AN ANALYSIS OF THE STRUCTURE

AND DETERMINANTS OF TURKEY-EU TRADE

by

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This Ph.D Thesis is devoted to the following

members of my family:

Mother; Turkan,

Brother; Mehmet,

Sister in law; Dilek,

And my little niece; Sultan.

DECLARATION

I hereby certify that the work embodied in this thesis is the result of my own investigations except where reference has been made to published literature.

I declare that this work has not already been accepted in substance, nor is it currently being published in candidature for any other degree.

ABSTRACT

The aim of this thesis is to examine the structure and determinants of Turkey-EU trade at both aggregate and sectorally disaggregated levels after the trade liberalisation and restructuring program of Turkey in the 1980s in order to assess the possible effects of further trade liberalisation between Turkey and the EU (ie Turkey's accession to the EU).

Before studying the determinants of Turkey-EU trade, we first investigate the competitiveness of Turkish manufacturing relative to the EU over the liberalisation period using Balassa's revealed competitive advantage (RCA) indices as well as the similarity of exports from Turkey and the EU using Finger and Kreinin similarity indices. Our analysis on the similarity of exports includes comparison of the similarity of exports from Turkey and the three Mediterranean countries, namely Spain, Greece and Portugal which have similar factor endowments. Regarding the overall similarity of exports from Turkey and the EU as a whole, we find that the similarity of exports from the two areas has increased noticeably over the liberalisation period when there was a shift in commodity composition of Turkey's exports towards manufactured goods. Our results suggest that the assessment of the similarity of exports from Turkey and the three Mediterranean countries should consider the type of the products as the similarity of exports in agricultural goods differs substantially from that of manufactured goods.

Our results on determinants of Turkey-EU trade indicate that wages appear to be a key factor in explaining Turkey's exports to the EU not only for low-tech

industries, but also for medium and high-tech industries. This suggests that the remarkable increase in Turkey's exports in the 1980s relied heavily on low wage levels which not only increased the cost competitiveness of the country but also reduced domestic demand and hence forced firms to exploit foreign markets.

In conclusion, our results indicate that the structural adjustment and trade liberalisation reforms of Turkey in the early 1980s have brought the Turkish economy closer to the EU and put Turkey's economy on the right track for integration with the EU or Europe at large, notwithstanding the huge problems that have emerged.

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CHAPTER 1

INTRODUCTION

1.1.- The Purpose of the Study

While much of the debate about Turkey's accession to the EU has focused on the political relationship, the reasoning that led Turkey in 1959 to take the first step on the long road to full membership was mainly economic. The situation became more complex along the road, but in 1987, when Turkey applied for full membership, economic considerations were again at the forefront of the discussion and they played a crucial role in the 1996 Customs Union agreement and in EU's decision to accept Turkey's application for full membership in 1999.

Turkish policy makers have turned to Europe when domestic economic difficulties have made them search for new policy alternatives abroad. Trade and investment have always been the key factors in the consideration of this alternative. This became more pronounced after the accession of the three Mediterranean countries (Spain, Greece and Portugal) to the EU.

To understand Turkey's economic relations with the EU, one has to look to a wider context, Turkey's global trading position, which was changing in the 1980s. The 1980 stabilisation and structural adjustment programme has aimed to integrate the domestic economy with the world economy by liberalising trade. This integration in world markets was at the expense of trade with the Europe at the beginning, but after

the mid-1980s gained momentum once again as the markets of the oil producing countries in Middle East proved to be unreliable. Therefore, trade relationships between Turkey and the EU were very unstable. From time to time Turkey diverted its trade from the EU to other regions, with similar effects on capital inflow and trade, later returning its attention to Europe with renewed enthusiasm.

The aim of this thesis is to investigate the structure and determinants of Turkey-EU trade and to examine the changes over the 1980 trade liberalisation period. This analysis is expected to shed some light on the possible economic effects of further liberalisation of trade between Turkey and the EU (eg. Turkey's full membership to the EU).

1.2.- The Methodology of the Study

This thesis examines the determinants of Turkey-EU trade in three sections. Section 1 gives a brief overall analysis of the 1980 trade liberalisation program and its effects on Turkish economy. More specifically, we examine the trade regime of Turkey over the pre- and post liberalisation periods and summarise the changes in protection level as well as fiscal and monetary policy over the restructuring program.

We focus on Turkey-EU trade patterns in Section two and investigate the structure of Turkey-EU trade in terms of both country and commodity distribution. Section two also looks at the factor endowment of Turkey and the comparative advantage of Turkish industry with respect to the EU. The similarity of exports from Turkey and the EU as a group and particularly from Turkey and the three

Mediterranean member states are investigated in this section. We use Neven and Roller's framework to examine changes in the factor endowment of Turkey and we employ revealed comparative advantage (RCA) to assess Turkey's comparative advantage with respect to the EU. Our analysis on similarity of exports is based on Finger and Kreinin's similarity indices.

The final section analyses the determinants of Turkey-EU trade at both aggregate and disaggregate levels. We start by examining the determinants of trade at an aggregate level by estimating conventional import and export demand functions for Turkey where we assess the importance of income and price elasticities as well as exchange rates on Turkey's foreign trade. We continue our analysis at a sectoral level and examine the impacts of wages, relative capital formation and the size of the home market on Turkey's trade for 24 industries, 17 of which are low-tech and 7 of which are medium and high-tech. Section three also examines the pattern and determinants of intra-industry trade (IIT) for Turkey over the pre- and the post liberalisation periods at a disaggregate level. We use marginal intra-industry trade (MIIT) indices to study IIT in new trade created during the liberalisation period and compare it with that of pre-liberalisation period. Our analysis on the determinants of IIT investigates the effects of factors such as scale economies, product differentiation and competitiveness on IIT.

An alternative approach to assess the impact of Turkey's possible membership to the EU could be applying an intertemporal general equilibrium (GE) analysis (see, for example, Mercenier and Yeldan (1997)) to examine welfare effects of further trade liberalisation between Turkey and the EU. However, this methodology is based solely

on estimation of a utility function for a representative Turkish household and pays no attention to competitiveness of Turkey and industry specific determinants of Turkey-EU trade. However, our analysis allows to approach the issue from different angels as we use several methods at both aggregate and disaggregate levels.

1.3.- The Significance of the Study

This thesis investigates analytically the structure and determinants of Turkey's foreign trade with a particular emphasis on Turkey-EU trade over the liberalisation period. It contributes to the existing literature in four ways. First of all, to our knowledge, this is the first empirical study which investigates the determinants of Turkey's trade at the disaggregate level. The existing empirical studies on the determinants of Turkey's trade focus only on aggregate analysis of trade by estimating conventional export and import demand functions (see, for example, Ersel and Temel (1984) and Bairam (1993)) where the centre of attention is to asses the magnitude of income and price elasticities. Secondly, this study is the first attempt to test the impact of exchange rates on Turkey's trade. We examine the effect of not only the current, but also predicted exchange rates on Turkey's foreign trade.

Thirdly, though there is a vast literature on the pattern and determinants of intra-industry trade (IIT), there is very little empirical work on the pattern of IIT between developing and developed countries where the difference in factor endowments can be reasonably substantial. Considering Turkey's distinctive position, we look into the pattern of IIT between a semi-industrialised developing country and a group of industrialised countries in the EU. Finally, as far as we are aware, there is no

study on the relation between trade liberalisation and IIT for Turkey, which may have important policy implications due to the possible link between IIT and structural adjustment costs.

1.4.- The overview of the Chapters

The thesis examines the structure and determinants of Turkey-EU trade in three sections. Briefly, Section 1 (Chapter 2) is devoted to the overall analysis of the impact of the 1980 liberalisation program on the Turkish economy. Section 2 (chapters 3, 4, and 5) examines the structure of the Turkey-EU trade over the pre- and post liberalisation periods. The final section (chapters 6, 7 and 8) investigates the determinants of Turkey's foreign trade with particular attention to Turkey-EU trade. In what follows we give a brief overview of the remaining chapters.

Chapter 2 provides a preliminary analysis of the impact of Turkey's 1980 liberalisation reforms on Turkish economy. In this chapter we first compare the foreign trade regime of Turkey over the pre- and post liberalisation periods and examine the effects of Turkey's outward looking trade and exchange rate policy on her foreign trade. We also study the inter-industry distribution of Turkey's protection level (ie nominal and effective protection rates) over the liberalisation period. Finally, this chapter summarises the response of trade flows to altered incentives in Turkey's trade and payments regime.

Following the overall analysis of the 1980 liberalisation reforms in Section 1, we focus on the structure of Turkey-EU trade in section 2. Chapter 3 starts with a

brief summary of Turkey-EU relations and examines Turkey-EU trade patterns over the pre- and post liberalisation periods. In this chapter we also examine the geographical distribution of Turkey's foreign trade as well as the commodity structure of Turkey-EU trade over the liberalisation reforms.

In Chapter 4 we investigate the factor intensity of Turkey in order to assess comparative advantage of Turkey with respect to the EU. This chapter gives a brief note on theoretical arguments on the measurement of comparative advantage and studies Turkey's factor intensity and comparative advantage at the industry level using Neven and Roller's approach and the well-known Balassa's revealed comparative advantage (RCA) indices. The aim of this chapter is to evaluate Turkey's comparative advantage with respect to the EU and to explore whether Turkey was better able to exploit comparative advantage after liberalising trade with the EU.

Chapter 5 studies the similarity of exports from Turkey and the EU12 between 1975 and 1990. The aim of is chapter is, first, to assess the overall similarity of exports from Turkey and the EU12 over the liberalisation period, when important changes took place in both the magnitude and composition of Turkey's foreign trade. Secondly, we study the similarity of exports from Turkey and the three Mediterranean countries (Spain, Greece and Portugal) to the EU12 and to the industrialised EU5 which can shed some light on the trade diversion effect of Turkey's possible membership of the EU.

Following the analysis of the structure of Turkey-EU trade in the previous section, we examine the determinants of Turkey-EU trade in Section 3. Chapter 6

investigates the determinants of Turkey-EU trade at an aggregate level by estimating conventional import and export demand functions for Turkey over the period 1973-1993 studying the impact of price and income variables as well as exchange rates on trade flows. In examining the determinants of trade, the distinction is made between price and non-price factors. Chapter 6 also includes an *ex post* model for measuring the effect of Turkey's liberalisation program on exports and imports.

Chapter 7 provides a more detailed examination of Turkey-EU trade at a disaggregate level by using cross section and time series data for 24 industries over the period 1967-1990. In order to investigate the influence of price or cost competitiveness on trade we used a variable which compares relative wages in Turkey and the EU. The impact of non-price competitiveness on trade is captured by the technology variable which accounts for innovative ability or adaptive capacity. The gross investment in capital is used as a proxy to measure this potential for imitation. A home market variable is also added to the analysis to reflect scale factors.

Chapter 8 focuses on intra-industry trade (IIT) between Turkey and the EU. In this chapter we examine first the pattern of IIT for Turkey's overall trade and Turkey-EU trade at both 2 digit level (for 63 industries) and 3 digit level (for 231 industries) over the pre- and post liberalisation periods and investigate if the degree of IIT for Turkey has changed between the two periods. Secondly, we use a model to evaluate the role of scale economies, product differentiation and competitiveness on the level of IIT at both aggregate and disaggregate levels using cross section and time series data for 24 industries for the period 1975-1990.

PART I

AN OVERVIEW ON

TURKISH ECONOMY IN THE 1980'S

CHAPTER 2

THE 1980 LIBERALISATION PROGRAM IN TURKEY AND ITS EFFECTS ON TURKISH ECONOMY

2.1.- Introduction

"Trade liberalisation is one of the most important areas in which people's perceptions of economic policy changed over the recent decades. Whereas in the 1950s and even well into the 1960s there were wide bodies of opinion advocating high protection (for the purpose of stimulating import-substituting industrialisation), today there is hardly any body of professional opinion that seeks to defend such a position.[1]"

Following the economic success stories of Taiwan, South Korea, Hong-Kong, Singapore and other Far Eastern countries, Turkey forged its way into this "winner's circle" of trade liberalisation in the early 1980s. In fact, three distinct liberalisation attempts: 1950, 1958, 1970 have already been made until the early 1980s in Turkey. However, these first three attempts are seen as "one shot", while the last one in 1980 as broader and deeper. The 1980 liberalisation, which can be divided into two major episodes; one beginning in 1980 and the other toward the end of 1983, represents a more fundamental attempt by the government to commit itself to a liberalised foreign trade regime. Underlying this attempt were several objectives: stabilisation of balance of payments; rationalisation of the foreign exchange system; improved efficiency of

state enterprises; a boost to the private sector; and encouragement of worker remittances and foreign direct investment.

Turkey stands out for having achieved significant economic growth in the decade of the 1980s, while many other countries were mired in stagnation. Although it is not clear whether the 1980 liberalisation program actually changed the effective protection rate of Turkey, without a doubt, successful trade liberalisation was the principal factor responsible for this achievement. Over the first phase of Turkey's liberalisation program (1980-1983) the rate of inflation dropped from 116 percent in 1980 to 36 percent in 1981 and 27 percent in 1982. In response to the changed policy environment, exports experienced a big spurt. They had doubled between 1980 and 1983, and they doubled again between 1983 and 1988 in dollar value. Exports of manufactures more than tripled between 1980 and 1983, and nearly tripled again by 1988.

Not only did the reform program lead to an export boom; it also produced positive results in terms of the economy's overall growth rate. The growth rate in Turkey reached an average of 5.3 percent over 1981-1990 and sustained its increasing level during the 1990s with an average of 4.3 percent.

The most vulnerable aspect of Turkey's reform program concerned economic stabilisation. While inflation started the decade at over 100 percent, and was brought down to 27 percent in 1982, the expectation of continued progress on the stabilisation

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[1] Harberger C. Arnold (1992), Introduction to Kruger and Aktan (1992), 'Turkey'.

front was never fulfilled. Instead, the inflation rate fluctuated between 30 and 50 percent from 1983 through 1987, and then burst out above 65 percent for 1988, 1989 and 1990. After 1990 the inflation rate continued to rise and was over 100 percent in 1994 again. Therefore, today the biggest challenge facing policy makers is to bring about price stability without sacrificing the notable achievements of the previous decade in the areas of liberalisation, economic efficiency, and growth.

Considering the fact that the success of any liberalisation program depends on certain socio-political and economic conditions, the Turkish governments attempted to create the necessary socio-political grounding, in addition to securing the much-needed support of multilateral organisations such as the EU, IMF and OECD. The IMF supported the programme with a standby agreement and the World Bank provided structural adjustment loans that helped to reschedule commercial dept. The EU did not give a direct stimulus to the reform package, but these reforms were necessary to fulfil the Turkish government's obligations concerning the customs union with the EU.

Turkey's economic ties with the EU have developed as a result of Turkey's association with the EU since 1963. The Turkish application of April 14, 1987 for full membership of the EU was an important step in liberalisation period and marked the beginning of a new era in Turkish-EU relations, one which followed a unique path of development. Turkey's relations with the EU should be evaluated in accordance with Turkey's aspirations to become a European nation, that is, with Turkey's 'European vocation'.

Turkey and the European Union moved towards the establishment of a customs union in 1995. At the Lisbon European Council meeting of 1992, basic guidelines were adopted for co-operation with Turkey, with a view to establishing the customs union in 1995. Prior to the signing of the Customs Union Agreement, Turkey already had close economic ties with the member states of the EU. Recently, more than 50 percent of the Turkish foreign trade is conducted with the EU and more than 60 percent of foreign investments in Turkey are made by EU member states.

This chapter first examines the impact of the 1980 liberalisation program on macroeconomic performance of Turkish economy after the 1980s. The main focus of the chapter is to study changes in protection level of Turkey and the changes in trade flows over the liberalisation period.

The remainder of the chapter is organised as follows. Section 2 briefly reviews the Turkish experience of liberalisation in the 1980s. This section also gives an assessment on inter-industry dispersion of protection for Turkey. Section 3 examines Turkey's foreign trade over the pre- and post liberalisation periods. Finally, section 4 analyses the macroeconomic performance of Turkish economy in the 1980s. Section 4 also gives some explanations on sources of the rapid increase in Turkish exports in post liberalisation period. Following the overall analysis of the 1980 liberalisation program, in Chapter 3 we focus on the impact the liberalisation on Turkey-EU trade patterns in the 1980s.

2.2.- An Overview of Trade Reforms in Turkey

On January 24, 1980, the Turkish government announced a major economic reform program. Many of the policy changes - a change in the exchange rate, major increases in prices of goods and services sold by public sector enterprises, inauguration of a stabilisation program backed by the IMF - had also been components of earlier reform packages in 1958 and 1970. Indeed, in 1977 and 1978, reform programs had been announced, although their impact had been minimal. What differed in 1980 was the government's statement that, in addition to the usual stabilisation measures, it intended to liberalise the economy more generally. There were significant alterations in Turkey's trade and payments regime.

Before 1980, Turkey's development strategies and economic policies had been based upon the premise that industrialisation was essential and could be effected only through policies that protected fledging Turkish industries from foreign competition. In other regards, Turkish economic policies since the Second World War had varied, but at no time had the policy of protecting domestic industry been seriously questioned. As a consequence, by the late 1970s, Turkish exports were only 4-5 percent of GNP, and imports were similarly small. This was clearly an uneconomic situation for a country of Turkey's size, proximity to Europe, and resource endowment. From the outset, therefore, the 1980 reform program was qualitatively different from earlier programs.

Although the reform program has not been successful in all dimensions, the achievements of the Turkish trade liberalisation and the switch to an outward-oriented trade regime were remarkable by any standard. Exports have been a major engine of

growth. Turkey's exports, measured in U.S. dollars, grew at an average annual rate of 22.2 percent from 1980 to 1985- a period when world trade was almost stagnant-. Exports continued to grow rapidly in the later half of the 1980's, reaching $11.7 million in 1988. (see Chart 2.1)

The purpose of this section is to analyse Turkey's 1980 reform program. Focus is upon the trade and payments liberalisation of the 1980s, and its effects on the Turkish economy. Such an examination cannot be undertaken, however, without some understanding of the context in which the reforms took place. Such a context includes both the circumstances of the Turkish economy and Turkish economic policy before the January 1980 program and the macroeconomic environment within which trade and exchange rate policy had its effects after the 1980 reforms. Therefore, the analysis starts with an account of Turkish economic policy and performance before the start of the reforms in 1980. The next part provides an account of policy reforms undertaken during the first phase of the reforms, 1980-1983. The part after that traces policy changes after 1983 and goes into greater depth in analysing nominal and effective protection rates of different sectors. This first section of the work provides the basis for the discussion of the developments in Turkish foreign trade after the 1980 liberalisation program.

2.2.1.- Turkey's trade and payments regime before the 1980 reforms

It can be argued that two driving forces determined Turkey's trade and payments regime during the 1950-1980 period. First, the Turkish government was strongly committed to a policy of industrialisation through import substitution

throughout the 1960s and 1970s. Second, the government was equally committed to maintaining a fixed nominal exchange rate despite domestic inflation, with the result that there was always excess demand for foreign exchange. The foreign exchange shortage compelled many policy actions and interacted with the policy of encouraging domestic industry substitution.

Baysan and Blitzer (1988) provide estimates of the effective protection rate (EPR) equivalents of quotas and tariffs for manufacturing industries in 1973, a year when foreign exchange was relative easy; protection rates became higher in the late 1970s. According to their estimates, paper and paper products were accorded an EPR of 154 percent; plastic products 358 percent; iron-and steel-based industries, 203 percent; non-electric machinery, 108 percent; and so on. By contrast, EPRs for agricultural commodities and many mineral products- all exportables- were negative.

As in most developing countries, import-substitution policies in Turkey became increasingly costly as time passed. The EPR estimates already cited above one indication. The rising cost was also reflected in a rapidly rising incremental capital-output ratio (ICOR): according to Balassa (1985), the ICOR in Turkey rose from 1.6 in the period 1963-1967 to 2.4 in the period 1968-1972 and 4.7 in the period 1973-1977. In constant 1976 prices, the average investment per job created rose from TL (Turkish Lira) 267 thousand between 1963 and 1967 to TL 572 thousand a decade later.

The mechanisms put in place for import licensing under the stabilisation program of 1958 lasted until 1980. The import programs so established became the

basis for regulating imports and protecting domestic manufactures until after the 1980 reforms. In reaction to the lengthy delays for imports licences that prevailed before 1958, the practice of establishing import lists began. Three lists were established. An important feature of the import regime was that any commodity that did not appear on a list could not legally be imported. Once an item was domestically produced, it was accorded virtually unlimited protection through the simple device of removing it from all three import lists. Those commodities that were legally importable were divided among the three lists. One list indicated items that could be imported only under bilateral trading arrangements Turkey had with a number of countries, primarily in Eastern Europe and the Middle Est. This bilateral list was rather marginal, but if the authorities deemed that a commodity was available from those sources, they attempted to encourage purchases from bilateral sources by restricting the quantities that could be imported under the other two lists. These two lists, the liberalised list and quota list, were more significant.

It was intended that imports on the liberalised list - primary raw materials, intermediate goods, capital goods, and spare parts- be freely importable during the six-month period of the import program subject only to the individual's obtaining the requisite foreign exchange only from the central bank. For the latter list, complex procedures were established to allocate available quotas to various producers or importers who had claims to them.

Although the quota list was intended to be more restrictive than the liberalised list, the opposite was true during periods of balance of payments difficulty. In the late 1960's, and again after the mid-1970s, those with quota rights under the quota list

generally received their import licences early in the import program period and then applied immediately to the central bank for foreign exchange. Ironically, those who wished to import items on the liberalised list later in the import program period were subject to delays of increasing length as balance of payments difficulties mounted. In that sense, the liberalised list was increasingly illiberal immediately before devaluation and the stabilisation program.

Thus, by the mid-1970s, the Turkish trade and payments regime was fairly chaotic and heavily biased toward import substitution and against exports. Tariffs were established at a variety of rates; import lists were drawn up, and their composition was altered every six months; delays were encountered in obtaining foreign exchange even when import licenses had been received; there were export subsidies. Moreover, the rate of inflation was over 50 percent a year, while devaluations were infrequent and often less than proportionate to the cumulative inflation since the preceding devaluation.

2.2.2.- Trade reforms after the 1980s; The first phase, 1980-1983

In many regards, the economic and political situation in January 1980 was not fundamentally different from what it had been since 1977, except in the sense that economic and political deterioration had been in progress longer. The major difference from the years 1977-1979 was that the Demirel government chose to adopt a major program of economic reform, with the support of the IMF and the donor community. The plan was announced by Prime Minister Demirel on January 24, 1980 and had two key interrelated objectives: to reverse the downward spiral in economic activity and to

stem the inflationary spiral. Unlike earlier policy packages, however, it was immediately stated that there would be a fundamental change in the underlying policy regime. It was intended to strengthen market forces and competition by opening up the Turkish economy to the rest of the world; simultaneously, state controls over economic activity were to be reduced.

The initial program had three major components: exchange rate policy, internal price policy, and fiscal and monetary policy which are analysed in detail in the following part.

2.2.2.1.- Trade and Exchange Rate Policy

The Turkish lira (TL) was immediately devalued, and it was announced that, henceforth, exchange rate policy would be more flexible, with more frequent devaluations to maintain the attractiveness of exports. Simultaneously, several other measures were taken to encourage exports and to reduce the restrictiveness of the import regime. The official exchange rate was changed from TL 45 to TL 70 per U.S. dollar. Although some items continued to be subject to different exchange rates, the earlier multiple exchange rate system was unified considerably.

A variety of other liberalisation measures were also taken. Banks authorised to hold foreign exchange were authorised to retain up to 80 percent of their receipts, using them to cover acceptance credit obligations and to finance imports of oil, petroleum products, fertilisers, and pharmaceutical raw materials.

In addition, incentives for exporters were introduced or enhanced. Exporters were permitted to retain $10,000 or 5 percent of their receipts, whichever was greater. Also, all duties on imports used in export production relating to exports were eliminated, and administrative procedures relating to exports were greatly simplified. Provisions were made for subsidised export credits, and export subsidies were retained.

Finally, the import regime was liberalised in several ways. The coverage of the liberalised list was enlarged, and advance deposit requirements on imports were generally reduced. In addition, the quota list, which had previously been issued once a year, became semi-annual.

As a result of these liberalisation policies over the first phase of Turkey's liberalisation program (1980-1983), the rate of inflation dropped from 116 percent in 1980 to 36 percent in 1981 and 27 percent in 1982 and exports had doubled between 1980 and 1983, and they doubled again between 1983 and 1988 in dollar value. Exports of manufactures more than tripled between 1980 and 1983, and nearly tripled again by 1988. (see Chart 2.4)

2.2.2.2.- Pricing Policies

One important element of the program, which was immediately felt by the entire people, was the removal of controls over SEE (State Economic Enterprises) prices. This was important for its prospective impact on the budget deficit. The OECD

had attributed the government's overshooting of expenditure targets in earlier programs largely to rising transfer payments, of which transfers to SEEs were the largest single component. In turn, ceilings on central bank credits had been broken as government fiscal requirements driven by SEE deficits dictated central bank financing

The 1980 program contained an announcement that, henceforth, prices of SEE outputs- except coal, fertilisers, and electricity- would be freely determined and, with a few exceptions, government subsidies would no longer be given. Measures were also taken to remove controls over many prices of goods and services provided by the private sector.

For purposes of analysing the reforms in the trade regime and their effects, it is unnecessary to consider the evolution of price controls in the 1980s, except to note two things. First, the deficits of SEEs were greatly reduced in the first half of the 1980s, largely as a result of the liberalisation[2]. Second, price controls were largely phased out and there were far fewer controls over private sector pricing in the 1980s.

2.2.2.3.- Fiscal and Monetary Policy

In addition to reducing the deficits of the SEEs through price increases, measures were taken to make monetary and fiscal policy less expansive, including the raising of interest rates and the imposition of controls over public sector expenditures.

In June 1980, the government and IMF finally entered into an agreement to place ceilings on net domestic assets and net borrowing by the public sector and to further both financial liberalisation and liberalisation of the import regime.

These steps, in turn, permitted a rescheduling of outstanding debt and the commitment of new money by the IMF and the World Bank. On June 18, 1980, after several months of discussion, the government of Turkey and the IMF signed a three-year standby agreement for SDR 1.25 billion- six times Turkey's quota and the largest credit extended by the IMF to that date. The terms of the letter of intent associated with the standby agreement have not been made public, but are known to have included the usual ceilings on net domestic assets of the central bank and on net borrowing by the public sector, along with provisions to liberalise the import regime as circumstances permitted, to refrain from adopting multiple exchange rate practices, and to prevent the accumulation of any new payments arrears.

2.2.3.- The second Phase of Policy Reform, 1983 to the 1990s

By late 1983, a new and democratically elected government was in power under a prime minister committed to economic liberalisation and having a mandate to carry out further reforms. One of the first policy pronouncements of the new Ozal government after the November elections was an affirmation of its determination to continue integrating Turkey into the world economy. The second stage of the reform

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[2] The reductions in the deficits of the SEEs was sizeable, amounting to almost 5 percent of GNP. Fiscal deficits did not diminish as much as SEE deficits were reduced, because government

program began with an announcement in December 1983 that, henceforth, the authorities intended to provide incentives more through the exchange rate, and less through special export incentives, than had been the case. They further indicated that they intended to move toward a unified exchange rate for all transactions.

Several steps were immediately taken to move in this direction. The import lists were changed from prescriptive lists (under which any items not listed could be imported) to proscriptive lists (under which any not listed could be imported). About 200 items were ineligible for importation under the initial 1984 program but later programs progressively reduced this number by making further commodities eligible for importation. Simultaneously, tariff reclassifications were announced, and the average tariff rate was reduced by about twenty percentage points. Import procedures were also greatly simplified.

Nevertheless, there were some conflicting currents. As import duties were reduced and items removed from the negative lists, several special "funds" were created. These funds, which were off-budget items, were for particular purposes, such as a "housing fund" and "support and price stabilisation fund" (SPSF), and so on. While the rates of levy for these funds were far below earlier levels (reaching a maximum of 10 percent for the SPSF in 1989) and applied uniformly to a large number of imported commodities, they were increased times, and their scope was generally extended.

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expenditures on infrastructure rose sharply.

2.2.4.- The Overall Magnitude of Changes in Incentives

2.2.4.1.- Devaluation of Turkish Lira

The real exchange rate - whether measured against U.S. dollar or against a seven-currency basket- appreciated considerably in the late 1970s. In real terms, the devaluation of 1980 was substantial, amounting to more than 30 percent on either basis. During the first half of the 1980s, real depreciation continued, so that by 1985 the real cost of foreign exchange in terms of domestic purchasing power was about twice what it had been in 1979. This in itself constituted a major change in the incentive for exporting[3].

2.2.4.2- Removal of Quantitative Trade Restrictions; Inter-industry Distribution of Protection

For the purpose of liberalising foreign trade, quantitative restrictions on imports were removed, while simultaneously tariffs were reduced. This offset a considerable portion of the increased real price of foreign exchange that importers had to pay. Estimates of the combined impact of the removal of quantitative restrictions and tariff reductions suggest that imports, on average, cost 129 percent of the c.i.f. price (at the nominal exchange rate) in 1980, fell gradually to 99 percent in 1984, and then to 68 percent in 1985 and 55 percent by 1987[4]. Thus, the protection accorded to import-competing industries was greatly reduced.

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[3] To stimulate exports, export tax rebates and discriminatory allocation of foreign exchange were introduced. Baysan and Blitzer (1991) argue that the export subsidy equivalent of these measures was about 20 %.

[4] Kruger and Aktan (1992).

Baysan and Blitzer (1991) estimate that, for a sample of 23 consumer intermediate and capital goods industries, the average nominal tariff fell from 38.8% to 2.3.% between December 1983 and January 1984. A fall in average tariff of 36 percentage points would appear to be dramatic. There are, however, several problems in interpreting this. First, the data only applies to a (non random) subset of industries; second, the reductions in nominal tariffs are offset by increases in other restraints; third, the data reported apply to nominal not effective tariffs.

Olgun and Togan (1991) address the deficiencies above by calculating nominal and effective protection, rather than just nominal tariffs. They show that although there was some quota liberalisation over the period 1980-1983, and although customs duty was reduced for a number of commodities, average nominal protection actually increased between 1983 and 1984, from 65% to 70%. It then subsequently declined to 55% in 1988 and 41% in 1989. This implies that some policy substitution did actually occur early on in the liberalisation. To some extent changes in effective protection mirror these changes in nominal protection. The average effective rate increased from 59% in 1983 it then showed a sharp drop to 54%. (see Table 2.2 for sectoral distribution of protection rates)

Table 2.1: Frequency Distribution of Protection Rates (Number of sectors)

Percent	Nominal Protection Rate (NPR)				Effective Protection Rate (EPR)			
	1983	1984	1988	1989	1983	1984	1988	1989
100 to ∞	11	12	10	3	11	16	15	13
50.01 to 100.0	19	20	14	18	14	13	14	20
20.01 to 50.0	14	14	18	24	9	6	9	11
0 to 20.0	5	3	7	4	8	9	8	3
-0.01 to - 100.0					1	1	1	1
-100.01 to -∞					6	4	2	1
Total	49	49	49	49	49	49	49	49

Source: Olgun and Togan (1991) pp.163.

Table 2.1 presents the frequency distribution of the NPRs and EPRs for the years 1983,1984,1988 and 1989. The most striking conclusion to be derived from this table relates to the height of protection in Turkey. From Table 2.1 indicates that among the 49 tradable goods industries considered, there were 30 industries in 1983, 32 in 1984, 24 in 1988 and 21 in 1989 which had a NPR higher than 50 percent. On the other hand, there were only 5 industries in 1983, 3 in 1984, 7 in 1988 and 4 in 1989 which had a NPR less than 20 percent.

After having shown the height of protection, we now turn to a more detailed examination of the characteristics of the tariff revisions. Table 2.2 respectively presents the NPR and EPR for the 49 tradable goods sectors in 1983, 1984, 1988 and 1989. First, Table 2.2 reveals that both the 1988 and 1989 revisions have affected all of the tradable goods considered. However, neither the direction nor the extent of the effects of the revisions were uniform across the industries. Comparing the 1989 values with those of 1984, we note that the NPR of 36 industries was lowered and that of the remaining 13 industries was raised. Similarly, the EPR of 24 industries was lowered and that of the other 25 industries was raised.

The data in Table 2.2 also indicate that changes in the NPR and EPR have been substantial for a number of industries. While the NPR of the sectors producing tobacco, plastics, leather, footwear, fruit and vegetables were reduced substantially, the NPR of the alcoholic beverages, fishery products, vegetable and animal oil, grain mill products, and non-alcoholic beverages increased.

Table 2.2: Sectoral Protection Rates in Turkey (percent)

Code[a]	Industry	Nominal Protection Rate				Effective Protection Rate			
		1983	1984	1988	1989	1983	1984	1988	1989
1	Agriculture	25.05	36.12	53.00	28.93	23.90	35.88	60.01	31.08
2	Animal husbandry	21.66	25.90	32.65	20.93	16.65	18.41	6.96	14.37
3	Forestry	36.37	41.11	17.61	59.28	45.67	50.44	19.11	62.57
4	Fishery	40.67	45.03	82.82	126.20	39.18	43.53	88.11	143.22
5	Coal mining	81.02	85.38	29.21	23.71	88.45	93.06	35.66	27.94
6	Crude petroleum	24.36	29.49	24.34	24.15	39.96	45.17	44.07	45.11
7	Iron and mining	15.91	20.27	12.43	36.91	8.12	12.62	9.74	40.65
8	Other metall. ore mining	15.74	20.10	36.82	41.79	11.71	16.29	44.89	52.13
9	Non-metall. mining	102.06	107.07	70.91	57.34	115.44	120.95	82.57	66.51
10	Stone quarrying	25.80	27.59	17.55	14.59	20.64	22.36	18.24	16.38
11	Slaughtering&meat pre.	78.28	78.68	40.00	43.63	-1,755.98	48,767	79.72	96.37
12	Fruit&veg, canning	140.71	145.54	94.85	42.39	-13,862.05	2,325	225.23	72.54
13	Veg.&ani.oils&fats	56.71	61.29	16.23	140.06	110.10	105.17	10.05	506.89
14	Grain mill products	46.80	51.16	104.75	97.08	264.43	142.16	-752.26	-323.86
15	Sugar refining	139.66	144.43	103.17	73.76	-468.48	-611.72	289.71	218.12
16	Other food proces.	108.36	131.73	104.24	80.62	793.34	1,804	288.97	194.74
17	Alcoholic beverages	90.42	95.02	224.82	188.78	-966.96	-1,890	388.63	363.91
18	Non-alc. beverages	63.99	68.35	172.62	93.46	56.49	60.97	493.91	189.47
19	Processed tobacco&pro.	372.79	378.68	78.16	71.81	-122.20	-124.65	97.68	101.24
20	Ginning	7.42	9.67	22.52	10.43	-22.64	-28.21	-0.58	-3.82
21	Textiles	109.07	104.44	64.20	37.48	232.72	212.85	117.97	67.50
22	Clothing	154.89	160.46	169.45	68.18	177.97	188.83	-16,584	158
23	Leather&fur pro.	152.48	157.05	40.77	38.11	321.65	345.56	55.84	50.97
24	Footwear	157.00	161.75	57.56	54.99	188.14	195.56	75.36	73.97
25	Wood&cork&pro.	83.25	88.67	24.64	54.65	128.10	136.85	37.23	65.09
26	Wood furniture&fix.	129.49	133.85	163.32	74.65	190.17	197.61	678.46	113.72
27	Paper&paper pro.	63.23	63.97	19.77	45.56	92.40	92.31	43.29	93.07
28	Printing and publish.	26.07	26.83	21.70	24.84	5.48	6.25	27.32	24.70
29	Fertilisers	31.12	35.48	20.69	23.54	12.35	18.43	14.22	21.70
30	Pharmaceutical pro.	26.89	30.47	27.48	42.61	13.59	18.12	29.23	49.64
31	Other chemical pro.	51.46	45.17	47.48	37.63	56.47	46.49	68.14	48.08
32	Petroleum refinery	57.60	62.88	41.27	30.52	96.24	101.76	82.33	50.01
33	Petroleum&coal pro.	65.26	69.85	11.56	24.66	76.24	81.39	0.06	30.81
34	Rubber products	53.78	61.70	52.78	32.94	44.21	59.94	68.84	36.90
35	Plastic products	250.98	256.34	105.04	69.53	-4,412	-2,170	325.59	159.30
36	Glass&glass pro.	67.13	74.29	146.51	73.30	92.70	105.36	242.28	99.96
37	Cement	48.16	5.87	8.41	27.55	73.18	0.92	11.47	54.00
38	Other non-met. min.pro.	54.05	58.75	42.31	49.75	65.96	78.83	66.11	83.82
39	Iron& steel	39.53	42.48	31.56	17.26	43.04	46.14	61.16	31.93
40	Non-ferrous metals	61.93	53.43	35.20	33.72	86.87	71.99	64.62	62.17
41	Fabricated metal pro.	82.17	86.87	95.91	64.80	114.22	125.96	398.88	202.34
42	Non-electrical mach.	53.58	57.06	73.43	53.15	50.48	54.42	108.88	80.36
43	Agricultural mach.	47.37	60.43	84.16	59.04	46.78	67.04	169.05	129.36
44	Electrical mac.	49.45	58.96	76.43	47.51	46.13	62.59	110.63	62.00
45	Ship building&repair	63.27	66.79	90.35	90.45	64.69	68.56	121.58	125.67
46	Railroad equip.	19.28	23.64	43.71	42.71	11.24	15.63	48.39	55.14
47	Motor vehicles	65.00	70.70	106.62	60.17	86.32	94.89	187.23	99.79
48	Other transport equ.	14.62	19.01	34.08	8.32	6.63	11.55	42.78	15.64
49	Other manuf. indust.	70.09	125.71	69.12	47.50	74.75	193.15	93.55	58.63
Weighted average		65.22	70.19	55.42	41.16	58.82	78.78	79.25	53.80
Standard deviation		63.75	65.39	48.28	33.62	217.40	409.69	189.19	109.99

[a] Sector code.
[b] In calculation of the weighted average EPR, the sectors with an absolute value EPR above 4.000 have been eliminated. These are the sectors 11,12,22 and 35.

Source: Olgun and Togan (1991), pp.165-166.

Table 2.2 also shows that the EPR of the sectors producing meat, fruit and vegetables, other food products, grain mill products, leather, textiles, products of other manufacturing industries, and footwear have been reduced substantially. The EPR of plastics, alcoholic beverages, sugar, vegetable and animal oil, tobacco, and non-alcoholic beverages increased enormously during the period 1984-89.

So far, the structure of protection at the industry level have been examined. Now we examine it at a more aggregate level, using Table 2.3 which presents the NPR and EPR for broad industry groups. In the upper part of this table, industries have been classified into ten industry groups and in the lower part into four trade categories: export, export-and import-competing, import competing, and non-import-competing.

Table 2.3: Nominal and Effective Protection Rates by major Commodity Groups and Trade Categories (percent)

	1983		1984		1988		1989	
	NPR	EPR	NPR	EPR	NPR	EPR	NPR	EPR
	Commodity Groups							
I. Primary activities [a]	24.57	23.13	33.14	31.97	42.15	44.61	28.73	29.66
II. Mining&energy [b]	56.05	64.17	60.10	68.37	28.92	36.90	25.56	32.63
III. Manufacturing	81.83	93.92	85.40	126.67	61.83	118.37	46.78	80.17
1. Consumer Goods	129.09	165.81	133.98	285.83	88.07	222.14	65.30	147.44
Processed food [c]	92.92	498.72	102.99	1,323.6	77.13	491.66	75.22	390.32
Beverages&Tobacco[d]	316.22	-210.38	321.84	-314.59	103.86	141.68	89.30	132.94
Non-durable&durable consumer goods [e]	123.98	185.93	122.90	173.67	96.46	139.20	48.37	60.03
2. Intermediate goods[f]	57.97	71.83	59.21	72.46	38.04	60.85	32.39	47.32
3.Investment Goods	61.53	66.55	68.00	77.50	87.87	176.39	56.71	101.31
Machinery [g]	61.69	63.07	68.51	75.23	83.31	180.40	55.82	103.81
Transport Equipment[h]	61.06	75.67	66.57	83.44	100.60	165.88	59.19	94.77
4.Other Manufactur. Industries [i]	70.09	42.40	125.76	109.57	69.12	53.07	47.50	33.26
	Trade Categories							
I. Export industries [j]	131.29	178.80	136.78	282.23	93.01	166.27	58.27	106.04
II. Export and Import competing industries[k]	46.70	49.04	49.01	54.47	42.79	67.33	31.28	47.89
III. Import-competing industries[l]	52.95	59.49	58.20	65.87	51.13	64.90	53.85	71.91
IV. Non-import competing industries[m]	47.16	33.60	52.61	40.52	45.14	65.06	34.34	39.38

[a] Includes sectors No:1-4.- [b] Includes sectors No: 5-10.- [c] Includes sectors No:11-16.- [d] Includes sectors No: 17-19.- [e] Includes sectors No: 21,22,24 and 26.- [f] Includes sectors No: 20,23,25 and 27-40.- [g] Includes sectors No: 41-44.- [h] Includes sectors No: 45-48.- [i] Includes sectors No: 49.- [j] Includes sectors No: 12,16-23,36 and 41.- [k] Includes sectors No: 8-9,29,31,39-40,42-43 and 49.- [l] Includes sectors No: 3,5,6-7,10,13,27,30 and 44-48.- [m] Includes sectors No: 1-2,4,11,14-15,24-26,28,32-35 and 37-38.

Source: Olgun and Togan (1991) pp.168.

Table 2.3 reveals significant characteristics of the structure of protection. There appears a marked tendency for protection rates to be lowest for primary activities, followed by mining and highest on manufacturing. For instance, in 1989 the NPR was 28.7 percent on primary activities, 25.6 percent on mining and energy, and 46.8 percent on manufacturing. The EPRs on these three sectors, on the other hand, were 29.7, 32.6 and 80.2 percent, respectively. Table 2.3 reveals significant characteristics of the structure of protection. There is a market tendency for protection rates are lowest for primary activities, followed by mining and highest on manufacturing. For instance, in 1989 the NPR was 28.7 percent on primary activities, 25.6 percent on mining and energy, and 46.8 percent on manufacturing. The EPRs on these three sectors, on the other hand, were 29.7, 32.6 and 80.2 percent, respectively.

Although one would expect the import-competing industries to be more heavily protected than export industries in general, the calculation shown in the lower part of the Table 2.3 does not support such an expectation. Throughout the 1983-1989 period, export industries were more heavily protected than import-competing and non-import competing industries. This indicates that Turkey's recent success in expanding its exports has been achieved under protection. The government, while protecting the export industries, has also provided them with various incentives to encourage exports.

2.2.5.3- An Assessment on Inter-industry Dispersion of Protection

The extend to which tariff revisions have altered the level of protection and the inter-industry dispersion of the incentives granted to domestic industries can be

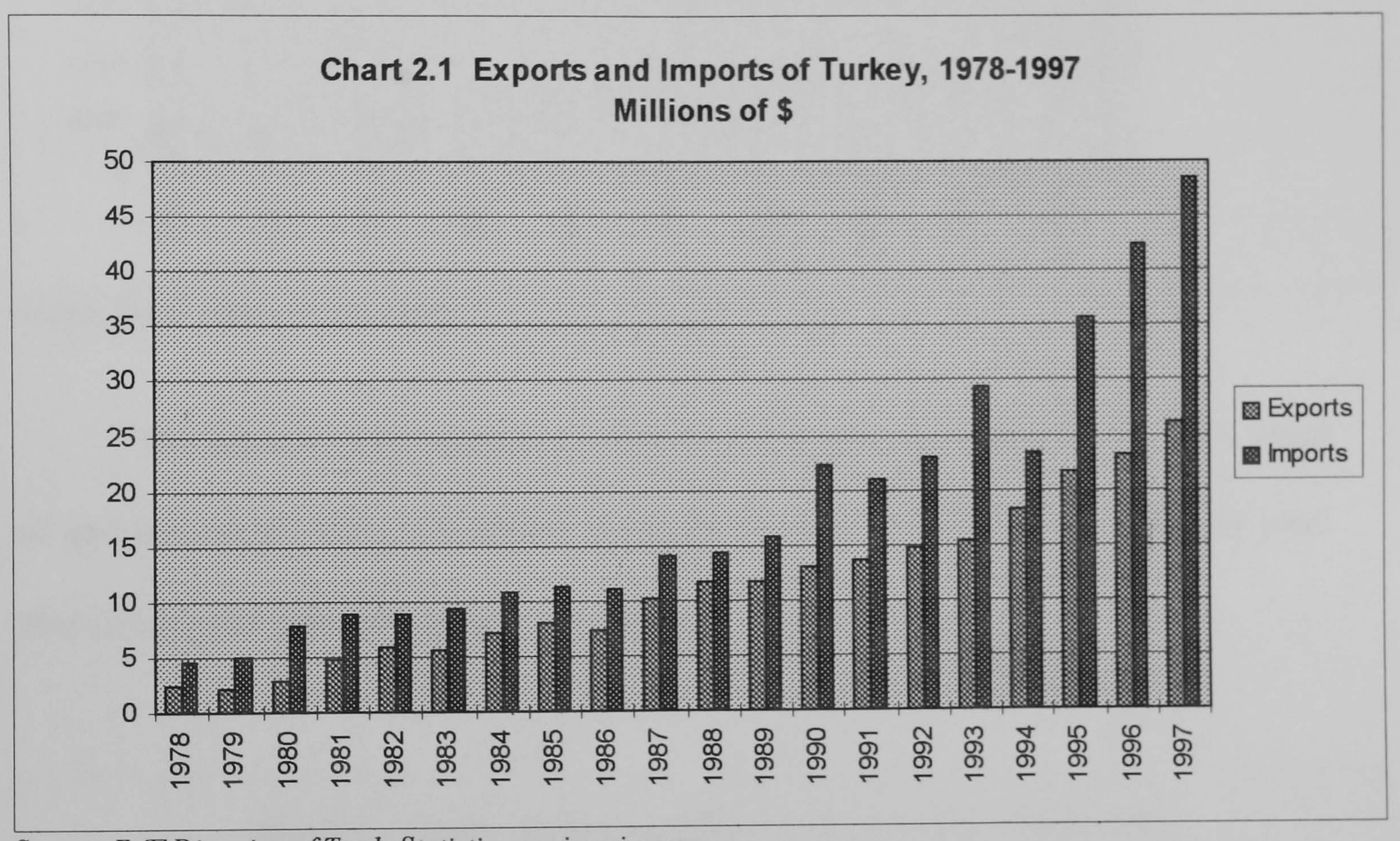
measured by comparing the economy-wide average NPR and EPR and their standard deviations before and after revisions. Thus, notwithstanding the fact that customs duty was reduced for a large number of commodities in 1984, the average NPR in the economy rose from 65.2 percent in 1983 to 70.2 percent in 1984, largely because of the imposition of the Housing Fund Levy and the upward adjustment in the stamp duty. However, the final effects of 1988 and 1989 revisions have been to reduce the average level of protection in the economy.

Although the stamp duty and the Support and Price Stabilisation Fund Tax were both raised to 10 percent, the downward adjustments in the customs duty were large enough to lower the overall protection. The average NPR went down from 70.2 percent in 1984 to 55.4 percent in 1988 and to 41.2 percent in 1989. Corresponding to these changes, the economy-wide EPR rose from 58.8 percent in 1983 to 78.8 percent in 1984 and further to 79.3 percent in 1988, but dropped to 53.8 percent in 1989. Thus, while the 1984 revisions have raised the average protection in the economy, it is apparent that the 1989 revision has substantially lowered it. More specifically, the recent revisions have narrowed the inter-industry dispersion of the incentives as measured by the coefficient of variation of the inter-industry distribution of the EPR.

2.3.- Response to Altered Incentives of Liberalisation Program; Change in Exports and Imports

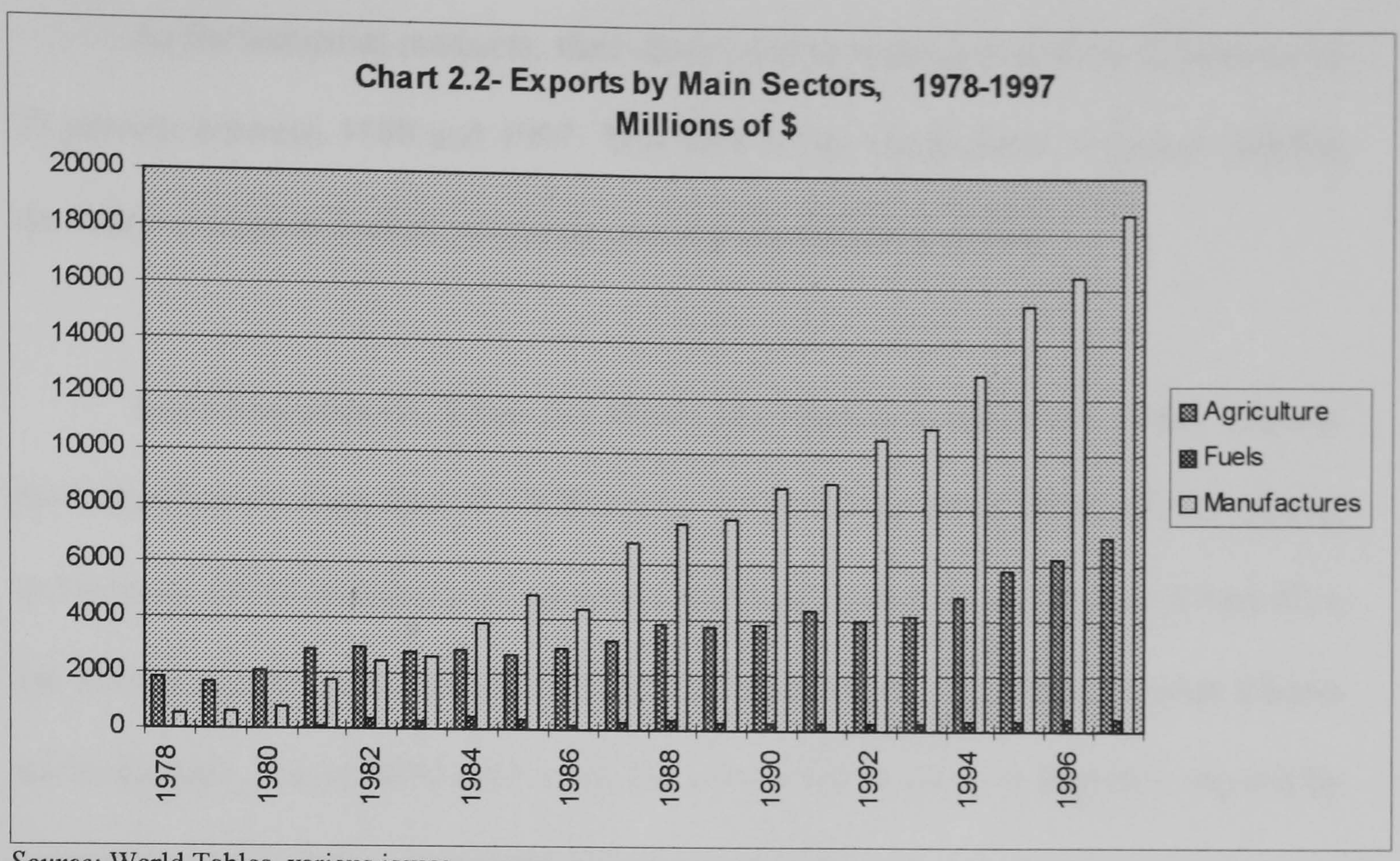
Removal of quantitative restrictions, tariff reductions, export incentives, and a more realistic real exchange rate all served to increase the relative and absolute attractiveness of exporting. In response to this changed policy environment, exports

experienced a big spurt. As Chart 2.1 below shows, exports had doubled between 1980 and 1983, and they doubled again between 1983 and 1988 in dollar value. Exports of manufactures more than tripled between 1980 and 1983, and nearly tripled again by 1988 (see Chart 2.2). It appears that imports had experienced even larger increase particularly during the 1990s resulting in a big trade deficit.



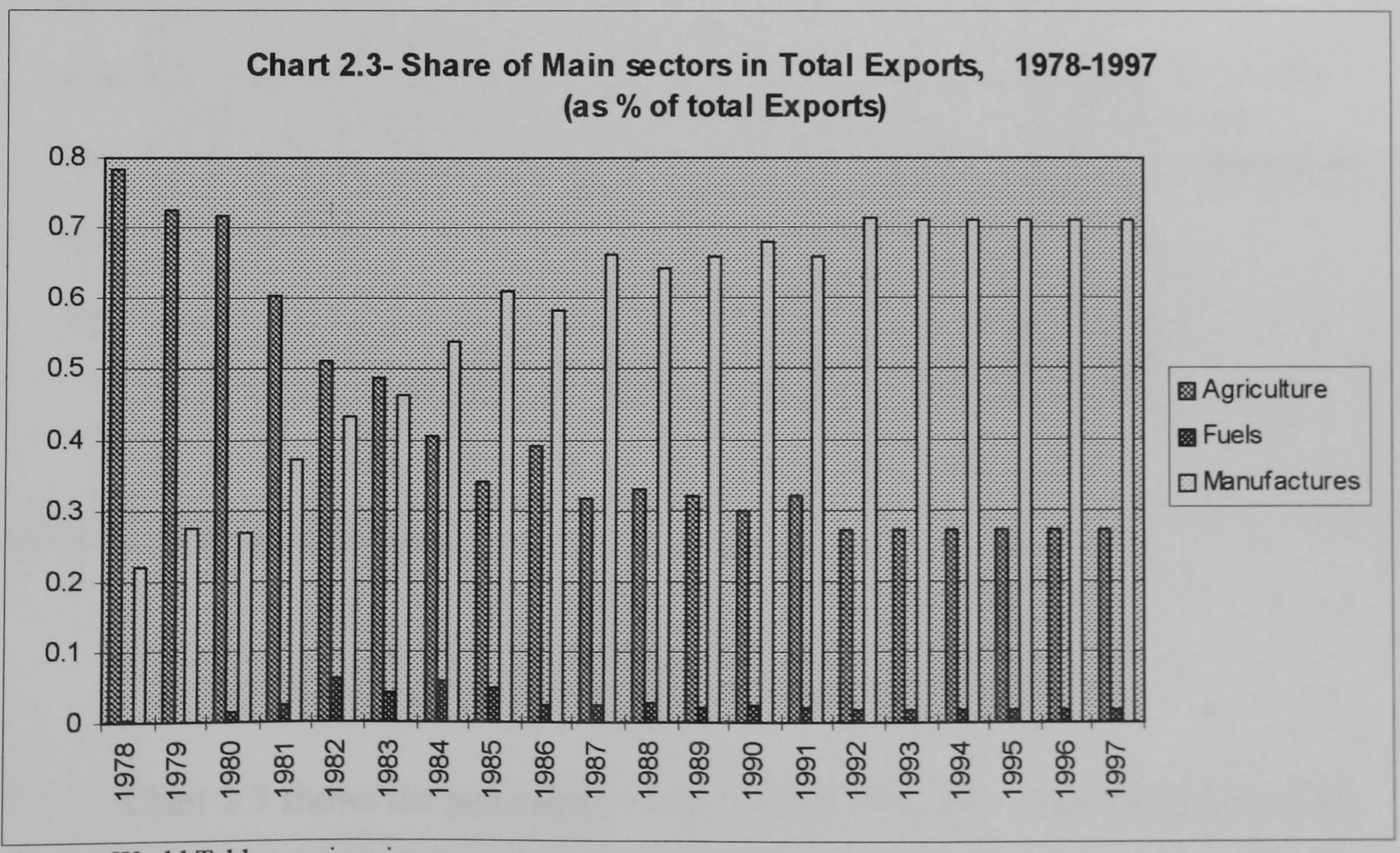
Source: IMF Direction of Trade Statistics, various issues.

Chart 2.2 below indicates the change in Turkey's exports by main sectors; agriculture, mining and industry, and reveals the structural transformation of Turkey's exports after the 1980s. It follows from Chart 2.2. that there was a significant boost in Turkey's exports of manufactures particularly after the second half of the 1980s while there was no significant change in exports of agriculture and fuels.



Source: World Tables, various issues.

The share of main sectors in total exports is given in Chart 2.3. In 1980s share of agricultural products constituted about 60 percent of total exports while in 1997 they constituted lees than 30 percent of total exports.

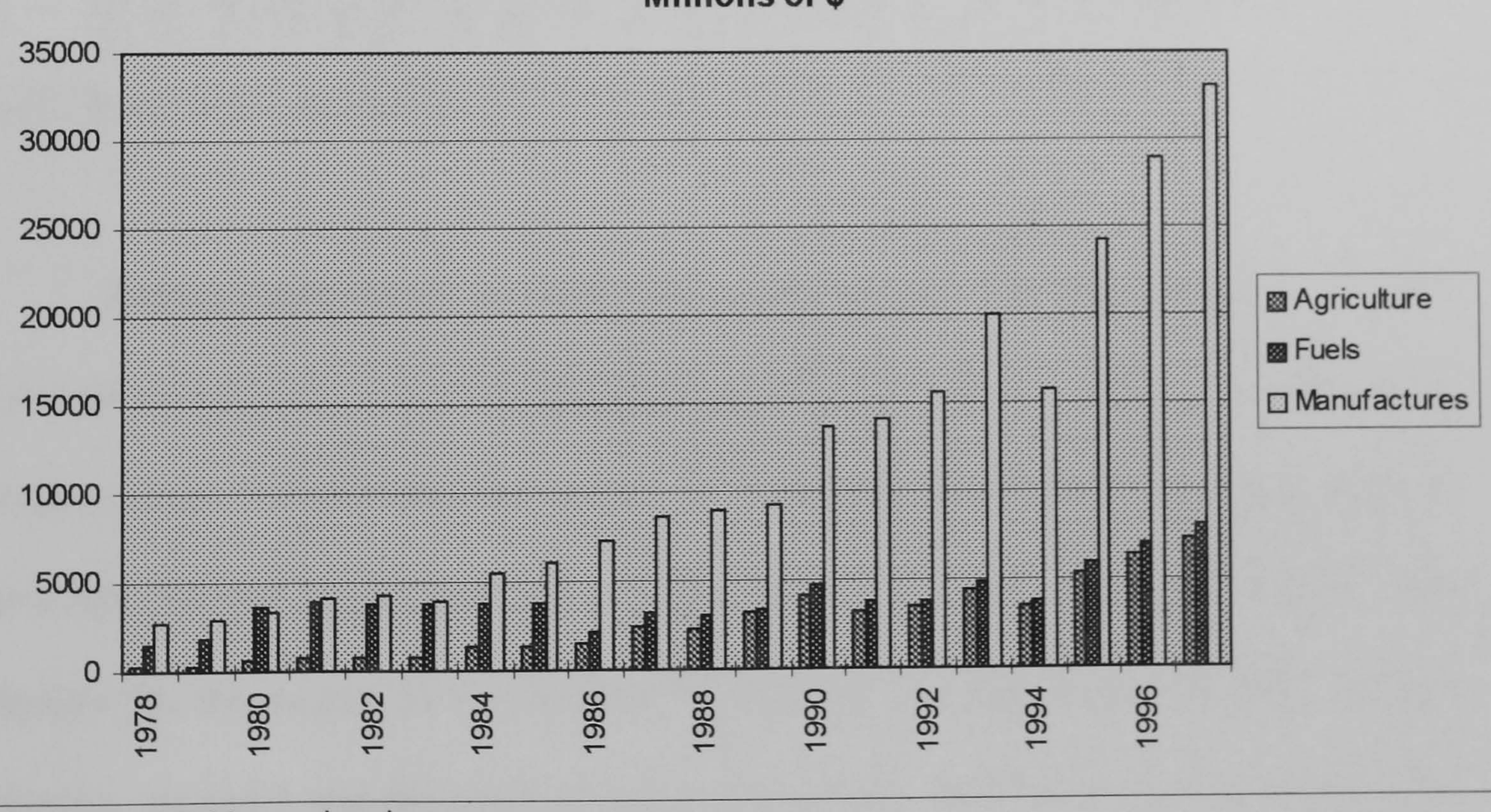


Source: World Tables, various issues.

As for industrial products, their share in total exports rose from 27 percent to 71 percent between 1980 and 1997. This shift in the composition of exports exhibits the major change in Turkish economy over the liberalisation period.

Regarding imports, Chart 2.1 shows the imports boom in the 1980s. Imports have significantly risen from $ 7.9 Billion in 1980 to over $48 Billion in 1997 causing an immense deficit in balance of payments particularly after the 1990s. (see Chart A2.1 for Turkey's current account balance -exports-imports- in Appendix). In what follows we investigate the possible sources of this substantial increase in Turkey's exports by examining commodity composition of imports over time.

