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# Trade Preferences in Manufactures
# The Case of the Turkey–EU Customs Union

*Work In Progress*

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## Introduction

Since Turkey's application for Association membership of the European Economic Community (EEC) in 1959 the Ankara agreement was signed in 1963, and consequently the Customs Union Decision announced in 1996. In the future this relationship will be extended to give Turkey full membership of the European Union (EU). Yet it appears the Customs Union (CU) is here to stay for several years to come.

There have been a few studies that consider the effects of this preferential trading arrangement (e.g. Mercenier and Yeldan, 1997; Harrison *et al.*, 1996 ; and De Santis, 2000). These studies mostly (an exception is the work of Togan, 1997) rely on Computable General Equilibrium (CGE) Modelling techniques. However, the shortcomings of CGE approaches are well known, as they use very restrictive functional forms and, most importantly, instead of providing *ex-post* measures they attempt *ex-ante* predictions. The motivation for the present research stems from the fact that there are no detailed econometric studies.

This paper will carry out such a study, focusing on how the trade preferences offered to imports of manufactures from the EU has affected the EU import share. In next section we will establish the importance of EU imports of manufactures. We will also identify the main competitors to the EU in these imports, as well as considering which are the more dominant categories of imports of manufactures. Then we will consider the various ways to estimate a demand system and therefore explain our choice of the Almost Ideal Demand System. Finally we will specifying the model and present the results.

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**Import Trends**

Turkish imports of manufactures form a large proportion of all Turkish imports – a high of 80% in 1972[1]. Hence this sector is of particular interest. Additionally, examining Figure 1 we can see that imports of manufactures from the EU form a consistently high share of total Turkish imports of manufactures: a high of 68% in 1974-75 and low of 54% in 1984. We may have expected an increase in this share over time due to the CU. Yet we are unable to identify such a trend - this may be explained by the fact that this share is already extremely high.

The following empirical analysis exploits the use of disaggregated import data and therefore it is interesting at this point to break down manufacturing imports into four categories and consider not only the EU but also two of its major competitors: Japan and the United States (US) [2]. In Figures 2-4 we have considered the share of imports in each category out of total manufactured imports. There is a great difference in trends between each of the graphs. In comparison to the graphs showing imports from Japan and the US it seems imports from the EU by manufacturing category have a reasonably stable trend over time. By far the largest category of manufactures imported from the EU over the period 1970-2000 is that of machinery and transport equipment with a high of a 59% share in 1976 and low of 46% in 1974. The second largest manufacturing category varies between chemicals and basic manufactures over the period. Miscellaneous manufactured goods appear to have consistently the lowest share of the manufactures imported from the EU. The other interesting feature of Figure 2 is that the trend in share of basic manufactures often appears as a mirror image of the machinery and transport equipment. In other words it seems possible that imports of basic manufactures were replaced by imports of machinery and transport equipment, and vice versa. To a lesser extent this replacement appears to occur between chemicals and machinery and transport equipment.

Before turning to examine Figures 3 and 4 it is worth remembering that in Figure 1 we identified the share of manufactured imports from Japan and the US to be far lower than that of the EU. Therefore, although we notice a great deal of volatility in Figures 3 and 4 and it is reasonable to attach some degree of importance but we should also keep the volatility in perspective. It interesting to note the dominance of machinery and transport equipment imports from both Japan and US that was also seen for the EU.

**Estimating Demand Systems**

I have only been able to identify one published study that estimates the import demand of Turkey. Tansel and Togan (1987) uses a standard aggregate import demand model to consider price and income effects on Turkish imports for the period 1960-1985. Several different log-linear functions are estimated, starting with a basic model relating import demand ($m$) positively to the level of real income ($y$) in Turkey and negatively to the ratio of the price of imports to the price of domestic substitutes ($p_m/p$):

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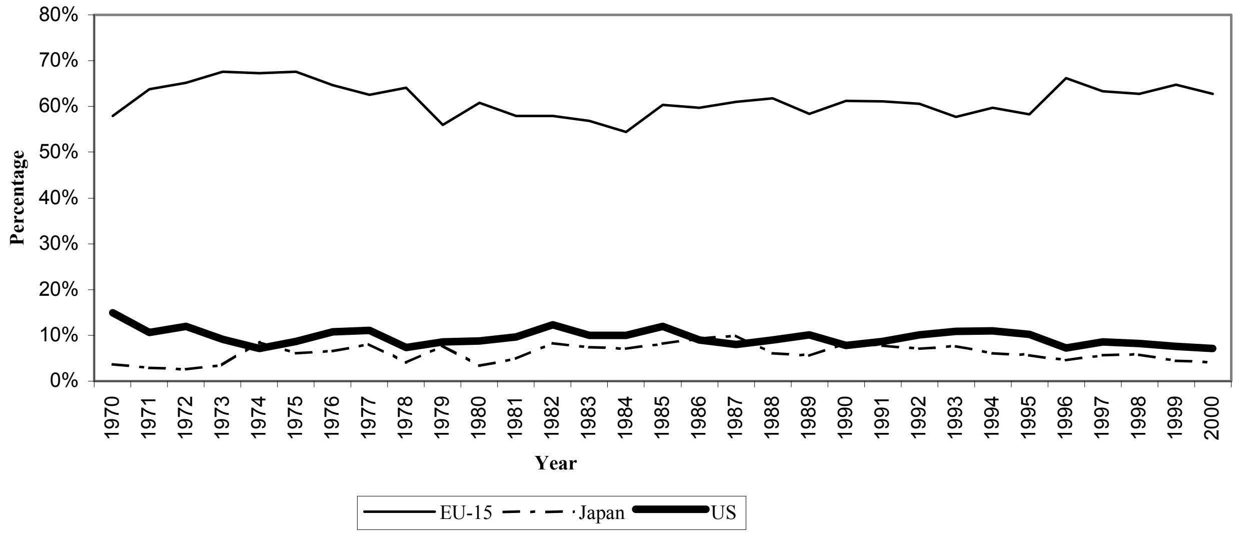
[1] Authors' own estimation based on the OECD International Trade by Commodity data

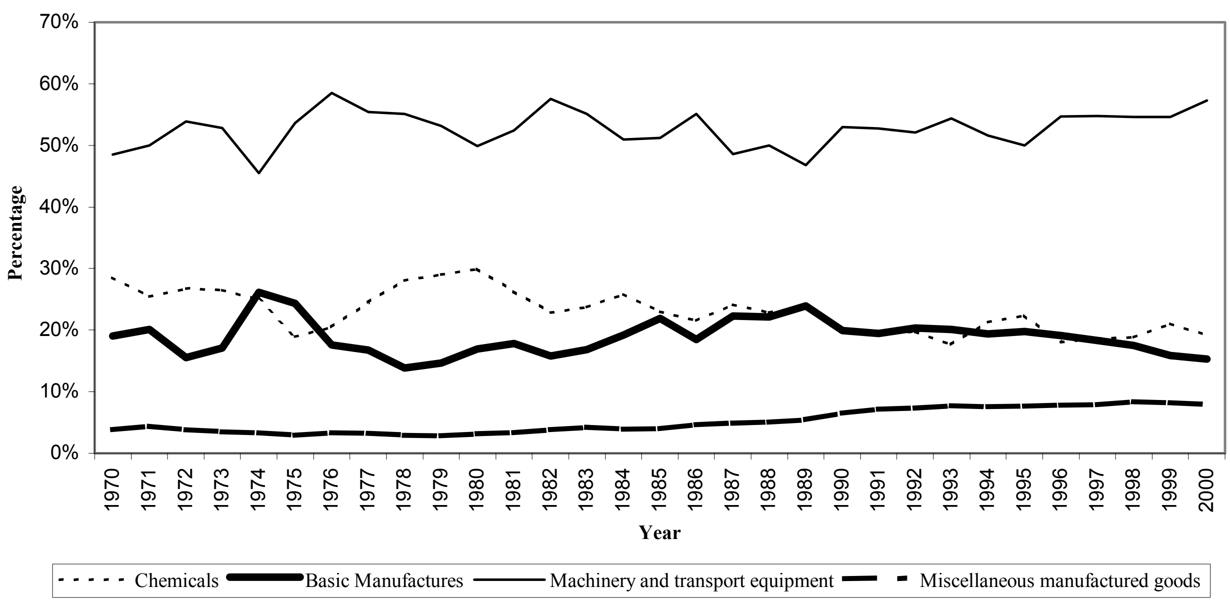
[2] Chemicals (SITC division 5), basic manufactures (SITC division 6 excluding division 68), machinery and transport equipment (SITC division 7) and miscellaneous manufactured goods (SITC division 8). Note that SITC division 9 will not be considered in this break down since the division only contains commodities and transactions not classified elsewhere in the SITC.

