# A COMPARATIVE ANALYSIS OF THE EU AND TURKEY: MACROECONOMIC CONVERGENCE AND TRADE SIMILARITY

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# ABSTRACT

## A COMPARATIVE ANALYSIS OF THE EU AND TURKEY: MACROECONOMIC CONVERGENCE AND TRADE SIMILARITY

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The aim of this thesis is to evaluate the sufficiency of Turkey for joining the Economic and Monetary Union of the European Union (EMU) in terms of similarity and convergence. The study has been conducted in a comparative and descriptive way. First, the similarity and convergence of Turkey to some selected countries are examined with respect to her macroeconomic position. When taking EMU as a benchmark and comparing the convergence of Turkey with the convergence of some of the countries and country groups, it is found that the macroeconomic deficiencies of Turkey are not in an extent that characterizes Turkey as a totally insufficient candidate for EMU. Next, whether there are similarity and convergence in trade structures of Turkey and the European Union

of 15 member states (EU15) for the period between 1995 and 2008 is inspected. The results indicated that Turkish export structure is clearly converging to the export structure of EU15 in the course of time. In general, findings of the thesis indicated that there is mostly a continuous convergence in all of the indicators considered but still Turkey does not meet all of the convergence criteria, perfectly. Therefore, as a result of the examinations, some suggestions have been made which would facilitate EMU membership of Turkey.

**Keywords:** trade similarity, macroeconomic convergence, trade structure, Turkey, EMU, EU15

# ÖZ

## AB VE TÜRKİYE'NİN MUKAYESELİ ANALİZİ: MAKROEKONOMİK YAKINSAMA VE TİCARET BENZERLİĞİ

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Bu tezin amacı Türkiye'nin Avrupa Ekonomik ve Parasal Birliği'ne (AEPB) girmedeki yeterliliğinin benzerlik ve yakınsama kavramları bakımından incelenmesidir. Çalışma, karşılaştırmalı ve betimleyici yollarla yürütülmüştür. İlk olarak, Türkiye'nin makroekonomik konumu bakımından bazı seçilmiş ülkelere benzerliği ve yakınsaması incelenmiştir. AEPB referans olarak alınıp Türkiye'nin yakınsaması, seçilmiş bazı ülke ve ülke gruplarının yakınsaması ile karşılaştırıldığında; Türkiye'nin makroekonomik eksikliklerinin, Türkiye'yi AEPB için tamamıyla yetersiz bir aday olarak nitelendirecek boyutlarda olmadığı görülmüştür. Ardından, Türkiye'nin ve Avrupa Birliği üyesi 15 ülkenin (AB15) ticaret yapılarında, 1995-2008 yılları arasında, benzerlik ve yakınsama

olup olmadığı incelenmiştir. Sonuçlar, zaman içerisinde Türkiye'nin ihracat yapısının AB15'in ihracat yapısına açıkça yakınsadığını göstermiştir. Sonuç olarak, Türkiye hala bütün yakınsama kriterlerini tam olarak karşılamıyor olsa da; tezin bulguları, dikkate alınan bütün göstergelerde çoğunlukla sürekli bir yakınsama olduğuna işaret etmiştir. Bu nedenle, incelemelerin sonucu olarak Türkiye'nin AEPB üyeliğini kolaylaştırabilecek bazı önerilerde bulunulmuştur.

**Anahtar Kelimeler:** ticaret benzerliği, makroekonomik yakınsama, ticaret yapısı, Türkiye, AEPB, AB15

**To My Mother**

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AB15: Avrupa Birliği Üyesi 15 Ülke (The European Union of 15 member states)
AEPB: Avrupa Ekonomik ve Parasal Birliği (The Economic and Monetary Union of the European Union)
BOPS: Balance of Payments Statistics
CBT: Central Bank of Turkey
CC: Candidate Countries
CC1: Candidate Countries 1
CC2: Candidate Countries 2
CEECs: Central and Eastern European Countries
CMC: Candidate Member Countries
CN8: Combined Nomenclature 8-Digit Commodity Numbers
COMEXT: Eurostat Reference Database for External Trade
COMTRADE: United Nations Commodity Trade Statistics Database
CPI: Consumer Price Inflation
CU: Customs Union
EBRD: European Bank for Reconstruction and Development
EC: European Commission
ECB: European Central Bank
ECU: European Currency Unit
EEC: European Economic Community
EFTA: European Free Trade Area
EMI: European Monetary Institute
EMS: European Monetary System

EMU: Economic and Monetary Union of the European Union

ERM: Exchange Rate Mechanism

ERM II: New Exchange Rate Mechanism

EU: the European Union

EU12: the European Union of 12 member states

EU15: the European Union of 15 member states

EU27: the European Union of 27 member states

EUROSTAT: Statistical Office of the European Communities

FDI: Foreign Direct Investments

GATT: General Agreement on Tariffs and Trade

GDP: Gross Domestic Product

HS1992: 1992 version of the Harmonized System Nomenclature

IFS: International Financial Statistics

IMF: International Monetary Fund

LABORSTA: International Labor Organization Department of Statistics

NMC: New Member Countries

OCA: Optimum Currency Area

OECD: Organization for Economic Co-Operation and Development

R&D: Research and Development

SGC: Second Generation Countries

TL: Turkish Lira

TURKSTAT: Turkish Statistical Institute

UK: United Kingdom

UN: United Nations

UNECE: United Nations Economic Commission for Europe

UNSTAT: United Nations Statistics Division

UPMFT: Undersecretariat of the Prime Ministry for Foreign Trade

U.S.: United States

USD: United States Dollar

UT: The Undersecretariat of Turkish Treasury

WB: World Bank

WCO: World Customs Organization

WDI: World Development Indicators

WEO: World Economic Outlook

YTL: Yeni Türk Lirası (New Turkish Lira)

# CHAPTER 1

# INTRODUCTION

## 1.1 INTRODUCTION

After the collapse of Bretton Woods system in 1971, which brought an end to fixed exchange rate system, in 1972 six existing European Economic Community (EEC) member countries and three future member countries (the United Kingdom (the UK), Ireland and Denmark) decided to preclude exchange rate fluctuations of greater than 2.25% between the European currencies. In March 1979 European Monetary System (EMS) was created, which has been set out in the Werner Report (1970) and based on the concept of fixed, but adjustable exchange rates. An exchange rate mechanism (ERM), a credit mechanism and a reference currency called the European Currency Unit (ECU) which would be used as a unit of account, were the basic elements of EMS. All EEC member countries (except the UK) participated in ERM where each currency had an exchange rate linked to the ECU and bilateral exchange rates were allowed to fluctuate within a band of 2.25%.

In April 1989, the Delors Report was issued which outlined three stages for the achievement of EMU and in June 1989 at the European Council in Madrid, a three-stage plan for EMU was adopted on the basis of the Delors Report. First stage officially began on 1 July 1990 and capital movements within the EEC were liberalized. During this stage the Maastricht Treaty was signed and the criteria for the European Union (EU) member states to enter the third stage were set. On 1 January 1994, the European Monetary Institute (EMI) was established which is admitted as the start of the second stage. In June 1997, new exchange rate mechanism (ERM II) was adopted, which would succeed the EMS and the ERM after the launch of the euro. Lastly, on 1 January 1999, with the irrevocable fixing of the exchange rates of 11 member states'[1] currencies and the adaption of euro in non physical form, the third stage started. In this stage the EMI is dissolved and European Central Bank (ECB) is established which became responsible for single monetary policy. In 1 January 2002 euro notes and coins were issued in 12 countries (Greece joined to the above 11 countries on 1 January 2001) and since then euro has been legal tender in the Euro Area countries. Today, there are 16 EU member states which have adopted the euro currency as their sole legal tender. Together with twelve countries mentioned above, Slovenia (joined on 1 January 2007), Cyprus (joined on 1 January 2008), Malta (joined on 1 January 2008) and Slovakia (joined on 1 January 2009) constitute the EMU. Also, Estonia will join the Eurozone on 1 January 2011.

When considering 51 years of the EU adventure of Turkey briefly, in 1959 Turkey applied for the first time for associate membership in the

[1] Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain

EEC. Subsequently, on 12 September 1963 Turkey signed Ankara Agreement for the progressive establishment of a Customs Union (CU) with the EEC and for bringing Turkey to eventual membership. In 1970 an additional protocol is signed in Brussels and in April 1987 Turkey applied for formal membership into the European Community. This is followed by the establishment of CU between Turkey and EU on 1 January 1996. After EU Helsinki Council recognized Turkey as a candidate country on an equal footing with other candidate countries in December 1999, Copenhagen European Council in December 2002 stated that the EU would open negotiations with Turkey 'without delay' if the European Council in December 2004 decides that Turkey fulfills the Copenhagen political criteria. Consequently, in December 2004, the EU agreed to start negotiations with Turkey.

It is not clear if Turkey will be accepted for membership in the EU or when she will be accepted. However, once she becomes a member, as all of the EU member states are required to adopt the euro (except Denmark and the UK, which have 'opt-outs' from joining) and join the Euro Area when they meet certain convergence criteria (Maastricht Criteria), Turkey will also be demanded to meet these criteria and eventually become a member country of EMU. Therefore it is quite important to evaluate the topic of ‘possible accession of Turkey to the EMU’ from different aspects. Although there exists a vast literature examining the topic of ‘possible accession of Turkey to the EU’ from different aspects, there are few studies examining the possible EMU membership of Turkey. Thus, in this thesis, the subject that is mostly dealt with in the literature is taken one step further and the sufficiency of Turkey for possible EMU membership is analyzed in a comparative and descriptive way in two main parts.

First of all, the similarity and convergence of Turkey to some selected countries and country groups, mainly to the EU and Euro Area countries, with respect to her macroeconomic position are analyzed. The aim of this analysis is identifying whether new members and future members of the Eurozone have more stable macroeconomic conditions than Turkey has and whether they are more similar in terms of these conditions with the Euro Area and the EU than Turkey is.

Next, the similarity and convergence in trade structures of Turkey and EU15 is analyzed. In this analysis, trade with EU15 data is taken as a proxy for trade with Eurozone, due to better data availability. De Benedictis and Tajoli (2003) assume that the similarity in trade structures among countries will ease the integration process and based on this assumption, to what extent Turkish export structure converged to that of the EU15 is examined. The aim of this analysis is discovering how the export structures of Turkey and EU15 have changed with respect to the beginning of the transition process and second, how the export structure of Turkey has changed with respect to the EU15 export structure.

## 1.2 OUTLINE OF THE THESIS

The study is organized as follows. In Chapter 2, a literature review of the studies on macroeconomic convergence - especially those examining convergence between the EU countries or prospective EU member countries - and studies that evaluate Turkish economic convergence with the EU and Eurozone member countries are presented. Next, another branch of the convergence literature which

focuses on the changes in the similarities in trade structures of countries and the relationship between international trade and economic convergence is demonstrated. Lastly, the limited number of studies trying to determine whether EMU is an optimum currency area (OCA) for Turkey is presented.

In Chapter 3, first the annual averages of some selected macroeconomic indicators of Turkey, 27 EU member countries and 18 other countries are calculated and compared. Next, the similarity of Turkey with these countries is analyzed by computing and comparing the bilateral correlation coefficients of the annual averages of these indicators for the period between 1995 and 2008[2]. Lastly, international similarities in terms of the stability structure of the considered countries are analyzed by computing and comparing bilateral correlation coefficients of the standard deviations of these indicators for the same period.

In Chapter 4, evolution of trade structure of Turkey through the period between 1995 and 2008 is given. Next, selected countries are classified based on the volume of exports they receive from Turkey and for the countries with the highest ranking; a detailed sectoral analysis of Turkish exports to these countries is provided.

