[12] This does not necessarily imply that the import content of textiles exports increased during 1985-1990, since the share of other imported inputs may have diminished. For a quantitative analysis of the evolution of the import content of exports of the main sectors of the Turkish economy, see Pamukçu (2000).

final goods and an increase in the effect of import substitution of intermediate products - increases from 38,7 % to 56,2 % from 1979-1985 to 1985-1990 ; (iii) the transformation of the intermediate demand structure of the Turkish economy - i.e. technological change- increases imports of light intermediate products, a trend that started during 1973-1979.

- ***Basic intermediates***

Imports of basic intermediates, taken together with those of investment goods, represent between 60 and 75 % of total imports of the Turkish economy over the period 1968-1990, though different trends can be observed within the two subperiods 1968-1979 and 1979-1990, as discussed below.

Over the period 1968-1973, domestic demand expansion and technological change are the main determinants of the average annual growth rate of 14,6 % of imports of this sector, with contributions amounting to 58,3 % and 38 %, respectively. Import substitution of intermediate products has a negative effect (-2,4 %) which is, by far, insufficient to counterbalance the positive impact of technological change. Consequently, inward-oriented policies of the seventies, and especially those pursued in view of replacing imports of basic intermediates by local production, failed mainly because (i) they required - indirect- imports in order to carry out the aforementioned local production ;[13] and (ii) they transformed the interindustry relations of the Turkish economy in a way that led to the increase in imports of intermediate products.

Growth rate of imports of basic intermediates drops from 14,6 % over 1968-1973 to 5,7 % over 1973-1979, mainly as a consequence of the foreign exchange crisis of the late seventies. This appears as a negative effect of the import substitution of intermediate products (-32,8 %). However, efforts to replace imports of final goods by local production increase basic intermediate imports by 15,7 % over this period. The contribution of technological change to import growth is still positive in this sector (61,6 %) and is more important than the one observed during the previous subperiod.

The annual average growth rate of basic intermediate imports drops from 9,2 % 1968-1979 to 5,5 % over 1979-1990. The negative contribution of import substitution of intermediate products over 1979-1985 (-38,4 %) should not be interpreted as the continuation of the import-reducing policies of

[13] Structural Decomposition Analysis can be used to disentangle the - negative - direct effects of these policies on import growth from their import-increasing indirect effects : see Kubo (1980).

the previous decade : the foreign exchange crisis of the late seventies, and the compression of imports it caused, had stopped the termination of public investments projects in this sector. These investments were terminated during the first half of the eighties, a phenomenon that led to the substitution of imports of basic intermediates by local production. This came to an end during 1985-1990, when import substitution of intermediate products exerts a positive effect (22,6 %) on imports of this sector.

The positive effect of technological change on imports of basic intermediates over 1968-1979 (49,3 %) vanishes over the period 1979-1990 (-3,5 %). Consequently, outward-oriented policies of the eighties changed the direction in which the intermediate demand pattern of the Turkish economy evolved and this caused a decline in imports of basic intermediates, loosening in this way the external constraint on economic growth. This effect was partly offset by another characteristic of the new development strategy, namely export expansion : its contribution to import growth of basic intermediates increased from 5,7 % over 1973-1979 to 31,2 % over 1979-1985. The substantial growth in exports that occurred during 1979-1985 necessitated an important increase in imports of basic intermediates, which could be expected given the important forward linkages of this industry. The reduction in the positive effect of export expansion from 1979-1985 (31,2 %) to 1985-1990 (9,0 %) reflects its reduced contribution to the growth of output in the Turkish economy[14].

- ***Investment goods***

Investment goods represented half of the imports of the Turkish economy in 1968 and a third in 1979. Domestic demand expansion is the main source of import growth over the period 1968-1973 (108,5 %), while substitution of imports of intermediate products by local production decreases imports of this sector by 12 % over this period. The change in the intermediate demand structure of the Turkish economy reduces these imports as well (-14,8 %). Taken together, these last two sources counterbalance the import-increasing effect of import substitution of final demand (15,5 %). They can not offset, however, the positive effect of domestic demand expansion.