Chart 2.4- Imports by Main Sectors, 1978-1997
Millions of $

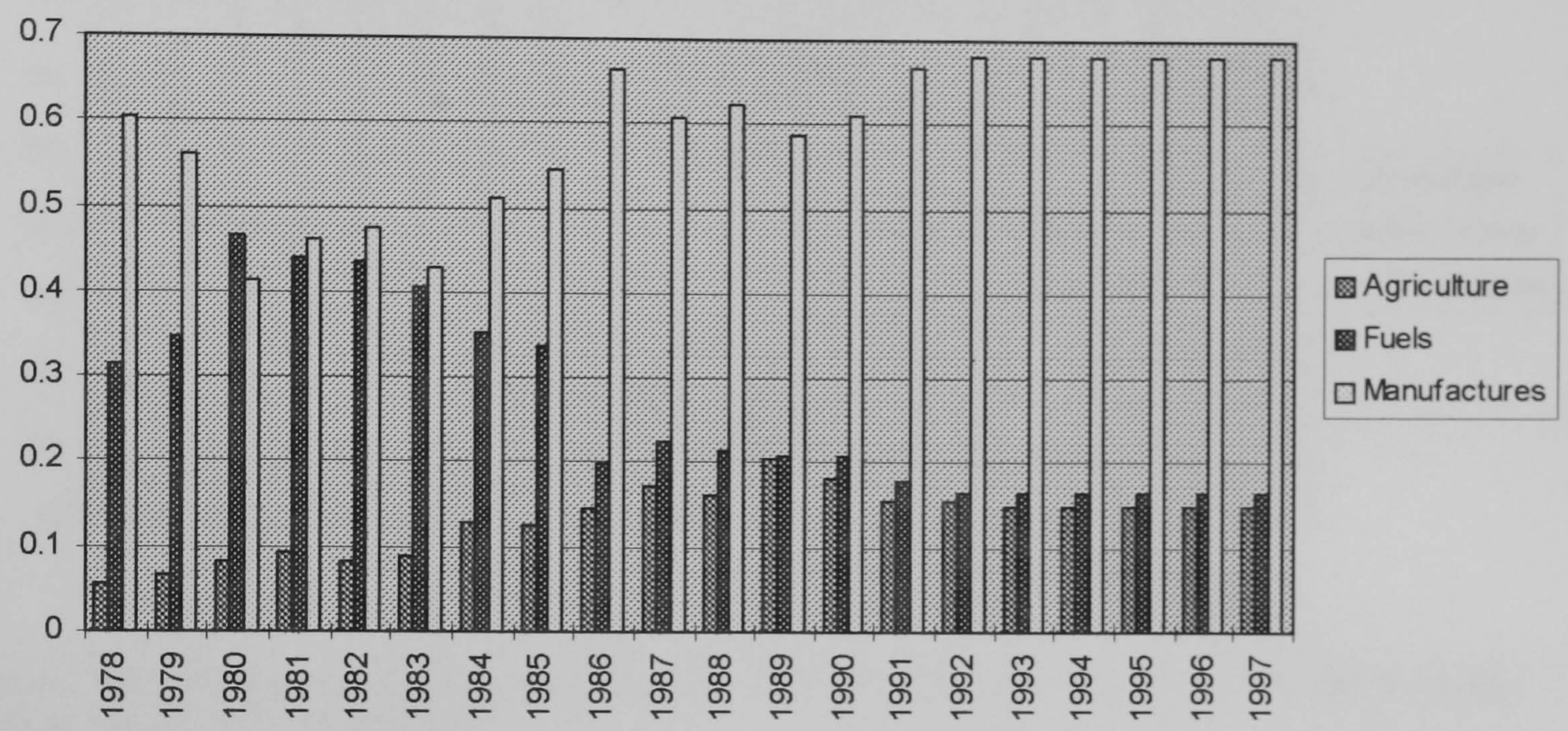


Source: World Tables, various issues.

Chart 2.5 shows the percentage share of these three main commodity groups in total imports and indicates that the share of agricultural goods and especially

manufactures in total imports has slightly increased while there has been a fall in the share of fuels. The unstable nature of fuel prices may be the cause of these fluctuations in fuel imports.

Chart 2.5- Share of Main Sectors in Total Imports, 1978-1997
(as % of total Imports)



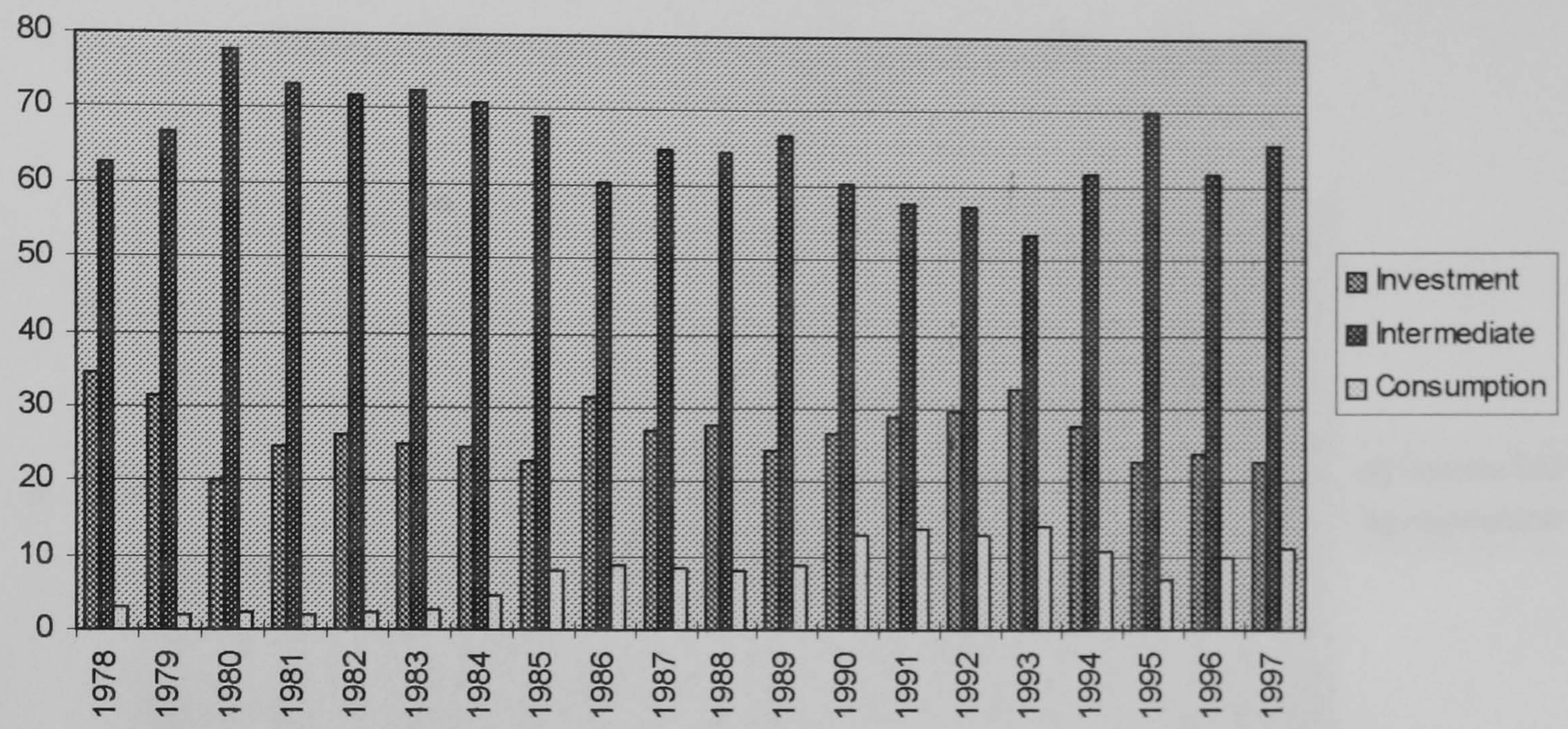
Source: World Tables, various issues.

Further examination of commodity composition of imports is given in Chart 2.6. and reveals very important information about the sources of the export boom in Turkey. Chart 2.6 indicates that shares of investment goods and intermediate goods have not changed significantly over the period when exports expanded notably. This implies that the source of the increase in exports was not due to creation of new capacity, instead it was the result of expanding present production capacity level of the economy which reduced the need for imports of manufactured investment goods[5]. This observation suggests that sustaining the export growth in the 1980s is quite difficult in

[5] One of the policy instruments in the 1980s has been restraining real wages and thus suppressing domestic demand. It is consistent with increase in exports without any significant change in production capacity of the economy.

the long term. Apart from this, the notable increase in consumption goods imports is a serious concern.

Chart 2.6- Commodity compostion of Imports, 1978-1997, (as % of total)

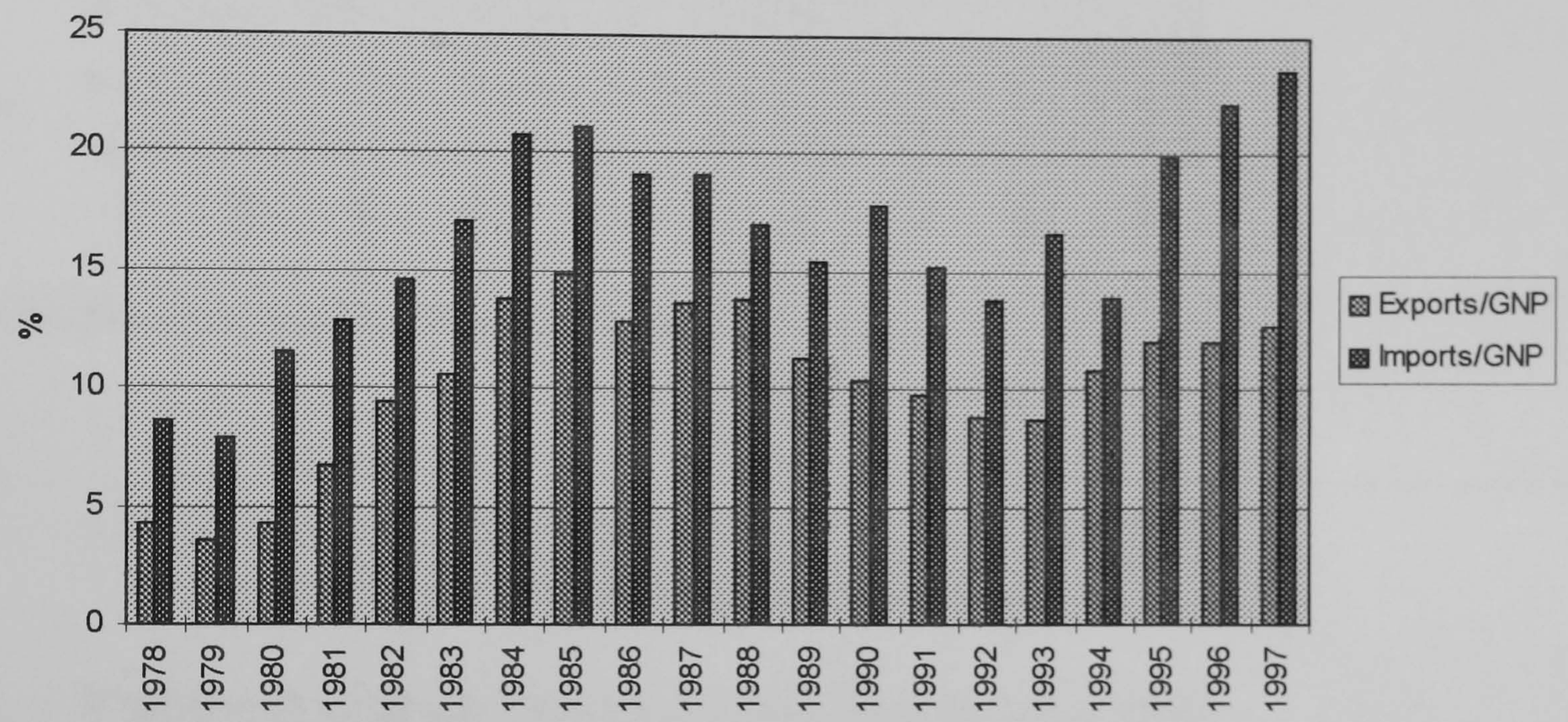


Source: State Planning Organisation (SPO), Statistic Indicators 1923-1995 , for 1978-1995; OECD Country Survey, Turkey, 1999, for 1995-1997.

We now focus on the share of foreign trade in GNP over the pre- and post liberalisation periods. It appears that exports constituted only about 4 percent of GNP in the late 1970s, an amazingly low proportion for a country such as Turkey. By 1988, the share of exports in GNP had risen to 13 percent, reaching a maximum of 15 percent in 1985 (see Chart 2.7). This represented a tripling of export share in eight years. That increase was accomplished with an average annual rate of growth of export earnings (in U.S. dollars) of 18.9 percent over the 1980-1988 period. However, average annual growth rate of export earnings have slowed down to 9.4 percent by 1995. Accompanying the increase in export earnings was an increase in the share of imports in GNP. Chart 2.7 shows that imports increased from 8 percent of GNP in the

late 1970s to over 14 percent in every year after 1984 reaching 21.6 percent in 1995. Thus, the increase in exports represented a structural shift as both exports and imports increased in relative and absolute importance.

Chart 2.7- Share of Exports and Imports in GNP, 1978-1997
(as % of GNP)

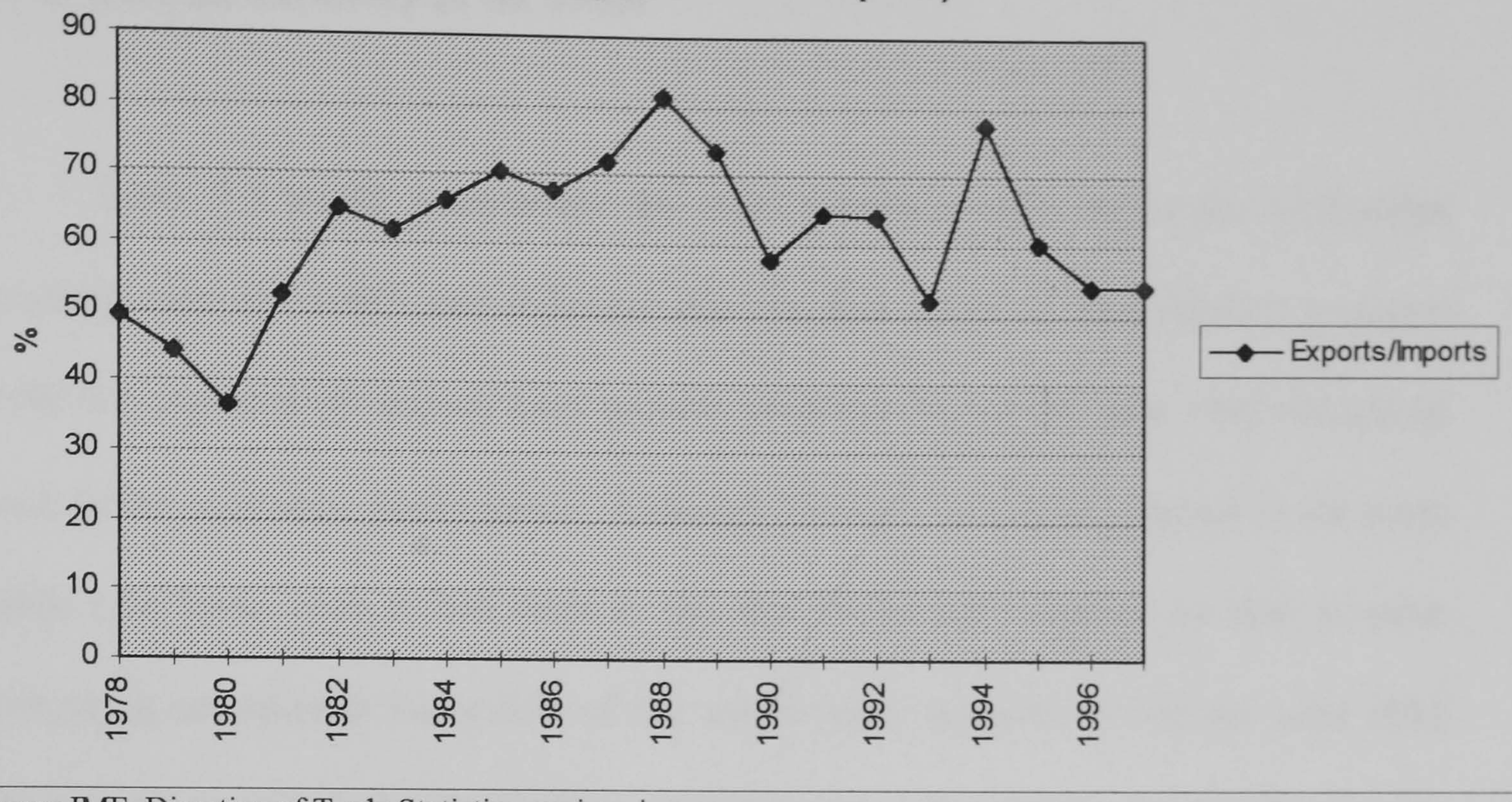


Source: IMF Direction of Trade Statistics for trade data; World Tables for data on GNP.

Regarding exports/imports ratio, as Chart 2.8 shows, the compensation of imports have risen from 37 per cent in 1980 to 81 per cent in 1988, however, it fluctuates after 1988 reaching a maximum value of 77 per cent in 1994.

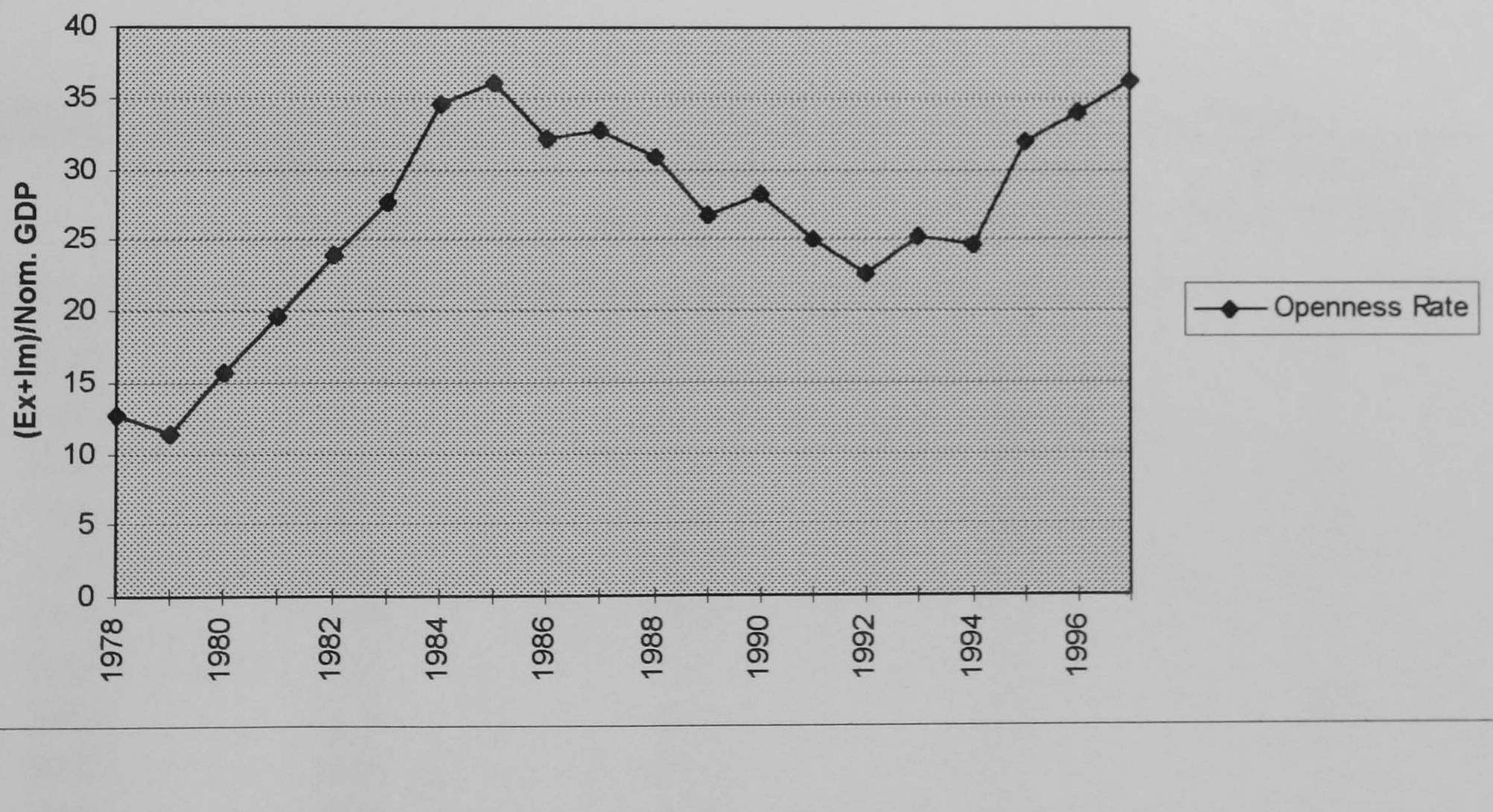
Chart 2.9 shows the openness rate [(exports + imports) / Nominal GDP] of Turkish economy in the period 1970-1992 and indicates that Turkish economy was much more open after the introduction of liberalisation program in 1980. This implies that following the implementation of the reform program in the 1980s Turkish economy was more vulnerable to external shocks.

Chart 2.8- Exports/Imports Ratio in Turkey, 1978-1997
(Exports as % of Imports)



Source: IMF, Direction of Trade Statistics, various issues.

Chart 2.9- Openness Rate of Turkey, 1978-1997
(Exports+imports)/Nominal GDP



Following the analysis of changes in Turkey's foreign trade in the 1980s, in what follows we focus on the macroeconomic performance of Turkish economy over the liberalisation period.

2.4.- Macroeconomic Performance of the Turkish Economy

2.4.1.- Turkish Economy in the 1980s

Table 2.4 briefly summarises the main macroeconomic indicators of Turkish economy over the 1980s and indicates that the first phase of liberalisation program (1980-83) was one of relative slow growth, whereas the period after 1983 witnessed much better economic performance. Although Turkey's economic growth in the early 1980s was better than it had been in the late 1970s and superior to that of most developing countries in the middle of the world-wide recession, it was not until 1984 that growth accelerated. Thereafter, growth rates were highly respectable by any standard. As can be seen in Table 2.4, real GDP growth averaged more than 5 percent between 1981 and 1990, reaching 9.8 percent in 1987.

Table 2.4: Indicators of Macroeconomic Performance, 1980-1990 (% change)

	Real GDP Growth[1]	Growth of Investment[2]	Increase in Consumer Prices[3]	Increase in Wholesale Prices[3]
1980	-2.8	-6.9	110	107
1981	4.8	1.7	37	36
1982	3.1	3.5	34	25
1983	4.2	3.0	31	30
1984	7.1	0.4	48	52
1985	4.3	16.9	45	40
1986	6.8	11.0	34	26
1987	9.8	5.4	38	39
1988	1.5	-1.3	75	68
1989	1.6	-1.0	69	69
1990	9.4	15.8	60	52

[1] Real GNP at 1987 prices, [2] Gross fixed capital investment at 1987 prices, [3] Base year 1978-79=100.
Source: State Institute of Statistics (SIS) and State Planning Organisation (SPO), *Main Economic Indicators;* and SIS, *Price Indices Monthly Bulletin.*

In its initial phase, the major success of the program was to bring about a reduction in inflation. By early 1981, it was estimated that inflation had dropped to 37 percent, contrasted with its high in 1980 of 110 percent; it remained at about that rate through 1982 and 1983. Although inflation accelerated after 1983 as government expenditures increased before the election and as the new economic team reversed earlier restrictive policies, the first two years of the program must nonetheless be deemed to have been successful in achieving their objective of reducing the rate of inflation. However, there was a sharp increase in inflation rate over the late 1980s which continued through the 1990s.

As already stated, investment was sluggish during the 1980-1983 period, and exports apparently were produced by better utilisation of existing capacity. Thus despite export growth, the overall level of economic activity rose only modestly. It appears that it was not until the mid-1980s that the reoriented trade regime was consistent with an increase in real investment.

2.4.2- Turkish Economy in the 1990s

Table 2.5 shows the main macroeconomic indicators in Turkey over the 1990s. It is clear from Table 2.5 that Turkey achieved to maintain the high growth rate of the 1980s in the following decade though there was a significant fall in growth in 1994 when the country experienced the first negative growth rate since 1980.

Table 2.5: Indicators of Macroeconomic Performance 1990-1997 (% change)

	Real GDP Growth[1]	Growth of Investment[2]	Increase in Consumer Prices[3]	Increase in Wholesale Prices[3]
1991	0.3	1.22	66	55
1992	6.4	5.5	70	62
1993	8.1	26.3	66	58
1994	-6.1	-15.9	106	120
1995	8.0	9.13	93	88
1996	7.1	14.0	80	64
1997	6.0	14.8	76[4]	77[4]

1- Real GNP at 1987 prices, 2- Gross fixed capital investment at 1987 prices. 3- Base year 1987=100 for 1991-1995, base year 1994=100 for 1996 and 1997, 4- For only first quarter.
Source: State Institute of Statistics (SIS) and State Planning Organisation (SPO), *Main Economic Indicators;* and SIS, *Price Indices Monthly Bulletin.*

The year 1994 was also significant for an immense fall in growth rate of investment. Compared to the previous decade, the average growth rate of investment was much higher over the period between 1991 and 1997.

The least satisfactory result of reform program has been the persistently high rate of inflation. The previous increase in rate of inflation had accelerated notably in the 1990s and the average rate of inflation in the period between 1991 and 1997 was about 75 per cent. In large part, this is because of persistently large government expenditures which were directed largely towards the development of infrastructure. To the extent that the large gains achieved by the reorientation of Turkish economic activity towards the international economy are threatened, it is the failure to achieve a lower rate of inflation that constitutes the most visible threat. As shown in Table 2.5, the most vulnerable aspect of Turkey's macroeconomic performance after the liberalisation program has been the instability of prices.

2.5.- CONCLUSION

This chapter gives an overview of the economic impact of the 1980 liberalisation program on Turkish economy. More specifically, we examine Turkey's trade and payments regime over the pre- and post liberalisation periods which includes analysis of exchange rate policy, pricing policies and trade protection.

In Turkey inward-looking economic policies were followed during the 1960s and 70s. The industrialisation effort was based on import substitution, but it was handicapped by the high costs of inputs and capital and the limited market for industrial goods. Given the deep-rooted structural problems of the Turkish economy, the oil crisis of 1973-74 and the global recession which followed hit the country very hard. There were balance of payments difficulties and a series of foreign exchange crises which peaked in 1978-79. Therefore the economic situation was clearly unstable and a radical redirection in economic policy was called for.

Given the above conditions 1980 was to prove a major watershed in the development of the Turkish economy. Import substitution policies were replaced by those of the export-led growth. High export growth was pursued through realistic exchange rate policies (based on the "crawling peg" system), the removal of restrictions on foreign trade and capital movements, and export credits and incentives. Foreign investment was also encouraged by the removal of bureaucratic impediments. As a result the total amount of Foreign Direct Investment (FDI) in Turkey increased to $ 6.22 billion in 1980-1990 compared to $ 228 million during 1954-1980. The success of the 1980 program is illustrated by the growth in exports from $ 2.9 billion in 1980

to $ 12.9 billion in 1990 which later reached $ 26.2 billion in 1997. The export performance of industry has also been impressive: the share of industrial goods in total exports increased from 36 percent in 1980 to almost 80 percent in 1990. However, as we have argued in this chapter the high export performance of Turkish industry over the liberalisation period relied heavily on the better exploitation of productive capacities created in the previous years and the reduction in the level of real wages, rather than the introduction of new technologies.

The 1980 economic reform program also aimed to reduce state intervention liberalise goods and financial markets. One of the symbols of change during this period was the opening of the Istanbul Stock Exchange in 1986, although the volume of shares traded remained limited until 1992. However, Istanbul Stock Exchange has recently become one of the most promising financial markets in terms of both increase in the volume shares traded and profitability.

There have, nevertheless, been areas of economic difficulties: these include a growing current account deficit, rising foreign debts, continuing high inflation rates, high real interest rates and only a limited success in the privatisation of state owned enterprises. As a result of the high real interest rates there has been a shift in the domestic private investment into property, trade and financial services where economic risks are considered to be fewer. Therefore, while export orientation has led to greater industrial output, there are concerns that Turkish industry has failed to modernise in terms of technology.

PART II

AN ANALYSIS OF TURKEY-EU TRADE AND TURKEY'S COMPARATIVE ADVANTAGE WITH RESPECT TO THE EU12

CHAPTER 3

THE STRUCTURE OF TURKEY-EU TRADE;

AN ANALYSIS OF TURKEY-EU TRADE PATTERNS

3.1.- Introduction

As explained in the previous chapter, since the 1980 trade liberalisation program important changes have taken place in Turkey's foreign trade. These changes, mainly very significant expansion in exports (especially manufactures) and imports, are far from completed and became a centre point after the Customs Union Agreement between Turkey and the EU. Following the overall analysis of Turkey's foreign trade in previous chapter, we have a closer look at the Turkey-EU trade patterns in the present chapter and examine commodity and country distribution of Turkey-EU trade over the liberalisation period. The aim of this chapter is to prepare the basis for further analysis Turkey-EU trade in terms of factor intensity and comparative advantage, similarity of exports and determinants of Turkey's comparative advantage with regard to the EU which will be subject of the following chapters.

The consequences for Turkey of liberalising trade with the EU are, in principal, relatively straightforward (see Smith and Venables 1988; and Norman 1989). As barriers to trade between the Turkey and the EU are removed, one can expect that the comparative advantage between Turkey and the EU will be further exploited and accordingly that *inter-industry* trade will develop between the two areas[1]. Between countries having similar factor endowments, one can also expect that scale economies

will be further exhausted and hence that *intra-industry* trade will increase. Therefore, in order to assess the consequences of trade liberalisation with the EU for Turkey in terms of export potential, competition from imports and associated restructuring, a useful approach will consist of trying to assess the comparative advantage of Turkey which has already been exhausted since 1980 liberalisation program, as well as the potential for further intra industry trade after the1996 Customs Union Agreement[2].

The potential competition between Turkey and the southern European member countries in the EU, namely Portugal, Spain and Greece, is another important aspect of Turkey's likely membership of the EU. These countries are considered as having similar factor endowments and hence competitors in their trade with the EU. To investigate the characteristics of this conflict, it is necessary to analyse the extent of similarity between Turkey and the three southern European members.

In the light of the arguments above, this chapter examines the Turkey-EU trade specialisation patterns during pre-and post liberalisation periods of Turkey. We start this chapter with a brief analysis of Turkey's liberalisation program in regard to the relations between Turkey and the EU. Then we proceed by examining the factor content of the actual trade between Turkey and the EU, which should 'reveal' comparative advantage of Turkey with regard to the EU. A further examination of Turkey's comparative advantage which uses Balassa's RCA (Revealed Comparative Advantage) indices will be given later in Chapter 4.

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[1] See Neven and Roller (1990) for the effect of European integration on EU trade.
[2] See Amiti 1999 for specialisation patterns in the EU.

As for the analysis of the potential competition between Turkey and the southern European countries, in order to determine the extent of similarity between Turkey and the three countries, similarity of these countries' exports to the EU will be examined in Chapter 5.

This chapter is organised as follows. In section 2, we give a short note on the impact of the 1980 reforms on Turkey-EU relations. The structure of Turkey-EU trade patterns is examined in section 3 which analyses the magnitude of trade flows and identifies the relative importance of EU countries for Turkey as well as the importance of Turkey for each EU country as a trade partner. Section 4 looks at the commodity distribution of Turkey-EU trade and studies the changes in commodity structure of trade over the liberalisation period. Section 5 draws some conclusions from our analysis.

3.2.- A brief analysis of liberalisation program in regard to the relations between Turkey and EU

The political and economic history of Turkey has been an attempt to catch up with, or adapt to, the developments in the rest of Europe. These attempts have gained an especial momentum since implementation of the liberalisation program in the 1980s. The basic economic reforms undertaken in the 1980s were shaped by the Turkish policy-makers' concern on the ramifications of the ongoing European integration on the Turkish economy and the Turkish desire to be 'a part of the team' rather than a spectator. In this view, Turgut Ozal, the Prime minister of Turkey between 1983 and

1989, and the President 1989 to his death in April 1993, summarised the main motives behind the economic reforms of the 1980s: " the aim of the economic liberalisation programme and our reforms was to facilitate our integration into the European Community as a full member "[3].

Therefore, the economic reforms in Turkey during the 1980s can be seen as an attempt to adapt to the new emerging system in Europe. This, however, is not a denial of other needs impinging upon Turkish policy-making. Multilateral institutions such as IMF, World Bank and the OECD have all been influential in drawing up the economic strategies to deal with the Turkish 'mini' crisis in 1977 and subsequent economic liberalisation attempts. These, however, have been complementary to the ultimate aim of Turkish economic restructuring in order to have compatibility with the standards of the EU. One can evaluate the EU's impact on Turkish economic policies in Turkey's adoption of value added tax (VAT) prior to the majority of the EU countries.

Prior to 1980, the tariffs were very high and there were strict quantitative restrictions on imports from the EU. If the authorities decided that the domestic production of a specific good was adequate, it meant that the good could not be imported legally. The 1980 decisions made a major break with those policies by dismantling trade restrictions (see Table 3.1). The measures on the import front were sharp reductions in stamp duty, guaranteed deposits on imports, a simplification of

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[3] Quoted by Muftuler M. (1995) pp. 85, Turgut Ozal's speech in the Turkish Parliament on 13 April 1987, Prime Ministerial Documents, 1987, p.256.

import procedures, and a programme to abolish the list of goods subject to global quotas which represented 12 percent of total imports in 1980[4].

Table 3.1 : Effective Tariff Rates on Imported Goods

Year	Overall	Petroleum	Other
1979	.43	.16	.56
1980	.12	.04	.20
1981	.11	.03	.13
1982	.10	.02	.16
1983	.12	.02	.19
1984	.10	.01	.14
1985	.09	.01	.12

Source: State Planning Institute, *Foreign Trade Statistics*, (Ankara, 1986), pp.156.

Some of these reductions on imports were actually a part of the Additional Protocol reductions that Turkey had agreed upon in 1970, but because of the import substitution policies of the 1970s, they were not adopted, which gave the EU the excuse not to fulfil its own obligations. However, largely owing to its liberalisation programme, Turkey in 1988 was able to make a 10 percent reduction in 12-and 22-year lists of the Additional Protocol with the EU as stipulated by the agreement towards the customs union, and on 1 January 1989 Turkey was able to make a 20 percent reduction as an attempt to adjust to the Community's Common Customs Tariff. In 1994, 60 percent of the tariff reductions on the 12-year list and 50 percent of the 22-year list have been enacted by the Turkish government (see Table 3.2). Thus, the import liberalisation strategies adopted by the Turkish government sought to open up the Turkish economy to the European forces, and to prepare the Turkish economy

[4] Muftuler M. (1995) pp.92.

for full integration into the Community as an official member, because 80 percent of all the liberalisation measures applied to imports from the EU[5].

Table 3.2: Tariff reductions according to the Additional Protocol *(%)*

Turkey's obligations	Required	Achieved	
		1993	1995
a. reductions 12-year list (had to be completed in 1985)	100	80	95
b. reductions 22-year list (had to be completed in 1995)	80	70	90
c. adoption of CET (12 year list, 1985)	100	60	90
d. adoption of CET (22-year list, 1995)	70	50	85

Source : Undersecretary of Treasury and Foreign Trade, *EC and Turkey*, Ankara, 1996.

Apart from these changes in tariff regime, Turkey also introduced remarkable exchange rate reforms in the 1980s. Until 1980 Turkey operated a rigid system of exchange rate control originally established to protect the value of its currency. The 1980 programme immediately devaluated Turkey's exchange rate by 48.6 percent, after which the Turkish Lira was constantly devaluated. It would not be far-fetched to claim that one of the underlying reasons for the Turkish exchange rate reforms was to adapt and prepare the Turkish Lira for the newly emerging European Monetary System (EMS). Thus, the Turkish Lira was being prepared for integration into the EMS as it progressed towards full convertibility by finding its real value instead of its overvalued self of the 1970s for an ever increasing degree of monetary integration with the EU.

In addition to these exchange rate reforms, in April 1995 the government enacted a major banking reform as part of financial liberalisation programme which aimed at changing the banks' structure. A year earlier, in 1994, the Turkish

[5] ibid. pp.93

government passed an act that allowed residents to open foreign currency accounts, which was an important step towards bringing Turkish banks closer to the EU standards. Moreover, in January 1986, the Istanbul Stock Exchange started secondary market operations. On 2 April 1986 an inter-bank money market began operating where banks borrow and loan funds to each other anonymously with the intermediation of the Central Bank, filling a structural gap in the Turkish money market. All in all, the banking reform and financial liberalisation strategies were attempts to adjust the Turkish financial markets to those of the EU.

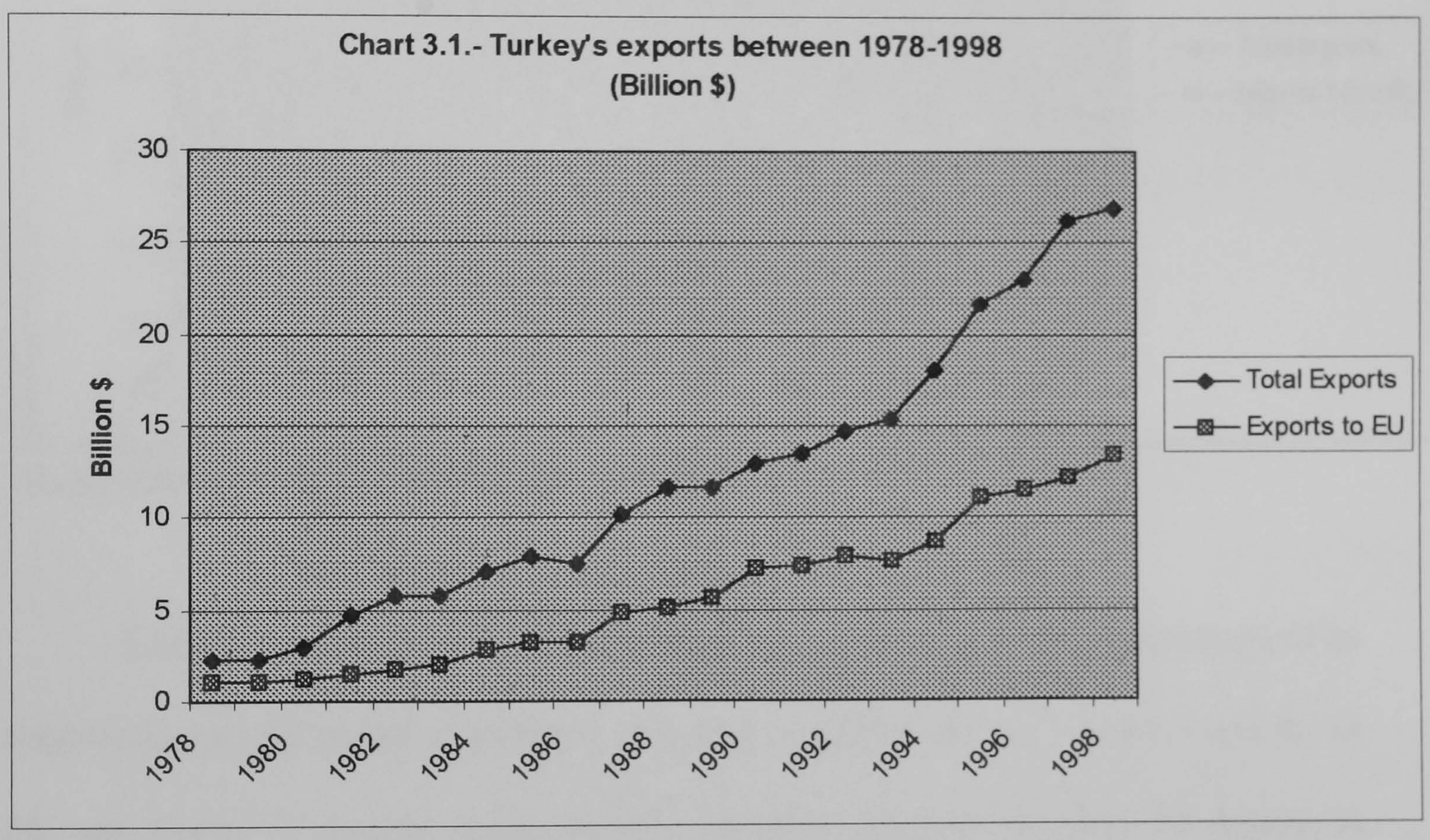
In short, the analysis above shows that since 1980 Turkey has been trying to adjust to the changes within the EU's internal structure and preparing for a customs union with the EU with an eye to full membership. Thus, the economic liberalisation policies of the Turkish government in the 1980s have to be evaluated in the light of European integration.

3.3.- Trade patterns between Turkey and EU

This section examines the trade patterns between Turkey and the EU (Belgium and Luxembourg being taken together) over the period between 1980 and 1998. In what follows I shall focus on four dimensions of Turkey-EU trade, namely the evaluation of trade balances, the relative importance of EU countries as markets and sources of supply for Turkey, the relative importance of Turkey for EU countries and finally the Turkey- EU trade by commodity.

3.3.1.- Turkey-EU trade balance

Table 3.1 presents Turkey's total exports and exports to EU between 1978-1998 and Table 3.2. shows total imports and imports from EU over the same period. It follows from the tables that both Turkey's total trade and Turkey-EU trade have steadily increased after the 1980 liberalisation reforms.

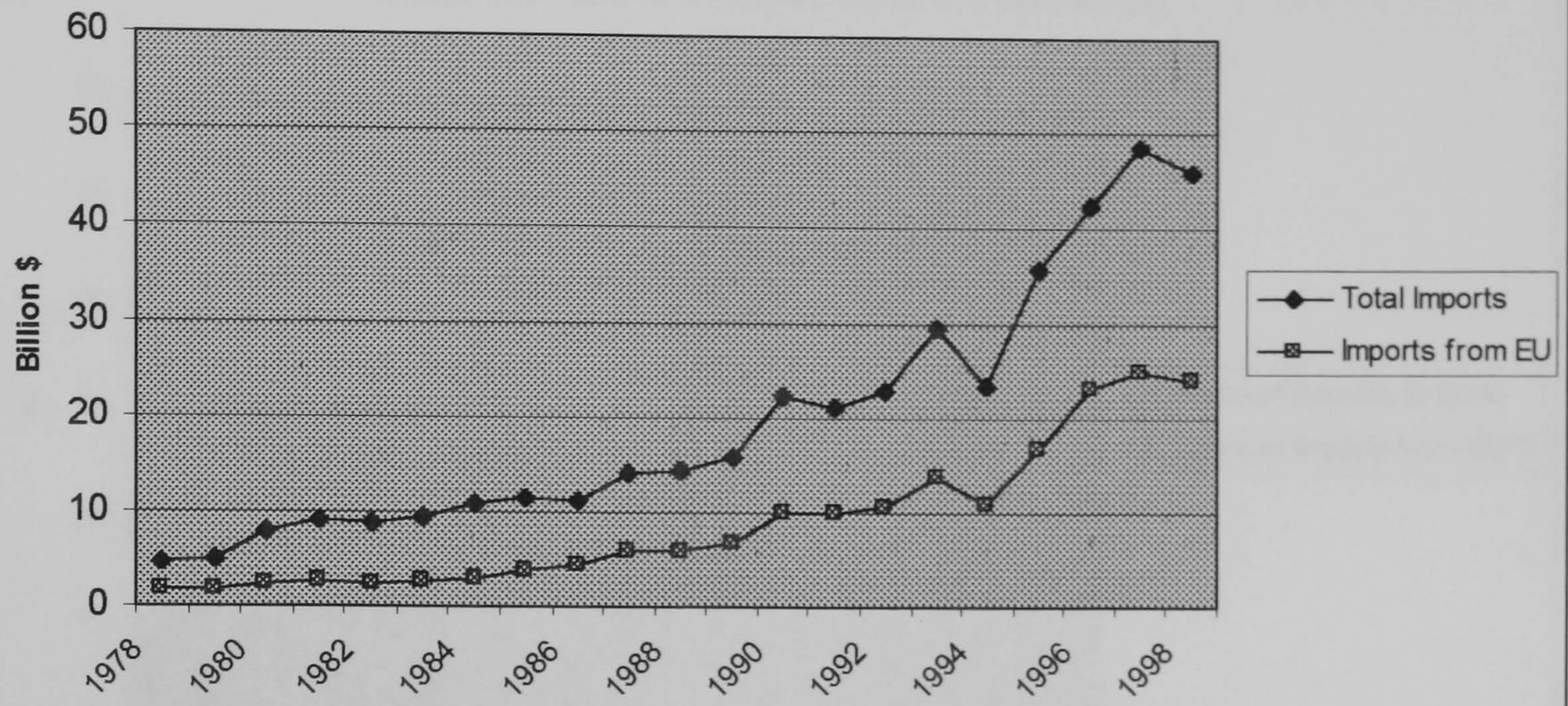


Source: IMF Direction of trade statistics, various years.

It appears that both exports and imports have particularly gained a momentum during the 1990s though there were small breakdowns in imports in 1991 and 1994. The rapid expansion of imports in the 1990s can be due the fact that both nominal and effective protection rates in Turkey have actually increased over first stages of the liberalisation program as tariffs were replaced with the Housing Fund Levy and the stamp duty. As shown in chapter 1 previously, throughout the 1983-1989 period, the overall effective protection rate (EPR) in Turkey rose from 58.8 percent in 1983 to

78.8 percent in 1984 and further to 79.3 percent in 1988, but dropped to 53.8 percent 1989[6].

Chart 3.2.- Turkey's Imports between 1978-1998
(Billion $)



Source: IMF Direction of Trade Statistics, various issues.

Chart 3.3 shows the share of Turkey's trade with the EU as a proportion of its total trade over the period considered. It appears that the share of Turkey's exports to EU was almost 50 percent during the late 70s and it dropped to about 30 percent in 1982. Similarly the share of imports decreased from about 40 percent in 1978 to 30 percent in 1982. However, particularly the share of exports has started to increase after 1982 reaching a peak 55 percent in 1995.

The share of Turkey's trade with the EU continued to increase over the 1990s though there is a fall in share of exports towards the of the decade. It is interesting to note that the share Turkey's exports to EU has been greater than that of imports

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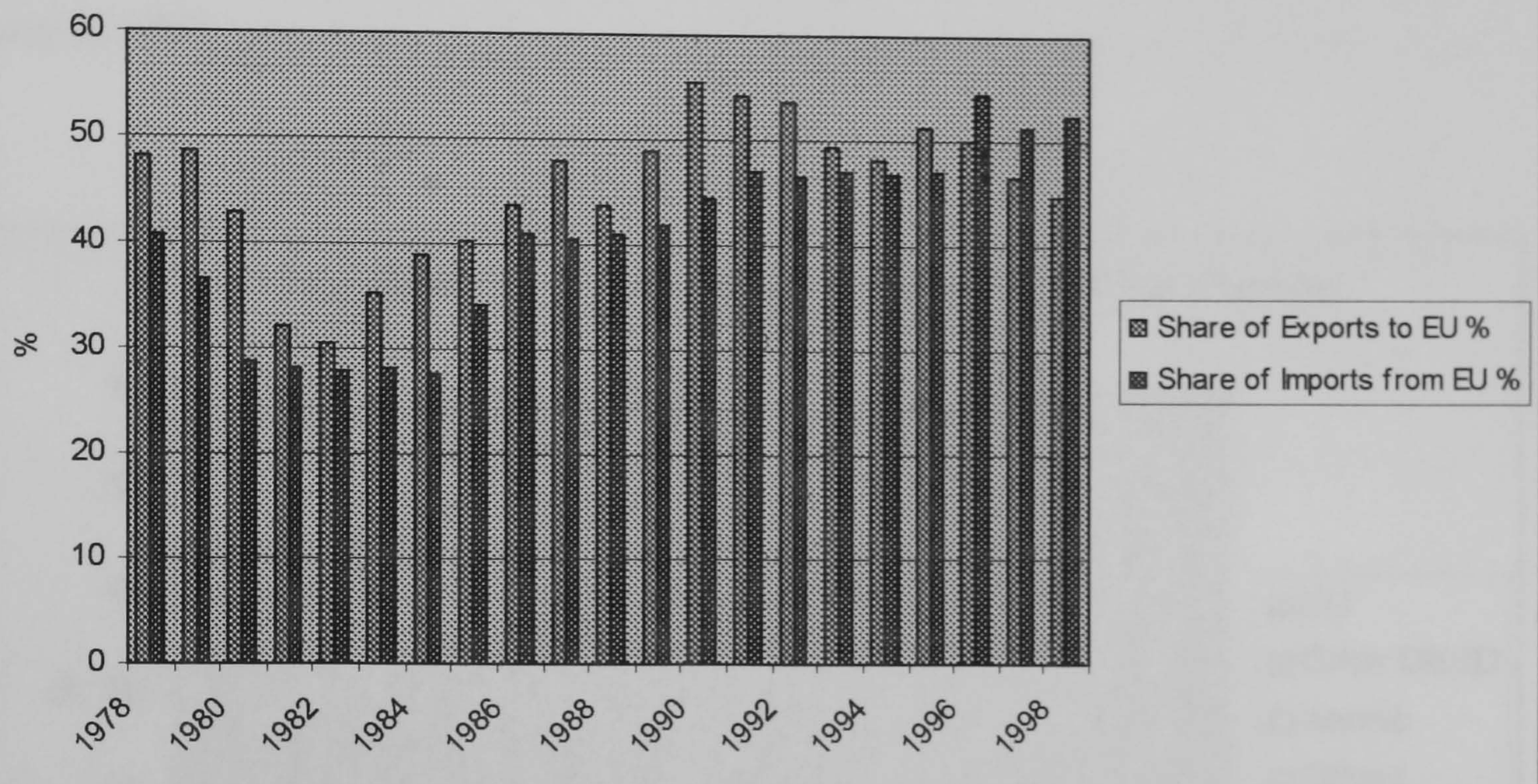
[6] After the revision of import regime in 1989, there was no commodity in Turkey's import restriction list except for the goods for which imports are prohibited by specific regulations (State Planing

between 1978-1995. However, the share of imports went ahead of exports after 1996 which may very well be as a result of the Customs Union Agreement.

Chart 3.3.- Share of EU in Turkey's total trade,



Source: IMF Direction of Trade Statistics, various issues.

Charts 3.4 and 3.5 show the geographical distribution of Turkey exports and imports between 1978-1997, respectively. Focusing first on exports, it is follows from Chart 3.4 that the share of Turkey's exports to Islamic countries has increased over the early 1980s when the share of exports to EU has fallen suggesting that Turkey experienced some trade diversion from Europe to the Middle East.

This diversion may be due to the sharp increase in the oil price over the beginning of the 1980s which increased income level in Middle Eastern countries. The

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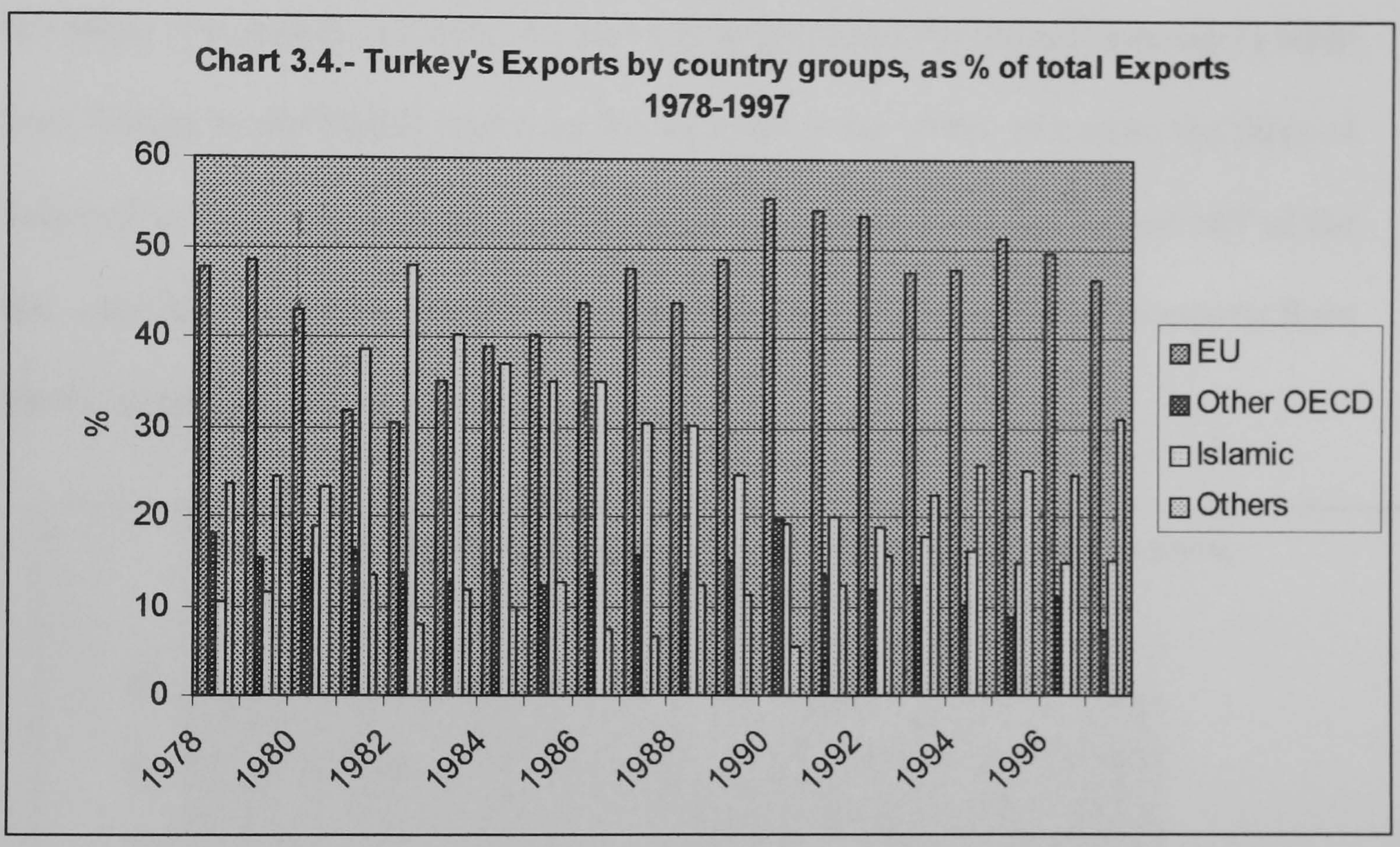
Institute, 1990).

Iran-Iraq War may have also helped Turkey supply essential goods to these countries[7]. Apart from these factors, the uncertainty in Turkey-EU relations owing to the crisis in 1970s might have influenced the share of Turkey's trade with EU[8]. As a result of the problems between the two parties the Association Agreement and all the other relations with the EC were effectively frozen when the military government took power in 1980.



Source: OECD country surveys, Turkey, various issues.
Note: Other OECD countries include the US, Japan, Switzerland and some non-EU countries.

Chart 3.4 also shows that the share of other countries has increased after the formation of BSEC[9] (Black Sea Economic Coorperation) in 1992 which indicates

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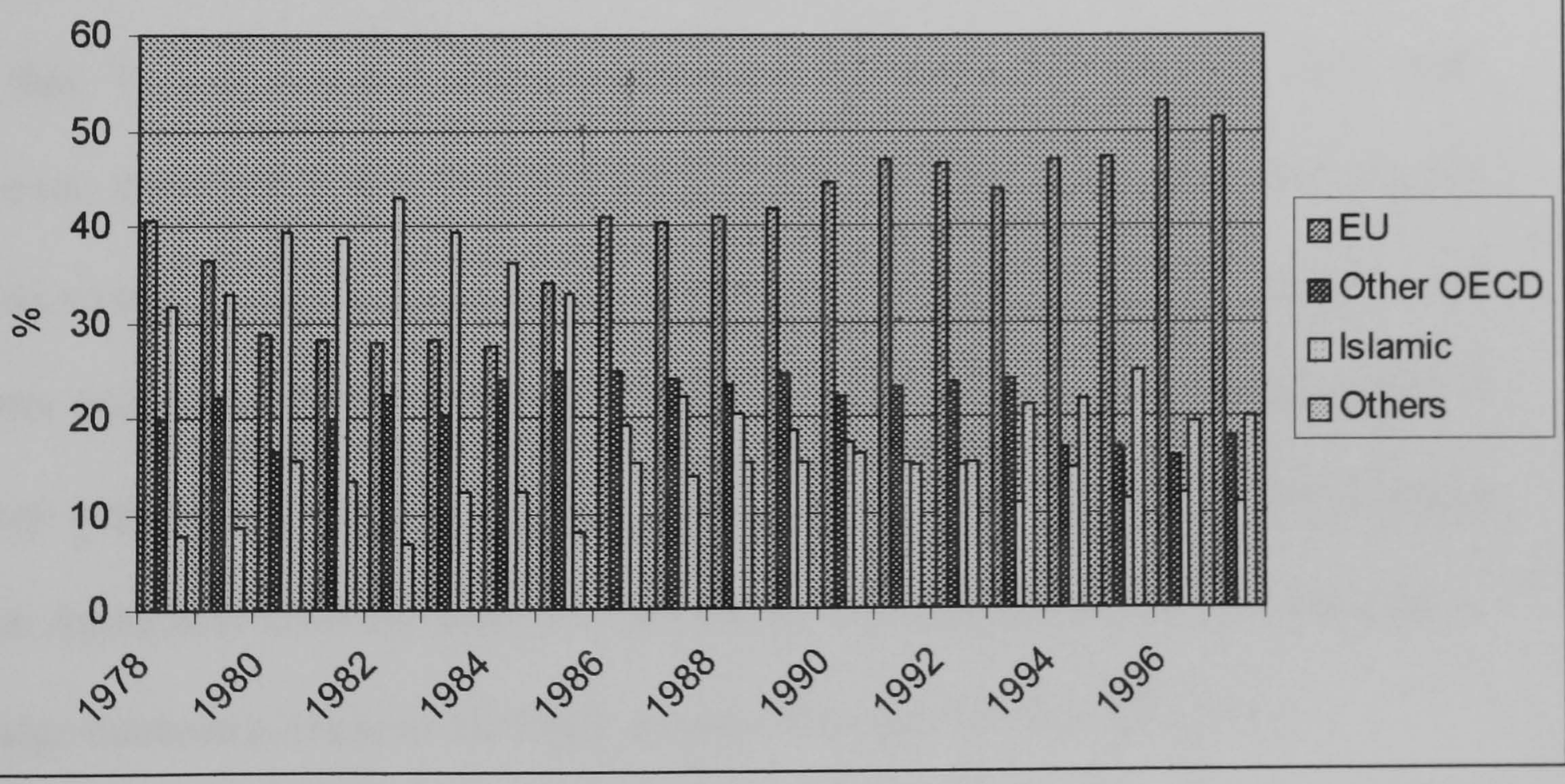
[7] See Balkir and Williams (1993) for further discussion on this.
[8] A number of problems arose when the Additional Protocol (A.P.) was put into practice in 1973. The first problem was a disagreement between the two parties over what was meant by the harmonisation of agricultural policies. For Turkey, harmonisation meant joining the CAP; for the Community, it meant trade liberalisation. A second problem was the EC's Mediterranean Policy. The preferential treatment that Turkey was supposed to receive under the auspices of the A.P. was cancelled out by the Mediterranean adopted by the EC in 1975 after the OPEC crisis.
[9] The idea of forming BSEC emerged in the early 1990s with an agreement signed in 1992 by nine participating countries (Armenia, Azerbaijan, Bulgaria, Georgia, Moldova, Romania, Russia, the

Turkey's attempts to establish alternative trade opportunities with neighbouring countries.

Regarding the share of Turkey's imports by country groups, Chart 3.5 shows that the share of Turkey's imports from Islamic countries and EU followed a trend similar to the share of exports. The share of Turkey's imports from the Middle East has increased over the first half of the 1980s while the share of imports from the EU has fallen. The picture in Charts 3.4 and 3.5. suggest that Turkey has diverted its trade from Europe to the Middle East over the first half of the 1980s. However, the share of Turkey-EU trade has surpassed the other country groups after the second half of the 80s. As Chart 3.6 shows Turkey's total imports has grown faster than its imports from the EU especially after the 1990's.