In Chapter 5, similarity and convergence in terms of trade patterns are analyzed between EU15 and Turkey. After the comparison of total export shares in 97 sectors in years 1995 and 2008 for Turkey and EU15 is provided separately, Tukey's Boxplot is demonstrated for a

[2] As the CU between Turkey and EU is established on 1 January 1996, 1995 is also chosen as the starting year to be able to capture the effects of the CU on Turkish foreign trade performance with the EU.

broader analysis of the changes occurring along the years for Turkish export shares. Then, metrics are defined which are used to measure similarity between export structures of EU15 and Turkey. After that, first, similarity of Turkish and EU15 export structures to their initial export structures through time (self-similarity) is presented and then whether there exists a convergence between Turkish and EU15 export structures between 1995 and 2008 is analyzed by using the same correlation and distance metrics.

Chapter 6, in a sense, gathers previous chapters and connects them. In Chapter 6, maturity of Turkey for EMU membership is interpreted first in terms macroeconomic convergence by referring to the Maastricht convergence criteria and second in terms of trade convergence by referring to the similarity of trade structures of Turkey and EU15 analyzed in the previous chapter. Then, required policies and preconditions which would help in better positioning to benefit more from EMU membership is discussed and in the last section of Chapter 6, expected benefits and costs, that Euro adoption will bring for its member countries, are covered in general.

Lastly, Chapter 7 summarizes and concludes the study.

# CHAPTER 2

# LITERATURE REVIEW

In this chapter, a review of the studies on macroeconomic convergence and similarity with an emphasis on trade is presented.

## 2.1 REVIEW OF LITERATURE ON CONVERGENCE BETWEEN THE EU COUNTRIES AND THE PROSPECTIVE EU MEMBER COUNTRIES

With the increasing trends in globalization and new establishments of monetary unions like EMU, studies on macroeconomic convergence and similarity became more popular than before. Matkowski and Prochniak (2004) indicate that the concept of real economic convergence includes two major and independent aspects. These are: (a) a tendency towards the equalization of income and development levels, which may be called as growth or income convergence, (b) a tendency among the countries towards the conformity of their business cycles, which may be called as cyclical convergence.

A majority of convergence literature is comprised of studies that examine convergence between the EU countries or prospective EU member countries from different perspectives. Kasman, Kirbas and Turgutlu (2005) provide a structured literature survey of the studies that have examined the real and nominal convergence within the EU members and transition economies to the EU. As for the EU countries' convergence, Karfakis and Moschos (1990) investigate the issue of convergence from interest rate perspective and analyze the interest rate linkages between Germany and the other EMS countries which participate in the exchange rate mechanism of the system. They first investigate whether there exists long-run co-movements between Germany and other EMS members' rates by employing integration and cointegration techniques on monthly data of short term domestic nominal interest rates for Belgium, France, Germany, Ireland, Italy and the Netherlands over the period from April 1979 to November 1988. Their analysis does not reveal the existence of systematic interest rate relationships in the long run between Germany and any of the other EMS countries and this result is attributed to the non-stationarity of either the expected exchange rate movements or the risk premia.

MacDonald and Taylor (1991) follow a comparative approach and seek to obtain measures of the extent of real and nominal exchange rate and monetary policy long-run convergence between EMS members (France, Germany, Italy) and compare this to the pattern among certain non-EMS countries (Canada, Japan, the U.K. and the United States (U.S.)). They analyze bilateral U.S. dollar nominal and real exchange rates for three major EMS currencies (the French franc, German mark and the Italian lira) and three major non-EMS currencies (the Canadian dollar, the Japanese yen and the British pound) and nominal money

supplies for all these currencies (including the U.S. dollar) by applying the multivariate cointegration technique. Their data sample runs from the beginning of the exchange rate mechanism of the EMS in March 1979 and ends in December 1988. Their results indicate that in comparison with a control group of non-ERM exchange rates, ERM exchange rates (both nominal and real); appear to move together during the analyzed period. A similar convergence is also determined for the money supplies of EMS members.

Fountas and Wu (1998) point out a methodological weakness in the previous studies that aim to measure interest rate convergence between EMS countries. They indicate that possible structural breaks in the cointegrating relationship could justify the finding of no cointegration, although it exists. In other words, the presence of structural breaks biases cointegration tests in favor of acceptance of the null of no cointegration. In order to avoid this problem, they propose a test that allows for an endogenously-determined structural break in the cointegrating vector where the break could be due to exchange rate realignments, institutional changes like changes in the existing restrictions on capital movements or asymmetric interest rate changes due to asymmetric adjustment in the stance of monetary policy in the two countries. As opposed to some several previous studies on the same subject (such as Karfakis and Moschos (1990) and Katsimbris and Miller (1993)), their calculations imply a strong cointegration between the German interest rate and interest rates in other ERM countries.

With the aim of complementing the work of Fountas and Wu (1998), Camarero, Ordonez and Tamarit (2002) assess the linkages existing

between the interest rates within the EU countries in order to discover if the Exchange Rate Mechanism has led to a converging process. They test this hypothesis using the uncovered interest rate parity relative to the Maastricht Treaty's interest rate criterion and determine the evidence of interest rate convergence for all the EU countries except for Italy. More explicitly, they cluster the EU countries in four groups according to their degree of convergence. The first group includes the countries that have already converged (Germany, Austria, the Netherlands, the UK, Sweden and Luxembourg). A second group of countries (Belgium, France, Denmark, Ireland and Spain) is found to be catching-up with no structural changes in their deterministic component. Finland and Portugal are also found to be catching-up but there is a break in that trend. Moreover, for these two countries, the process of convergence has been more recent than for the second group of countries. Therefore, Finland and Portugal are considered to comprise the third group. Finally, Italy is found to show no sign of convergence.

Haug, MacKinnon and Michelis (2000) investigate the issue of convergence according to criteria based on the Maastricht Treaty. Based on these criteria, the authors analyze the original 12 EU countries together. Nominal exchange rates, real exchange rates, long-term interest rates, and government budget deficits are each analyzed for co-movements among the 12 countries (Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and the UK) and alternative subgroups of them. Their results suggest that not all of the 12 original countries of the EU can form a successful EMU over time. Italy, Spain, and Portugal are found to be in greater need of policy coordination with the rest of the EU countries. On the other hand, the results point to a complete

convergence of government policies among Belgium, Denmark, France, Germany, Luxembourg, the Netherlands and the UK. Based on this evidence, Haug et al. (2000) find it tempting to conclude that these countries would form a successful EMU in the long-run.

As mentioned previously, convergence of the prospective EU member countries has also been the subject of a vast amount of convergence literature. With the aim of explaining factors behind continued high inflation rates in three Baltic countries (Estonia, Lithuania and Latvia), Richards and Tersman (1995) analyze price convergence between these countries and some EU members. Their results indicate divergent price levels.

Brada and Kutan (2001) investigate the issue of whether the transition-economy applicants (the Czech Republic, Hungary, the Slovak Republic, Slovenia and Poland) are able to achieve the necessary stability between their exchange rates and those of their EU partners. They answer this question by investigating the extent to which transition-economy applicants have been able to achieve some measure of convergence between the evolution of their money supply and that of Germany, which they use as a historical proxy for the future monetary policy stance of the ECB. They also compare the convergence achieved by these five transition-economy candidate countries to that achieved by countries that have recently become members of the EU, by several non-transition candidate countries as well by some transition economies whose candidacy for the EU membership has been deferred because they have made slower progress toward stabilizing their economies and introducing market mechanisms and institutions. The authors indicate that among the

transition economies, the ability to follow the policies of the Bundesbank is weaker or non-existent for some countries.

Kocenda (2001) aims to address the question of whether the Central and Eastern European Countries (CEECs) have achieved a path of economic development eventually leading to a certain degree of convergence. The countries in question are the Czech Republic, Slovakia, Hungary, Poland, Slovenia, Romania, Bulgaria, Albania, Estonia, Latvia, and Lithuania. Kocenda (2001) indicates that there are two principal reasons to expect the convergence of macroeconomic variables of CEECs. Firstly, all CEECs engage quite heavily in international trade with each other. The second factor is of an institutional nature. Due to the prospect of their accession to the EU, these countries have been confronted with the list of criteria upon which the EU conditioned the acceptance of new member countries since the middle of the 1990's. These criteria are common for all applicants for the EU membership. Therefore, the conception of adequate institutional arrangements along with adjustments in monetary and fiscal policies that are motivated by the attempt to fulfill the criteria is supposed to generate similar trends of macroeconomic fundamentals. In his study, Kocenda (2001) examines the real and nominal convergence of industrial output, money aggregate, M1, producer and consumer prices and nominal and real interest rate spreads using a panel unit root technique. The empirical findings of the study imply the evidence of convergence in macroeconomic fundamentals among the CEECs in general, despite diverse starting conditions at the beginning of transformation, different institutional features accompanying transition, and distinct privatization techniques adopted. However, the strength of the results differs for particular variables as well as for groups of

countries. Regarding the macroeconomic variables, the greatest degree of convergence was achieved in growth rates of real output across all groups of economies. The growth rates of producer and consumer prices converged at the slowest pace. However, these rates did tend to converge toward the low inflation region in most countries.

In order to investigate the sensitivity of real and nominal economic convergence of transition economies to model specification and restrictions, Kutan and Yiğit (2004) extend the work of Kocenda (2001) by considering a more stable, post-1993 period and by adopting a more recent panel estimation approach. The new technique involves less restrictive assumptions than the previous panel unit root techniques by allowing heterogeneity in convergence rates. Their results show less nominal and real economic convergence than those of Kocenda (2001). This leads to the conclusion that inferences about convergence among transition economies may be more sensitive to restrictions placed on the panel technique employed than to the data period used.

Brada, Kutan and Zhou (2005) use rolling cointegration method to measure the convergence of base money, M2, the consumer price index and industrial output between two reference countries, Germany and France and the recent EU members and some transition economy candidates. Their calculations show that countries that recently joined the EU exhibit time-varying cointegration with the reference countries over much of the 1980-2000 sample period. Cointegration for the transition economies was comparable for M2 and prices, but less comparable for monetary policy and industrial output. They indicate that this result suggests that a peg to the euro upon accession is feasible for

the East European candidates, but the benefits of joining the Euro zone are as yet limited.

## 2.2 REVIEW OF THE LITERATURE ON TURKISH ECONOMIC CONVERGENCE BETWEEN THE EU COUNTRIES AND THE EURO AREA

In another strand, there are studies evaluating Turkish economic converge with the EU and the Euro Area. These studies mainly focus on the Maastricht convergence criteria and analyze the Turkish data with respect to these criteria. For instance, Kösekahyaoğlu (2006) examines convergence and divergence patterns for Turkey and the EU between 1980 and 2007. The author first analyzes the general convergence trends in the EU and then concentrates on comparison of Turkey with EU15 and new members. Comparative analysis of the author is based on estimation of the coefficient of variation and considers; gross domestic income, unit labor cost, unemployment rate, exchange rates and interest rates. Kösekahyaoğlu (2006) finds that there has been no tendency of catching up between Turkey and EU15 in terms of gross domestic income and that the divergence in exchange rates and interest rates increased mainly over the periods of financial crises in 2000 and 2001.

Akçay (2008) evaluates Turkish economy with respect to both Copenhagen economic criteria[3] and Maastricht convergence criteria in

[3] These are the rules that define whether a country is eligible to join the EU ("Copenhagen criteria", 2010).

her paper. Akçay (2008) states that due to economic policies that are implemented and political stability that is achieved since 2002, high sustainable growth and macroeconomic stability are substantially achieved. According to the author, for this reason, even though there are some deficiencies in Turkish economy in practice, it can be stated that Turkey meets the Copenhagen economic criteria to a large extent. Improvements in free market economy were also instrumental in improvements in macroeconomic indicators and Turkey highly improved her monetary indicators (inflation and interest rates criteria) although they are still much higher than the EU and Euro Area averages. Furthermore, Turkey became better than most of the EU member countries and the EU average in terms of fiscal indicators (budget deficit and government debt) (Akçay, 2008).