**Figure 1:**
**Major Sources of Turkish Manufactured Imports**



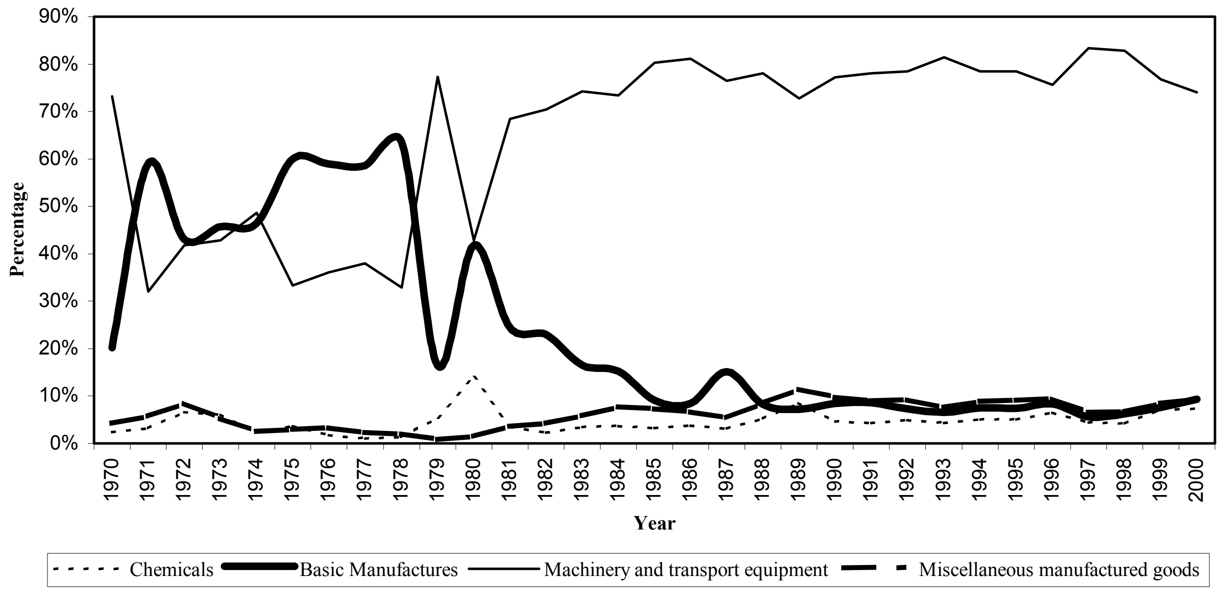

*Source: Authors' own estimation based on the OECD International Trade by Commodity data*

**Figure 2:**
**Share of Turkish Imports from the EU-15 by Manufacturing Category**



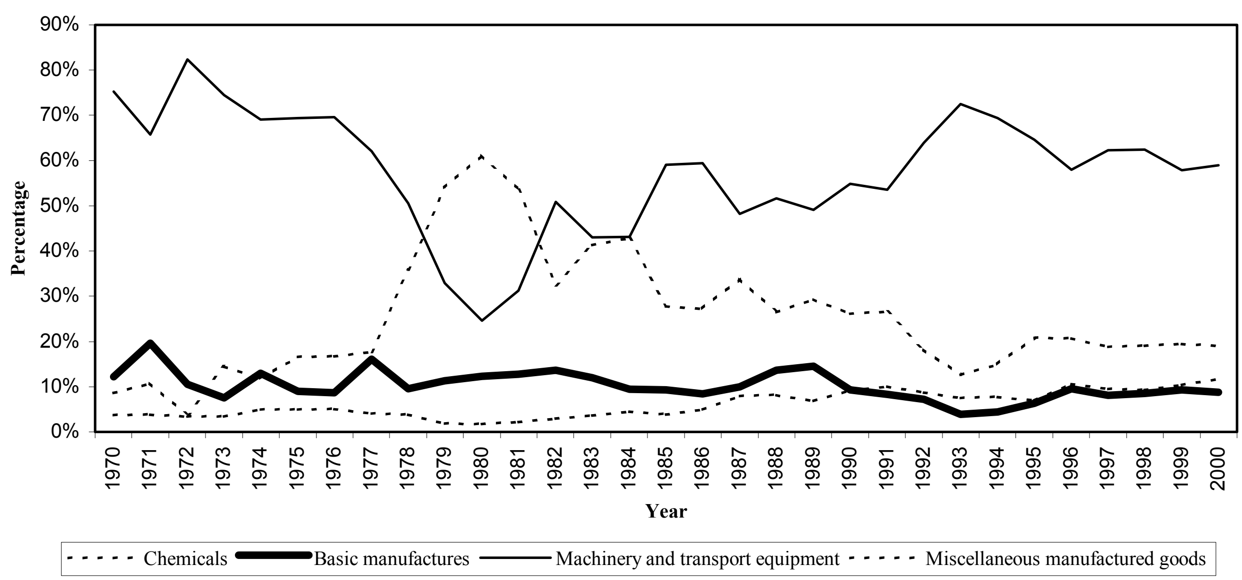

*Source: Authors' own estimation based on the OECD International Trade by Commodity data*

**Figure 3:**
**Share of Turkish Imports from Japan by Manufacturing Category**




*Source: Authors' own estimation based on the OECD International Trade by Commodity data*

**Figure 4:**
**Share of Turkish Imports from the US by Manufacturing Category**




*Source: Authors' own estimation based on the OECD International Trade by Commodity data*

$$\ln m = \ln \frac{p_m}{p} + \ln y$$

They then include one period lags of each of the variables and specify the variables in terms of growth rates. Estimating a log-linear demand function with the variables specified in growth rates, but excluding lags found the best result. Income elasticity is found to have a value of 1.49 and price elasticity a value of –0.45.

It is worth discussing more generally this popular approach to estimating a demand function. A more general way of expressing a log-linear demand function is shown in equation (1).

$$\ln m_{it} = \alpha_{it} + \ln \sum_k e_{ikt} p_{kt} + e_{it} \ln y_t \qquad (1)$$

This equation has quantity of imports demanded, *m,* in year *t* from country *i* as the dependant variable. Explanatory variables are prices, $\sum_k p_k$ where $k = 1 \ldots n$, include the price of imports from country *i,* price of imports from *i's* competitors and domestic prices, and income, *Y*. Once estimated you can look at the coefficients on prices and income for estimates of income elasticity, $e_i$, and price elasticities, $e_{ik}$ (see Goldstein *et al.*, 1980).

However this popular demand function has several weaknesses. Firstly, the adding-up restriction imposed by demand theory on the estimated coefficients is not satisfied. This means total expenditure on domestic goods and imports does not satisfy the budget constraint[3]. Secondly, the choice of functional form and variables to be included is subjective (Leamer and Stern, 1970 and Sadoulet and de Janvry, 1995). The demand functions theoretical basis is also questionable since it employs the separability and homotheticity assumptions. Separability means that you split a complex process into two steps. If we have two groups of goods, domestic goods and imported goods, in the first step we allocate our expenditure between the groups. In the second step we allocate our expenditure on individual goods. Hence consumption on an individual good is a function of the expenditure on whole group to which it belongs (i.e. domestic goods or imports) and the prices of the goods in that group. Homotheticity means that if income increases by a factor k then the income spent on both imports and domestic goods increases by the same factor k. If these two assumptions are made it can be shown that income elasticity must equal one ($e_i = 1$) and therefore there appears no particular reason to include income in the equation. Hence the traditional import demand equation has questionable theoretical base (mainly ignored in the literature) since it cannot be derived from the standard theoretical framework.

In the current literature there is a way to avoid the problems we have just mentioned using the Almost Ideal Demand System (AIDS). This model is derived from the standard theoretical framework and uses a general utility function meaning it can approximate almost any form. It is also not based on the limiting separability assumption, and homotheticity is only satisfied if $\sum_j \gamma_{ji} = 0$ is imposed. We are able to derive the AIDS demand functions in budget share form (Appendix 1). The budget share, $w_i$, is the price for i, $p_i$, multiplied by the quantity for i, $q_i$, as a share of total expenditure, $x$ (i.e. $w_i = p_i q_i / x$):

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[3] The adding-up restriction can be expressed mathematically as $\sum_k w_k e_k = 1$ and $\sum_k w_k e_{ki} + w_i = 0$ (see Deaton and Muellbauer, 1980a)

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$$w_i = \alpha_i + \sum_j \gamma_{ij} \log p_j + \beta_i \log\{x / P\} \qquad (2)$$

where $$\log P = a_0 + \sum_k \alpha_k \log p_k + \frac{1}{2}\sum_k \sum_j \gamma^*_{kj} \log p_k \log p_j \qquad (3)$$

Stone's (1953) index can be used as an approximation of *log P*:

$$\log P^* = \sum_k w_k \log p_k$$

Hence we can derive the own-price Marshallian elasticity:

$$\eta_{ii} = \frac{\gamma_{ij}}{w_i} - 1 \qquad (4)$$

and cross price elasticity:

$$\eta^M_{ij} = \frac{\gamma_{ij}}{w_i} \qquad (5)$$

## Empirical Analysis

### *Model Specification*

Given the advantages of the AIDS model, as I have discussed, I have used it to examine the reaction of Turkish importers to the preferential treatment offered to manufacturing imports from the EU. I believe this analysis improves on the current study by Tansel and Togan by avoiding the disadvantages of the log-linear demand function and taking advantage of the AIDS.