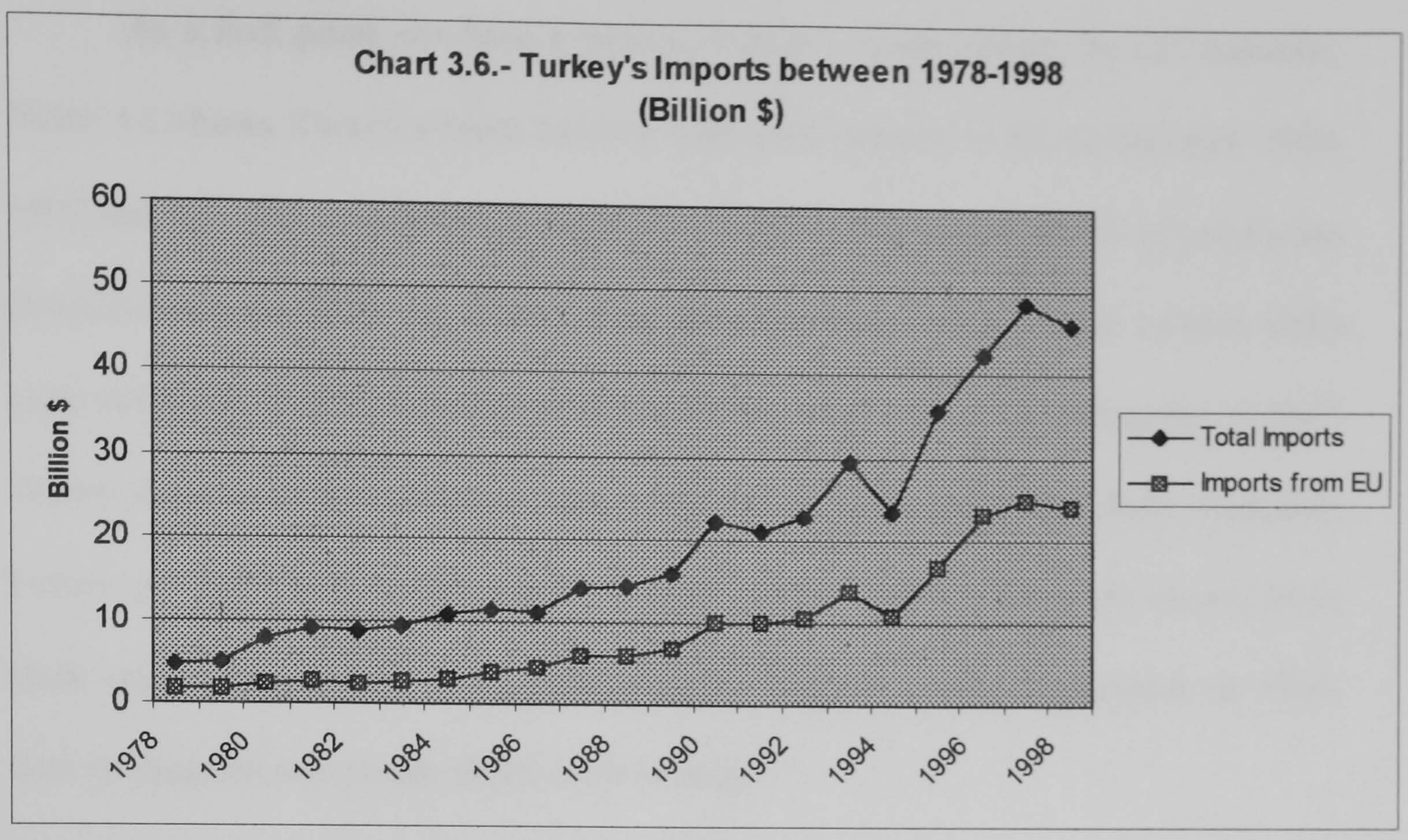
Chart 3.5.- Turkey's Imports by country groups, as % total Imports, 1978-1997



Source: OECD country surveys, Turkey, various issues.
Note: Other OECD countries include the US, Japan, Switzerland and some non-EU countries.

Ukraine and Turkey). Recently, Uzbekistan, Iran, the Federal Republic of Yugoslavia and Macedonia have applied for membership. In 1997, a Declaration of Intend for the establishment of a BSEC Free

Chart 3.6.- Turkey's Imports between 1978-1998
(Billion $)



Source: IMF Direction of trade statistics, various issues.

We now turn to analysis of the Turkey-EU trade balance. Table 3.3 shows trade balance (exports minus imports) for Turkey's total trade and Turkey-EU trade. We observe that there was no significant change in Turkey's trade balance with EU and that Turkey's overall trade balance got slightly better between 1980-1990. However, there was a very sharp increase in both Turkey's trade deficit with the EU and its overall trade deficit over the 1990s. The difference between Turkey's total exports and imports was over $ 20 Billion in 1997. Interestingly, the difference in Turkey exports and imports to EU12 more than doubled after the 1996 Customs Union Agreement reaching over $ 12 Billion in 1997 which was initially indicated by the large increase in share of Turkey's imports from the EU (see Chart 3.3).

Trade Area was adopted in Istanbul.

As a final point, we have a look at Turkey's trade balance by EU countries. Table 3.3 shows Turkey's trade balance with each country in EU12 between 1980-1997 and indicates that the trade balance of Turkey with almost all EU countries has deteriorated since 1980. It follows from the table that Turkey's trade balance drifts quite noticeably over time and most of the deterioration took place during the 1990s[10]. Turkey appears to be running a large trade deficit particularly with Italy, Germany, France and the UK in recent years. Though Turkey had a small trade surplus in its trade with Greece since 1985, following the Custom Union Agreement in 1996, Turkey began to run a trade deficit with Greece.

Table 3.3 : Trade balance between Turkey and EU countries[1]

	1980	**1985**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**
Germany	-233.5	+522	-440	+181	-94	-877	+288	-514	-6258	-2757
France	-212.7	-296	-603	-538	-542	-1182	-550	-963	-2427	-1800
UK	-84.5	+74.7	-389	-490	-391	-710	-281	-696	-2164	-1253
Italy	-81.2	-153.2	-621	-873	-976	-1808	-975	-1737	-3804	-3069
Netherlands	-120.3	-3	-138	-167	-198	-352	-119	-274	-1199	-704
Bel-Luxem.	-102.8	-71.7	-212	-240	-261	-389	-161	-461	-994	-651
Denmark	-1	-4.3	-15	-8	-12	-53	-5	-56	-133	-29
Ireland	+2.7	+3.2	-36	-24	-27	-49	-68	-145	-135	-118
Spain	-57.5	-265.8	-146	-83	-21	-230	-146	-233	-877	-829
Greece	-55.8	+29	+10	+67	+58	+3	+64	+9	-225	-132
Portugal	13.5	-12.1	+27	+24	+18	-3	2	-12	-65	-1

[1]: Turkey's Exports- Turkey's Imports, in million U.S. $.
Source: IMF Direction of Trade Statistics, various issues.

[10] As mentioned previously, (see Table 3.2. Tariff reductions according to the Additional Protocol), with the 1993 import liberalisation regime Turkey had for the first time introduced clear preferences for the member states of the EU. The overall protection levels on the bulk of the EU's industrial exports to Turkey (on a trade-weighted basis) fell from 22 percent in 1992 to 15 percent in 1993 and to 12 percent in 1994. In 1994, protection levels on agricultural products averaged 45 percent (Under-secretary of Treasury and Foreign Trade, year (1995))

An interesting feature in Table 3.3 is that Turkey had a considerably large surplus with Germany, in 1985, 1991 and 1994. This may simply reflect the cultural (and geographical) proximity of Germany.

On the whole, it seems that the overall trade balance of Turkey as well as Turkey's trade balance with the EU has seriously deteriorated over the trade liberalisation period with an increasing trend after the 1990s.

3.3.2.- The relative importance of EU countries for Turkey

In Table 3.4 we examine the relative importance of EU countries as markets and sources of supply for Turkey. The left-hand side of Table 3.4 presents the market shares of the various EU countries in the total exports of Turkey for 1980, 1985, 1990 and 1995. Similarly, the right-hand of Table 3.4 presents the market shares of EU countries in the total imports of Turkey.

The first observation is that the EU as a whole has become more important for Turkey both as export market and import source over the period between 1980 and 1995. The share of Turkey's exports to EU12 rose from 43 percent in 1980 to over 51 percent in 1995. Similarly, the share of Turkey's imports from EU12 countries increased from 28.6 percent in 1980 to 47.2 percent in 1995.

Table 3.4 : Relative importance of EU12 countries for Turkey[1].

	Market share of exports[2]				Market share of imports[2]			
	1980	1985	1990	1995	1980	1985	1990	1995
Germany	20.8	17.4	23.8	23.3	10.6	11.9	15.8	15.5
Italy	7.5	6.3	8.5	6.7	3.8	5.8	7.7	8.9
UK	3.6	6.8	5.7	5.2	4.0	4.1	4.5	5.1
France	5.6	2.7	5.7	4.8	4.8	4.5	6.0	5.6
Netherlands	2.9	2.7	3.4	3.4	2.6	1.9	2.6	2.8
Bel-Luxem.	1.9	2.0	2.4	2.1	2.0	2.1	2.3	2.6
Spain	0.1	0.7	1.5	1.6	1.1	2.9	1.5	1.7
Greece	0.3	0.1	1.1	1	0.8	0.4	0.6	0.6
Denmark	0.3	0.3	0.7	0.6	0.1	0.3	0.5	0.5
Portugal	0.7	0.1	0.3	0.3	0.08	0.2	0.07	0.2
Ireland	0.1	0.1	0.2	0.2	0.02	0.05	0.3	0.5
EU12	43.0	40.2	55.5	51.2	28.6	34.1	44.5	47.2

[1] Spain, Portugal and Greece were not a member of the EU in some observation periods.
[2] Market Shares of EU countries as % of Turkey's total exports and imports.
Source : Calculated from IMF Direction of Trade Statistics Yearbook, various years.

We also observe that Germany has about quarter of the export and 15 percent of the import market of Turkey and has always been the most important partner country in the EU. Regarding shares of exports, it is clear that all EU12 countries, except for Portugal, France and Italy, experience a rise in their market shares between 1980 and 1995. Ireland and Belgium-Luxembourg, maintain a more or less constant market share over time. Focusing on shares of imports, we observe that all EU countries; except for Greece (with a small decrease), experience a rise in their market shares. Consistent with Turkey's increasing trade surplus, Greece's importance as import markets decreases from 0.8 percent to 0.6. Finally, maintains a more or less constant market share. The Netherlands maintain a constant market share over time.

To sum up, the trade balance of Turkey with all EU countries; with the exception of Greece, has deteriorated notably over the liberalisation period, and the

geographical pattern of trade with the EU has not tended to change. For the purpose of this work, it is particularly significant that there has been no change in the direction of trade flows from high income EU countries to low income ones[11].

3.3.3.- The importance of Turkey for EU countries

Table 3.5 presents the shares of Turkey's exports (imports) to the EU countries, as a percentage of their total exports (imports) for 1980, 1985, 1990 and 1995.

Table 3.5: Importance of Turkey for EU12 countries[1].

	Market share of exports[2]				Market share of imports[2]			
	1980	1985	1990	1995	1980	1985	1990	1995
Greece	1.2	1.0	1.6	1.8	0.08	0.8	0.7	0.8
Italy	0.4	0.8	2.5	1.4	0.2	0.6	0.6	0.7
Germany	0.4	0.7	0.9	1.1	0.3	0.9	0.9	1.1
UK	0.3	0.5	0.5	0.8	0.1	0.5	0.3	0.4
France	0.3	0.5	0.6	0.7	0.1	0.2	0.3	0.4
Spain	0.4	1.3	0.6	0.6	0.08	0.2	0.2	0.3
Bel-Luxem.	0.2	0.4	0.4	0.5	0.07	0.3	0.3	0.3
Netherlands	0.3	0.3	0.4	0.5	0.1	0.3	0.3	0.4
Denmark	0.05	0.2	0.3	0.4	0.04	0.1	0.3	0.3
Ireland	0.02	0.06	0.3	0.4	0.04	0.09	0.1	0.1
Portugal	0.1	0.6	0.1	0.3	0.2	0.2	0.2	0.2
EU	0.32	0.59	0.72	0.88	0.16	0.48	0.51	0.62

[1] Spain, Portugal and Greece were not a member of the EU in some observation periods.
[2] Market Share of Turkey as % of EU countries' total exports and imports.
Source : Calculated from IMF Direction of Trade Statistics Yearbook, various years.

We observe that although Turkey's market share in EU countries' overall trade has steadily increased Turkey's share in EU countries' total exports is less than 1

[11] This finding is important in explaining the reasons for the significant change in the size and commodity dispersion of Turkey's exports.

percent and hence that Turkey is not a significant export market for all EU countries It is clear from Table 3.5 that the importance of Turkey as both export market and import source for all EU countries has tended to increase over the liberalisation period and that Turkey is more important as export market than as import source for EU countries.

Although Greece is not an important export market for Turkey, relative market share of Turkey for Greece is the highest in the EU. Parallel to their relative importance in Turkey's exports markets, Turkey's share in export market for Italy, Germany, UK and France is relatively higher than other EU countries. Similar to its market share of exports, though Turkey's market share of imports has slightly increased over the period considered, it is not significantly large for all EU countries.

On the whole, we find that the EU is a very important trade partner for Turkey both as export market and import source and that the importance of EU trade for Turkey has grown noticeably over the trade liberalisation period. Although Turkey's share in total trade of EU countries is rather small, Turkey's importance for the EU has also increased during the same period.

3.3.4.- Turkey-EU trade by commodity groups

Following the analysis of the size and direction of Turkey-EU trade in previous section, in this section I shall look at product distribution of Turkey-EU trade and concentrate on three dimensions; the distribution of Turkey's exports by product groups, the share of Turkey's traditional exports and their trend over time and finally

analysis of product groups by country. The aim of this section is to analyse whether there has been any change in commodity distribution of Turkey's exports to EU corresponding to the notable expansion of Turkey's total exports to EU over the liberalisation period.

3.3.4.1- Turkey's exports to EU by product groups

Table 3.6 shows percentage distribution of Turkey's exports to EU by product groups over pre-liberalisation and post liberalisation periods, for 1975, 1985 and 1995. The sectors are categorised, according to their SITC (Standard International Trade Classification) codes, into three broad product groups: the first group, [0+1+2+3], presents "primary products"; the second group, [3], presents "oils"; and finally [5+6+7+8+9] presents "industrial products".

Table 3.6 : Structural change in Turkey's exports to the EU12[1],

SITC[2]	1975	1985	1995
Agricultural Pro. [0+1+2+4]	42.2	45.6	25.2
Fuels [3]	0.3	1.2	1.1
Industrial Pro. [5+6+7+8+9]	57.5	53.2	73.7

[1] As % of Turkey's total exports to the EU12,

[2] Sectors [0+1] ; Food, beverages and tobacco, [2+4] ; Crude materials, oils and fats, [3] : Mineral fuels, lubricants and related materials, [5+6+7+8+9] ; Machinery, equipment and other sectors.

Source: Calculated from the trade data [at 2 digit level, (Rev.2)] obtained from State Institute of Statistics (SIS) of Turkey.

We first observe that, as one might expect, over the pre-liberalisation period, in which Turkey has followed long lasting "import substitution" policies, the percentage share of "industrial products" in Turkey's total exports to EU has been as large as

57.5 percent. Although in the following period their share has slightly fallen, it has risen to about 75 percent of total exports in 1995. Consequently, primary products has largely lost their importance in Turkey's exports to EU during the same period. Oils has always constituted a very small component of Turkey's exports. Table 3.6 suggests that there has been a significant change in commodity distribution of Turkey's exports in favour of industrial products.

It is of interest to analyse the trend of commodity distribution of EU's imports over the same period. From Table 3.7 we observe that over Turkey's liberalisation period EU's total imports of primary products, [0+1] and [2+4], have been almost constant; the imports of oil, [3], have sharply fallen and the imports of industrial products, [5+6+7+8+9], have risen especially during the period between 1980 and 1985.

Table 3.7: Imports Volume Indices of EU by ISIC, (1985 = 100)

	Total	**[0+1]**	**[2+4]**	**[3]**	**[5+6+7+8+9]**
			Intra-EC Trade		
1981	77	84	74	81	75
1982	84	91	79	88	82
1983	89	89	84	89	88
1984	95	98	98	98	94
1985	100	100	100	100	100
1986	95	99	88	54	101
1987	95	99	84	49	102
1988	98	102	90	42	107
1989	105	108	98	51	114
1990	106	108	93	56	115
			Extra-EC Trade		
1981	78	79	81	85	72
1982	84	84	83	92	79
1983	88	90	87	92	85
1984	98	100	104	100	94
1985	100	100	100	100	100
1986	77	92	79	50	94
1987	73	81	75	47	92
1988	75	83	86	39	98
1989	83	85	97	48	106
1990	81	77	89	52	102

Source: Eurostat, Basic Statistics of the Community, 30th edition, pp.342, 1993.

Table 3.8 shows import volume indices for the EU and indicates that between 1990 and 1995 the share of primary products, [0+1] and [2+4], and the share of oils, [3], in EU's total external trade has slightly increased; the share of machinery and equipment, [7], has almost been constant; and the share of other industrial products, [5+6+8+9], has notably increased.

Table 3.8: Imports Volume Indices of EU by ISIC, Rev.3 (1990 = 0)

	Total	[0+1]	[2+4]	[3]	[7]	[5+6+8+9]
			Intra-EU 15[1]			
1991	103.8	108.5	103.8	105.7	103.7	102.6
1992	105.1	114.1	102.4	106.5	102.7	105.0
1993	92.1	107.6	88.6	112.1	84.5	90.1
1994	99.4	115.3	97.8	118.3	92.3	98.5
1995	101.6	117.2	97.4	115.6	98.2	100.0
			Extra-EU 15			
1991	105	104	97.6	109.1	106.6	105.7
1992	106.5	107.0	100.4	111.7	101.2	109.7
1993	101.3	99.6	93.8	111.0	93.2	109.3
1994	108.6	107.1	106.7	116.8	98.4	119.9
1995	111.4	107.8	104.9	112.3	106.0	121.3

Source: Eurostat, Basic Statistics of the Community, 33rd edition, pp.330, 1996.

[1] Owing to the change in the method of collecting intra-EU data as from 1.1.1993, comparisons between results prior to and after that data must be made with caution.

On the whole, Table 3.7 and Table 3.8 suggest that during the liberalisation period between 1980 and 1995, in which there has been a significant expansion in Turkey's industrial product exports to the EU, there has been an overall increase in EU's imports of industrial products from non-member countries.

3.3.4.2.- The share of Turkey's principal exports to EU

Before we examine the principal commodities that Turkey exports to the EU12, we first look at the overall commodity distribution of Turkey-EU trade for 24 industries over the period between 1975 and 1990. Table 3.9 below presents the trade

flows between Turkey and the EU12 for 24 industries. The main goal of this analysis is to find out the industries that caused the structural change in commodity distribution of trade which was shown in Table 3.6.

Table 3.9: Commodity distribution of Turkey's trade with EU12 (Thousands of $)

	1975		1980		1985		1990	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Food products	210541	58899	564311	120926	501091	100192	1062983	506659
Beverage	878	1442	2071	163	3606	703	7101	7217
Tobacco	38703	0	58214	0	79929	4623	113127	10387
Textiles	75566	32136	237928	23097	535829	51999	966547	235759
Wearing app.	71360	46	94129	18	936297	916	2615820	12531
Leather prod.	47	339	0	322	6330	11623	5874	87399
Footwear	24	5	64	20	11772	2920	11060	3732
Wood prod.	180	843	657	433	28176	5444	5280	16698
Furniture	13	158	296	1	287	843	7200	20889
Paper	285	11480	3	9594	509	21964	4464	79455
Printing	170	4177	1063	1912	14548	6295	2824	31780
Petroleum ref.	34655	31111	27285	182648	247882	17014	205461	143750
Pottery	5	0	11182	808	166	14	4963	3299
Glass	977	4132	441	2636	10363	7120	44040	26890
Iron&Steel	3961	369183	18010	191939	17311	495332	30711	655127
Fabricated M.	2605	47009	5319	38133	69891	65430	62582	207443
Other m. pro.	1141	11156	2402	6864	32103	36904	56789	153012
Rubber	867	15526	2340	6903	8176	16316	30627	70856
Plastic pro.	0	66646	4317	165091	239	74415	564049	344582
Non-ferro. M.	9480	43290	6893	29437	28821	80888	131934	184819
Mac. Exc. El.	990	210298	686	168564	64930	307212	22236	760126
Machinery El.	185	114321	1259	80346	41977	239614	89566	649823
Transport eq.	35	174099	10219	114835	19456	243056	60785	686056
Profes&Sci.eq	2	33626	42	33903	15167	62540	10201	216768

Source: Calculated using data obtained from OECD, International Trade by Commodities Statistics (ITCS)

Table 3.9 makes it clear that the increase in Turkey's exports of manufactured goods after the 1980s was mainly due to increase in "traditional" exports, such as textiles, wearing apparel, and footwear as well as plastic products, and non-ferrous metals. Exports of more technology intensive products such as, machinery except electric, machinery electric, transport equipment and professional and scientific equipment have also increased notably during this period. Though the bulk of the increase in industrial exports came through a rise in "traditional" exports, the increase in exports of high-tech industries signals the change in production pattern of Turkey in recent years.

Secondly, we shall examine the commodity structure of exports more closely and concentrate on the share of Turkey's principal exports to EU. Table 3.10 presents the percentage share of five most important goods in Turkey's total EU exports for 1979, 1985, 1990 and 1995. We observe that Turkey's exports to EU are mainly concentrated on four products;

1.- [08]; edible fruit and nuts

2.- [42]; articles of leather, saddlery, harness

3.- [55]; man made fibres (discontinues)

4.- [61]; knitted and crocheted goods and articles.

Some other products: [20]; preparations of vegetables, [27]; mineral fuels mineral oils, [58]; special fabrics, lace, wall carpets, [60]; knitted and crocheted goods, [62]; non knitted and crocheted goods and articles, [85]; electrical machinery and equipment, also constitute an important component in Turkey's total EU exports.

Table 3.10 : Share of five most important goods in Turkey's total exports to EU12[1]. (%)

ISIC*	1979	1985		1990		1995	
[55]	17.6	[42]	13.2	[60]	16.6	[61]	21.1
[08]	13.8	[55]	10.1	[61]	12.9	[62]	12.8
[27]	13.4	[61]	9.7	[08]	8.0	[08]	7.5
[61]	11.4	[08]	8.4	[42]	7.8	[85]	4.9
[58]	7.8	[60]	8.0	[55]	5.8	[20]	3.0
Others	36		50.6		48.9		50.7

* 08; Edible fruit and nuts, 20; Preparations of vegetables, 27; Mineral fuels mineral oils, 42; Articles of leather, saddlery, harness, 55; man made fibres (discontinues), 58; Special fabrics, lace, wall carpets, embroide, 60; Knitted and crocheted goods, 61; Knitted and crocheted goods and articles, 62; Non knitted and crocheted goods and articles, 85; Electrical machinery and equipment.
[1] Because data were not available estimations exclude Portugal in 1990 and Belgium-Luxembourg in 1994 and 1995.
Source : Calculated from the data provided by State Institute of Statistics (SIS) of Turkey at 2 digit level.

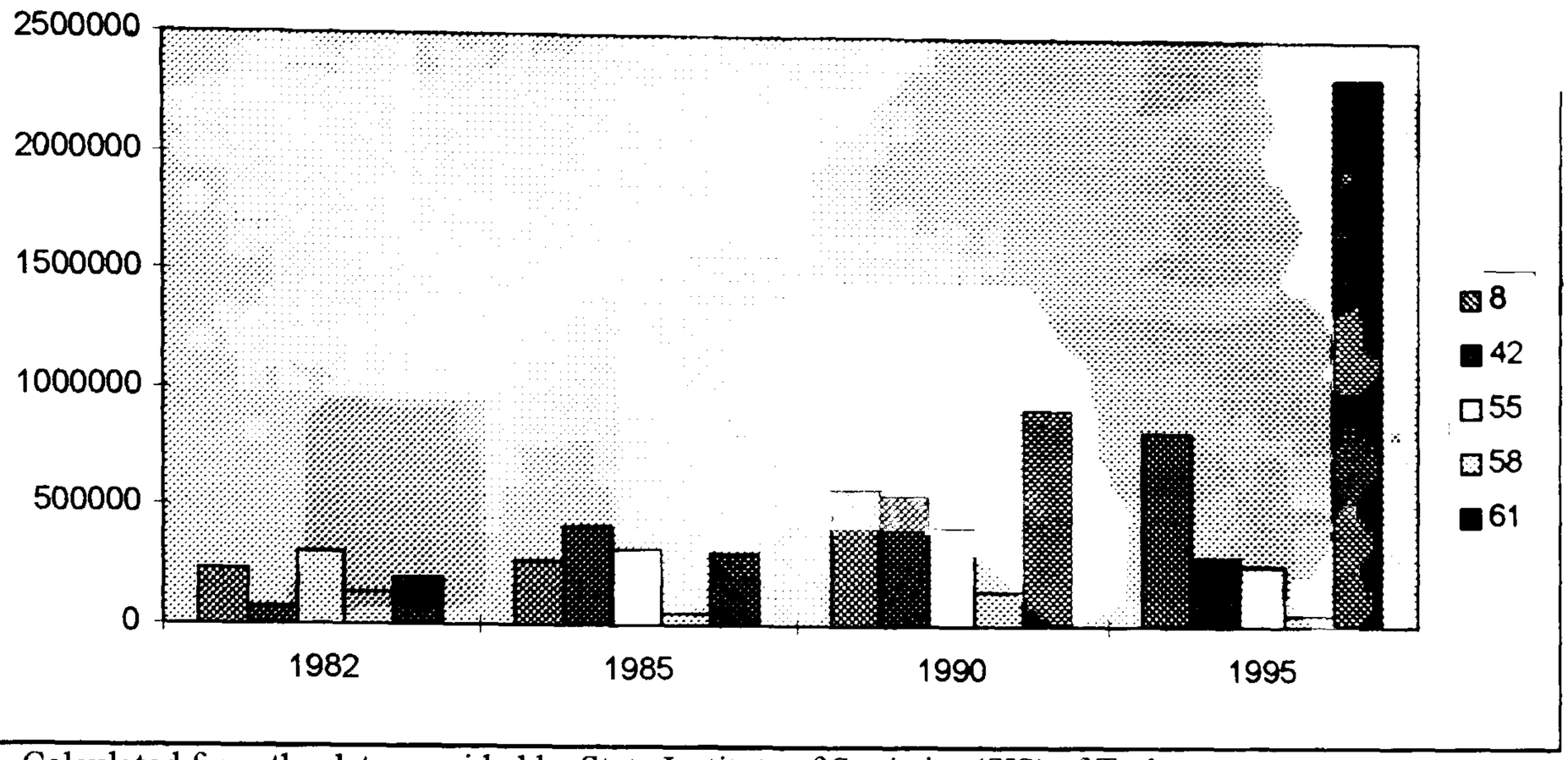
Table 3.10 indicates that the percentage share of five most important exports was as large as about 64 percent of total exports in 1979 while they made up less than 50 percent of total exports in 1995. This suggests that Turkey has become less dependent on traditional exports by possibly changing the variety of products in the period between 1979 and 1995.

Another feature emerging from Table 3.10 is that, consistent with previous finding on notable increase in the share of industrial products, electrical machinery and equipment; [85], has become one of the essential goods in Turkey's total EU exports in 1995.

In what follows I shall analyse the trend of principal exports in Table 3.10 for the period between 1982 and 1995. Chart 3.7 presents the overall direction of five main exports; namely [8], [42],[55],[58] and [61][12] over time.

[12] See notes in Table 3.10 for explanation on these products.

Chart 3.7 : Turkey's Main Exports to EU12 (in Thousand $)



Source: Calculated from the data provided by State Institute of Statistics (SIS) of Turkey.

Chart 3.7 shows that only [8] and [61] have a stable increasing trend over time while others; [42], [55] and [58], shift frequently. This changing structure of some products basically suggests that there is no steady demand for these products.

3.3.4.3.- Distribution of Turkey's main EU exports by country

This section analyses the distribution of Turkey's principal EU exports by country. The aim of this is to examine whether there has been a change in country distribution of Turkey's exports to the EU12 (e.g., from EU countries with a high income level to poor ones). Table 3.11 presents the country distribution of exports of three product groups; primary products, [0+1+2+4]; oils, [3] and industrial products, [5+6+7+8+9].

We observe from Table 3.11 that major industrialised countries of EU; Germany, Italy, UK and France, are the main importers for Turkey's primary products, [0+1+2+4], in both 1985 and 1995. Spain has especially increased its share while there

is no very significant change in other countries' share. Denmark, Germany, Italy, UK and France are the main importers of oils, [3], however, with the exception of Germany, their share has significantly fallen in 1995. The share of Greece and Spain has notably increased in 1995. As for industrial products; [5+6+7+8+9], Germany seems to be the major importer of this product group. France has notably increased its share while there has been a fall in the UK's share.

Table 3.11: Turkey's exports to EU by country and by product groups[1],

	1985			1995		
	[0+1+2+4]	**[03]**	**[5+6+7+8+9]**	**[0+1+2+4]**	**[03]**	**[5+6+7+8+9**
France	9.5	19.5	3.9	11.0	11.5	8.6
Netherlands	6.1	1.8	7.0	7.6	6.4	6.3
Germany	37.9	13.1	46.1	37.0	24.4	47.8
Italy	20.2	19.4	11.3	22.0	9.8	10.1
UK	14.9	29.9	16.4	9.2	19.4	10.4
Ireland	0.20	1.6	0.3	0.4	1.0	0.4
Denmark	1.0	10.3	0.4	1.2	1.0	1.2
Greece	4.4	3.3	0.8	3.4	11.9	1.2
Portugal	0.1	0.02	0.7	0.7	1.5	0.4
Spain	2.6	0.05	1.0	7.5	12.8	1.5
Bel-Lux.	3.1	1.0	12.1	N.A	N.A	N.A

[1] As percentage of Turkey's total exports to EU12 for each main commodity group.
Source: Calculated from the data obtained from State Institute of Statistics (SIS) of Turkey.

On the whole, Table 3.11 indicates that the country distribution of Turkey's exports to EU did not change significantly over time. It is also clear that major industrial countries of the EU, Germany, Italy, France and UK, are main importers of each of the three main product groups. This suggests that factor endowments of EU countries appear to have a significant role in determining the structure of exports from Turkey. The role of factor endowments and comparative advantage will be analysed in next chapter and this analysis is expected to shed more light on the effect of factor intensity of countries on trade between Turkey and EU.

3.4.- CONCLUSION

This chapter examined the impact of Turkey's 1980 reform program on Turkey-EU trade patterns. We started our analysis with a brief note on Turkey-EU relations following the 1980 liberalisation program and carried on by examining magnitude, country and commodity distribution of trade flows between Turkey and the EU over the liberalisation program.

Our assessment on relationships between Turkey and the EU indicates that while Turkey decided to shift the orientation of its economy from a more inward-looking position to greater integration in world markets, its relations with the EU suffered a serious set-back during the first stages of the liberalisation program mainly due to political issues. It was after a special meeting of the EC-Turkey Association Council's meeting in 1986 that reactivation of the Association Agreement was called for and Turkey was given green light for normalisation of relations. In circumstances under which normalisation of Turkey-EC relations were still debated, the decision taken by Turkish government to apply to the EC for full-membership on 14 April 1987 which was deferred until at least 1992 following a preliminary assessment by the Commission of the EC.

However, Turkey's economic relations with the EU developed irrespective of the eventual outcome of the application for membership and Turkey itself to completing a customs union with the EU by 1996. Consequently, Turkey-EU relations entered a new era after Turkey's application which were reflected by significant changes in Turkey-EU trade over the 1990s.

Our analysis shows that parallel to the changes in Turkey's overall trade after the implementation of an export oriented liberalisation program in the 1980s, there have been important changes in Turkey's trade with the EU particularly over the 1900s. Not only the magnitude of but also the commodity structure of Turkey-EU trade has changed notably after the 1980s. Turkey's exports and imports to the EU have both increased over 10 times in dollar terms between 1980-1998. The shares of Turkey's exports and imports to EU constituted over 50 percent of Turkey's total trade in 1998 while they were only 33.2 percent and 29.4 percent respectively in 1981.

There was also a structural change in commodity distribution of Turkey's trade with EU. The structural change in Turkey's exports to EU was particularly significant. The share of industrial products in Turkey's total exports to EU increased from about 40 percent to in the 1980s to well over 70 percent in the 1990s. Consequently, the share of agricultural products in Turkey's total exports to EU has fallen sharply during the same period. We examine the similarity between exports of Turkey and the EU in next chapter over the period when important changes took place in commodity structure of Turkey's foreign trade.

Though there have been important changes in both size and commodity distribution of Turkey-EU trade, there was no essential change in country distribution of trade. Germany has always been the most important partner country in EU as both export market and import source. Although the shares of Turkey's exports and imports constitute only a small part of EU countries' total trade, the importance of Turkey's trade for all EU countries has increased over the liberalisation period.

Despite the fact that the bulk of the increase in Turkey's exports to EU came through an increase in exports of "traditional" goods, such as textiles and wearing apparel, Turkey has become less dependent on traditional exports by changing the variety of products and exporting more capital intensive goods after the 1980s. However, as mentioned in previous chapter, though there was significant changes in structure of Turkey's trade patterns over the liberalisation period, these changes were not followed by a transformation in technology and production pattern of Turkish economy.

CHAPTER 4

FACTOR INTENSITY OF TURKEY'S TRADE WITH THE EU

4.1- Introduction

As mentioned in Chapter 2 and 3 previously, there have been remarkable changes in Turkey's foreign trade, especially with the EU, in terms of both the magnitude and the commodity structure of trade following implementation of the 1980 liberalisation program. In order to examine the characteristics of these changes in Turkey's foreign trade with EU, Chapter 3 has analysed the structure of Turkey-EU trade by country and by commodity and concluded that the EU as a whole has become more important for Turkey both as an export market and an import source over the liberalisation period although there has been no significant change in the country pattern of Turkey-EU trade. Having observed these changes in Turkey-EU trade, Chapter 4 looks at the factor endowment of Turkey and its role in explaining Turkey-EU trade as the international differences in "factor endowments" are mostly seen as the key factor in explaining comparative advantage and international trade flows.

Comparative advantage is an important concept central to the trade theory. A better understanding of how it pertains to the actual world is useful for identifying the consequences of policy shifts and in clarifying economic welfare. Empirical measures of aggregate comparative advantage can identify the overall direction and thrust which

a country's investment and trade should take in order to exploit international differences in factor endowments.

When attempting to assess the comparative advantage of Turkey's industry in order to find out its competitiveness, one faces a highly controversial topic. After the "Leontief-Paradox" had questioned the capacity of the Heckscher-Ohlin (H-O) theorem (in its simple version) to explain the actual commodity structure of a country's exports, several alternative explanations have been formulated and tested empirically. However, this work does not intend to test either the H-O theorem or another trade proposition as such[1]. This would not be feasible at all, since the data against which the individual hypotheses should be tested are insufficient and, at present, impossible to compile. Nevertheless, I shall attempt to answer the question of whether Turkey's resource allocation is fully reconcilable with the factor endowment of the country which is considered highly influential in determining the direction of trade flows[2]. The assumption underlying this statement is that Turkey is rich in unskilled labour, while (physical and human) capital are short[3].

The objective of this Chapter is to analyse the role of factor endowments in Turkey-EU trade and the comparative advantage of Turkey relative to the EU by using

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[1] A very illustrative material on this issue is given by R.E. Baldwin (1971). See also Vollrath (1991) for an evaluation of alternative trade intensity measures of revealed comparative advantage.
[2] This is a problem which is common to plenty of developing countries. See Little-Scitovsky and Scott (1970). A recent cross-section analysis provides support for this widespread opinion, since it shows that LCDs are producing too capital-intensively when compared with their factor endowments.
[3] Donges (1977) argues that in Spain, as compared to its abundancy, labour appears to be too expensive although there are no autonomous labour organisations and no right for workers to strike. However, this doesn't seem to be the case for Turkey since trade unions have lost their power significantly as a result of government pressure after the 1980 military coup. Following the elections in 1989, parallel to reduced government pressure on trade unions, real wages rose.

relative export performance as a proxy for comparative advantage. This analysis is expected to shed some light on the question of whether there has been any change in factor intensity of Turkey's trade with the EU after the 1980 liberalisation program when important changes took place in Turkey-EU trade.

Chapter 4 is organised as follows. Section 2 briefly summarises the theoretical arguments on measuring comparative advantage. The two methodologies that we used in this work, namely Neven and Roller's approach and Balassa's revealed comparative advantage (RCA) indices, are introduced in Section 3. An assessment on factor intensities of Turkey-EU trade, using Neven and Roller's framework, is given in Section 4. This approach is applied for the five different commodity groups that categorised by Neven and Roller. Section 5 gives an overall evaluation on the factor intensity of Turkey's trade with the EU as a whole. Finally, Section 6 evaluates the comparative advantage of Turkey with respect to EU using Balassa's revealed comparative advantage (RCA) indices presuming that the revealed comparative advantage is a good guide to the actual one). Section 7 draws conclusions from our results.

4.2.- Theoretical assessment on comparative advantage

The task of quantifying comparative advantage empirically is not a trivial attempt because the rigor of economic theory imposes severe restrictions and because country and commodity aggregations necessarily entail conceptual compromise. One problem is that the theoretical concept of comparative advantage is usually specified in terms of *pre-trade* (autarky) relative prices in a distortions world where markets function perfectly. Unfortunately, researchers are confronted with data generated by trade-flows in *post-trade* equilibria[4].

Balassa (1965) outlined these difficulties and shortcomings of the classical doctrine in determining comparative advantage and suggested that "*revealed comparative advantage*" (RCA) can be indicated by the trade performance of individual countries in the sense that the commodity pattern of trade reflects relative costs as well as differences in non-price factors[5]. When introducing the notion of RCA, Balassa (1965) proposed two measures, one based on export-import ratios, the other on relative exports shares. He argues that (pp.116-117) "Comparative advantages appear to be the outcome of a number of factors, some measurable, others not, some easily pinned down, others less so. One wonders, therefore, whether more could not be

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[4] Difficulties also arise when applied economists depart from the simplified neo-classical world to incorporate characteristics of the multi-dimensional real world where many commodities flow across national boundaries and where many countries trade the same commodities and have different trading partners.

[5] Many applied economists have attempted to approximate comparative advantage using indicators derived from real world post-trade observations. Hillman (1980); Bowen (1983;1985;1986); Ballence et al.(1985;1986); Yeats (1985) and Marchese and Nadal De Simone (1989) have analysed the properties of various indexes proposed to approximate actual comparative advantage. Ballence et al.(1987) examined the consistency of alternative RCA measures and found considerable incoherence.

gained if, instead of enunciating general principals and trying to apply these to explain actual trade flows, one took the observed pattern of trade as a point of departure..."

4.3.- Methodology for the analysis of factor intensity in Turkey-EU trade

As summarised in previous section, there are serious theoretical and empirical questions about the applicability of proposed devices in determining and measuring the comparative advantage of the trading countries. Considering these obstacles, I shall use two different methods to assess the "revealed" comparative advantage of Turkey relative to the EU[6]. The first method, applied by Neven and Roller[7] (1991) to examine the comparative advantage of COMECON countries as a block relative to western European countries, is based on classifying industries according to their factor intensities and suggests that the factor content of trade flows will 'reveal' the comparative advantage underlying actual trade. The second method is the one developed by Balassa (1965) which uses relative export shares[8] in measuring RCA in an attempt to identify the enduring effects of trade liberalisation.

In the following part, I shall firstly employ the framework of Neven and Roller in order to assess the 'revealed' comparative advantage of Turkey relative to the EU. I shall use this framework to study RCA of Turkey relative to the EU for the period

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[6] A standard approach to assess comparative advantage would consist of estimating differences in factor prices and productivity across countries. An alternative approach would be to estimate differences in factor endowments. However, these approaches are unlikely to be successful for Turkey because in the absence of well organised labour and capital markets in Turkey, recorded factor prices might not be very meaningful and because reliable information on factor endowments is hard to come by.

[7] See Table A4.3 in appendix for their results.

[8] Given the shortcomings of the other measure of Balassa I shall only use the relative export shares measure in defining RCA.

between 1975 and 1990 in an attempt to identify whether 1980 trade liberalisation program of Turkey had an effect on RCA of the country[9]. Secondly, I shall use the methodology developed by Balassa (1965) as a measure to examine the RCA of Turkey relative to EU and the effect of trade liberalisation on RCA.

4.4.- Assessment of factor intensities in Turkey-EU trade by using Neven and Roller's framework

Neven and Roller (1991) use the three digit ISIC industrial classification (for 29 industries) and sort these industries into five categories according to their factor intensity[10]. Their classification contains the following classes: industries intensive in *natural resources*, industries with an *average labour and capital* intensity, industries *highly intensive in labour*, industries *highly intensive in capital* and industries with a *high content of human capital*[11].

Table 4.1 and Table 4.2 present the percentage allocation of Turkey's total exports and imports to each EU country for the five categories of industries for 1975 and 1990, respectively. Given that imports and exports are reported on a different basis (FOB versus CIF), only import data are used in calculating percentage distribution of each commodity group (exports being reconstructed from imports data in the

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[9] It is clear that this RCA will provide insight into the effect of trade liberalisation only to the extent that the revealed advantage is a fair guide to the actual comparative advantage.

[10] See Table (A4.1) in appendix for the classification of industries according to factor intensities.

[11] Neven (1990) used the succeeding procedure to sort out 29 industries according to their factor intensity. For each country, first, he created a specific category for the industries which are intensive in natural resources (foodstuffs and wood). The other industries have been sorted out according to the following criteria; whenever an industry has factor intensity which is higher than one standard

destination countries). Following the overall distribution of the each commodity group, *net exports* (exports-imports) of Turkey as a proportion of total trade (exports + imports) with EU countries for each of the five categories of industries are given in Table 4.3- 4.7 for the years, 1975, 1980, 1985 and 1990.

Focusing first on trade in commodities intensive in natural resources, we observe that Turkey's exports of such commodities accounted for a very large share of total exports in 1975. Specially exports to northern European EU countries such as, Denmark (67 %), France (56%), UK (38 %), Netherlands (34 %) and Germany (29 %) and exports to Ireland (47 %) had a substantial share in Turkey's total exports while southern European countries such as, Greece (19 %) and Portugal (2 %), had a rather small share. However, the share of natural resources in Turkey's total exports to northern European EU has fallen sharply while the share of exports to southern European countries has experienced an increase after the liberalisation period in 1990.

Table 4.1 indicates a notable shift in Turkey's exports from average labour-capital intensive goods to labour intensive goods between 1975 and 1990. The share of exports of labour intensive goods has increased sharply while the share of exports of average labour-capital intensive goods has significantly decreased for almost all EU countries.

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deviation above the mean defined over all industries, it is considered to be highly intensive in this factor.

Table 4.1: Composition of Turkey's Exports to the EU12[1],

	1 Natural Resources.		2 Ave. Labour-Capital Int.		3 Labour Intensive		4 Capital Intensive		5 Human-Capital Intensive	
	1975	**1990**	**1975**	**1990**	**1975**	**1990**	**1975**	**1990**	**1975**	**1990**
France	56.1	19.3	17.3	20.4	24.6	48.8	0.6	3.2	1.4	6.3
Netherlands	34.3	19.7	20.3	14.3	42.5	58.5	0.7	3.2	2.2	3.3
Denmark	67.9	16.5	18.5	25.4	11.9	55.1	1.4	1.7	0.3	1.3
Germany	29.2	14.4	29.4	13.6	36.6	63.8	2.9	3.7	1.9	3.5
Bel-Lux.	24.7	10.5	47.6	25.0	25.4	54.9	0.9	5.2	1.4	4.4
UK	38.9	15.6	48.9	24.2	8.7	47.0	1.7	7.3	1.8	5.9
Italy	24.2	15.1	67.7	31.2	3.1	24.7	4.7	20.9	0.3	8.1
Ireland	47.2	6.6	33.7	10.4	18.9	57.1	0.0	25.1	0.2	0.8
Spain	0.6	0.7	47.9	9.0	47.1	37.7	1.4	47.0	3.0	5.6
Greece	19.0	25.0	17.4	21.9	58.5	19.6	2.7	26.2	2.4	7.3
Portugal	2.8	16.6	87.5	33.1	9.1	32.6	0.0	11.0	0.6	6.7

[1] As % of Turkey's total exports to each EU country.

Source: Calculated from the data obtained from OECD (International trade by commodity statistics).

Regarding Turkey's exports of capital and human capital intensive goods, Table 4.1 indicates an increase in exports of such commodities particularly in the case of Spain, Greece, Ireland and Italy over the period considered. The change in exports of capital intensive goods has been more significant particularly for southern European countries as well as Italy.

As for composition of imports, Table 4.2 shows the share of each commodity group in Turkey's total imports from EU countries and indicates that, differing from exports, the overall structure of imports has not changed significantly over time. The share of natural resources, average labour-capital intensive goods and labour intensive goods has slightly increased (especially in the cases of Italy and Netherlands) whilst the share of capital and human-capital intensive goods has dropped for many countries.

Table 4.2: Composition of Turkey's Imports from EU12[1];

	1 Natural Resources.		2 Ave. Labour-Capital Int.		3 Labour Intensive		4 Capital Intensive		5 Human-Capital Intensive	
	1975	**1990**	**1975**	**1990**	**1975**	**1990**	**1975**	**1990**	**1975**	**1990**
France	6.7	18.9	8.2	6.9	0.22	0.19	39.3	26.9	45.6	47.1
Netherlands	7.3	9.9	7.0	19.1	0.26	0.32	32.9	30.5	51.8	40.1
Denmark	4.4	6.5	2.65	1.5	0.35	0.60	11.7	8.6	80.9	82.8
Germany	0.4	2.2	3.3	8.5	0.60	0.68	44.5	46.8	51.2	41.8
Bel-Lux.	1.3	10.3	21.8	16.1	0.90	0.71	20.1	18.3	55.9	54.5
UK	7.2	5.3	6.7	11.4	1.2	1.5	42.9	44.7	42.0	37.1
Italy	0.1	5.6	6.1	14.2	0.8	1.2	52.5	43.2	40.5	35.8
Ireland	0.1	11.3	1.3	10	0.8	0.8	29.5	19.5	68.3	58.4
Spain	0.2	7.3	15.5	21.2	0.6	0.5	24.3	23.6	59.4	47.4
Greece	20.2	12.9	18.1	24.1	1.6	2.9	29.5	28.3	30.6	31.8
Portugal	10.3	11.9	6.2	12.4	1.2	4.7	30.1	26.3	52.2	44.7

[1] As % of Turkey's total imports from each EU country.
Source: Calculated from the data obtained from OECD (International trade by commodity statistics).

In what follows the factor intensity of Turkey-EU trade for each of the five commodity categories is examined separately.

4.4.1.- The factor intensity of Turkey-EU trade in natural resources

The change in composition of Turkey's *net* exports of natural resources (as % of Turkey's total trade with each EU country) between 1975 and 1990 is given in Table 4.3. We can assess Turkey's comparative advantage by examining its *net exports* over time.

As one might expect, Turkey seems to be a net exporter of natural resources for all EU countries over the majority of periods, except for Spain. Due to increase in imports of natural resources over time, Turkey has become a net importer of such goods in its trade with France, Belgium-Luxembourg and Ireland in 1990.

Table 4.3 : Composition of Turkey's net exports in Natural Resources (1)[1]

	1975	1980	1985	1990
France	5.18	7.36	9.29	-5.34
Netherlands	3.86	16.39	6.18	4.62
Denmark	16.86	27.09	-5.65	4.40
Germany	6.59	17.10	6.94	5.54
Bel-Lux.	3.68	6.85	1.44	-2.54
UK	0.75	2.98	4.43	5.28
Italy	4.45	12.36	4.47	4.91
Ireland	14.58	14.73	4.71	-6.19
Spain	-0.10	-0.04	-2.18	-4.62
Greece	25.81	1.81	4.98	11.63
Portugal	-0.72	2.55	0.26	11.33

[1] As % of Turkey's total trade with each EU country (exports + imports).

Source: Calculated from the data obtained from OECD (International trade by commodity statistics).

The picture in Table 4.3 suggests that Turkey has a comparative advantage in natural resources and that its comparative advantage got weaker after the 1980s.

4.4.2.- The factor intensity of Turkey-EU trade in average labour-capital commodities

Turning to the second category of industries with average capital and labour content (group 2), we observe from Table 4.4 that Turkey is a net exporter of such commodities although the share of its net exports has a decreasing trend between 1975 and 1990. Interestingly, Turkey has been a net importer of average labour-capital intensive goods in its trade with Germany in 1985 and 1990.

Table 4.4 : Composition of Turkey's net exports in Ave. Labour-Cap. int. goods (2)[1]

	1975	1980	1985	1990
France	0.41	5.92	4.46	2.76
Netherlands	2.76	4.57	1.35	-4.66
Denmark	17.90	30.88	4.77	0.69
Germany	15.00	10.06	-6.00	-1.31
Bel-Lux.	4.78	3.75	7.76	10.88
UK	4.40	6.70	4.24	1.96
Italy	-8.50	9.33	7.85	3.11
Ireland	2.91	2.03	3.68	5.43
Spain	8.64	11.20	-0.97	-0.17
Greece	49.29	61.05	19.08	22.90
Portugal	7.70	27.26	10.42	3.51

[1] As % of Turkey's total trade with each EU country (exports + imports).
Source: Calculated from the data obtained from OECD (International trade by commodity statistics).

Table 4.4 indicates that, similar to natural resources, Turkey appears to have a comparative advantage in average labour-capital intensive goods not only in its trade with northern EU countries but also with southern EU countries though this pattern has slightly changed over the second half of the 1980s.

4.4.3-The factor intensity of Turkey-EU trade in labour intensive commodities

Table 4.5 shows net exports of Turkey in labour-intensive commodities (group 3). Turkey clearly seems to be a net exporter of labour intensive goods in its trade with especially northern EU countries over the all periods considered. Net exports to France, the UK and Belgium and Luxembourg increased particularly after the 1980s.

Table 4.5 : Composition of Turkey's net exports in Labour intensive goods (3)[1]

	1975	1980	1985	1990
France	1.35	2.05	8.49	17.46
Netherlands	1.97	3.00	7.52	17.57
Denmark	1.88	6.15	31.69	7.44
Germany	0.06	0.01	0.04	1.53
Bel-Lux.	1.75	10.63	15.36	16.67
UK	4.33	5.10	14.97	29.64
Italy	1.35	2.57	3.64	6.65
Ireland	0.35	0.71	4.03	15.29
Spain	0.30	0.01	0.19	0.29
Greece	0.16	0.01	0.01	1.07
Portugal	0.21	0.41	1.02	2.23

[1] As % of Turkey's total trade with each country (exports + imports).
Source: Calculated from the data obtained from OECD (International trade by commodity statistics).

Table 4.5 suggests that, as one might expect, Turkey has a clear comparative advantage in its trade with northern EU countries in labour intensive commodities and that Turkey was able to exploit its comparative advantage better after the 1980s.

4.4.4.- The factor intensity of Turkey-EU trade in capital intensive commodities

With respect to the commodities intensive in physical capital, Table 4.6 shows that Turkey is a net importer of such commodities in its trade with especially Germany, Italy and France. However, Turkey has improved its position against some northern EU countries such as France, Italy and the UK as well as Spain over time.

Table 4.6 : Composition of Turkey's net exports in Capital intensive goods (4)

	1975	1980	1985	1990
France	-14.91	-7.12	-6.89	-6.03
Netherlands	-9.17	-8.94	-15.34	-7.22
Denmark	-0.26	-0.06	-2.45	6.07
Germany	-14.60	-9.69	-48.29	4.05
Bel-Lux.	0.05	-0.24	-0.01	-0.58
UK	-19.87	-8.54	-5.30	-4.51
Italy	-24.49	-10.89	-16.31	-12.55
Ireland	-5.89	-4.63	-4.22	-5.12
Spain	-14.53	-0.03	-13.46	3.80
Greece	-2.13	-4.27	-7.80	-0.07
Portugal	-11.55	-2.79	-7.72	0.86

[1] As % of Turkey's total trade with each EU country (exports + imports).

Source: Calculated from the data obtained from OECD (International trade by commodity statistics).

Table 4.6 suggests that, though Turkey was able increase its exports of capital intensive goods notably (see Table 4.1), Turkey still has a comparative disadvantage against both northern and southern EU countries in such commodities.

4.4.5.- The factor intensity of Turkey-EU trade in human capital intensive commodities

Table 4.7 shows Turkey's net exports in human capital intensive commodities. Similarly to capital intensive goods, Turkey is a clear net importer of human intensive commodities especially in its trade with Denmark, Belgium and Luxembourg, France, the UK. Turkey's net imports of human capital intensive goods from its largest partner in the EU, Germany, has fallen noticeably between 1975 to 1990.

Table 4.7: Composition of Turkey's net exports in Human Capital intensive goods (5)[1]

	1975	1980	1985	1990
France	-28.58	-17.16	-44.71	-20.41
Netherlands	-30.05	-19.02	-15.38	-15.30
Denmark	-42.03	-18.20	-11.40	-33.11
Germany	-17.53	-12.05	-7.73	-11.11
Bel-Lux.	-39.37	-24.74	-17.03	-28.84
UK	-19.47	-15.93	-18.66	-18.15
Italy	-14.56	-11.60	-14.48	-11.41
Ireland	-31.46	-31.09	-19.64	-16.77
Spain	-12.09	-3.37	-6.99	-0.23
Greece	-2.52	-6.94	-19.52	-6.68
Portugal	-30.16	-16.92	-17.07	-14.74

[1] As % of Turkey's total trade with each EU country (exports + imports).
Source: Calculated from the data obtained from OECD (International trade by commodity statistics).

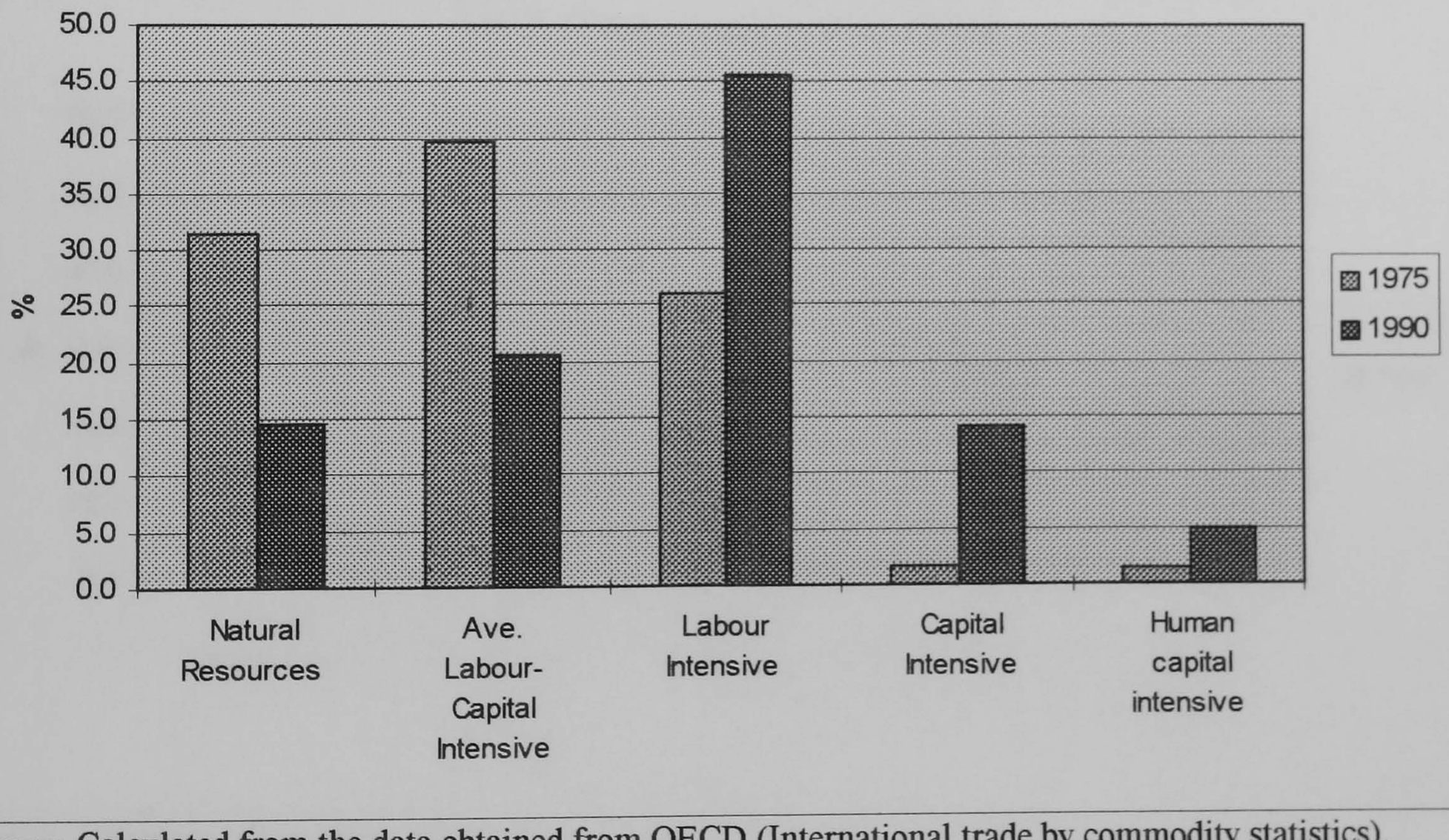
The picture in Table 4.7 indicates that Turkey has a very clear comparative disadvantage in human capital intensive goods particularly in the cases of northern EU countries. As a result of an increase in the share of such goods in Turkey's exports (see Table 4.1) to Germany -together with a decrease in the share of imports from Germany-, Turkey has improved its position with Germany in human capital intensive goods between 1975 and 1990.

4.5.- Overall evaluation on the factor intensity of Turkey-EU trade

In this section I shall examine the factor intensity of Turkey-EU trade from a general perspective and give a comparison of 'revealed' comparative advantage between Turkey and the other EU countries in the following section. Chart 4.1 and Chart 4.2 show the change in the factor intensity of Turkey's exports and imports to the EU12 as a group between 1975 and 1990, respectively.

Focusing first on the change in factor intensity of Turkey's exports, we observe that natural resources (1) and average labour-capital intensive goods (2) constituted the largest share in Turkey's exports to EU12 in 1975 suggesting that Turkey has specialised in these commodities. However, the share of such commodities, e.g., group (1) and (2), has fallen sharply while the share of the commodities in other groups, namely labour intensive (3), capital intensive (4) and human capital intensive (5), has grown considerably in 1990.

Chart 4.1- Composition of Turkey's exports to EU12, 1975-1990, (as % of total exports to EU12)



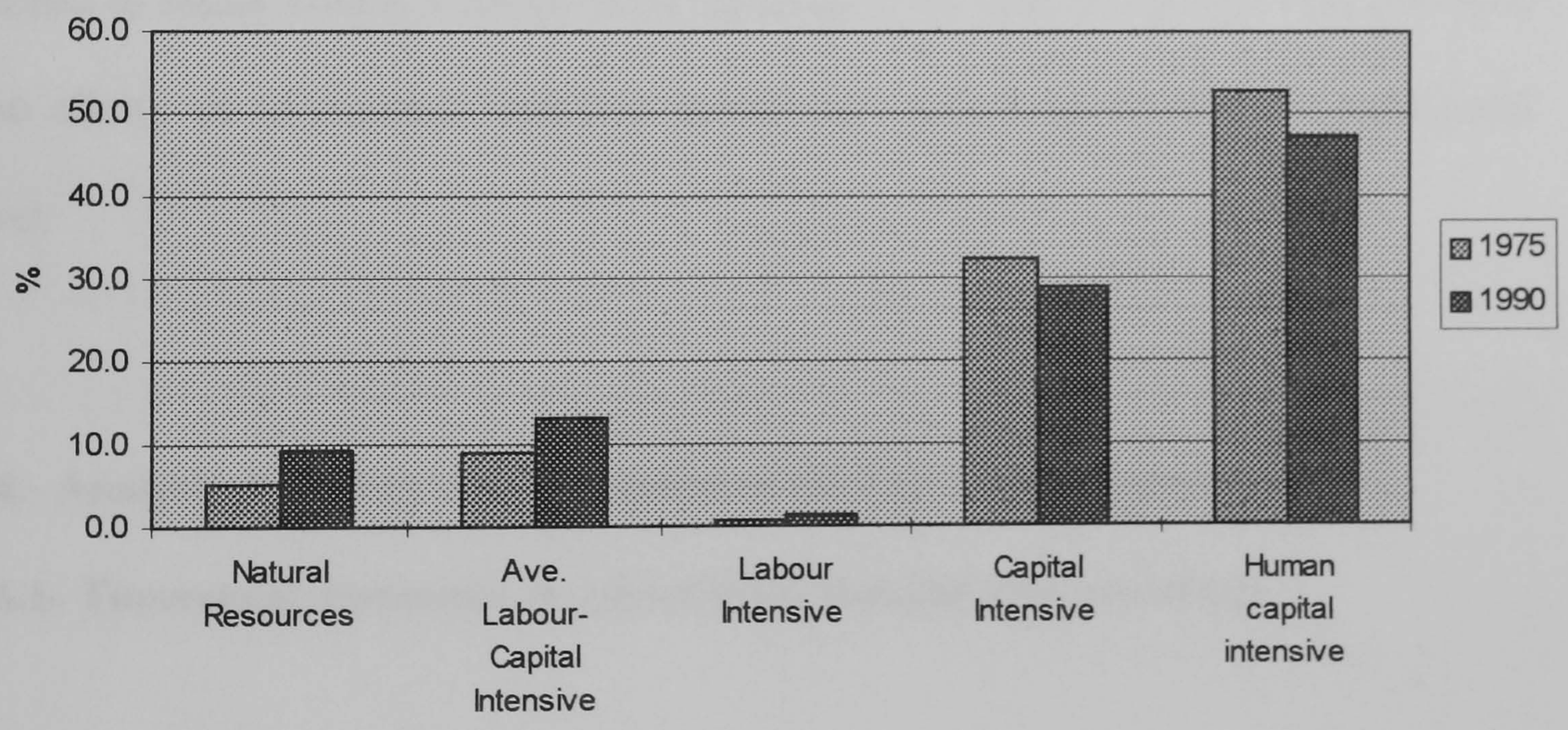
Source: Calculated from the data obtained from OECD (International trade by commodity statistics).

The picture in Chart 4.1 indicates that Turkey's specialisation patterns has changed significantly between 1975 and 1990 and that Turkey has become an exporter

of more physical and human capital intensive goods as well as labour intensive goods in which Turkey is expected to have a comparative advantage.

Turning to the change in share of imports, we observe from Chart 4.2. that composition of Turkey's imports from EU12 has not changed notable between 1975 and 1990. The share of physical and human capital intensive commodities constitutes the largest share in Turkey's total imports from EU12 and that the share labour intensive commodities was very small in both 1975 and 1990.

Chart 4.2- Composition of Turkey's Imports from EU12, 1975-1990, (as % of total imports from EU12)



Source: Calculated from the data obtained from OECD (International trade by commodity statistics).

Chart 4.2 also indicates that between 1975 and 1990 the share of natural resources and average labour-capital intensive goods has increased slightly while there

has been a small amount of fall in the share of physical and human capital intensive commodities.

