COUNTRY CONCENTRATION OF TURKISH EXPORTS AND IMPORTS OVER TIME

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1. Introduction

After the 1980 reforms especially concerning the foreign trade regime, extensive studies have been done to show the changes in Turkish foreign trade, particularly in exports [Aricanli and Rodrik (1990), Krueger and Aktan (1992), Erlat and Erlat (1994), Erlat and Sahin (1998), Erlat (1999)].

The objective of this study is to observe what is happening to exports and imports with respect to Turkey's trading partners. Specifically, we would like to investigate country concentration of our exports and imports. If a country's foreign trade depended heavily on a limited number of trading partners for a long period of time, then this country would be vulnerable to business fluctuations in these countries. On the other hand, if the country in question could diversify both the export commodities and export markets and, also, if she had alternative sources for imports, then she would be more hedged against changes or fluctuations in other countries.

Country concentration of Turkish exports have been investigated by Ergün (1991) for the period 1975-1989 by using the Gini-Hirschman coefficient and trend analysis. Togan (1994) calculated the same measure for imports for the years 1970-1991. In this study, we calculate several concentration measures to show country concentration of both imports and exports. The time period we cover is 1969-1999. We examine the changes in country concentration of both exports and imports between the pre-and-post-1980 periods, and compare our results with those obtained by Ergün (1991) and Togan (1994).

Many studies on the economy of Turkey have focused on the changes in growth policy, beginning in 1980, which involved considerable liberalization in her foreign trade. An account of the Turkish experience due to change in her trade policy can be found in, e.g., Erlat and Erlat (1997:127-128) and Ekinci (2000). As a result of these changes, Turkish exports have increased more than 12 times (from 2.3 billion dollars to 26.6 billion dollars) and imports increased more than 7 times (from 5.1 billion dollars to 40.1 billion dollars) from 1979 to 1999. In an earlier study (Erlat and Sahin (1998)), we have already pointed out that there was a definite increase in the diversification of exported commodities, beginning in 1980, and that this process went on until the new export composition stabilized. In Erlat (1999) and Erlat and Gokalp (2001), we found that, in each of the last three decades, there was diversification in exports but the magnitude of this diversification was larger in the 1980s.

In the following section, we present the methodology we use and give information on the data set. We discuss the empirical results in section 3 and finally, our conclusions will be presented in section 4.

2. Methodology and Data

2.1 Measures Of Concentration

In many studies, a single measure of concentration is decided upon as being the most appropriate one for the problem at hand. Appropriateness depends on the use to be made of the concentration measure and the nature of the data on which the estimate is based (Bailey and Boyle (1971:702). Erlat and Sahin (1998:56), Ergun (1991) and Togan (1994) are examples of such studies. We follow Erlat (1975, 1976) and use five different measures of concentration and compare the results of these different measures.

All five concentration measures are based on the shares of individual elements. The individual elements, in the present context, are the trading partners of Turkey. Let m denote the number of these trading partners and q_{it} represents the exports to or imports from the ith partner country at time t. Then the sum of q_{it} from 1 to m will be q_t and the share of each country in exports or imports of that group of commodity for year t, would be expressed as:

$$p_{it} = \frac{q_{it}}{q_t}$$

$$i = 1,...,m \quad \text{and} \quad t = 1,...,T$$

In this study m is equal to 14, T is equal to 31 and there are 65 commodity groups, even though our analysis will be based on a sub-sample of these as explained in the next section. Therefore, a value for p_{it} is calculated for each commodity group and country at time t. All the concentration measures below are based on p_{it}.

The five measures of concentration can be classified into three groups. Discrete measures of concentration consider only some of the p_{it}s and the first measure, **Concentration Ratio (CR),** belongs to this group. CR shows the total share of k countries which have the largest shares in exports or imports of a commodity group. It is denoted by CR(k) and calculated as,

$$CR(k)_t = \sum_{i=1}^{k} p_{it}, \quad k < m$$

(1)

In most applications CR(4), CR(8) or CR(16) are used; the selection of k is arbitrary. This is its main disadvantage but is widely used because of its ease of calculation. (See, e.g., SIS (1996).)