## 2.3 REVIEW OF LITERATURE ON ECONOMIC CONVERGENCE AND CHANGES IN THE SIMILARITIES IN THE TRADE STRUCTURES OF COUNTRIES

Another branch of the convergence literature focuses on the changes in the similarities in trade structures of countries and the relationship between international trade and economic convergence. When considering the literature on trade and convergence relationship, Rassekh (2004) provides a detailed literature survey of the studies that have examined the interplay of international trade, economic growth, and income convergence across economies.

In order to investigate the dynamics of trade and convergence, Ben-David and Loewy (1998) build a model which emphasizes the role that knowledge spillovers resulting from heightened trade can have on income convergence and growth rates during transition and over the long run. Among the results of the model, unilateral liberalization by one country is determined to reduce the income gap between the liberalizing country and other wealthier countries. From the long-run growth perspective, unilateral (and multilateral) liberalization is found to generate a positive impact on the steady-state growth of all the trading countries (Ben-David and Loewy, 1998).

A prominent work which suggests that trade can increase the gap between rich and poor countries and therefore result in divergence belongs to Young (1991). Young (1991) develops a learning by doing model which, although bounded in each good, exhibits spillovers across goods. The author uses this model to examine the impact of the free trade on the growth rates, rates of technical progress, and intertemporal consumer welfare of two economies, one of which is initially less technically advanced than the other. The author's results indicate that trade increases the income disparity between rich and poor countries because the benefits of learning by doing spill over across goods produced within an economy but not between economies. In a similar fashion Krugman and Venables (1995) propose that trade does not necessarily close the gap between the rich and the poor economies. At high transportation costs, all countries have some manufacturing but when transportation costs fall below a critical value a core-periphery pattern spontaneously forms and nations that find themselves in the periphery suffer a decline in real income which then leads to divergence among countries in question.

Sachs and Warner (1995) define a subset of countries that have sustained "appropriate" market-based economic policies during the period of observation, which is the 1970-1989 period. They classify each country in 1970 as either “open” or “closed” to international trade. The economy in question is considered to be closed if any of the following holds; otherwise, it is open: (1) the average tariff rate exceeds 40 percent, (2) non-tariff barriers cover more than 40 percent of imports, (3) socialist economy, (4) state monopoly of major exports, and (5) the black-market premium exceeding 20 percent. Then they examine whether there is a tendency towards economic convergence among this subset of qualifying countries during this sub-period. Their results indicate that open economies display a strong tendency towards economic convergence.

Ben-David (1996) examines the relationship between international trade and income convergence among countries by focusing on groups of countries comprising major trade partners. The author’s results indicate that grouping countries according to their primary trade affiliations tend to produce significant income convergence within the groups. Convergence of this magnitude is not a common outcome among these countries when they are grouped randomly instead of by their trade patterns. Furthermore, this convergence is not due to the inclusion of any one particular country, but is instead an outcome that tends to be relatively robust to the exclusion of trade partners that are members in most of the groups.

In an earlier study, Ben-David (1993) examines the effects of freer trade on income disparity among countries and attempts to shed some light on the issue by examining episodes of major postwar trade

liberalization within specified groups of countries. The author finds that per capita income dispersion among liberalizing countries decreased after liberalization started and as it is evidenced by the analysis of the world case, in the absence of free trade, there is no reason to assume convergence in income levels.

Edwards (1993) reviews the previous literature on trade policy in developing countries, trying to evaluate the extent to which the existing empirical evidence supports the view that more open and outward oriented economies have outperformed the countries with restrictive trade regimes. He analyzes the methodology used in this literature and evaluates the conceptual and theoretical models developed to investigate the relationship between trade orientation and growth. An important question that he addresses is whether the shift in views regarding protectionist policies to the contributions made by the academic literature on the subject can be traced. His analysis reveals that there is a positive relationship between trade liberalization and income convergence.

Slaughter (2001) focuses on four important post-1945 multilateral trade liberalizations (formation of the EEC, formation of the European Free Trade Area (EFTA), liberalization between the EEC and EFTA and the Kennedy round of the General Agreement on Tariffs and Trade (GATT)) in order to analyze whether trade liberalization cause per capita income convergence. The author uses a difference in differences approach which compares the convergence pattern among the liberalizing countries before and after liberalization with the convergence pattern among randomly chosen control countries before and after liberalization. The author's main empirical result is that trade

liberalization appears to have led to income divergence, rather than convergence.

Some studies use an extended period of time to investigate the relation between trade and convergence. Vamvakidis (2002) indicates that the empirical growth – trade openness connection has only focused on evidence after 1970 and hence it has limited usefulness in assessing the long term relation between trade and growth. The author seeks to fulfill this gap by estimating the impact of trade protection on growth using historical data from 1870 to 1990. He divides the investigation into four periods: 1870 to 1910, 1920 to 1940, 1950 to 1970, and 1970 to 1990. Growth regressions are estimated for the period 1920–1990 using cross country estimation methods, and correlations between openness and growth for earlier decades. The author finds that there is no relationship between trade openness and growth during the years 1870–1910 and 1950–1970; a negative relationship over the period 1920 to 1940; and a positive relationship only over the period 1970 to 1990. However, the significance of the positive correlation between trade openness and growth is sensitive to the proxy variable for trade openness and this demonstrates the need of constructing better measures for trade openness. Vamvakidis (2002) concludes as the impact of trade openness on convergence is not positive in periods before 1970; it may be suggested that in a protectionist world economy, being open to trade may not result in growth benefits.

An issue that attracted considerable attention regarding the relationship between convergence and trade has been the direction of causality between the two. Frankel and Romer (1999) approach the problem from a unidirectional perspective and try to investigate the impact of

international trade on standards of living. Frankel and Romer (1999) argue that the trade share should be viewed as an endogenous variable, and similarly for the other indicators such as trade policies. Therefore, the authors use IV methods to estimate the income-trade relationship. They propose geography as an alternative instrument for trade. In order to construct the instrument for international trade, they first estimate a bilateral trade equation and then aggregate the fitted values of the equation to estimate a geographic component of countries' overall trade. They find that these geographic characteristics are important determinants of countries' overall trade. As for the causation relationship, their results suggest that trade has a quantitatively large and robust, though only moderately statistically significant, positive effect on income. Similar to Frankel and Romer (1999), Cyrus (2004) approaches the problem from a unidirectional perspective and tries to investigate the direction of causality between international trade and cross-country income differences in several ways. The author first uses instruments for income in pooled gravity regressions to determine the effect of income differences on bilateral trade, and instruments for trade in regressions to determine the causes of income dispersion. Results of these cross-country estimations show that more similar countries trade more, while trade appears to increase dispersion. Second, the author performs fixed-effects regression, random-effects regression, and Granger causality tests which show that trade reduces income differences over time. Thus, the results indicate that while the postwar era has seen increasing trade and conditional convergence, the causality is bi-directional: convergence causes trade, and trade causes convergence.

When considering the convergence literature that focuses on the changes in the similarities in trade structures of countries, Zaghini (2003) analyzes the evolution of the trade specialization pattern in the ten countries (the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia, Malta and Cyprus) which will join the EU in 2004, by studying the dynamics of their comparative advantages over the period 1993-2000. The author finds that, although some countries are still broadly relying on natural resources, most of them enjoy significant comparative advantages in many manufactured goods.

Using detailed statistics, Crespo and Fontura (2007) analyze the transformation of CEECs' export structures and whether it led to structural convergence with the remaining EU members. They also analyze structural transformation within sectors in terms of quality ranges where the results show that, in general terms, CEECs have converged both at inter- and intra- sectoral levels towards pre-existing EU members.

For the Turkish case, Özdamar and Albeni (2009) measure Intra-Industry Trade levels for the foreign trade of capital and technology intensive products between Turkey and EU27 (the European Union of 27 member states) in the 2000-2008 period with the aim of analyzing if Turkey's development level is converging to the EU in terms of production quality, range and technology. The results of their study shows that there is no convergence of Turkey to the EU in Difficultly Imitable Research-Oriented Goods but Turkey and the EU have similar production structures in Capital-Intensive Goods and Easily Imitable

Research-Oriented Goods in terms of production quality, range and technology.

## 2.4 REVIEW OF LITERATURE ON PERFORMANCE OF COUNTRIES WITH RESPECT TO OCA

Some authors also analyze the convergence of countries by examining the performance of countries with respect to OCA criteria. Frankel (2004) states that, according to OCA theory, trade patterns and cyclical correlations are important criteria for whether a country should join a monetary area such as EMU. That is, a link to the euro, like accession to the EU, promotes trade with Western Europe, which in turn raises the cyclical correlation or cyclical convergence, which in turn makes the country in question a better candidate for EMU (Frankel, 2004).

Boreiko (2003) analyzes the empirical evidence on the topic of the readiness of CEECs to join EMU by using fuzzy clustering algorithm. The problem is split into two parts. The author, first looks at the Maastricht criteria as a set of requirements to be fulfilled by the applicants in order to qualify and finds support for the existence of a clear-cut structure in the data, i.e. several countries, among them all of the CEECs that have implemented the currency board arrangement (Bulgaria, Estonia, Lithuania), joined by Latvia and Slovenia, consistently outperforms the others in coming close to satisfying the Maastricht criteria. Secondly, Boreiko (2003) investigates the question of economic convergence of CEECs to the EU by analyzing their performance with respect to the OCA criteria and finds that only Slovenia and Estonia are leaders both in nominal and real

convergence. The author adds that the recent economic and restructuring performance of Poland is identified as the main reason for associating her with the other group of countries, which are not converging at such a fast rate to the EU economic area.

Frankel and Rose (1997) consider the relationship between two of the criteria used to determine whether a country is a member of an OCA. They state that from a theoretical viewpoint, the effect of increased trade integration on the cross-country correlation of business cycle activity is ambiguous. That is, reduced trade barriers can result in increased industrial specialization by the country and therefore more asynchronous business cycles resulting from industry-specific shocks. On the other hand, increased integration may result in more highly correlated business cycles because of common demand shocks or intra-industry trade. However Frankel and Rose (1997) assert that this ambiguity is theoretical rather than empirical. Using a panel of thirty years of data from twenty industrialized countries, Frankel and Rose (1997) find a strong positive relationship between the degree of bilateral trade intensity and the cross-country bilateral correlation of business cycle activity. In other words, greater integration historically has resulted in more highly synchronized cycles.

Fidrmuc and Korhonen (2001) examine the correlation of supply and demand shocks between CEECs and the Euro Area. Their purpose is to assess whether the EU accession countries belong to the same OCA as the current members of the monetary union. Meanwhile, they use data from the past decade to assess the similarity of the shocks within the Euro Area. As opposed to the previous studies where the correlation of shocks has been calculated against Germany or France,

they claim that a correlation with the Euro Area as a whole is the appropriate benchmark. Their findings indicate that for some accession countries like Hungary and Estonia, correlation of supply and demand shocks with the Euro Area does not differ much from the smaller Euro Area countries' correlation. On the other hand, for most of the countries the correlation of shocks remains very low.

## 2.5 REVIEW OF LITERATURE ON EMU MEMBERSHIP OF TURKEY

Due to the ongoing and extensive efforts for admission to the EU, the studies regarding the implications of a possible currency union membership of Turkey are specifically focused on EMU. These studies are generally aimed to answer the question of whether EMU is indeed an OCA for Turkey and try to estimate the implications of a possible EMU membership. Unfortunately as Utkulu (2006) mentions, these studies are limited in number. As stated in many other articles, Utkulu (2006) also states that, even though EMU is a success story it does not still form an OCA and adds that Turkey cannot join EMU in the short run.