Therefore I have estimated an equation for each year, where the share of product *i* imported by Turkey from the EU:

$$w_i = \alpha_i + \sum_j \gamma_{ij} \log p_j + \beta_i \{\log x - \sum_j w_j \log p_j\}$$

$p_j$ is the price of product *i* from source *j, j=1,…,N. x* is the value of manufacturing imports from all sources. $w_j$ denotes the share of product *i* imported from source *j*.

In this analysis I have used unit values as a proxy for prices. Unit values are calculated by dividing the value of imports by the quantity of imports. I believe that my use of unit values as a proxy for prices is acceptable on the grounds that I will use disaggregated product data. This should mean I avoid the problem of unit values not reflecting "true" prices due to changes in the composition of imports.

In order to model the CU decision I will include dummy variables in the AIDS (Winters, 1987). Table 1 shows the value of the dummy variable in each year. The value of the dummy has been determined by the reduction in the rate of Turkish tariffs imposed on EU imports (GATT, 1994 and WTO, 1998). Therefore the dummy captures the process towards the customs union decision, with a particular focus on imports of EU goods.

***Data and, choice of importers and products***

This paper utilises panel data for the period 1970–2000. Both import values and import units were from the OECD International Trade by Commodity Statistics. Whereas prices of exports used in the construction of the export deflator came from the National Accounts of OECD Countries: Main Aggregates.

**Table 1: Dummy Variable**

| Year | Value of Dummy Variable |
|---|---|
| 1970 | 0 |
| 1971-1975 | 1 |
| 1976-1988 | 2 |
| 1989 | 3 |
| 1990 | 4 |
| 1991 | 5 |
| 1992 | 6 |
| 1993 | 7 |
| 1994 | 8 |
| 1995-2000 | 9 |

The OECD publishes imports in nominal values and therefore it was necessary to use a deflator. I initially considered using a GDP deflator, since it is readily available. Yet this would have only been a crude approximation, hence I have constructed an export deflator for each source. This involved dividing the current prices of expenditure on exports of goods and services by the real prices, for each of the sources. This export deflator was then used to obtain real values that were in turn used to construct unit values. In addition I used nominal and real prices of expenditure on imports of goods and services into Turkey to deflate *x,* the value of manufacturing imports from all sources.

For computational reasons I have limited myself to the top 3 exporters of manufacturing goods into the Turkish market. In our discussion of import trends we mentioned that there are several countries that have a large share of the value of manufacturing goods imported into Turkey: EU, US and Japan. Through examination of these shares, over the period 1970-2000, shown in Table 2 you will see that the EU, Japan and the US form between 70% and 83% of Turkish Manufacturing imports[4]. Therefore the following empirical analysis assumes Japan and the US as major competitors for Turkish manufacturing imports from the EU[5].

Once again for computational reasons I have needed to limit the number of manufacturing products used in the analysis. In my selection of 15 products I considered data availability and

[4] I use the World Bank classification for manufactured products: Standard International Trade Classification revision 2 sections 5-9 excluding division 68.

[5] I have proxied the EU by Germany, UK, France and Italy since data from the rest of the EU-15 includes unreported values. However Table 2 indicates consistently high estimates of market shares are still obtained for Germany, UK, France and Italy.

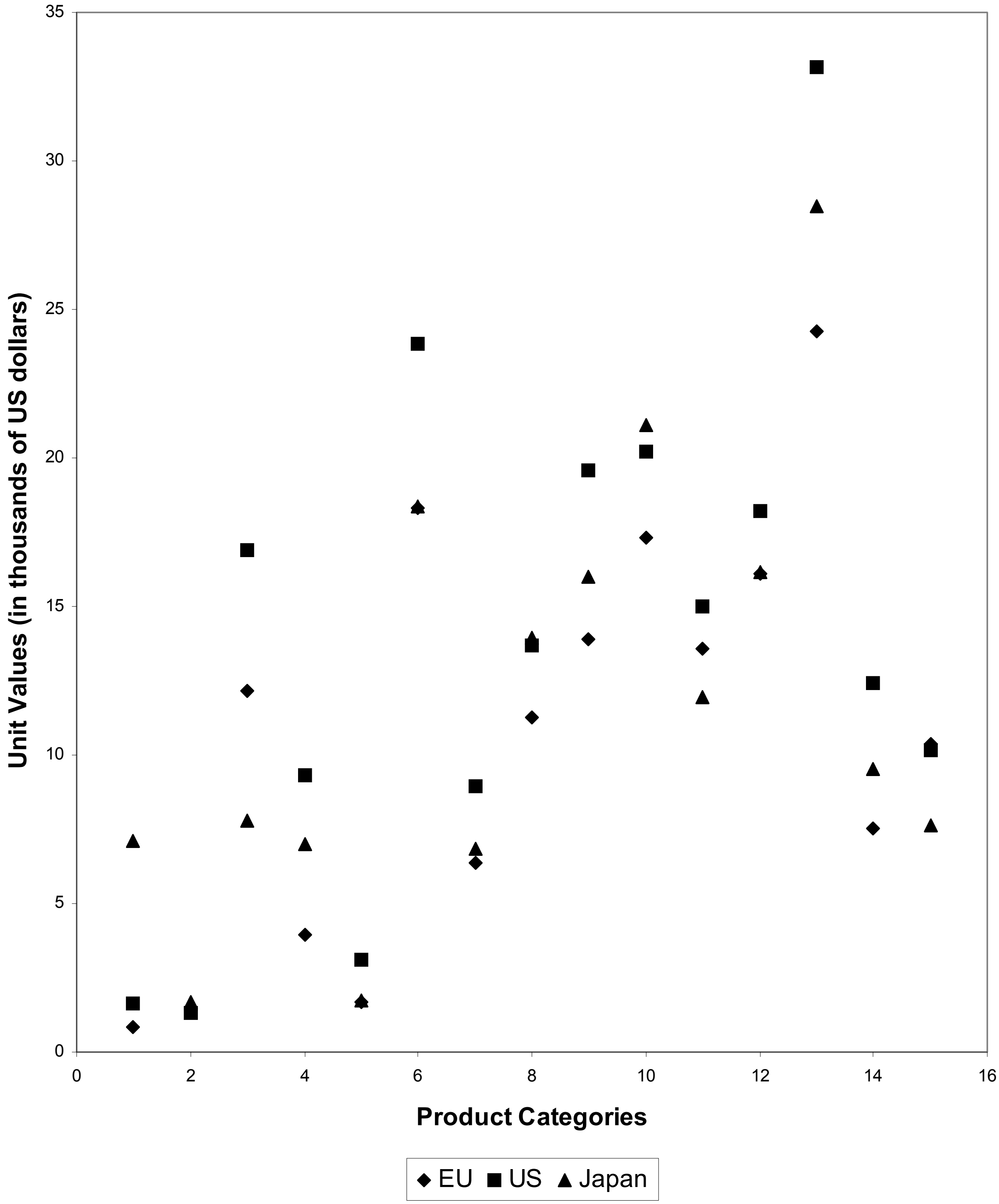
market share. I decided on those products denoted by the Standard International Trade Classification (revision 2) as 523, 583, 628, 642, 678, 695, 699, 716, 724, 742, 743, 749, 772, 778, and 784. For descriptions of these product classifications see Appendix 2. Appendix 3 shows market shares for each of the product categories. Although difficult to identify any trends in these shares, for all but two product categories (628 and 678) the EU has consistently the highest market share over the period. In addition these selected products form between 13% and 24% of total Turkish manufacturing imports (Appendix 4). Given the dominance of the EU in the Turkish import market in each of the selected product categories I have compared average unit value prices in Figure 5. Although only averages over the period this still illustrates that in all but four product categories (583, 628, 743 and 784) the EU has the lowest unit value price in comparison to that of the US and Japan.