The second group of measures are referred to as summary measures. Three of our five measures belong to this group.

The **Hirschman-Herfindahl Index (HH)** simply consists of the sum of p_{it}s weighted by themselves:

$$HH_t = \sum_{i=1}^{m} p_{it}^2$$

(2)

The HH index lies between 1/m, the case where all p_{it}s are equal, and 1, where there is only one p_{it}, implying that $q_{it} = q_t$.[1]

The next summary measure, the **Rosenbluth-Hall-Tideman (RHT) index**, requires the p_{it} to be put in descending order because the p_{it} are weighted by their ranks, i. Small sized countries which do not have a significant effect in the HH index, could now have a larger effect on concentration this way. RHT is calculated as

$$RHT_t = \left[2\sum_{i=1}^{m} (i.p_i) - 1 \right]^{-1}$$

(3)

where $1/(2m-1) \le RHT_i \le 1$.

The final summary measure of concentration is the **Entropy Index (H)**. The p_{it}s are weighted by the natural logs of the inverses of the p_{it}s:

$$E_t = \sum_{i=1}^{m} p_{it} .ln\left(\frac{1}{p_{it}}\right)$$

(4)

Hence, small values of the entropy index reflect high concentration, as opposed to the previous three measures. In order to make it comparable with the other measures, the inverse of the antilog of E_t is used and called H_t:

$$H_t = \frac{1}{anti\,log(E_t)} = \prod_{i=1}^{m} p_{it}^{p_{it}}$$

(5)

The final group of measures combine the characteristics of both discrete and summary measures. Our last measure of concentration, the **Comprehensive Measure of Concentration (CCI)**, belongs to this group. As with RHT, it requires the p_{it} to be put in descending order but its main focus is on the largest p_{it}, p_{1t} according to this ordering. The remaining p_{it}s are used to adjust p_{1t}:

$$CCI_t = p_{it} + \sum_{i=2}^{m} p_{it}^2 (1 + (1 - p_{it}))$$

(6)

We analyse the empirical results in three stages and discuss the stages in the Empirical Results section.

2.2 The Data

We have obtained the data from the Undersecretariat of Foreign Trade, Economic Research Department. The first group of data consist of Turkey's total import and export figures in US dollars, in current prices, in Standard Industrial Trade Classification (SITC, Rev.2) 2 digit format, for the period between 1969 and 1999. There are 65 commodities in total, in SITC 2 digit classification, which are actually traded between Turkey and the outside world. The second group of data consists of exports and imports of Turkey with 14 trading partners. There are 65 commodity groups, for each country, again classified according to SITC, Rev.2. These countries are France, Germany, Great Britain, Italy, Netherlands, Iraq, Iran, Saudi Arabia, Kuwait, Syria, Lebanon, USA, Canada and Japan.

Selection of trading partners to use in calculating the concentration measures was a first crucial step. We used the shares of each trading partner in total exports and in total imports in choosing the fourteen countries cited above. We calculated these shares for the period 1969-1999 and found that the 14 countries chosen for this study constituted a maximum value of more than 77% of total Turkish exports in 1985, and a minimum of 52% in 1997. Similarly, these 14 countries constituted a maximum of an 75% of total Turkish imports in 1974, and a minimum of 54% in 1999. Therefore, we decided that a study using these 14 countries will be representative enough of Turkish foreign trade for the period under study.

The second problem we needed to resolve was the commodities to be used in the calculations. Even though we had data on 65 SITC 2-digit commodity groups initial computations involving all 65 commodity groups revealed certain aspects which led us to consider using only a subset of these commodities. We found that there were zero values for some commodities, implying that no trade had taken place for certain sub-periods. We also noted that, for certain industries the paths of country concentration were very erratic and, in certain instances, showed patterns which were very specific to the industry being considered. Since we wanted to see if we could capture general patterns, we decided to choose a subset of the total commodity groups which had the major share in Turkish trade so that, if there were departures from a general pattern, they would be for commodities which mattered in overall trade.