Özer, Özkan and Aktan (2007) examines Turkey's position relative to European countries with respect to the OCA criteria, taking Germany as the center country and employing Mahalanobis distance[4] as a similarity

[4] Mahalanobis distance is a metric introduced by P.C Mahalanobis in 1936. The metric is based on correlations between variables by which different patterns can be identified and analyzed. It is a useful way of determining similarity of an unknown sample set to a known one. Mahalanobis distance differs from Euclidean distance in that it takes into account the correlations of the data set and is scale-invariant, i.e. not dependent on the scale of measurements ("Mahalanobis distance", 2010).

measure. Özer et al. (2007) construct their analysis under three cases in which they apply the Hodrick-Prescott (H-P) and the Baxter-King (B-K) filters[5] to industrial production series and real interest rates and then compute OCA similarity indices. They calculate countries' similarities with respect to Germany and their nearest neighbors, and compare the results. Results of the study show that, Turkey is the second furthest neighbor country to Germany after Croatia in the first two cases and she is the third furthest country to Germany after Norway and Romania in the third case.

Samsar (2003) investigates the supply and demand shocks according to OCA theory and in this context analyzes the potential costs and benefits of membership of EMU for Turkey and England. In his study, Samsar (2003) uses VAR model to identify the supply and demand shocks for nine EMU countries, Turkey and the UK and analyzes the speed of adjustment and the size of the shocks by adding Turkey and the UK to the EMU members. The results of his study support the view that under the OCA theory EMU is not an OCA. Even though the UK fits much better in the EMU than Turkey, Samsar (2003) states that it is a wise decision for them not to join the EMU because the EMU is not an OCA so Turkey has to wait to join the EMU. The author also reaches these results for Turkey and England in the first part of his study.

[5] For more detail see Baxter and King (1999), Hodrick and Presscot (1997) and Özer et al. (2007).

# CHAPTER 3

# EVALUATION OF TURKEY'S SIMILARITY TO SOME SELECTED COUNTRIES AND COUNTRY GROUPS FROM MACROECONOMIC PERSPECTIVE

In one of his articles, Kibritçioğlu (2003)[6], tries to find answers to how far Turkey is different than the 10 EU membership candidate countries (CC)[7], Cyprus and the EU countries in terms of ten selected macroeconomic indicators[8] between 1993 and 1997 and secondly to

[6] Kibritçioğlu, A. (2003). EMU, EURO and EU-Membership: An Evaluation from the Turkish Macroeconomic Perspective. *Macroeconomics 0301004, EconWPA, revised January 16 2003.*

[7] These countries were candidates of EU membership in that time period but today all of these countries are EU-member countries. In his paper, Kibritçioğlu (2003) divides these 10 candidate countries (CC) into two sub-groups which are "Candidate Countries 1 (CC1)" and "Candidate Countries 2 (CC2)" as the author thinks that the CC1 countries have more chances to participate the EU earlier than the CC2 countries because of the existing economic and political differences between these countries. CC1 countries are Poland, Hungary, the Czech Republic, Slovenia and Estonia; CC2 countries are Romania, Bulgaria, the Slovak Republic, Lithuania and Latvia.

[8] These indicators are consumer price inflation, unemployment rates, real GDP growth, population growth, current account balance to GDP ratio, general government balance to GDP ratio, nominal long-term interest rates, increase in money supply (M2 or M3), gross government debt stock to GDP ratio and growth rate of nominal exchange rates (unit price of the U.S. dollar in terms of national currencies).

what extent the introduction of the euro will affect the balance of payments accounts and foreign exchange rates in Turkey.

In this chapter, first section of Kibritçioğlu (2003)'s abovementioned study is extended in terms of time span and countries in question. The similarity and convergence of Turkey to some selected countries, mainly to the EU and Euro Area countries, with respect to her macroeconomic position is analyzed. In other words, Turkish similarity to 27 EU countries and 18 other countries in terms of 9 selected macroeconomic indicators[9,10] for the period between 1995 and 2008[11] is investigated. Furthermore, the sufficiency of Turkey for the EU and especially Eurozone membership is questioned from a macroeconomic point of view. The results are compared with those of new member countries (NMC)[12] and candidate member countries (CMC)[13] of the Eurozone with the aim of understanding whether second generation countries (SGC)[14] have more stable macroeconomic conditions than

[9] The selection of indicators was decided on both the availability and the reliability of data. Therefore, some of other relevant macroeconomic indicators were not utilized in comparisons due to data limitations.

[10] Within this analysis, Maastricht Criteria indicators are also covered, which are examined in detail for Turkey in Chapter 6. However, data of some of the indicators may vary due to different definitions of indicator's components in various resources.

[11] The time period stated here may change for some of the variables and/or countries because of missing data.

[12] We use "New Member Countries (NMC)" term for the countries which have joined Eurozone not at the time of its first introduction but have joined after then, namely; Greece, Slovenia, Malta, Cyprus and Slovakia.

[13] "Candidate Member Countries (CMC)" consists of current ERM II member countries (Estonia, Lithuania, Latvia, and Denmark) and the countries which are obliged to join ERM II (Bulgaria, the Czech Republic, Hungary, Romania, Poland, Sweden).

[14] Second Generation Countries (SGC) = CMC + NMC

Turkey and whether their macroeconomic conditions are more similar to the Eurozone and the EU than that of Turkey's.

## 3.1 SIMILARITY IN TERMS OF CORRELATIONS OF THE MACROECONOMIC INDICATORS

In Table 3-1, annual averages of the 9 basic macroeconomic indicators for specific periods are presented for Turkey and 45 other countries[15]. The selected indicators are the annual averages of current account balance, total central government debt and general government balance over GDP ratios; consumer price inflation (CPI), unemployment rate, real GDP (Gross Domestic Product) growth, population growth, exchange rate[16] change and lastly long term interest rates. As can be seen in Table 3-1, Turkey has the highest average long term interest rates within all selected countries and country groups with a rate of 44.38%. Furthermore, Bulgaria has the maximum CPI (94.88%) and maximum exchange rate increase (57.93%); Japan has the minimum CPI (0.06%), minimum real GDP growth (1.23%) and maximum total central government debt over GDP (147.38%); Latvia has the minimum population growth (-0.74%) and maximum current account deficit over GDP (-10.01%); Norway has the maximum current account balance

[15] In addition to the 27 EU member countries, 2 EU candidate countries (Croatia and Macedonia), Switzerland (whose negotiations are frozen due to public opinion), Morocco (whose application was rejected by the EU council in 1987), Norway (who rejected to join the EU by referendum in 1992) and lastly most of the G20 countries are also added as reference countries.

[16] National currency per U.S. $ period average (For Euro Area member countries, exchange rate data is calculated as 'national currency per U.S. $' until membership and 'Euro per U.S $' after membership).

over GDP (11.40%) and maximum public sector borrowing requirement over GDP (11.32%) within all selected countries and country groups. Moreover, Macedonia has the maximum unemployment rate (34.35%), China has the maximum real GDP growth (9.68%), South Africa has the maximum population growth (1.72%), Mexico has the minimum unemployment rate (2.89%), Brazil has the minimum long term interest rate (0.81%), Luxembourg has the minimum total central government debt over GDP (1.86%), Lithuania has the minimum exchange rate increase (-3.84%), Albania has the minimum public sector borrowing requirement over GDP (-7.08%).

| | Consumer Price Inflation (1995-2008*) | Unemployment Rate (1995-2008*) | Real GDP Growth (1995-2008*) | Population Growth (1995-2008*) | Current Account Balance as % of GDP (1995-2008*) | Exchange Rate Change (1995-2008*) | Long Term Interest Rates (2001-2006*) | Total Central Government Debt as % of GDP (2001-2006*) | General Government Balance % of GDP (1997-2007*) |
|---|---|---|---|---|---|---|---|---|---|
| **Albania** | 7,10 | 14,96 | 6,16 | -0,06 | -5,63 | 0,01 | | 60,67 | -7,08 |
| **Argentina** | 5,96 | 13,59 | 3,29 | 1,06 | 0,44 | 16,10 | | | |
| **Austria** | 1,88 | 6,68 | 2,43 | 0,36 | 0,36 | -0,15 | 4,25 | 61,07 | -1,81 |
| **Belgium** | 2,03 | 11,35 | 2,21 | 0,39 | 3,80 | -0,12 | 4,27 | 94,32 | -0,61 |
| **Brazil** | 11,48 | 8,87 | 3,09 | 1,33 | -1,57 | 7,00 | 0,81 | | |
| **Bulgaria** | 94,88 | 12,66 | 3,21 | -0,69 | -7,74 | 57,93 | 5,12 | 42,35 | 1,21 |
| **Canada** | 2,07 | 7,57 | 3,02 | 1,00 | 1,22 | -1,79 | 5,08 | 33,99 | 0,99 |
| **China,P.R.** | 3,19 | 3,63 | 9,68 | 0,76 | 4,22 | -1,37 | 2,14 | 18,25 | |
| **Croatia** | 3,73 | 12,45 | 4,17 | -0,43 | -6,30 | -0,03 | 7,28 | | -4,50 |
| **Cyprus** | 2,89 | 3,56 | 3,82 | 1,56 | -3,96 | -0,64 | 5,53 | 126,10 | -3,02 |
| **Czech Republic** | 4,73 | 7,20 | 3,40 | 0,06 | -4,10 | -2,85 | 3,60 | 19,84 | -4,10 |
| **Denmark** | 2,18 | 5,74 | 1,96 | 0,38 | 1,89 | -0,35 | 3,91 | 45,38 | 1,89 |
| **Estonia** | 8,37 | 9,39 | 6,42 | -0,69 | -9,76 | 1,15 | 6,08 | 2,66 | 0,70 |
| **Euro Area** | 3,03 | 8,67 | 3,32 | 0,62 | -0,67 | -0,27 | 4,43 | 57,41 | -1,64 |
| **Finland** | 1,64 | 11,50 | 3,62 | 0,31 | 5,67 | -0,18 | 4,23 | 40,71 | 3,11 |
| **France** | 1,67 | 9,53 | 2,11 | 0,56 | 0,90 | -0,46 | 4,26 | 51,35 | -2,67 |
| **Germany** | 1,58 | 10,39 | 1,54 | 0,07 | 2,10 | -0,15 | 3,96 | 38,14 | -2,25 |
| **Greece** | 4,32 | 10,10 | 3,71 | 0,44 | -7,37 | 0,48 | 4,43 | 108,11 | -4,61 |
| **Hungary** | 10,82 | 7,38 | 3,48 | -0,17 | -6,82 | 3,23 | 7,30 | 56,00 | -6,49 |
| **India** | 6,34 | 6,25 | 6,90 | 1,56 | -0,71 | 2,44 | 6,80 | 60,67 | |
| **Indonesia** | 13,03 | 7,89 | 3,91 | 1,31 | 1,60 | 21,23 | 11,80 | 58,53 | |
| **Ireland** | 3,48 | 6,39 | 6,73 | 1,58 | -0,85 | -0,81 | 4,22 | 25,84 | 1,64 |
| **Italy** | 2,63 | 9,16 | 1,38 | 0,37 | -0,23 | -1,25 | 4,38 | 98,24 | -2,73 |
| **Japan** | 0,06 | 4,30 | 1,23 | 0,16 | 2,97 | 1,14 | 1,36 | 147,38 | -5,89 |
| **Korea, Republic of** | 3,61 | 3,74 | 4,78 | 0,64 | 1,61 | 3,91 | 5,37 | 22,84 | 0,73 |
| **Latvia** | 8,07 | 8,03 | 6,15 | -0,74 | -10,01 | -0,60 | 5,12 | 12,10 | -1,22 |
| **Lithuania** | 7,48 | 8,14 | 5,95 | -0,60 | -8,95 | -3,84 | 5,30 | 19,46 | -2,84 |
| *** For some of variables and countries, because of the insufficiency in data, the time period changes.** | | | | | | | | | |