**Table 2:**
**Share of Manufacturing Imports to Turkey: 1970-2000 (per cent)**

| | EU | US | Japan | Total |
|---|---|---|---|---|
| **1970** | 57.94 | 14.87 | 3.73 | 76.55 |
| **1971** | 63.81 | 10.61 | 2.92 | 77.33 |
| **1972** | 65.14 | 11.93 | 2.65 | 79.71 |
| **1973** | 67.65 | 9.09 | 3.50 | 80.24 |
| **1974** | 67.23 | 7.17 | 8.52 | 82.92 |
| **1975** | 67.65 | 8.69 | 6.13 | 82.46 |
| **1976** | 64.59 | 10.79 | 6.54 | 81.92 |
| **1977** | 62.57 | 11.04 | 8.12 | 81.72 |
| **1978** | 64.08 | 7.40 | 4.08 | 75.57 |
| **1979** | 55.99 | 8.61 | 7.76 | 72.36 |
| **1980** | 60.81 | 8.76 | 3.35 | 72.92 |
| **1981** | 57.94 | 9.60 | 4.92 | 72.46 |
| **1982** | 57.99 | 12.25 | 8.33 | 78.57 |
| **1983** | 56.83 | 9.98 | 7.50 | 74.31 |
| **1984** | 54.46 | 10.00 | 7.10 | 71.55 |
| **1985** | 60.32 | 12.01 | 8.21 | 80.54 |
| **1986** | 59.74 | 9.01 | 9.30 | 78.04 |
| **1987** | 61.02 | 8.04 | 9.98 | 79.04 |
| **1988** | 61.83 | 8.95 | 6.17 | 76.95 |
| **1989** | 58.38 | 10.06 | 5.65 | 74.08 |
| **1990** | 61.28 | 7.81 | 8.18 | 77.27 |
| **1991** | 61.10 | 8.72 | 7.75 | 77.57 |
| **1992** | 60.60 | 10.09 | 7.11 | 77.80 |
| **1993** | 57.78 | 10.91 | 7.68 | 76.37 |
| **1994** | 59.72 | 11.04 | 6.12 | 76.88 |
| **1995** | 58.24 | 10.32 | 5.67 | 74.24 |
| **1996** | 66.21 | 7.37 | 4.59 | 78.18 |
| **1997** | 60.23 | 8.55 | 5.74 | 74.51 |
| **1998** | 59.68 | 8.29 | 5.77 | 73.73 |
| **1999** | 61.39 | 7.59 | 4.50 | 73.48 |
| **2000** | 58.76 | 7.10 | 4.12 | 69.99 |

*Source: Authors' own estimation based on the OECD International Trade by Commodity data*

**Figure 5:**
**Comparison of Average (1970-2000) Unit Value Prices**




Note: The product categories 1-15 are listed in Appendix 1 from top to bottom.

*Source: Authors' own estimation based on the OECD International Trade by Commodity data*

**Empirical Results**

The four standard panel data regressions have been carried out: pooled OLS (OLS), random effects (RE), fixed effects (FE) and between effects (BE) and the results are shown in Table 3. To understand the differences between these results we should briefly consider the following model:

$$y_{it} = \alpha + x_{it}\beta + v_i + \varepsilon_{it} \tag{6}$$

In this model $v_i + \varepsilon_{it}$ is the residual, with $v_i$ the unobserved individual specific effect and $\varepsilon_{it}$ the remainder stochastic disturbance term. Pooled OLS estimates equation (6) with the slope coefficients and intercepts constant over *t* and *i*. If (6) is the true model then the following must also be true:

$$\bar{y}_i = \alpha + \bar{x}_i\beta + v_i + \bar{\varepsilon}_i \tag{7}$$

where $\bar{y}_i = \sum_t y_{it} / T_i$ , $\bar{x}_i = \sum_t x_{it} / T_i$ and $\bar{\varepsilon}_i = \sum_t \varepsilon_{it} / T_i$

Therefore by subtracting (7) from (6) the following must also hold true:

$$(y_{it} - \bar{y}_i) = \alpha + (x_{it} - \bar{x}_i)\beta + (\varepsilon_{it} - \bar{\varepsilon}_i) \tag{8}$$

The FE estimator – otherwise known as the within estimator – uses OLS to estimate (8) with only the slope coefficients constant. Whereas the BE estimator uses OLS to estimate (7). On the other hand, the RE estimator is a weighted average of the BE and FE estimators. Therefore GLS (since OLS is inefficient) is used to estimate:

$$(y_{it} - \theta\bar{y}_i) = (1-\theta)\alpha + (x_{it} - \theta\bar{x}_i)\beta + \{(1-\theta)v_i + (\varepsilon_{it} - \theta\bar{\varepsilon}_i)\} \tag{9}$$

Where $\theta$ is function of $\sigma_v^2$ and $\sigma_\varepsilon^2$.

Our first observation from Table 3 is that the results are identical for the OLS regression and the RE regression[6]. This is explained by the fact that in the RE regression the estimate of variation due to the individual specific effect, $\sigma_v$, was very small and therefore defaulted to zero. This means $\theta = 0$ in equation (9) and for that reason equation (6) can be estimated using OLS.

In addition the R-squared's suggest that the RE performs worse within that the FE estimator and worse between than the BE estimator and better overall (as it must). The R-squared's for the BE estimator suggest that this estimator predicts well between manufacturing products but, poorly over time and overall. Whereas the FE estimator predicts well over time and overall. The model is significant in all cases.

We consistently find the coefficient on EU price to be between 0 and 1. This means that if for example the EU price rises then as the value of manufacturing imports from all sources remains constant that the quantity imported from the EU falls. The coefficients on Japanese and US prices are all between 0 and –1. This suggests that if EU and US prices and quantities remain

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[6] It should be noted at this point that not all statistical programs gives this identical result, sometimes the results are just very similar.

constant and the Japanese prices fall then Japanese imports rise. The coefficient on the CU dummy suggests that as the tariffs on EU imports of manufactures into Turkey fall by one unit the share of EU imports rise by either 13.2% (according to the RE estimator) or 12.4% (according to the FE estimator). Hence the estimates coefficients have the intuitively expected signs.

**Table 3: Panel Data Results**

| | OLS | RE | FE | BE |
|---|---|---|---|---|
| $P_{EU}$ | 0.488 (0.08)*** | 0.488 (0.08)*** | 0.471 (0.17)*** | 0.75 (0.17)*** |
| $P_{US}$ | -0.293 (0.08) *** | -0.293 (0.08) *** | -0.201 (0.09)** | -0.836 (0.18)*** |
| $P_{JAPAN}$ | -0.466 (0.05)*** | -0.466 (0.05)*** | -0.513 (0.06)*** | -0.183 (0.1)* |
| $\log X - \sum_j w_j \log p_j$ | -0.595 (0.02) *** | -0.595 (0.02) *** | -0.585 (0.02)*** | -0.68 (0.05)*** |
| Dummy | -0.132 (0.01)*** | -0.132 (0.01)*** | -0.124 (0.01)*** | |
| Constant | 5.149 (0.16)*** | 5.149 (0.16)*** | 5.010 (0.20)*** | 5.312 (0.37)*** |
| No. of observations | 465 | 465 | 465 | 465 |
| R-squared | 0.8056 | within = 0.8000<br>between = 0.8982<br>overall = 0.8056 | within = 0.8008<br>between = 0.8654<br>overall = 0.8045 | within = 0.6732<br>between = 0.9611<br>overall = 0.6796 |

Notes: 1/ Significance: *** at 1%, ** at 5% and * at 10%
2/ Standard Errors are in brackets

**Conclusions and Further Research**

Turkish imports largely consist of manufactures and as one would expect these originate from the EU. Therefore it is very important to determine the effect of the Turkey-EU CU on imports of manufactures. To this end I have estimated the theoretically sound AIDS and included a dummy variable to capture the effect of this preferential treatment. This has shown the fall in tariffs to raise the EU share of manufacturing imports.

There are several developments to be made to this research. The biggest is the incorporation of tariffs in prices. I have been making slow progress with this since disaggregate tariffs for 1970-2000 is difficult to come by. Another vital development is to obtain a measure of the welfare effects of the CU for Turkey. This could be derived through the measurement of compensating and equivalent variation.