In making this selection, we performed some calculations of commodity concentration based on the concentration ratio, which is simply the sum of shares of the k highest ranked (in this case) commodity groups and is denoted by CR(k). We calculated CR(4), CR(8) and CR(16) for total exports and imports and then for the total exports and imports of the 14 trading partners. Then, for each case, the number of years that a commodity has a share in the concentration ratio is found and the commodities are ranked accordingly. Therefore, the maximum value that a commodity can take is 31 (we covered 31 years) and the minimum value is zero.

We found that 38 commodity groups in CR(16) accounted for 97% of total exports and 37 commodity groups in CR(16) accounted, again, for 97% of the exports of the 14 countries in question. The compositions of these commodity groupings are almost the same, leading us to conclude that the commodity composition of the exports of these 14 countries are fairly representative of the commodity composition of total exports; hence, we shall base our calculations on these 37 commodity groups.

The same exercise was performed for imports. The list for all-country imports contains 32 and the list for 14-country imports contains 33 items and, again, have very similar compositions so that the 14-country list may, once more, be regarded as quite representative so that we shall base our calculations on the 33 commodity groups in that list.

3. Empirical Results

We analyse the empirical results in three stages. The first stage involves the comparative performance of the five concentration measures. The outcome of this analysis is used in presenting the results in the next two stages. In the second stage, we consider country concentration of total exports and imports for 14 trading partners and compare the results with those of Ergun (1991) and Togan (1994). In the final stage, we examine country concentration of exports and imports for specific two-digit commodity groups.

The empirical results for the total trade with the 14 trading partners are presented as a set of three items. The first item contains the actual concentration figures yielded by the five measures of concentration for the period 1969-1999. The second item is the frequency with which each trading partner appears in the CR(4) measure over this period. The last item is the time-series plot of the concentration figures given in the first item.

3.1 Comparison Of Concentration Measures

When we compare the concentration measures, the first thing we note is that the discrete concentration measure, CR(4), gives high concentration figures compared to the summary measures (see Tables 1, 2). CCI, which incorporates the characteristics of both summary and discrete measures, gives concentration figures which are in between the values of discrete and summary measures. Of the summary measures, H gives uniformly the lowest figures. The relationship of the HH and RHT indexes, however, differ from sub-period to sub-period. From Tables 1, 2 and Figures 1, 2, even though the RHT results appear to dominate the HH results throughout the 1969-1999 period in the case of imports, there are sub-periods when the HH results completely dominate the RHT results for exports.

We note the following points from related 2-digit sector graphs[2]:

i. CR(4) gives very high values in general.

TABLE 1
CONCENTRATION FIGURES FOR EXPORTS AND

FREQUENCY OF COUNTRIES IN CR4

TOTAL COMMODITIES

-	-	-	-	-	-	-	-	YEARS
YEARS	**CR4**	**HH**	**H**	**RHT**	**CCI**		**COUNTRIES**	**IN CR4**
1969	0.7299	0.1819	0.1352	0.1788	0.4652		U.S.A	24
1970	0.6787	0.1660	0.1278	0.1646	0.4410		S.ARABIA	2
1971	0.6953	0.1667	0.1277	0.1675	0.4426		GERMANY	31
1972	0.6949	0.1743	0.1265	0.1652	0.4525		FRANCE	9
1973	0.6656	0.1471	0.1200	0.1564	0.4089		HOLLAND	0
1974	0.6890	0.1758	0.1250	0.1628	0.4529		G.BRITAIN	14
1975	0.6450	0.1619	0.1154	0.1466	0.4314		IRAQ	9
1976	0.6828	0.1523	0.1137	0.1491	0.4181		IRAN	5
1977	0.6749	0.1710	0.1184	0.1527	0.4445		ITALY	27
1978	0.6735	0.1756	0.1193	0.1524	0.4497		JAPAN	0
1979	0.6859	0.1814	0.1263	0.1631	0.4601		CANADA	0
1980	0.6107	0.1545	0.1070	0.1319	0.4177		KUWAIT	0
1981	0.5866	0.1234	0.0993	0.1269	0.3602		LEBANON	3
1982	0.6410	0.1288	0.1049	0.1372	0.3665		SYRIA	0
1983	0.6543	0.1450	0.1108	0.1447	0.4037			
1984	0.6691	0.1406	0.1111	0.1469	0.3954			
1985	0.6446	0.1351	0.1103	0.1443	0.3827			
1986	0.5861	0.1314	0.1018	0.1296	0.3816			