Table 3-1 Annual Averages of Some Macroeconomic Indicators for Selected Countries and Country Groups and for Selected Years[17, 18]

[17] Years that are specified under each variable are selected according to the availability of the relevant data for most of the countries.

| | Consumer Price Inflation (1995-2008*) | Unemployment Rate (1995-2008*) | Real GDP Growth (1995-2008*) | Population Growth (1995-2008*) | Current Account Balance as % of GDP (1995-2008*) | Exchange Rate Change (1995-2008*) | Long Term Interest Rates (2001-2006*) | Total Central Government Debt as % of GDP (2001-2006*) | General Government Balance % of GDP (1997-2007*) |
|---|---|---|---|---|---|---|---|---|---|
| **Luxembourg** | 2,12 | 3,43 | 4,35 | 1,38 | 10,16 | -0,12 | 3,57 | 1,86 | 2,57 |
| **Macedonia, FYR** | 3,56 | 34,35 | 2,57 | 0,36 | -5,18 | 1,31 | | 40,32 | -1,04 |
| **Malta** | 2,64 | 6,05 | 3,08 | 0,69 | -6,59 | -1,22 | 5,10 | 67,13 | -6,09 |
| **Mexico** | 12,10 | 2,89 | 2,86 | 1,23 | -1,65 | 4,51 | 9,04 | 20,99 | |
| **Morocco** | 2,26 | 13,61 | 3,87 | 1,31 | 0,39 | -0,54 | 5,88 | 64,80 | |
| **Netherlands** | 2,17 | 4,92 | 2,78 | 0,47 | 5,47 | -0,10 | 4,26 | 41,94 | -0,50 |
| **Norway** | 2,11 | 3,78 | 2,95 | 0,68 | 11,40 | -0,62 | 4,66 | 17,75 | 11,32 |
| **Poland** | 8,12 | 14,81 | 4,82 | -0,06 | -3,52 | 0,49 | 5,77 | 42,57 | -4,22 |
| **Portugal** | 2,95 | 6,23 | 2,31 | 0,43 | -7,90 | -0,39 | 4,31 | 62,65 | -3,51 |
| **Romania** | 34,92 | 7,88 | 3,79 | -0,47 | -7,20 | 26,49 | | 21,25 | -2,64 |
| **Russian Federation** | 35,82 | 9,13 | 4,06 | -0,31 | 7,58 | 21,56 | 11,08 | 25,43 | 1,88 |
| **Slovak Republic** | 6,60 | 13,61 | 5,37 | 0,09 | -6,13 | -1,88 | 5,49 | 34,46 | -4,27 |
| **Slovenia** | 6,70 | 11,88 | 4,28 | 0,13 | -1,73 | 3,05 | 4,68 | 26,65 | -0,96 |
| **South Africa** | 5,92 | 23,46 | 3,57 | 1,72 | -2,51 | 7,67 | 9,67 | 37,27 | |
| **Spain** | 3,16 | 14,00 | 3,45 | 1,06 | -4,35 | -0,32 | 3,89 | 39,91 | -0,49 |
| **Sweden** | 1,37 | 6,09 | 2,87 | 0,39 | 4,90 | -0,21 | 4,42 | 46,94 | 1,13 |
| **Switzerland** | 1,00 | 3,41 | 1,82 | 0,64 | 10,29 | -0,33 | 2,60 | 27,10 | -0,07 |
| **Turkey** | **45,26** | **8,58** | **4,61** | **1,36** | **-2,43** | **34,69** | **44,38** | **59,78** | **-6,49** |
| **United Kingdom** | 2,89 | 5,91 | 2,79 | 0,44 | -1,80 | -1,04 | 4,61 | 40,64 | -1,48 |
| **United States** | 2,70 | 5,05 | 2,82 | 1,04 | -3,95 | | 4,50 | 34,78 | -1,76 |
| **EU 27 average** | 8,60 | 8,59 | 3,63 | 0,29 | -2,36 | 2,82 | 4,69 | 46,95 | -1,64 |
| **NMC**** | 4,63 | 9,04 | 4,05 | 0,58 | -5,16 | -0,04 | 5,05 | 72,49 | -3,79 |
| **CMC**** | 18,90 | 8,88 | 4,29 | -0,27 | -4,94 | 8,69 | 4,92 | 28,06 | -1,12 |
| **SGC**** | 15,43 | 9,28 | 4,42 | -0,04 | -6,45 | 6,29 | 5,29 | 44,51 | -2,96 |

*** For some of variables and countries, because of the insufficiency in data, the time period changes.**
****NMCs are Malta, Slovenia, Slovakia, Cyprus and Greece; CMCs are Denmark, Estonia, Bulgaria, Poland, Lithuania, Romania, Latvia, Czech, Hungary and Sweden and SCG=NMC+CMC**

Table 3-1 (cont'd) Annual Averages of Some Macroeconomic Indicators for Selected Countries and Country Groups and for Selected Years (Sources: IMF, WB, UN, EUROSTAT, OECD, EBRD, own calculations and some other financial websites) [17, 18]

[18] In some of the cases, limitations in data are partially eliminated by using some other data sources which are stated in the references part.

In addition, to be able to see the overall picture more clearly and analyze the data easier, as Kibritçioğlu (2003) does, the relative macroeconomic positions of some of the countries which are presented in Table 3-1 are arranged in groups and compared through Figure 3-1 to Figure 3-4[19]. The rectangles shaded in each of these graphs present the data combinations which belong to the EU countries, Euro Area countries and the SGCs. The rectangle in green color represents the data combinations that belong to the EU countries, the rectangle in purple color represents the data combinations that belong to the Euro Area countries and the rectangle in orange color represents the data combinations that belong to the SGCs. Since each rectangle represents all of the possible data combinations in a group of countries, it can be assumed that the bigger surface areas[20] for a certain group indicate smaller similarity between the members of the group in terms of the related macroeconomic indicators.

In Figure 3-1, annual averages of CPIs and unemployment rates for some selected countries and country groups, between 1995 and 2008 are given[21]. When consumer price inflation data is considered, it is seen that Bulgaria has the highest CPI within both EU members and SGCs

[19] In this grouping USA, Japan, China and the Russian Federation are also added as reference countries in the graphs. Because, when all countries in the world are sorted according to their GDP (the U.S. $) value in 2008 (as 2008 is the latest year in our analysis, it is selected as reference year), these countries are within the 8 countries with the highest ranking in the world. See APPENDIX A for detailed ranking of these countries.

[20] More detail on surface areas of each group of countries is provided in APPENDIX B.

[21] These two variables are paired because this matching is performed widely in the literature as it is generally assumed that there exists a relationship between these two. There is also a widely-used fundamental concept called the Philips curve, discovered by Professor A. W. Phillips, which describes the relationship between inflation and unemployment.

with a rate of 94.88%. In addition, Slovenia has the highest CPI within the Eurozone countries with a rate of 6.70%. Although, Turkey has higher average CPI rate (45.26%) than other countries except Bulgaria, this is not the case for unemployment rate averages. It can be seen that Turkey has an average unemployment rate of 8.58% between 1995 and 2008 which is lower than the mean of the average unemployment rates of CMCs (8.88%), NMCs (9.04%), SGCs (9.28%), the EU member countries (8.59%) and lastly Eurozone member countries (8.67%) for the same period. Furthermore, Poland has the highest unemployment rate (14.81%) within both the EU member countries and SGCs and Spain has the highest unemployment rate (14.00%) within Euro Area member countries.

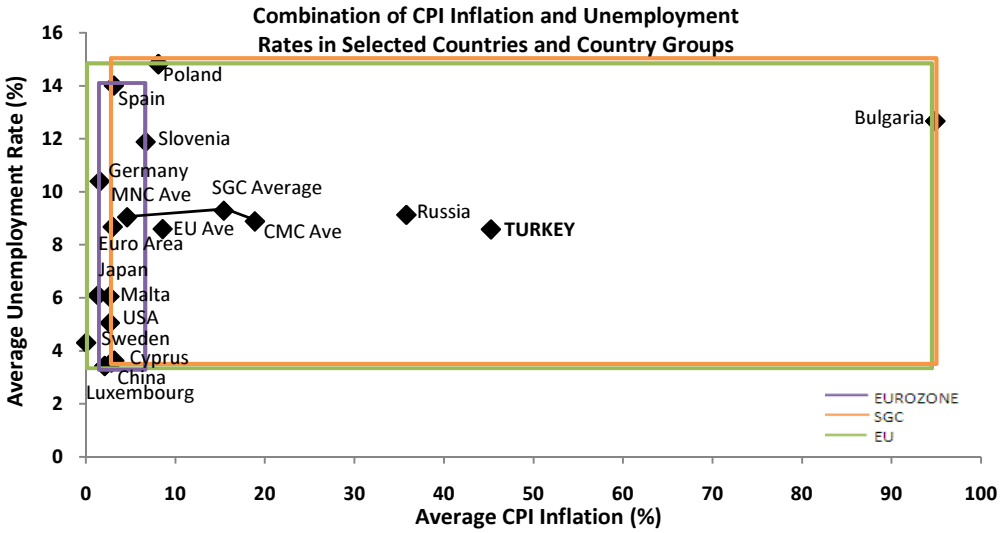



Figure 3-1 Annual Averages of CPI Change and Unemployment Rate for Selected Countries

| | CPI Inflation (in %) | Unemployment Rate (in %) | Country |
|---|---|---|---|
| EU (min CPI change) | 1,37 | 6,09 | SWEDEN |
| EU (max CPI change) | 94,88 | 12,66 | BULGARIA |
| EU (min unemployment) | 2,12 | 3,43 | LUXEMBOURG |
| EU (Max unemployment) | 8,12 | 14,81 | POLAND |
| EU average | 8,60 | 8,59 | |
| SGC (min CPI change) | 2,64 | 6,05 | MALTA |
| SGC (max CPI change) | 94,88 | 12,66 | BULGARIA |
| SGC (min unemployment) | 2,89 | 3,56 | CYPRUS |
| SGC (max unemployment) | 8,12 | 14,81 | POLAND |
| SGC Average | 15,43 | 9,28 | |
| EUROZONE (min CPI change) | 1,58 | 10,39 | GERMANY |
| EUROZONE (max CPI change) | 6,70 | 11,88 | SLOVENIA |
| EUROZONE (min unemployment) | 2,12 | 3,43 | LUXEMBOURG |
| EUROZONE (max unemployment) | 3,16 | 14,00 | SPAIN |
| EUROZONE Average | 3,03 | 8,67 | |
| NMC Average | 4,63 | 9,04 | |
| CMC Average | 18,90 | 8,88 | |
| TURKEY | 45,26 | 8,58 | |
| Japan | 0,06 | 4,30 | |
| USA | 2,70 | 5,05 | |
| China P.R | 3,19 | 3,63 | |
| Russia | 35,82 | 9,13 | |

| | CPI Inflation (%) | Unemployment Rate (%) |
|---|---|---|
| EU (min) | SWEDEN | LUXEMBOURG |
| EU (max) | BULGARIA | POLAND |
| SGC (min) | MALTA | CYPRUS |
| SGC (max) | BULGARIA | POLAND |
| EUROZONE (min) | GERMANY | LUXEMBOURG |
| EUROZONE (max) | SLOVENIA | SPAIN |

Table 3-2 Data for Figure 3-1
(Sources: IFS, LABORSTA)

In Figure 3-2, annual averages of GDP growth and population growth for some selected countries and country groups, between 1995 and

2008 are given[22]. It is noteworthy that Turkey is located inside of all 3 rectangles in Figure 3-2 with an average GDP growth of 4.61% and an average population growth of 1.36%. Moreover, mean of the average GDP growth of CMCs is 4.29%, mean of the average GDP growth of NMCs is 4.05%, mean of the average GDP growth of SGCs is 4.42%, mean of the average GDP growth of the EU member countries is 3.63% and lastly mean of the average GDP growth of Eurozone member countries is 3.32% and all of these rates are lower than the average GDP growth of Turkey for the same period. In addition, mean of the average population growth of CMCs is -0.27%, mean of the average population growth of NMCs is 0.58%, mean of the average population growth of SGCs is -0.04%, mean of the average population growth of the EU member countries is 0.29% and lastly mean of the average population growth of Eurozone member countries is 0.62%. Again all of these rates are lower than the Turkish average population growth for the same period. When looked at the country groups in detail, it can be seen that Italy has the minimum average GDP growth (1.38%) and Ireland has the maximum average GDP growth (6.73%) within both Euro Area and the EU member countries. Furthermore, Malta has the minimum average GDP growth (3.8%) and Estonia has the maximum average GDP growth (6.42%) within SGCs.