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## Appendix 1: Almost Ideal Demand System

A cost or expenditure function tells us the minimum expenditure necessary to attain a specific utility level (u) at given prices (p). Deaton and Muellbauer (1980) specified the following cost function:

$$\log c(u,p) = (1-u)\log\{a(p)\} + u\log\{b(p)\} \qquad \text{(A1)}$$

They then proceeded to specify the functional form for log{a(p)} and log{b(p)}:

$$\log\{a(p)\} = a_0 + \sum_k \alpha_k \log p_k + \frac{1}{2}\sum_k \sum_j \gamma^*_{kj} \log p_k \log p_j \qquad \text{(A2)}$$

$$\log\{b(p)\} = \log a(p) + \beta_0 \prod_k p_k^{\beta k} \qquad \text{(A3)}$$

Now substituting equations (A2) and (A3) into (A1) we find:

$$\log c(u,p) = (1-u)\log\{a(p)\} + u[\log a(p) + \beta_0 \prod_k p_k^{\beta k}]$$

$$\Rightarrow \quad \log c(u,p) = \log\{a(p)\} + u\beta_0 \prod_k p_k^{\beta k}$$

$$\Rightarrow \quad \log c(u,p) = a_0 + \sum_k \alpha_k \log p_k + \frac{1}{2}\sum_k \sum_j \gamma^*_{kj} \log p_k \log p_j + u\beta_0 \prod_k p_k^{\beta k} \qquad \text{(A4)}$$

Equation (A4) is the AIDS cost function. For a utility maximising consumer total expenditure, *x*, is equal to *c(u,p)*. Therefore by substituting *x* for *c(u,p)* in equation (A4) and then inverting:

$$u\beta_0 \prod_k p_k^{\beta k} = \log x - a_0 - \sum_k \alpha_k \log p_k - \frac{1}{2}\sum_k \sum_j \gamma^*_{kj} \log p_k \log p_j$$

$$\Rightarrow \quad u\beta_0 \prod_k p_k^{\beta k} = \log x - \log P = \log\{x/P\} \qquad \text{(A5)}$$

where $\log P = a_0 + \sum_k \alpha_k \log p_k + \frac{1}{2}\sum_k \sum_j \gamma^*_{kj} \log p_k \log p_j$ (A6)

Hence equation (A5) is the indirect utility function.

Using equation Roy's identity, $q_i = \frac{\partial u}{\partial p_i} / \frac{\partial u}{\partial x}$, we can find budget shares as a function of prices and utility[7]:

$$w_i = \left(\frac{\partial \log x}{\partial \log p_i}\right) = \alpha_i + \sum_j \gamma_{ij} \log p_j + \beta_i u \beta_0 \prod p_k^{\beta k} \qquad \text{(A7)}$$

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[7] $\frac{p_i q_i}{x} = \left(p_i \frac{\partial x}{\partial p_i}\right)\frac{1}{x} = \left(\frac{\partial x}{\partial \log p_i}\right)\left(\frac{\partial \log x}{\partial x}\right) = \left(\frac{\partial \log x}{\partial \log p_i}\right)$

where $\gamma_{ij} = \frac{1}{2}\left(\gamma^*_{ij} + \gamma^*_{ji}\right)$

The indirect utility function, equation (A5), can then be substituted into equation (A7) to yield the AIDS demand functions in budget share form:

$$w_i = \alpha_i + \sum_j \gamma_{ij} \log p_j + \beta_i \log\{x / P\} \tag{A8}$$

Note that restrictions are implied on the parameters as follows[8]:

$$\sum_{i=1}^{n} \alpha_i = 1, \ \sum_{i=1}^{n} \gamma_{ij} = \sum_{i=1}^{n} \beta_i = 0, \ \sum_j \gamma_{ji} = 0 \text{ and } \gamma_{ij} = \gamma_{ji}$$

In order to make estimation simpler instead of (A6) we could take advantage of the collinearity of prices and use the Stone's (1953) index as an approximation[9]:

$$\log P^* = \sum_k w_k \log p_k \tag{A9}$$

In general the uncompensated elasticities of demand, $\eta_{ij}$, from the AIDS are written as:

$$\eta_{ij} = -\delta_{ij} + \frac{d \log q_i}{d \log p_j}$$

where $\begin{array}{l} \delta_{ij} = 0 \ \ for\, i \neq j \\ \delta_{ij} = 1 \ \ for\, i = j \end{array}$

They can also be expressed as follows:

$$\eta_{ij} = -\delta_{ij} + \frac{dq_i}{dp_j}\frac{p_j}{q_i}$$

Remembering that $q_i = \frac{w_i x}{p_i}$ we get:

$$\eta_{ij} = -\delta_{ij} + \frac{d}{dp_j}\left(\frac{w_i x}{p_i}\right)\frac{p_j}{q_i}$$

[8] The first two restrictions satisfy the adding up property, which says that, the system of demand functions add up to total expenditure. The third restriction satisfies the homogeneity property, which says that the demand functions are homogenous of degree zero in prices. Then lastly we have the property of Slutsky symmetry. We note that the AIDS must also satisfy the negativity condition, which cannot be guaranteed simply by restrictions on the parameters.

[9] Deaton and Muellbauer show that when Stone's index is used it is found to be an excellent approximation of P.

$$\eta_{ij} = -\delta_{ij} + \left(\frac{dw_i}{dp_j}\right)\left(\frac{p_j x}{q_i p_i}\right)$$

$$\eta_{ij} = -\delta_{ij} + \left(\frac{dw_i}{dp_j}\right)\left(\frac{p_j}{w_i}\right)$$

$$\eta_{ij} = -\delta_{ij} + \frac{d \log w_i}{d \log p_j} \qquad \text{(A10)}$$

Now let us substitute (A8) into (A10):

$$\eta_{ij} = -\delta_{ij} + \left(\frac{d}{dp_j}(\alpha_i + \sum_j \gamma_{ij} \log p_j + \beta_i \log\{x/P\})\right)\left(\frac{p_j}{w_i}\right)$$

$$\eta_{ij} = -\delta_{ij} + \left(\frac{\gamma_{ij}}{p_j} - \beta_i \frac{d \log P}{dp_j}\right)\left(\frac{p_j}{w_i}\right)$$

$$\eta_{ij} = -\delta_{ij} + \left(\gamma_{ij} - \beta_i p_j \frac{d \log P}{dp_j}\right) / w_i$$

$$\eta_{ij} = -\delta_{ij} + \left(\gamma_{ij} - \beta_i \frac{d \log P}{d \log p_j}\right) / w_i \qquad \text{since } p_j \frac{d \log P}{dp_j} = \frac{dp_j}{d \log p_j} \frac{d \log P}{dp_j}$$

If $\log P$ is denoted according to equation (A6) we find:

$$\frac{d \log P}{d \log p_j} = \alpha_j + \sum_k \gamma_{kj} \log p_k$$

Hence the expression for the elasticity is as follows:

$$\eta_{ij} = -\delta_{ij} + \left(\gamma_{ij} - \beta_i (\alpha_j + \sum_k \gamma_{kj} \log p_k)\right) / w_i \qquad \text{(A11)}$$

Yet if *log P* is replaced with Stone's index we differentiate (A9) with respect to $\log p_j$:

$$\frac{d \log P^*}{d \log p_j} = w_j + \sum_k w_k \ln p_k \frac{d \log w_k}{d \log p_j}$$

$$\frac{d \log P^*}{d \log p_j} = w_j + \sum_k w_k \log p_k (\eta_{kj} + \delta_{kj}) \qquad \text{using (A10)}$$

Hence the expression for the elasticity using Stone's index:

$$\eta_{ij} = -\delta_{ij} + \frac{\gamma_{ij}}{w_i} - \frac{\beta_i}{w_i}\left\{w_j + \sum_k w_k \log p_k (\eta_{kj} + \delta_{kj})\right\} \qquad \text{(A12)}$$

If we assume $\frac{d \log P^*}{d \log p_j} = 0$ the elasticity is equal to:

$$\eta_{ij} = -\delta_{ij} + \frac{\gamma_{ij}}{w_i} \quad \text{(A13)}$$

Hence the own-price Marshallian elasticity:

$$\eta_{ii} = \frac{\gamma_{ij}}{w_i} - 1 \quad \text{(A14)}$$

and cross price elasticity:

$$\eta_{ij}^{M} = \frac{\gamma_{ij}}{w_i} \quad \text{(A15)}$$

**Appendix 2: Description of the Manufacturing Products used in the Analysis**

| SITC Revision 2 Code | Description of products |
|---|---|
| 523 | Other inorganic chemicals |
| 583 | Polymerisation and copolymerisation products |
| 628 | Articles of rubber, n.e.s. |
| 642 | Paper and paperboard, cut to size or shape |
| 678 | Tubes, pipes and fittings, of iron or steel |
| 695 | Tools for use in hand or in machines |
| 699 | Manufactures of base metal, n.e.s. |
| 716 | Rotating electric plant and parts |
| 724 | Textile & leather machinery and parts |
| 742 | Pumps for liquids, liquid elevators and parts |
| 743 | Pumps & compressors, fans & blowers, centrifuges |
| 749 | Non-electric parts and accessories of machines |
| 772 | Electrical appliances such as switches, relays, fuses, plugs etc. |
| 778 | Electrical machinery and apparatus, n.e.s. |
| 784 | Parts & accessories of:<br>1. Electrical appliances such as switches, relays, fuses, plugs etc.<br>2. Passenger motor cars, for transport of passengers & goods<br>3. Motor vehicles for transport of goods/materials<br>4. Road vehicles, n.e.s. |