In sum, we find in this section that there have been important changes in factor intensity of Turkey's exports to EU12 while there was very little change in factor intensity of imports. Our results indicate that Turkey's comparative advantage is laid in labour intensive goods though Turkey was able increase its exports of physical and human capital intensive goods extensively after implementing the 1980 liberalisation program.

In order to test robustness of the results based on Neven and Roller's framework, in what follows I use a different approach which was introduced by Balassa to assess Turkey's comparative advantage with regard to EU12. This approach also allows us to examine Turkey's comparative advantage at more disaggregated level.

4.6.- Analysis of Turkey's RCA relative to the EU12 by industry level

4.6.1- Theoretical discussion on quantifying comparative advantage

This section briefly summarises the theoretical arguments on measuring comparative advantage and introduces Balassa's "revealed comparative advantage" (RCA) method which will be used in this work later in order to asses Turkey's comparative advantage relative to EU12 by industry level.

Liesner (1958) was the first to use *post-trade* data in order to quantify comparative advantage. He devised indexes of relative export performance as proxies for comparative costs in an effort to assess the effects of an entry into the European Common Market on British industry. The indexes he used can be written as follows;

$$RCA1_a^i = (X_a^i / X_e^i) / (X_d^i / X_e^i) = X_a^i / X_d^i \qquad (1)$$

where RCA_a^i denotes the revealed comparative advantage of country a in commodity i, X_a^i equals export value of country a in commodity i, d and e point, respectively, to any of the specified European countries, and to the seven specified developed countries.

Balassa (1965), who first coined the term 'revealed comparative advantage' (RCA), adjusted Liesner's methodology in an attempt to identify the enduring effects of trade liberalisation resulting from the Kennedy Round of GATT. The essence of his *normalised* relative export measure was obtained by "dividing a country's share in the export of a given commodity by the combined exports of manufactured goods of 10 industrial countries under consideration"[12]. Balassa formulated his index as:

$$RCA2_a^i = (X_a^i / X_a^t) / (X_w^i / X_w^t) \qquad (2)$$

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[12] These countries include the following developed countries: Belgium, France, Italy, Luxembourg, Netherlands, Sweden and West Germany.

where X_a^i denotes exports of country a in commodity i, X_a^t denotes total exports of country a, X_w^i denotes world exports of commodity i, and X_w^t is world's total exports[13].

Balassa (1965) also experimented with a simple, relative export-import measure which can be written as:

$$RCA3_a^i = (X_a^i / X_a^t) / (M_a^i / M_a^t) \qquad (3)$$

where M refers to imports and all the other notation denote the same as in equation (2).

Balassa is, however, concerned about the heterogeneous incidence of subsidies, quotas, and special arrangements since they raise justifiable questions on whether reported observations on imports should be used in calculations of revealed comparative advantage.

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[13] In some applications, Liesner and Balassa altered their basic measures to include trend factors. Liesner modified the core RCA1 as follows:

$$mRCA1_a^i = (RCA1_a^i)\ (g_a^i / g_d^i) / 2 + RCA1_a^i$$

where m is world exports of i and g is an index of export growth. In 1965. Balassa used the following weighting scheme;

$$mRCA2_a^i = \tfrac{1}{2}\,[(RCA2_a^i)_t + (RCA2_a^i)_t\,(RCA2_a^i)_t / (RCA2_a^i)_{t-1}]$$

where t refers to any specific time period.

Taking into account the growing importance of intra-industry trade, Balance et al (1987) introduced two other indexes of comparative advantage, one of the UNIDO type (RCA4) and the other of the Donges and Riedel type (RCA5):

$$RCA4_a^i = (X_a^i - M_a^i) / (X_a^i + M_a^i) \qquad (4)$$

$$RCA5_a^i = [((X_a^i - M_a^i) / (X_a^i + M_a^i)) / ((X_a^w - M_a^w) / (X_a^w + M_a^w)) - 1] .[\text{ sign } (X_a^w - M_a^w)] \qquad (5)$$

where X_a^i (M_a^i) denotes exports (imports) of country *a* in commodity *i*, and X_a^w (M_a^w) denotes world exports (imports) of commodity *i*.

Vollrath (1991) argues that actually RCA4 and RCA5 are indicators of "inter and/or intra-industry trade", thus they are not measures of comparative advantage. The reason for that is that they both focus on a single commodity and, therefore, do not fulfil the contrasting dimensions inherent in the principle of comparative advantage.

Bowen (1983) makes a very serious allegation indicting previously defined global RCA measures, namely that " a trade intensity above (below) unity cannot be used to infer a country's relative advantage (disadvantage) in any given commodity". He especially criticises Balassa's intensity index, pointing out that it treats "exports and imports separately when comparative advantage is properly a net trade concept". To avoid this problem, he develops an alternative measure of revealed comparative advantage (RCA6) using two indices called the *net trade intensity index* (NI) and the *production intensity index* (PI) which are based upon the relationship between a

country's production, consumption and trade in a commodity relative what would occur in a hypothetical neutral comparative advantage world.

$$RCA6_a^i = NI_a^i = (PI_a^i - 1)\text{, where}$$

$$NI_a^i = T_a^i / (Y^I / Y^w)\, Q_a^w \quad \text{and} \quad PI_a^i = Q_a^I / (Y^I / Y^w)\, Q_a^w, \qquad (6)$$

where (Y) refers to gross national product and where net trade (T_a^i) is equivalent to domestic production (Q_a^i) minus domestic consumption (C_a^i).

However, Balllance et all (1985) questioned the validity of Bowen's alternative index because it is dependent on the assumption of identical and homothetic preferences. They reject RCA6 on the basis of cross-country regression results covering 13 commodities which showed this assumption about demand to be inappropriate.

4.6.2.- The results on Turkey's RCA relative to the EU

Among the different approaches which were summarised in previous section to determine a country's comparative advantage, Balassa's RCA indexes, (the relative export measure; RCA2 and the relative export – import measure; RCA3) are most commonly used[14] indicators in the literature though there are still questions about their appropriateness. Following Kucukahmetoglu (1996), I shall employ Balassa's relative

export-import measure (RCA3) to assess Turkey's RCA against the EU in the industry level.

Table 4.8 below presents the estimated relative export-import indexes for both pre-liberalisation (1978-1980) and post-liberalisation (1988-1990) periods by using Balassa's relative export-import measure (RCA3). Considering the fluctuations in trade flows, following Kucukahmetoglu (1996), the average export and import values of three years are used for each period. In interpreting Balassa's RCA indexes, an index value greater (smaller) than unity indicates comparative advantage (disadvantage) in the industry.

Table 4.8 firstly indicates that, consistent with previous results based on Neven&Roller's frame work, Turkey has a comparative advantage especially in labour intensive industries while it has comparative disadvantage in capital and human capital intensive industries.

Among the industries considered, Turkey seems to have comparative advantage (indicated by a RCA index value greater than 1) in 14 industries during the first period (1978-1980) while it had comparative advantage in only 12 industries during the second period (1988-1990). Over the two periods considered, it appears that Turkey has lost its comparative advantage particularly in metal products, and leather as well as wood while it has become more competitive in some capital intensive goods, e.g., glass.

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[14] Recently, Andreosso O'Callaghan and Noonan (1996) use Balassa's RCA indices in a study of intra-industry trade in Central and Eastern Europe.

Table 4.8: Change in revealed comparative advantage of Turkey against EU12[1]

	Period 1 1978-1980	Period 2 1988-1990
1-Natural Resources		
Food Stuff	**11.6**	**3.6**
Wood	**5.5**	0.4
2-Average Lab-Capital		
Rubber	**9.8**	**1.4**
Metallic Products	**1.4**	0.5
Leather	**2.9**	0.3
Textile	**15.7**	**6.4**
Non-ferrous Products	0.02	0.51
Wood Furniture	**13.6**	**1.7**
Printing	0.69	0.13
3-Labour Intensive		
Ceramic	**745.3**	**1.9**
Clothing	**2048**	**418.3**
Shoes	**14**	**4.8**
4-Capital Intensive		
Beverage	**43.1**	**1.5**
Plastics	0.004	0.195
Paper	0.018	0.049
Mineral Products	**2.9**	**5.7**
Cement	0.0005	0.0027
Pottery	**137.3**	**2.5**
Glass	0.4	**2.2**
Steel	0.204	0.040
5-Human Capital Intensive.		
Chemicals	0.0165	0.225
Pharmaceuticals	0.039	0.048
Mechanical Machinery	0.015	0.039
Electrical Machinery	0.036	0.142
Transport Equipment	0.023	0.179
Optical Equip.	0.064	0.132
Medical Equip.	0.00004	0.036

[1] The RCA index values that greater than 1 are indicated in bold.

Source: Calculated by using Balassa's relative export-import measure (RCA3).

Table 4.8 interestingly reveals that Turkey's comparative advantage in many average labour capital intensive and labour intensive goods has become weaker in the second period. This suggests that following trade liberalisation program in 1980, some traditional Turkish export industries lost their competitiveness.

Despite having a comparative disadvantage in both periods, it appears that Turkey has become more competitive in some physical capital intensive goods such as plastics, paper, cement, as well as all human capital intensive goods in the second period. This finding is consistent with our previous observation on the notable increase in the share of such goods in Turkey's total exports to EU12 after the 1980s (see Table 4.1).

4.6.3.- Comparison of the empirical results with other studies

Using the same methodology, Kucukahmetoglu (1996) examines Turkey's RCA relative to the EU for 260 industries (at three-digit SITC) for the period (1991-1993) and finds that Turkey has a revealed comparative advantage in only 74 of those industries. He applies the same approach to Turkey's total trade for two periods, [(1984-1986) and (1991-1993)] and finds that, out of 233 industries, Turkey didn't have comparative advantage in 147 industries in both periods and that it has comparative advantage in 46 industries in both periods. Between these two periods, 22 industrie lost their competitiveness while 15 industries became competitive. He concludes that the effect of tariff reductions during the two periods considered had little effect on overall competitiveness of Turkey's industry since there was no significant change in majority of industries.

4.7.- CONCLUSION

Having examined the patterns of Turkey-EU12 trade in Chapter 3, this Chapter analyses the factor intensity of trade between Turkey and EU in an attempt to assess comparative advantage of Turkey with regard to EU12 by using Neven and Roller's (1991) framework and Balassa's revealed comparative advantage (RCA) indices. The first objective of this chapter is to study factor endowment and hence comparative advantage of Turkey in different commodity groups over time and the second is to investigate whether Turkey has been able to better exploit its comparative advantage after the 1980 trade liberalisation program.

When analysing trade flows, it is important to distinguish *intra-industry* trade arising from product differentiation and scale economics, and *inter-industry* trade arising from specialisation to exploit comparative advantage. Therefore, Chapter 3 and 4 can be seen as an attempt towards studying the *inter-industry* patterns of Turkey's trade with the EU12 over the liberalisation period although the given analysis of factor intensity of trade (particularly a high proportion of net exports in total trade) can shed some light on *intra-industry* trade. Given the intuition that inter-industry and intra-industry trade depend particularly on the factor endowments of countries, Chapter 4 is also expected to prepare a ground for the analysis of similarity of endowments between Turkey and the EU12 and the *intra-industry* trade, which will be the subject of the following chapters.

In this chapter we find that the analysis of trade patterns by looking at SITC (Standard International Trade Classification) may be inadequate in examining factor

intensity and comparative advantage of a country. In chapter 3 it was shown that there has been a radical increase in Turkey exports of manufactured goods (given by SITC 5+6+7+8) while there was a significant decrease in exports of agricultural goods (given by SITC 0+1+2+4) to EU12 after the 1980s (see Table A4.2 in Appendix). This picture may suggest that recently Turkey has specialised in exports of physical capital and human capital intensive manufactured goods rather than labour intensive agricultural goods in its trade with EU12. However, it is shown in this chapter that the bulk of the increase in Turkey's exports to EU after the 1980s has come through a remarkable boost in share of labour intensive goods in total exports as the increase in the share of physical and human capital intensive goods was rather small (see Table 4.1). This may be simply as a result of classifying some average labour-capital intensive and labour intensive goods (e.g., textiles and clothing) in the "manufactured goods" category (SITC 5). Therefore, the analysis of factor intensity in Turkey-EU trade in this chapter reveals that the actual change in structure of Turkey-EU trade patterns after the 1980s appears to be captured better by examining the factor intensity of trade rather than by looking at the distribution of trade according to SITC classification.

This chapter interestingly shows that though Turkey was able to better exploit its comparative advantage in labour intensive goods after the 1980s (given by aggregate analysis of Turkey-EU trade based on Neven and Roller framework), a more disaggregated examination of Turkey's comparative advantage (by using Balassa's RCA indices) indicates that the degree of Turkey's competitiveness in some of its "traditional" labour intensive industries has become lower during the same period. This may simply be a result of a rise in wages in these traditional labour intensive industries due to increase in labour demand.

The policy implication of the analysis in this chapter is that Turkey should make an effort to promote not only the physical and human capital intensive (medium and high-tech) industries in which Turkey has a comparative disadvantage but also the "traditional" labour intensive (low-tech) industries in order to maintain its current export markets and to create new markets for industrial goods.

Finally, it is useful to note that in interpreting the given results on factor endowments and 'revealed' comparative advantage indices one should be cautious as these results crucially depend on the categorisation of the industries under consideration. Therefore, our results will provide insight into the effect of trade liberalisation only to the extent that the revealed comparative advantage is a fair guide to the actual comparative advantage and only if the five categories we used represent the factor intensity of the industries equally in all countries.

The changes that we examined in structure of Turkey-EU trade patterns in Chapters 2, 3 and 4 so far raise an important question of whether Turkey's trade patterns has become similar to that of the EU12. Considering the fact that the "similarity" or "complementarity" of trading partners is one the key issues in examining the effects of customs unions, in the following chapter we analyse similarity of Turkey's exports with the EU12 and compare Turkey with the three southern EU countries (namely, Spain, Greece and Portugal).

4.8.- APPENDIX

Table A4.1: Classification of industries according to factor intensities

1. Natural resources	2. Average capital and average labour intensity	3. High Labour – intensity	4. High Capital intensity	5. High Human capital intensity
Foodstuff	Metallic Products	Clothing	Plastics	Chemicals
Wood	Printing	Shoes	Glass	Pharmaceuticals
	Leather	Ceramic	Other mineral pro.	Mechanical machinery
	Wood furniture		Beverage	Electrical machinery
	Non-ferrous products		Paper	Transportation equip
	Rubber		Steel	Medical/Optical instru.
	Textile			

Source: Neven and Roller (1991)

Table A42: Structural change in Turkey's trade with EU, 1980-1990 %

Share in exports to the EU	**1980**	**1990**
Industrial products	41.4	82.7
Agricultural products	51.1	15.2
Mining	7.5	2.1
Total	100.0	100.0
Share in imports from the EU	**1980**	**1990**
Industrial products	98.7	96.2
Agricultural products	0.8	3.5
Mining	0.5	0.3
Total	100.0	100.0

Source : Undersecretary of Treasury and Foreign Trade of Turkey.

Table A4.3: Revealed comparative advantage; Net exports/domestic output (adjusted for overall trade balances) (%)

	Natural Resources	Average Capital-Labour	High Labour	High Capital	High human Capital
Belgium	7.5	8.4	-91.8	18.3	-10.3
Denmark	28.5	-11.6	-26.5	-9.1	N/A
France	1.7	-2.6	-9.8	0.2	1.4
Germany	-4.0	-0.4	-26.2	-20.0	5.8
Greece	-1.7	7.0	80.0	-1.3	-98.7
Ireland	16.5	-9.1	-61.3	-9.5	11.2
Italy	-14.9	6.1	36.1	3.1	-5.2
Netherlands	12.0	N/A	-74.4	-17.2	-10.1
Portugal	12.2	4.4	79.4	10.2	-35.8
Spain	0.6	2.4	8.7	2.4	-6.6
UK	-0.8	1.0	-2.2	2.8	-4.8

Source: Neven (1990), pp.26.

CHAPTER 5

THE SIMILARITY BETWEEN EXPORTS OF TURKEY AND THE EU12

5.1.- Introduction

This chapter examines the similarity between exports of Turkey and the EU12 between 1975-1990. The first objective is to asses to what extent these two groups are complementary (or competitive) in their exports to the world. The second goal is to compare the similarity of exports from Turkey with that of southern European members of the EU; Spain, Portugal and Greece, which are largely considered as *opponents* of Turkey in terms of the similarity of their factor endowments.

Apart from the factors such as the tariff levels, the differences in unit-costs and the size of the countries, *the degree of complementariness* (or competitiveness) of the countries is regarded as a crucial element in evaluating the effects of forming a customs union. However, there are different views on the role of complementariness on the success a customs union. Viner (1950)[1] argued that a customs union is more likely to be beneficial "... the *less* the degree of complementarity – or the *greater* the degree of rivalry- of the member countries with respect to *protected* industries, prior to customs union." Meade (1955)[2], however, criticised Viner's analysis and concluded that a customs union is more likely to raise standards "... the more substitutable for

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[1] Viner.J. (1950), "The Customs Union Issue".

[2] Meade (1955) criticised Viner's study on the grounds that his conclusions on welfare effects of trade creation and trade diversion are valid only where all elasticities of demand are zero and all elasticities of supply are infinite.

each other are the products of the countries forming the union". Meade's argument has received a considerable support from Lipsey (1960) who argued that the trade diversion effect of forming a customs union would be small for complementary countries as they will continue to import the commodities that they all have a comparative disadvantage. More recently, Wonnacott and Lutz (1989) discuss that the competitiveness between member countries would be beneficial only if the costs of the member countries were close or below the cost level of the world.

Given this ambiguous structure of theoretical arguments on the role of complementariness upon the countries forming a customs union, this work shall only look at the similarity of exports between Turkey and the EU12 overtime without making very strong conclusions on consequences of Turkey's possible entry into the EU by comparing similarity of exports of the two parties.

The work is organised as follows. In section 2, I provide a brief description for the theoretical background of Finger and Kreinin export similarity indices and present an example on how the similarity indices are calculated. Section 3 examines the similarity between exports of Turkey and the EU12 for both agricultural and manufactured commodities over the period between 1975-1990. In section 4, I first analyse the similarity between the overall exports of Turkey and the southern European members of the EU; Spain, Portugal and Greece. Secondly, I examine the similarity between the exports of Turkey and the three southern European countries to industrialised EU5 (namely, Germany, the UK, France, Italy and Netherlands) over the same time period. Policy implications of our results are discussed in conclusion.

5.2.- The theoretical background of taste and export similarity

"The most widely taught and understood theory of international trade is the Hechscher-Ohlin theory, which explains patterns of trade in terms of factor productivity and relative factor endowments"[3]. However, Linder (1961) challenged this orthodox notion and argued that Hechscher-Ohlin (H-O) theory is too simplistic and ignores systematic *demand-related* factors that are important in explaining trade flows. In particular, Linder suggested that "taste similarities" between nations are a key determinant of bilateral trade patterns in manufactures. In Linder's view: "International trade is really nothing but an extension across national frontiers of a country's own web of economic activity"[4].

Since exports are viewed as an extension of the domestic market in Linder's analysis, it follows that exporters will look to countries with similar demand patterns as most likely potential markets for their products. Therefore, the more similar the range of products demanded in the two nations, the greater will be the overlap of potential exports. Linder emphasises the role of product differentiation between nation's goods and monopolistic competition as a trade creating factor.

In sum, Linder's hypothesis basically implies that countries will trade - in manufactures- relatively more (other things being equal) with countries of similar per capita incomes. Regarding the two contrasting theories, it can be said that the Linder model of trade in manufactured goods is a "demand" theory of trade while the H-O model is essentially a "supply" theory of trade.

In empirical studies on international trade issues, several measures for comparing the commodity composition of trade have been introduced. For example, Linnemann (1966) has introduced a measure which was also used by Hufbauer (1970) in testing the Linder hypothesis[5]. A substantial literature has risen testing the Linder hypothesis, a literature which has, in general, found support for the hypothesis. However, many of these studies have been vulnerable to criticism from a number of standpoints. First, though Linder's hypothesis is stated in terms of manufactured goods, total trade rather than manufactured goods trade data are often used in the tests. Second, the effect of distance on transportation costs and trade has often been ignored or inadequately addressed. Hence, the results showing an association between income levels and trade may be the result of the geographic clustering of high income countries which produces low transportation costs and large trade flows.

Apart from the Linnemann's measure which has been used to test Linder's hypothesis, two better-known measures are the Grubel-Lloyd (1975) index for estimating the extent of intra-industry trade and the export similarity index proposed by Finger and Kreinin (1979). In our work attention will be focused on the Grubel-Lloyd index and the Finger and Kreinin index of export similarity rather than testing the Linder hypothesis. In what follows we first examine the similarity in exports of Turkey and the EU using the Finger and Kreinin index and in Chapter 8 we use the the Grubel-Lloyd index in examining the overall trend of intra-industry trade (IIT) for Turkey as well as the IIT in Turkey-EU trade.

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[5] For studies testing the Linder hypothesis, see Fortune (1971), Sailors et al (1973), Greytak and

5.2.1- A measure of 'Export Similarity' and its possible uses

The index of export similarity measures the similarity of the exports of any two countries (or country groups) to a third market and was firstly used by Mac Dougall (1952). MacDougall described the export similarity index as the ratio of the product elasticity of substitution (in demand) between imports from two different sources to the aggregate (across all products) elasticity of substitution of imports from those sources. Finger and Kreinin (1979) proposed a different index to measure export similarity and pointed out that "... the MacDougall index is sensitive to the relative scale of exports of the two exporters, and tends toward unity when one exporter is notably larger than the other ". An advantage of Finger and Kreinin index is that it requires only international trade data and these are available on a standardised basis for all countries.

Finger and Kreinin (1979) argue that a number of propositions in international economics can be used to examined by the use of an export similarity index. First, Finger and Kreinin discuss that the General System of Preferences (GSP) -granted by all industrial countries to the manufacturing exports of LDCs (less developed countries) – gives rise to two effects: *trade creation* and *trade diversion*. They point out that the latter effect would be important if and only if LDCs export the same type of commodities as industrial countries to the market of donor countries. Therefore, if exports are dissimilar – subject to little or no 'commodity overlap', then there is little scope for trade diversion. Secondly, they argue that only to the extent that LDCs' exports to OECD countries overlap the commodities exchanged by the industrial countries themselves, would any benefits flow to the LDCs from such GATT (General

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McHugh (1977), Kohlhagen (1977), and Linnemann and Beers (1988).

Agreement on Trade and Tariffs) tariff cuts. Finally, they discuss that the similarity of exports between any two countries or groups of countries can be used as a criteria to assess the degree to which their economic structure is becoming more similar or more divergent.

5.2.2- Methodology of Finger and Kreinin index

Finger and Kreinin define the index of export similarity by the formula;

$$\mathbf{S_i\,(ab,c) = \{ \sum_i \; Minimum\; [\, X_i\,(ac),\, X_i\,(bc)\,]\; \}\; 100} \qquad (1)$$

where S_i (ab, c) is similarity between exports of country *a* and *b* to a common market *c* in commodity *i*, X_i (ac) is the *share* of commodity *i* in *a*'s (Turkey) exports to *c* (world); and similarly X_i (bc) is the *share* of commodity *i* in *b*'s (EU12) exports to *c* (world).

In equation (1), if the commodity distribution of *a*'s and *b*'s exports are identical (X_i (ac) = X_i (bc) for each *i*), the index will take on a value of 100. If *a*'s and *b*'s export patterns are totally dissimilar (for each X_i(ac) > 0, X_i (bc) = 0 , and vice versa) the index will take on a value of zero.

The export similarity index in equation (1) can best be illustrated by the following example. Suppose two exporters, *a* and *b*, sold the following amounts of each of two products to the same market, *c*:

	Exporter			
	a		b	
Product	Value	X_i(ac)	Value	X_i(bc)
1	$10	0.1	$500	0.5
2	$90	0.9	$500	0.5
Total	$100	1.0	$1000	1.0

$$S\,(ab,c) = [\min(0.1, 0.5) + \min(0.9, 0.5)]\,100 = 60 \qquad (2)$$

Since the index in equation (1) is intended to compare only patterns of exports across product categories, it should not be affected by the relative sizes or scales of total exports. To remove the scale effect, the exports of, say, *a* must be rescaled so that they are equal in total to those of *b*. Therefore, *a*'s 'hypothetical' exports of products 1 and 2 would become $100 and $900, respectively. Given this example above, the whole $100 of *a*'s (scaled) exports of product 1 is *matched* by *b*'s exports of the same product, with $400 of *b* exports to spare. Of the $900 of *a*'s (scaled) exports of product 2, only $500 is matched by *b* exports of the same product. Therefore, of *a*'s $1000 of scaled total exports, $600 ($100 + $500), or 60 % is 'matched' by *b* exports, and the export similarity index would assume a value of 60.

5.3.- Results on Finger and Kreinin similarity indices

5.3.1- The similarity between exports of Turkey and the EU12

In this section I examine the similarity between exports of Turkey and the EU12 as a group for the period 1975-1990 using the Finger and Kreinin indices. The indices are calculated for sixty-five commodities; twenty-four of which are defined as agricultural (SITC 0,1,2 and 4) and forty-one of which are defined as manufactured (SITC 5-9), at two-digit level[6].

Table5.1: The Similarity between Exports of Turkey and the EU12, 1975-1990 %

SITC	1975	1978	1981	1984	1987	1990
Agricultural [0+1+2+4]	42	53	44	46	42	42
Manufactured [5+6+7+8+9]	37	29	43	44	49	46
All goods [0+1+2+4+5+6+7+8+9]	26	23	34	41	46	44

Note: Calculated using Finger and Kreinin indices.

Table 5.1 and Chart 5.1 above present export similarity indices for Turkey and the EU12. It appears that the overall similarity between exports of Turkey and the EU12 has increased particularly due to rising level of similarity in manufactured goods between 1975 and 1990. Table 5.1 also shows that the similarity of exports in agricultural products has been greater than that of manufactures in all periods except 1987 and 1990. Although there has been some fluctuations, Table 5.1 suggests that the overall similarity between exports of Turkey and the EU12 has increased over the time under consideration.

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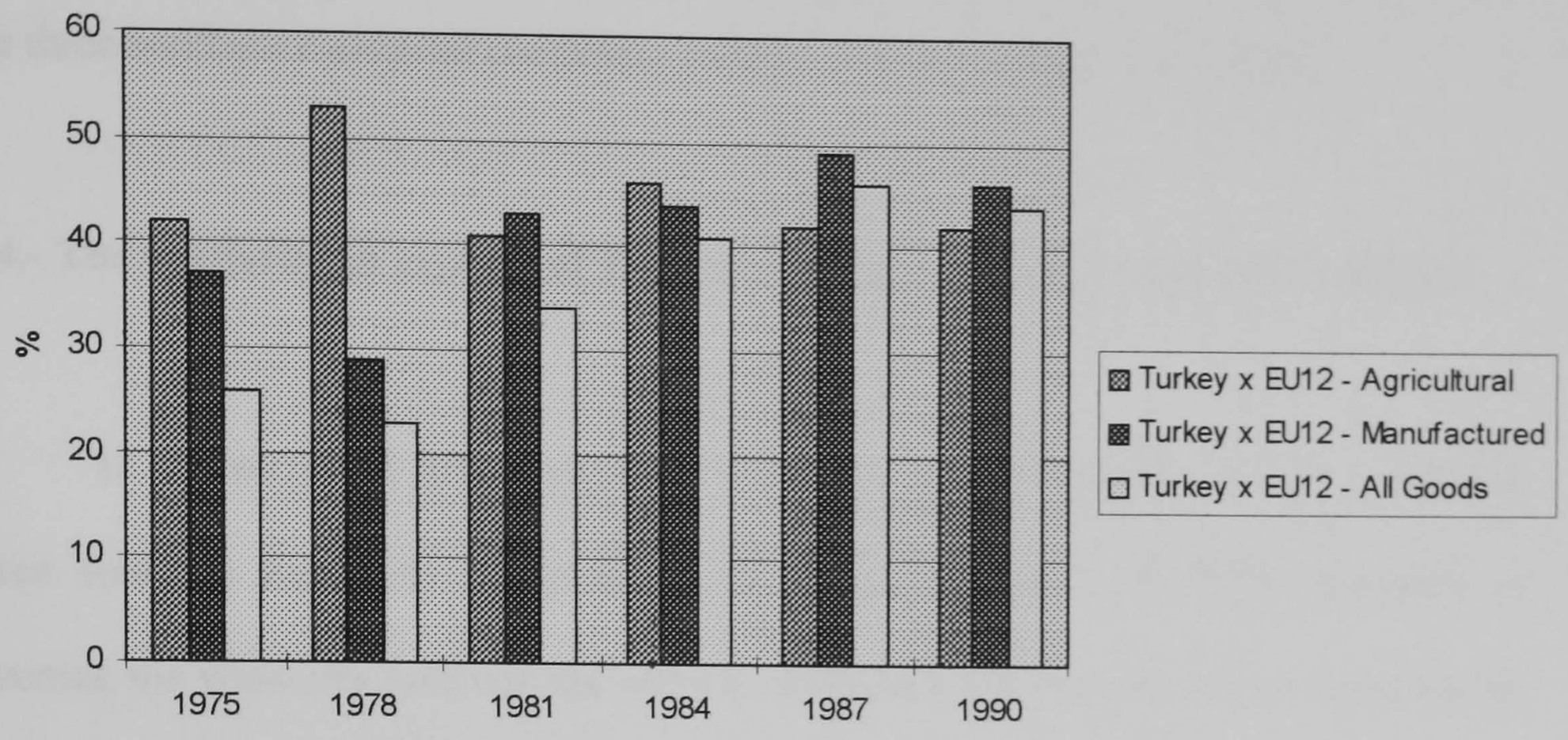
[6] The data used in the estimation of indices are obtained from the OECD. (CD-ROM Historique. 1961-1990, International Trade by Commodities Statistics, Rev.2)

Chart 5.1.- Similarity between exports of Turkey and EU12, 1975-1990



Note: Calculated using Finger and Kreinin indices

It is interesting to note that following Turkey's 1980 liberalisation program there has been a significant rise in similarity of exports in manufactured commodities while the similarity of exports in agricultural products has not changed particularly. This is consistent with our previous finding on the shift in Turkey's exports towards manufactured goods after the 1990s. The picture in Table 5.1 suggests that the overall structure of exports of Turkey and EU has become more similar after Turkey's trade reforms.

In sum, our analysis on the similarity between exports of Turkey and the EU12 as a whole indicates that the economic structure of the areas has become more similar (or less divergent) over time. As discussed before, however, it is difficult to reach a final judgement on the overall impact of similarity on achievement of forming a customs union.

After analysing the similarity between exports of Turkey and the EU12 as a group, in what follows I shall focus on the similarity between exports of Turkey and the three southern European countries; namely, Spain, Portugal and Greece.

5.4.- The similarity in exports of Turkey and the southern European countries

In this section, I first analyse the similarity of total exports of Turkey and the three southern European countries to EU between 1975 and 1990. Secondly, I examine the similarity between the exports of Turkey and the other three countries to industrialised EU5 (namely, Germany, the UK, France, Italy and Netherlands) over the same time period.

5.4.1.- The similarity in overall exports of Turkeys and the southern European countries

Table 5.2, 5.3 and 5.4 below show the similarity between exports of Turkey and the three southern European countries to EU12 in all goods, agricultural goods and manufactured goods, respectively.

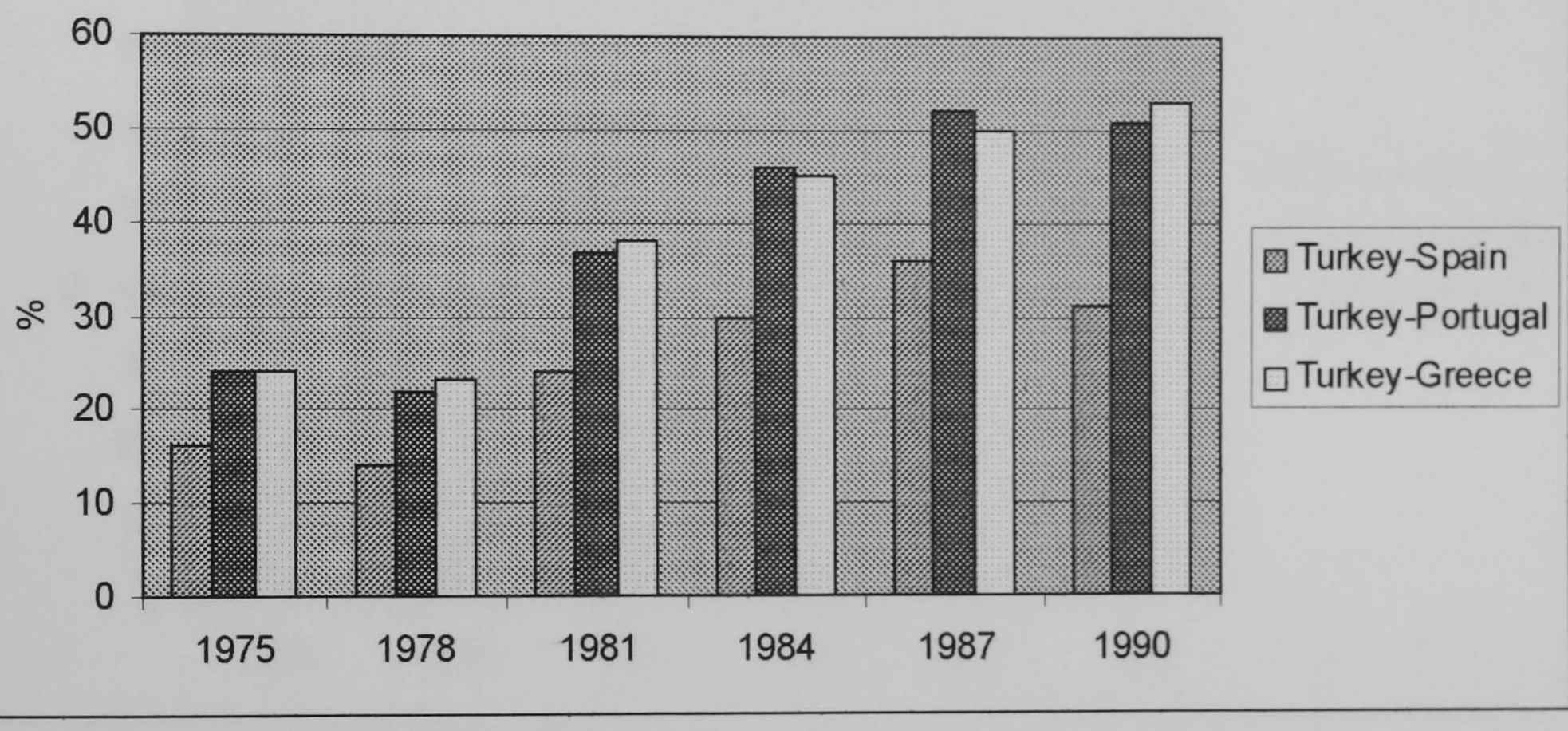
Table 5.2: The Similarity of Exports to EU12 in All goods, 1975-1990 %

	1975	**1978**	**1981**	**1984**	**1987**	**1990**
Turkey×Spain	16	14	24	30	36	31
Turkey×Portugal	24	22	37	46	52	51
Turkey×Greece	24	23	38	45	50	53

Note: Calculated using Finger and Kreinin indices

Table 5.2 and Chart 5.2 show the overall similarity between exports of Turkey and the other three countries and indicate that the similarity between exports of these increased notably over the period 1975-1990 and that, compared to Spain, the aggregate total exports of Portugal and Greece are more similar to that of Turkey.

Chart 5.2.- The Similarity of exports to EU12 in All Goods, Comparison of Turkey with Spain, Portugal and Greece, 1975-1990



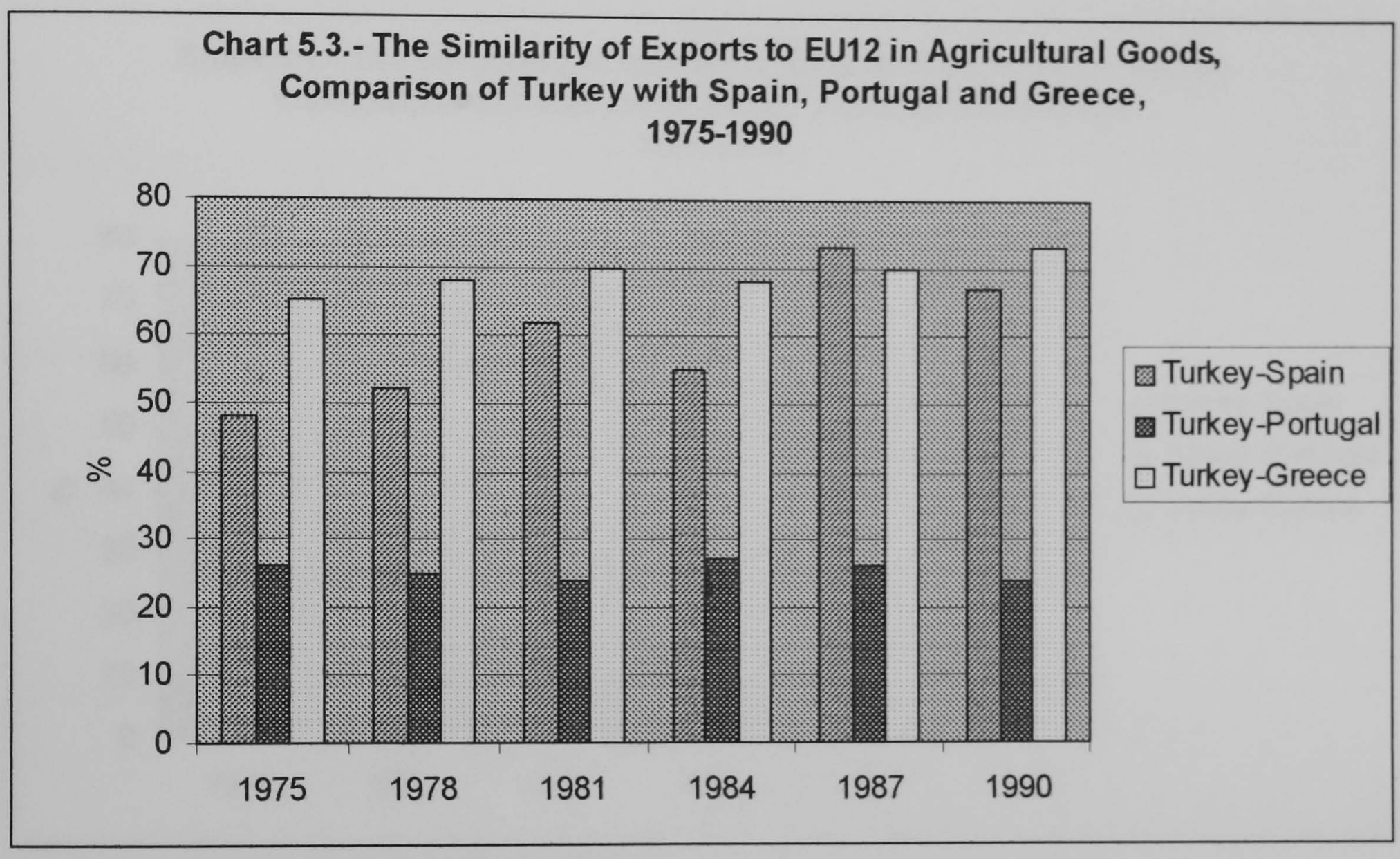
Note: Calculated using Finger and Kreinin indices.

Table 5.3 and Chart 5.3 show the similarity between exports of Turkey and the three southern European countries in agricultural goods. It appears that the similarity between exports of Turkey, Spain and Greece increased while there was no significant change in the similarity between exports of Turkey and Portugal during the period under consideration. Table 5.3 also shows that, compared to Spain and Portugal, exports of Greece in agricultural goods is more similar to that of Turkey.

Table 5.3: The Similarity of Exports to EU12 in Agricultural goods, 1975-1990 %

	1975	1978	1981	1984	1987	1990
Turkey×Spain	48	52	62	55	73	67
Turkey×Portugal	26	25	24	27	26	24
Turkey×Greece	65	68	70	68	70	73

Note: Calculated using Finger and Kreinin indices



Note: Calculated using Finger and Kreinin indices

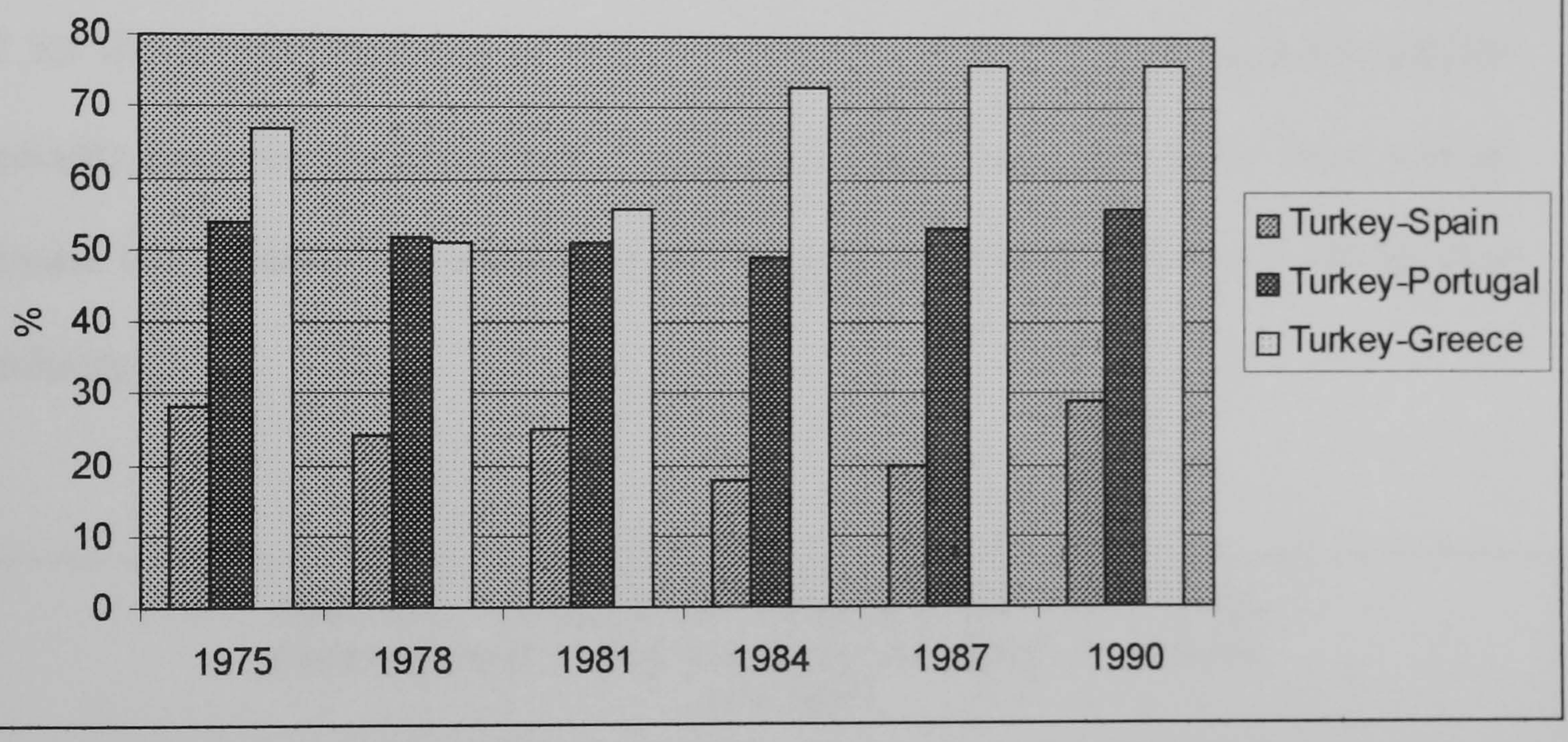
Finally, the similarity between exports of Turkey and the others in manufactured goods is given in Table 5.4. It seems that there has been no significant change in similarity of exports of manufactures in the cases of Spain and Portugal while there has been a significant rise in the case of Greece after the 1980s. It appears that Turkey and Spain are not competitors in exports of manufactured goods as only a small proportion (i.e., less than 30 percent) of their exports to EU12 are similar.

Table5.4: The Similarity of Exports to EU12 in Manufactured goods, 1975-1990 %

	1975	1978	1981	1984	1987	1990
Turkey×Spain	28	24	25	18	20	29
Turkey×Portugal	54	52	51	49	53	56
Turkey×Greece	67	51	56	73	76	76

Note: Calculated using Finger and Kreinin indices

Chart 5.4.- The Similarity of Exports to EU12 in Manufactured Goods, Comparison of Turkey with Spain, Portugal and Greece, 1975-1990



Note: Calculated using Finger and Kreinin indices

5.4.2.- The similarity in exports of Turkeys and the southern European countries to the industrialised EU5

In this section I compare the similarity between exports of Turkey with the other three countries to the industrialised EU5 (namely, Germany, the UK, France, Italy and Netherlands) over the same time period.

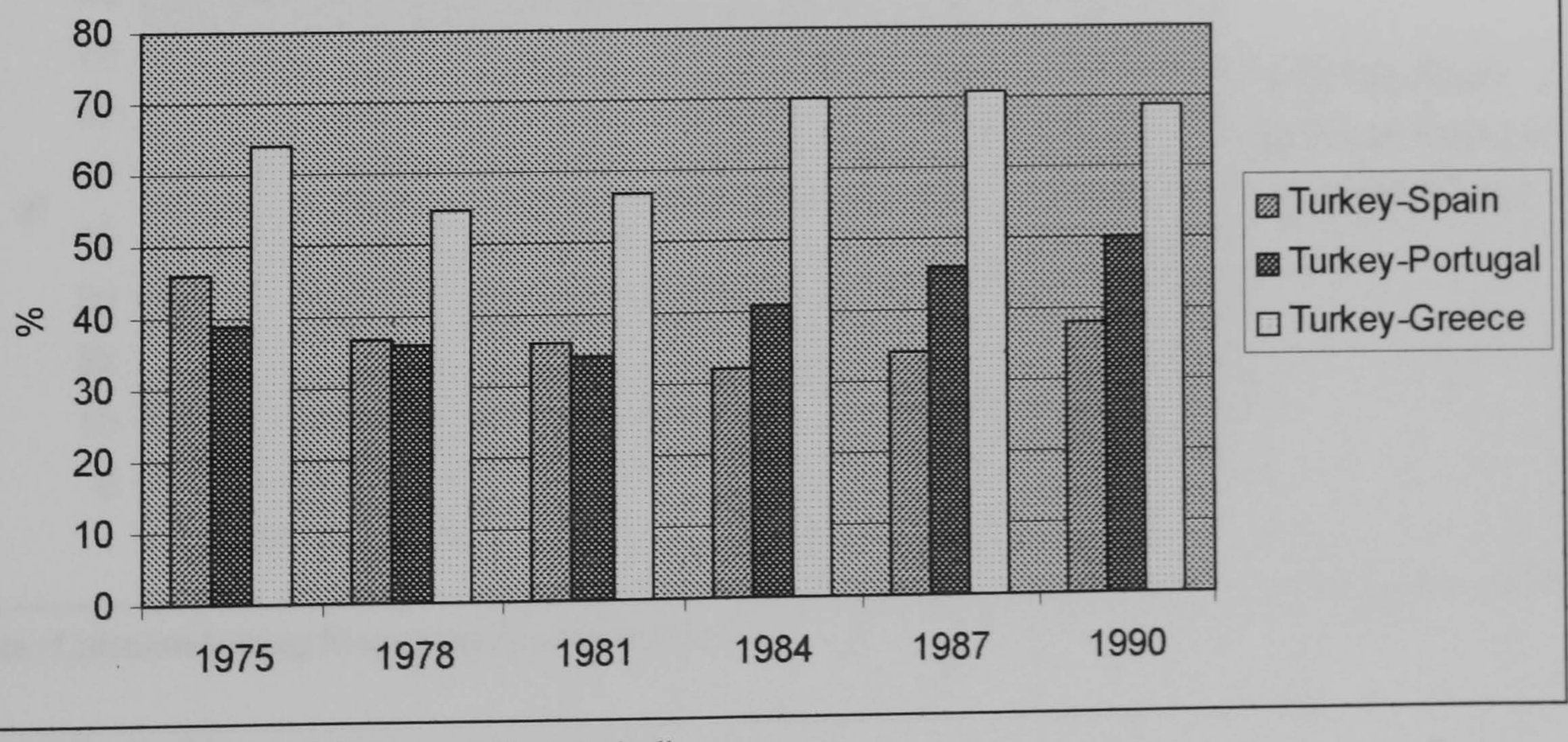
Table 5.5: The Similarity of Exports to EU5 in All goods, 1975-1990 %

	1975	**1978**	**1981**	**1984**	**1987**	**1990**
Turkey×Spain	46	37	36	32	34	38
Turkey×Portugal	39	36	34	41	46	50
Turkey×Greece	64	55	57	70	71	69

Source: Calculated using Finger and Kreinin indices

Table 5.5. shows that the overall similarity of exports from Turkey and the three EU countries to the industrialised EU5 is greater than that of EU12 (see Table 5.2 for the overall similarity of exports to EU12). Table 5.5 also indicates that the similarity between the exports of Turkey and Spain decreased while there was an increase in similarity between exports of Portugal and Greece (which has the greatest similarity).

Chart 5.5.- The Similarity of Exports to EU5 in All Goods, Comparison of Turkey with Spain, Portugal and Greece, 1975-1990



Note: Calculated using Finger and Kreinin indices

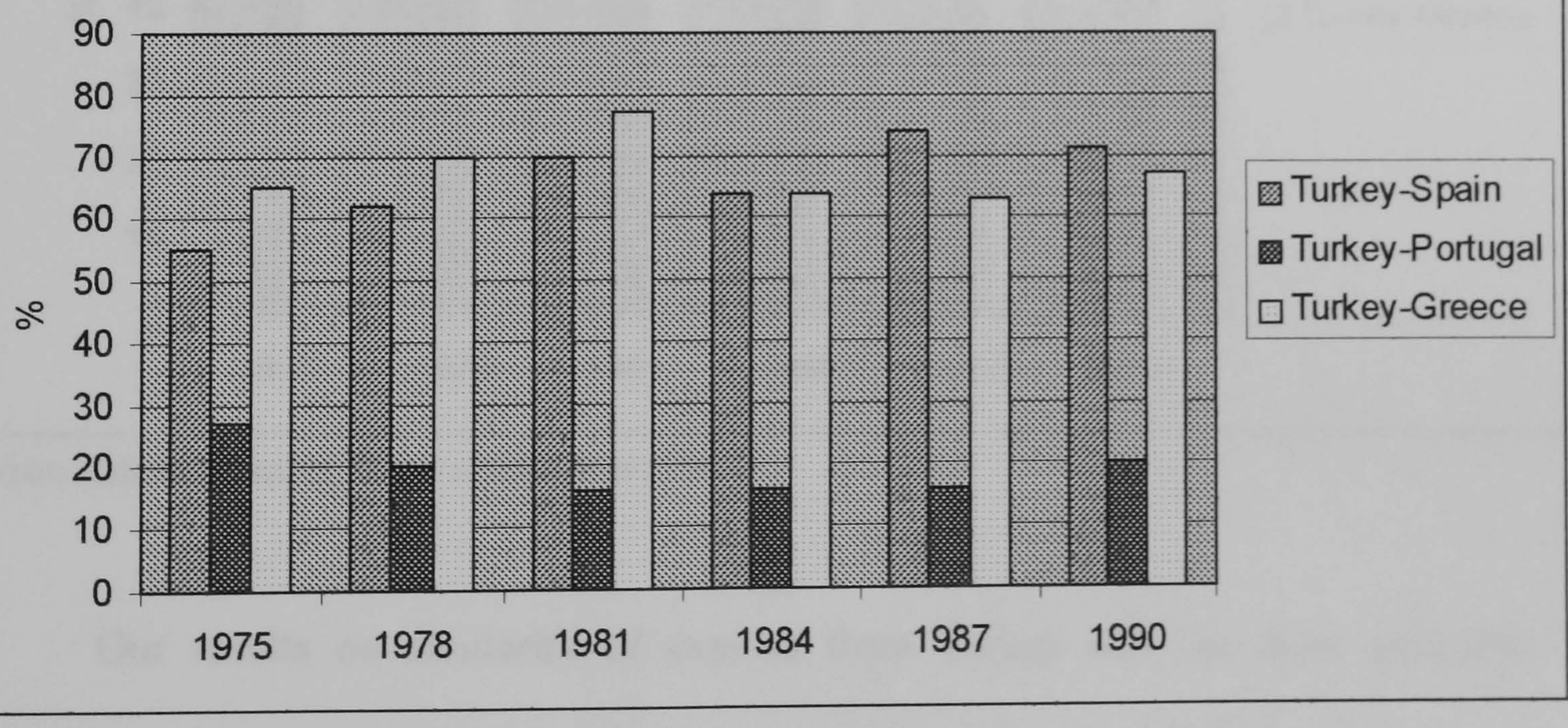
Table 5.6 shows the comparison of the similarity between the exports of Turkey and the others in agricultural goods. It is clear from Table 5.6 that the similarity between exports of Turkey and Portugal is rather low and it has slightly increased between 1981-1990 while the similarity between exports of Turkey and Spain and Turkey and Greece is relatively high.

Table 5.6: The Similarity of Exports to EU5 in Agricultural goods, 1975-1990 %

	1975	**1978**	**1981**	**1984**	**1987**	**1990**
Turkey×Spain	55	62	70	64	74	71
Turkey×Portugal	27	20	16	16	16	20
Turkey×Greece	65	70	77	64	63	67

Note: Calculated using Finger and Kreinin indices

Chart 5.6.- The Similarity of Exports to EU5 in Agricultural Goods, Comparison of Turkey with Spain, Portugal and Greece, 1975-1990



Note: Calculated using Finger and Kreinin indices

Regarding manufactured goods, the comparison of the similarity of Turkey's manufacture exports with that of three southern European countries is given in Table

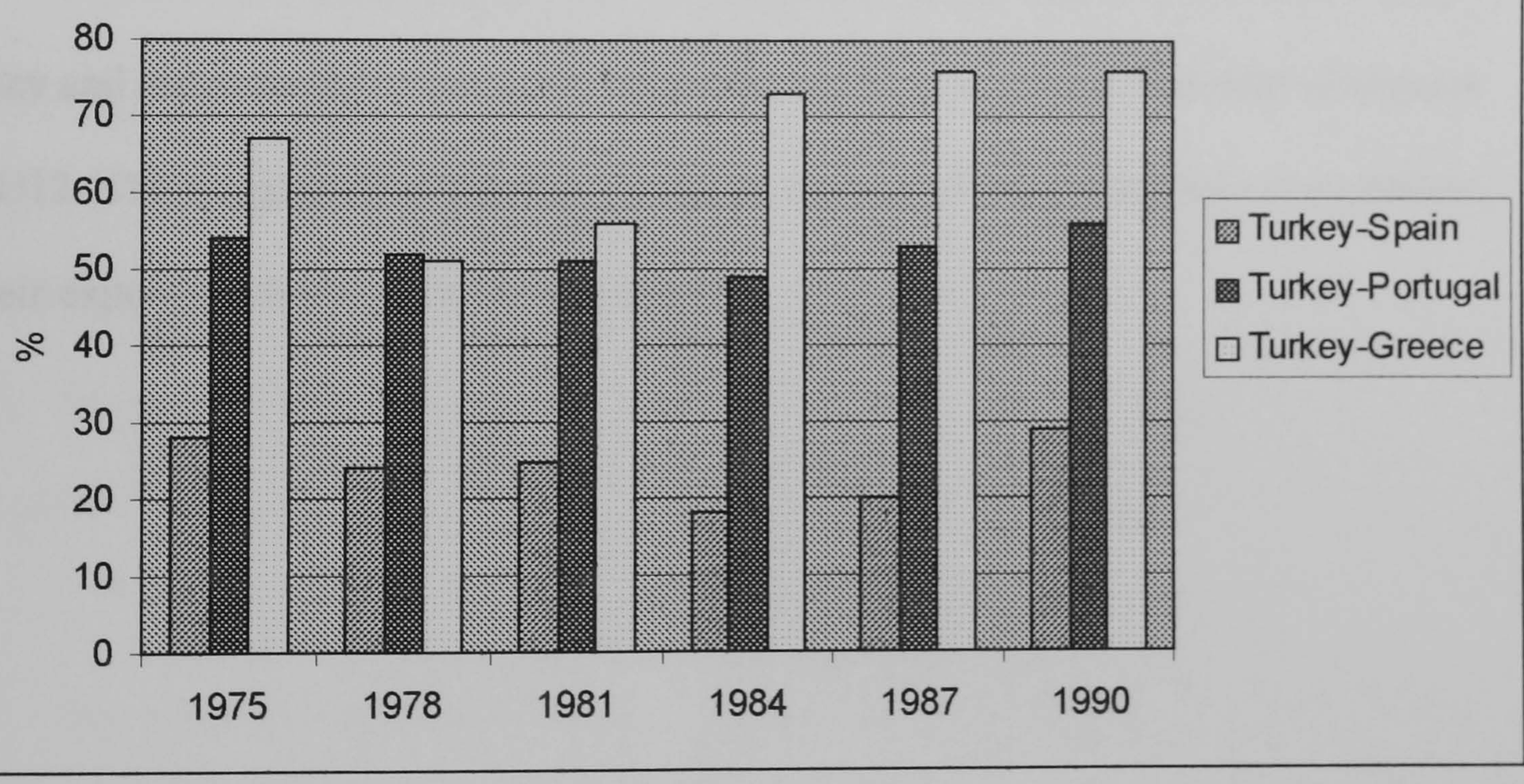
5.7. It appears that only the similarity between manufacture exports of Turkey and Greece increased while there was no significant change in the similarity between exports of Turkey the other two, namely, Spain and Portugal.

Table 5.7: The Similarity of Exports to EU5 in Manufactured goods, 1975-1990 %

	1975	1978	1981	1984	1987	1990
Turkey×Spain	28	24	25	18	20	29
Turkey×Portugal	54	52	51	49	53	56
Turkey×Greece	67	51	56	73	76	76

Note: Calculated using Finger and Kreinin indices

Chart 5.7.- The Similarity of Exports to EU5 in Manufactured Goods, Comparison of Turkey with Spain, Portugal and Greece, 1975-1990



Note: Calculated using Finger and Kreinin indices

Our results on similarity of exports from Turkey and the three southern European countries appears to be consistent with the findings of Ozkale (1993)[7] and suggest that one should be cautious in assessing the similarity among these countries

[7] Ozkale examines similarity in exports from Turkey and the three southern European countries for 1974 and 1981-1988. Her findings suggest that similarity in exports of manufactures from Turkey and Spain is particularly low hence Spain's accession to the EU can not be harmful for Turkish manufacture exports.

as the similarity of exports among these countries varies significantly in different product groups. Our results indicate that, as one might expect, Turkey and the three EU countries are competitors especially in exports of agricultural goods. Ozkale (1993) argues that following Turkey's possible accession to the EU Turkey is likely to export more agricultural goods to the EU as exports of agricultural goods are extensively restricted under Common Agricultural Policy (CAP). A study carried out by State Planning Organisation (SPO) in 1990 on evaluation of world prices of agricultural goods suggests that although Turkey is likely to be a net importer of some agricultural goods where world prices are lower than domestic prices, the overall net effect of Turkey's possible membership to the EU is expected to be positive.

In relation to manufactured goods, it seems that the similarity of exports from Turkey and the three EU countries to industrialised EU5 is greater than that of exports to EU12. This suggests that the four countries concerned are particularly competitors in their exports to the large markets in the EU.

5.5.- CONCLUSION

This chapter first examines the similarity between the exports of Turkey and the EU12 as a group and, secondly, it compares the similarity of Turkey's exports with that of the three southern European countries; namely, Spain, Portugal and Greece, in order to assess to what extent these three countries are competitors of Turkey in their total exports to EU and in their exports to industrialised EU5.

Given the uncertainty on the welfare effect of "*complementariness*" (or competitiveness) on the countries forming a customs union, it is very difficult to draw firm conclusions on magnitude of *trade creation* and *trade diversion* effects. Therefore, this work only analyses the similarity between exports of Turkey and the EU12 overtime without making any powerful conclusion on the consequences of Turkey's possible entry into the EU. Therefore, this work should be considered as an attempt to use the similarity of exports between Turkey and the EU12 as a criteria to assess the degree to which their economic structure is becoming more similar or divergent.

Our results on the similarity between the exports of Turkey and the EU12 as a group suggest that the overall similarity of exports and the similarity in exports of manufactures from the two areas increased particularly after the 1980s between 1975-1990 while similarity of exports of agricultural goods slightly decreased mainly after the 1980s.

Our results on the similarity between exports of Turkey and the three southern European countries indicate, first, that the comparison of Turkey with these three

countries should be made by considering the type of products exported as some of these countries do not appear to be a competitor of Turkey in some commodity groups. Spain, for example, does not seem to be a competitor of Turkey in the exports of manufactured goods (less than 30 percent of Spain's manufacture exports to EU12 is matched with that of Turkey). Besides, the similarity between the exports of Turkey and Portugal in agricultural products appears to be also rather small (only about 25 percent of Portugal's agricultural good exports to EU12 is matched with that of Turkey). It appears that compared to Spain and Portugal, Greece has the highest similarity in exports of both manufactured and agricultural products. The overall similarity in exports to the industrialised EU5 seems to be greater than that of the exports to EU12 not only in the case of agricultural goods but also in industrial goods. The high similarity in exports of manufactures may be due the fact that Turkey's exports of agricultural goods are restricted under Common Agricultural Policy however trade restrictions on manufactures have been largely removed since the 1973 Additional Protocol between Turkey and the EU.