The negative growth rate of imports of investment goods during 1973-1979 shows that they were hit more severely by the crisis of the late seventies than imports of intermediate goods, a point confirmed by the strong negative contribution of import substitution term to import growth.

Technological change now exerts a positive effect on these imports (33,5 %). Domestic demand expansion still increases imports (21,2 %), but at a much more moderate level than during the previous period.

Over the period 1979-1985, import substitution of final goods is the main source of growth of imports of investment goods (70,8 %). The slightly negative impact of import substitution of intermediate products (-7,9 %) is due to the termination of investments of the public sector. With respect to its impact on basic intermediate imports (88,7 %), the impact of domestic demand expansion on import growth of investment goods is low (35,8 %). The impact of export expansion on imports of investment goods is also low (3 %). Technological change has a slightly negative impact on imports of this sector (-0,3 %).

The following remarks with respect to the sources of import growth of investment goods over 1985-1990 : (i) the impact of domestic demand expansion rises to 117 % ; (ii) the negative effect of the import substitution of intermediate products vanishes ; (iii) the impact of technological change is now positive (9,7 %) and (iv) import substitution of final goods decreases considerably imports of investment goods (-77,8 %).

4.3 Results for primary sector

As imports of the primary sector are composed mainly of mining products over the period 1968-1990 (see Table A1 of the appendix), results of the decomposition of the sources of import growth will only be presented for this sector.

Table 2 below shows that over the whole period 1968-1990 imports of mining consisted almost exclusively of petroleum products (including crude oil). As their share in total imports increased from 8,2 % in 1968 to 15 % in 1979[15], unraveling the sources of import growth in this sector will also illuminate the factors shaping import growth of the whole economy during this period.

---

[14] See Pamukçu (2000).

[15] Celasun (1983) notes that imports of primary products represented 6,3 % of total imports in 1963.

Table 2 : Share of mining and petroleum products in total imports (%)

	1968	1973	1979	1985	1990
Mining	5,4	10,9	21,3	28,3	15,6
petroleum products	*5,1*	*10,2*	*19,7*	*26,0*	*14,4*

Technological change is clearly the main source of the growth of imports of mining over 1968-1979 (80,3 %)[16], this effect being more pronounced over 1968-1973 (95,5 %) than over 1973-1979 (37 %). The switch from the easy to the difficult phase of the inward-oriented development strategy in the late sixties led to the transformation of the intermediate demand pattern of the Turkish economy in a way that strongly increased imports of petroleum products and consequently tightened the external constraint on the growth process. The important contribution of technological change over the period 1968-1979 offsets largely the negative effect of the imports substitution of intermediate products (-27,3 %).

Although the annual growth rate of mining imports diminishes from 1968-1973 (28,5 %) to 1973-1979 (3,9 %), the contribution of technological change to import growth still remains positive over this second period (37 %). Moreover, import substitution of intermediate products has now an import-increasing effect (42,3 %). These developments seem to reflect sectoral priorities of the import-substitution policies of the late sixties and the seventies : the importance of imported petroleum products in the intermediate input structure of the promoted sectors led the government to subsidize oil prices. Abstracting from problems of substitution of oil by other energy sources, these policies certainly did not result in reducing the consumption of these products in the Turkish economy[17].

It could, indeed, be expected that a developing country using imported western technologies was bound to see its propensity to use petroleum products rise. However, as noted in Keyder (1987), this trend was much more pronounced in Turkey than in other countries at a similar stage of development. Several explanations are provided by the author :

1. As mentioned earlier, subsidies granted to petroleum products maintained their price at almost the same level during 1973-1977, whereas their price was multiplied by four on the world market. Consequently, the

[16] Note that this is almost the double of the contribution of domestic demand expansion over the same period (41,7 %).

share of imported petroleum products in total energy consumption increased from 30 % to 60 % from 1970 to 1977 ;

2. Railway and maritime transportation were neglected as means of transport of passengers and goods. Road transport was given absolute priority in order to promote the transport equipment industry (this is another reason why imports of petroleum products were granted subsidies) ;

3. Intensive use of oil in the production of electricity and at the same time, neglect of other alternative sources of energy.