**Appendix 3:**
**Market Shares for 15 selected Manufacturing Products (Per Cent)**

| | 523 | | | 583 | | | 628 | | | 642 | | | 678 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EU | Japan | US | EU | Japan | US | EU | Japan | US | EU | Japan | US | EU | Japan | US |
| 1970 | 44.42 | 0.04 | 0.64 | 39.75 | 1.72 | 10.81 | 50.67 | 11.19 | 12.71 | 43.33 | 0.22 | 4.41 | 45.28 | 7.58 | 9.77 |
| 1971 | 61.36 | 0.25 | 0.73 | 57.38 | 0.75 | 6.15 | 54.86 | 21.37 | 7.61 | 56.70 | 0.92 | 8.88 | 30.89 | 9.30 | 8.95 |
| 1972 | 64.53 | 0.42 | 1.02 | 70.77 | 0.60 | 5.04 | 60.32 | 4.96 | 12.24 | 66.71 | 2.49 | 2.45 | 39.59 | 6.86 | 5.26 |
| 1973 | 72.78 | 0.32 | 0.67 | 79.77 | 0.26 | 4.10 | 71.59 | 2.73 | 10.38 | 45.61 | 1.86 | 1.97 | 53.88 | 3.83 | 5.25 |
| 1974 | 54.19 | 1.05 | 0.71 | 80.93 | 1.04 | 2.06 | 67.88 | 4.33 | 11.19 | 48.75 | 1.39 | 2.32 | 36.38 | 15.14 | 12.75 |
| 1975 | 47.02 | 1.40 | 0.64 | 71.10 | 2.96 | 6.94 | 69.74 | 3.25 | 6.70 | 46.53 | 1.22 | 0.76 | 76.45 | 10.98 | 4.16 |
| 1976 | 53.44 | 0.65 | 1.05 | 49.78 | 0.44 | 4.46 | 63.75 | 1.48 | 4.48 | 45.67 | 1.47 | 2.72 | 74.85 | 12.11 | 3.86 |
| 1977 | 61.19 | 0.42 | 0.34 | 50.01 | 0.25 | 4.73 | 63.57 | 6.22 | 6.33 | 57.40 | 9.39 | 2.09 | 45.93 | 9.40 | 10.01 |
| 1978 | 59.67 | 0.49 | 0.89 | 58.59 | 0.18 | 0.92 | 71.49 | 1.13 | 6.24 | 57.82 | 0.16 | 1.00 | 33.30 | 4.40 | 15.15 |
| 1979 | 38.63 | 0.38 | 3.34 | 59.85 | 0.19 | 1.16 | 51.26 | 18.38 | 2.00 | 47.96 | 0.29 | 0.29 | 52.38 | 2.26 | 6.49 |
| 1980 | 57.95 | 0.04 | 0.21 | 43.08 | 0.33 | 4.68 | 23.79 | 69.40 | 2.72 | 48.24 | 2.22 | 0.92 | 41.01 | 33.63 | 0.61 |
| 1981 | 55.77 | 0.30 | 0.35 | 43.31 | 0.45 | 3.21 | 21.47 | 65.40 | 4.40 | 39.91 | 0.41 | 1.91 | 73.33 | 11.75 | 2.68 |
| 1982 | 48.45 | 0.18 | 0.31 | 45.72 | 0.41 | 0.92 | 70.09 | 4.30 | 11.30 | 55.17 | 0.55 | 1.82 | 36.17 | 45.18 | 1.22 |
| 1983 | 41.91 | 0.67 | 0.24 | 25.51 | 0.62 | 1.66 | 67.88 | 6.02 | 9.17 | 57.25 | 0.63 | 3.27 | 56.19 | 15.53 | 5.04 |
| 1984 | 52.33 | 2.22 | 0.46 | 24.33 | 0.76 | 6.39 | 52.47 | 25.21 | 6.36 | 47.90 | 0.35 | 2.55 | 35.57 | 16.81 | 3.00 |
| 1985 | 56.99 | 1.78 | 0.93 | 29.60 | 0.56 | 5.09 | 57.92 | 14.70 | 6.90 | 36.31 | 0.74 | 2.08 | 24.59 | 13.61 | 7.72 |
| 1986 | 51.09 | 2.28 | 0.64 | 34.10 | 2.08 | 3.05 | 64.38 | 10.96 | 7.19 | 46.48 | 1.29 | 1.21 | 85.41 | 2.77 | 0.43 |
| 1987 | 53.54 | 2.49 | 0.78 | 34.65 | 1.27 | 9.99 | 52.02 | 18.11 | 4.75 | 42.22 | 1.68 | 2.26 | 49.30 | 35.08 | 0.88 |
| 1988 | 51.83 | 2.48 | 0.87 | 41.44 | 1.31 | 4.17 | 56.50 | 11.26 | 6.56 | 38.29 | 0.94 | 1.60 | 72.41 | 1.60 | 1.45 |
| 1989 | 52.31 | 2.32 | 4.36 | 38.52 | 1.16 | 8.25 | 62.38 | 7.02 | 6.41 | 53.94 | 3.34 | 2.80 | 65.09 | 2.23 | 2.80 |
| 1990 | 55.20 | 2.64 | 9.59 | 38.56 | 0.95 | 5.74 | 58.74 | 10.87 | 4.82 | 53.59 | 3.03 | 4.07 | 83.41 | 0.96 | 1.24 |
| 1991 | 51.55 | 2.80 | 1.91 | 35.92 | 0.80 | 9.08 | 59.60 | 19.16 | 4.30 | 49.58 | 1.60 | 5.37 | 69.62 | 3.10 | 1.82 |
| 1992 | 49.14 | 2.52 | 2.17 | 39.01 | 0.94 | 6.28 | 60.17 | 16.45 | 6.15 | 61.73 | 1.53 | 5.41 | 65.27 | 3.65 | 5.05 |
| 1993 | 46.37 | 2.63 | 1.41 | 41.36 | 1.11 | 5.00 | 64.57 | 13.01 | 5.01 | 58.40 | 2.99 | 12.60 | 56.76 | 14.66 | 2.43 |
| 1994 | 45.25 | 1.37 | 3.08 | 41.40 | 1.08 | 4.47 | 69.08 | 7.85 | 3.62 | 61.40 | 1.68 | 12.94 | 80.98 | 1.64 | 2.54 |
| 1995 | 42.33 | 1.30 | 1.61 | 42.94 | 0.83 | 6.38 | 67.38 | 8.99 | 4.70 | 55.55 | 1.33 | 9.07 | 69.39 | 2.25 | 2.60 |
| 1996 | 38.10 | 0.68 | 2.30 | 44.70 | 0.96 | 5.00 | 68.75 | 8.80 | 5.58 | 59.23 | 0.94 | 9.13 | 79.00 | 2.56 | 1.87 |
| 1997 | 31.96 | 0.65 | 3.12 | 42.27 | 0.96 | 5.62 | 64.20 | 10.32 | 5.50 | 61.75 | 0.89 | 4.69 | 75.08 | 1.39 | 5.61 |
| 1998 | 27.18 | 0.88 | 0.93 | 40.80 | 1.28 | 4.77 | 58.37 | 7.48 | 4.76 | 65.59 | 1.08 | 2.82 | 57.69 | 3.74 | 4.68 |
| 1999 | 25.01 | 1.35 | 0.72 | 38.08 | 1.65 | 2.85 | 59.04 | 8.04 | 3.68 | 59.04 | 1.41 | 1.23 | 56.23 | 3.70 | 4.47 |
| 2000 | 26.34 | 1.05 | 0.77 | 36.70 | 1.46 | 2.73 | 58.48 | 9.34 | 3.85 | 47.89 | 0.98 | 1.55 | 54.30 | 3.89 | 4.39 |