Year								
1987	0.6229	0.1408	0.1053	0.1352	0.3980			
1988	0.6156	0.1341	0.1028	0.1325	0.3863			
1989	0.6053	0.1353	0.1027	0.1315	0.3885			
1990	0.6728	0.1746	0.1204	0.1546	0.4491			
1991	0.6739	0.1927	0.1276	0.1591	0.4705			
1992	0.6731	0.1972	0.1278	0.1586	0.4753			
1993	0.6741	0.1991	0.1288	0.1603	0.4778			
1994	0.6922	0.1880	0.1264	0.1618	0.4673			
1995	0.7255	0.2087	0.1369	0.1747	0.4928			
1996	0.7256	0.2054	0.1352	0.1728	0.4890			
1997	0.7339	0.1996	0.1368	0.1782	0.4849			
1998	0.7489	0.2005	0.1430	0.1871	0.4888			
1999	0.7517	0.1978	0.1455	0.1897	0.4878			

FIGURE 1
COUNTRY CONCENTRATION OF EXPORTS
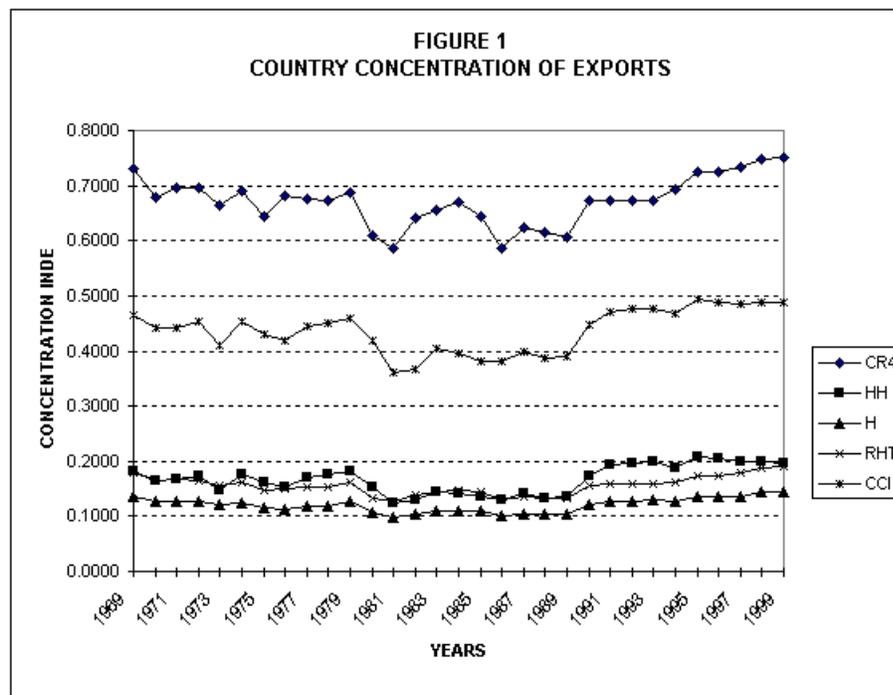
ii. The RHT, H and HH measures provide similar movements for concentration figures over the period under study. In addition, the figures calculated by these measures are also very close to each other in magnitude and become even closer when the country concentration for that commodity is relatively high.

iii. When the concentration figures change frequently and in opposite directions, the figures obtained from different measures are closer to each other. In this case, the deviations are sharper in H, HH and RHT than in CR(4).

iv. When trade in a commodity is relatively recent, (such as in 56 "Fertilizers"), the export figures of which start in 1982, then, concentration figures calculated with different measures become even closer in value. They are volatile however and more time needs to elapse before they can stabilize at, probably, a lower figure than is encountered at the beginning of the period.