All in all our results suggest that freeing trade flows between Turkey and the EU12 has made the production pattern of the two regions more similar. Therefore, further integration of Turkey into EU may result in closing the technology gap between the two areas.

PART III

DETERMINANTS OF TURKEY-EU TRADE

CHAPTER 6

AN ANALYSIS OF INCOME AND PRICE ELASTICITIES OF DEMAND FOR TURKEY'S IMPORTS AND EXPORTS

Section1: Import demand model for Turkey

6.1.-Introduction

Following the analysis of Turkey-EU trade patterns in previous chapters, this chapter examines the determinants of Turkey-EU trade in two sections. In section 1 we begin our analysis with estimating an import demand function for Turkey and in section 2 we replicate the same analysis for Turkey's exports. The aim of Chapter 6 is to examine the price and non-price determinants of Turkey's trade by employing conventional import and export demand functions.[1]

Conventional import demand functions relate the volume of a country's imports to two independent variables: *relative prices* (indicating price/cost competitiveness) and *income* (indicating non-price competitiveness)[2]. Although the price variable can capture the effect of changes in exchange rates, considering the

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[1]Three well-known methods which have been used to estimate the changes in trade resulting from freeing trade flows and customs union are *the trade shares* method, *the income elasticities* approach and *the import demand functions* model. The trade shares method involves the calculation of apparent import/consumption ratios for the country under investigation and the comparison of their changing values with those of a country which is used as a 'normaliser' (for example, Truman, 1969; Kreinin, 1972; Plummer, 1991). The income elasticities approach was used by Balassa (1967), who estimated *ex post* income elasticities of demand for imports for pre- an post-integration periods, a rise in the value of elasticity indicating *trade creation* and a fall in its value indicating *trade diversion*. The import demand functions model involves the estimation of import demand functions for members of the customs union. See, for example, Kreinin (1969) for application of this method to EC countries.

[2] The information provided by import demand functions includes estimates of income and price elasticities. In the econometric analysis of international trade the emphasis has conventionally been on

importance of exchange rate fluctuations in trade for a developing country like Turkey and the fact that there are fewer errors in measurement of exchange rate changes than other of other price changes, we also include the current, lagged and expected exchange rates as explanatory variables to the import demand function for Turkey[3].

In first section of Chapter 6, we examine whether there has been a structural change in Turkey's imports from the EU over the pre and post liberalisation periods by estimating Turkey's import demand function for the period between 1973 and 1993 and searching for a structural break in the period after the1980s. We apply the same procedure to Turkey's exports in second section of the chapter.

The remainder of Chapter 6 is organised as follows. Section 2 briefly reviews the theoretical and empirical background of import demand functions. Section 3 examines Turkey's total imports and its imports from the EU as well as Turkey's import demand function by main industrialised EU countries; Germany, UK, France, Italy and Netherlands, for the period between 1973 and 1993. Finally, section 5 investigates the "structural stability" of the parameters of our import demand models between the pre-and post liberalisation periods.

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the price elasticities. However, recently it has also been increasingly recognised that income elasticities are at least as important, especially in a growing economy.

[3] One possible reason for expecting a different response, on the part of traders, to changes in the exchange rate and to changes in other foreign prices can also be the visibility of exchange rate movements (market participants may be more aware of them than they are of other price changes).

6.2.- The Theoretical and Empirical Background of Import Demand Model

The conventional formulation of the import demand function [see, e.g. Khan and Ross (1977), Boylan et al (1980), Melo and Vogt (1984), Bahmani-Oskooee (1986), Asseery and Peel (1991)] can be stated as follows[4]:

$$M_t = f\,[Y_t, (P_{mt} / P_{dt})] \qquad (1)$$

where M_t is the quantity of imports demanded at period t; Y_t is real GDP at period t; P_{mt} is the import price index at period t; and P_{dt} is the domestic price level at period t.

Theoretically, equation (1) presupposes that in the absence of money illusion demand functions are homogenous of degree zero in prices and money income. Therefore, the demand for imports can be expressed in terms of real income and relative prices (Gafar 1988). This specification imposes the restriction that the influence of the two price variables are equal in magnitude but opposite in sign.

Surveys of empirical studies involving the estimation of import functions [see Magee, (1975) and Goldstein and Kahn, (1985)] support the inclusion of income, the price of imports and domestic prices of substitutes as appropriate variables for

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Secondly, traders may perceive one type of change as more transitory and/or reversible than another, inducing a different kind of response. See Wilson and Takacs (1979) for further discussion on this.

[4] The import demand model is conceptually like any other demand model. The price and quantity demanded are assumed to be inversely related, *ceterus paribus* , with the equilibrium price and quantity determined by the interaction of supply and demand. The estimation of this type of model generally proves to be quite troublesome due to the identification problem. This problem has been solved in international trade by making the additional assumption that the supply elasticity is infinite (see Murray and Ginman 1976).

explaining changes in imports. The income variable has sometimes been measured in GDP, GNP or GDP per capita, although Kennedy and Thirlwall (1979), Tsegaye (1981) and Sinclair and Sutcliffe (1988) have argued that expenditure may be more appropriate. Some authors have distinguished between secular and cyclical income effects [Dunlevy and Deyak, (1989); Marquez, (1990); Apostolakis, (1991)]. Data for the price of imports and the price of domestic substitutes are often unavailable. However, unit value indices appear to be a reasonable proxy for import prices (Shiells, 1991). Proxies for domestic substitute goods include the wholesale price index, the GDP deflator and the consumer price index.

The functional form of import demand functions which has been used most widely in past research is the log-linear function [for example, Khan and Ross, (1977); Boylan et al, (1980); Melo and Vogt, (1984); Bond, (1987); Gafar, (1988); Sarmad, (1989); Marquez, (1990)]. However, Anderton et al (1992) modelled UK imports of manufactures using the Almost Ideal Demand System (AIDS) specification, which allows for identical demand functions for imports and output, and found to be superior to the log-linear import demand function. The AIDS model was also used by Winters (1984) to examine the effect of EU membership on the UK's imports of manufactures from major suppliers. Since theory provides no *a priori* criteria for selecting the proper form, the choice of the functional form remains an empirical question. The decision regarding the appropriate functional form is crucial because the income and price elasticities of import demand change as the functional form changes.

The common assumption behind the import demand model is that there are no supply constraints (see footnote 4), so that the price of imports can be considered as exogenous. This implies that the supply of imports is infinitely elastic, therefore, the quantity demanded of imports is demand determined. Because imports of Turkey constitute only a small part of total world imports[5], the assumption of small country appears to be suitable for Turkey.

6.2.1.- Specification of the Model for Turkey

Two types of import demand functions were estimated in this study. The first, based on the conventional specification, is given by;

$$M_t = f(Y_t, P_{mt}, P_{dt}, D_{80}, E) \qquad (2)$$

where M_t is the total quantity of Turkey's imports[6] at period t, Y_t is Turkish real GDP (at 1987 prices) at period t, P_{mt} is the import price index at period t, P_{dt} is the domestic wholesale price index (1987=100) at period t, D_{80} is a shift dummy variable to account for Turkey's 1980 liberalisation program (taking the value zero for the period (1973-1979) and unity for (1980-1993), and E is the exchange rate variable (defined as units of foreign currency per unit of Turkish Lira).

The second import demand function we use is based on the AIDS model, which specifies imports as a share of expenditure,

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[5] Turkey's total imports constituted only 0.76 % of total world imports in 1993. (IMF Direction of

$$M_t/Y_t = f(Y_{et}, P_{mt}, P_{dt}, D_{80}, E) \quad (3)$$

where Y_{et} is Turkish real domestic expenditure at period *t* and the other variables are defined as above.

The exchange rate variable, E, in equations (2) and (3) is an additional variable to test the impact of exchange rates changes on Turkey's imports for the purposes discussed in introduction. As an alternative to E, we first lagged the exchange rate variable one year and tested E_{t-1}. That a perverse effect of exchange rate changes on the *value* of trade occurs frequently is well known from the literature on the *J*-curve[7]. But it is also possible for *anticipatory* changes in the exchange rate to affect the *current volume* of imports in a perverse fashion (Wilson and Takacs, 1980)[8]. To test this proposition, secondly, we added an *expected exchange rate* variable, E^p, to Turkey's import demand model. Due to the lack of a better alternative, we adopt a variable of Wilson and Takacs (1980) as a proxy for E^p:

$$E^p = [\, 0.7\,(\ln E_t - \ln E_{t-1}) + 0.3\,(\ln E_{t-1} - \ln E_{t-2})\,] \quad (4)$$

where ln denotes natural logs[9].

In sum, the import demand model in equation (2) was estimated for Turkey in four different functional forms by using the following equation;

Trade Statistics, 1994)

[6] The value of total imports (in millions of $) is deflated by import prices.

[7] It is not tested in this study.

[8] Due to continuous depreciation of exchange rates in Turkey, expected exchange rate, E^p, is considered to play an important role on trade flows.

$$\ln M_t = \beta_0 + \beta_1 \ln Y_t + \beta_2 \ln (P_{mt}/ P_{dt}) + \beta_3 \ln M_{t-1} + \beta_4 D_{80} + \beta_5 \ln E_t + \beta_6 \ln E_{t-1} + \beta_7 \ln E^p + \mu_t \quad (5)$$

where μ_t is a random disturbance term and all the other variables are defined as before.

Finally we consider the error correction model (ECM) of Davidson et al. (1978). We accept a non-stochastic steady state theory of imports so that imports are assumed to be proportional to income in the steady state, i.e. $m_t = \bar{\gamma} Y_t$, where $\bar{\gamma}$ is constant for a given growth rate of Y (and so of m). In logarithmic form this becomes;

$$\ln m = y + \ln Y \quad (6)$$

On the basis of equation (6) we postulate a stochastic disequilibrium relationship between ln m and ln Y, which will simplify to equation (6) in steady state. In absence of a solid dynamic theory we assume a general autoregressive distributed lag (ADL) model. For simplicity, we consider only current and one period lags of $\ln m_t$ and $\ln Y_t$ as in the equation;

$$\ln m_t = \alpha_0 + \alpha_1 \ln m_{t-1} + \beta_0 \ln Y_t + \beta_1 \ln Y_{t-1} + v_t \quad (7)$$

where v_t is assumed to be *white noise* . Long-run homogeneity condition (equation 6) requires that $\alpha_1 + \beta_0 + \beta_1 = 1$. Therefore, rewriting (7) with that restriction gives;

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[9] This specification, which implies an assumed distributed lag, was used to minimise serial correlation with E.

$$\Delta \ln m_t = \alpha + \beta \Delta \ln Y_t + \delta (\ln m_{t-1} - \ln Y_{t-1}) + v_t \qquad (8)$$

where α, β and δ are unrestricted parameters. In this formulation the term $\beta \Delta \ln Y_t$ reflects the immediate impact that a change in $\ln Y_t$ has on $\ln m_t$. The other term $\delta (\ln m_{t-1} - \ln Y_{t-1})$ reflects the impact on $\Delta \ln m_t$ of having $\ln m_{t-1}$ out of line with $y + \ln Y_{t-1}$. Therefore, with this term agents are assumed to correct their errors. In the steady state suppose that $\Delta \ln Y_t = \Delta \ln m_t = r$, then with $v_t = 0$ we have;

$$r = \alpha + \beta r + \delta \ln \left(\frac{m}{Y}\right)_{t-1} \qquad (9)$$

Assuming $\delta \neq 0$, we have the following equation in a steady state;

$$m_t = \bar{y}\, Y_t \quad \text{where } \bar{y} = e^{[-\alpha + (1 - \beta r] / \delta} \qquad (10)$$

Equation (10) gives the long-run elasticity of Y.

6.2.2.- Methodology

The study was carried out in the following way. Firstly, in order to avoid spurious correlation, all dependent and independent variables were tested for "stationarity", using the DF (Dickey-Fuller) tests. This demonstrated, as expected, that the variables were non-stationary [I (1)]. We then tested for cointegrated relationships between either ' imports and GDP plus relative prices' or only 'imports

and GDP'. This was done by running an OLS regression and testing the residuals for stationarity[10].

The model in equation (5) was estimated with the import prices, P_{mt}, and the domestic prices, P_{dt}, separately and with the relative prices, (P_{mt} / P_{dt}). The results indicated that the homogeneity form was more appropriate. Therefore the prices are shown in relative terms. Another reason for this specification is to avoid the problem of multicollinearity between the import prices and the domestic prices.

Since the model is expressed in log-linear form, the estimated coefficients of variables are the *elasticities.* Therefore, for example, β_1 and β_2 are the income and the price elasticities of demand, respectively. The expected signs of the variables in the model are as follows. The real GDP, Y_t, is expected to have a positive sign and the relative price variable, (P_{mt} / P_{dt}), is expected to have a negative sign[11]. Depending on existence of *habit persistence*, the lagged imports, M_{t-1}, is expected to have positive sign. As for the exchange rate variables, E and E_{t-1} are expected to have positive signs while E^p is expected to have a negative sign.

Tests are undertaken to examine the stability of the import demand function over time. This point is particularly important in this study since its purpose is to examine whether there have been a structural change in Turkey's imports after the

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[10] Engle and Granger (1987) indicate that if y_t is integrated of order of 1 or I (1) and $x_t \sim$ I (1), and if there exists a β such that $y_t - \beta x_t$ is I(0), then the regression equation $y_t = \beta x_t + u$ makes sense because y_t and x_t do not drift too far apart from each other over time.

[11] However, the sign of real income could be negative. For example, if imports represent the difference between domestic consumption and domestic production of importable goods, production may rise faster (slower) than consumption in response to rise in real income. Hence, imports could fall (rise) as the real income increases, resulting in a negative (positive) sign for real income (Goldstein and Khan, 1976).

implementation of the 1980 trade liberalisation program. In addition to testing for structural change by including a shift dummy variable (D80), in the estimating equations the Chow tests were also carried out to examine the possibility of a structural break between the pre- and post- liberalisation periods.

6.3.- The empirical results

6.3.1- The empirical results for Turkey's total imports

The estimated results of aggregate import demand model using annual time series Turkish data for the period 1973-1993 are given in Tables 6.1 and 6.2[12]. The tables show the estimated price and income elasticities with their *t*-values in parentheses which were estimated in four different functional forms.

In the tables "LOG" indicates that the equation was specified in log linear form, and the "GROWTH RATE" refers to equations in which variables are specified in growth rates using first difference transformations, $\Delta \ln x = \ln x_t - \ln x_{t-1} \cong (x_t - x_{t-1}) / x_{t-1}$, in order to make the variables "stationary". Table 6.1 shows the estimated results for log-static and log-dynamic models and Table 6.2 gives the results for static and dynamic growth rate models. The results for diagnostic tests, namely serial correlation (SR), functional form (FF), normality (NORM) and heteroscedasticity (HET), are also given for each model.

[12] As the results for the AIDS specification were poor with problematic diagnostic statistics, they are not included.

Table 6.1: Estimates of the Import Demand Function for Turkey[1], 1973-1993

Equation	Constant	Y	(P_m/P_d)	M_{t-1}	D_{80}	E	E_{t-1}	E^p
1-Log-Static	9.8383	.42453	-.1378**					
(ln M) **1a-**	(3.3003)	(.64733)	(-1.770)					
R^2= .86053, DW=.61417, SR= 18.3714[.000], FF=7.5927[.014], NORM=.63918[.726], HET=10.7841[.004]								
1b-	9.5657	.53966	-.1709*		.2865*			
	(3.6836)	(.94257)	(-2.478)		(2.599)			
R^2= .90021, DW= .97905, SR= 8.1829[.011], FF= .11102[.743], NORM= 2.8444[.241], HET= 2.0034[.173]								
1c-	9.4297	.71099	-.2242*			.13984*		
	(3.3795)	(1.1284)	(-2.621)			(1.9148)		
R^2= .88527, DW= .70345, SR= 15.0298[.001], FF= .099805[.756], NORM= 1.2071[.547], HET=6.0889[.023]								
1d-	9.9886	.47956	-.18796				.064840	
	(2.1372)	(.46686)	(-1.310)				(.59628)	
R^2= .85234, DW= .59031, SR= 19.3038[.001], FF= 31.8647[.000], NORM= .74311[.690], HET=15.9000[.001]								
1e-	6.5297	1.1218	-.30745					.3457*
	(1.1627)	(.90632)	(-.0584)					(2.135)
R^2= .89623, DW= .89570, SR= 4.9545[.043], FF= 11.8903[.004], NORM= .63990[.726], HET= 5.2191[.035]								
2-Log-Dynamic	5.2950	.48410	-.11826	.74300*				
(ln M) **2a-**	(1.1645)	(.4083)	(-1.054)	(3.6151)				
R^2= .92769, DW= 1.7682, SR= .085694[.774], FF= .32077[.580], NORM= 1.1476[.026] HET= .39622[.537]								
2b-	7.0826	1.0522	-.1638*	.81041*	.013111			
	(1.9216)	(1.205)	(-1.879)	(2.7083)	(.08689)			
R^2= .92866, DW= 1.9150, SR= .0048131[.946], FF= 1.0187[.033], NORM= 1.2551[.534], HET= .0091088[.925]								
2c-	7.2113	1.0209	-.1668*	.78872*		.9722E-		
	(2.0996)	(1.144)	(-1.777)	(3.3278)		(.01342)		
R^2= .92863, DW= 1.8766, SR= .036577[.851], FF= 6.8994[.020], NORM= 1.2991[.522], HET= .024400[.878]								
2d-	6.8866	1.1460	-.12581	.83658*			-.05320	
	(2.0285)	(1.384)	(-1.224)	(4.1107)			(-.6472)	
R^2= .93056, DW= 1.9976, SR= .12560[.728], FF= 1.1401[.030], NORM= .93614[.012], HET= .14290[.710]								
2e-	7.1055	.64679	-.10225	.64410*				.22120
	(1.5994)	(.5739)	(-.9590)	(3.1634)				(1.6521)
R^2= .93948, DW= 1.9692, SR= .089783[.769], FF= .014224[.007], NORM= 1.0126[.603], HET= .002(0)(0)[.965]								

Notes: OLS estimations. Diagnostic statistics are reported according to the following notation; SR: Serial Correlation *F* version, FF: Functional form *F* version, NORM: Normality *LM* version, HET: Heteroscedasticity *F* version. Figures in square parentheses are probability [p] values.

[1] Figures in parentheses are *t*-statistics. * Significant at the 95% confidence level. ** Significant at the 90% confidence level.

Concerning the log-static form of the import demand function in Table 6.1, it is clear that, as suggested by Granger and Newbold (1974) [13], the results suffer from "spurious" correlation which is indicated by $R^2 > DW$ d statistic[14]. Regarding the log-dynamic form, it follows from the table that the results of diagnostic tests, particularly functional form (FF) and normality (NORM), were rather poor.

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[13] They argue that "an $R^2 > d$ is a good rule of thumb to suspect the estimated regression suffers from spurious regression".

Table 6.2: Estimates of the Import Demand Function for Turkey , 1973-1993

Equation	Constant	Y	(P_m/P_d)	M_{t-1}	D_{80}	E	E_{t-1}	E^p
3-Growth rate	-.14065	1.4694*	-.4360*					
Static	(-1.654)	(1.770)	(-2.133)					
(Δln M) **3a-**								
R^2= .36712, DW=1.9618, SR= .013619[.909], FF=.28527[.601], NORM=1.4243[.625], HET=.99619[.331]								
3b-	-.17624	1.8739*	-.08782		.1357**			
	(-1.912)	(2.8103)	(-.2968)		(1.8922)			
R^2= .50593, DW=2.5330, SR= 2.4454[.140], FF= .10858[.747], NORM= 6.0647[.028], HET= .071121[.003]								
3c-	-.24280	1.9961	-.4396*			.06552		
	(-2.238)	(1.0817)	(-2.189)			(.5625)		
R^2= .44430, DW= 2.2254, SR= .36714[.554], FF=.11174[.743], NORM= 16.8093[.000], HET=.66505[.426]								
3d-	-.24176	1.9820*	-.35923				-.16970	
	(-2.666)	(3.4687)	(-1.110)				(-1.524)	
R^2= .50867, DW= 2.2007, SR= .34378[.567], FF= .40613[.534], NORM= 17.7030[.000], HET=.46334[.505]								
3e-	-.22630	2.0736*	-.4807*					.064546
	(-2.123)	(2.5138)	(-1.999)					(.61906)
R^2= .46248, DW= 2.1237, SR= .085573[.774], FF= 3.0540[.104], NORM= 8.4307[.015], HET= .09240[.237]								
4-Growth rate	-.21875	2.0582	-.4337*	.12057				
Dynamic	(-2.301)	(1.2632)	(-2.165)	(.5301)				
(Δln M) **4a-**								
R^2= .44301, DW= 1.9948, SR=.010307[.921], FF= .072832[.791], NORM= 16.8881[.000], HET= .44887[.512]								
4b-	-.17814	2.0896*	.019869	.29001	.1839**			
	(-1.972)	(3.1358)	(.06577)	(-1.271)	(1.8986)			
R^2= .45706, DW= 2.1417, SR=2.3471[.149], FF= 2.7119[.124], NORM=5.8947[.052], HET= .012389[.913]								
4c-	-.24542	2.2108*	-.4434*	.10753		-.05930		
	(-2.199)	(2.9095)	(-2.147)	(-.4577)		(-.4924)		
R^2= .45250, DW= 2.1325, SR= .32204[.580], FF= .0012613[.972], NORM= 17.9845[.000], HET= .46978[.502]								
4d-	-.24901	2.2742*	-.3641*	.13315			-.17234	
	(-2.666)	(3.2724)	(-1.843)	(-.6096)			(-1.514)	
R^2= .52137, DW= 2.1091, SR= .23608[.635], FF= .10848[.747], NORM= 19.5415[.000], HET= .32961[.573]								
4e-	-.23793	2.3781*	-.4992*	.15256				.066149
	(-2.154)	(2.4969)	(-2.018)	(-.6392)				(.62072)
R^2= .47886, DW= 2.0254, SR= .015953[.902], FF= 1.9863[.184], NORM= 8.9751[.011], HET= .17535[.681]								

Notes: OLS estimations. Diagnostic statistics are reported according to the following notation; SR: Serial Correlation *F* version, FF: Functional form *F* version, NORM: Normality *LM* version, HET: Heteroscedasticity *F* version. Figures in square parentheses are probability [p] values.
[1] Figures in parentheses are *t*-statistics. * Significant at the 95% confidence level. ** Significant at the 90% confidence level.

Given the poor performance of the log-static and log-dynamic models and the advantages of modelling in growth rates, we focus on the results in Table 6.2. Considering the significance of the variables and the diagnostic tests in the table, it appears that the best result is obtained from the static growth model[15], namely (3a), indicating that the income elasticity of imports equals 1.4694 and price elasticity of imports - .4360.

[14] In such a case the standard *t* and F testing procedures are not valid.

Table 6.1 and 6.2 indicate that the shift dummy variable, D_{80}, was significantly different from zero in all cases but the log-dynamic model (see model 2b) and that the exchange rate variables, i.e. E, E_{t-1} and E^p, were significantly different from zero in only two cases (see models 1c and 1e).

With regard to the application of the error correction model (ECM) to the analysis of import demand, our preferred equation (3a) turns out to be of the following form;

$$\Delta \ln m_t = \underset{(-2.425)}{-4.371} - \underset{(-2.651)}{.584}\,\Delta \ln (p_m/p_d)_t + \underset{(.682)}{.243}\Delta \ln (p_m/p_d)_{t-1} + \underset{(2.257)}{1.924}\Delta \ln Y_t$$

$$- \underset{(-1.521)}{1.012}\Delta \ln Y_{t-1} - \underset{(-2.271)}{.52} \ln (m/Y)_{t-1} - \underset{(-.598)}{.232} \ln (p_m/p_d)_{t-1} + \underset{(1.159)}{.230} \ln Y_{t-1}$$

$$+ \underset{(1.75)}{.17}\Delta \ln m_{t-1} \qquad (11)$$

Considering a steady-state growth path along which the following condition holds; $\Delta \ln m = \Delta \ln (p_m/p_d) = \Delta \ln Y = 0$, then the equation (11) yields the steady-state solution (see equation 10):

$$m = .00022\,(p_m/p_d)^{-.4461}\; Y^{1.4423} \qquad (12)$$

indicating a long-run income elasticity value of 1.4423 and long-run price elasticity value of -.4461.

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[15] Considering the significance of the variables, the dynamic growth model was disregarded.

In sum, the results in Table 6.1 and 6.2 indicate that the income and relative prices seem to be the main determinants Turkey's imports and that there appears to be a structural change in Turkey's imports over the pre- and post liberalisation periods. This point will be analysed in detail later by examining the stability of the parameters over time.

6.3.2.- Comparison of our results with other studies

It is interesting to compare our results with the findings of other studies. Table 6.3 shows the summary of results reported by Houthakker and Magee (1969), Warner and Kreinin (1983) and Bairam (1993). In comparing the results it should be noted that the elasticities crucially depend on the specification of the model used.

Table 6.3: Income and price elasticities of demand for Imports

	Income[a]	Income[b]	Price	E[d]	E_{t-1}[e]	E^p
Turkey	2.68					
	(2.73)					
Germany	1.92	1.80	-.24	.41		
	(3.79)	(17.25)	(-.91)			
UK	2.14	1.66	.22	.29		
	(7.49)	(10.54)	(1.07)			
France	2.42	1.66	.17	.51	.70	-1.67
	(7.58)	(9.31)	(.26)			
Italy	2.83	2.19	-.13	.38		
	(8.06)	(6.48)	(-.18)			
Netherlands	2.00	1.89	.23	1.14		
	(9.22)	(11.37)	(.44)			
Spain[c]	-	-.07	-.84	1.15		
Greece	1.08	-	-			
	(2.58)					
Portugal	1.69	.94	1.39			
	(2.88)	(.77)	(17.89)			

Notes: Figures in parentheses are *t*-statistics. [a] The income elasticity of imports for Turkey and the other EU countries reported by Bairam`s (1993) study for the period 1970-1985. [b] The price elasticities reported by Houthakker and Magee`s (1969) study for the period 1951-1966. [c] Reported by Warner and Kreinin (1983). [d] The elasticities of exchange rates reported by Warner and Kreinin (1983). [e] E_t and E_{t-1} were not reported for all of the countries by the authors.
Source : Bairam (1993). Warner and Kreinin (1983), Houthakker and Magee(1969)

The first column of Table 6.3 shows that the income elasticity of demand for Turkey's imports reported by Bairam (1993) appears to be greater than the income elasticity for all other countries but Italy. The income elasticity of demand our preferred static growth model suggests for Turkey's imports, 1.46, seems to be much smaller than the one reported by Bairam's (1993) study. However, our dynamic growth model estimates are rather similar to the Bairam's results.

6.3.3- Analysis of Turkey's Import Demand Function by its main EU partners

In order to examine the country specific importance of the variables in Table 6.1 and 6.2, further analysis of Turkey's imports from its main trading partners in the EU was undertaken. The results for Turkey's import demand function by its five main trading partner countries in the EU; namely Germany, the UK, France, Italy and Netherlands,[16] for the same time period are given in Table 6.4.

The import demand functions used for the EU countries are similar to the general model we used for Turkey's total imports and can be written as;

$$\ln M_{EUt} = \beta_0 + \beta_1 \ln Y_t + \beta_2 \ln (P_{EUt}/ P_{dt}) + \beta_3 D_{80} + \beta_4 \ln E \qquad (13)$$

where M_t is the quantity of Turkey's imports[17] from the EU countries at period t, Y_t is Turkish real GDP (at 1987 prices) at period t, P_{EUt} is the price index of imports into Turkey at period t, P_{dt} is the domestic wholesale price index (1987=100) in

[16] Turkey's imports from those five EU countries constituted about 82 % of Turkey's total imports from the EU in 1993 (IMF, Direction of Trade Statistics).
[17] The value of total imports (in millions of $) is deflated by import prices.

Turkey at period t, D_{80} is a shift dummy variable to account for Turkey's 1980 liberalisation program (taking the value zero for the period (1973-1979) and unity for (1980-1993), and E is the exchange rate variable (defined as units of foreign currency per unit of Turkish Lira).

Table 6.4 presents the income and price elasticities we estimated for Turkey's imports from the each EU country using the preferred static growth rate models[18]. It follows from the table that the income elasticities of Turkey's imports from the EU countries appear to be notably higher than that of Turkey's total imports (see Table 6.2).

This may be simply as a result of imports from the EU constituting a large share of Turkey's total manufactured good imports where non-price competitiveness (indicated by income elasticity) matters more. Table 6.4 also indicates that the shift dummy variable (D80), was significantly different from zero for all countries but France, however, the exchange rate variable (E) was significant only in the cases of Germany and the UK.

[18] Due to the poor performance of log-static and log-dynamic models we only report the results obtained from the growth rate models. We also report only the best results obtained from models with the different exchange rate (E) variables.

Table 6.4: Estimates of Turkey's Import Demand Function for EU5, 1973-1993

Equation (Δln M)	Constant	Y	(P_m/P_d)	D_{80}	E	E_{t-1}	E^p
GERMANY	-.29437	2.6422*	-.30468				
	(-1.881)	(3.6384)	(-1.051)				
R^2= .46553, DW= 1.5878, SR= .89805[.357], FF=.77438[.392], NORM=2.1366[.344], HET=.8959E-3[.976]							
	-.22813	2.4488*	.32747	.31292*			
	(-2.243)	(4.0981)	(1.4521)	(4.9967)			
R^2= .79126, DW= 2.6330, SR= 2.1801[.160], FF= .036352[.851], NORM= .92171[.631], HET= 1.2861[.272]							
	-.37304	2.2276*	-.26633			-.2731**	
	(-2.381)	(4.1926)	(-.9640)			(-1.809)	
R^2= .58079, DW= 1.9506, SR= .013690[.909], FF= .63813[.438], NORM= 2.1946[.334], HET= .13033[.723]							
UK	-.25600	2.595**	-.41707				
	(-1.433)	(1.8363)	(-1.184)				
R^2= .17042, DW= 2.1041, SR= .18852[.670], FF= .023564[.880], NORM= 30.3322[.000], HET= .82321[.376]							
	-.21658	2.3466	.34978	.37068*			
	(-1.412)	(1.2207)	(.84402)	(2.6927)			
R^2= .42913, DW= 2.8020, SR= 3.8465[.069], FF= .27103[.610], NORM= 7.7411[.021], HET= 5.2395[.034]							
	-.33107	2.126**	-.6320				.45362*
	(-1.951)	(1.8397)	(-1.717)				(2.4801)
R^2= .45155, DW= 2.0625, SR= .071181[.794], FF= .45338[.513], NORM= 46.1472[.000], HET= .0027111[.959]							
FRANCE	-.39505	2.3201*	-.60181				
	(-2.142)	(3.0477)	(-1.709)				
R^2= .35459, DW= 2.2894, SR= .37847[.547], FF= 1.6390[.219], NORM= 15.4184[.000], HET= .088873[.769]							
	-.39332	2.4940*	-.47892	.06892			
	(-2.084)	(2.7861)	(-1.081)	(.47752)			
R^2= .36366, DW= 2.2915, SR= .37027[.552], FF= .71289[.412], NORM= 12.1860[.002], HET= .11289[.741]							
	-.50259	2.5401*	-.6369**			-.27815	
	(-2.426)	(3.1109)	(-1.758)			(-1.197)	
R^2= .40422, DW= 2.1319, SR=.081234[.780], FF= .43740[.519], NORM= 8.1852[.017], HET= .0087136[.927]							
ITALY	-.17052	2.6833*	-.05376				
	(-.8558)	(2.3845)	(-.1315)				
R^2= .36048, DW= 2.2470, SR=.88531[.363], FF= 2.1525[.164], NORM=2.3148[.314], HET= .3707E-3[.985]							
	-.20354	2.3922*	.28797	.22389*			
	(-1.032)	(2.0800)	(.59598)	(2.2649)			
R^2= .42607, DW= 2.5751, SR=4.2825[.059], FF= 8.6263[.012], NORM=1.3313[.514], HET= .70229[.414]							
	-.01023	2.463**	-.09731		.45401		
	(-.0492)	(1.9070)	(-.2535)		(1.7512)		
R^2= .47540, DW= 1.6897, SR= .98006[.340], FF= 4.1804[.062], NORM= 1.0541[.590], HET= .024897[.876]							
Netherlands	-.36103	1.903**	-.6833**				
	(-1.949)	(1.9909)	(-2.045)				
R^2= .23729, DW= 1.7264, SR= .16103[.694], FF= .68708[.419], NORM= 2.0322[.362], HET= 1.3020[.269]							
	-.29610	1.8041	-.02302	.33487*			
	(-1.959)	(1.4416)	(-.0674)	(3.1637)			
R^2= .53081, DW= 2.1730, SR= .17723[.680], FF= 2.2356[.156], NORM= .017813[.991], HET= .73404[.403]							
	-.39047	1.880**	-.6438**		-.12318		
	(-1.995)	(2.0341)	(-1.852)		(-.5781)		
R^2= .25290, DW= 1.8219, SR= .035746[.853], FF= .11376[.741], NORM= 2.1432[.342], HET= 1.1404[.300]							

Notes: OLS estimations. Diagnostic statistics are reported according to the following notation: SR: Serial Correlation *F* version, FF: Functional form *F* version, NORM: Normality *LM* version, HET: Heteroscedasticity *F* version. Figures in square parentheses are probability [p] values.

[1] Figures in parentheses are *t*-statistics. * Significant at the 95% confidence level. ** Significant at the 90% confidence level.

6.4.- Structural Stability of Parameters

In order to test for structural stability of the parameters between the two periods, we use the Chow[19] tests to examine if the import demand models have undergone a "s*tructural change*". The results of structural stability tests for the import demand functions used are given in Table 6.5.

Table 6.5- The Chow test results for structural stability of parameters.

	The Chow Test Statistics[1]
	Break point: 1980 [(1973-1979)-(1980-1993)]
TOTAL IMPORTS	5.5792 [.011]*
GERMANY	8.2634 [.002]*
UK	2.8561 [.075]**
FRANCE	6.5097 [.000]*
ITALY	2.2643 [.126]
NETHERLANDS	5.8462 [.008]*

Notes: The F version of the Chow test statistics. * Significant at the 95% confidence level. ** Significant at the 90% confidence level.

The Chow test statistics in Table 6.5 indicate that there was a "structural change" in the coefficients of our import demand models (in all cases but Italy) between the pre-and post-liberalisation periods[20] [(1973-1979) - (1980-1993)] as we reject the hypothesis of "no structural change"[21]. It also follows from Table 6.5 that the there is no evidence of such a structural break in the coefficients of the import demand models (in all cases but France) between the periods before and after

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[19] The Chow test examines the equality of regression coefficients over the two sample periods conditional on the equality of error variances. It is based on the null hypothesis of "no structural break". In the statistics literature this test is know as the analysis of covariance test.

[20] This result was actually indicated by significant shift dummy variable, D80, in Tables 6.1-6.3.

[21] If the *p* values in square parentheses are smaller (greater) than [.05], we reject (do not reject) the hypothesis of 'no structural break'.

Turkey's application to EU for membership [(1973-1986) - (1987-1993)] as we can not reject the hypothesis of "no structural change".

SECTION 2

AN ANALYSIS OF INCOME AND PRICE ELASTICITIES OF DEMAND FOR TURKEY'S EXPORTS

6.5.- Introduction

In this section I complement the previous analysis of income and price elasticities of Turkey's imports by applying the same approach to Turkey's exports. Similar to the previous section, the aim of this section is to examine the determinants of Turkey's exports by estimating a conventional export demand function for Turkey.

Similar to the conventional import demand functions, the export demand functions relate the volume of a country's exports to two independent variables: income of the country's partners and (relative) prices. For the reasons discussed in import demand functions, the exchange rate variable has also been included to the export demand function for Turkey[22].

The reminder of this section is organised as follows. Section 7 briefly reviews the theoretical and empirical background of export demand functions. Section 8 examines demand for Turkey's total exports as well as Turkey's exports to main EU countries; Germany, UK, France, Italy, and Netherlands, for the period between 1973 and 1993. In Section 9, I analyse the structural stability of the export demand

[22] See Akcay et al (1997) for a study on stability of exchange rates in Turkey.

functions estimated in previously and examine whether there has been a structural change in demand for Turkey's exports after 1980 and 1987.

6.6.- The Theoretical and Empirical Background of Export Demand Models

6.6.1.- The general framework of export demand models

The conventional formulation of the export demand functions [see Houthakker and Magee (1969), Khan (1974), Khan and Goldstein (1976), Warner and Kreinin (1983), Bond (1985)] can be written as follows:

$$X_t = f[Y_t, (P_{dt} / P_{wt})] \qquad (14)$$

where X_t is the quantity of exports demanded at period t ; Y_t is real GDP for importing countries at period t; P_{dt} is the export price index of exporting country at period t; P_{wt} is the export prices of importing countries at period t.

Many studies on export flows assume that exports are determined by *supply-side* variables, such as domestic prices (official or market determined), the growth of GDP, taxes, tariffs and subsidies. Fewer studies focus on the *demand-side* determinants of exports, such as demand for imports in market countries or prices in competitor countries. This gap in the literature seems to have arisen because the typical non-oil developing country is assumed to be small, and to face an infinitely

elastic demand for its exports, so that changes in foreign demand can influence exports only through changes in world prices[23].

Among the numerous studies that examine the relationship between developing country exports and supply-side variables, Balassa (1978) and Tyler (1981) find a significant positive relationship between economic growth in developing countries and their supply of exports of manufactures. Elson (1973) and Teigeiro and Elson (1973) conclude that, during the post-war period, exchange rate movements have been have been an important determinants of the supply of exports from Argentina and Colombia. Bhagwati (1978), Kruger (1978) and Balassa (1978) analyse the effect of different trade policies on the growth and export behaviour of developing countries. Their findings from the country studies support the view that altering trade strategies toward greater export orientation is consistent with more export growth and greater employment opportunities.

The principal analysis of the demand determinants of export growth of developing countries are by Goldstein and Khan (1982), Wong (1985), Bond (1985) and Bahmani (1986). These studies focus on how changes in aggregate demand are transmitted from industrial to developing countries through the link between real income growth in the industrial countries and export growth in groups of developing countries. Houthakker and Magee (1969), using two-stage estimation procedures, find that real income and in importing countries and price competitiveness in exporting

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[23] This lack of attention to the influences of foreign demand may also be traced to the almost total concentration on exports from individual countries rather than from groups of countries. If the focus is on groups, two important differences arise. Firstly, the small country hypothesis is no longer relevant, the assumption that demand is infinitely elastic is inappropriate for a group. Secondly, pricing policies may not have the desired effect. Countries in a group that produce a product for which the market price elasticity is low may have to allow a considerable price fall for any increased supply to be absorbed.

countries are the principal determinants of exports of a number of developing countries[24].

6.6.2.- The Export Demand Model for Turkey

Similar to the import demand model, the export demand model used in this work is in the following simple form;

$$X_t = f\ (Y_{wt}, P_{dt} / P_{wt}\ , D_{80,} E\ \ ) \qquad (15)$$

where X_t is the quantity of Turkey's exports at period t, Y_{wt} is real GDP of importers (at 1987 prices) at period t, P_{dt} is Turkey's export prices at period t, P_{wt} is the world export price index at period t, D_{80} is a shift dummy variable to account for Turkey's 1980 liberalisation program [taking the value zero for the period (1973-1979) and unity for (1980 -1993)], E is the exchange rate variable[25] (defined as units of foreign currency per unit of Turkish Lira).

In sum, the export demand model in equation (15) was estimated for Turkey's exports in four different functional forms by using the following equation;

$$\ln X_t = \beta_0 + \beta_1 \ln Y_{wt} + \beta_2 \ln (P_{dt}/ P_{wt}) + \beta_3 \ln X_{t-1} + \beta_4 D_{80} + \beta_5 \ln E_t$$

$$+ \beta_6 \ln E_{t-1} + \beta_7 \ln E^p + \mu_t \qquad (16)$$

---

[24] Their estimates of income elasticities of importing countries with respect to exports of individual developing countries (excluding Europe and Israel) range from 0.34 (for Brazil) to 2.01 (for Peru), while estimates by Khan range from 0.2 (for Columbia) to 1.12 (for Peru).

[25] See equation (4) in previous section for definition of expected exchange rate variable.

where Y_{wt} is the world real income, P_{wt} is the world export prices, μ_t is a random disturbance term and all the other variables are defined as before.

Since the model is expressed in logs, the estimated coefficients of variables are the *elasticities*. Therefore, for example, β_1 and β_2 are the income and the price elasticities of export demand, respectively.

As the methodology we used is discussed in detail in previous section where we examined the import demand function for Turkey, in this section we do not discuss the methodology in detail. The results are reported in next section.

6.7.- The empirical results

6.7.1.- The empirical results for Turkey's total exports

The estimated results of export demand model using annual time series Turkish data for the period 1973-1993 are given in Tables 6.6 and 6.7. The tables show the estimated price and income elasticities with their *t*-values in parentheses which were estimated in four different functional forms. Table 6.6 shows the estimated results for log-static and log-dynamic models and Table 6.7 gives the results for static and dynamic growth rate models. The results for diagnostic tests, namely serial correlation (SR), functional form (FF), normality (NORM) and heteroscedasticity (HET), are also given for each model.

Regarding the log-static form of the export demand function in Table 6.6, it is clear that the results suffer from "spurious" correlation in some cases which is

indicated by $R^2 > DW$ d statistic (see 1a and 1b) . As for the log-dynamic form, it follows from the table that the equations do not exhibit parameter constancy, existence of serial correlation and heteroscedasticity.

Table 6.6: Estimates of the Export Demand Function for Turkey's exports[1]

Equation	Constant	Y_w	(P_d/P_w)	X_{t-1}	D_{80}	E	E_{t-1}	E^p
1-Log-Static (ln M) **1a-**	-10.085 (-3.243)	1.2994* (3.8622)	-1.6754 (-1.219)					
R^2= .59347, DW= .43171, SR= 29.8868[.000], FF= .45010[.511], NORM= .45476[.797], HET= .33298[.571]								
1b-	-5.5778 (-1.625)	.68445 (1.6892)	-1.4220 (-1.145)			.66097* (2.2844)		
R^2= .68895, DW= .64980, SR= 14.8400[.001], FF= 2.7965[.114], NORM= 7.5324[.023], HET= .43414[.518]								
1c-	6.3884 (3.8714)	-.6731* (-3.526)	-.68853 (-.6157)				-.4074* (-2.542)	
R^2= .96034, DW= 1.3790, SR= 1.2482[.280], FF= .15372[.700], NORM= .73972[.691], HET= .0013588[.971]								
1d-	6.2909 (3.1976)	.8677* (2.794)	-.77824 (-1.265)					-.4068* (-3.173)
R^2= .96604, DW= 1.7058, SR= .15095[.703], FF= .38303[.545], NORM= .50695[.776], HET= .15005[.703]								
1e-	2.7899 (.92609)	.91324 (1.5299)	-1.3176 (-1.000)					1.1662* (3.308)
R^2= .92995, DW= 1.7119, SR= .013305[.910], FF= 3.7399[.074], NORM= .28881[.866], HET= .54862[.469]								
2-Log-Dynamic (ln M) **2a-**	.96670 (.43020)	1.05584 (.30313)	-.95089 (-.6340)	.99372* (9.6624)				
R^2= .94116, DW= 2.4151, SR= 1.0952[.312], FF= .19545[.665], NORM= .60192[.740] HET= 9.6254[.006]								
2b-	1.3423 (.65849)	.88679 (.4840)	-.82280 (-.3020)	.90999* (9.0247)	.26579* (2.1420)			
R^2= .95494, DW= 2.9139, SR= 5.2515[.038], FF= 1.2250[.287], NORM= .97176[.615], HET= 4.7935[.042]								
2c-	5.2775 (2.5994)	.6760* (2.409)	-.88922 (-.9867)	.41238* (2.3783)		-.2604* (-3.735)		
R^2= .96952, DW= 2.4882, SR= 3.7034[.075], FF= .42412[.525], NORM= .59912[.741], HET= 1.2765[.273]								
2d-	5.3147 (2.7426)	.8655* (2.171)	-.83178 (-1.433)	.31800 (1.7350)			-.2917* (-4.025)	
R^2= .97172, DW= 2.5777, SR= 3.6773[.076], FF= .73479[.406], NORM= .21947[.896], HET= .99874[.331]								
2e-	1.8688 (.70440)	.80089 (.3942)	-.68047 (-.5778)	.57865* (2.3987)				.5215** (1.7666)
R^2= .95036, DW= 2.3856, SR= 1.7509[.209], FF= 1.9694[.184], NORM= .69092[.708], HET= 4.7509[.044]								

Notes: OLS estimations for 1973-1993. Diagnostic statistics are reported according to the following notation; SR: Serial Correlation *F* version, FF: Functional form *F* version, NORM: Normality *LM* version, HET: Heteroscedasticity *F* version. Figures in square parentheses are probability [p] values.
[1] Figures in parentheses are *t*-statistics. * Significant at the 95% confidence level. ** Significant at the 90% confidence level.

Given the poor performance of the log-static and log-dynamic models, we focus on the results based on the static and dynamic growth rate models in Table 6.7. Considering the significance of the variables and the diagnostic tests in the table, it seems that the best result is obtained from the static growth model [26], namely (3a), indicating that the income elasticity of exports equals 1.54 and price elasticity .76[27].

Table 6.7: Estimates of the Export Demand Function for Turkey's exports

Equation	Constant	Y_w	(P_d/P_w)	X_{t-1}	D_{80}	E	E_{t-1}	E^p
3-Growth rate	.11860	1.5402*	-.7613**					
Static	(2.6830)	(2.040)	(-1.950)					
(Δln M) **3a-**								
R^2= .13072, DW= 2.9232, SR= .085573[.774], FF= .0039921[.950], NORM= .33427[.846], HET= .75438[.397]								
3b-	.04562	1.353**	-.72663		.09528*			
	(.57305)	(1.937)	(-1.655)		(2.0991)			
R^2= .19174, DW= 3.0524, SR= 5.3835[.034], FF= .067692[.798], NORM= 2.7184[.257], HET= 2.2531[.151]								
3c-	.07230	1.4047	-.7649**			-.1454*		
	(.96963)	(1.546)	(-1.998)			(-2.275)		
R^2= .16224, DW= 2.9513, SR= 6.9331[.019], FF= .13103[.722], NORM= 1.4857[.476], HET= 2.2446[.151]								
3d-	.09784	1.771**	.66406				-.08206	
	(1.0805)	(1.962)	(1.4953)				(-.3708)	
R^2= .14405, DW= 3.1059, SR= 8.5875[.011], FF= .31143[.586], NORM= .79242[.673], HET= 1.8533[.191]								
3e-	.14067	2.080**	-.70644					-.00855
	(2.4607)	(1.959)	(-.6214)					(-.0317)
R^2= .46248, DW= 2.1237, SR=5.7723[.030], FF= 3.0540[.104], NORM= 8.4307[.015], HET= 1.49240[.237]								
4-Growth rate	.18085	1.2545*	-.74104	-.4434**				
Dynamic	(3.6621)	(2.220)	(.58650)	(-1.942)				
(Δln M) **4a-**								
R^2= .30986, DW= 2.3738, SR= 4.4296[.054], FF= .25324[.623], NORM= 1.2890[.525], HET= 1.0622[.317]								
4b-	.13060	1.1882	-.72079	-.4473**	.06286			
	(1.4417)	(-1.611)	(.33262)	(-1.922)	(1.5672)			
R^2= .33114, DW= 2.3881, SR= 4.6291[.051], FF= .27162[.611], NORM= 1.1555[.561], HET= .44281[.515]								
4c-	.18956	1.450**	-.70193	-.4497**		.-0236*		
	(2.1080)	(2.120)	(.56898)	(-1.857)		(2.1176)		
R^2= .31055, DW= 2.3707, SR= 3.8924[.070], FF= .38943[.543], NORM= 1.3008[.522], HET= 1.2674[.276]								
4d-	.15393	-1.671**	-.66885	-.4419**			-.07557	
	(1.7311)	(-1.932)	(.42668)	(-1.879)			(-.3691)	
R^2= .31652, DW= 2.3211, SR= 3.3027[.092], FF= .020432[.889], NORM= 1.2411[.538], HET= 1.1582[.297]								
4e-	.19560	-1.8819	-.67942	-.5291*				.097537
	(3.5537)	(-1.758)	(-.6623)	(-2.338)				(.40856)
R^2= .39377, DW= 1.6598, SR= .11835[.737], FF= .31773[.583], NORM= 1.8437[.398], HET= 4.1400[.059]								

Notes: OLS estimations for 1973-1993. Diagnostic statistics are reported according to the following notation; SR: Serial Correlation *F* version, FF: Functional form *F* version, NORM: Normality *LM* version, HET: Heteroscedasticity *F* version. Figures in square parentheses are probability [p] values.
[1] Figures in parentheses are *t*-statistics. * Significant at the 95% confidence level. ** Significant at the 90% confidence level.

[26] Considering the significance of the variables and the results of diagnostic tests, the dynamic growth model was disregarded.
[27] According to Ersel and Temel (1984) the price elasticity demand for Turkey's exports lies between 0.326 and 0.663. Hence they argue that Turkish exports are price inelastic.

Table 6.6 and 6.7 indicate that the shift dummy variable, D_{80}, was significantly different from zero in all cases except in the dynamic growth model (see model 4b) and that the exchange rate variables, i.e. E, E_{t-1} and E^p, were significantly different from zero in all cases except in the following four models; 3d, 3e, 4d, and 4e. These results suggest that the 1980 liberalisation program had an impact on the exports of Turkey. Differing from the import demand models, it appears that the exchange rates are important in explaining Turkey's exports.

We also consider the application of the error correction model of Davidson et all (1978) to the analysis of exports. We accept a steady-state theory of exports, whereby exports are assumed to be proportional to income in the steady-state, i.e. $x_t = \bar{\gamma} Y_t$, and the steady-state equilibrium solution is presumed to be in the form of;

$$\ln \bar{\gamma} = \gamma_0 + \gamma_1 \ln (p_d/p_{eu}) + \gamma_2 \ln Y \qquad (17)$$

Equation (18) below presents our "preferred" error correction model for Turkey's exports.

$$\begin{aligned}\Delta \ln x_t = {} & -5.872 - .532\Delta \ln (p_d/p_{eu})_t + .257\Delta \ln (p_d/p_{eu})_t + 1.944\Delta \ln Y_t \\ & (-2.472) \quad (-1.598) \qquad (.765) \qquad (2.145) \\ & + 1.441\Delta \ln Y_{t-1} - .959 \ln (x/Y)_{t-1} - .785 \ln (p_d/p_{eu})_{t-1} + .443 \ln Y_{t-1} \\ & (.954) \qquad (-2.562) \qquad (-1.452) \qquad (.863) \\ & + .43\Delta \ln x_{t-1} \\ & (1.124)\end{aligned} \qquad (18)$$

Considering a steady-state growth path along which the following condition holds; $\Delta \ln x = \Delta \ln (p_d/p_{eu}) = \Delta \ln Y = 0$. Then the equation (18) gives the steady-state solution;

$$x = .0022 (p_d/p_{eu})^{-.818} (Y)^{1.461} \quad (19)$$

indicating a long-run price elasticity value of about -.82 and long-run income elasticity value of 1.46.

In sum, the results in Table 6.6 and 6.7 indicate that relative price term (P_d/P_{eu}) and exchange rates (E_t) play an important role in determining world demand for Turkey's exports and that there seems to be a structural change in Turkey's between the pre- and post liberalisation periods.

6.7.2.- Turkey's Export Demand Function by its main EU partners

In order to examine the country specific importance of the variables in Table 6.6 and 6.7, we give a further analysis of Turkey's exports to its main trading partners in the EU. The results for demand function for Turkey's exports to its five main trading partners; namely Germany, the UK, France, Italy and Netherlands, for the period between 1973-1993 are given in Table 6.8.

The export demand functions used for the EU countries are similar to the general model we used for Turkey's total exports and can be written as;

$$\ln X_{EUt} = \beta_0 + \beta_1 \ln Y_{EUt} + \beta_2 \ln (P_{dt}/ P_{eut}) + \beta_3 D_{80} + \beta_4 \ln E \qquad (13)$$

where X_t is the quantity of Turkey's exports at period[28] t, Y_{wt} is real GDP of each EU country (at 1987 prices) at period t, P_{dt} is Turkey's export prices at period t. P_{eut} is the export prices of each EU country at period t, D_{80} is a shift dummy variable to account for Turkey's 1980 liberalisation program [taking the value zero for the period (1973- 1979) and unity for (1980 -1993)], E is the exchange rate variable[29] (defined as units of foreign currency per unit of Turkish Lira).

Due to poor performance of the results in the other three functional forms (i.e. log-static, log-dynamic and dynamic growth rate), we only report the results using our preferred static growth model in Table 6.8.

It follows from Table 6.8 that, considering the preferred static growth models with exchange rates, the UK has the largest income and price elasticities compared to the other countries while Italy and France had the smallest income and price elasticities, respectively. Comparison of Table 6.8 with Table 6.4 -which shows the income and the price elasticities for Turkey's imports from the five EU countries- suggests that income elasticity of Turkey's demand for the goods imported from the five countries is greater than that of the goods exported from Turkey.

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[28] The value of exports (in millions of $) is deflated by export prices.
[29] See equation (4) in previous section for definition of expected exchange rate variable.

Table 6.8: Estimates of Turkey's Export Demand Function for EU5, 19⁻3-1993

Equation (Δln M)	Constant	Y	(P_d/P_{eu})	D_{80}	E	E_{t-1}	E^p
GERMANY	.13922	1.037**	-.43068				
	(3.7312)	**(1.984)**	(-.1306)				
R^2= .19376, DW= 2.5732, SR= 1.7389[.206], FF=.34649[.564], NORM=1.5220[.467], HET= .87292[.363]							
	.10950	.88191	-.32453	.036284*			
	(1.5148)	(1.603)	(-.3408)	(2.48415)			
R^2= .20541, DW= 2.5614, SR= 1.6827[.214], FF= .076502[.786], NORM= 1.4392[.487], HET= .81947[.377]							
	.13863	.8375**	.35934		-.16654*		
	(2.0266)	(1.912)	(.33230)		(-3.6757)		
R^2= .26228, DW=2.5955, SR= 1.6927[.216], FF= .68292[.423], NORM= 1.7392[.419], HET= .49785[.491]							
UK	.16935	1.4767	-1.069*				
	(1.6339)	(1.741)	(-2.318)				
R^2= .17287, DW= 2.7968, SR= 4.8083[.043], FF= .0052601[.943], NORM= .28130[.869], HET= .48436[.495]							
	-.00674	1.2893	-.8300	.22376*			
	(-.0397)	(1.527)	(-1.267)	(3.2971)			
R^2= .25157, DW= 3.1215, SR= 8.4587[.011], FF= .057820[.813], NORM= 1.0564[.590], HET= .61494[.443]							
	.18414	1.3285*	-.94057		.15530		
	(1.5131)	(2.463)	(-.9249)		(.32878)		
R^2= .17695, DW= 2.7917, SR= 6.4072[.025], FF= .38348[.546], NORM= .071736[.965], HET= .33972[.568]							
FRANCE	.090950	.90038	-.64454				
	(1.4817)	(.4370)	(-1.048)				
R^2= .270871, DW= 2.5307, SR= 2.3759[.143], FF= 5.1272[.038], NORM= 1.2815[.527], HET= .61866[.442]							
	.006024	.74346	-.67593	.10338*			
	(.05301)	(.0880)	(-1.091)	(2.39026)			
R^2= .21472, DW= 2.6823, SR= 3.1712[.095], FF= .61490[.445], NORM= 5.5532[.062], HET= 1.2300[.282]							
	.048783	.83637*	-.13841		-.12924		
	(.44111)	(2.2861)	(-.2074)		(-.50783)		
R^2= .218607, DW= 3.0097, SR= 5.6320[.032], FF= 3.5171[.082], NORM= 2.1473[.342], HET= 1.0411[.322]							
ITALY	.12201	.80299	-.4153**				
	(1.5678)	(1.450)	(-1.872)				
R^2= .12018, DW= 1.7587, SR= .020162[.889], FF= .59653[.451], NORM= 2.3058[.316], HET= .33974[.567]							
	.089109	-.76804	-.42925	.042070			
	(.68826)	(-1.326)	(-1.474)	(.32306)			
R^2= .12588, DW= 1.7889, SR= .026905[.872], FF= .17799[.679], NORM= 4.3046[.116], HET= .47052[.501]							
	.10355	-.72765	-.30902		-.25553**		
	(1.2001)	(-.5436)	(-1.188)		(-1.91386)		
R^2= .10101, DW= 1.3817, SR= .0087635[.927], FF= .33720[.571], NORM= 5.7042[.058], HET= .003664[.952]							
Netherlands	.14721	1.1270*	-.30306				
	(3.9130)	(-2.853)	(-.0408)				
R^2= .32705, DW= 2.6845, SR= 2.4656[.136], FF= 1.5162[.236], NORM= .37673[.828], HET= .22339[.642]							
	.10631	.9971*	-.45066	.045843			
	(1.2884)	(-2.073)	(-.2433)	(.55999)			
R^2= .33998, DW= 2.7219, SR= 2.6945[.121], FF= .90226[.357], NORM= .50583[.777], HET= .50696[.486]							
	.10565	-1.047	-.51844				.10759
	(1.4320)	(-1.541)	(-.3383)				(.65880)
R^2= .25290, DW= 1.8219, SR= .035746[.853], FF= .11376[.741], NORM= 2.1432[.342], HET= 1.1404[.300]							

Notes: OLS estimations. Diagnostic statistics are reported according to the following notation; SR: Serial Correlation *F* version, FF: Functional form *F* version, NORM: Normality *LM* version, HET: Heteroscedasticity *F* version. Figures in square parentheses are probability [p] values.

[1] Figures in parentheses are *t*-statistics. * Significant at the 95% confidence level. ** Significant at the 90% confidence level.

This implies that the overall income growth in both Turkey and the five EU countries would deteriorate Turkey's balance of trade account. This comparison also reveals that the price elasticity of Turkey's demand for the goods imported from the five EU countries is smaller than that of the goods exported from the Turkey in all cases but Netherlands. This signifies that Turkey would benefit more from a reduction in prices as a result of decrease in trade costs (i.e. tariff reduction).

Considering the price elasticity of demand for Turkey's exports and imports from the five EU countries in Tables 6.4 and 6.8, it follows that the Marshall Lerner (M-L) condition[30] is satisfied only for Turkey's trade with the UK and France. This suggests that devaluation of exchange rates in Turkey would affect balance of payments (i.e. increase exports and decrease imports) only in these two cases.

Table 6.8 also indicates that the shift dummy variable (D80), was significantly different from zero for all countries but Italy and Netherlands, however, the exchange rate variables were significant only in the cases of Germany and Italy.

6.8.- Structural Stability of Parameters

In this section we test for structural stability of the parameters in the export demand functions we used between the pre and post liberalisation periods. We employ the Chow tests to examine if the export demand models have undergone a "*structural change*". The results of structural stability tests for the import demand functions used are given in Table 6.9.

Table 6.9- The Chow test results for structural stability of parameters.

	The Chow Test Statistics[1]
	Break point: 1980 [(1973-1979)-(1980-1993)]
TOTAL EXPORTS	3.8004[.033]*
GERMANY	2.6715[.085]**
UK	2.9443[.067]**
FRANCE	4.0222[.028]*
ITALY	1.4764[.261]
NETHERLANDS	4.7003[.017]*

Notes: The F version of the Chow test statistics. * Significant at the 95% confidence level. ** Significant at the 90% confidence level.

The Chow test statistics in Table 6.9 indicate that there was a "structural change" in the coefficients of demand for Turkey's exports (in all cases but Italy) between the pre-and post-liberalisation periods [(1973-1979) - (1980-1993)] as we reject the hypothesis of "no structural change". It also follows from Table 6.9 that the there is no evidence of such a structural break in the coefficients of the export demand models (in all cases but Netherlands) between the periods before and after Turkey's application to EU for membership [(1973-1986) - (1987-1993)] as we can not reject the hypothesis of "no structural change".