**Appendix 3 (continued):**
**Market Shares for 15 selected Manufacturing Products (Per Cent)**

| | 695 | | | 699 | | | 716 | | | 724 | | | 742 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EU | Japan | US | EU | Japan | US | EU | Japan | US | EU | Japan | US | EU | Japan | US |
| 1970 | 48.75 | 0.48 | 7.16 | 44.45 | 2.41 | 14.66 | 44.09 | 4.31 | 16.43 | 66.23 | 4.07 | 5.11 | 67.87 | 0.50 | 13.86 |
| 1971 | 69.77 | 0.97 | 8.43 | 58.56 | 5.66 | 16.17 | 61.30 | 1.84 | 6.18 | 65.07 | 5.78 | 1.60 | 63.77 | 0.16 | 20.78 |
| 1972 | 51.57 | 0.74 | 20.88 | 57.60 | 4.85 | 15.83 | 59.52 | 1.50 | 14.69 | 59.70 | 3.59 | 9.44 | 73.28 | 1.88 | 15.80 |
| 1973 | 53.49 | 0.38 | 23.66 | 74.28 | 4.31 | 7.30 | 63.37 | 0.73 | 8.92 | 62.52 | 1.28 | 5.89 | 74.67 | 3.36 | 11.37 |
| 1974 | 55.71 | 1.19 | 22.86 | 66.44 | 5.05 | 6.17 | 68.27 | 3.22 | 4.92 | 54.09 | 5.40 | 10.38 | 69.32 | 2.17 | 14.39 |
| 1975 | 55.19 | 2.12 | 17.04 | 68.35 | 9.02 | 7.83 | 66.57 | 5.78 | 4.46 | 60.83 | 4.68 | 7.72 | 77.27 | 3.18 | 8.96 |
| 1976 | 71.48 | 0.87 | 14.90 | 70.08 | 7.19 | 7.93 | 55.68 | 7.25 | 13.00 | 64.71 | 2.80 | 7.66 | 65.13 | 0.76 | 11.71 |
| 1977 | 52.01 | 2.02 | 11.78 | 72.41 | 4.01 | 6.69 | 45.44 | 9.74 | 18.45 | 62.24 | 4.22 | 2.75 | 70.34 | 1.12 | 12.64 |
| 1978 | 82.63 | 0.28 | 5.14 | 69.04 | 2.59 | 3.78 | 54.11 | 6.13 | 18.03 | 47.10 | 1.67 | 2.51 | 65.79 | 6.60 | 13.00 |
| 1979 | 58.53 | 2.96 | 16.54 | 72.73 | 4.40 | 3.81 | 58.34 | 5.39 | 3.62 | 67.20 | 3.65 | 3.32 | 70.53 | 4.24 | 6.36 |
| 1980 | 26.69 | 37.00 | 14.47 | 83.21 | 1.34 | 3.74 | 68.13 | 1.93 | 1.22 | 59.84 | 2.60 | 1.61 | 75.22 | 0.57 | 8.86 |
| 1981 | 40.86 | 2.75 | 18.48 | 67.25 | 6.49 | 4.12 | 36.91 | 7.16 | 2.98 | 43.22 | 0.70 | 4.59 | 76.62 | 7.56 | 6.02 |
| 1982 | 27.24 | 1.19 | 44.93 | 61.83 | 4.08 | 8.52 | 30.21 | 7.48 | 6.25 | 62.38 | 5.16 | 0.76 | 69.15 | 8.01 | 10.35 |
| 1983 | 38.52 | 1.91 | 8.31 | 43.98 | 11.24 | 14.30 | 42.49 | 4.77 | 6.16 | 60.98 | 6.04 | 0.82 | 77.71 | 2.94 | 9.58 |
| 1984 | 42.62 | 5.01 | 15.91 | 65.24 | 7.55 | 6.86 | 41.07 | 18.66 | 6.96 | 57.91 | 5.97 | 0.38 | 71.84 | 2.58 | 17.47 |
| 1985 | 54.06 | 2.45 | 14.93 | 53.48 | 3.56 | 3.56 | 62.92 | 4.35 | 8.88 | 54.65 | 10.90 | 3.71 | 78.29 | 1.84 | 11.82 |
| 1986 | 52.83 | 3.28 | 13.16 | 64.49 | 5.70 | 3.69 | 58.86 | 2.74 | 6.45 | 57.06 | 9.80 | 2.09 | 63.08 | 3.14 | 13.48 |
| 1987 | 53.68 | 2.48 | 15.52 | 63.34 | 5.10 | 6.38 | 55.00 | 2.95 | 6.52 | 56.37 | 8.52 | 1.88 | 74.38 | 2.33 | 9.48 |
| 1988 | 53.09 | 1.66 | 22.06 | 66.41 | 4.56 | 5.52 | 64.89 | 4.40 | 11.46 | 53.38 | 6.76 | 1.17 | 73.56 | 1.96 | 12.09 |
| 1989 | 47.67 | 2.61 | 17.60 | 60.25 | 4.06 | 4.49 | 43.34 | 28.07 | 5.04 | 53.35 | 9.98 | 1.35 | 75.19 | 2.67 | 12.70 |
| 1990 | 58.25 | 2.22 | 12.80 | 66.42 | 3.76 | 4.09 | 53.44 | 5.63 | 9.18 | 61.27 | 10.45 | 2.89 | 77.96 | 3.79 | 7.58 |
| 1991 | 55.17 | 2.58 | 12.37 | 65.81 | 3.52 | 5.28 | 49.67 | 3.35 | 6.45 | 60.17 | 12.13 | 1.97 | 69.10 | 4.98 | 13.32 |
| 1992 | 55.23 | 2.23 | 15.32 | 69.64 | 3.43 | 4.41 | 49.86 | 1.80 | 7.73 | 63.40 | 11.35 | 2.34 | 74.26 | 5.26 | 10.69 |
| 1993 | 69.46 | 2.10 | 8.63 | 70.68 | 4.11 | 5.27 | 50.09 | 4.60 | 22.81 | 59.32 | 15.33 | 1.75 | 73.24 | 8.04 | 8.73 |
| 1994 | 67.16 | 2.03 | 6.96 | 58.54 | 14.61 | 5.33 | 47.61 | 17.64 | 12.65 | 59.52 | 9.47 | 7.67 | 68.73 | 5.21 | 13.66 |
| 1995 | 54.56 | 2.05 | 9.19 | 65.02 | 7.93 | 3.74 | 60.57 | 5.07 | 8.82 | 59.77 | 11.14 | 1.26 | 73.76 | 5.38 | 11.67 |
| 1996 | 57.52 | 2.47 | 6.50 | 60.83 | 5.75 | 3.89 | 59.18 | 5.80 | 12.50 | 63.67 | 9.76 | 1.56 | 78.78 | 2.97 | 6.81 |
| 1997 | 52.63 | 2.58 | 10.62 | 60.20 | 4.98 | 5.88 | 55.66 | 9.16 | 14.49 | 59.64 | 11.91 | 1.94 | 72.58 | 5.89 | 12.12 |
| 1998 | 54.81 | 2.32 | 8.19 | 63.07 | 3.49 | 4.47 | 48.70 | 8.79 | 16.42 | 61.35 | 12.54 | 1.47 | 66.82 | 6.87 | 8.70 |
| 1999 | 49.22 | 2.19 | 7.86 | 62.76 | 3.28 | 5.00 | 56.31 | 2.53 | 5.22 | 59.91 | 12.59 | 3.06 | 62.47 | 5.56 | 10.00 |
| 2000 | 48.11 | 2.25 | 6.07 | 58.36 | 4.64 | 5.26 | 51.82 | 2.71 | 3.17 | 59.71 | 10.97 | 3.16 | 69.46 | 6.17 | 6.17 |

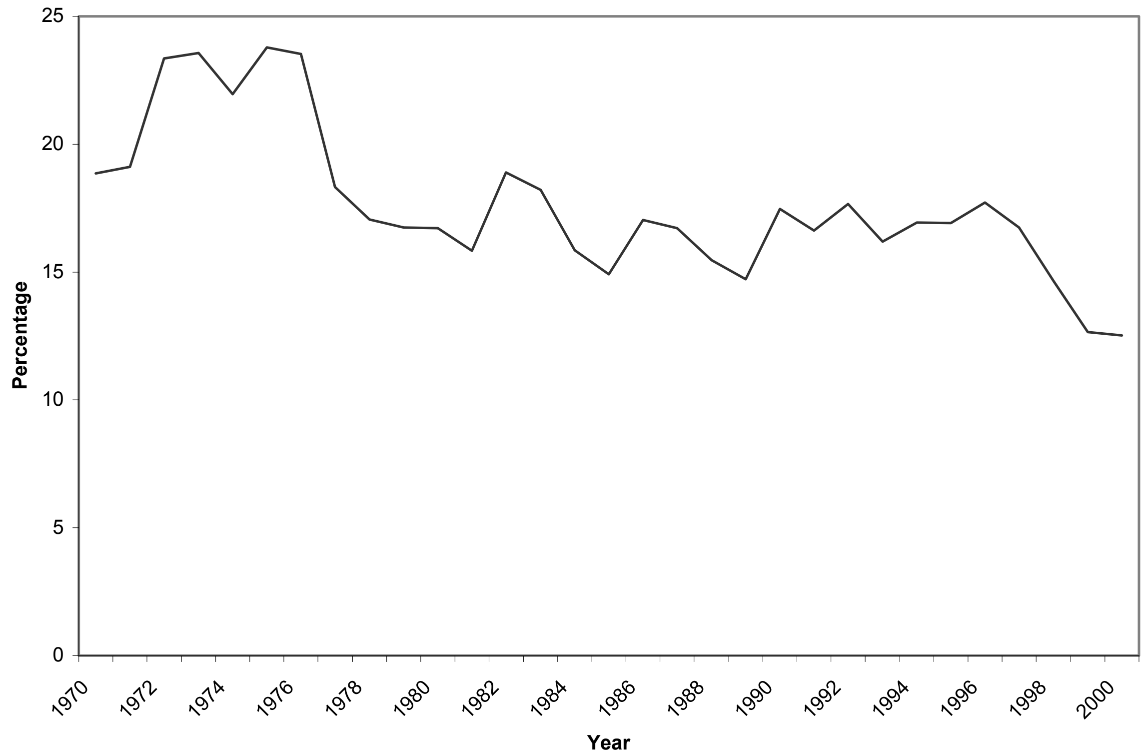
**Appendix 3 (continued):**
**Market Shares for 15 selected Manufacturing Products (Per Cent)**