The important contribution of technological change to imports of petroleum products during 1968-1979 reflects all these developments.

What about the impact of the outward-oriented policies of the eighties on the evolution of imports of the mining sector ? First, with respect to its contribution over 1968-1979 (80,3 %), a substantial reduction is observed in the effect of technological change over the period 1979-1990 (7,5 %). This reduced role results from a contribution of 60,5 % of this factor over the period 1979-1985 and a negative contribution of 56,7 % over the period 1985-1990 ; in other words, the import-increasing impact of the changing intermediate demand structure continued during 1979-1985 as far as mining imports are concerned while this same effect on manufacturing imports ceased during this period (see Table A4 of the appendix).

From 1968-1979 to 1979-1990, there is a reversal in the sign of the impact of import-substitution of intermediate products (from -27,9 % to 26,7 %) which now increases imports of mining products and becomes the second most important factor after domestic demand expansion (53,9 %). Substitution of imports of final goods by local production is the only factor reducing -slightly - mining imports (-6,1 %).

Moreover, the contribution of export expansion to import growth of the mining sector increases from 1968-1979 to 1979-1990 from 3,4 % to 18 %. Finally, although the contribution of export expansion to import growth in manufacturing industries decreases from 1979-1985 to 1985-1990, its impact on imports of the mining sector increases from 15,6 % to 20,9 %.

---

[17] Calculations based on input-output matrices in current prices show that the share of imports of oil in total supply

5. CONCLUSION

In this paper, we used Structural Decomposition Analysis in order to assess the impact of the sources of import growth in the Turkish economy over the period 1968-1990. Firstly, we identified channels through which policies implemented during the « difficult » stage of the import substitution strategy influenced import growth, and examined whether they succeeded in loosening the external constraint on economic growth. Secondly, we examined whether the more outward-oriented policies of the eighties changed the relative contributions of the sources of import growth, and in which way. A summary of our main findings will be given below.

The contribution of import substitution[18] to import growth during 1968-1979 shows that policies aimed at replacing imports by local production were successful at the economy-wide level, as well as for the manufacturing sector. This import-reducing effect is mainly due to the substitution of imports of intermediate inputs local production in the following sectors : mining, heavy intermediates and investment goods. Nevertheless, the aforementioned import-decreasing effect of the policies of the late sixties was more than offset by the induced transformation of the intermediate demand structures, and caused the end of the inward-oriented development strategy . This finding is in accordance with the view according to which « *in an industrializing economy such as Turkey's .... the aggregate import-output ratio tends to stabilize, if not to rise ; (and) accordingly, the possibility of removing the trade bottleneck and resuming self-sustained growth by further contraction of real aggregate imports was limited in the late seventies* » (Celasun, 1983, pp. 117-118) and that « *on the eve of the 1980s, the resumption of growth required, therefore, a decisive change in development strategy toward higher export orientation and more efficient import substitution* » (ibid.).

---

increased from 40,2 % in 1968 to 71,6 % in 1973 and then to 82,6 % in 1979.

[18] i.e. the combined effect of import substitution of intermediate and final products.

Increasing « export-GDP » and « import-GDP » ratios are the main characteristics of the outward-oriented period 1979-1990. The main trends concerning the sources of import growth in the Turkish economy during this period are summarized below.