TABLE 2							
CONCENTRATION FIGURES FOR IMPORTS AND							
FREQUENCY OF COUNTRIES IN CR4							
TOTAL COMMODITIES							
-	-	-	-	-	-	-	**YEARS**
YEARS	**CR4**	**HH**	**H**	**RHT**	**CCI**	**COUNTRIES**	**IN CR4**
1969	0.8193	0.1875	0.1481	0.1949	0.4757	U.S.A	30
1970	0.7907	0.1901	0.1471	0.1933	0.4804	S.ARABIA	2
1971	0.7110	0.1496	0.1195	0.1584	0.4104	GERMANY	31
1972	0.7209	0.1534	0.1229	0.1608	0.4196	FRANCE	9
1973	0.6596	0.1472	0.1143	0.1494	0.4097	HOLLAND	0
1974	0.5677	0.1240	0.1032	0.1299	0.3660	G.BRITAIN	6
1975	0.6571	0.1536	0.1176	0.1535	0.4207	IRAQ	15
1976	0.6518	0.1436	0.1186	0.1539	0.4022	IRAN	7
1977	0.6402	0.1371	0.1164	0.1495	0.3882	ITALY	24
1978	0.6380	0.1423	0.1129	0.1475	0.4007	JAPAN	0

1979	0.6387	0.1293	0.1108	0.1430	0.3651	CANADA	0
1980	0.6692	0.1419	0.1125	0.1479	0.3980	KUWAIT	0
1981	0.6214	0.1389	0.1092	0.1397	0.3947	LEBANON	0
1982	0.6324	0.1283	0.1074	0.1389	0.3710	SYRIA	0
1983	0.6380	0.1259	0.1066	0.1374	0.3601		
1984	0.6648	0.1328	0.1104	0.1439	0.3771		
1985	0.6313	0.1218	0.1051	0.1338	0.3454		
1986	0.6233	0.1315	0.1074	0.1391	0.3792		
1987	0.5939	0.1245	0.1072	0.1360	0.3638		
1988	0.6172	0.1247	0.1064	0.1364	0.3616		
1989	0.6887	0.1426	0.1168	0.1530	0.3929		
1990	0.6255	0.1336	0.1094	0.1409	0.3839		
1991	0.6733	0.1447	0.1264	0.1589	0.4026		
1992	0.6677	0.1463	0.1234	0.1584	0.4070		
1993	0.6558	0.1418	0.1207	0.1540	0.3974		
1994	0.6533	0.1417	0.1193	0.1522	0.3985		
1995	0.6722	0.1466	0.1196	0.1557	0.4075		
1996	0.6785	0.1548	0.1222	0.1595	0.4231		
1997	0.6872	0.1540	0.1222	0.1611	0.4217		
1998	0.7029	0.1584	0.1297	0.1693	0.4297		
1999	0.6954	0.1520	0.1248	0.1617	0.4182		

FIGURE 2
COUNTRY CONCENTRATION OF IMPORTS
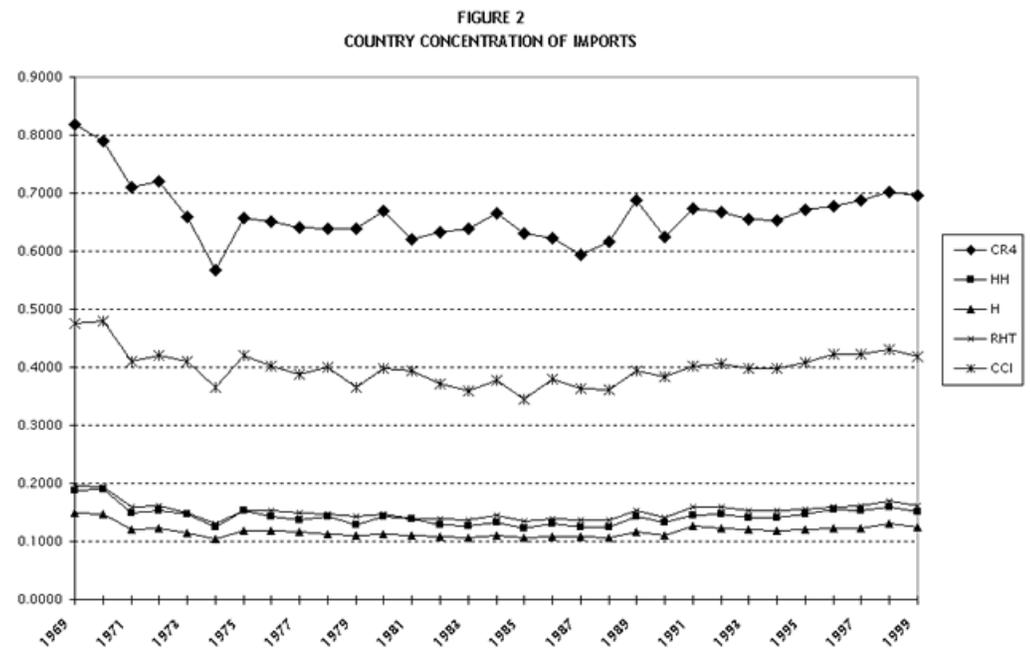
In view of these points, we found that our interpretation of country concentration results should be based on the summary measures, HH, RHT and H, rather than the discrete [CR(4)] or semi-discrete [CCI] measures. We would thus be able to get a closer picture of the peaks and shifts in country concentration over time.