| | 743 | | | 749 | | | 772 | | | 778 | | | 784 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EU | Japan | US | EU | Japan | US | EU | Japan | US | EU | Japan | US | EU | Japan | US |
| 1970 | 59.68 | 0.38 | 14.59 | 61.51 | 1.43 | 16.25 | 64.16 | 0.85 | 11.73 | 52.58 | 9.16 | 21.74 | 67.65 | 0.83 | 25.14 |
| 1971 | 61.54 | 2.62 | 9.59 | 62.09 | 2.87 | 14.97 | 64.40 | 1.58 | 7.22 | 65.15 | 8.77 | 10.72 | 75.94 | 1.21 | 18.14 |
| 1972 | 62.18 | 0.26 | 18.20 | 62.79 | 4.87 | 14.69 | 67.11 | 1.56 | 8.01 | 46.69 | 7.94 | 9.86 | 80.89 | 0.65 | 14.52 |
| 1973 | 59.82 | 0.90 | 16.38 | 66.25 | 5.09 | 11.97 | 76.31 | 1.83 | 4.63 | 54.92 | 9.31 | 8.07 | 85.04 | 0.35 | 11.45 |
| 1974 | 52.93 | 1.73 | 17.98 | 65.43 | 3.82 | 12.03 | 70.04 | 5.60 | 3.10 | 57.82 | 12.96 | 8.99 | 83.42 | 0.42 | 12.42 |
| 1975 | 59.26 | 1.81 | 13.52 | 67.91 | 5.12 | 8.56 | 73.89 | 4.82 | 3.61 | 63.79 | 13.54 | 8.31 | 82.96 | 0.38 | 12.53 |
| 1976 | 61.20 | 11.19 | 11.00 | 68.24 | 6.41 | 8.85 | 77.34 | 3.48 | 5.44 | 57.80 | 14.27 | 10.11 | 82.79 | 0.48 | 12.44 |
| 1977 | 59.79 | 5.25 | 14.06 | 65.34 | 4.82 | 14.06 | 67.42 | 3.90 | 9.10 | 60.66 | 11.84 | 8.17 | 81.03 | 0.27 | 10.96 |
| 1978 | 74.65 | 0.71 | 6.98 | 64.25 | 2.23 | 7.60 | 55.48 | 12.85 | 3.44 | 58.36 | 6.06 | 5.91 | 84.36 | 0.02 | 4.64 |
| 1979 | 73.35 | 2.90 | 7.66 | 55.16 | 14.98 | 3.89 | 54.75 | 16.11 | 8.44 | 50.36 | 2.20 | 3.80 | 83.43 | 0.30 | 5.42 |
| 1980 | 81.79 | 1.80 | 4.38 | 68.02 | 8.75 | 5.38 | 55.37 | 8.56 | 6.52 | 55.06 | 3.66 | 3.38 | 83.00 | 0.62 | 3.50 |
| 1981 | 50.38 | 7.26 | 14.02 | 65.49 | 8.92 | 8.74 | 43.33 | 2.70 | 1.32 | 56.18 | 3.54 | 8.26 | 82.13 | 1.06 | 5.37 |
| 1982 | 62.90 | 3.40 | 8.93 | 66.63 | 4.57 | 7.97 | 42.76 | 9.62 | 3.37 | 64.38 | 5.12 | 6.67 | 80.49 | 1.13 | 9.99 |
| 1983 | 55.05 | 10.25 | 13.12 | 65.94 | 5.67 | 9.53 | 52.11 | 7.19 | 3.98 | 55.63 | 8.58 | 4.86 | 82.92 | 1.66 | 10.33 |
| 1984 | 40.60 | 2.16 | 12.43 | 62.13 | 6.41 | 9.48 | 44.34 | 19.59 | 4.27 | 59.55 | 9.20 | 4.95 | 81.90 | 2.69 | 9.56 |
| 1985 | 63.28 | 3.65 | 12.80 | 67.51 | 6.37 | 9.90 | 56.07 | 5.84 | 4.17 | 60.55 | 7.91 | 4.13 | 80.97 | 2.62 | 9.65 |
| 1986 | 58.41 | 6.36 | 5.85 | 64.28 | 9.13 | 7.93 | 58.16 | 6.44 | 3.70 | 52.19 | 10.81 | 4.09 | 79.66 | 3.42 | 9.54 |
| 1987 | 62.51 | 6.08 | 6.39 | 67.04 | 7.29 | 7.12 | 66.09 | 6.77 | 5.17 | 54.63 | 9.59 | 5.95 | 82.93 | 4.19 | 6.08 |
| 1988 | 70.97 | 6.97 | 6.80 | 65.20 | 9.38 | 7.77 | 63.50 | 6.70 | 5.23 | 56.22 | 7.42 | 6.50 | 83.19 | 4.90 | 6.04 |
| 1989 | 68.71 | 4.69 | 7.07 | 66.17 | 7.69 | 8.42 | 63.28 | 5.61 | 7.56 | 58.37 | 7.56 | 7.04 | 81.62 | 6.70 | 5.98 |
| 1990 | 67.65 | 3.28 | 7.84 | 65.80 | 9.91 | 6.74 | 59.47 | 7.15 | 3.73 | 56.82 | 10.18 | 7.02 | 84.38 | 6.06 | 4.44 |
| 1991 | 62.01 | 8.07 | 8.01 | 66.88 | 7.25 | 5.86 | 61.62 | 5.93 | 5.59 | 53.17 | 12.19 | 8.17 | 83.93 | 6.67 | 3.84 |
| 1992 | 55.20 | 8.42 | 7.09 | 67.08 | 7.99 | 5.26 | 61.97 | 4.70 | 3.43 | 60.61 | 7.23 | 6.30 | 81.02 | 8.03 | 2.36 |
| 1993 | 57.66 | 5.75 | 9.92 | 70.10 | 7.79 | 4.64 | 60.81 | 4.05 | 7.15 | 53.80 | 6.44 | 16.06 | 79.16 | 11.13 | 1.85 |
| 1994 | 64.54 | 5.71 | 9.22 | 64.28 | 10.97 | 5.54 | 66.87 | 4.96 | 7.81 | 51.02 | 6.58 | 19.51 | 79.84 | 10.96 | 2.11 |
| 1995 | 75.68 | 3.52 | 6.64 | 69.17 | 8.39 | 7.15 | 69.53 | 4.92 | 5.48 | 59.25 | 7.13 | 8.21 | 76.32 | 15.04 | 2.11 |
| 1996 | 69.93 | 4.08 | 9.29 | 68.81 | 5.44 | 6.43 | 67.11 | 2.82 | 7.91 | 53.53 | 4.90 | 8.23 | 78.23 | 10.18 | 2.45 |
| 1997 | 59.87 | 4.66 | 14.31 | 66.63 | 5.23 | 7.61 | 65.70 | 4.04 | 6.81 | 51.49 | 6.69 | 7.30 | 70.57 | 14.61 | 1.77 |
| 1998 | 52.91 | 5.86 | 11.06 | 64.51 | 7.85 | 5.84 | 63.23 | 4.55 | 6.22 | 48.56 | 7.91 | 6.44 | 61.97 | 15.61 | 1.50 |
| 1999 | 53.75 | 4.42 | 8.86 | 60.33 | 5.45 | 8.47 | 61.71 | 4.65 | 6.95 | 45.89 | 7.81 | 8.11 | 70.67 | 11.47 | 1.19 |
| 2000 | 53.04 | 5.38 | 8.20 | 61.63 | 7.69 | 5.09 | 62.22 | 4.49 | 6.15 | 43.45 | 6.92 | 6.98 | 68.19 | 12.11 | 1.05 |

Note: Market Shares are based on Turkish imports from all sources for each of the product categories.

*Source: Authors' own estimation based on the OECD International Trade by Commodity data*

**Appendix 4: Import Share of Selected Products from the EU, US and Japan of Total Turkish Manufacturing Imports**




*Source: Authors' own estimation based on the OECD International Trade by Commodity data*