[22] As there exists a vast literature on examination of the level of correlation between population growth rate and GDP growth rate indicators, these two indicators are paired together in Figure 3-2.

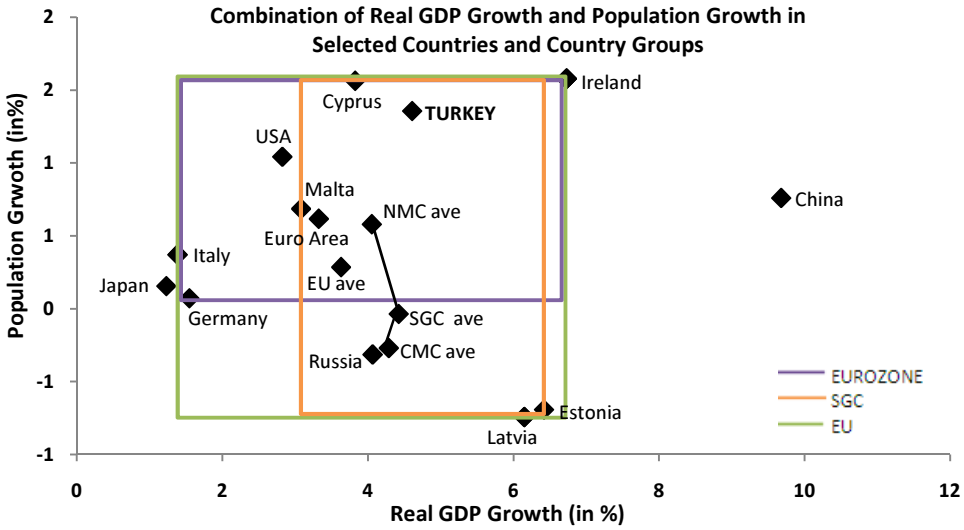



Figure 3-2 Annual Averages of Real GDP Growth and Population Growth for Selected Countries

| | Real GDP Growth Rate (in %) | Population Growth Rate (in %) | Country |
|---|---|---|---|
| EU (min GDP Growth) | 1,38 | 0,37 | ITALY |
| EU (max GDP Growth) | 6,73 | 1,58 | IRELAND |
| EU (min Population Growth) | 6,15 | -0,74 | LATVIA |
| EU (max Population Growth) | 6,73 | 1,58 | IRELAND |
| EU average | 3,63 | 0,29 | |
| SGC (min GDP Growth) | 3,08 | 0,69 | MALTA |
| SGC (max GDP Growth) | 6,42 | -0,69 | ESTONIA |
| SGC (min Population Growth) | 6,15 | -0,74 | LATVIA |
| SGC (max Population Growth) | 3,82 | 1,56 | CYPRUS |
| SGC Average | 4,42 | -0,04 | |
| EUROZONE (min GDP Growth) | 1,38 | 0,37 | ITALY |
| EUROZONE (max GDP Growth) | 6,73 | 1,58 | IRELAND |
| EUROZONE (min Population Growth) | 1,54 | 0,07 | GERMANY |
| EUROZONE (max Population Growth) | 6,73 | 1,58 | IRELAND |
| EUROZONE Average | 3,32 | 0,62 | |
| NMC Average | 4,05 | 0,58 | |
| CMC Average | 4,29 | -0,27 | |
| TURKEY | 4,61 | 1,36 | |
| Japan | 1,23 | 0,16 | |
| USA | 2,82 | 1,04 | |
| China P.R | 9,68 | 0,76 | |
| Russia | 4,06 | -0,31 | |

| | Real GDP Growth Rate (in %) | Population Growth Rate (in %) |
|---|---|---|
| EU (min) | ITALY | LATVIA |
| EU (max) | IRELAND | IRELAND |
| SGC (min) | MALTA | LATVIA |
| SGC(max) | ESTONIA | CYPRUS |
| EUROZONE (min) | ITALY | GERMANY |
| EUROZONE (max) | IRELAND | IRELAND |

Table 3-3 Data for Figure 3-2

(Sources: WDI,UNECE)

In Figure 3-3, annual averages of current account balance over GDP ratios between 1995 and 2008 and general government balance over GDP ratios between 1997 and 2007 are given for some selected

countries and country groups[23]. When Table 3-1 and Figure 3-3 are evaluated together, it can be seen that Turkey has twin deficits for the specified time period. Furthermore, even though she has relatively low level of current account deficit/GDP ratio (2.43%), she has the highest level of general government deficit/GDP ratio (6.49%) after Albania. However, high level of average general government deficit over GDP ratio of Turkey mostly stems from the early years of the period considered, i.e. even though the average general government deficit is higher in 90s, with the help of the stability programs applied mainly after 2000, it decreases considerably in the process of time. Moreover, it is important to note that all of the SGCs (except Sweden) have also twin deficits for the same period.

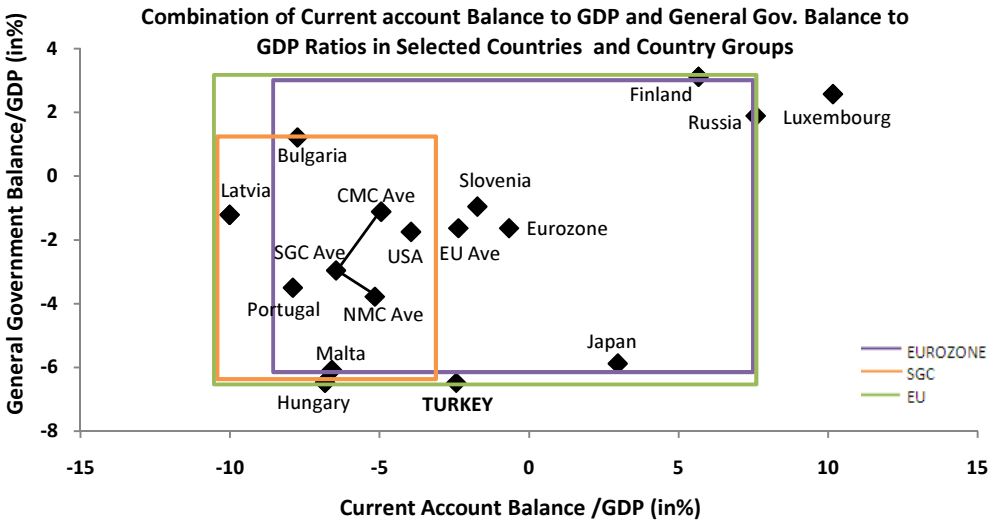



Figure 3-3 Annual Averages of Current Account Balance to GDP and General Government Balance to GDP for Selected Countries

[23] There exists "twin deficits hypothesis" that claims a strong relationship between current account and general government balances of a country and this hypothesis is studied considerably in the literature which is why these two indicators are paired together in the present study.

| | Cur. Acc. B./GDP (in %) | Gen.Gov. B./GDP (in %) | Country |
|---|---|---|---|
| EU (min Cur. Acc. B./GDP) | -10,01 | -1,22 | LATVIA |
| EU ( max Cur. Acc. B./GDP) | 10,16 | 2,57 | LUXEMBOURG |
| EU (min Gen.Gov. B./GDP) | -6,82 | -6,49 | HUNGARY |
| EU (Max Gen.Gov. B./GDP) | 5,67 | 3,11 | FINLAND |
| EU average | -2,36 | -1,64 | |
| SGC (min Cur. Acc. B./GDP) | -10,01 | -1,22 | LATVIA |
| SGC (max Cur. Acc. B./GDP) | -1,73 | -0,96 | SLOVENIA |
| SGC (min Gen.Gov. B./GDP) | -6,82 | -6,49 | HUNGARY |
| SGC (max Gen.Gov. B./GDP) | -7,74 | 1,21 | BULGARIA |
| SGC Average | -6,45 | -2,96 | |
| EUROZONE (min Cur. Acc. B./GDP) | -7,90 | -3,51 | PORTUGAL |
| EUROZONE (max Cur. Acc. B./GDP) | 10,16 | 2,57 | LUXEMBOURG |
| EUROZONE (min Gen.Gov. B./GDP) | -6,59 | -6,09 | MALTA |
| EUROZONE (max Gen.Gov. B./GDP) | 5,67 | 3,11 | FINLAND |
| EUROZONE Average | -0,67 | -1,64 | |
| NMC Average | -5,16 | -3,79 | |
| CMC Average | -4,94 | -1,12 | |
| TURKEY | -2,43 | -6,49 | |
| Japan | 2,97 | -5,89 | |
| USA | -3,95 | -1,76 | |
| China P.R | 4,22 | | |
| Russia | 7,58 | 1,88 | |

| | Cur. Acc. B./GDP (in%) | Gen. Gov. B./GDP (in %) |
|---|---|---|
| EU( min) | LATVIA | HUNGARY |
| EU( max) | LUXEMBOURG | FINLAND |
| SGC (min) | LATVIA | HUNGARY |
| SGC(max) | SLOVENIA | BULGARIA |
| EUROZONE (min) | PORTUGAL | MALTA |
| EUROZONE (max) | LUXEMBOURG | FINLAND |

Table 3-4 Data for Figure 3-3
(Sources: BOPS, WEO, EBRD)

Looking at the country groups data in detail, it is seen that Latvia has the lowest current account balance/GDP ratio (-10.01%) within the EU member countries and Portugal has the lowest current account balance/GDP ratio (-7.90%) within Eurozone member countries.

Luxembourg has the highest current account balance/GDP ratio (10.16%) within both the EU member countries and Eurozone member countries. Moreover, all of the SGCs have negative average current account balances for the same period where Slovenia has the lowest current account deficit/GDP ratio (-1.73%) and Latvia has the highest current account deficit/GDP ratio (-10.01%). For the case of general government balances, Hungary has the highest general government deficit/GDP ratio (-6.49%) within both the EU member countries and SGCs. Finland has the highest general government surplus/GDP ratio (3.11%) within the EU member countries and Bulgaria has the highest general government surplus/GDP ratio (1.21%) within SGCs. For Eurozone member countries, Malta has the highest general government deficit/GDP ratio (-6.09%) and Finland has the highest general government surplus/GDP ratio (3.11%). Another notable point in Figure 3-3 is that the mean values for the averages of current account balance/GDP and general government balance/GDP ratios for all of the SGCs, NMCs, CMCs, Euro Area and the EU member countries are negative.