3.2 Results on Total Foreign Trade

The country concentration results of our total exports to and imports from the 14 trading partner are presented in Figures 1 and 2, respectively. It is observed that the country concentration of Turkish exports declined between 1980 and 1981, after which the figures show a slight decrease until 1989 and then an upward movement until 1999. It can be said that the country concentration of exports experienced a structural downward shift after 1980.

The geographic concentration of Turkish exports was also calculated by Ergün (1991:58) by using the GH index. Ergün (1991:54-57) concluded that, although the commodity concentration values decreased in the period between 1981 and 1989, geographic concentration remained the same between 1975 and 1989. Togan (1994:170), on the other hand, interprets Ergun's (1991) results to imply that Turkey diversified her exports geographically during the 80s since the index value decreased from 29.15 in 1975 to 26.64 in 1989. A much longer period is covered in our study and our conclusions on the country concentration of exports are similar to those of Togan (1994).

Our calculation of the country concentration of imports does not indicate a structural shift in the period under study. The figures are highly stable, as can be seen from Figure 2. Togan (1994:212) presents his own calculations on the geographic concentration of Turkish imports by using the GH index. He concludes that Turkey has diversified her imports geographically during the period 1970-1991. The index value decreased from 34.7 in 1970 to 28.75 in 1991. Our findings are, thus, different from

that of Togan (1994).

When we compare the country concentration of exports and imports, it can be said that, in general, the country concentration of exports is higher than that of imports.

3.3 Results on Individual Commodity Groups

When we consider the export and import country concentration figures for individual commodity groups, three types of movements can be observed. First, there are **industry specific structural shifts,** such as SITC 62, "Rubber Manufactures" and 76, "Telecommunications and Sound Recording". This type of movement can be characterised by frequent changes in country concentration until a certain year, after which the figures become more stable and a relatively lower course of country concentration is followed.

For exports, the commodity groups that show industry specific structural shifts are 67 "Iron and Steel", 12 "Tobacco and Tobacco Manufactures", 66 "Non-metallic Mineral Manufactures", 76 "Telecommunications and Sound Recording and Reproducing Apparatus", 72 "Machinery Specialized for Particular Industry", 68 "Non-Ferrous Metals", 62 "Rubber Manufactures", 51 "Organic Chemicals", 57 "Plastics in Primary Forms", and "Coffee, Tea, Cocoa and Spices". For imports, they are 84 "Articles of Apparel and Clothing Accessories" and 21 "Hides, Skins and Furskins, Raw".

The second type of movements are **industry specific movements** as in the case of 42, "Fixed Vegetable Fats and Oils" for imports. They are characterised by frequent changes and, therefore, have fluctuations through time. Such movements may take place if there are frequent changes in the regulations for that commodity group's exports or frequent changes in taxes and duties which will result in volatility in country concentration.