6.9- A brief note on our results

The short and long-run income elasticities of demand for Turkey's imports and exports we estimated in this chapter provide some useful information on the relation between growth and exchange rates. As Krugman (1989) argues "...differences in income elasticities in trade and/or differences in growth rates among countries would

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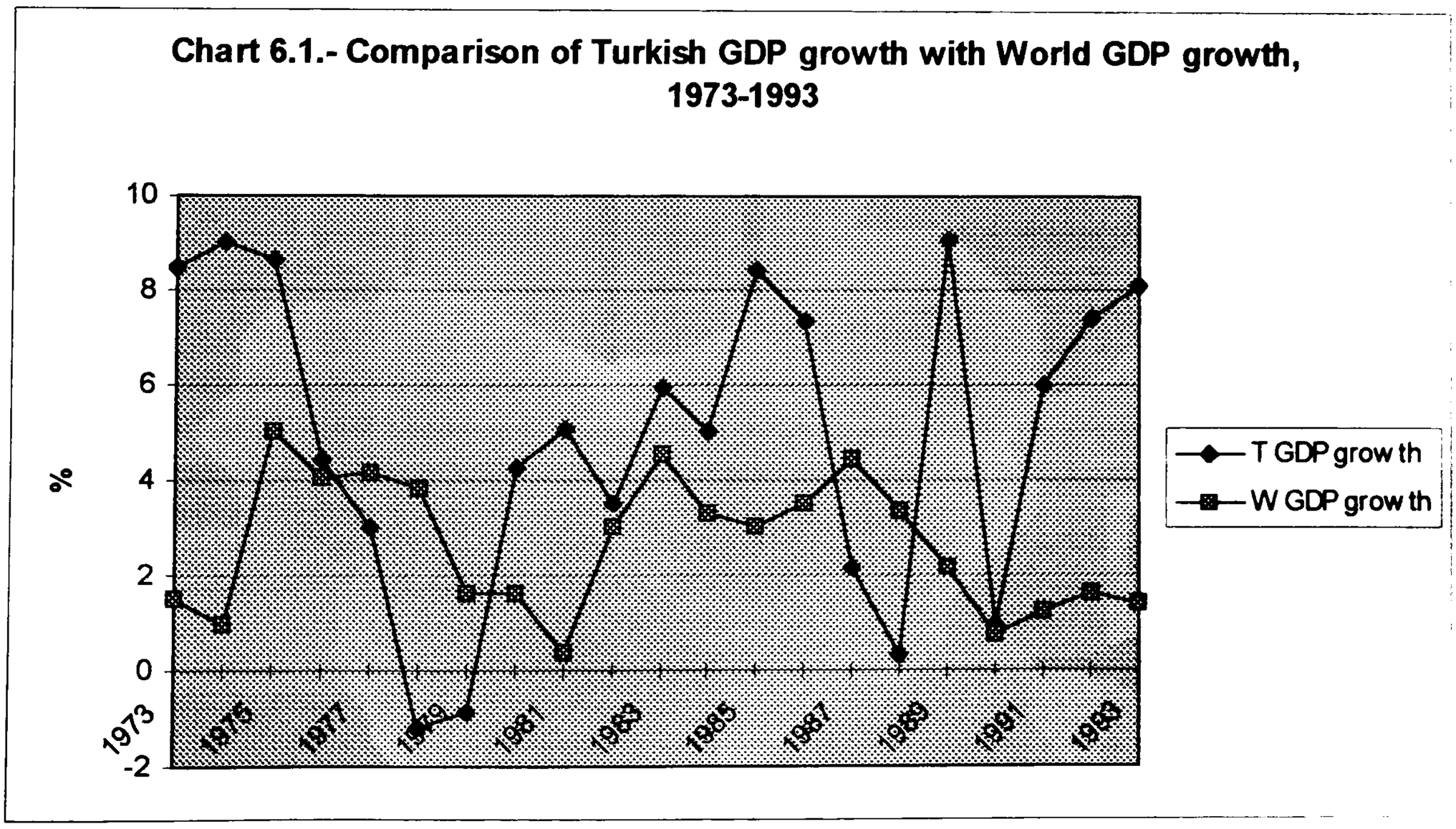
[30] Marshall Lerner (M-L) condition suggests that only if $|X_p + M_p| \geq 1$ is satisfied depreciation is effective.

give rise to strong secular trends in real exchange rates; for example, fast growing countries might need steady depreciation to get the world to accept their growing exports". However, in fact income elasticities are analytically related to growth rates by the 45-degree rule which implies that fast-growing countries seem to face high income elasticities of demand for their exports, while having low income elasticities of import demand. In what follows, given the income elasticities estimated, we investigate the relation between growth rate of Turkey and exchange rates.

Charts 6.1 and 6.2 show real GDP growth in Turkey and trade balance of the country, respectively. Chart 6.1 gives a comparison of overall GDP growth in the world and Turkey[31] and Chart 6.2 presents trade balance of Turkey (exports minus imports in absolute values), respectively.

Chart 6.1.-Comparison of Turkish GDP growth with that of World, 1973-1993



[31] The figure shows growth of GDP in constant 1987 prices.

It is clear from Chart 6.1 that the real GDP of Turkey has grown much faster than the real GDP in world especially after the 1980s[32]. As Chart 6.2 shows, during the same period the trade deficit of Turkey has increased particularly after 1988.

Chart 6.2.- Trade deficit of Turkey between 1973-1993.

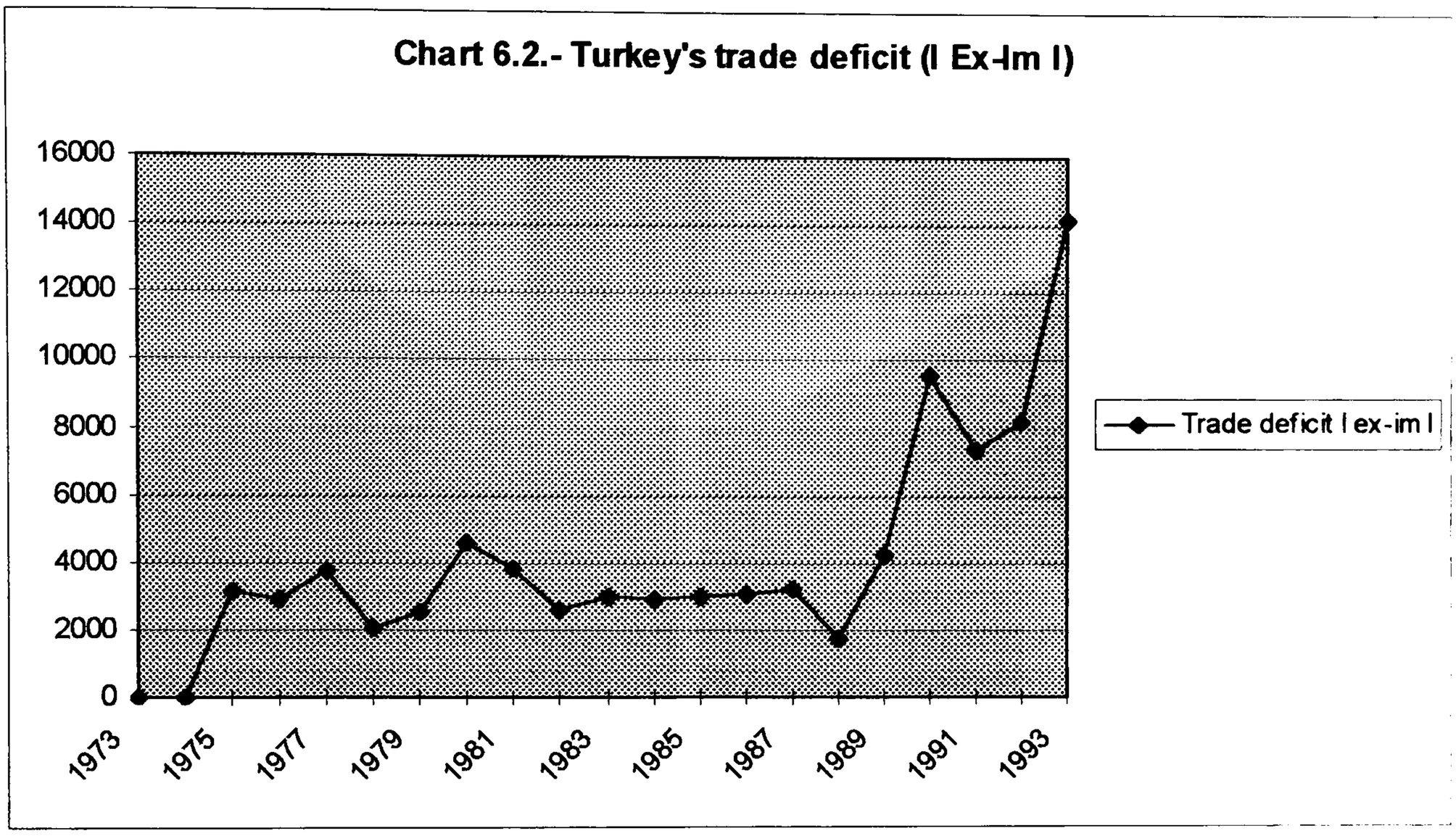


Chart 6.3 shows the time trend of exchange rates (units of US $ per unit of Turkish Lira) in Turkey between 1973 and 1993. It follows from the chart that the value of Turkish Lira (TL) against US $ has fallen steadily especially during the late 1970s, indicating a constant *devaluation* or *depreciation* of Turkish Lira over the period considered[33].

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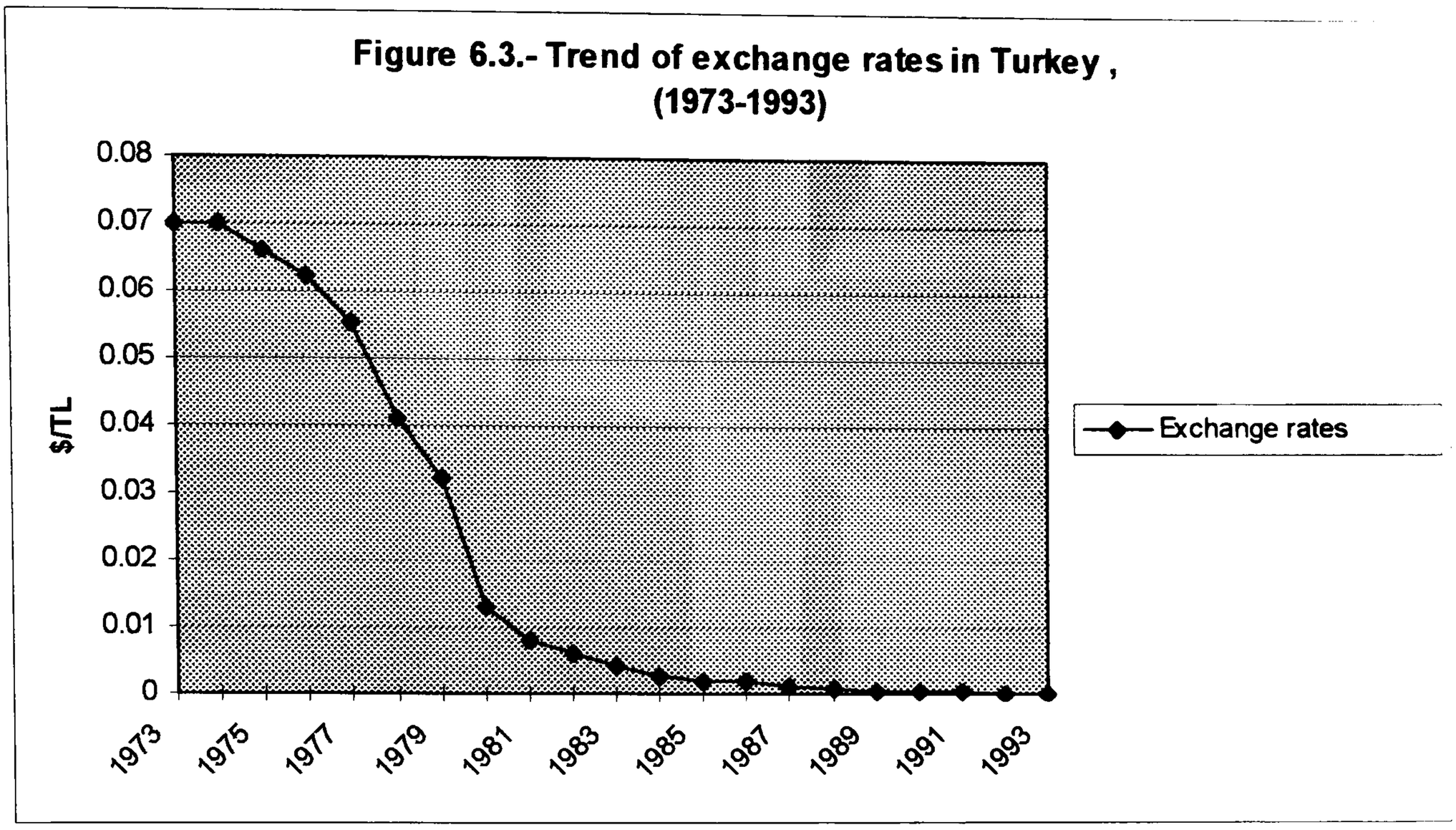
[32] The average GDP growth of GDP between 1973 and 1993 was about 5 percent for Turkey and 2.6 percent for the world.

[33] Due to the import substitution policies Turkey followed in the 1970s Turkish Lira was overvalued before the beginning of the liberalisation period.

Chart 6.3.- Exchange rates in Turkey between 1973-1993.



In sum, our final analysis on the relation between income elasticities of demand for imports and exports, growth and exchange rates indicates that though Turkey faces a high income elasticity of demand for its exports while having low income elasticities of import demand, substantial real GDP growth of Turkey in the 1980s caused a large deterioration in trade balance as the overall increase in world GDP was not large enough to balance the increase in imports of the country during this period. Therefore, it appears that the changes in exchange rates (ie devaluation of Turkish Lira) have been one of the key factors behind the rapid increase in Turkey's exports in the 1980s.

6.12.- CONCLUSION

In this chapter both the short- and long-run income and price elasticities of demand for Turkey's imports and exports are estimated using aggregate data for the period 1973-1993. We also examine if there has been a structural change in conventional import and export demand models for Turkey between the pre- and post liberalisation periods.

The results also indicate that the Marshall-Lerner (M-L) condition is satisfied, it appears therefore that the exchange rate policies can be effectively used to stabilise trade balance of Turkey. Exchange rates seem to be a particularly significant determinant of Turkey's exports. We also show that the constant depreciation of Turkish Lira during the late 1970s and over the 1980s may very well be one of the main driving factors behind the notable increase in Turkey's exports after the 1980 liberalisation program of Turkey.

Our tests for the effect of liberalisation on imports and exports indicate that there was a structural break after the implementation of the 1980 liberalisation program.

Although aggregate analysis of import and export models provide useful information about the income and price elasticities, dis-aggregate analysis of the elasticities for specific commodity groups (i.e. for agricultural and manufactured goods separately) could produce more information on determinants of trade in homogenous (agricultural) and differentiated (manufactured) commodities.

Considering the steady growth of income in Turkey, it can be said that Turkey is likely sustain a stable import increase in the future suggesting a good market for EU (and world) exports and possible balance of payments problems for the country.

In interpreting the results above it should be noted that the conventional import and export demand models we estimated are based on the assumption of "infinite supply elasticity". However, supply factors (capacity constraint) may also very well affect the models estimated. A simultaneous equation estimation of the models with factors that influence supply of imports and exports would be appropriate. Obviously, one should also consider the impact of trade protection (ie tariffs, and export subsidies) in modelling trade flows. However, this was not possible in this study as data on tariffs were not available.

CHAPTER 7

DETERMINANTS OF *INTER-INDUSTRY TRADE* BETWEEN TURKEY AND THE EU12

7.1.- Introduction

Following the analysis on the determinants of Turkey's total trade and Turkey-EU trade using conventional price and income elasticities at the aggregate level in previous chapter, this chapter studies the determinants of Turkey-EU trade at both the aggregate and disaggregate levels. The goal of the chapter is to identify the impacts of *non-price competitiveness* (R&D and technology) and *price competitiveness* (labour cost) on Turkey-EU trade.

The behaviour of foreign trade flows has been subject to many empirical investigations. The underlying traditional theoretical framework for the determination of trade volumes is one from consumer demand theory: income and prices are the explanatory variables which are generally put forward for the determination of trade flows. Unfortunately, empirical studies show that price effects appear to be rather weak (for instance, Bairam (1988). Since data suggest that changes in trade shares are not associated with major terms of trade disturbances, it seems necessary to search for an alternative explanation. This is possibly along the lines of the new international trade literature (see Krugman,1989; Helpman, 1990). This literature stresses the fact that prices and other factors, reflecting the diversity and the quality of products supplied by aggregate producers, are joint determinants of market shares.

In parallel, the relation between international trade flows and technological performance has long received attention. Yet, as Owen and Loeff (1989) have noticed, it is quite surprising that until recently the empirical research has focused almost exclusively on inter-industry analysis for single countries. Actually, an immense literature (e.g. Spencer and Brander 1983; Krugman, 1983) underscores the basic insight that strategic R&D rivalry between countries can be crucial for explaining the evolution of trade flows.

Related themes are present in the post-Keynesian literature [Thirlwall, (1979) and Kaldor, (1981)] where the emphasis lies on non-price factors of competitiveness. Neo-technology [Soete, (1987)] or 'evolutionary' approaches to technological change and growth [Dosi *et al.*, (1990); Amendola *et al.*, (1993); Verspagen, (1993); and Fagerberg , (1997)] also stress that international technological differences can provide a basis for trade, which is treated as a dynamic process of competition.

Given the theoretical arguments above, the aim of this chapter is to provide an empirical analysis of the determinants of Turkey's exports to the EU at disaggregated level, taking account of international differences in price and non-price factors. The main motivation for the analysis of non-price factors is the fact that empirical work has predominantly focused on the determinants of trade flows between developed countries and the role of non-price factors in explaining developing countries' trade patterns have hardly been examined[1].

[1] One reason for that is the difficulty of collecting data on proxies of non-price factors for developing countries. Data on proxies of technology (for example, R&D expenditure and patents) are hard to obtain for developing countries.

The chapter is organised as follows. Section 2 reviews the theoretical arguments on price and non-price competitiveness. Section 3 develops an empirical framework for modelling the determinants of Turkey-EU trade. Section 4 presents the empirical results for 24 Turkish industries (more specifically,17 low-tech and 7 high-tech) over the period 1967-1990. Section 5 examines the relation between factor prices and potential comparative advantage for the case of Turkey-EU trade. Finally, section 6 draws some conclusions.

7.2.- Price and Non-Price Competitiveness: An Overview

7.2.1.- Price and Income Elasticities Approach

Assessing the international competitiveness of a country relative to others is the subject of a number of empirical studies. However, it is rather rare to see the concept of international competitiveness of a country clearly defined. Competitiveness generally refers to the *ability of a country to expand its shares in domestic and world markets*.

Many applied studies have incorporated non-price factors along with price factors in foreign trade modelling. A common approach to modelling trade flows takes price and income differentials as explanatory variables (see Goldstein and Khan, 1985). A typical equation incorporating such effects would be of the following form:

$$X = Y^{\eta} [P / P^{*}]^{\varepsilon} \qquad (1)$$

where X and P are the country's exports and price level, and Y and P^{*} are the income and price level of the rest of the world. Imperfect substitutability, and hence

imperfect competition, between goods allows for the existence of non-infinite price elasticities ε, so that the *law of one price* does not hold. A country's exports are then more or less sensitive to price differentials according to the value of ε. Sensitivity to price variations depends very much on the type of goods exported, so that we would expect different price elasticities according to the industry origin of the exported goods.

Price differences are the most obvious influences on trade competitiveness. Nevertheless, the 'Kaldor paradox' (Kaldor,1978) comes from the observation that the fastest growing countries in terms of GDP and exports have experienced a faster growth in relative unit labour costs. Therefore relative prices, when taken alone, cannot be the major determinants of competitiveness. In the long-term a country cannot necessarily expect to see its exports growing because of a continuous decrease in relative prices (see McCombie,1992 for the post- Keynesian explanation).

Influences other than price competitiveness are then summed up in the income elasticities of imports and exports. A higher η means that all other things being equal, a country will benefit more than others from the growth of world income. Several interpretations may be related to a high η (McCombie,1992; Amable,1993). It may reflect the sectoral orientation of the country's exports. Some industries enjoy a higher income elasticity because their products tend to be substituted for the products of other industries as income rises. For example, high-technology goods generally have a higher than average demand growth. The value of the elasticity may also reflect the quality of the exported goods. *Ceteris paribus* countries with high-quality products will gain market share over other countries. All in all, the income elasticity usually represents the bulk of non-price factors.

7.2.2.- Technology and Competitiveness

The relationship between technology and competitiveness was mostly neglected in trade theory by neoclassical theoreticians and has recently become a major topic for both theoretical and empirical analysis. Strictly speaking, traditional neoclassical trade theory hardly took into account differences in technological performance in explaining trade flows between countries, supposing that every country had access to the same technology set and concentrating on factor endowments, and hence on factor prices, instead[2].

When Leontief (1954) provided evidence that the specialisation pattern of the USA in international trade seemed to deviate from what neoclassical theory predicted several authors responded to this by suggesting that the real competitive strength of US industry lay not in its capital abundance, but in its superior technological capability. This led to the formulation of the so-called neo-technological trade theories of the 1960s, which emphasised the importance of cross-country differences in technological capability and their impact on trade [Posner, (1961); Vernon, (1966)][3].

In the framework of the previous section, an explanation of what determines non-price competitiveness is lacking, since income elasticities are given exogenously in theoretical models of international trade and estimated directly in applied work[4]. It is then possible to introduce additional factors in trade equations such as Equation 1.

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[2] This traditional neoclassical view on growth and trade rested on very restrictive assumptions. In particular, it neglected demand as a source of growth, it did not allow for economies of scale, and it assumed away technological differences across countries.

[3] For an overview, see Dosi and Soete (1988).

[4] Landesmann and Snell (1989) argue that the value of the income elasticity may change over time, reflecting improvements or worsening of a country in non-price competitiveness.

Introducing a broad 'Schumpeterian' aspect, one can think of differences in technological capability as one of the main influences behind non-price competitiveness. Hughes (1986) proposed a model for the exports of the UK where factors in the form of relative R&D expenditures represented non-price effects. Fagerberg (1988) proposed a multi-equation model including a technology variable constructed with patent counts and R&D expenditure. Trade equations also took into account the effects of investment in order to reflect the international differences in the ability to meet demand and escape from capacity constraints. In an evolutionary spirit, Verspagen (1993) tested several models of competitiveness with variables reflecting price as well as technological competitiveness (or innovative ability and adaptive capacity).

Neoclassical supply-side explanations may also account for the role of technology in trade. Magnier and Toujas-Bernate (1994), embracing the 'new international economics', considered that countries can expand their world market shares by expanding the range of goods that they produce, especially if new goods are being discovered with the help of R&D expenditures, Therefore, they introduced an R&D variable in their trade equations, along with an investment term, reflecting the ability to deliver.

Soete *et al* (1991) point out that the interpretation given to technology in the new trade vision is indeed only a poor reflection of the complexity of the process of technological change and innovation. They argue that a careful analysis of the process of technological change and innovation reveals a number of specific features some of which are more fundamentally at odds with the traditional economic view of "technology". Dosi *et al* (1990) summarise these specific "alternative" features of the

technology factors[5] and argue that the "virtuous circle" between technological levels, foreign competitiveness and domestic growth is not entirely automatic and endogenous to the process of economic development.

7.3.- A Model of International Trade

7.3.1.- Modelling the relation between technology and trade

Empirically, analysts have tried to highlight the relation between competitiveness and technology by regressing a measure of trade performance on a technology variable and other variables that were considered relevant for the analysis. Generally, the basic functional relation is the following:

$$X = f(T, O) \qquad (2)$$

where X is a measure of export performance, T is a technology proxy, and O is a set of other variables[6].

The technology variables used in these analyses can be divided into *technology-input* and *technology output* measures (Soete, 1981). Among the former, the most popular choice is R&D spending, but scientific personnel has also been used. Technology-output measures include patent-based measures (Soete, 1981). Innovation counts (Greenhalgh, 1990; Greenhalgh *et al*, 1994); and various measures of

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[5] First, technology, in essence, cannot be reduced to freely available information hence it must be viewed as embodying *specific*, local, often tacit, and only partly appropriable knowledge. Second, the widely accepted representation of "technical progress" does not represent adequately the more complex reality that emerges from a variety of industry and firm based studies. See Soete *et al* (1991) for more discussion on this.

[6] Similar analysis have also been carried out with imports or performance on the domestic market as the dependent variable, and have yielded roughly similar results. Trade in services, on the other hand, has been completely neglected. See Buxton et al (1994).

productivity (Milberg, 1991; Wolff, 1995, 1996)[7]. Composite measures combining two or more of these alternatives have also been suggested (Aquino,1981; Fagerberg, 1988)[8].

Taking into account both price and non-price factors, Fagerberg (1997) formulates the general relation in Equation (2) as the following:

$$X = f(WAGE, RD, INV, HOME) \quad (3)$$

where X is exports, WAGE is labour cost per worker, RD is direct R&D[9], INV is gross fixed capital formation, HOME is domestic demand (measured as production + imports - exports).

In Equation (3), WAGE reflects the influence of price (or cost) competitiveness. The second variable, RD, is the technological variable and presents the *direct* effect of innovation on competitiveness. As mentioned before, R&D expenditure and/or patents are the most commonly used proxies for the technological variable. The third variable, INV, is the ratio of investment to value added (or production) and accounts for *indirect* non-price factors related to technological innovation. For instance, *learning by doing effects*, and *imitation ability* can be thought to be represented in this variable, but so also are effects related to embodiment of innovations in new capital. Finally the fourth

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[7] It should be noted that none of these measures is perfect. For instance, innovations made by engineers as a result of learning by doing, etc. do not have a clear cut relationship with R&D as normally recorded (Patel and Pavitt 1994). Productivity measures have at best an indirect relationship with innovation. However, at the national level, R&D, patents, and productivity-based measures are closely correlated (Fagerberg, 1987).

[8] A comprehensive overview may be found in Wakelin,(1995).

[9] Fagerberg (1997) also considers the impact of indirect R&D and foreign share of R&D.

variable, HOME, is included to allow for an impact of market size[10] on competitiveness, consistent with some of the suggestions of "new trade theory" (the 'home market effect')[11].

The expectations for the signs of the variables are as follows. For unit labour cost (WAGE), the expected sign on the parameters is a little ambiguous. From the point of view of production costs, we would expect high wages to lead to low relative competitiveness, and hence that the parameter would be negative in the estimation. However, as high wages might also be connected to high skill levels, low wages might also be connected to low competitiveness. It may therefore be the case that the exact expectation on the sign of the wage variable differs between sectors. In sectors with high-skill requirements, the sign might be positive, while in sectors where labour input has a low-skill level, the sign is expected to be negative. Nevertheless, since each variable is compared to averages, the general expectation is a negative sign. For RD, INV and HOME, a positive sign is expected since these variables represent the positive factors affecting non-price competitiveness.

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[10] In a world characterised by imperfect competition, economies of scale and trading costs, countries specialise in products for which there is a relatively large domestic market.
[11] See Krugman (1990).

7.3.2.- Previous Empirical Results on Impact of Price and Non-Price Factors on Trade Performance

The following section discusses the main empirical results from the application of Equation (2) to single countries across industries or cross-section of countries for single industries. As Fagerberg (1997) argues, analyses for single countries across industries, interesting as they might be, fail to test for possible differences across sectors in the impact of technology and other variables. The latter may be investigated by applying Equation (2) to a cross section of countries for single industries and such research typically uses data for all or most OECD countries [See, for example, Lacroix and Scheuer,(1976); Soete, (1981); Dosi and Soete, (1983); Fagerberg,(1995)]. There are also some studies that use pooled cross- sectional and time series data, but for a smaller number of countries [(Magniera and Toujas-Bernate, (1994); Amable and Verspagen, (1995)]. As these studies use different variables, the results are not directly comparable. However, to facilitate comparison, results from a number of studies are presented in Table 7.1. Since preparation of this table has involved a considerable element of judgement, the results must be interpreted with caution.

Table 7.1 indicates that the results of these studies support the hypothesis of a positive relation between technological activity and export performance for a large number of industries. The most consistent results supporting such a relationship are found for the chemical (drugs, industrial chemicals, and plastics) and machinery industries. Among the latter the evidence is particularly strong for non-electrical machinery. There is also quite strong evidence linking technology and exports in the car

Table 7.1: Impact of Price and Non-Price Factors on Trade Performance

R&D intensity (expenditure in % of production) 1985		Technology						Price/Cost			Investment					Scale	
		R&D			Patents												
		L	F	M	S	F	A	F	M	A	L	S	F	M	A	S	F
Aerospace	20	–	–	⊗	⊗	–	–	–	⊗	–	–	–	–	×	⊗	–	⊗
Computers	10	⊗[e]	–	⊗	⊗	–	⊗	–	⊗	–	–	–	–	⊗	⊗	–	⊗
Electronics	8	⊗[e]	⊗	–	⊗		–	⊗[d]	⊗	–	–[E]	–	–	⊗	–	–	⊗
Instruments	6	⊗[e]	⊗	–	⊗	⊗	⊗	–	⊗	⊗	–[E]	–	–	⊗	–	–	–
Electrical Mac.	3	⊗[e]		–	⊗	⊗	–	⊗	–	–	–[E]	–	–	–	–	–	–
Non-Elect. Mac.	2	⊗		⊗	⊗	⊗	⊗	⊗[b]	–	–	–	–	–	–	–	(-)	⊗[c]
Cars	3	⊗[f]	–	⊗	⊗	–	⊗	–	–	–	–[f]	–	–	–	×	⊗	⊗
Other Transport	3	⊗[f]		–			–		⊗	–	–[f]			–	–		
Ships	0	⊗[f]	×		–	–	–	–		–		–	⊗		–	–	–
Drugs	9	⊗[f]		–	⊗	⊗	⊗	⊗	⊗	–	–	–	×	⊗	–	–	×
Indust. Chemicals	3	⊗	⊗[a]	⊗	⊗		⊗	⊗[a]	⊗	⊗	–	–	–[a]	–	–	⊗	–[a]
Plastics	1	⊗	⊗	–	⊗		⊗	⊗	–	⊗	–	⊗	–	⊗	–	⊗	–
Petroleum Ref.	1	–		–	–				⊗		–	⊗		–		–	
Ferrous Metals	1	⊗[g]	–	–	⊗	–	⊗	–	⊗	⊗	–[a]	–	–	–	–	⊗	–
Non-ferrous Met.	1	⊗[g]	–	–	⊗	–	–	–	⊗	–	–[g]	⊗	–	–	–	–	×
Metal Products	1	⊗[g]		⊗	⊗	⊗		⊗	⊗	⊗	–[g]	–	–	–	–	⊗	–
Stone, glass, clay	1	–		–	⊗		⊗		–	⊗	–	–		–	(-)	⊗	
Wood	0	–		⊗			⊗		⊗	⊗	–			–	–		
Paper	0	⊗	–	⊗		–		–	⊗		–		–	–			–
Textiles, clothing	0	–	–	⊗	–	–	⊗	⊗	⊗	⊗	–	–	–	–	–	⊗	–
Food & drinks	0	⊗		⊗	–		⊗		⊗	⊗	–	–		–	–	–	

Symbols: ⊗ = significant, correct sign; × = significant, incorrect sign;
– = not significant, correct sign; (-)= not significant, incorrect sign; blank = not included.
Notes: [a] Organic Chemicals. [b] Special machinery. [c] Power-generating mach. [d] Semiconductors. [e] Electrical. machinery and instruments. [f] Transport equipment (excluding aerospace). [g] Metals and metal products.
Source: Fagerberg (1997). L = Lacroix and Scheuer (1976); [15 sectors /12-17 countries, 1968]; F = Fagerberg (1995); [28 sectors/19 countries, 1960-83 (average values)]; M= Magnier and Toujas-Bernate (1994); [20 sectors/5 countries, 1980-87]; S = Soete (1981);[40 sectors/ 22 countries, 1977]; A = Amable and Verspagen (1995);[18 sectors/ 5 countries, 1970-1991].

industry. However, the evidence of such a link is not confined to industries commonly regarded as high-tech (or R&D intensive), although the evidence is generally stronger for these industries. Among the less high-tech industries for which technological competition appears to be important, metal products and food and drinks may be mentioned. It is noteworthy that there is only one industry (petroleum refining) for which there is no evidence of a positive impact of technology on export performance.

As for the importance of price competition, the evidence is more mixed. Price competition appears to be significant in chemicals, for which technology was also found to be an important factor. For machinery and transport equipment the evidence of price competition is rather weak, with the exception of electrical machinery (which includes many consumer products) and electronics. As one might expect, price competition appears to be of importance in many low-tech industries, such as textiles and clothing. The investment variable – usually measured per worker- fails to have a significant impact in all but a few cases.

Some studies also include a variable assumed to reflect the size of the country or its domestic market. But –with the exception of Fagerberg (1995)- the reported results are difficult to assess, since several variables included in these tests to some extent already reflect scale factors. Fagerberg (1995) found such scale factors to be important in a few industries only, covering around one-fifth of total OECD trade. The findings in Table 7.1 suggest that a distinction should be made between technology (including R&D) as an input in the process of production and as the most decisive factor in the process of global competition. Industries such as aircraft, computers, and –to a lesser extent- cars are clearly among the most R&D-intensive, but according to this study,

comparative advantage is determined by access to a large domestic market rather than by differences between countries in R&D efforts[12].

Until recently, most studies have focused on the impact of direct R&D and innovation by firms on exports. The impact of technology flows from other firms, industries and countries, though potentially important according to recent theorising in this area, has received far less attention. The reason is, of course, that little is known about these flows. However, Fagerberg (1997), in a study based on data for ten OECD countries and 20 industries in the mid-1980s, included both direct and R&D acquired indirectly through purchase of capital goods and intermediary products from domestic and foreign sources as possible determinants of exports. The results from that study indicate that although both direct and indirect R&D have a significant and positive impact on export performance, the impact (i.e. the estimated elasticity) of the latter is about twice that of the former.

7.3.3.- Concluding Remarks on Impact of Technology on Trade

The notion of the international competitiveness of a country has attracted much attention lately though it is rather difficult to formulate a clear definition of the concept. A consensus definition of international competitiveness might perhaps be that it reflects the ability of a country to secure a high standard of living for its citizens, relative to the citizens of other countries, both in the short and long term. At the same time, it is usually assumed that the concept is related to trade. This is perhaps not so controversial in itself; what is at stake is rather the direction of causality. A number of arguments

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[12] Van Hulst et al (1991) also found that technology variables had little explanatory power in some very

have been considered, focusing on the demand as well as on the supply side. While growth obviously affects trade, there are also good reasons to assume a feedback from trade on growth, i.e. that causation goes both ways. Thus, it makes considerable sense to look at indicators reflecting both income (or productivity) and trade when assessing international competitiveness.

Regarding the impact of non-price variables on trade, three central findings may be noted. First, R&D and innovation play an important role in many industries, and not only in those that are commonly regarded as high-tech (although the impact is perhaps more pronounced in the latter). Second, in some 'very high-tech' industries, competitiveness seems to be strongly affected by the size of the domestic market. This is true for aerospace, but may also apply to other industries. Thus, while R&D and innovation may be important for competitiveness in both large and small countries, the latter should be careful not to use the specialisation pattern of the former as a kind of yardstick of success. Third, R&D does not only matter for the firm or sector of origin, but spills over to other firms and sectors, and these spillovers are at least as important as the direct effects.

7.4.- An Empirical Model of Turkey's Exports to the EU

7.4.1- General Remarks

In order to assess the impact of price and non-price factors on trade, in what follows we shall introduce a model of Turkey's foreign trade with the EU at a disaggregated level, in the way which is put forward by the new theory on international trade. Both cross sectional and time-series specifications shall be employed to examine

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high-tech' industries.

the link between exports and wages, investment and home market for 24 industries (17 low-tech and 7 high-tech) for the period 1967-1990. Consistent with Fagerberg (1997) and Soete (1981), to examine the effects of price competitiveness I shall use relative wages per worker. For non-price factors, since data on R&D expenditure and patents were not available for Turkey, only the indirect effect of technology (captured by gross fixed capital formation; investment) shall be examined. As discussed before, the investment variable indicates the ability to imitate and learning by doing skills. To account for the size of market, a home demand variable is introduced to the model[13]. In order to analyse the effect of Turkey's 1980 liberalisation program on its trade, a shift dummy variable is added. The models to be estimated are as follows;

$$\text{i.} \quad X_{it} = \beta_{i0} + \beta_{i1} WAGE_{it} \tag{4}$$

$$\text{ii.} \quad X_{it} = \beta_{i0} + \beta_{i1} WAGE_{it} + \beta_{i2} INV_{it} \tag{5}$$

$$\text{iii.} \quad X_{it} = \beta_{i0} + \beta_{i1} WAGE_{it} + \beta_{i2} INV_{it} + \beta_{i3} HOME_{it} \tag{6}$$

$$\text{iv.} \quad X_{it} = \beta_{i0} + \beta_{i1} WAGE_{it} + \beta_{i2} INV_{it} + \beta_{i3} HOME_{it} + \beta_{i4} D80 \tag{7}$$

where X_{it} is Turkey's exports of industry i to the EU in period t; $WAGE_{it}$ is the relative (Turkey / EU12 average) wage per worker in industry i in period t; INV_{it} is the relative investment (measured as 'gross fixed capital formation / value added') in industry i in period t; $HOME_{it}$ is the home demand (measured as 'production + imports - exports') for industry i in period t; and D80 is the time dummy variable to account for Turkey's 1980 trade liberalisation program. Because the models in

[13] Home demand variable is used to examine the effect of differences in country size on trade. However, because this study is for a single country, this variable is expected to reflect the effect of cross-industry differences in home demand.

Equations (4-7) are in log-linear form, the coefficients of the variables are elasticities. All variables are measured in current prices in a common currency (US dollars).

The data for trade at a disaggegated level were obtained from the OECD (International Trade by Commodities Statistics, ITCS, Rev.2) and the data for the other industry specific variables were acquired from the UNIDO (Industrial Statistics Database, 1997, 3-Digit, ISIC).

7.4.2.- Empirical Results

7.4.2.1.- The Aggregate Analysis of the Low and High-Tech Industries

Table 7.2 presents the OLS estimates of the models given in Equations (4-7) over the period 1967-1990 by using pooled time series data. The industries were classified as *low-tech* and *high-tech* industries according to their R&D intensities using the criteria employed by the OECD[14].

Table 7.2 first indicates that goodness of fit (measured by adjusted R^2; $\overline{R}^2$) improves significantly with the addition of the HOME variable while the investment variable; INV, does not appear to improve the explanatory power of the models in all cases. However, one might expect to have a higher $\overline{R}^2$ in time series analysis. The reason for this may be the absence of variables to account for the impact of natural resources and/or technology on trade. The latter could be captured by R&D expenditure and/or patents, however, data for these variables was not available for Turkey.

[14] See Appendix for classification of industries.

Table7.2: Pooled time series analysis, Determinants of Turkeys' Exports to the EU

Dependent Var. Logged Exports	Constant	Relative Wages	Relative Capital Form.	Home Demand	Time Dummy	$\overline{R}^2$	D-W
Low-Tech Industries							
Model i	4.3694	-2.8467*				.16478	.27063
	(11.017)	(-9.0164)					
Model ii	4.2982	-2.8987*	-3.1384			.17177	.27162
	(10.843)	(-9.1912)	(-1.1038)				
Model iii	-24.1620	-1.5713*	.38882	1.5359*		.61929	.40806
	(-18.160)	(-7.0689)	(1.635)	(21.841)			
Model iv	-23.5081	-1.2973*	.39726	1.5087*	.42002	.61984	.40170
	(-16.473)	(-4.1753)	(1.3384)	(20.524)	(1.2611)		
Med&High-Tech Indust.							
Model i	1.6206	-4.0819*				.29063	.38460
	(2.6845)	(-8.3320)					
Model ii	1.6322	-4.1923*	-.68030*			.30457	.38805
	(2.7306)	(-8.5913)	(-2.0799)				
Model iii	-21.3669	-3.3627*	-.14823	1.2199*		.62862	.50368
	(-10.904)	(-9.2589)	(-.60984)	(12.040)			
Model iv	-15.3663	-1.0824**	.043523	.98004*	2.7552*	.63592	.49813
	(-6.9594)	(-1.8749)	(.18838)	(9.1738)	(4.8889)		
All Industries (Low+Med&high)							
Model i	3.6293	-3.1491*				.18848	.28963
	(10.701)	(-11.599)					
Model ii	3.5623	-3.2199*	-.43012			.20110	.29373
	(10.565)	(-11.912)	(-1.1724)				
Model iii	-22.8948	-2.0561*	.20739	1.4212*		.58642	.37825
	(-19.577)	(-10.235)	(.8058)	(23.127)			
Model iv	-22.3042	-1.8567*	.21868	1.3958*	.27695*	.58961	.39363
	(-18.709)	(-8.5317)	(.6631)	(22.448)	(2.3315)		

Notes: All variables are in logs. Figures in parentheses are *t*-statistics. * Significant at the5 % level . ** Significant at the 10 % level.

Secondly, it is clear from Table 7.2 that cost competitiveness (proxied by wages per worker) is an important determinant of exports for both low-tech and high-tech industries and that, as one might expect, its impact on trade is greater in low-tech industries (indicated by the magnitude of its coefficient).

Thirdly, the investment variable (measured by the ratio of gross fixed capital formation to value added) does not seem to have a significant impact on

competitiveness in all but one case (for high-tech industries)[15]. Fourthly, the size of the home market appears to be as important as wages in determining Turkey's exports especially in the case of low-tech industries. Finally, Turkey's 1980 trade liberalisation program (captured by the time dummy variable) seems to have a positive impact on trade in all cases, especially in the case of high-tech industries.

Table 7.3 below presents the correlation between the dependent variable, logged exports; LEX, and the other variables used in the regression analysis.

Table 7.3: Estimated Correlation Matrix of Variables.

Dependent variable Logged Exports, LEX	**Relative Wages LRWAGE**	**Relative Investment LRINV**	**Home Market LHOME**
Low-tech Industries	-.40845	-.062639	.74409
Medium-High Industries	-.54303	-.074381	.66603
All industries	-.43577	-.081870	.70998

It is clear from Table 7.3 that, as one might expect, there is a negative correlation between trade performance and relative wages. However, interestingly, the link between the exports and the relative wages appears to be stronger in medium and high-tech industries. The strong relation between exports and relative wages in medium and high-tech industries can be explained by the existence of Turkey's traditional exports in this category (for example, textiles and wearing apparel) for which cost competitiveness is clearly important. As suggested by the regression analysis in Table 7.2, the link between exports and home market is positive and very strong, especially

[15] As previously shown in Table 7.1 the investment variable was found insignificant in many other studies.

for low-tech industries. The correlation between exports and relative investment seems to very weak and negative, though one expects a positive relation.

The results in Table 7.2 and 7.3 indicate that the cost competitiveness (or price factors) appear to have a significant impact on Turkey's exports and its effect on medium and high-tech industries is as important as in the case of low-tech industries. However, the effect of non-price factors -or in other words, the indirect effect of technology, proxied by physical capital investment- on trade flows seems to be insignificant in all cases. This suggest that, similar to some other studies, our results do not support the indirect effect of technology (through learning by doing and ability to imitate) on trade for Turkey's exports to the EU. Nevertheless, this result may be due to the weakness of the proxy used to capture the indirect impact of technology[16] on trade. Home demand seems to be a crucial factor in explaining Turkey's exports in all cases. Finally, our results suggest that Turkey's 1980 trade liberalisation program had a positive impact on Turkey's exports, especially in the case of medium and high-tech industries.

7.4.2.2.- Testing for slope homogeneity

Following the pooled time series estimates of the industries in the sample, it is of interest to test the hypothesis that the coefficients of the explanatory variables in Table 7.2 are the same across all the industries. In terms of the coefficients of the Equation (7), the relevant null hypothesis (for relative wages, for instance) is;

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[16] Differing from the proxy used in this work (physical capital / value added), some studies use other proxies (e.g. "physical capital per worker", or "physical capital / output") to capture the indirect effect of

$$H_0 : \beta_{i1} = \beta_1 \qquad \text{for} \quad i = 1, 24 \tag{8}$$

Table 7.4 below presents the Wald test results for the hypothesis that the given set of parameters are jointly equal. The results are given for each parameter and for low-tech and high-tech industries separately. Table 7.4 indicates that in all cases the probability (P) values in square parenthesis are smaller than [.05], therefore, we strongly reject the slope homogeneity hypothesis at .5 per cent significance level.

Table 7.4: Wald Test results for homogeneity of variables

	Wald Test for the Hypothesis that the given set of Parameters are jointly equal:			P-Value
Low-tech Industries				
ALL VARIABLES	CHISQ(64)	=	2043.0304	[0.00000]
R.WAGE	CHISQ(16)	=	130.28071	[0.00000]
R.INVESTMENT	CHISQ(16)	=	87.394654	[0.00000]
HOME DEMAND	CHISQ(16)	=	197.22932	[0.00000]
TIME DUMMY	CHISQ(16)	=	178.62299	[0.00000]
High-tech Industries				
ALL VARIABLES	CHISQ(24)	=	283.60503	[0.00000]
R.WAGE	CHISQ(6)	=	21.708169	[0.00137]
R.INVESTMENT	CHISQ(6)	=	10.372570	[0.03460]
HOME DEMAND	CHISQ(6)	=	43.324525	[0.00000]
TIME DUMMY	CHISQ(6)	=	71.162753	[0.00000]

Considering the results of slope homogeneity tests above, in follows we examine the disaggregate analysis of the 24 industries in the sample over the same period.

technology on trade. However, their results also confirm the weakness of this variable in explaining trade

7.4.3.- The Disaggregate analysis of 24 industries

7.4.3.1.- The OLS estimates

Following the analysis of factors determining Turkey's exports at aggregate level in previous section, this section shall examine these factors at a disaggregate level for 24 industries using the Model (iv) in Equation (7) over the same period ,1967-1990. The OLS estimates of Model (iv) for each of the 24 industries is given in Table 7.5 and the summary of the results is shown in Table 6. A number of interesting features emerge from these results:

a.-) The explanatory power of variables (indicated by $\overline{R}^2$) was poor especially for leather products, paper and petroleum refineries; where one might assume that 'natural resource' endowments play a crucial role[17]. Because no such variable was included in the model, this result should come as no surprise.

b.-) Consistent with our previous results at aggregate level, the relative wages appear to be one of the main factors in determining Turkey's exports for most of the industries considered. The relative wage variable was significant with expected negative sign for almost all industries. In addition, significant results were obtained for all high-tech industries in the sample, such as machinery electric and scientific and professional equipment.

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flows. See Amable and Verspagen (1995) and Fagerberg (1997).
[17] See Soete (1981) for similar results.

Table7.5: OLS Estimates, Determinants of Turkey's exports to the EU, 1967-1990

	Constant	Relative Wages	Relative Capital Formati.	Home Market	Time Dummy 1980	$\bar{R}^2$	DW
Food Products	-14.4613 (-3.4630)	-.3751** (-1.7647)	-.1490 (-1.1934)	1.2002* (6.7812)	-.0630 (-.3489)	.9207	1.7600
Beverages	-27.8291 (-10.3865)	-.49431** (-2.0262)	-.0808 (-.5770)	1.7430* (12.9244)	-.4688 (-1.4993)	.9259	1.3423
Tobacco	-2.1979 (-.7935)	-.2071 (-1.1392)	-.1641 (-1.5038)	.6004* (4.2445)	.4351 (1.6350)	.7276	1.8641
Textiles [1]	-25.8020 (-9.5608)	-1.1763* (-5.2370)	.1198 (.82997)	1.6855* (13.1179)	-.5489* (-2.9134)	.9625	1.7741
Wearing apparel	-18.3385 (-3.7869)	-.2571 (-.4938)	-.0352 (-.1974)	1.5567* (5.7478)	-.9626* (-2.3119)	.9420	.89887
Leather products	-29.8863 (-1.4848)	-5.5976* (-2.9420)	1.5863** (1.9464)	1.4271 (1.2816)	-.8622 (-.5088)	.4850	2.1822
Footwear	-16.2637 (-2.2236)	-4.9930* (-4.3975)	.1206 (.3721)	.8663* (2.1641)	1.3057 (1.3627)	.8367	1.9303
Wood products	2.0113 (1.7975)	-1.1375 (-.8970)	-1.1307* (-1.7501)	.1461E-8 (.6521)	3.0678* (2.9899)	.8117	1.6443
Furniture [1]	-36.3097 (-4.6095)	-5.6022* (-3.6513)	-1.0899 (-1.6989)	1.7944* (3.5639)	.0261 (.0255)	.7927	1.7245
Paper	-27.8947 (-1.9763)	-3.3031* (-2.5079)	-.3691 (-.6033)	1.5280** (2.0604)	-2.5907** (-1.7722)	.4367	1.0713
Printing	-20.1118 (-2.5406)	-1.8766* (-2.6823)	-.3520 (-1.5795)	1.2821* (2.8777)	-1.5102* (-2.6799)	.7914	1.4248
Petroleum ref.	-9.4501 (-.6436)	-2.3487** (-1.9390)	-.6978** (-1.9707)	.7419 (1.0407)	-.4482 (-.33411)	.5239	.97806
Pottery	-26.5344 (-3.8360)	-2.7415* (-3.4572)	-.6927** (-1.7880)	1.5565* (3.9478)	-.7543 (-.7951)	.8101	1.5096
Glass	-26.4899 (-4.9823)	-1.0639 (-1.4827)	.10432 (.3864)	1.6975* (5.5844)	.8864 (1.3766)	.8522	1.2376
Iron and steel [1]	-18.0308 (-3.0888)	-.9398** (-1.8361)	.5883* (2.2130)	1.2385* (4.3094)	.1817 (.4617)	.8954	2.3609
Fabricated met.	-28.0537 (-3.1195)	-2.7090* (-3.3948)	.0061 (.0180)	1.6444* (3.4953)	-.5159 (-.83882)	.8922	1.7948
Other man. Pro.	-5.7256 (-1.7779)	-1.8365* (-6.5954)	.3203* (2.3933)	.6247* (3.2126)	1.0081* (3.3236)	.9364	1.5452
Rubber	-33.3940 (-3.8972)	-3.6655* (-4.5157)	-.0274 (-.0560)	1.8532* (4.1370)	.3876 (.4774)	.8369	1.5161
Plastic products	-5.4942 (-.4766)	-4.2073* (-2.3178)	.0522 (.0629)	.2206 (.3411)	2.8923* (2.3618)	.8429	1.4076
Non-ferro. Met.[1]	-6.4309 (-.9895)	-1.2483** (-1.7835)	.2784 (.8273)	.7061** (2.0741)	-.0860 (-.1319)	.6442	1.2802
Mac. exc. Elect.	-36.1839 (-5.3242)	-4.2047* (-3.8291)	.4339 (.8551)	1.8595* (5.3349)	-.7654 (-.8923)	.8838	1.6274
Mac. Electric	-19.1954 (-3.8493)	-2.5439* (-2.2386)	.6004 (1.5161)	1.1077* (4.1106)	1.4189** (1.7835)	.9118	1.6537
Transport equ.	-34.5190 (-2.9904)	-4.8382* (-3.1139)	-.5351 (-.54793)	1.7484* (2.9223)	-.5634 (-.4171)	.7204	.96046
Profes.&Scient.	-5.0640 (-.9818)	-2.6671* (-3.3164)	.4938 (1.7011)	.2147 (.6580)	2.7089* (3.1879)	.8122	1.6420

Notes: [1] For the period 1970-1990. All variables are in logs.
Figures in parentheses are *t*-statistics. * Significant at the 5 % level . ** Significant at the 10 % level.

Table 7.6: Summary of OLS estimates, Determinants of Turkey's exports to the EU

	Relative Wages	Relative Capital Formation	Home Market	Time Dummy
Food Products	⊗	(-)	⊗	(-)
Beverages	⊗	(-)	⊗	(-)
Tobacco	–	(-)	⊗	–
Textiles	⊗	–	⊗	×
Wearing apparel	–	(-)	⊗	×
Leather products	⊗	⊗	–	(-)
Footwear	⊗	–	⊗	–
Wood products	–	×	–	⊗
Furniture	⊗	(-)	⊗	–
Paper and products	⊗	(-)	⊗	×
Printing	⊗	(-)	⊗	×
Petroleum refineries	⊗	×	–	(-)
Pottery	⊗	×	⊗	(-)
Glass and products	–	–	⊗	–
Iron and steel	⊗	⊗	⊗	–
Fabricated metals	⊗	–	⊗	(-)
Other manufac. prod.	⊗	⊗	⊗	⊗
Rubber	⊗	(-)	⊗	–
Plastic products	⊗	–	–	⊗
Non-ferrous metals	⊗	–	⊗	(-)
Machinery exc. Elect.	⊗	–	⊗	(-)
Machinery electric	⊗	–	⊗	⊗
Transport equipment	⊗	–	⊗	(-)
Profes.&scientific equ.	⊗	–	–	⊗

Notes: "⊗ : Significant , correct sign"; " ×: significant, conflicting sign "; " – : not significant, correct sign"; " (-): not significant, conflicting sign ".

In terms of the magnitude of relative wages' impact on trade, among low-tech industries; leather products, footwear and furniture; and among high-tech industries; plastic products, machinery except electric, and transport equipment appear to have higher elasticities[18].

c.-) The investment variable, similar to the result obtained in aggregate analysis, fails to have a significant impact on Turkey's exports for almost all industries. However, in the case of high-tech industries, it has the expected positive sign for all industries, except for rubber. This result is consistent with the theoretical arguments.

d.-) The home demand variable was significant for most industries with expected positive sign, and seems to have an important impact on trade. However, the magnitude of its effect does not appear to be as important as relative wages.

e.-) Turkey's 1980 liberalisation program seems to have mixed effects on exports for the industries in the sample.

7.4.3.2.- The SURE estimates

Considering the major disturbance problems (e.g. serial correlation and heteroscedasticity) affecting single equation models in Table 7.5, in what follows we present the multiple equation SURE[19] (seemingly unrelated regression equations) model results for the same 24 industries in Table 7.7 and the summary of the results are shown

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[18] It is interesting to note that, the impact of relative wages on these high-tech industries seem to be greater than some of Turkey's traditional exports (for example, textiles and wearing apparel).

[19] The SURE model allows the disturbances across equations to be freely correlated. If all equations have the same set of exogenous variables and if there are no linear constraints imposed, then SURE is the same as equation by equation ordinary least squares (OLS).

Table 7.8. The results from the SURE model appear to be similar to the OLS results and can summarised as follows;

a.-) The explanatory power of variables (indicated by R^2) was greater than that of OLS model, however, it was still poor for leather products, paper and petroleum refineries; where one might assume that 'natural resource' endowments play an important role.

b.-) Similar to the OLS results, relative wages appear to be one of the main factors in determining Turkey's exports for most of the industries considered. Though not as clear as the OLS results, the relative wage variable was significant with expected negative sign for the majority of industries including most high-tech industries in the sample. The magnitude of relative wages' impact on trade, compared to the OLS estimates, seems to be smaller in the SURE estimates, though, among low-tech industries; leather products, footwear and furniture; and among high-tech industries; plastic products, machinery except electric, and transport equipment appear to have higher elasticities.

c.-) The investment variable, similar to the OLS model results, fails to have a significant impact on Turkey's exports for most industries. In the case of high-tech industries, this variables was significant for machinery except electric and professional and scientific equipment.

d.-) Consistent with the OLS results, the home demand variable was significant for most industries with expected positive sign, and seems to have an important impact on Turkey-EU trade. The size of the home market seems crucial especially for textiles, paper, rubber and machinery except electric.

Table 7.7: SURE Estimates, Determinants of Turkey's exports to the EU, 196?-1990

	Constant	Relative Wages	Relative Capital Formati.	Home Market	Time Dummy 1980	$\overline{R}^2$	DW
Food Products	-10.8102 (-4.95243)	-.3996* (-2.68754)	-.0410 (-.6332)	1.0507* (10.9204)	.913E-03 (.643E-02)	.9305	1.6437
Beverages	-27.2559 (-13.1107)	-.4301* (-2.5040)	-.0883 (-1.1178)	1.71662* (16.3939)	-.3407** (-1.7365)	.9378	1.2861
Tobacco	-1.5396 (-.7627)	-.1452 (-1.1886)	-.2035* (-3.9272)	.5677* (5.6809)	.5960* (3.3100)	.7704	1.6666
Textiles [1]	-38.6275 (-8.4415)	-1.3544* (-3.2238)	-.0432 (-.2267)	2.2689* (10.1555)	-1.2229* (-3.6922)	.9112	.84182
Wearing apparel	-26.7124 (-14.1629)	.0852 (.3409)	.2665* (3.2836)	1.9828* (18.3524)	-1.3377* (-3.7692)	.9648	.65408
Leather products	-14.4380 (-1.7194)	-4.0730* (-4.1248)	.1854 (.7645)	.7485 (1.5450)	-1.0210 (-1.3934)	.5559	1.3739
Footwear	-19.4416 (-4.3231)	-4.2847* (-8.0965)	.0710 (.6272)	1.0984* (4.4225)	.9035* (1.9946)	.8572	1.4502
Wood products	-8.9761 (-1.5600)	-.0566 (-.0836)	-1.4018* (-5.0916)	.6565* (2.1320)	3.2044* (5.3589)	.8339	1.6030
Furniture [1]	-21.1823 (-4.3096)	-3.8386* (-3.9078)	-.8130** (-1.8983)	1.1090* (3.3514)	1.3424 (1.4875)	.7748	1.0782
Paper	-48.0082 (-4.2133)	-2.1364* (-2.3336)	-.2345 (-.7422)	2.5835* (4.3329)	-2.6560* (-2.7511)	.5324	1.0400
Printing	-23.4792 (-4.3845)	-1.6281* (-3.5637)	-.3919* (-3.6059)	1.4769* (4.9417)	-1.9854* (-4.8145)	.8186	1.4204
Petroleum ref.	-4.5650 (-.4503)	-2.4821* (-3.1809)	-.8735* (-5.0696)	.4903 (1.0006)	-.5657 (-.5107)	.5456	1.2315
Pottery	-33.0523 (-6.8465)	-2.8252* (-5.5365)	-.7460* (-3.7261)	1.9087* (7.0122)	-1.8386* (-2.7342)	.8465	1.5580
Glass	-29.4344 (-7.4052)	-.4607 (-.8681)	.1837 (1.5938)	1.8820* (8.6552)	.3799 (.8415)	.8610	1.1266
Iron and steel[1]	-21.6825 (-6.4352)	-.1374 (-.4325)	-.0447 (-.4229)	-.1374* (8.6295)	1.0505* (3.4258)	.9076	2.1526
Fabricated met.	-38.7455 (-7.9935)	-1.8216* (-7.0416)	.1123 (.9552)	2.2167* (8.9552)	-.7453* (-3.0915)	.8988	1.3777
Other man. pro.	-7.5449 (-2.82239)	-1.5295* (-3.99630)	.2106* (2.81401)	.7480* (4.68186)	.5824 (1.42826)	.9193	.86848
Rubber	-42.1223 (-5.0165)	-3.8784* (-4.2509)	-.2790 (-.9168)	2.2993* (5.3249)	-.5130 (-.5988)	.8615	1.4007
Plastic products	-.6074 (-.0565)	-3.4355* (-2.0281)	-.2325 (-.3149)	-.0467 (-.0776)	4.8023* (4.0709)	.8585	1.3039
Non-ferro. Met.[1]	.6414 (.1311)	-.9383 (-1.6341)	-.1645 (1.4078)	.3694 (.7078)	.3971 (-.8685)	.6161	1.0882
Mac. exc. Elect.	-37.9074 (-7.1501)	-3.7019* (-4.7718)	.6347* (2.3267)	1.9638* (7.3025)	-.6194 (-.9403)	.9023	1.4784
Mac. Electric	-31.2632 (-3.1603)	-4.1718* (-3.3170)	.1845 (.3533)	1.6148* (3.1766)	.5284 (.4638)	.7557	.86330
Transport equ.	-2.2558 (-.5213)	-2.5273* (-4.2586)	.2456 (1.1034)	.0275 (.10259)	3.5291* (4.6807)	.8480	1.6097
Profes.&scient.	-14.8689 (-4.0300)	-4.2219* (-6.7573)	.4716** (1.8829)	.8403* (4.2004)	.8725** (1.8202)	.9183	1.5736

Notes: Notes: [1] For the period 1970-1990. All variables are in logs.
Figures in parentheses are *t*-statistics. * Significant at the 5 % level . ** Significant at the 10 % level.

Table 7.8: Summary of SURE estimates, Determinants of Turkey's exports to the EU

	Relative Wages	Relative Capital Formation	Home Market	Time Dummy
Food Products	⊗	(-)	⊗	–
Beverages	⊗	(-)	⊗	×
Tobacco	–	×	⊗	⊗
Textiles	⊗	(-)	⊗	×
Wearing apparel	(-)	⊗	⊗	×
Leather products	⊗	–	–	(-)
Footwear	⊗	–	⊗	⊗
Wood products	–	×	⊗	⊗
Furniture	⊗	×	⊗	–
Paper and products	⊗	(-)	⊗	×
Printing&Publishing	⊗	×	⊗	×
Petroleum refineries	⊗	×	–	(-)
Pottery	⊗	×	⊗	×
Glass and products	–	–	⊗	–
Iron and steel	–	(-)	×	⊗
Fabricated metals	⊗	–	⊗	×
Other manufac. Prod.	⊗	⊗	⊗	–
Rubber	⊗	(-)	⊗	(-)
Plastic products	⊗	(-)	(-)	⊗
Non-ferrous metals	–	(-)	–	–
Machinery exc. Elect.	⊗	⊗	⊗	(-)
Machinery electric	⊗	–	⊗	–
Transport equipment	⊗	–	–	⊗
Profes.&scientific equ.	⊗	⊗	⊗	⊗

Notes: [1] For the period 1970-1990.

"⊗ = Significant , correct sign"; " × = significant, incorrect sign" ; "– = not significant, correct sign "; " (-) = not significant, incorrect sign ".

e.-) Turkey's 1980 liberalisation program seems to have mixed effects on exports for the industries in the sample.

7.5.- Factor Prices and Potential Comparative Advantage

7.5.1.- Theoretical Arguments

The previous sections have identified the various factors underlying Turkey's comparative advantage with respect to the EU. This section examines the potential for a better exploitation of Turkey's comparative advantage. The first motivation for this analysis is the conclusion from the previous analysis of the importance of cost competitiveness in determining Turkey's competitiveness. The second motivation is the fact that the bulk of trade barriers between Turkey and the EU have already been removed especially after the 1996 Customs Union agreement[20] and thus the existing non-tariff barriers (NTBs) appear to be one of the main sources of gains from a possible membership of Turkey into the EU.