Firstly, at the economy-wide level, as well as for the manufacturing sector, the substantial contribution of technological change to import growth during 1968-1979 disappears over the period 1979-1990 and the negative effect of import substitution during 1968-1979 turns into a positive one during 1979-1990. In the case of basic intermediates, the transformation of the intermediate demand pattern of the Turkish economy during 1979-1990 reduces the *use* of these products, i.e. their imports, as well as their local production, as shown in Pamukçu and de Boer (1999). Technological change continues to exert a positive impact on the growth of mining imports during 1979-1990 (7,5 %), but this represents a huge fall with respect to its impact during 1968-1979 (80,3 %). It is also worthwhile to note that annual growth rate of imports of these two sectors is reduced from 1968-1979 to 1979-1990, and that their share in total imports either stabilizes (mining) or diminishes (basic intermediates), reflecting the changing sectoral priorities of the policies implemented in the eighties. Although the external constraint on economic growth has been loosened to a large extent due to increasing exports, this reduction in the contribution of technological change to import growth has also been instrumental in this respect.

Secondly, as a consequence of the trade liberalization policies implemented in the eighties, import substitution of final and intermediate goods by local production increases total and manufacturing imports over the period 1979-1990[19]. Two trends in opposite directions can be observed, however, within this period : (i) the import-decreasing effect of import substitution of intermediate products, observed during 1979-1985, is a temporary phenomena and, as pointed out in the previous section, due to the termination of public investment projects initiated during the seventies ; (ii) the negative contribution of import substitution of final products to manufacturing import growth during 1985-1990 concerns solely the imports of investment goods. A more in-depth investigation is necessary to sort out the causes of this last finding.

[19] Over this period, import substitution is the main factor explaining the increasing imports of food, textiles and light intermediates.

Compared to its contribution to manufacturing import growth during 1968-1973[20] (3,3 %), export expansion exerts a more important impact on imports of this sector during 1979-1990 (7 %). This effect seems to be more pronounced for imports of basic intermediates (17 %) and textiles (9,1 %). The impact of export expansion on manufacturing imports diminishes, however, from 9,4 % over 1979-1985 to 5,7 % over 1985-1990[21]. This reduction is most important for imports of basic intermediates (from 31,2 % to 9 %) and for imports of light intermediates (from 10,9 % to 1,9 %). The contribution of export expansion to imports of investment goods is very low over the period 1979-1990 (less than 2 %), indicating the low skill and technology intensity of the imports induced by Turkey's export-oriented production. Moreover, as noted in the previous section, the contribution of export expansion to import growth remains well below the figures corresponding to the South Korean economy at the beginning of the export-oriented development strategy of this country.

Domestic demand expansion continues to be the main source of growth in basic intermediate and investment good imports[22] during 1979-1990, as it was during 1968-1979, but its relative importance with respect to the contribution of technological change increases substantially from the first to the second period.

Finally, it should be pointed out that empirical findings reported here are obtained by using a data set in constant prices constructed in a consistent manner over the whole period 1968-1990. In future research, this data set can be used for the analysis of the role of imports in the Turkish economic development in the post-1980 period, by examining, for instance, whether the outward-oriented policies - that loosened the external constraint on economic growth - increased the role of imports in the production structure of the economy, in the same way as it has been the case for newly industrialized countries like South Korea and Taiwan[23].

[20] For reasons explained in the previous section, the contribution of export expansion during 1979-1990 should be compared to its contribution over the period 1968-1973, an not to the one recorded during 1968-1979.
[21] This is similar to the evolution of the impact of export expansion on output growth, which changes from 37,4 % during 1979-1985 to 19,8 % over the period 1985-1990. See Pamukçu (2000) for more details.
[22] Note that imports of these goods represent between 60 and 75 % of total imports during 1979-1990.

[23] The main issues relate to the role of imported intermediates in the intermediate demand structure and to the import content of exports : on these points, see Kubo, de Melo, Robinson and Syrquin (1986), and Pamukçu (2000).

REFERENCES

BALASSA, B. (1981), "The Process of Economic Development and Alternative Development Strategies", in : B. Balassa, *The Newly Industrializing Countries in the World Economy*, Pergamon Press, 1-28.