For exports, commodity groups that show such movements are 00 "Live Animals", 77 "Electrical Machinery", 04 "Cereals and Cereal Preparations", 42 "Fixed Vegetable Fats and Oils", 33 "Petroleum, Petroleum Prod. And Related Materials", 01 "Meat and Meat Preparations", 08 "Feeding Stuff for Animals", 21 "Hides, Skins and Furskins, Raw", 56 "Fertilizers" and 32 "Coal, Coke and Briquettes". For imports, they are 26 "Textile Fibres and Their Wastes", 00 "Live Animals", 04 "Cereals and Cereal Preparations", 42 "Fixed Vegetable Fats and Oils", 06 "Sugar, Sugar Preparations and Honey" and 34 "Gas, Natural and Manufactured".

Finally, **there are structural shifts of country concentration which are the results of developments outside the industry of that commodity**. A radical change in trade or growth policy or an internal social chaos or a fundamental restructuring of the economy may be the cause of such a structural shift in the country concentration of foreign trade. One of the aims of this study was in fact, to capture this type of movement in the country concentration of Turkey's trade flows which was a result of changes due to the export oriented strategy implemented after 1980. The effects of such a change on country concentration is expected in export industries, in particular.

According to our calculations, the commodity groups which showed that

kind of structural shift in their country concentration of exports after 1980, are 05 "Vegetables and Fruit" and 65 "Textile Yarn, Fabrics, Made-Up Articles".

The first commodity group is 05 "Vegetables and Fruits". This group was in the CR(4) calculations in every year during the period under study. It reached a lower and more stable plateau of country concentration after 1980 which continued up to 1999 with slightly increasing figures after 1989. Although the imports of this commodity group was not picked up in the ranking, there was a sharp decline in 1983 for every measure as if dividing the period into two; in the former there is a tendency to increase in every measure; in the latter, just the opposite.

As was the case in vegetables and fruits, a declining trend of country concentration after 1980 is observed for 65 "Textile Yarn, Fabrics, Made-Up Articles"**.** The figures are still smoothly decreasing at the end of the period. It shows that export oriented policies implemented after 1980 have positively affected the country concentration of textile yarns and fabrics. There is a relatively stable and smoothly declining pattern for all the measures concerning the imports of this commodity group .

There is only one commodity group in imports which showed a structural shift in country concentration after 1980. It is 65 "Textile Yarn, Fabrics, Made-Up Articles". This commodity group showed the same structural change in its exports also. But it does not provide enough evidence to conclude that there is a parallel movement in the country concentration of a commodity group between exports and imports. In general it can be said that the country concentration of imports are more stable than that of exports and they show less industry specific structural movements.

3.4 Results Based on Frequency of Occurrence

As mentioned at the beginning of Section 3, the results for each commodity group contains a table showing the frequency with which each trading partner appears in the CR(4) measure over the period 1969-1999. A close look at these tables lead us to a few interesting observations.

1. The most important trading partners for 65 "Textile Yarn, Fabrics, Made-Up Articles" are Germany, Great Britain, France, Holland and USA for exports and Germany, Italy, USA, Great Britain, France and Japan for imports. Even though the high aggregation level of the two-digit classification may be a bit misleading, this commodity group appears to be a good example of intra-industry trade since we are exporting it to and importing it from the same trading partners.

2. We also observe a special form of intra-industry trade in a number of commodity groups where the imports are mainly from the European countries and/or U.S.A. and Japan while the exports are mostly to Middle Eastern countries. We shall call this type of trade flow the **Bridge Effect**. A commodity group which exhibits this effect is 77 "Electrical Machinery". Imports are mostly from developed countries and the exports are to Middle Eastern countries such as Iraq, Iran, Saudi Arabia, Lebanon and Syria. Similarly, 00 "Live Animals" are exported mostly to Lebanon, Saudi Arabia, Kuwait, Syria, France, Italy, Iran and Iraq while being imported from Germany, Holland, G. Britain and U.S.A. Other sectors exhibiting the Bridge Effect SITC 04 "Cereals and Cereals Preparation", SITC 78 "Road Vehicles", SITC 42 "Fixed Vegetable Fats", SITC 76 "Telecommunications and Sound Recording and Reproducing Apparatus and