A useful insight into the question of whether comparative advantage is already fully exploited can be obtained from a comparison of factor prices across the EU countries and Turkey. Traditional trade theory, based on the assumption of perfect competition, suggests that a full exploitation of comparative advantage will lead to an equalisation of relative factor prices across countries. Along these lines, a deviation

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[20] Harrison, Rutherford and Tarr (1997) report that Turkey's average tariff reduction after the 1996 Customs Union agreement is about 7%.

from the equality of factor prices could be interpreted as an indicator that comparative advantage is not fully exploited because of NTBs. Even if one allows for imperfect competition, a condition of free entry will usually guarantee that factor prices will tend to equalise (Helpman and Krugman, 1985). If there is significant market power, it is possible that factor prices will not converge. Yet, it will still be the case that some comparative advantage is left unexploited. A removal of (NTBs) should increase the degree of competition, leading to an increase in the market share of low-cost producers, further specialisation and a convergence in factor prices[21].

7.5.2.- A sectoral convergence analysis of wage costs between Turkey and the EU

In order to investigate what has happened to the dispersion of wages across Turkey and the EU, the coefficients of variation in wages for EU12 and Turkey is calculated for the same 24 industries over the period 1970-1990. To examine the impact of Turkey on convergence of wages in EU, the coefficients of variation in wages per worker is first calculated for 13 countries, EU12 and Turkey, and then it is compared with the EU12.

Table 7.9 shows the calculated coefficients of variation (defined as the ratio of standard deviation to the –unweighted- mean) among these 13 countries for each industry in 1970, 1975, 1980, 1985 and 1990. The same analysis for EU12 only is given in Table 7.10.

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[21] See Neven (1990) for a an analysis of potential comparative advantage for the EU countries following the 1992 single market programme.

In the light of the theoretical arguments in section 7.5.1, it is apparent that the greater the differences in factor prices (wages, in our analysis) the greater the potential comparative advantage that will stem from the existence of NTBs. Therefore, the industries with an increasing (decreasing) trend in coefficient of variation over time can be seen as the industries that have an enlarging (declining) potential for exploiting comparative advantage resulting from cost competitiveness.

Table 7.9 indicates, first, that the coefficient of variation of wages in low-tech industries is greater than that in medium and high-tech industries. The dispersion of wages seems to be higher especially in food products, beverages, leather and footwear at the beginning of observation period, 1970. Among high-tech industries, the variation of wages appears to be greater for plastic products and machinery except electric over the whole observation period. A careful examination of Table 7.9 also indicates that, despite the substantial shifts in some industries over time, the dispersion in wages among the 13 countries has increased for some industries; such as, tobacco, wearing apparel, machinery electric, transport equipment and professional and scientific equipment (indicating more room for further exploitation of comparative advantage). However, the dispersion in wages among these countries has decreased in the case of beverages, textiles, leather, footwear, paper and rubber(indicating less room for exploitation of comparative advantage).

Table 7.9 : Coefficient of variation in Wages per worker for the **EU-12 and Turkey**. *24 manufacturing industries , 1970-1990*

	1970	1975	1980	1985	1990
Low-tech Industries					
Food Products	0.4590	0.5986	0.5133	0.5198	0.4568
Beverages	0.9955	0.5218	0.4404	0.4772	0.4411
Tobacco	0.3802	0.4331	0.4335	0.4819	0.4562
Textiles	0.7319	0.5050	0.4967	0.4456	0.4490
Wearing apparel	0.4341	0.4553	0.5040	0.5352	0.5434
Leather	0.8190	0.5140	0.4745	0.5796	0.5500
Footwear	0.8484	0.5007	0.4631	0.4670	0.4608
Wood Products	0.5081	0.4878	0.4636	0.6008	0.5326
Furniture	0.5614	0.5494	0.5448	0.5340	0.5461
Paper	0.5432	0.5303	0.4273	0.4398	0.3939
Printing	0.5343	0.5735	0.4708	0.4679	0.4585
Petroleum ref.	0.4572	0.5100	0.4567	0.5613	0.4151
Pottery	0.4432	0.4536	0.4271	0.3863	0.4691
Glass	0.4265	0.4344	0.4264	0.4174	0.3731
Iron and steel	0.3259	0.3719	0.3904	0.3937	0.3590
Fabricated metal pro.	0.5339	0.5608	0.4634	0.5189	0.5198
Other man.pro.	0.4903	0.5332	0.5248	0.5192	0.5322
Med&High-tech Ind.					
Rubber	0.5032	0.5104	0.3983	0.3975	0.3581
Plastic pro.	0.4609	0.4790	0.4766	0.4760	0.4461
Non-ferrous metals	0.3342	0.3971	0.4128	0.5641	0.4256
Machinery exc. Elec.	0.4433	0.4552	0.4707	0.5010	0.4572
Machinery Electric	0.3871	0.4373	0.4371	0.4519	0.4269
Transport	0.3605	0.3971	0.3994	0.4505	0.3916
Professional&Sci. equ.	0.3698	0.4862	0.4616	0.5424	0.4954

Note: The coefficient of variation is defined as the ratio of the standard deviation to the (unweighted) mean. As data was not available France was excluded from EU12 in 1970 and 1975.

Table 7.10 : Coefficient of variation in Wages per worker for the EU-12, 24 manufacturing industries, 1970-1990

	1970	1975	1980	1985	1990
Low-tech Industries					
Food Products	0.4282	0.5581	0.4583	0.4555	0.3967
Beverages	0.9671	0.4786	0.3919	0.4099	0.3760
Tobacco	0.3295	0.3765	0.3760	0.4094	0.3761
Textiles	0.7034	0.4689	0.4423	0.3792	0.3808
Wearing apparel	0.4415	0.4181	0.4417	0.4609	0.4734
Leather	0.7867	0.4587	0.4116	0.5079	0.4772
Footwear	0.8424	0.4706	0.4135	0.4074	0.4082
Wood Products	0.4728	0.4659	0.4093	0.5380	0.4701
Furniture	0.5090	0.4799	0.4625	0.4596	0.4791
Paper	0.5322	0.5204	0.3889	0.3684	0.3284
Printing	0.5296	0.5504	0.4091	0.4005	0.3949
Petroleum ref.	0.4707	0.5167	0.4200	0.5135	0.3673
Pottery	0.4382	0.4220	0.3719	0.3394	0.4102
Glass	0.4045	0.3787	0.3568	0.3507	0.3290
Iron and steel	0.2917	0.3458	0.3536	0.3276	0.3012
Fabricated metal pro.	0.5210	0.5271	0.4008	0.4650	0.4642
Other man. pro.	0.4711	0.4882	0.4643	0.4500	0.4664
Med&High-tech Ind.					
Rubber	0.4929	0.4916	0.3493	0.3239	0.3066
Plastic pro.	0.4286	0.4272	0.4074	0.4032	0.3719
Non-ferrous metals	0.3106	0.3545	0.3594	0.4959	0.3478
Machinery exc. Elec.	0.4217	0.4185	0.4216	0.4420	0.3902
Machinery Electric	0.3603	0.3957	0.3902	0.3920	0.3653
Transport	0.3202	0.3549	0.3569	0.3839	0.3283
Professional&Sci. equ.	0.3066	0.4220	0.3929	0.4533	0.4277

Notes: The coefficient of variation is defined as the ratio of the standard deviation to the (unweighted) mean. As data was not available France was excluded from EU12 in 1970 and 1975.

Table 7.11 : Wages per worker in Turkey as % of the EU12 average, 1970-1990

	1970	1975	1980	1985	1990
Low-tech Industries					
Food Products	0.2990	0.1539	0.1532	0.1298	0.1719
Beverages	0.3318	0.3268	0.3359	0.2172	0.2510
Tobacco	0.4093	0.3494	0.3449	0.2202	0.2040
Textiles	0.3804	0.3985	0.2734	0.2417	0.2306
Wearing apparel	0.7748	0.4136	0.2275	0.1829	0.1991
Leather	0.3398	0.2865	0.2688	0.1749	0.1828
Footwear	0.5254	0.4370	0.3413	0.2891	0.3270
Wood Products	0.4015	0.4964	0.2916	0.1806	0.2121
Furniture	0.3074	0.2305	0.1419	0.1830	0.2122
Paper	0.5583	0.5720	0.4210	0.2518	0.3090
Printing&Publis.	0.6138	0.4583	0.2765	0.2520	0.2749
Petroleum refin.	0.8409	0.7328	0.4159	0.3074	0.3780
Pottery	0.6462	0.4485	0.3339	0.4228	0.3184
Glass	0.5359	0.3532	0.2685	0.1886	0.4229
Iron and steel	0.5063	0.5244	0.4323	0.2798	0.3445
Fabricated metal p.	0.5384	0.3733	0.2487	0.2657	0.2558
Other manufactur.	0.5258	0.3572	0.2546	0.2148	0.2247
Med&High-tech Ind.					
Rubber	0.5776	0.5107	0.3823	0.2726	0.3978
Plastic pro.	0.4577	0.3471	0.2386	0.2227	0.2356
Non-ferrous metals	0.5621	0.4152	0.3272	0.2298	0.2989
Machinery exc. Elec.	0.5182	0.4171	0.3164	0.2738	0.2598
Machinery Electric	0.5120	0.3984	0.3469	0.2961	0.3039
Transport	0.4509	0.4179	0.3942	0.2658	0.3205
Professional&Sci. equ.	0.3376	0.2565	0.2206	0.1506	0.2652

Notes: As data was not available France was excluded from EU12 in 1970 and 1975.

Table 7.10 shows that the exclusion of Turkey from the analysis results in a clear decrease in the dispersion of wages for all industries. This finding suggests that the level of wages in Turkey is notably lower than the EU12 countries for the industries considered. Table 7.11 presents the wages in Turkey the 24 industries as percentage of the EU average and confirms the findings of Table 7.9 and 7.10. A comparison of OLS and SURE results, given in Table 7.5 and Table 7.7 respectively, and Table 7.11 indicates that for the industries where the relative wages have a significant and large impact on Turkey's exports, the wages in Turkey as a percentage the EU12 average are low. For example; from Table 7.5 and 7.7, the relative wages appear to have a significant and relatively higher impact on Turkey's exports for leather, plastic products, machinery except electric and professional and scientific equipment.

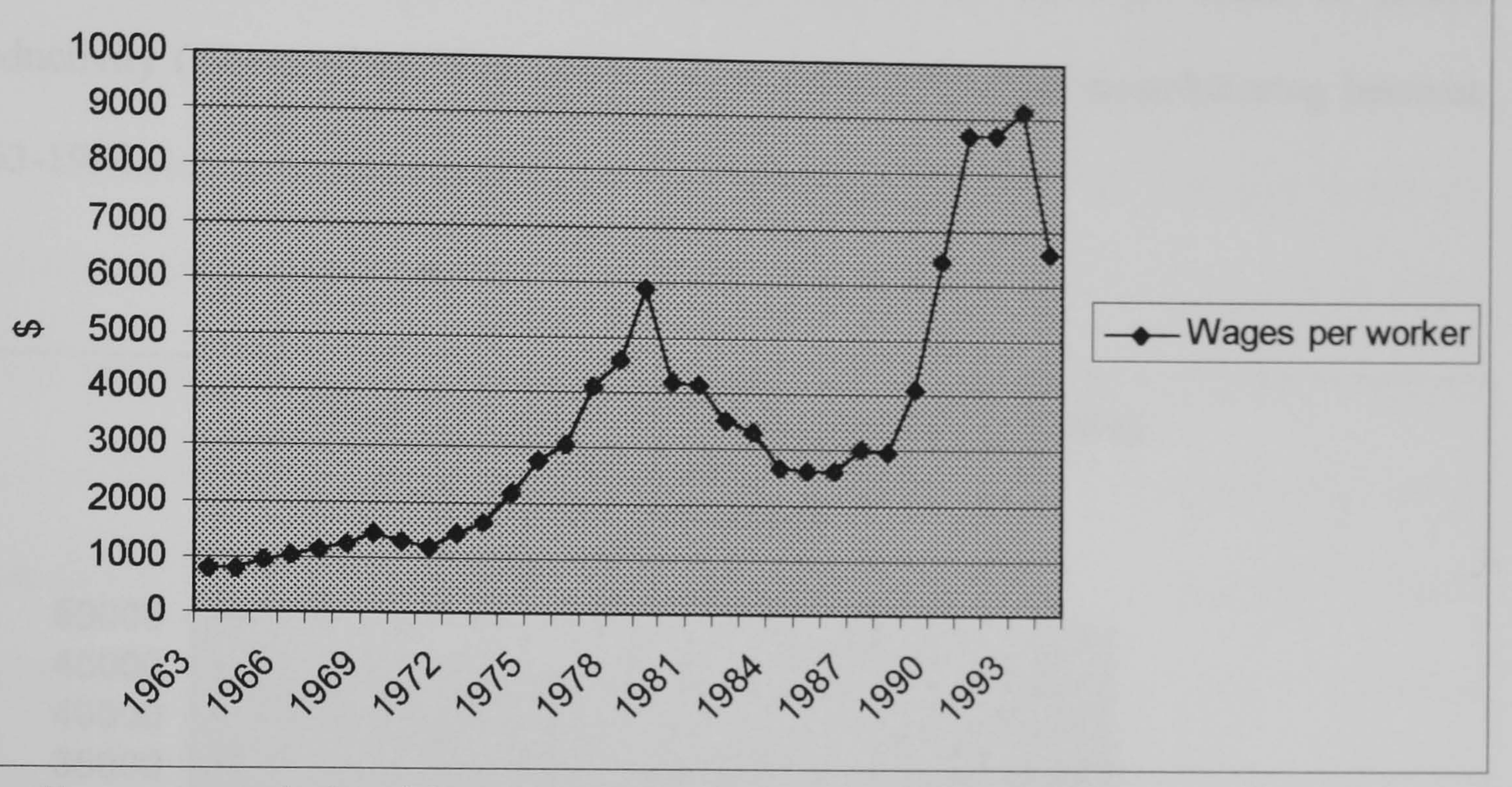
Table 7.11 indicates that the wages in Turkey in these industries actually constitute a very small proportion of the EU average. The wages per worker in Turkey was only 18 % of the EU12 average in 1990 for leather; 23 % for plastic products; 25 % for machinery except electric; and 26 % for professional and scientific equipment. However, this relation does not seem to hold in the cases of footwear, rubber and transport where the relative wages appear to have a significant and large impact on Turkey's exports. The wages in these industries seem to be relatively higher than the others; 32 % for footwear, 39 % for rubber and 32 % for transport.

Chart 7.1. below shows wages per worker[22] in Turkey in total manufacturing (for 27 industries) between 1963-1994. It follows from the chart that the wages per worker in Turkey has increased continually between 1963 and 1979 when Turkey followed import substitution policies. As maintaining a large domestic consumption

[22] Total wages and salaries divided by total number of workers.

plays a crucial role in an economy based on import substitution, the high scale wages were consistent with Turkey's development strategy in the 1960s and 1970s.

Chart 7.1.-Wages per worker in Turkey, Total Manufacturing 1963-1994



Note: Figures are calculated from UNIDO Industrial Statistics Database, 1997 3-Digit ISIC.

As shown in Figure 7.1 the overall wage level in Turkey has started to fall drastically following the 1980 liberalisation and they continued to rise again sharply after 1989. This decline in wages is generally considered as the main drive behind the substantial increase in Turkey's exports of both labour and capital intensive commodities during the first stages of the liberalisation period[23].

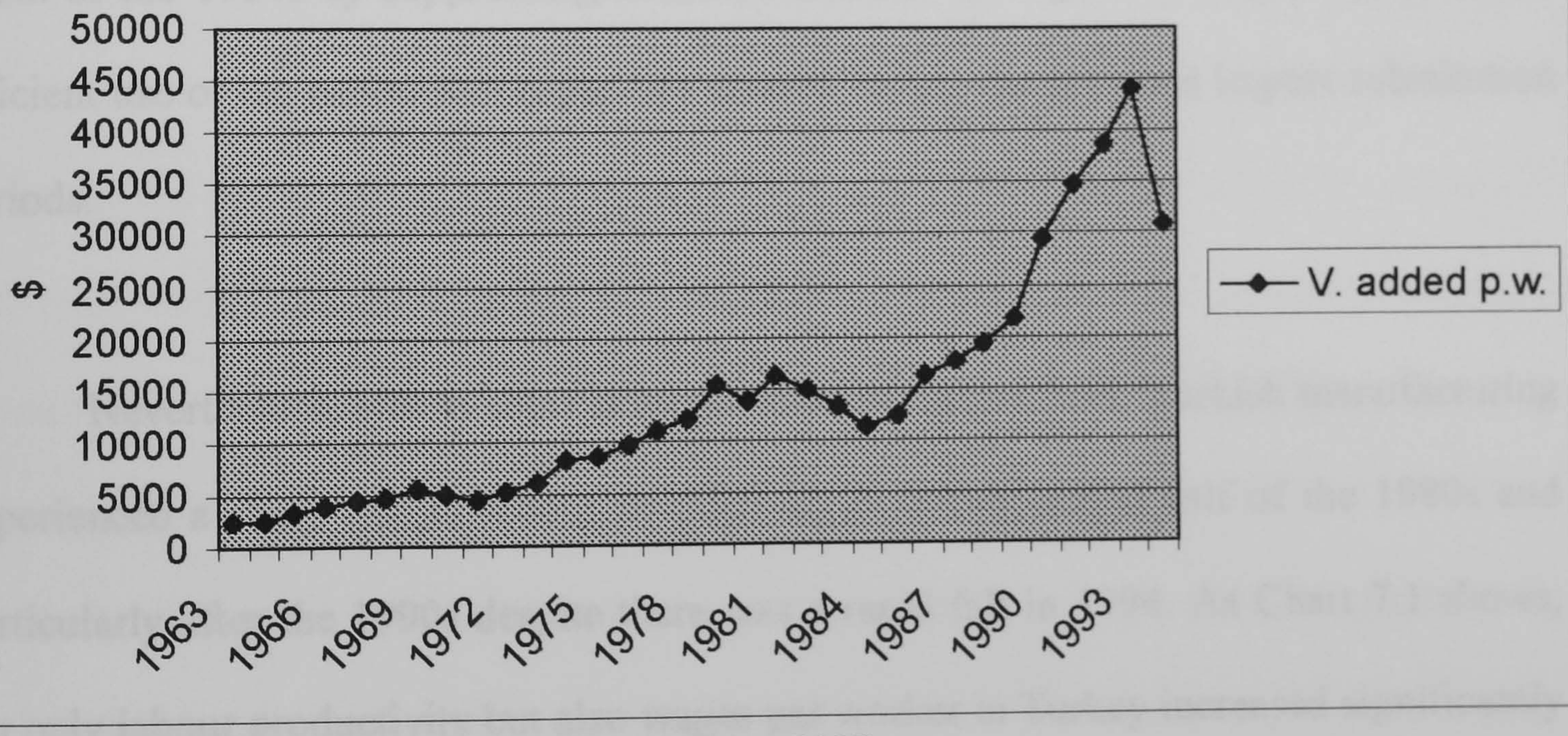
Akder (1986), for example, examines the sources of increase in Turkey's exports to EU using constant market share analysis over 1981-1985 and concludes that the

[23] The year 1989 is significant for the second election since the 1980 military coop in Turkey. The election resulted in victory of Social Democrat Party (SHP) over conservative party of Turgut Ozal who directed the 1980 liberalisation program. The continues fall in real wages has been seen as the main factor for social democrat party's defeat whose main promise was to reduce the pressure on trade unions.

increase in Turkey's competitiveness has played a crucial role while effects of global rise in EU's imports and composition of goods were negligible.

Following the analysis of wages, in what follows we have a closer look at labour productivity in Turkey between 1963-1994. Chart 7.2 shows the trend of labour productivity (measured as value added per worker) in Turkish manufacturing between 1963-1994.

Chart 7.2.- Value Added per worker in Turkey, Total Manufacturing, 1963-1994



Note: Calculated using UNIDO Industrial Statistics (1997).

It follows from the chart that the pattern of labour productivity in Turkish manufacturing has been rather similar to that of wages over the period considered. It appears that parallel to the rise in wages, labour productivity has constantly increased over the 1960s and 1970s when Turkey followed import-substitution policies. As

mentioned in chapter 2[24], over this period the incremental capital-output ratio (ICOR) in Turkey rose significantly and in constant 1976 prices, the average investment per job created rose from TL 267 thousand between 1963 and 1967 to TL 572 thousand a decade later. Therefore, it appears that the high level of labour productivity in Turkey over the 1960s and 70s was driven by a sizeable increases in investment.

Following the rise in labour productivity during the previous decades, however, there was a slow down in productivity growth over the first half of the 1980s when Turkey experienced a big expansion in its exports. Together with decreasing level of wages in Turkey over this period it seems that Turkey managed to maintain the export boom of the 1980s by suppressing domestic demand through low wages and by more efficient use of the productive capacities created during the previous import substitution periods.

Nevertheless, after a short slow down over the first half, Turkish manufacturing experienced a sharp rise in labour productivity over the second half of the 1980s and particularly after the 1990s despite there was a rapid fall in 1994. As Chart 7.1 shows, not only labour productivity but also wages per worker in Turkey increased significantly after the 1990s. This suggests that price competitiveness based on low wages played a key role in Turkey only during the first stages of the liberalisation period in the 1980s. In short, the picture in Charts 7.1 and 7.2 sheds some light on sources of the change in commodity structure of Turkey's exports towards industrial goods in the 1990s which reflects importance of non-price competitiveness rather than price competitiveness.

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[24] According to Balassa (1985) the incremental capital-output ratio (ICOR) in Turkey rose from 1.6 in the period between 1963-1967 to 2.4 in the period 1968-1972 and 4.7 in the 1973-1977.

7.6.- CONCLUSION

This chapter examines the impact of cost (price) and non-price factors on the comparative advantage of Turkey with respect to the EU on both aggregate and disaggregate data. As well as time series, cross section data were used to analyse the determinants of Turkey's competitiveness for the period 1967-1990. The main motivation has been the lack of such an analysis in the literature for developing countries and specifically for Turkey.

In recent years, there has been an increasing awareness among economists, especially in the field of international economics, of the importance of technological competition. A logical conclusion from different approaches has been to include both technological competitiveness (proxied by R&D expenditure and the number of patents) and price competitiveness in the modelling trade flows and comparative advantage. However, even if a country is very competitive in terms of technology and prices, it is not always able to meet the demand for its products because of capacity constraint. Similarly, lack of competitiveness in terms of technology or prices may sometimes be compensated by a high ability to meet demand, if some other country faces a capacity constraints. Because of this, investments, and factors influencing investments are included in the models to account for the ability to create new production capacity and to imitate technological improvements. Some studies also include a variable assumed to reflect the size of the country or its domestic market. Since the data on R&D expenditure and the number of patents were not available for Turkey, this research was only able to examine the impacts of price competitiveness, investment and the home market on Turkey's comparative advantage. A time dummy was also added to the model to account for Turkey's 1980 trade liberalisation program.

In this work we investigated the effect of price and non-price factors on Turkey's competitiveness with respect to EU firstly at the aggregate level and then at a disaggregate level for 24 industries, 17 of which are low-tech and 7 of which are high-tech industries. Our results suggest that the price competitiveness (proxied by labour cost) and the size of home market appear to have a significant effect on Turkey's competitiveness while investment had very little impact. The price factors, indicated by relative wages, seem to have a significant impact on exports of both low-tech and high tech industries. Interestingly, the magnitude of the effect of wages on exports of high-tech industries appear to be as large as that of low-tech industries. It appears that the shift dummy variable to account for Turkey's liberalisation program interacts with key variables and that it generated mixed effects for both low and medium/high tech industries.

The results on sectoral convergence analysis of factor prices (i.e. wages) between Turkey and the EU suggest that Turkey has not fully exploited its comparative advantage particularly in low-tech industries such as tobacco and wearing apparel and in some medium and high tech industries such as transport equipment and machinery electric.

In assessing the results of this work it should be noted that, though price factors appear to be an important element in determining Turkey's competitiveness, a *long term* strategy for Turkey must consider the crucial role of non-price factors or technological competition on the country's comparative advantage. This is suggested by the experience of many newly developed countries.

7.7.- APPENDIX

Table A7.1: Classification of industries according to their R&D intensities,

ISIC	Low-Tech Industries	ISIC	Medium and High-Tech Industries
311	Food	355	Rubber
313	Beverages	356	Plastic
314	Tobacco	372	Non-ferrous metals
321	Textiles	382	Machinery, except electrical
322	Wearing apparel	383	Machinery electric
323	Leather products	384	Transport equipment
324	Footwear	385	Professional & scientific equipment
331	Wood products		
332	Furniture		
341	Paper products		
342	Printing and Publishing		
353	Petroleum refineries		
361	Pottery		
362	Glass and products		
371	Iron and steel		
381	Fabricated metal products		
390	Other manufactured Prod.		

Source: OECD

Notes: Low: R&D intensity 0.5 times the mean R&D intensity or lower.
Medium: R&D intensity between 0.5 and 1.5 times the mean R&D intensity.
High: R&D intensity 1.5 times the mean R&D intensity or higher.

Table A7.2: OLS Results, Determinants of Turkey's Net exports , 1967-1990

	Constant	Relative Wages	Relative Capital Formati.	Home Market	Time Dummy 1980	$\bar{R}^2$	DW
Food Products	37.6532 (1.7313)	1.4541 (1.3135)	-.61320 (-.94298)	-1.4988 (-1.6259)	-.12805 (-.13613)	.30356	1.6150
Beverages	6.6894 (.51296)	3.0465* (2.5410)	.59364 (1.3745)	-.14023 (-.21523)	1.9717 (1.6803)	.19808	1.8616
Tobacco	25.5620 (1.3091)	4.8618* (3.7927)	.27968 (.36356)	-.50525 (-.50665)	-2.1968 (-1.1710)	.68116	1.0069
Textiles[1]	-35.9574 (-5.6408)	-.51200 (-.80105)	-.045025 (-.11638)	1.7165* (5.4792)	-1.6962* (-3.3066)	.73884	.92610
Wearing apparel	-9.8383 (-1.0767)	-1.7601 (-.94380)	.51002 (1.0711)	.77073 (1.4429)	-2.8072** (-1.7336)	.35094	.68605
Leather products	16.88836 (.83240)	-.95958 (-.50048)	.82027 (.99879)	-1.1150 (-.99372)	-.47549 (-.27849)	.18663	1.8723
Footwear	1.4529 (.22219)	-.45909 (-.45226)	.082424 (.28434)	-.069730 (-.19482)	.79060 (.92290)	.038939	1.7626
Wood products	-5.5284 (-5.0482)	-3.3274* (-3.3176)	-.58746 (-.86777)	.1714E-8 (.63285)	-2.0634** (-1.8161)	.59366	1.8584
Furniture[1]	-31.2344 (-2.6176)	-7.0934* (-3.0520)	.46712 (.48064)	1.0643 (1.3954)	-3.8296* (-2.4623)	.43580	1.4410
Paper and products	-17.9987 (-1.3375)	-2.5632** (-2.0412)	-.28418 (-.48714)	.58912 (.83322)	-2.4520** (-1.7593)	.098010	1.1916
Printing	-18.9996 (-2.3731)	-1.9707* (-2.7851)	-.36393 (-1.6144)	.78889** (1.7507)	-2.6558* (-4.6599)	.69402	1.8143
Petroleum ref.	7.1268 (.33989)	-3.8010* (-2.1973)	-1.3372* (-2.6442)	-.61306 (-.60211)	-1.4945 (-.77997)	.31102	1.3738
Pottery	-19.2934 (-1.8554)	-1.1702 (-.98165)	-.98056 (-1.6836)	1.1442** (1.9305)	-4.5737* (-3.2072)	.35029	1.5212
Glass and products	-27.2985 (-5.6252)	-.80391 (-1.0094)	-.14691 (-.62717)	1.3396* (4.9827)	-.36420 (-.52145)	.76182	1.3907
Iron and steel[1]	-10.4112 (-1.2630)	-.54335 (-.75173)	.66763** (1.7784)	.32099 (.79097)	.24912 (.44824)	.51326	2.0121
Fabricated metals	-30.0538 (-3.6761)	-1.5768* (-4.1363)	.20729 (.76406)	1.2791* (3.0469)	-.83235** (-1.9751)	.85572	2.5163
Other man. prod.	-3.6821 (-1.1637)	-1.2806* (-4.6810)	.21116 (1.6059)	.024026 (.12575)	-.18921 (-.63489)	.72240	1.8884
Rubber	-26.0017 (-2.3781)	-3.5972* (-3.1690)	-.54319 (-1.0902)	.98315** (1.7654)	.29902 (.27568)	.73174	1.7319
Plastic products	-36.4321 (-1.1154)	-5.2095 (-1.0129)	.80891 (.34439)	1.3132 (.71639)	-1.8274 (-.52664)	.16091	2.8536
Non-ferrous metals[1]	-1.7471 (-.34746)	.042178 (.098009)	.070828 (.27116)	-.0011734 (-.004425)	1.1411* (2.7717)	.28913	2.2517
Machinery exc. elect.	-29.8532 (-3.5340)	-3.6137* (-3.4002)	.93865** (1.8687)	.98920* (2.4219)	-.77075 (-.87548)	.72804	1.5414
Machinery electric	-15.7885 (-2.9684)	-3.3159* (-3.7482)	.24677 (.59749)	.36748 (1.2656)	.53695 (.81818)	.78614	1.2966
Transport equipment	-29.4782 (-2.4395)	-4.8192* (-2.9628)	-.57628 (-.56365)	.93930 (1.5002)	-.65730 (-.46484)	.57199	.94719
Profes.&scientific equ.	-4.1491 (-.77654)	-2.1054* (-2.5271)	.37481 (1.2463)	-.40923 (-1.2103)	2.5485* (2.8950)	.64770	1.5436

Notes: [1] For the period 1970-1990.

Figures in parentheses are t-statistics. * Significant at the5 % level . ** Significant at the 10 % level.

The Relation Between Trade and its Determinants

Following Deardorff (1984), the relationship between relative autarky prices and relative factor endowments can be shown as follows. Supposing that preferences and production functions are given by the following Cobb-Douglas functions, identical an all countries, for n goods and m factors:

$$U = \prod_{j=1}^{n} X_j^{\alpha_j} \qquad (1)$$

$$Xj = \prod_{i=1}^{m} (L_{ij})^{\theta_{ij}} \qquad (2)$$

where U is utility, X_j is output and consumption of good j, L_{ij} is the amount of factor I employed in producing good j, α_j, θ_{ij} are non-negative fractions. With the additional assumptions of full employment of fixed endowments of the factors, $\bar{L}_i$, plus perfect competition, autarky prices can be derived as:

$$\ln p_j = A_j - \sum_{i=1}^{m} \theta_{ij} \ln \bar{L}_i \qquad (3)$$

$$A_j = \ln \bar{Y} - \sum_{i=1}^{m} \theta_{ij} \ln \left(\theta_{ij} \Big/ \sum_{ik=1}^{n} \alpha_k \theta_{ik} \right)$$

and $\bar{Y}$ is nominal GNP. Using as a basis for comparison the equilibrium prices in the world as a whole assuming free trade of both goods and factors, autarky prices for country c relative to the world, w, can be written as follows:

$$\ln (p_j^c / p_j^w) = \sum_{i=1}^{m} \theta_{ij} [\ln \bar{Y}^c / \bar{Y}^w) - \ln (\bar{L}_i^c / \bar{L}_i^w)] \qquad (4)$$

This is a linear form relating relative autarky prices on the left to a matrix of factor intensities, θ_{ij}, and the measure of relative factor abundance shown in square brackets. Given (4), a typical regression equation might take the following form:

$$T_j = \beta_1\theta_{1j} + \ldots + \beta_m\theta_{mj} + u_j, \qquad j = 1,\ldots..,n, \qquad (5)$$

where T_j is trade and u_j is a stochastic disturbance term.

CHAPTER 8

A SECTORAL ANALYSIS OF DETERMINANTS OF *INTRA-INDUSTRY TRADE* FOR TURKEY

8.1.- INTRODUCTION

Following the analysis of *inter-industry trade* in the previous chapter, in this chapter we first examine the trend of *intra-industry trade* (IIT) for Turkey over the pre- and post-liberalisation periods and then we focus on the determinants of IIT for Turkey for the period 1975-1990.

In assessing the implications of trade liberalisation, examination of whether any expansion in trade was primarily *inter-industry* or *intra-industry* in nature is crucial as it can provide some insight into the potential consequences of further trade liberalisation (e.g. Turkey's accession to the EU)[1]. As a consequence of Turkey's trade liberalisation attempts with the EU, one can expect that as trade barriers between Turkey and the EU are removed Turkey can further exploit its comparative advantage and therefore that *inter-industry* trade will develop between the two areas. Among countries with similar factor endowments, one can also expect that scale economies will be further exhausted and hence that *intra-industry* trade will increase. It is of interest to examine the trend of *intra-industry* trade between Turkey and the EU over

[1] See Smith and Venables (1988) and Norman (1989) for further discussion on this.

pre- and post liberalisation periods as we have previously found that the similarity between the two areas has increased after the liberalisation period.

A number of questions with important implications for economic policy revolve around the impact of trade liberalisation on levels of intra-industry trade (IIT) and costs of structural adjustment. Firstly, does trade liberalisation through, say, the formation of a free trade area, stimulate a greater degree of IIT? Secondly, are the adjustment costs to trade liberalisation lower in industries characterised by high degrees of IIT? (see Globerman and Dean (1990), Globerman (1992), Menon and Dixon (1997) for further discussions).

In order to answer the first question, Caves (1981) tests whether natural and artificial barriers (i.e. non-trade barriers -NTB's) to trade discourage trade of the IIT type. Caves is not convinced that there are good theoretical reasons for the relationship and his doubts are confirmed by his results. On the other hand, Balassa and Bauwens (1987) test for a negative relation between the height of trade barriers and IIT and a positive correlation between IIT and participation in economic unions. Their results provide strong support for both of these propositions. The implication of their result is that trade liberalisation due to customs unions stimulates trade of the *intra-industry* type.

Regarding the second question, the nature of trade has important implications for the process of structural adjustment to trade liberalisation and the extent of costs to be borne. It is generally argued that adjustment costs are lower when new trade is *intra-industry* type because disruption is minimised when adjustment is internal to an

industry[2]. The reason for this is that it is easier to transfer and adapt resources within firms or industries than to switch them from one industry to another. Krugman (1981) has formally shown that when countries have sufficiently similar factor endowments, both partners tend to gain from trade liberalisation and the consequent IIT poses fewer adjustment problems than in the standard case.

Given the ambiguity of theoretical arguments on the possible link between trade liberalisation and IIT, this work aims at further examining a causal relationship between liberalisation and IIT for Turkey. This is, however, not an easy task. As Caves (1981) argues, if two countries have some intra-industry trade and then liberalise their bilateral trade, an equiproportionate increase in exports of each country will raise the *amount* of IIT but will not raise the *proportion* of it. To overcome this obstacle, in this work I use not only the traditional Grubel-Lloyd indices of IIT but also a new measure – the index of marginal intra-industry trade (MIIT)- which measures the degree of IIT in *new* trade.

The rest of this work is arranged as follows. The next section, firstly, investigates the theoretical and empirical arguments on the potential correlation between freeing trade and IIT. This section also briefly summarises short comings of traditional Heckscher-Ohlin (H-O) type theories in explaining trade flows and introduces the recent new trade theory (NTT) and new economic geography (NEG) models. Section 3 defines the measures of IIT employed and tests whether Turkey's 1980 trade liberalisation stimulated IIT. Section 3 also examines IIT in *new trade* created after the trade liberalisation by using marginal IIT (MIIT) indices. Section 4 analyses the industry specific determinants of IIT for Turkey using a cross-sectional

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[2] This proposition has been tested by Finger (1975) and Hansson (1989) with inconclusive results.

time series data for 24 industries for the period between 1975 and 1990. The last section draws some conclusions on the results.

8.2.- TRADE LIBERALISATION, STRUCTURAL ADJUSTMENT AND IIT

8.2.1- The relation between trade liberalisation and IIT

Research on IIT has generated a lot of stimulating approaches to the development of international trade theory in the last three decades. The reason for this intensive work is the difficulty of finding comfortable explanations of the phenomenon of IIT within the framework of the traditional H-O theory of trade. Recent research has advocated the need for complementing the factor endowment approach to international trade with other theories, notably those emphasising the role of scale economies and product differentiation[3]. The emergence of these new theories of IIT, namely the new trade theory (NTT) and the new economic geography (NEG), can essentially be attributed to the empirical finding of high and growing shares of IIT which has been deemed incompatible with neo-classical H-O models[4].

As mentioned in the introduction, there is no clear-cut theoretical basis on the relationship between trade liberalisation and IIT. In the traditional H-O model, trade flows are primarily driven by national differences in comparative advantage. The implication of this model is that trade liberalisation could lead to potentially substantial *inter-industry* reallocation of resources within countries as economic activity is geographically rationalised to conform more closely to patterns dictated by

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[3] For surveys of the literature on IIT, see Tharakan (1983) Greenaway and Miller (1986, 1987), Lloyd (1989), Hansson (1989).

[4] However, as Brulhart (1998) argues, the upward trend in IIT cannot be taken as a straightforward confirmation of the new theories since the observed rise of IIT has occurred alongside a generalised fall in trade costs.

differences in relative factor prices. The models of new trade theory (NTT), however, introduce activity-specific features ("second nature") such as imperfect competition, differentiated products and increasing returns. The typical outcome of NTT models has two layers. First, there is *inter-industry* specialisation, with sectors clustering in locations which offer best access to product markets. Second, there is *intra-industry* specialisation across firms, each of which produces a unique, horizontally differentiated variety of the industry's product. Thus, as long as some firms are left in the smaller market, IIT will ensue. However, as trade costs fall towards zero, all increasing returns activity will tend to concentrate near the core market and IIT between the core and the periphery disappears.

Similar to the theoretical arguments, the empirical work which investigates if trade liberalisation stimulates more IIT is inconclusive too[5]. Though Balassa and Bauwens (1987) find strong empirical support for a positive correlation between trade liberalisation and IIT, the most celebrated model of the NTT, Krugman (1980), predicts that, as trade barriers are reduced, increasing-returns industry concentrates in the large market. Therefore, the share of IIT should tend to zero with trade liberalisation. More recently, the results of Hamilton and Kniest (1991) provide no support for the proposition that trade liberalisation encourages IIT[6]. Given this picture of empirical studies on the association between trade liberalisation and IIT, great care needs to be taken in interpreting empirical findings as corroboration or rejection of theoretical models.

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[5] Other studies on this area are; Balassa (1979), Havrylshyn and Civan (1983), Drabek and Greenaway (1984), and Groberman and Dean (1990).

8.2.2- The relation between structural adjustment and IIT

The impact of trade liberalisation on the extent of *structural adjustment* is another area of interest as assessment of the welfare effects of trade liberalisation depends on the relation between adjustment costs and IIT. Though structural adjustment is a difficult concept to define and measure, a number of studies have constructed some indicators which reflect changes in certain important characteristics of industry structure[7]. Some of them are: changes in the number of establishments, changes in employment, changes in turnover and changes in labour productivity (turnover per worker) in each industry. Intuitively it can be argued that under the impact of trade liberalisation, structural change is felt more strongly in industries with low levels of IIT. We would expect this to be the case as industries with high levels of IIT would be more likely to experience adjustment *within* the industry, reflected in a smaller net change in the number of establishments, employment and turnover[8].

The connection between trade liberalisation and structural adjustment is a crucial issue in assessing impact of economic integration. The possibility of lower adjustment cost suggests that the prospects for a common market are higher when more of existing and potential trade is of the *intra-industry* type. Marvel and Ray (1987) argue on political economy grounds that high levels of IIT make trade protection more difficult to secure and the freeing of trade meets less resistance.

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[6] However, they find that the intra-industry pattern of new trade stimulated by trade liberalisation may differ from that established under protection.

[7] See Lundberg and Hansson (1986) for further discussion.

[8] Hamilton and Kniest (1991) examines the relationship between structural change and IIT for Australian manufacturing and find that there is some evidence trade liberalisation has induced more structural adjustment – and higher adjustment costs - in industries characterised by *inter-industry* rather than *intra-industry* trade.

Although it is hard to establish a conclusive *a priori* case for the contention that adjustment will always be smoother in a setting of intra-industry trade compared with a setting of inter-industry trade, it nevertheless appears reasonable to suppose that adjustment frictions of some form may still exist. Cox and Harris (1985), for example, provides a general equilibrium assessment of the impact of unilateral and multilateral trade liberalisation in Canada. Their work also offers some comments on the adjustment issue. This work finds that in both the unilateral and multilateral trade liberalisation scenarios imports and exports expand in all sectors. Moreover, in both cases intra-sectoral resource reallocation dominated inter-sectoral reallocation. For instance, in the multilateral liberalisation case only 6 per cent of the labour force is reallocated intersectorally. This suggests to the authors that 'the adjustment costs of adopting a free trade policy may not be large' (pp.140). Therefore, the simulations seem to provide strong support for the view that adjustment to trade expansion may be smother in an economy where a significant degree of intra-industry specialisation is possible. [see also Adler (1970) and Andreosso and Noonan (1996)]

8.3.- THEORETICAL AND EMPIRICAL BACKGROUND ON IIT

8.3.1 – Overview

The aim of this section is to investigate if the 1980 trade liberalisation program of Turkey had an impact on the country's IIT pattern over time. This section also compares IIT indices for Turkey's total trade with Turkey's trade with the EU. Moreover, considering the categorising problems in estimating IIT indices, I examine the IIT patterns for Turkey using trade data at both two digit SITC (for 63 industries) and at three digit SITC (for 231 industries).

In this section, first, I give a brief overview on trends in IIT and summarise theoretical and empirical arguments on the measurement of IIT and problems with the measurement procedure. Secondly, using trade data, I examine the pattern of IIT for Turkey over the period between 1975 and 1990 and test if there has been a change in the IIT pattern after implementation of Turkey's liberalisation program in the1980s. In this section I also analyse the specialisation patterns of Turkey over the same period using production data. Thirdly, considering the shortcomings of traditional IIT indices, I examine IIT in *new* trade created after the trade liberalisation using *marginal* IIT (MIIT) indices.

8.3.2 – Measurement of IIT

Several theoretical measures of IIT –the two-way trade of goods falling under the same industry classification- have been proposed in the literature. Analyses have been conducted using either a cross section of industries,[9] a cross section of countries [e.g., Globerman and Dean (1990), Balance et al. (1992)], or a multi-country multi-commodity framework [e.g. Loertscher and Wolter (1980), Balassa (1986), Balassa and Bauwens (1987), and Ballance et al.(1992))

The most widely used measure is the Grubel-Lloyd (GL) (1975) index. In this index, IIT in industry *i* for country *j* is:

$$IIT_{ij} = [\ (X_{ij} + M_{ij}) - |\ X_{ij} - M_{ij}\ |\ ]\ /\ (X_{ij} + M_{ij}), \qquad (1)$$

[9] Pagoulatos and Sorensen (1975), Toh (1982), Lundberg (1982), Greenaway and Miller (1984), Hamilton and Kniest (1991), and Lunberg (1992).

In its contracted form:

$$IIT_{ij} = 1 - |X_{ij} - M_{ij}| / (X_{ij} + M_{ij}), \qquad (2)$$

where X_i is exports of industry *i*, M_i is imports of industry *i*, $|X_{ij} - M_{ij}|$ is net trade, $(X_{ij} + M_{ij})$ is total trade, i = 1,2,3...n, and $0 \leq IIT_j \leq 1$. In equation (2), an index value of 0 would indicate complete *inter-industry* trade. In this case, either the value of exports or imports would be zero. Higher index values are associated with greater *intra-industry* trade as a proportion of total trade, with an index value of 1 indicating equality between exports and imports.

In the literature on IIT, there are some arguments on validity of the IIT index in equation (2). Firstly, it is argued that when equation (2) is aggregated across industries to form a weighted average IIT measure, the resulting index will not attain the desired maximum value of 1 if the country's total commodity trade is imbalanced. As a result of this finding, GL (1975) argue that such measures of IIT must be adjusted for the aggregate trade imbalance. Many succeeding studies calculate IIT measures that have been corrected for the overall imbalance between imports and exports.

However, according to Vona (1991), and Kol and Mennes (1989), measures of IIT should not be corrected for the overall trade imbalance. Vona employs arithmetic examples to establish the superiority of GL's uncorrected index over corrected indices

which appear in the literature. Based on these, and other arguments advanced by the same authors, this work employs the standard uncorrected GL measure of IIT[10].

Secondly, several studies have argued that observed values of IIT tend to be lower at higher levels of sectoral disaggregation, and IIT values are therefore difficult to interpret [see Lipsey (1976), for example]. In the literature, this has been referred as the "categorical aggregation problem"[11]. Studies by GL (1975) and Brulhart and McAleese (1995) indicate that IIT dynamics are remarkably robust to differences in the level of sectoral aggregation. As Brulhart (1998) argues, the industry definition problem therefore seems to be a weak argument against reading real significance into the secular rise of observed IIT. Considering these arguments, this work will test if sectoral disaggregation matters by estimating and comparing the standard GL indices at two digit SITC (for 63 industries) and at three digit SITC (for 231 industries) for Turkey over the same time period.

Early empirical investigation of IIT had been confined to "static" indicators such as the standard GL index, which measure IIT for one year. However, a paper by Hamilton and Kniest (1991) has revealed a new and potentially challenging dimension to the empirical analysis of IIT by suggesting a measure of marginal intra-industry trade (MIIT). In recent literature on IIT, it is argued that, in order to infer conclusions on adjustment from measurement of IIT, it is conceptually necessary to analyse the pattern of *change* in trade flows rather than comparing the composition of trade at different time points in time. Three methods have been proposed to date for the '*dynamic*' analysis of IIT; namely, the Hamilton-Kniest index, the Greenaway et al

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[10] Toh (1982), Globerman and Dean (1990), Hamilton and Kniest (1991), Lundberg (1992). Ballance et al. (1992) are examples of recent studies that do not correct IIT indices for the overall trade imbalance. Bergstrand (1990) uses the adjusted GL index.

index[12] and the Grubel-Lloyd style measure of MIIT[13]. In this work I employ the Grubel-Lloyd style MIIT indices because they share all statistical properties of the standard GL index. The MIIT index I used is given as;

$$\mathbf{MIIT_i = 1 - [\,|\,(X_t - X_{t-n}) - (M_t - M_{t-n})\,|\,] \,/\, [\,|(X_t - X_{t-n}) + (M_t - M_{t-n})\,|\,]} \quad (3)$$

where X_t (M_t) and X_{t-n} (M_{t-n}) are exports and (imports) of a particular industry *i* in years *t* and *t-n*, *n* standing for the number of years separating the two years of measurement. The MIIT index in equation 3 can also be written as:

$$MIIT_i = 1 - [\,|\,\Delta X - \Delta M\,|\,] \;/\; [\,|\,\Delta X\,| + |\,\Delta M\,|\,] \quad (4)$$

where Δ shows *change*. This index, like the standard GL measure, varies between 0 and 1, where 0 indicates marginal trade in the particular industry to be completely of the *inter-industry* type, and 1 represents marginal trade to be entirely of the *intra-industry* type[14].

Two important conclusions can be drawn from the empirical literature on IIT, one positive and one negative. The positive conclusion is that studies of IIT provide support for theoretical approaches which go beyond the neo-classical H-O framework. This suggests that a large and increasing part of the forces which drive international trade are different from those identified in H-O theory. The negative conclusion is that the available evidence on IIT patterns does not lend strong support to the approach

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[11] See Greenaway and Miller (1986) for an authoritative discussion.
[12] Greenaway et al. (1994).
[13] See Brulhart (1994) for a comprehensive description of these indices.
[14] See Greenaway and Miller (1986) for a detailed explanation of the statistical properties of this index.

taken in most of the new trade theories. The general trend is for the trade share of IIT to grow parallel with the lowering of trade costs (e.g. trade liberalisation). As mentioned before, however, this conflicts with the prediction of the standard new trade theory [e.g. Krugman (1980)].

8.3.3.- Estimates of IIT indices for Turkey

8.3.3.1.- Analysis of the amount and the proportion of IIT

The aim of this section is to examine the *amount* and the *proportion* of IIT for Turkey and test if there has been any change after the trade liberalisation. This section starts with an analysis of the amount of IIT for Turkey and investigates if categorisation of industries accounts for measuring the amount of IIT. Secondly, I study the proportion of IIT for Turkey over the post-liberalisation period (1980-1990) using MIIT indices. Thirdly, I compare the level of IIT for Turkey's total trade with that of its trade with the EU12. Finally, I give a country and industry specific analysis of IIT for Turkey.

To examine the *amount* of IIT, I estimate average unadjusted GL indices of IIT in equation (2) for Turkey at both the two-digit SITC (for 63 industries) and at the three-digit SITC (for 231 industries) over the period between 1975 and 1990[15]. The results are presented in Table 8.1.

Table 8.1, first, shows that, as one might expect, categorisation of industries matters in measuring IIT since the IIT indices at the two-digit appear to be

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[15] Though the GL indices are principally used to measure IIT in manufacture, in order to observe the trend of IIT in non-manufactured goods and in total trade as well, the IIT indices are estimated for non-manufactured (0-4) and manufactured (5-8) goods separately, and for overall trade (0-8).

significantly different (greater) than those at three-digit in all cases (with exception of manufacture in 1975). Secondly, and more importantly, it appears that the level of IIT, especially in manufactured goods, has notably increased following the 1980 trade liberalisation program of Turkey though there has been a slight fall in the case of non-manufactured goods[16]. This increased pattern of IIT for Turkey after trade liberalisation is confirmed by estimations at both the two-digit and the three-digit level.

Table 8.1: Intra-industry trade indices for Turkey[1]

Commodity Groups (SITC)	1975	1980	1985	1990
63 SITC 2-Digit Groups[2]				
Non-Manufactured (0-4)	0.33	0.21	0.34	0.39
Manufactured (5-8)	0.21	0.26	0.38	0.41
Overall (0-8)	0.25	0.24	0.37	0.41
231 SITC 3-Digit Groups[2]				
Non-Manufactured (0-4)	0.28	0.20	0.24	0.26
Manufactured (5-8)	0.22	0.23	0.31	0.32
Overall (0-8)	0.23	0.23	0.29	0.30

Notes: 1.- The Grubel-Lloyd (unadjusted) index was calculated for each industry and unweighted averages were calculated across industries. 2.- Groups with unidirectional trade have not been included (i.e. where either exports or imports are zero).

Chart 8.1 below shows trend of IIT for Turkey over 1975-1990 at 2 digit. It follows from the chart that the level of IIT in agricultural goods (ie about 35 percent of total trade) was greater than that of manufactured goods (ie about 20 percent of total trade) during the pre liberalisation period. However, it is clear from the chart that the level of IIT in manufactured goods has exceeded that of agricultural goods after the 1980s. It appears that the overall level of IIT has increased particularly in the case of manufactured goods over the post-liberalisation period.

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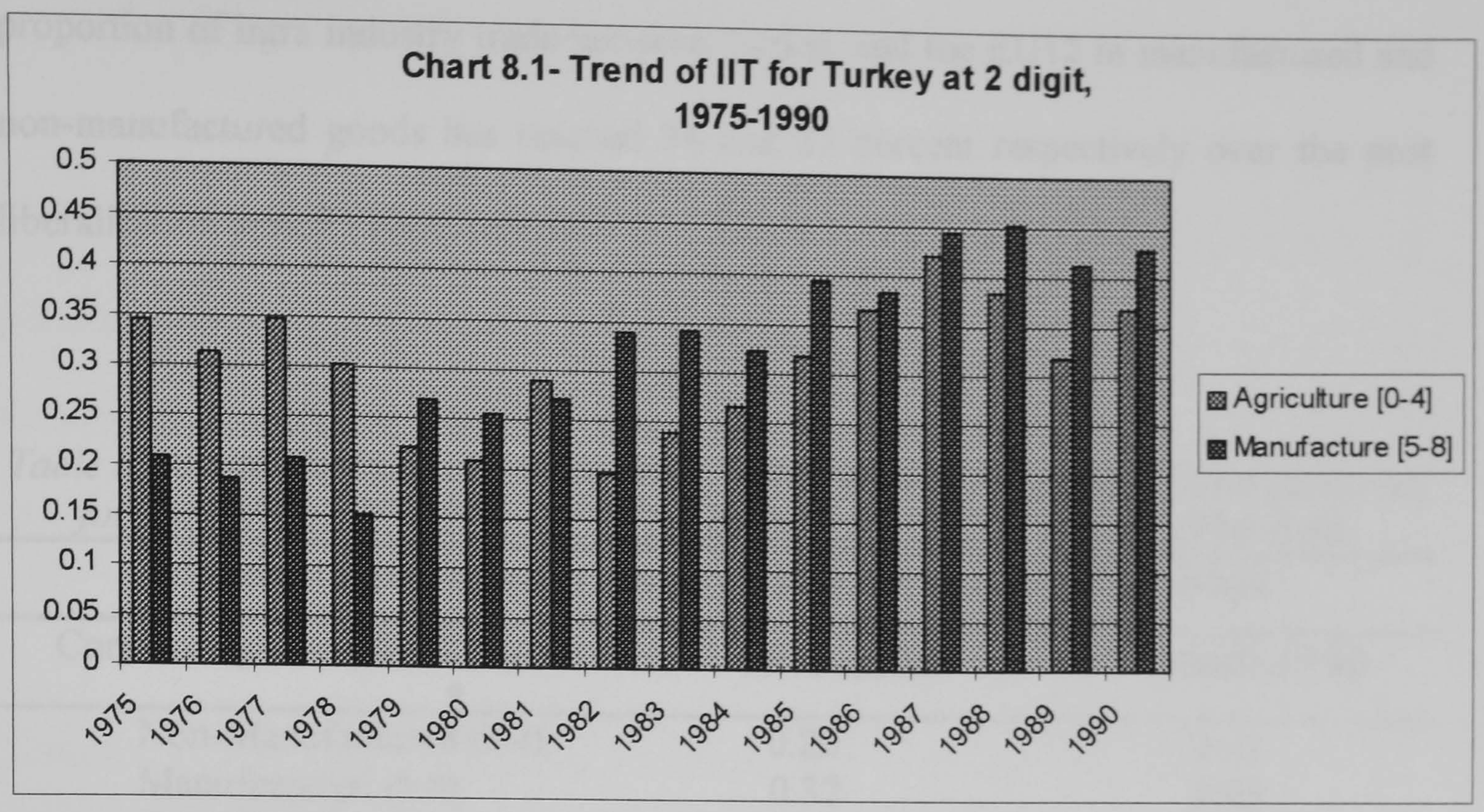
[16] In 1990 non-manufactured (manufactured) goods constituted about 30 % (70 %) of Turkey's total



As mentioned earlier, the standard GL indices of IIT have some shortcomings as they only indicate the *amount* of IIT but not changes in the *proportion* of it in new trade. Therefore, in order to examine the changes in *proportion* of IIT for Turkey after trade liberalisation, I employ the index of marginal intra-industry trade (MIIT)- which measures the degree of IIT in *new* trade- over the period between 1980 and 1990. Table 8.2 below shows the MIIT indices (calculated according to equation 4) for Turkey's total trade and for its trade with the EU12 over the pre-liberalisation (1975-1980) and post-liberalisation (1980-1990)periods.

Table 8.2 illustrates that about 32 (22) percent of Turkey's total trade (between 1975 and 1990) in manufactured (non-manufactured) goods was in the form of intra-industry trade. However, about 45 (43) percent of *new* trade created between 1980 and 1990 in manufactured (non-manufactured) goods was intra-industry type. Similarly, about 24 (29) percent of Turkey's trade with the EU12 in manufactured goods (non-manufactured goods) was in the form of intra-industry trade over 1975 and 1980. The

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exports.

proportion of intra industry trade between Turkey and the EU12 in manufactured and non-manufactured goods has reached 34 and 33 percent respectively over the post liberalisation period (1980-1990).

Table 8.2 : Marginal Intra Industry Trade (MIIT) indices for Turkey's total trade and for Turkey's trade with the EU12 for the periods 1975-1980 and 1980-1990.

Commodity Groups (SITC)	**1975-1980**	**1980-1990**
Marginal Intra Industry Trade (MIIT) for Turkey's total trade		
Non-Manufactured (0-4)	0.22	0.43
Manufactured (5-8)	0.32	0.45
Overall (0-8)	0.29	0.44
Marginal Intra Industry Trade (MIIT) for Turkey's trade with the EU12		
Non-Manufactured (0-4)	0.29	0.33
Manufactured (5-8)	0.24	0.34
Overall (0-8)	0.25	0.34

Notes: 1.- Marginal Grubel-Lloyd (unadjusted) index, MIIT, was calculated for each industry and unweighted averages were calculated across industries.

Our analysis so far suggests that Turkey's trade liberalisation program endorsed intra-industry type of trade especially in manufactured goods. It appears that freeing trade flows influenced not only the *amount* but also the *proportion* of IIT in new trade created over the liberalisation period. Tables 8.1 and 8.2 give support to the proposition that trade liberalisation encourages intra-industry type of trade.

8.3.3.2.- Comparison of IIT for Turkey's total trade with its trade with the EU12

In what follows I examine if IIT indices for Turkey's total trade differ from its trade with the EU12. Table 8.3 gives a comparison of IIT indices for Turkey overall trade with Turkey's biggest trading partner, the EU, at SITC two-digit level.

It is clear from Table 8.3 that the level IIT for Turkey's trade with the EU12 in manufactured goods has increased from 12 percent to 33 percent between 1975-1990 while IIT in non-manufactured goods has slightly decreased from 37 percent to 35 percent over the same period. One possible reason for this can be due to the fact that Common Agricultural Policy (CAP) of the EU notably restricts trade flows between non-member countries and the EU in non-manufactured (agricultural) goods[17].

Table 8.3: Comparison of Intra Industry Trade (IIT) Indices for Turkey's Total Trade with Turkey's Trade with the EU12 at SITC 2-digit.

Commodity Groups (SITC)	1975	1980	1985	1990
IIT Indices for Turkey's total trade				
Non-Manufactured (0-4)	0.33	0.21	0.34	0.39
Manufactured (5-8)	0.21	0.26	0.38	0.41
Overall (0-8)	0.25	0.24	0.37	0.41
IIT Indices for Turkey's trade with the EU12				
Non-Manufactured (0-4)	0.37	0.23	0.31	0.35
Manufactured (5-8)	0.12	0.17	0.31	0.33
Overall (0-8)	0.21	0.19	0.31	0.34

Notes: 1.- The Grubel-Lloyd (unadjusted) index was calculated for each industry and unweighted averages were calculated across industries. 2.- Groups with unidirectional trade have not been included (i.e. where either exports or imports are zero).

Table 8.3 also suggests that the level of IIT for Turkey's total trade has been mostly greater than that of Turkey's trade with the EU except for non-manufactured goods in 1975 and 1980.

[17] Fennel (1997) examines the EC share of world agricultural trade between the late 1970s and early 1990s and finds that imports to the EC for most products decreased as a percentage of world trade while exports of the EC increased. Her findings suggest that two-way trade (IIT) of the EC in agricultural products has decreased over the period considered.

8.3.3.3.- A country specific analysis of IIT for Turkey

Table 8.4 presents a country specific analysis of IIT in manufactures (SITC 5-8) for Turkey's trade with six selected EU countries three of which are highly industrialised (namely, Germany, the UK and France) and three of which are less industrialised (namely, Spain, Greece and Portugal).

Table 8.4: IIT for Turkey's trade with selected EU countries in Manufactures.

(SITC 5-8)	**1975**	**1980**	**1985**	**1990**
GERMANY	0.12	0.16	0.23	0.27
UK	0.08	0.16	0.37	0.27
FRANCE	0.17	0.13	0.20	0.26
SPAIN	0.12	0.15	0.16	0.26
GREECE	0.58	0.32	0.32	0.39
PORTUGAL	0.56	0.36	0.10	0.34

Notes: 1.- The Grubel-Lloyd (unadjusted) index was calculated at the two digit level for each industry in manufactures (SITC 5-8) and unweighted averages were calculated across industries. 2.-Groups with unidirectional trade have not been included (i.e. where either exports or imports are zero).

A number of conclusions can be drawn from Table 8.4. First, it seems that the level IIT for Turkey's trade with the industrialised EU countries (especially with the UK) and with Spain has significantly increased between 1975 and 1990 though the amount of IIT for these countries is still below the level of IIT for EU12 in most periods.

Secondly, the level of IIT for Turkey's trade with Greece and Portugal (whose factor endowments are considered to be similar with Turkey's) appears to be greater than that of the industrialised countries, however, it has a decreasing trend over time. As Nilsson (1997) points out, this may be a basic result of Greece and Portugal being

small countries and thus having relatively low trade imbalances in their trade with Turkey[18].

8.3.3.4.- A comparison of IIT level for Spain, Greece and Portugal with that of Turkey

In order to have a closer look at the IIT levels for these three non-industrialised southern European countries and to compare them with that of Turkey, we examine the IIT indices for each of these countries. Table 8.5 below shows the IIT indices for Spain, Greece and Portugal at 2 digit over the period between 1975 and 1990.

Table 8.5 : IIT indices for Spain Greece, and Portugal at 2-digit level.

Commodity Groups (SITC)	1975	1980	1985	1990
Spain				
Non-manufactured (0-4)	0.29	0.41	0.41	0.44
Manufactured (5-8)	0.54	0.63	0.61	0.71
Overall (0-8)	0.43	0.53	0.53	0.59
Greece				
Non-manufactured (0-4)	0.33	0.34	0.38	0.40
Manufactured (5-8)	0.41	0.39	0.38	0.32
Overall (0-8)	0.38	0.37	0.38	0.36
Portugal				
Non-manufactured (0-4)	0.35	0.39	0.37	0.37
Manufactured (5-8)	0.50	0.48	0.54	0.49
Overall (0-8)	0.43	0.44	0.47	0.44

1.- The Grubel-Lloyd (unadjusted) index was calculated for each industry and unweighted averages were calculated across industries. 2.- Groups with unidirectional trade have not been included (i.e. where either exports or imports are zero).