CELASUN, M. (1983), Sources of Industrial Growth and Structural Change : The Case of Turkey, *World Bank Staff Working Paper*, No 614, World Bank, Washington DC.

CELASUN, M. (1992), "Trade and Industrialization in Turkey : Initial Conditions, Policy and Performance in the 1980s", in : G.K. Helleiner (ed.), *Trade and Industrialization in Turbulent Times*, Routledge, London & New York, 453-484.

CHENERY, H., S. Robinson & M. Syrquin (1986), *Industrialization and Growth. A Comparative Study, A World Bank Research Publication*, Oxford University Press, London & New York.

CHENERY, H. & M. Syrquin (1986), "Typical Patterns of Transformation", in : H. Chenery et al., *Industrialization and Growth. A Comparative Study*, Oxford University Press, London & New York, 37-83.

ÇEÇEN, A.A., A.S. Doğruel & F. Doğruel (1994), "Economic Growth and Structural Change in Turkey : 1960-1988", *International Journal of Middle East Studies*, 26, 37-56.

DERVIS, K., J de Melo & S. Robinson (1982), *General Equilibrium Models for Development Policy*, A World Bank Research Publication, Cambridge University Press, Cambridge.

DEUTSCH, J. & M. Syrquin (1989), "Economic Development and The Structure of Production", *Economic Systems Research*, 1, 447-464.

DIETZENBACHER, E. & B. Los (1997), "Analyzing Decomposition Analyses", in : A. Simonovits & A.E. Steenge (eds.), *Prices, Growth and Cycles - Essays in Honour of Andras Bròdy*, Macmillan, London, 108-131.

FROMM, G. (1968), "Factors Affecting the Postwar Industrial Composition of Real Product : Comment", in : J.W. Kendrick (ed.), *The Industrial Composition of Income and Products*, National Bureau of Economic Research & Columbia University Press, 59-66.

HANSEN, B (1991), *The Political Economy of Poverty, Equity, and Growth : Egypt and Turkey, A World Bank Comparative Study*, Oxford University Press, New York & London.

KEYDER, Ç. (1987), *State and Class in Turkey : A Study in Capitalist Development*, Verso, London.

KUBO, J. (1980), Methodology for Measuring Sources of Industrial Growth and Structural Change, World Bank, Washington DC, mimeo.

KUBO, J., S. Robinson & M. Syrquin (1986), "The Methodology of Multisector Comparative Analysis", in : H. Chenery et al., *Industrialization and Growth. A Comparative Study*, Oxford University Press, London & New York, 121-147.

KUBO, J., J. de Melo & S. Robinson (1986), "Trade Strategies and Growth Episodes", in : H. Chenery et al., *Industrialization and Growth. A Comparative Study*, Oxford University Press, London & New York, 148-187.

KUBO, J., J. de Melo & S. Robinson & M. Syrquin (1986), "Interdependence and Industrial Structure", in : H. Chenery et al., *Industrialization and Growth. A Comparative Study*, Oxford University Press, London & New York, 188-226.

PAMUK, S. (1987), " Import Substitution, Foreign Exchange Bottlenecks and Turkey : 1947-1979 (in Turkish)", in : K. Boratav, Ç. Keyder & S. Pamuk, *Crisis, Income Distribution and Alternatives in Turkey*, Kaynak, Istanbul, 37-78.

PAMUKÇU, T. (2000), The Impact of Technological Change on Economic Development : The Case of Turkey, Ph. D. Thesis (in French), Free University of Brussels, Department of Economics, Brussels.

PAMUKÇU, T. & P.M.C de Boer, "Technological Change and Industrialization : An Application of Structural Decomposition Analysis to the Turkish Economy (1968-1990)", *Ekonomik Yaklasim*, 10, 5-30.

ROSE, A. & S. Casler (1996), "Input-Output Structural Decomposition Analysis : A Critical Appraisal", *Economic Systems Research*, 8, 33-62.