Lastly in Figure 3-4, annual averages of central government debt over GDP ratios between 2001 and 2006 and annual average exchange rate changes between 1995 and 2008 are given for some selected countries and country groups[24]. When Table 3-1 and Figure 3-4 are interpreted together, it is seen that, Turkey (34.69%) takes the second place after Bulgaria (57.93%) in the ranking of average change in exchange rates

[24] As there are many studies about whether government debt affects exchange rates, these two indicators are paired in Figure 3-4.

between 1995 and 2008 where Bulgaria has the highest average exchange rate appreciation within both SGCs and the EU member countries. However in Eurozone, the highest average exchange rate change remains only at 3.05% (Slovenia). Lithuania has the highest exchange rate decrease (-3.84%) in both of the SGCs and the EU-countries; additionally Slovak Republic has highest exchange rate decrease (-1.88%) in Euro area member countries. When central government debt over GDP ratios is taken into consideration, it is seen than Cyprus has the maximum central government debt over GDP ratio (126.10%) within all SGCs, Euro Area member countries and the EU member countries. What is more, Estonia has the lowest central government debt over GDP ratio (2.66 %) within SGCs and Luxembourg has the lowest central government debt over GDP ratio (1.86 %) within both the EU and Eurozone member countries. When examining the mean values of averages of central government debt/GDP ratio, NMCs have the highest mean value (72.49%) for the average of central government debt/GDP ratio, NMCs has the second highest (72.49%), Eurozone has the third highest (57.41%), the EU has the fourth highest (46.95%) and lastly SGCs has the lowest mean value (44.51%) for the average of central government debt/GDP ratio. On the other hand, CMCs have the highest mean value (8.69%) for the average of exchange rate change data, SGCs has the second highest (6.29%), and the EU has the third highest mean value (2.82%) for the average of exchange rate change data. NMCs and Eurozone member countries have negative average exchange rate changes throughout the period where the average mean value of exchange rate change for MNCs is -0.24% and Eurozone is -0.27%.

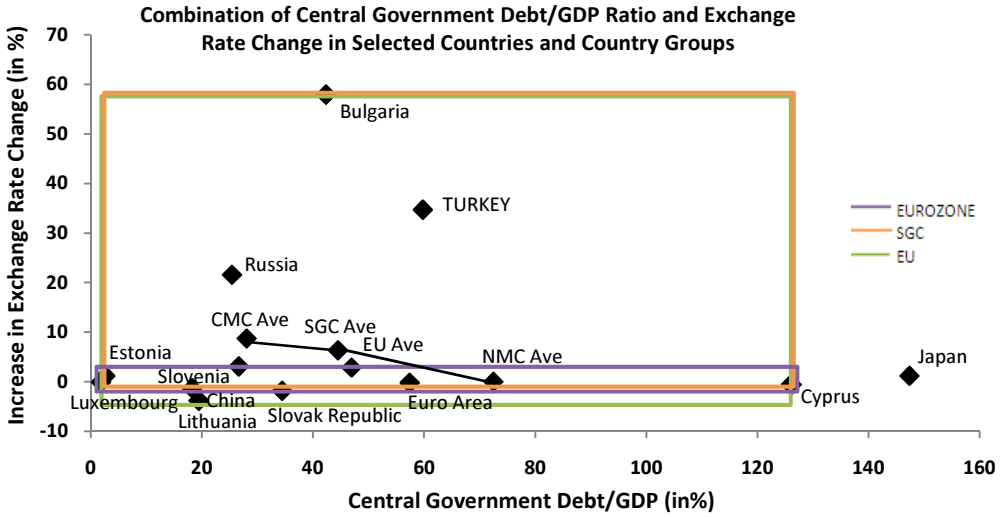



Figure 3-4 Annual Averages of Central Government Debt to GDP Ratio and Exchange Rate Change[25] for Selected Countries

A detailed analysis of the graphs through Figure 3-1 to Figure 3-4 indicates that the rectangles representing the Euro Area countries in Figure 3-1 and Figure 3-4 have significantly smaller surface areas than that of the SGCs. On the other hand, for Figure 3-2 and Figure 3-3, surface areas are bigger for Euro Area countries than for SGCs where there is only a negligible difference in Figure 3-2. Considering that many of the Euro Area countries are initial members of the EU with relatively strong economies, this fact can be interpreted as an indication of the advanced macroeconomic convergence between the former EU members in comparison to that of the SGCs. Another observation can be the similar surface areas for the EU countries and SGCs. A careful

[25] We took exchange rate data from UNSTAT database for all countries and calculated exchange rate change data individually.

inspection of data reveals that the recent EU members mainly determine the corners of the rectangles for the EU countries and SGCs. Therefore the similar surface areas for the EU countries and SGCs for each indicator may be attributed to these recent EU members that are present in both of the groups.

| | CGD/GDP (in %) | ER Increase (in %) | Country |
|---|---|---|---|
| EU (min CGD/GDP) | 1,86 | -0,12 | LUXEMBOURG |
| EU (max CGD/GDP) | 126,10 | -0,64 | CYPRUS |
| EU (min ER Increase) | 19,46 | -3,84 | LITHUANIA |
| EU (max ER Increase) | 42,35 | 57,93 | BULGARIA |
| EU average | 46,95 | 2,82 | |
| SGC (min CGD/GDP) | 2,66 | 1,15 | ESTONIA |
| SGC (max CGD/GDP) | 126,10 | -0,64 | CYPRUS |
| SGC (min ER Increase) | 19,46 | -3,84 | LITHUANIA |
| SGC (max ER Increase) | 42,35 | 57,93 | BULGARIA |
| SGC Average | 44,51 | 6,29 | |
| EUROZONE (min CGD/GDP) | 1,86 | -0,12 | LUXEMBOURG |
| EUROZONE (max CGD/GDP) | 126,10 | -0,64 | CYPRUS |
| EUROZONE (min ER Increase) | 34,46 | -1,88 | SLOVAK REPUBLIC |
| EUROZONE (max ER Increase) | 26,65 | 3,05 | SLOVENIA |
| EUROZONE Average | 57,41 | -0,27 | |
| NMC Average | 72,49 | -0,04 | |
| CMC Average | 28,06 | 8,69 | |
| TURKEY | 59,78 | 34,69 | |
| Japan | 147,38 | 1,14 | |
| USA | 34,78 | | |
| China P.R | 18,25 | -1,37 | |
| Russia | 25,43 | 21,56 | |

| | CGD/GDP (in %) | ER Increase (in %) |
|---|---|---|
| EU (min) | LUXEMBOURG | LITHUANIA |
| EU (max) | CYPRUS | BULGARIA |
| SGC (min) | ESTONIA | LITHUANIA |
| SGC (max) | CYPRUS | BULGARIA |
| EUROZONE (min) | LUXEMBOURG | SLOVAK REPUBLIC |
| EUROZONE (max) | CYPRUS | SLOVENIA |

Table 3-5 Data for Figure 3-4
(Sources: OECD, WDI, IMF publications, UNSTAT)

In order to have a better understanding of Turkey's relative position to Euro Area countries and SGCs, a more detailed analysis in terms of each separate macroeconomic indicator is required. Our data indicates that typical negative macroeconomic characteristic features of the Turkish economy compared to these country groups are higher CPI rates, higher population growth, higher general government deficit over GDP ratios, higher exchange rate changes and higher total central government debt over GDP ratios. On the other hand, Turkish economy has lower unemployment rates, higher real GDP growth and comparable or relatively lower current account deficit over GDP ratios.

In terms of the combinations in Figure 3-1 to Figure 3-4, Turkey's location is always inside the EU's rectangle and SGCs' rectangle for all graphs. This indicates that in each group of countries, there exists at least one country with worse performance for every selected macroeconomic indicator and Turkey's performance indicator is not fully deviant. At this point, it is interesting to note that the results for the EU - Turkey similarity are significantly different than that of Kibritçioğlu (2003), where there are distinct dissimilarities in indicators of the EU countries and that of Turkey. This phenomenon may be attributed to inclusion of the recent EU members with similar or worse economic performances than that of Turkey. However, that kind of dissimilarity still exists between Turkey and Euro Area countries, i.e. it can be stated that, through time Turkish similarity to the EU increased however, this similarity still is not at the desired level.

Similar to Kibritçioğlu (2003), the simple correlation technique is utilized to measure the degree of similarity or convergence between the selected countries and country groups. Kibritçioğlu (2003) assumes that

the figures in the rows of the Table 3-1 can be perceived as a data vector which implies the macroeconomic characteristics or structure of the relevant individual country. Therefore, by using 9 macroeconomic data of countries and country groups represented in Table 3-1, the correlation coefficients between each country and country groups are derived and presented in Table 3-6. In Table 3-6, each cell represents the correlation coefficient between countries in the corresponding row and column.

Additionally, in Table 3-7 the correlation coefficients of Turkey, EU27 (average) and Euro Area (average), which are calculated in Table 3-6, are given separately, to be able to analyze the data in detail. The relatively high correlation coefficient of 0.85 between Turkey and CMCs in Table 3-7-a) indicates that Turkey's macroeconomic conditions seem similar to that of most of the CMCs. When the rank of each of the CMCs in Table 3-7-a) is considered, it is seen that Romania, Hungary, Bulgaria, Poland and the Czech Republic have significant similarities with Turkey. It can also be seen in Table 3-7-a) that, Turkey has a correlation coefficient of 0.79 with SGCs, 0.70 with EU27, and lastly 0.64 with NMCs.