Equipment", SITC 72 "Machinery Specialised for Particular Industry", SITC 68 "Non-Ferrous Metals", SITC 69 "Manufactures of Metals", SITC 01 "Meat and Meat Preparations", SITC 89 "Miscellaneous Manufactured Articles", SITC 62 "Rubber Manufactures", SITC 74 "General Industrial Machinery and Equipment", SITC 71 "Power Generating Machinery and Equipment", SITC 02 "Dairy Products and Birds' Eggs", SITC 32 "Coal, Coke and Briquettes", SITC 57 "Plastics in Primary Forms", SITC 59 "Chemical Materials and Products", SITC 87 "Professional, Scientific, Controlling Instruments and Apparatus", SITC 73 "Metal Working Machinery", SITC 53 "Drying, Tanking and Colouring Materials" and SITC 54 "Medical and Pharmaceutical Products". Finally, an opposite bridge effect can be seen for 33, "Petroleum and Petroleum Products"; imports are mostly from the eastern countries and exports are mainly to European countries such as Italy, France and Holland.

3. The trading partner composition of 78, "Road Vehicles" is quite interesting. Even though we import this commodity group mostly from Germany, France, G. Britain and Japan, our exports are also to Germany, France, and G. Britain, together with Iraq, Iran, S. Arabia, Lebanon and Syria, reminding us of the predictions of Product Cycle Theory. This theory predicts that every commodity has a life cycle such as the new, mature and standardised product stages. In the first two stages, the product would be produced and therefore exported by the innovating developed country and in the third stage, the production of the commodity is left for developing countries, and it is even possible that the developed country may import this commodity from the developing country.

4. Conclusions

1. We used five concentration measures to investigate the country concentration of Turkey's trade flows. The concentration ratio, CR(4), gave, uniformly, the largest and the Entropy index, uniformly, the lowest values. The two other summary measures, HH and RHT, moved close to each other and the results based on CCI lay between CR(4) and the summary measures. We found that CR(4) was very much affected by the distribution of the trading partners over time and made it very difficult to discern the path of country concentration over time when the frequency of occurrence of the countries in CR(4) indicated the same four countries. Thus, we preferred to base our subsequent analyses on the summary measures.

2. These measures indicated that the country concentration of total exports to the 14 trading partners chosen for this study exhibited a significant decline after the trade liberalisation based policy changes in 1980. However, no such significant change in the country concentration of imports was found. Thus, our conclusion with respect to exports are contrary to those of Ergun (1991) but are in accordance with Togan (1994)'s interpretation of Ergun's empirical results. However, Togan (1994), based on his own calculations, claims that imports also show a decline in country concentration, a conclusion which is not supported by our empirical results.

3. We find that individual commodity groups show three types of movements in country concentration over time. Groups like 62 "Rubber Manufactures" and 76 "Telecommunications and Sound Recording" exhibit industry specific structural shifts, implying that changes in their levels of country concentration are due to the dynamics of the industry and not to the changes in country policies concerning the trade regime. The second type of movement is also industry specific but mainly involves rather erratic behaviour which may not be comparable across commodity groups, as in the

case of the imports of 42 "Fixed Vegetables and Oils" and the exports of 00 "Live Animals". Finally, there are structural shifts in country concentration brought about by the liberalisation in the trade regime in 1980 and this is observed for two commodity groups in exports; 05 'Vegetables and Fruits" and 65 "Textile Yarn, Fabrics, Made-Up Articles", and for one group in imports; SITC 65.

4. A by-product of our empirical results was also to observe a particular type of intra-industry trade, which we called the Bridge Effect, where imports were mainly from developed Western countries and/or Japan and exports were to Middle Eastern countries. The commodity groups 77 "Electrical Machinery" and 00 "Live Animals' are two examples of such trade. We also noted that the trading partners for 78 "Road Vehicles" constituted a good example of the predictions of the Product Cycle Theory.

Endnotes

[1] A number of researchers (e.g., Michaely (1958, 1962), Massell (1970), Love (1984), Ergun (1991), Togan (1994)) use a transformation of HH, known as the Gini-Hirschman index (GH). GH is obtained by taking the square root of HH and multiplying it by a 100. The two indexes, obviously, give the same information. We prefer HH so that the results of all five measures are comparable.

[2] These graphs have not been presented to conserve on space. They are in the full text of the paper which can be requested from the authors.,

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