SCHUMANN, J. (1994), "Does It Make Sense to Apply the Static Open Input-Output Model for Imputation and Structural Decomposition ?", *Economic Systems Research*, 6, 171-178.

SKOLKA, J. (1989), "Input-Output Structural Decomposition Analysis for Austria", *Journal of Policy Modeling*, 11, 45-66.

STATE INSTITUTE OF STATISTICS (SIS) (1994), *Statistical Indicators (1923-1992)*, SIS, Publication No 1710, Ankara.

STATE PLANNING ORGANIZATION (SPO) (1985*), Developments on the Eve of the Fifth Five-Year Development Plan (1972-1983)* (in Turkish), SPO, Publication No 1975, Ankara.

SYRQUIN, M. (1976), Sources of Industrial Growth and Change : An Alternative Measure, unpublished paper presented at the European Meeting of the Econometric Society, Helsinki.

SYRQUIN, M. (1988), "Patterns of Structural Change", in : H. Chenery & T.N. Srinivasan (eds.), *Handbook of Development Economics*, vol. 1, Elsevier Science Publishers, North Holland, 203-273.

WANG, C.-L., J.-L. Sun & T.-C. Chou (1992), "Sources of Economic Growth and Structural Change", *Journal of Development Economics*, 38, 383-401.

Table A1 : Evolution of the sectoral repartition of imports (%)

		1968	1973	1979	1985	1990
I	**PRIMARY SECTOR**	**9,0**	**15,8**	**15,5**	**20,3**	**19,3**
IA	**Agriculture** (1)	0,8	0,7	0,4	2,0	3,7
IB	**Mining** (2)	8,2	15,1	15,0	18,3	15,6
II	**MANUFACTURING SECTOR**	**81,7**	**80,2**	**78,9**	**72,2**	**75,7**
IIA	**Food processing**	**0,3**	**0,4**	**0,7**	**1,9**	**6,5**
3	Food	0,3	0,2	0,7	1,2	4,0
4	Beverages & Tobacco	0,0	0,2	0,0	0,6	2,5
IIB	**Textile & Leather**	**1,5**	**1,2**	**1,4**	**3,1**	**4,3**
5	Textiles & Apparel	1,5	1,0	1,4	2,5	3,6
6	Leather	0,0	0,2	0,0	0,5	0,7
IIC	**Light intermediates**	**3,9**	**1,5**	**2,0**	**1,8**	**2,9**
7	Lumber & Wood products	0,0	0,0	0,1	0,1	0,3
8	Paper & Printing	3,4	1,0	1,1	1,3	1,4
9	Rubber products	0,5	0,5	0,9	0,4	1,2
IID	**Basic intermediates**	**26,7**	**31,7**	**39,3**	**31,5**	**29,0**
10	Chemicals	18,0	22,0	23,7	15,5	12,8
11	Coal & Petroleum products	1,0	0,6	10,4	2,5	2,5
12	Nonmetallic minerals	1,1	0,6	0,4	0,6	1,2
13	Basic metals	6,6	8,4	4,7	12,9	12,5
IIE	**Investment goods**	**49,3**	**45,4**	**35,4**	**33,9**	**33,1**
14	Metal products	2,3	3,2	4,8	1,9	2,4
15	Non-electrical machinery	31,0	22,7	16,6	14,6	13,8
16	Electrical machinery	6,0	5,9	6,4	6,5	7,5
17	Transport equipment	10,0	13,3	8,2	11,2	9,1
III	**TERTIARY SETCOR**	**9,3**	**4,0**	**5,6**	**7,6**	**5,0**
IIIA	**Social overhead**	**3,3**	**1,6**	**3,3**	**3,7**	**2,7**
18	Electricity, gas & water	0,0	0,1	0,6	1,1	0,0
19	Construction	0,0	0,0	0,0	0,0	0,0
20	Transport & Communication	3,3	1,5	2,7	2,6	2,7
IIIB	**Services**	**6,0**	**2,4**	**2,4**	**3,9**	**2,3**
21	Trade	0,3	0,0	0,1	0,1	0,0
22	Restaurants & Hotels	1,5	1,0	0,6	0,9	1,5
23	Financial institutions	0,3	1,0	0,6	1,6	0,0
24	Professional services	1,9	0,4	1,0	1,3	0,8
25	Public services	2,0	0,0	0,0	0,0	0,0
26	Real estate	0,0	0,0	0,1	0,0	0,0
	ECONOMY	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

Source : input-output tables in current prices.