An examination of Table 8.1 and Table 8.5 indicates, first, that the overall IIT level for these three southern European countries appears to be greater than that of

[18] See Nilsson (1997) for a comparison of German's IIT with small and large countries and for an

Turkey. Secondly, regarding the IIT in non-manufactured goods, the IIT level for the four countries under consideration seems to be fairly similar. However, with regard to manufactured goods, the evidence suggests that Spain, the most industrialised of the three countries, did have higher levels of IIT than the other three countries.

8.3.3.5.- An industry specific analysis of IIT for Turkey

Following the country specific analysis of IIT for Turkey, in this section I present an industry specific analysis of IIT for Turkey. Table 8.6 shows the level of IIT for some selected manufacturing industries (SITC 5-8) over time and indicates that the level of IIT has notably increased for majority of industries. The level of IIT seems to be particularly high in essential oils (55), rubber (62), non-metallic minerals (66) and manufactures of metal (69).

The high IIT level in resource-based and labour-intensive industries [such as leather (61), textiles (65) and footwear (85)] seems to be contradictory since the extent of IIT is normally positively correlated with the degree of product differentiation which is generally assumed to be greater in high-tech industries than in resource-based and labour-intensive industries. Nevertheless, the leather, textile and footwear industries are typical labour intensive industries where the extent of product differentiation can be high, given the possible deployment of brands, labels and advertising efforts.

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industry specific analysis of German`s IIT with Turkey.

Table 8.6: IIT for Turkey's total trade, selected manufacturing industries (SITC 5-8)[1].

SITC		1975	1980	1985	1990
51	Organic chemicals	**0.02**	0.08	0.13	**0.36**
52	Inorganic chemicals	**0.12**	**0.30**	**0.32**	**0.46**
54	Medicinal and pharmaceutical products	**0.10**	**0.09**	**0.34**	**0.45**
55	Essential oils & perfume materials	**0.36**	**0.69**	**0.85**	**0.83**
58	Artificial resins, plastic materials	**0.0002**	**0.01**	**0.27**	**0.47**
59	Chemical materials and products	0.05	0.02	0.33	0.15
61	Leather, leather manufactures	0.91	0.58	0.64	0.14
62	Rubber manufactures,	**0.14**	**0.75**	**0.70**	**0.63**
65	Textile yarn, fabrics, related products	0.75	0.37	0.24	0.56
66	Non-metallic mineral manufactures	0.79	0.66	0.47	0.81
68	Non-ferrous metals	**0.12**	**0.41**	**0.62**	**0.61**
69	Manufactures of metal	**0.29**	**0.30**	**0.71**	**0.72**
71	Power generating machinery and equipment	0.01	0.02	0.36	0.17
73	Metalworking machinery	**0.01**	**0.02**	**0.12**	**0.19**
75	Office machines & data processing equipment	**0.0002**	n.a[2]	**0.004**	**0.08**
76	Telecommunications & sound recording apparatus	**0.006**	**0.19**	**0.19**	**0.74**
77	Electrical machinery, apparatus & appliances .	0.02	0.19	0.36	0.30
78	Road vehicles (including air-cushion vehicles)	0.06	0.48	0.39	0.22
79	Other transport equipment	**0.02**	**0.0009**	**0.04**	**0.24**
83	Travel goods, handbags and similar containers	**0.04**	**0.06**	**0.02**	**0.13**
84	Articles of apparel and clothing accessories	0.004	0.0002	0.002	0.009
85	Footwear	**0.01**	**0.26**	**0.41**	**0.72**
87	Professional, scientific & controlling instruments	0.01	0.005	0.26	0.06

Notes: 1.- The Grubel-Lloyd (unadjusted) index was calculated at the two digit level for each industry in manufactures (SITC 5-8). 2.- Trade was unidirectional for this industry (i.e. where either exports or imports are zero). 3.- Figures in bold denote cases where there has been a distinct increase in IIT over time.

Interestingly, the level of IIT for industries in which Turkey is considered to have a comparative advantage [e.g., leather (61), textiles (65) and clothing (85)] appears to be decreasing over the observation period (except for the slight increase in clothing in 1990). This suggests a negative relation between comparative advantage

and IIT and this relation will be further examined in the following section where I analyse the determinants of IIT for Turkey.

8.4.- DETERMINANTS OF IIT FOR TURKEY

8.4.1.- Theoretical Discussions on Determinants of IIT

A number of studies have analysed either the country characteristics or the industry characteristics of IIT [for example, Pagoulatos and Sorensen (1975), Greenaway and Miller (1984), Globerman and Dean (1990), Lundberg (1992)] or in some cases both industry and country characteristics [Balassa (1986), Balassa and Bauwens (1987), Bergstrand (1990)]. The investigations on industry-specific determinants of IIT have focused on factors relating to scale economies, product differentiation and standardisation, categorical aggregation, market power, distance and tariff protection while the studies on country-specific determinants of IIT have concentrated on factors such as level of income, and market size[19].

The conclusions of these studies have been varied, leading Greenaway and Milner to conclude that the main centre of empirical work should now be on industry rather than country-specific factors while Balassa and Bauwens not only find an important role for both, but also find important evidence that the two sets of characteristics may interact, in ways that may benefit from further investigation.

Since this work aims at examining the determinants of IIT for a single country, Turkey, using a cross-sectional time series analysis for a number of industries, in what follows I investigate the industry-specific determinants of IIT. The following section,

first, studies the sources of IIT and how to model IIT. Secondly, it briefly summarises the proxies used for industry-specific determinants of IIT and the presumptions about their signs.

8.4.2.- Modelling IIT

The country and industry specific determinants of IIT mentioned above (e.g. scale economies, product differentiation) are considered as 'stylised facts' which are supportive of *general* hypothesis to be drawn from theory, however, this methodology is rather informal. Many separate and distinct models of IIT have been proposed in order to formulate testable hypothesis on sources of IIT in the literature. None of them, however, are model-specific and it is therefore difficult to "test" these specific models of IIT, at present at least[20]. Given the diversity of models of IIT, it is not possible to set up a simple and universal 'test' in the fashion of the factor endowments prediction of H-O model or of the wage-productivity relationship of Ricardian trade theory[21].

Not only is the testing of particular models of IIT problematic, but the diversity of possible sources of IIT, and therefore of alternative hypothesis to be tested, makes econometric investigation potentially hazardous. Attempts to explain inter-industry variation in the level of IIT by reference to market and production characteristics inferred by diverse and sometimes competing models are eventually

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[19] See Havrylyshyn and Civan (1983), Helpman (1984), Lundberg and Hanssen (1986) for an analysis of country-specific characteristics of IIT.

[20] See Greenaway and Miller (1986, p.111) and Balassa and Bauwens (1988) for a review of the hypothesis on sources of IIT.

[21] The diversity of types of IIT (i.e. in homogenous, horizontally and vertically differentiated products) under alternative market structures (competitive, monopolistically competitive and oligopolistic) makes the testing of specific models particularly problematic.

faced with problems of definition, measurement error, inappropriately included and omitted variables and potential collinearity between 'explanatory' variables. I shall examine such problems in next section where I introduce the proxies I used in this work.

Given the arguments above, I shall use the following model to examine industry specific determinants of IIT for Turkey. The proxies used for each variable will be explained in more detail in the following section. In line with the hypotheses used in econometric studies of IIT, we can model determinants of IIT as follows:

$$IIT_i = (\alpha_0 + \alpha_1 SE_i + \alpha_2 PD_i + \alpha_3 RCA_i + u_i) \qquad (5)$$

where IIT_i is intra-industry trade index of industry i, SE_i is a proxy for scale economies in industry i, PD_i is a proxy for product differentiation in industry i, RCA_i is a proxy for revealed comparative advantage in industry i, and u_i is stochastic disturbance term.

8.4.3.- Proxies for Industry-Specific Determinants of IIT

It is clear from the arguments in the previous section that in the absence of unambiguous tests of the predictions of specific models it is difficult to determine the quality and appropriateness of the assumptions of alternative models; appropriateness that is to specific, not general, circumstances. Therefore, in what follows I briefly summarise the proxies used in this work without making strong assumptions on their signs.

8.4.3.1.- Proxying Scale Economies

In most models scale economies (the presence of decreasing costs in production associated with plant size or length of run) are used in modelling IIT. Theorists of IIT argue that in the absence of scale economies all product varieties could be produced domestically and no IIT would take place. Various indicators were employed as proxies for economies of scale in empirical investigations of IIT. Hufbauer (1970) regressed value added per man on firm size, measured in terms of employment; Loertscher and Wolter (1980) used average value added per establishment; Caves (1981) divided minimum plant size by a measure of the cost disadvantages of small firms; and finally Lundberg (1982) utilised the share of labour force in firms having more than 500 workers for this purpose.

All these measures link costs to plant size. However, as Balassa and Bauwens (1988) discuss, this is not the appropriate consideration regarding economies of scale in industries producing differentiated products, which are mainly characterised by horizontal and vertical specialisation[22]. The former implies lessening product variety in individual plants while the latter entails producing parts, components, and accessories of a particular product in different plants. Therefore, vertical and horizontal specialisation may very well involve reducing – rather than increasing - plant size.

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[22] Bergstrand (1983) points out a problem with scale economies (SE) and argues that the degree of increasing returns is a positive function of the degree of product differentiation (PD) and that therefore only one of these two variables should be included. By omitting product differentiation (on questionable grounds that scale economies are easier to measure) Bergstrand tries to avoid the mixed signs on PD and SE. Tharakan (1984) seeks to get around this problem by splitting his sample into high - and low- scale products and then examining the performance of the explanatory variables between the two sub-samples. Tharakan does find a loss in significance in one of his proxies of PD, but the sign of the coefficient was not as expected in any case.

Accordingly, the above measures of economies of scale reflect the relative importance of product standardisation and are thus expected to be negatively correlated with the extent of IIT. In this work Loertscher and Wolter's measure is used. This involves dividing the value added of an industry by the number of establishments in this industry.

8.4.3.2.- Proxying Product Differentiation

The models of IIT tend to place more importance on two-way trade in differentiated rather than homogenous products. The need to subject the potential determinants of trade in differentiated goods to empirical investigation inevitably raises therefore the question of how one proxies product differentiation[23]. Although it may not always be possible to clearly distinguish in practice, we can formulate three distinct forms of product differentiation: *horizontal differentiation, vertical differentiation* and *technological differentiation.*

Horizontal differentiation refers to differentiation by attribute or characteristics mix; all the products within a given group share certain common, core characteristics. The manner in which these characteristics is combined determines the product's specification, and product attribute differentiation can be identified by the presence of a variety of specifications in a particular group or industry[24]. *Vertical differentiation* refers to the presence of differences in absolute amounts of all the core characteristics present in a group of products. Vertical differentiation can be seen as being broadly consistent with differentiation in quality; i.e. the availability of

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[23] A fuller discussion of this problem can be found in Greenaway (1984).

alternative quality grades of the products in an industry grouping. And finally, *technological differentiation* occurs when one or more of the core features of products in a group have technically different attributes and/or are combined in the process of production by technologically different processes. Therefore technological differentiation is the outcome of innovations (attribute and/or process) which result in new, technologically improved products at all price/quality ranges of the product.

The distinction between these various forms of product differentiation is important because the underlying determinants and the manner in which they affect international exchanges may differ. IIT in the Lancaster-Krugman sense refers to exchanges of *horizontally* differentiated goods; the "natural monopoly" models are concerned with *vertical differentiation*; while product cycle theory is concerned with explaining trade in *technologically* differentiated products. The testing of specific hypothesis therefore requires the careful selection of proxies of product differentiation.

The index suggested by Hufbauer and the advertising intensity measures are two of the most frequently used proxies for product differentiation[25]. The Hufbauer (1970) index is basically the ratio between standard deviation of export unit values and unweighted mean of those unit values. The index is therefore intended to proxy product differentiation by reference to the coefficient of variation of export unit

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[24] It is useful to distinguish this form of differentiation from image differentiation or what Lancaster (1979) refers to as pseudo-differentiation; the presence of brand image and loyalty in the presence of specification differences.

[25] Huges (1994) uses three R&D related variables to proxy product differentiation. He argues that R&D activity can lead to a wide range of innovative outcomes from relatively minor product development to major new products or processes. Accordingly, to the extent R&D leads to product differentiation it will have a positive effect on IIT. Gray and Martin (1980) suggest hedonic price indices in order to proxy product differentiation, however, in the absence of price observations in the necessary detail, the hedonic prices are not practicable.

values, the implicit assumption being that these capture the effect of variations in export prices to different destinations.

Regarding advertisement intensity, the use of advertising-intensity measures as proxies for product differentiation is relatively widespread in industrial organisation studies[26]. In this literature it is frequent to distinguish between 'informative' and 'persuasive' advertising. Where informative advertising is concerned, some kind of differentiation would ordinarily be essential for advertising activity, whilst 'persuasive' messages will in general be directed as emphasising (real or apparent) differences between varieties. It might therefore be argued that advertising expenditure proxies product differentiability directly. Indeed this evident link between advertising intensity and product differentiation has led a number of researchers to use *inter-industry* differences in advertising intensity (deflated by industry sales, net output, or apparent consumption) to proxy *inter-industry* differences in the extent of product differentiation in the study of trade flows[27].

Our first intention was to employ the Hufbauer (1970) index in order to proxy product differentiation in this work, but as data on export unit values at industry level were not available, we use 'advertising-to-sales ratio' which was previously employed by Caves (1981) and Clark (1993).

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[26] Advertising intensity tends to proxy horizontal differentiation in general; image differentiation (or pseudo-differentiation) in particular. If so, one might therefore expect advertising intensity to be more important in the case of "convenience" goods than "shopping" goods.

[27] Caves and Khalizadeh-Shirazi (1977) argue that advertising intensity tends proxy horizontal differentiation in general; image differentiation (or pseudo-differentiation) in particular. If so, one might therefore expect advertising intensity to be more important in the case of ' convenience' goods than 'shopping' goods.

Following Caves (1981), Greenaway and Miller (1984) and Tharakan(1984), the proxy to be used to capture product differentiation, advertising-sales ratio (advertising intensity), can be written as:

$$\mathbf{ADVER_i = A_i / S_i} \qquad (6)$$

where A_i is advertising expenditure in industry i , and S_i is sales revenue in industry i .

8.4.3.3.- Proxying Competitiveness

IIT is linked in several ways to the competitiveness and performance of markets. Exposure to the international economy –via either exports or competing imports- has generally been found to make national product markets more competitive. The expansion of IIT seems to coincide with the rationalisation of industry into more efficient (larger, more specialised) production units, and some evidence indicates a causal association. The growth of IIT is attractive as a process of adjustment, because production can become more efficient without a high simultaneous cost of transferring factors of production to different locations.

The task of quantifying competitiveness and comparative advantage empirically is not simple because economic theory imposes severe restrictions and because country and commodity aggregations necessarily entail conceptual compromise. Many measures of competitiveness have been proposed in the literature

by Liesner (1958), Balassa (1965), Bowen (1983) and Balance et al (1987)[28], however, the most commonly used is the one suggested by Balassa (1965).

Given the theoretical arguments above, in this work I shall proxy competitiveness by using the Balassa's revealed comparative advantage (RCA) indexes. The RCA index used in this work is:

$$\mathbf{RCA_i = (X_i / X_{it}) \ / \ (M_i / M_{it})} \qquad (7)$$

where X_i and M_i are exports and imports of industry i, and X_{it} and M_{it} are total exports and imports of the country under consideration.

8.4.4.- Empirical Results on Determinants of IIT for Turkey

8.4.4.1.- Methodology

The data set used in this work is a cross-sectional time series data set for twenty four industries over the period between 1975 and 1990. The model in equation (5) is estimated with an addition of shift dummy variable for 1980[29] by both OLS and SURE (seemingly unrelated regression equations) due to the major disturbance problems (i.e. serial correlation and heteroscedasticity) affecting single equation models. The interdependence of results for each industry in a country analysis is another reason for using the multiple equation models (SURE) as well as OLS.

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[28] See Vollrath (1991) for a further discussion on these measures of competitiveness.
[29] The step dummy for is used to account for the 1980 liberalisation program. It takes the value of zero for 1975-1979 and one for 1980-1990.

A number of studies (for example, Caves 1981) have argued that a logit form is appropriate since the dependent variable, IIT_j, varies between 0 and 1. However, the appropriateness of this specification has been challenged by Greenaway and Milner (1984) and Balassa (1986), in particular as the interpretation of the dependent variable as the proportion of successes in a trial is not relevant. As a result, Greenaway and Milner (1984) use OLS also because their aim was estimation and not prediction. Balassa has a large proportion of zero observations and therefore adopts non-linear least squares as the estimation procedure. In this work we follow Greenaway and Miller in utilising OLS as there are no observations equal to zero or to one.

The data were initially pooled across industries according to their R&D intensities (i.e. low-tech and high-tech). However, the Wald tests clearly rejected the slope homogeneity hypothesis and hence pooling across industries according to R&D intensities (i.e. low-tech and medium&high-tech). Therefore, we first present our pooled time series and then focus on disaggretage results for each industry separately.

8.4.4.2.- Results

We first report our aggregated results. Table 8.7 presents pooled time series results by OLS for seventeen low-tech, seven medium and high-tech and for all industries (twenty-four) for the period 1975-1990. The disaggregated results for each of the twenty-four industries are given in Table 8.8 and 8.9.

Table 8.7: Determinants of IIT for Turkey , Pooled Time Series, OLS Estimates

Dependent Variable ΔLIIT	Constant	ΔLSCALE	ΔLPRO. DIF.	ΔLRCA	Time Dummy 1980	$\overline{R}^2$	D.W.
Low-Tech Industries *(n= 17× 16=272)*							
Model 1	.4007	-.1888**				.2498	2.4923
	(.9093)	(1.9214)					
Model 2	1.0011	-.3719*	-.2884			.2862	2.5264
	(1.9163)	(3.6048)	(.5197)				
Model 3	-.7073	-.3644*	-.2931	.4613*		.3418	2.5578
	(-1.0102)	(3.6005)	(1.2829)	(2.4116)			
Model 4	-.1911	-.4981*	-.36092	-.5545*	.2752*	.3576	2.4147
	(-1.7623)	(3.8456)	(1.5025)	(3.3261)	(2.0901)		
Med. and High-Tech Industries *(n=7× 16=112)*							
Model 5	1.2018	-.5052				.2900	2.1092
	(.7173)	(1.2073)					
Model 6	-.7046	.4216*	-.5582			.4182	2.0190
	(-.8485)	(2.5802)	(1.4254)				
Model 7	.2283	.5118*	.6908	1.2123*		.5626	2.4774
	(.7197)	(3.4580)	(1.5151)	(2.8810)			
Model 8	-.2367	.5408*	.6904	1.3119*	.0095*	.5923	2.4768
	(-.8825)	(3.3881)	(.9883)	(2.5451)	(3.1759)		
All Industries *(n=24× 16=384)*							
Model 9	-.3031	-.2503				.1835	2.3597
	(1.2093)	(-.8093)					
Model 10	-.9419	.5519*	.3861**			.2472	2.4034
	(-1.0330)	(3.6706)	(1.8547)				
Model 11	-1.3112	.5382*	.3761	.9523		.3356	2.4064
	(-.5211)	(3.4556)	(1.4054)	(1.2681)			
Model 12	-.1911	.4981*	.3609	1.1451**	.2752*	.4043	2.4147
	(-1.7623)	(2.8456)	(1.5025)	(1.8261)	(2.0901)		

Notes:[1] For the period 1975-1990. All variables are in logs. The table shows the relation between growth rate of IIT (ΔLIIT) and the growth rate of the other variables. Figures in parentheses are *t*-statistics.
* Significant at the 5 % level . ** Significant at the 10 % level.

It follows from Table 8.7 that IIT is significantly influenced by a number of the determinant factors tested. Therefore, IIT appears not to be a pure statistical artifact as a consequence of inappropriate aggregation. Nonetheless, a high unexplained residual (i.e. low $\overline{R}$) is observable particularly in the case of low-tech industries where production and trade crucially depends on availability of natural sources. This suggests that important determinants of IIT may have been omitted. One

possible variable is trade protection (i.e. tariffs and NTbs) which couldn't be included because of lack of systematic data.

It seems that there is a negative correlation between growth of IIT and growth of scale in the case of low-tech industries while the opposite holds for medium and high-tech industries. The most plausible explanation for this incidence might be that the scale variable -proxied by value added per establishment- is an indicator of standardisation rather than for the economies of long production runs in differentiated commodities. If this interpretation holds, then the product differentiation hypothesis receives some support though it is significant only in the case of all industries (see model 10).It seems that growth of IIT is negatively related to growth of product differentiation –measured by advertising-sales ratio- in the case of low-tech industries while the opposite holds for medium and high-tech industries though it is insignificant in most cases.

Competitiveness variable -measured by RCA index- is significant in most cases and appears to be highly correlated with IIT especially in the case of medium and high-tech industries. However, as both IIT and RCA index are devised by quantities of exports and imports, our results critically suffer from possible danger of spurious correlation.

Regarding the shift dummy variable, as our previous analysis suggests, it seems that the 1980 trade liberalisation had a positive impact on growth of IIT though its coefficient is particularly very small in the case of high-tech industries.

Following our analysis at aggregate level, in what follows we focus on the determinants of ITT for Turkey at a disaggregate level. Table 8.8 presents our results for the model in equation (5) which was estimated for each of twenty-four industries over the period 1975 to 1990 by using OLS[30]. In order to overcome empirical problems related to "stationarity" of variables, we estimated the OLS model in Table 8.8 in growth rates. A number of conclusions can be drawn from these results:

a.-) The results and explanatory power of the equations seem to vary across industries with equations for low-tech industries (such as furniture, wood products, pottery and tobacco) –shown above the dotted line- having relatively weak explanatory power compared to high-tech industries (such as plastic products, and professional and scientific equipment) –shown under the dotted line-.

b.-) It appears that there is a significant negative relative relation between growth of IIT and growth of scale particularly in the case of low-tech industries such as food products, tobacco, leather products, and furniture. Though some previous studies (for example, Soete (1981)) suggest that economies of scale could be relatively more important for industries like stone, glass, and fabricated metals, we do not find any significantly positive relation in our case. Scale economies variable is significant with a positive sign in the case of all seven medium and high-tech industries except for rubber and machinery electric.

[30] See appendix for OLS and SURE estimates in levels.

Table 8.8: Determinants of IIT for Turkey , OLS Estimates 1975-1990

Dependent Variable ΔLIIT	Constant	ΔLSCALE	ΔLADVER	ΔLRCA	Time Dummy 1980	$\bar{R}^2$	D.W.
Food Products	-.1098 (-.8845)	-.0976* (-2.3728)	.1258 (.3213)	.8687 (.9263)	.2618* (2.4284)	.9230	2.7118
Beverages	-.1622 (-1.0391)	.8105 (1.7484)	.7619* (3.2111)	-.7038* (-3.0628)	.1647** (1.8950)	.9174	3.1211
Tobacco	-.9170 (-.8129)	3.7161* (3.5302)	-.3733 (-.7191)	-.3120** (-1.9844)	1.5488* (2.2749)	.3797	2.9476
Textiles	-.1387 (-1.1078)	.1856 (.8080)	-.0409 (-.3593)	-.7143* (-3.0775)	.2202* (2.8205)	.5318	2.5169
Wearing apparel	-.1647 (-2.1242)	.1748 (1.3703)	-.3326* (-2.2865)	-.8549* (-4.532)	.1979* (2.1821)	.9834	2.2729
Leather products	.0354 (.3098)	-.3668* (-.9757)	.3459 (1.5299)	.5747* (4.882)	.1272 (.1213)	.9266	1.9759
Footwear	-.1641 (-1.1252)	.2517 (1.2613)	-.0075* (-2.0758)	-.8746* (-2.1792)	.4367 (.8751)	.9649	2.4738
Wood products	-.1163 (-.2690)	.4449 (.6632)	.0639 (.2890)	.1331 (.4598)	.1159** (1.8343)	.3201	2.5766
Furniture	-.0264 (-.0729)	-.5783* (-2.7302)	.4966 (.8914)	-.0585 (-.2657)	.5474** (1.9124)	.2090	2.4244
Paper	.1328 (1.3881)	-.4987* (-2.0378)	.1546 (1.2666)	.7351* (3.2964)	.1348* (2.3157)	.9172	2.9554
Printing	.3308 (1.6077)	.2204* (.6228)	-.4156 (-1.0793)	.2070 (1.4543)	-.3296 (-1.4365)	.7975	1.7971
Petroleum ref.	.1734 (.9878)	.1440* (2.7808)	-.2055 (-1.2891)	-.1287* (-3.314)	-.1785** (-1.8365)	.9801	3.0685
Pottery	.5460 (.4068)	.3636 (.2128)	-.6963* (-2.4395)	.7596* (1.9993)	.4227* (2.2972)	.3766	2.8042
Glass	-.0591 (-.5799)	-.4195** (-1.8226)	-.1420 (-.8277)	.8644* (3.8139)	.2057 (.4530)	.7878	1.8263
Iron and steel	.0964 (.5319)	-.0706 (-.2654)	.1422** (1.9534)	.6999 (.9564)	.1964* (2.5448)	.7311	2.6707
Fabricated metals	-.0100 (-.0708)	-.1214* (-.4800)	-.3203* (-2.2050)	.2165** (1.9502)	.2176** (1.8367)	.6570	2.0752
Other man. prod.	.0333 (.2637)	-.1911* (-1.8985)	.8162* (2.2259)	.0194 (.1661)	.1880** (1.7204)	.5088	2.5827
Rubber	.2849 (1.1470)	-.6995** (-1.8737)	-.3775 (-.8586)	.7888* (2.7612)	.2313* (2.1842)	.9085	1.7824
Plastic products	.1670 (1.7451)	.3716* (2.862)	.2477** (1.8651)	-.8761* (-2.574)	.4552 (1.0617)	.9794	2.1849
Non-ferro. Met.	.1614 (1.7974)	.2938* (2.6090)	.1515 (1.3737)	.8151* (2.1477)	-.1283** (-1.9279)	.8227	2.3611
Mach. exc. elect.	.1340 (1.0142)	.2056** (1.8201)	.1248** (1.9318)	.8701* (2.7493)	.3775 (.5361)	.8734	2.6822
Mach. Electric	.0907 (.7248)	-.0886 (-.3690)	.1711 (.7857)	1.0880* (3.2681)	.1802 (.6419)	.8802	2.4384
Transport equ.	.1816 (2.0306)	.3394* (1.9712)	.4530* (2.3459)	.6602* (2.8256)	.6205* (2.1078)	.9191	2.3147
Prof. And sci. equ.	.0600 (.58009)	.1091* (2.02876)	.1184** (1.7757)	.9707* (2.580)	.1188** (1.8539)	.9852	1.9615

Notes: All variables are in logs. Figures in parentheses are *t*-statistics. * Significant at the 5 % level .
** Significant at the 10 % level.

c.-) Product differentiation seems to be positively associated with IIT for only some of the low-tech industries in our sample such as beverages and iron and steel. There appears to be no positive relationship between product differentiation (measured by advertising-sale ratio) and IIT in the case of Turkey's traditional labour intensive industries, such as textiles and wearing apparel, where deployment of brands, labels and advertising efforts can be high.

Product differentiation variable is significant with a positive sign for medium and high-tech industries like plastic products, machinery except electric, transport equipment and professional and scientific equipment. In sum, our results on product differentiation indicates that at disaggregate level we have some evidence to suggest that there exists a positive relation between IIT and product differentiation for medium and high-tech industries while the opposite holds for low-tech industries.

d.-) It appears that RCA of an industry has a significant and positive effect on IIT for low-tech industries such as food products, leather products, paper and glass while its effect seems to negative for beverages, textiles, and wearing apparel. The results on RCA indicate that competitiveness of an industry and its IIT level are positively linked particularly in the case of high-tech industries.

Table 8.8 interestingly reveals that if economies of scale are important for an industry while product differentiation is only possible to a limited extent, then international competitiveness can lead to the dominance of a few suppliers and therefore IIT for the industry in question will be small. Our results suggest that this relation between economies of scale and RCA seems to be valid in the case of tobacco, textiles, wearing apparel, foot wear and petroleum refineries where

coefficient of economies of scale is significant and positively related to IIT and coefficient of RCA has a significant and negative sign.

f.-) As our previous analysis suggests, the time dummy for 1980, which was included to the model in order to assess the impact of Turkey's 1980 liberalisation program, is significant with a positive sign for most industries. Size of the time dummy variable is particularly large for industries like tobacco, furniture, pottery, transport equipment and plastic products.

8.5.- CONCLUSION

This chapter examines the trend of IIT for Turkey and its determinants over period between 1975 and 1990 (pre- and post-liberalisation periods) using cross-sectional time series data. The first goal of the study is to analyse if there has been any change in patterns of IIT after the implementation of Turkey's liberalisation program in the early 1980s. Secondly, we investigate the determinants of IIT for Turkey by industry. The motivation of the work is the fact that most previous studies have focused on examining the pattern and the country specific determinants of IIT between industrialised countries -where factor price differences are small- while very little attention has been given to the IIT between industrialised and developing countries -where factor price differences can be very large-.

Although there is no clear-cut theoretical or empirical basis for the relationship between IIT and trade liberalisation, our results on the trend of IIT for Turkey suggest that there has been a notable increase in the overall level of IIT for Turkey particularly after the 1980s liberalisation program. This expansion in IIT was confirmed by comparing the level of IIT for non-manufactured and manufactured goods respectively and by examining IIT indices for Turkey's trade with the EU12.

Our results also indicate that not only the level but also the *proportion* of IIT (measured by marginal intra-industry trade, MIIT, indices) has increased over the same period. Therefore, this provides support for the proposition that trade liberalisation encourages IIT. Considering the increase in *inter-industry* trade over the liberalisation period, one can argue that the prediction of the recent new trade theory

(NTT) -an increase in both *inter-* and *intra-industry* specialisation following liberalisation- appears to be appropriate for Turkey's liberalisation experience.

The examination of IIT in Turkey's trade with EU12 and its comparison with Turkey's total trade reveal some important insights on the relationship between IIT in multilateral trade and IIT within-regional trade. The overall level of IIT in Turkey's total trade seems to be notably greater than that of Turkey's regional trade with the EU12 over the period considered. This may be basically due to dissimilarity of demand conditions (i.e. taste overlap) between Turkey and the EU12. Comparison of the IIT level for Spain, Greece and Portugal with that of Turkey suggests that the overall IIT level of the three southern EU countries has been notably higher than that of Turkey over the observation period while IIT level in non-manufactured goods appears to be similar for all.

As our previous analysis on similarity between exports of Turkey and the EU and regional specialisation between the two areas suggest, there has been an increase in both similarity of export and the regional specialisation between the two areas after the 1980s. In this chapter we show that the two-way trade (IIT) between these areas has also increased over the pre- and post liberalisation periods. One possible source of the increase in IIT between Turkey and the EU might the fact that GNP of Turkey has grown very fast in the 1980s (i.e. the average GNP growth of Turkey between 1980 and 1998 was about 5 percent). As the income gap between Turkey and EU falls we expect an increase in variety of products consumed in two regions which would enhance IIT level in trade between the two regions. However, the trend of GNP growth in Turkey in the 1960s and 70s makes such an explanation on IIT growth

rather difficult as GNP growth in pre- liberalisation period has been as high as post liberalisation period in Turkey.

Given theoretical and empirical difficulties in testing particular models of IIT and the diversity of possible sources of IIT, one should be cautious in interpreting the results on determinants of IIT. Despite definitional and proxy problems, our results suggest that scale economies –proxied by value added per establishment- seems to be negatively correlated with IIT in the case of low-tech industries while product differentiation - proxied by advertising-sales ratio- is positively correlated with IIT especially in the case of high-tech industries. Interestingly, there appears to be no positive relationship between product differentiation and IIT for Turkey's traditional labour intensive industries, such as textiles and wearing apparel, where deployment of brands, labels and advertising efforts can be high.

Our findings on determinants of IIT for Turkey suggest that international competitiveness of an industry can have a negative effect on IIT level in the industry if economies of scale are important for the industry while product differentiation is only possible to a limited extent. The reason for this is that competitiveness can lead to the dominance of a few suppliers which would result in specialisation rather than IIT for the industry in question. This effect is confirmed by our results for several low-tech industries.

To achieve greater confidence in and refinement of these conclusions requires that measurement/proxy errors can be reduced and that in turn this will permit more accurate modelling. All the studies thus far completed have employed single-equation models. The independent variables are all assumed to be exogenous. Clearly a range

of scale and product characteristics are endogenously and simultaneously determined alongside IIT. The need, therefore, is to develop and to test simultaneous-equation models, which (more critically) distinguish between endogenous and exogenous variables. The possible multicollinearity between independent variables is another problem in modelling IIT. Nevertheless, this work throws some light on the relationship between IIT and its industry specific determinants for Turkey.

The policy implication of the impact of trade liberalisation on the extent of IIT is linked with the relationship between IIT level and structural adjustment costs. Intuitively, it is argued that adjustment costs are lower in industries with high levels of IIT. The possibility of lower adjustment costs suggests that the prospects for freeing trade flows are higher when more of existing and potential trade is of the *intra-industry* type. The policy implication of this for Turkey is that the liberalisation attempt in the 1980s was a step in the right direction and that further liberalisation of trade (i.e. joining a common market, the EU) may lead to further reductions in adjustment costs, reflected in a smaller net change in the number of firms, employment and turnover. The relation between RCA and IIT suggests that government efforts to support non-competitive sectors of the economy (namely, high-tech industries) may very well increase the level of IIT and hence possibly cut the cost of adjustment in these industries.

8.6.-APPENDIX

Table A8.1: Classification of industries according to their R&D intensities.

ISIC	Low-Tech Industries	ISIC	Medium and High-Tech Industries
311	Food	355	Rubber
313	Beverages	356	Plastic
314	Tobacco	372	Non-ferrous metals
321	Textiles	382	Machinery, except electrical
322	Wearing apparel	383	Machinery electric
323	Leather products	384	Transport equipment
324	Footwear	385	Professional and scientific equ.
331	Wood products		
332	Furniture		
341	Paper products		
342	Printing and Publishing		
353	Petroleum refineries		
361	Pottery		
362	Glass and products		
371	Iron and steel		
381	Fabricated metal products		
390	Other manufactured Prod.		

Source: OECD

Notes: Low: R&D intensity 0.5 times the mean R&D intensity or lower.
Medium: R&D intensity between 0.5 and 1.5 times the mean R&D intensity.
High: R&D intensity 1.5 times the mean R&D intensity or higher.

OLS AND SURE ESTIMATIONS IN LEVELS

In addition to the OLS results in *growth rates* presented in Table 8.8, we give OLS and SURE estimates in *levels* in Tables A8.2 and A.8.3. It follows from the tables that the negative relation between scale and IIT in low-tech industries continues to hold regardless of the estimation method used. The results based on SURE estimates indicate that wearing apparel, tobacco, and textiles are the low-tech industries where there is a significantly negative relation between scale and IIT. Regarding product differentiation, the SURE results suggest, similar to the OLS model in growth rates, that there is no positive relationship between product differentiation and IIT in the case of Turkey's traditional labour intensive industries such as textiles and wearing apparel and that the positive relationship seems to be apparent for almost all medium and high-tech industries.

Both the OLS and SURE results confirm the finding of the OLS model in growth rates that competitiveness of an industry and its IIT are likely to be linked mainly in the case of medium and high-tech industries. The time dummy variable which accounts for the impact of Turkey's 1980 liberalisation program has a positive sign in the case of about half of the industries considered.

Table A8.2: Determinants of IIT for Turkey, OLS Estimates 1975-1990

Dependent Variable LIIT	Constant	LSCALE	LADVER	LRCA	Time Dummy 1980	$\bar{R}^2$	DW
Food Products	4.0600 (1.6923)	-.14876 (-.7897)	-.4141 (-1.3022)	-.9781* (-15.0333)	-.15022 (-.7567)	.9711	2.4049
Beverages	-.0041 (-.001477)	-.0448 (-.24897)	.7548* (3.5712)	-.7655* (-17.3214)	-.4499* (-2.8003)	.9558	2.5060
Tobacco	50.5621 (1.9293)	-3.1518** (-1.9939)	.1181 (.5444)	-.5401* (-4.0755)	2.7896* (3.3433)	.6670	2.6050
Textiles	3.6777 (2.0589)	-.1855 (-1.5867)	-.0378 (-.2278)	-.8495* (-6.1218)	-.3055* (-2.8548)	.7609	2.0140
Wearing apparel	5.7479 (5.0086)	-.3971* (-4.8779)	-.3636** (-1.9683)	-.9275* (-19.6224)	.19610 (1.3428)	.9753	1.5832
Leather products	-1.3218 (-.4377)	.0666 (.2843)	.2736 (1.7203)	.5821* (10.3076)	-.0654 (-.2780)	.9012	2.0590
Footwear	2.4707 (.9745)	-.1172 (-.6375)	-.0262 (-.2711)	-.8656* (-16.0670)	-.2892** (-2.0168)	.9681	2.1674
Wood products	-6.8016 (-.9181)	.4664 (.8525)	.0627 (.2300)	-.0225 (-.0808)	-.3955 (-.6157)	.1103	1.4803
Furniture	2.8522 (.5678)	-.3007 (-.7450)	.8468 (1.6745)	-.4246* (-3.6817)	.6265 (.7749)	.6031	2.6654
Paper	-2.3618 (-.9273)	.14814 (.8419)	.12305 (.6935)	.9775* (15.8954)	.0724 (.3962)	.9760	1.9718
Printing	-5.4538 (-1.3957)	.3343 (1.0783)	-.6791 (-1.4282)	.3571* (2.7725)	1.1736* (2.6938)	.7864	1.4911
Petroleum ref.	.4183 (.15657)	-.1383 (-.95072)	-.2169* (-2.7368)	1.0398* (27.6201)	.5503* (2.8936)	.9950	2.7921
Pottery	-18.0490 (-1.4619)	.9958 (1.2844)	-.2433 (-.1854)	-.8044* (-3.0093)	2.2439 (1.7134)	.3906	2.2149
Glass	.1139 (.0798)	.0176 (.2055)	-.3425** (-1.9461)	-.8048* (-10.3188)	-.0810 (-.6458)	.8822	2.1323
Iron and steel	1.3934 (.8746)	-.0752 (-.7600)	.1778* (3.1276)	.8480* (10.3190)	-.0115 (-.0642)	.9841	2.6413
Fabricated metals	-3.0516 (-2.0907)	.1903 (1.6522)	-.4618 (-1.6259)	.4794* (3.3878)	.4352** (2.1532)	.8662	1.8921
Other man. prod.	2.0108 (.9499)	-.1862 (-1.1547)	.6881* (5.2912)	.0841 (.9524)	-.1251 (-.9031)	.7640	1.7945
Rubber	3.2199 (.7702)	-.2792 (-.9513)	.4731 (.9862)	.7921* (7.9478)	.2906 (.8209)	.9713	1.3671
Plastic products	.0936 (.0539)	.0159 (.1327)	.0848 (.4944)	1.0535* (3.1259)	-.2921** (-2.1142)	.9969	2.3279
Non-fer. Metals	.3666 (.2030)	.0291 (.2481)	.3727* (5.0016)	.7833* (4.9170)	.0104 (.0813)	.9136	2.4685
Mach. exc. elect.	-2.6663 (-1.3133)	.1838 (1.2103)	-.0103 (-.0592)	1.0252* (14.2847)	.2208 (1.2134)	.9822	2.2838
Mach. Electric	-2.3226 (-2.5458)	.1821* (2.9650)	.3072 (1.6792)	1.2335* (13.5786)	-.3756** (-2.0734)	.9877	1.8084
Transport equ.	1.6990 (.8361)	-.1236 (-.9271)	.4422 (3.1685)	.8380* (10.6532)	-.1364 (-.5813)	.9770	1.6190
Prof. and sci. equ.	-3.2320 (-.5816)	.2330 (.5253)	-.0032 (-.0366)	.9606* (11.6961)	.4892* (2.6907)	.9879	1.6839

Notes: Figures in parentheses are *t*-statistics. All variables are in logs. * Significant at 5 the % level
** Significant at the 10 % level.

Table A8.3: Determinants of IIT for Turkey, SURE Estimates 1975-1990

Dependent Variable LIIT	Constant	LSCALE	LADVER	LRCA	Time Dummy 1980	R^2	DW
Food Products	3.535 (5.8683)	-.1148* (-2.6281)	-.4105* (-8.0886)	-.9671* (-6.2290)	-.1316** (-1.9151)	.9783	2.2249
Beverages	-.2731 (-.2393)	-.0268 (-.3412)	.7006* (7.9547)	-.7401* (-2.6938)	-.3419* (-3.3893)	.9582	2.4311
Tobacco	41.8749 (5.0663)	-2.6272* (-5.2882)	.1153 (1.5527)	-.5250* (-11.0785)	2.7660* (5.9584)	.7514	2.5099
Textiles	3.2282 (7.4607)	-.15412* (-4.9845)	-.0481* (-4.8979)	-.8586* (-5.8607)	-.2726* (-5.3324)	.8189	1.8520
Wearing apparel	5.6363 (7.6577)	-.3918* (-6.9132)	-.3503* (-3.4606)	-.9231* (-7.4630)	.2440* (4.7310)	.9815	1.5180
Leather products	-1.0155 (-1.0117)	.03496 (.4508)	.2228* (5.2905)	.5884* (8.0892)	.0730 (.7905)	.9273	1.9294
Footwear	2.3239 (4.4479)	-.1052* (-2.6718)	-.0220* (-2.1920)	-.8730* (-2.7520)	-.2680* (-4.1607)	.9764	2.0744
Wood products	-5.19011 (-1.2035)	.3461 (1.0894)	.0869 (1.0964)	-.1376 (-1.0122)	-.1268 (-.3482)	.1714	1.5066
Furniture	1.3805 (.5067)	-.1897 (-.8784)	.6338* (2.7538)	-.3742* (-5.2827)	.5840 (1.2672)	.7057	2.4118
Paper	-3.2435 (-5.1536)	.2100* (4.8178)	.1233* (2.9338)	.9734* (5.5313)	-.0298 (-.4287)	.9819	1.9446
Printing	-5.7472 (-4.8210)	.3644* (4.0957)	-.7670* (-8.2510)	.3498* (4.5574)	1.1414* (7.1860)	.8421	1.4632
Petroleum ref.	.5937 (1.3160)	-.1380* (-5.8957)	-.1997* (-2.6052)	1.0344* (2.3220)	.4985* (6.6775)	.9962	2.6676
Pottery	-12.7029 (-3.0399)	.9322* (2.2961)	-.0746 (-.2263)	-.8759* (-3.2977)	2.6074* (4.3061)	.5325	2.0890
Glass	-.9407 (-1.0521)	.0772 (1.3862)	-.3730* (-4.0149)	-.7577* (-7.0525)	-.0359 (-.5053)	.9039	1.7603
Iron and steel	1.4561 (1.2644)	-.0981 (-1.3592)	.1448* (3.7834)	.7950* (3.8353)	.15832 (1.1843)	.9869	2.3411
Fabricated metals	-1.9503 (-1.9350)	.0972 (1.2642)	-.3442* (-3.3300)	.4291* (6.1742)	.5274* (4.0477)	.8957	1.7805
Other man. prod.	2.2368 (1.6897)	-.2027** (-2.0120)	.7388* (8.8414)	.0039 (.0676)	-.1144 (-1.3262)	.8051	1.4858
Rubber	3.7715 (3.2620)	-.3182* (-3.9111)	.4122* (4.4884)	.8130* (3.7046)	.3235* (4.0259)	.9787	1.3427
Plastic products	.0997 (.2206)	.0134 (.3971)	.0785* (2.2883)	1.0475* (8.0810)	-.2943* (-6.1302)	.9977	2.2014
Non-fer. Metals	.0374 (.0441)	.0365 (.6629)	.3046* (6.5279)	.7509* (3.0075)	-.0017 (-.0292)	.9344	1.9196
Mach. exc. elect.	-1.1601 (-1.2442)	.0665 (.9734)	-.00044 (-.0111)	.9928* (4.7764)	.2970* (2.9460)	.9857	1.9610
Mach. Electric	-1.8114 (-3.1348)	-.1372* (-3.4685)	.1506** (1.8609)	1.1564* (6.6198)	-.1861** (-2.1200)	.9897	1.7947
Transport equ.	1.6391 (1.7065)	-.1294** (-2.0030)	.3423* (5.9448)	.8192* (3.0864)	.0068 (.0729)	.9811	1.5123
Prof. and sci. equ.	-9.7312 (-4.3172)	-.6266* (-3.7296)	.9175* (4.9621)	.5492* (6.3921)	.2761* (3.3816)	.9959	1.6118

Notes: Figures in parentheses are *t*-statistics. All variables are in logs. * Significant at 5 the % level .
** Significant at the 10 % level.

THE CORRELATION BETWEEN IIT AND RCA

In what follows in order to examine the possibility of spurious correlation between our dependent variable (IIT) and RCA we take a closer look at the relation between these variables. The model we estimated for each industry is;

$$\log IIT_i = \alpha_0 + \ldots + \alpha_3 \log RCA_i + u \qquad (1)$$

where
$$IIT_i = 1 - | X_i - M_i | / (X_i + M_i) \qquad (2)$$

and
$$RCA_i = (X_i / X_{it}) / (M_i / M_{it}) \qquad (3)$$

with X_i, M_i, X_{it} and M_{it} denoting exports, imports, total exports and total imports of industry *i* respectively.

If $X_i > M_i$, then
$$IIT_i = 2M_i / (X_i + M_i) \qquad (4)$$

and
$$\log IIT_i = \log M_i + \log 2 - \log (X_i + M_i) \qquad (5)$$

while if $X_i < M_i$, then
$$IIT_i = 2X_i / (X_i + M_i) \qquad (6)$$

and
$$\log IIT_i = \log X_i + \log 2 - \log (X_i + M_i) \qquad (7)$$

Similarly we can decompose RCA_i in equation (3) to give:

$$\log RCA_i = \log X_i - \log M_i - \log (X_{it} / M_{it}) \qquad (8)$$

Thus, in both cases given in equations (5) and (7) [net exporting or net importing industry] , we see that the same term ($\log X_i$ or $\log M_i$) appears both on left hand side and right and side (ie, if $X_i > M_i$, $\log M_i$ is on both sides and vice versa). Obviously, the importance of this correlation between IIT_i and RCA_i depends on the extent to which the other terms in each expression dominate or cancel.

CHAPTER 9

CONCLUSION

In what follows first we give a brief assessment of the overall outcomes of the 1980 structural adjustment and liberalisation program then we summarise the results from each chapter. Finally we the discuss policy implications of our results for Turkey.

A Short Note on the 1980 Restructuring Program of Turkey:

Structural adjustment and trade liberalisation policies in Turkey have been in effect for about twenty years (1980 through 2000), thus making possible a realistic evaluation of their outcomes. This is all the more important since Turkey has been mentioned abroad for its achievements and been depicted as a highly successful example of the transition to a free-market economy via the structural adjustment policies. The numerous countries that look forward to undertaking the same transition have, before them, the Turkish case as an example of laudable performance.

The first point to emphasise on favourable outcomes of the structural adjustment policies is that the most notable achievement has been their crucial role in solving Turkey's perennial foreign-exchange shortage problem. Whether this solution is due to a deep-rooted structural transformation in the economy, however, is a debatable question. None the less, new export sectors have evolved, and some of the existing industries have become more export-orientated; import bottlenecks no longer hamper economic growth; and debt servicing proceeds without disruption. The latter

point is of prime importance from the standpoint of foreign-loan institutions in their assessment of structural adjustment policies.

Secondly, the Turkish economy has been further integrated into international markets through an enlarged foreign-trade sector. Whereas manufactured exports plus imports constituted about 10 percent of GNP in the late 1970s, this figure reached 40 percent in the 1990s. The economy has broken the chains imposed by insufficient export revenues in return for exporting a few agricultural and semi- processed goods to largely stagnant foreign markets. By the early 1990s, about 80 percent of total exports made up of manufactured plus processed agricultural products – of which the share stood at only 30 percent in the late 1970s. Additionally, many service industries have expanded such as tourism, transportation and contracting. These recently yielded more than half as much revenue as exports of manufacture.

Thirdly, policy makers have exploited effort to develop basic market institutions thanks to the pressures created by the implementation of the liberalisation and structural adjustment program. Such key prices as the interest rate and the foreign-exchange rate are now determined by market forces, rather than government regulation, as the necessary institutions have been created. There is, therefore, far less state intervention in the goods and assets markets and hence less bureaucracy and the disequilibria associated with administrative price-setting. On the agenda is the establishment of a new institution which is expected to enable state economic enterprises to participate fully in the market as economic agents free from government intervention in price-setting and other activities. The former point is of importance in assessing the adaptation process and the integration of Turkish markets with the EU.

Compared to the potential Eastern European member countries of the EU, it can be argued that Turkey has an advantageous position in terms of the establishment of European economic and financial institutions.

These favourable changes in the economic field, as well as in individuals' attitudes, have been engendered by the direct and indirect effects of the liberalisation and structural adjustment program. There are, however, several adverse consequences of the program which constitute costs that society has had to, or having to, pay for its implementation; they have not only been costly but they also threaten the sustainability of the programme and/or the viability of the economy.

One of the main adverse consequences of the liberalisation program has been the notable increase in Turkey's total external debt as the structural adjustment policies were accompanied by massive capital inflows in the form of concessional credits over the first half of the 1980s and later, by and large, in the form of loans received from the international financial markets thanks to its enhanced creditworthiness. This helped the country over the hardships of the first stages of stabilisation phase as well as sustaining its growth rate.

Turkey's outstanding total external debt stood at $14.2 billion in 1979 and at $16.2 billion in 1980; by the end of 1990 the figure had reached $49.03 billion. The aggravation of the outstanding foreign-debt –about one-half of GNP in the late 1980s and 1990s – is of the greatest importance from different aspects: on the one hand, it exerts strong pressures on available resources and on economic growth for its servicing; on the other hand, it is major source of external pressures on the country.

Turkey's structural adjustment policies have relied heavily on real devaluations to shift domestic relative prices in favour of the foreign-trade sector as well as to reduce domestic demand to gain a competitive edge in foreign markets. In relation to external debt payments, real devaluations of Turkish Lira have also been important factors. Real devaluations give rise to two opposite effects. In so far as they help to reduce the current-account deficit, or result in a current-account surplus, debt servicing proceeds smoothly. Creditworthiness can, therefore, be sustained and spreads over LIBOR; hence interest rates on loans may be reduced.

Real devaluations can, however, also have effects in the opposite direction. The economy incurs capital losses on the outstanding foreign debt as the prices of its exportables are reduced in terms of foreign currencies. The real debt burden is, therefore, aggravated in this sense.

Regarding the overall macroeconomic stability of the Turkish economy over the liberalisation period, one can argue that the implementation of the structural adjustment policies went hand in hand with domestic macroeconomic instability particularly in terms of stability of prices. The major policy tools during the structural adjustment and transformation period were relative prices. Technological change and productivity increases and autonomous jumps in the private-saving rate, played a relatively minor role. It appears that constant real devaluations of the external value of the Turkish Lira, positive real interest rates, adverse terms of trade effects for agricultural goods and falling real wages helped shift income to the foreign trade sector and capital-income receivers at the expense of low income working class. Therefore, the structural adjustment and the transformation in foreign trade was

achieved by relative price changes in the course of inflationary price increases, making the best of the money illusion of the low-income social groups. The social pressure stemming from this process of falling real wages, however, put serious doubts on Turkey's ability for a sustainable export growth particularly over the period 1980-1990.

Evaluation of Chapters:

In Chapter 2 we examined the overall impact of the 1980 trade liberalisation and restructuring program on the Turkish economy. In particular, we looked at the changes in the foreign trade regime of Turkey as well as the inter-industry distribution of protection over the liberalisation period. Our analysis indicate that Turkey's foreign trade has undergone significant changes since Turkey replaced import substitution policies by those of export-led growth at the beginning of the 1980s. The success of the 1980 liberalisation program can be illustrated by the high growth in exports in the decade of 1980 –from $2.9 billion in 1980 to $12.9 billion in 1990– when many other countries were in stagnation. Our investigation suggests that the export boom in Turkey was achieved through realistic exchange-rate policies (based on the "crawling peg" system), the removal of restrictions on foreign trade and capital movements, and export credits and incentives.

However, interestingly, we show that particularly throughout the 1980s export industries were more heavily protected than import-competing and non-import competing industries. Therefore, it appears that Turkey's success in expanding its

exports over the first decade of the liberalisation period has been achieved under protection.

Chapter 3 has investigated the structure of Turkey's trade with the EU and the changes in Turkey-EU trade patterns after the implementation of the liberalisation program. We showed that there have been important changes in both the magnitude and commodity distribution of Turkey-EU trade in the 1980s. It appears that though Turkey diverted its trade from EU to other regions over the first stages of the liberalisation period, the size of Turkey-EU trade has increased significantly after freeing trade flows in the 1980s. Our analysis also indicated that the commodity structure of Turkey-EU trade has changed particularly in terms of the growth in Turkey's exports of manufactures. It appears that although the bulk of the increase in Turkey's exports to the EU came through an increase in exports of "traditional" commodities like textiles and wearing apparel, Turkey has become less dependent on traditional exports by altering the variety of products and exporting more capital intensive goods after the 1980s. Regarding imports, we showed that there was no significant change in commodity structure of Turkey's imports from the EU. An interesting point identified in this chapter is that about 80 percent of all the liberalisation measures were applied to imports from the EU, suggesting that Turkey's liberalisation reforms have particularly aimed at integrating the Turkish economy with the EU.

In chapter 4 we examined the factor intensity of Turkey's trade with the EU over the pre- and post liberalisation periods in order to evaluate the comparative advantage of Turkey with respect to the EU. Our analysis showed that, as one can

expect, Turkey's comparative advantage with respect to the EU lies in labour intensive goods and that Turkey was better able exploit its comparative advantage in such commodities following the 1980 liberalisation program though some "traditional" industries lost their competitiveness. Consistent with the rise of Turkey's exports of manufacture to the EU, we showed that, though Turkey has a comparative disadvantage in capital intensive goods, the competitiveness of some of these industries has increased over the liberalisation period.

Chapter 5 examines first the similarity of exports from Turkey and the EU12 as a group over the pre- and post liberalisation periods. Secondly, it compares the similarity of Turkey's exports with that of the three Mediterranean member states (Spain, Greece and Portugal) in order to assess to what extent these three countries are competitors of Turkey. Our results suggest that the overall similarity of the exports from Turkey and the EU12 as a whole increased after the 1980s indicating that the economic structure of Turkey and the EU12 has become more similar.

Regarding the similarity of exports from Turkey and the three Mediterranean countries, it appears that comparison of Turkey with these countries should consider the type of products exported as some of these countries do not seem be competitors of Turkey in some commodity groups. Spain, for example, does not seem to be a competitor of Turkey in exports of manufactured goods (less than 30 percent of Spain's manufacture exports are matched with that of Turkey). Besides, the similarity of exports from Turkey and Portugal in agricultural products also appears to be rather small (only 25 percent of Portugal's agriculture exports are matched with that of Turkey).

Having studied the structure of Turkey-EU trade in the previous chapters, we investigate the factors that have an effect on trade flows between Turkey and the EU in the following chapters. In Chapter 6 we estimated both the short run and long run income and price elasticities of demand for Turkey's imports and exports at the aggregate level for the period 1973-1993. The aim of the chapter is to asses the importance of income and relative prices as well as exchange rates on Turkey's foreign trade. We also investigated if there has been structural change in Turkey's exports and imports after the 1980 liberalisation program by using an *ex post* model.

Our results indicate first that the income elasticity of demand for Turkey's exports is slightly greater than that for imports, suggesting that an overall increase in world income would help Turkey reduce her trade deficit. Secondly, it appears that the Marshall-Lerner (M-L) condition is satisfied suggesting that exchange rate policies can be used effectively to stabilise the trade balance of Turkey. Exchange rates seem to be a significant factor, especially in the case of exports, indicating that transferring the changes in exchange rates to prices could be easier in the case of imports compared to exports. This is also confirmed by both the short run and long run price elasticities of demand for imports being smaller than those of exports. However, although it can be very useful to add exchange rates to the analysis of determinants of trade flows for a country like Turkey where shortage of exchange rates is important as national currency is not convertible, one should cautious in interpreting our results due to definitional problems in modelling.

Thirdly, our analysis on structural stability of the parameters we used in import and export demand models suggests that the implementation of the 1980

restructuring and trade liberalisation program had a significant impact on Turkey's exports and imports.

In chapter 7 we continued to examine the determinants of Turkey-EU trade at a disaggregated level by employing cross section and time series data for 24 industries (17 of which are low-tech and 7 of which are medium and high-tech) over the period 1967-1990. Our results indicate that price competitiveness (measured by relative wages) is a significant determinant of trade not only for the low-tech industries but also for the medium and high-tech industries. We find that the relation between non-price competitiveness (measured by gross capital formation to account for innovative ability) and trade was positive particularly in the case of medium and high-tech industries though it was not significant in many cases. This can be due to the well-known difficulties in identifying non-price competitiveness.

Having recognised the importance of price competitiveness in Turkey-EU trade, we also give a sectoral convergence analysis of relative factor prices (wages) for Turkey and the EU over the period 1970-1990. Our results suggest that Turkey has not fully exploited its comparative advantage particularly in some low-tech industries such as tobacco and wearing apparel and in some medium and high-tech industries like transport equipment and machinery electric.

In Chapter 8 we studied the pattern and determinants of intra-industry trade (IIT) for Turkey over the period 1975-1990. The aim of the chapter was first to assess if there was a change in level of IIT for Turkey over the pre- and post liberalisation periods. Secondly, we examined the significance of factors such as scale economies.

product differentiation and competitiveness on the level of IIT. Our results on the pattern of IIT indicated that the level of IIT for both Turkey's total trade and Turkey-EU trade has increased significantly after the implementation of the liberalisation program in the 1980s. We also employed marginal intra-industry trade (MIIT) indices to examine the level of IIT in new trade created after the 1980s (1980-1990) and compared it with the level of IIT in the pre-liberalisation period (1975-1980). It appears that the level of MIIT in the post-liberalisation period has been greater than that in the pre-liberalisation period. This analysis gives some support to the view that trade liberalisation stimulates a greater degree of IIT.

Regarding the determinants of IIT for Turkey, our results indicate that scale economies (measured by value added per establishment) appear to be negatively correlated with IIT for low-tech industries while product differentiation (measured by advertising-sales ratio) is positively correlated with IIT, particularly in the case of medium and high-tech industries. Interestingly, we do not find any evidence of a positive relation between product differentiation and IIT for Turkey's traditional labour intensive industries, such as textiles and wearing apparel, where employment of brands, labels and advertising can be high.

Final Conclusions and Policy Implications:

Turkey managed to maintain a high growth rate for two decades since the implementation of the liberalisation program. Growth, however, been accompanied by structural difficulties. The most spectacular of these has been instability of prices

reflected in high inflation rates for a long time. According to official estimates –based on whole sale prices- annual inflation rates never dropped below 25 percent during the 1980s and , in fact crept upwards during the late 1980s to reach over 100 percent in the 1990s. High inflation was followed by high interest rates, particularly over the 1990s partly fuelled by the large public-sector borrowing requirements. High real interest rates attracted 'hot' money especially from emigrants, and this added to inflationary pressures. High interest rates in Turkey created many distortions in the economy as investors found nonproductive investment in financial assets and durable goods more attractive and profitable than in productive areas. Without any doubt, high inflation and interest rates in Turkey not only generated obstacles to reaching sustainable growth in the following years, but also put serious question marks on Turkey's accession to the EU. Therefore, reducing high inflation and interest rates should be the primary concern of Turkish policy makers.

Our analysis of the determinants of Turkey-EU trade indicate that price competitiveness plays a crucial role in Turkey's trade in both low tech and medium and high-tech industries. We also showed that Turkey exploited its low level of wages, particularly over the first decade of the liberalisation program, when there was a substantial decline in wages. Although the decreasing pattern of wages in Turkey enhanced the competitiveness of the country and created a desirable atmosphere for foreign investment it also resulted in social distress and political instability due to serious income inequality. Therefore, Turkish policy makers should consider the deterioration in income distribution and concentrate more on non-price competition factors to reach a more sustainable export growth and to maintain competitiveness of the country.

In sum we believe that for a semi-industrialised country like Turkey to come closer to the highly industrialised countries of Western Europe under free-trade conditions implies some deep-rooted changes in the technological standing. Its technology should be improved, total productivity should be increased, industrial structure should be diversified and, to substantiate such technological progress, its investment climate should be made more favourable both for domestic and especially for foreign direct investment (FDI).

Although our study provides considerable support to the view that Turkey was better able to exploit its comparative advantage after the implementation of the 1980 liberalisation program, a full examination of Turkey's trade liberalisation program and its impact on the competitiveness of Turkey with respect to the EU requires further examination of the link between the removal of trade barriers and competitiveness at both aggregate and sectoral levels. Though the first stages of Turkey's liberalisation experience was achieved under heavy protection, such an analysis can provide a better understanding of the possible association between liberalisation and competitiveness and better assessment of Turkey's accession to the EU.

Finally, despite the fact that we produced some evidence that trade liberalisation can stimulate the level of IIT even if the difference in factor endowments of the trading partners is large (eg, Turkey and the EU), the causality between trade liberalisation and intra-industry trade (IIT) and the relation between the level of IIT and lower adjustment costs need further examination.

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