Table A2: Sources of import growth for 1968-1990 (%)

1968-1990	AAGR	DDE	EE	ISFD	ISID	TC
Primary sector	**12,8**	**45,0**	**11,6**	**-1,6**	**25,4**	**19,0**
Agriculture	16,4	19,9	2,2	-13,3	91,9	-0,7
Mining	12,2	50,1	13,5	-4,2	9,8	30,1
Manufacturing sector	**7,7**	**79,3**	**7,5**	**0,1**	**-11,4**	**24,2**
Food processing	14,2	14,2	0,5	46,4	35,3	3,6
Textile & Leather	10,0	9,5	6,4	18,0	108,5	-42,5
Light intermediates	8,1	30,4	3,6	5,1	37,1	23,9
Basic intermediates	7,3	67,0	11,7	8,5	-7,0	19,4
Investment goods	7,1	90,9	1,7	-11,1	17,7	0,6
Economy	**8,7**	**66,8**	**7,8**	**2,7**	**8,7**	**13,8**

Source : Results of the Structural Decomposition Analysis. Annual average growth rate (AAGR) of the imports of the economy takes into account imports of the tertiary sector. For other abbreviations, see section 1.

Table A3: Sources of import growth for 1968-1979 & 1979-1990 (%)

1968-1979	AAGR	DDE	EE	ISFD	ISID	TC
Primary sector	**14,5**	**40,2**	**3,4**	**9,8**	**-25,3**	**69,8**
Agriculture	4,1	-7,7	2,5	113,8	-21,6	13,0
Mining	15,1	41,7	3,4	0,0	-27,9	80,3
Manufacturing sector	**6,5**	**119,1**	**8,8**	**-20,3**	**-89,1**	**80,5**
Food processing	-0,8	-77,0	-20,6	-88,4	178,6	107,3
Textile & Leather	0,4	-28,4	-23,5	91,6	705,4	-645,1
Light intermediates	-0,2	7,9	0,7	-31,1	-12,9	135,5
Basic intermediates	9,2	54,2	4,8	7,9	-16,9	49,3
Investment goods	4,6	106,3	1,3	16,4	-10,2	-15,1
Economy	**8,3**	**83,0**	**4,7**	**-5,1**	**-32,4**	**48,6**

1979-1990	AAGR	DDE	EE	ISFD	ISID	TC
Primary sector	**11,1**	**46,6**	**14,4**	**-5,4**	**42,5**	**1,9**
Agriculture	28,7	20,4	2,2	-15,4	93,8	-0,9
Mining	9,4	53,9	18,0	-6,1	26,7	7,5
Manufacturing sector	**8,7**	**63,3**	**7,0**	**8,3**	**19,8**	**1,6**
Food processing	28,0	17,5	1,3	51,3	30,1	-0,2
Textile & Leather	18,8	12,8	9,1	11,5	55,8	10,8
Light intermediates	15,6	33,0	4,0	9,3	42,9	10,8
Basic intermediates	5,5	76,9	17,0	9,0	0,6	-3,5
Investment goods	9,4	85,7	1,8	-20,4	27,1	5,9
Economy	**9,0**	**60,5**	**9,0**	**5,7**	**24,5**	**0,3**

Source : see Table A2.

Table A4: Sources of import growth for 1968-1973, 1973-1979, 1979-1985 & 1985-1990 (%)

1968-1973	AAGR	DDE	EE	ISFD	ISID	TC
Primary sector	**27,6**	**41,6**	**4,4**	**20,9**	**-49,0**	**79,3**
Agriculture	14,3	15,0	4,1	103,1	-34,7	12,5
Mining	28,5	48,1	4,5	1,0	-52,4	95,5
Manufacturing sector	**13,4**	**91,5**	**3,3**	**8,5**	**-19,9**	**15,1**
Food processing	-4,0	-213,5	-53,9	-235,1	320,1	281,9
Textile & Leather	-0,4	-271,3	-64,4	6,0	1423,7	-994,0
Light intermediates	-5,1	-112,3	-4,7	2,2	187,1	28,4
Basic intermediates	14,6	58,3	4,1	0,7	-2,4	38,0
Investment goods	14,4	108,5	1,4	15,5	-12,0	-14,8
Economy	**13,5**	**82,9**	**3,5**	**10,7**	**-24,9**	**26,2**

1973-1979	AAGR	DDE	EE	ISFD	ISID	TC
Primary sector	**3,6**	**35,9**	**0,5**	**-24,4**	**47,6**	**40,5**
Agriculture	-4,4	-58,2	-1,2	137,7	7,5	14,1
Mining	3,9	23,5	0,3	-3,0	42,3	37,0
Manufacturing sector	**1,9**	**180,1**	**21,0**	**-84,2**	**-242,3**	**225,4**
Food processing	1,3	7,1	-0,1	2,0	91,3	-0,3
Textile & Leather	0,9	200,0	14,9	172,1	30,1	-317,1
Light intermediates	3,1	34,1	1,9	-38,4	-56,7	159,0
Basic intermediates	5,7	49,8	5,7	15,7	-32,8	61,6
Investment goods	-1,9	-21,2	-3,0	67,7	90,0	-33,5
Economy	**4,0**	**83,2**	**7,5**	**-42,2**	**-49,9**	**101,5**

Table A4 (continued) : Sources of import growth for 1968-1973, 1973-1979, 1979-1985 & 1985-1990 (%)

1979-1985	AAGR	DDE	EE	ISFD	ISID	TC
Primary sector	**12,1**	**25,4**	**12,5**	**14,9**	**-0,5**	**47,7**
Agriculture	33,1	1,1	1,0	63,2	34,5	0,1
Mining	10,8	31,9	15,6	2,0	-9,9	60,5
Manufacturing sector	**8,9**	**45,3**	**9,4**	**54,8**	**-10,8**	**1,3**
Food processing	45,5	3,6	1,3	97,5	-11,2	8,8
Textile & Leather	18,5	1,5	3,8	8,6	75,7	10,4
Light intermediates	11,7	41,9	10,9	11,5	27,2	8,5
Basic intermediates	6,4	88,7	31,2	17,5	-38,4	0,9
Investment goods	8,2	35,8	1,6	70,8	-7,9	-0,3
Economy	**10,9**	**39,6**	**10,1**	**43,9**	**-7,1**	**13,6**

1985-1990	AAGR	DDE	EE	ISFD	ISID	TC
Primary sector	**9,8**	**67,2**	**16,1**	**-25,0**	**84,0**	**-42,3**
Agriculture	19,5	29,1	2,7	-51,0	120,6	-1,4
Mining	6,3	80,5	20,9	-15,8	71,1	-56,7
Manufacturing sector	**8,4**	**72,6**	**5,7**	**-15,6**	**35,6**	**1,7**
Food processing	6,9	19,8	1,2	43,6	37,0	-1,7
Textile & Leather	19,1	18,5	11,7	13,0	45,8	10,9
Light intermediates	20,3	30,4	1,9	8,7	47,5	11,5
Basic intermediates	4,4	70,2	9,0	4,2	22,6	-5,9
Investment goods	10,8	117,0	1,9	-77,8	49,1	9,7
Economy	**7,2**	**73,8**	**8,3**	**-18,5**	**44,6**	**-8,2**

Source : see Table A2.