| | Alb | Arg | Aus | Bel | Bra | Bul | Can | Chi | Cro | Cyp | Cze | Den | Est | Euro | Fin | Fra | Ger | Gre | Hun | India | Indo | Ire | Ita | Jap | Korea | Lat | Lit | Lux | Mac | Mal | Mex | Mor | Net | Nor | Pol | Por | Rom | Rus | Slvk | Slvn | S.Afr | Spa | Swe | Swit | Tur | UK | US | EU27 | NMC | CMC | SGC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alb | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Arg | 0,47 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aus | 0,97 | 0,36 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bel | 0,97 | 0,30 | 1,00 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bra | 0,73 | 0,67 | 0,29 | 0,20 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bul | 0,28 | 0,44 | 0,20 | 0,19 | 0,83 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Can | 0,98 | 0,09 | 0,99 | 0,99 | 0,12 | 0,14 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chi | 0,86 | -0,44 | 0,87 | 0,87 | -0,14 | 0,00 | 0,88 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cro | 0,98 | 0,53 | 0,93 | 0,73 | 0,52 | 0,17 | 0,81 | 0,16 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cyp | 0,96 | 0,19 | 1,00 | 0,99 | 0,31 | 0,22 | 0,98 | 0,86 | 0,88 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cze | 0,97 | 0,22 | 0,89 | 0,88 | 0,55 | 0,30 | 0,92 | 0,83 | 0,94 | 0,87 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Den | 0,96 | 0,19 | 1,00 | 1,00 | 0,18 | 0,18 | 0,99 | 0,87 | 0,72 | 0,99 | 0,88 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Est | 0,30 | 0,47 | 0,08 | 0,04 | 0,70 | 0,40 | 0,14 | 0,08 | 0,86 | 0,06 | 0,46 | 0,06 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Euro | 0,98 | 0,38 | 1,00 | 1,00 | 0,44 | 0,21 | 0,99 | 0,87 | 0,96 | 0,99 | 0,91 | 1,00 | 0,13 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fin | 0,95 | 0,18 | 0,98 | 0,99 | 0,06 | 0,10 | 0,99 | 0,88 | 0,53 | 0,96 | 0,88 | 0,99 | 0,06 | 0,98 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fra | 0,98 | 0,36 | 1,00 | 1,00 | 0,28 | 0,19 | 0,99 | 0,86 | 0,88 | 0,99 | 0,91 | 0,99 | 0,11 | 1,00 | 0,99 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ger | 0,98 | 0,38 | 0,99 | 0,99 | 0,27 | 0,18 | 0,99 | 0,85 | 0,81 | 0,97 | 0,92 | 0,98 | 0,13 | 0,99 | 0,99 | 1,00 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gre | 0,98 | 0,53 | 1,00 | 0,99 | 0,64 | 0,25 | 0,98 | 0,86 | 0,98 | 1,00 | 0,90 | 0,99 | 0,13 | 1,00 | 0,97 | 0,99 | 0,98 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hun | 0,99 | 0,52 | 0,97 | 0,96 | 0,77 | 0,39 | 0,95 | 0,82 | 0,84 | 0,97 | 0,94 | 0,96 | 0,27 | 0,97 | 0,92 | 0,97 | 0,95 | 0,98 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Indi | 0,98 | 0,31 | 0,99 | 0,99 | 0,50 | 0,22 | 0,98 | 0,88 | 0,86 | 1,00 | 0,91 | 0,99 | 0,11 | 0,99 | 0,96 | 0,99 | 0,97 | 1,00 | 0,99 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Indo | 0,91 | 0,82 | 0,93 | 0,92 | 0,58 | 0,42 | 0,88 | 0,70 | 0,22 | 0,94 | 0,80 | 0,92 | 0,11 | 0,92 | 0,87 | 0,91 | 0,89 | 0,94 | 0,95 | 0,94 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ire | 0,98 | 0,06 | 0,97 | 0,96 | 0,30 | 0,17 | 0,98 | 0,92 | 0,81 | 0,96 | 0,95 | 0,96 | 0,27 | 0,98 | 0,95 | 0,97 | 0,96 | 0,97 | 0,96 | 0,97 | 0,86 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ita | 0,97 | 0,35 | 1,00 | 1,00 | 0,38 | 0,21 | 0,99 | 0,86 | 0,91 | 1,00 | 0,89 | 1,00 | 0,07 | 1,00 | 0,98 | 1,00 | 0,98 | 1,00 | 0,97 | 0,99 | 0,93 | 0,96 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jap | 0,95 | 0,29 | 1,00 | 1,00 | -0,05 | 0,21 | 0,97 | 0,86 | 0,51 | 1,00 | 0,85 | 0,99 | 0,00 | 0,99 | 0,97 | 0,99 | 0,97 | 0,99 | 0,95 | 0,99 | 0,93 | 0,94 | 1,00 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kor | 0,97 | 0,56 | 0,98 | 0,97 | 0,30 | 0,28 | 0,96 | 0,87 | 0,70 | 0,98 | 0,90 | 0,97 | 0,16 | 0,98 | 0,94 | 0,97 | 0,96 | 0,98 | 0,98 | 0,99 | 0,95 | 0,96 | 0,98 | 0,97 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lat | 0,74 | 0,38 | 0,58 | 0,54 | 0,67 | 0,45 | 0,62 | 0,53 | 0,87 | 0,56 | 0,84 | 0,56 | 0,85 | 0,61 | 0,54 | 0,60 | 0,60 | 0,62 | 0,72 | 0,61 | 0,56 | 0,72 | 0,57 | 0,51 | 0,65 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lit | 0,89 | 0,23 | 0,78 | 0,75 | 0,58 | 0,36 | 0,82 | 0,74 | 0,89 | 0,76 | 0,96 | 0,76 | 0,66 | 0,81 | 0,75 | 0,80 | 0,80 | 0,80 | 0,87 | 0,80 | 0,70 | 0,89 | 0,77 | 0,73 | 0,59 | 0,95 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lux | -0,24 | -0,56 | -0,17 | -0,14 | -0,58 | -0,51 | -0,13 | 0,09 | -0,29 | -0,20 | -0,25 | -0,15 | -0,54 | -0,19 | -0,05 | -0,15 | -0,12 | -0,24 | -0,31 | -0,24 | -0,39 | -0,20 | -0,18 | -0,16 | -0,21 | -0,52 | -0,37 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mac | 0,87 | 0,57 | 0,78 | 0,78 | 0,53 | 0,15 | 0,83 | 0,62 | 0,89 | 0,74 | 0,88 | 0,78 | 0,47 | 0,81 | 0,83 | 0,83 | 0,86 | 0,79 | 0,80 | 0,75 | 0,68 | 0,82 | 0,78 | 0,73 | 0,34 | 0,75 | 0,84 | -0,23 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mal | 0,99 | 0,38 | 0,99 | 0,99 | 0,46 | 0,24 | 0,98 | 0,86 | 0,95 | 0,99 | 0,92 | 0,99 | 0,16 | 1,00 | 0,96 | 0,99 | 0,98 | 1,00 | 0,99 | 1,00 | 0,93 | 0,98 | 0,99 | 0,98 | 0,61 | 0,65 | 0,83 | -0,25 | 0,79 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mex | 0,87 | 0,30 | 0,81 | 0,79 | 0,59 | 0,57 | 0,80 | 0,64 | 0,45 | 0,83 | 0,85 | 0,81 | 0,39 | 0,82 | 0,73 | 0,80 | 0,77 | 0,84 | 0,92 | 0,85 | 0,88 | 0,82 | 0,81 | 0,80 | 0,59 | 0,75 | 0,84 | -0,44 | 0,63 | 0,85 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mor | 0,99 | 0,37 | 0,99 | 0,99 | 0,31 | 0,14 | 1,00 | 0,87 | 0,88 | 0,98 | 0,92 | 0,99 | 0,11 | 1,00 | 0,99 | 1,00 | 1,00 | 0,99 | 0,97 | 0,99 | 0,91 | 0,97 | 0,99 | 0,98 | 0,37 | 0,59 | 0,80 | -0,19 | 0,83 | 0,99 | 0,80 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Net | 0,95 | -0,21 | 0,99 | 0,99 | -0,27 | 0,16 | 0,98 | 0,88 | 0,40 | 0,99 | 0,87 | 0,99 | 0,00 | 0,99 | 0,98 | 0,99 | 0,98 | 0,98 | 0,94 | 0,98 | 0,90 | 0,95 | 0,99 | 0,99 | 0,17 | 0,51 | 0,73 | -0,06 | 0,75 | 0,98 | 0,78 | 0,98 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nor | 0,55 | -0,48 | 0,69 | 0,72 | -0,55 | -0,20 | 0,71 | 0,81 | -0,49 | 0,69 | 0,43 | 0,73 | -0,36 | 0,67 | 0,76 | 0,67 | 0,67 | 0,65 | 0,53 | 0,77 | 0,65 | 0,63 | 0,70 | 0,71 | -0,18 | 0,04 | 0,29 | 0,35 | 0,40 | 0,62 | 0,51 | 0,80 | 0,74 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pol | 0,99 | 0,48 | 0,95 | 0,94 | 0,68 | 0,32 | 0,96 | 0,83 | 0,96 | 0,93 | 0,98 | 0,94 | 0,34 | 0,96 | 0,94 | 0,97 | 0,97 | 0,96 | 0,98 | 0,96 | 0,89 | 0,97 | 0,95 | 0,92 | 0,52 | 0,77 | 0,91 | -0,24 | 0,90 | 0,97 | 0,85 | 0,97 | 0,93 | 0,52 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Por | 0,98 | 0,48 | 0,99 | 0,98 | 0,57 | 0,26 | 0,98 | 0,85 | 0,95 | 0,99 | 0,92 | 0,99 | 0,18 | 0,99 | 0,96 | 0,99 | 0,97 | 1,00 | 0,99 | 1,00 | 0,94 | 0,98 | 0,99 | 0,98 | 0,59 | 0,66 | 0,83 | -0,28 | 0,80 | 1,00 | 0,86 | 0,99 | 0,97 | 0,62 | 0,97 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rom | 0,40 | 0,57 | 0,30 | 0,27 | 0,87 | 0,98 | 0,24 | 0,04 | 0,37 | 0,31 | 0,43 | 0,27 | 0,54 | 0,31 | 0,19 | 0,29 | 0,28 | 0,35 | 0,50 | 0,31 | 0,53 | 0,28 | 0,30 | 0,29 | 0,51 | 0,60 | 0,49 | -0,60 | 0,29 | 0,36 | 0,69 | 0,23 | 0,25 | -0,22 | 0,43 | 0,37 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rus | 0,46 | 0,40 | 0,40 | 0,38 | 0,74 | 0,94 | 0,34 | 0,18 | 0,20 | 0,40 | 0,46 | 0,38 | 0,32 | 0,40 | 0,32 | 0,39 | 0,38 | 0,42 | 0,55 | 0,40 | 0,58 | 0,34 | 0,40 | 0,39 | 0,31 | 0,48 | 0,46 | -0,31 | 0,29 | 0,42 | 0,72 | 0,33 | 0,38 | 0,04 | 0,49 | 0,43 | 0,93 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slvk | 0,98 | 0,39 | 0,92 | 0,90 | 0,60 | 0,29 | 0,94 | 0,82 | 0,97 | 0,90 | 0,99 | 0,91 | 0,44 | 0,94 | 0,91 | 0,94 | 0,94 | 0,93 | 0,96 | 0,93 | 0,84 | 0,96 | 0,91 | 0,88 | 0,53 | 0,83 | 0,95 | -0,27 | 0,91 | 0,94 | 0,84 | 0,94 | 0,89 | 0,47 | 0,99 | 0,94 | 0,42 | 0,45 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slvn | 0,98 | 0,62 | 0,92 | 0,91 | 0,75 | 0,36 | 0,94 | 0,79 | 0,94 | 0,90 | 0,97 | 0,91 | 0,40 | 0,94 | 0,92 | 0,94 | 0,95 | 0,93 | 0,96 | 0,93 | 0,88 | 0,94 | 0,92 | 0,89 | 0,57 | 0,79 | 0,91 | -0,29 | 0,92 | 0,94 | 0,84 | 0,95 | 0,90 | 0,48 | 0,99 | 0,94 | 0,48 | 0,52 | 0,99 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S.Afr | 0,93 | 0,75 | 0,86 | 0,86 | 0,57 | 0,21 | 0,89 | 0,67 | 0,89 | 0,83 | 0,91 | 0,86 | 0,40 | 0,88 | 0,89 | 0,89 | 0,91 | 0,87 | 0,88 | 0,85 | 0,83 | 0,88 | 0,86 | 0,82 | 0,45 | 0,74 | 0,84 | -0,36 | 0,97 | 0,87 | 0,74 | 0,90 | 0,82 | 0,57 | 0,95 | 0,88 | 0,35 | 0,36 | 0,95 | 0,97 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spa | 0,99 | 0,49 | 0,96 | 0,96 | 0,54 | 0,22 | 0,98 | 0,83 | 0,93 | 0,94 | 0,96 | 0,96 | 0,30 | 0,97 | 0,96 | 0,97 | 0,98 | 0,97 | 0,96 | 0,96 | 0,88 | 0,97 | 0,96 | 0,93 | 0,40 | 0,73 | 0,88 | -0,26 | 0,91 | 0,97 | 0,80 | 0,98 | 0,94 | 0,58 | 0,99 | 0,97 | 0,34 | 0,38 | 0,98 | 0,98 | 0,96 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Swe | 0,95 | -0,05 | 1,00 | 1,00 | -0,21 | 0,15 | 0,99 | 0,88 | 0,46 | 0,99 | 0,87 | 1,00 | 0,01 | 0,99 | 0,99 | 0,99 | 0,98 | 0,99 | 0,94 | 0,98 | 0,91 | 0,95 | 0,99 | 0,99 | 0,22 | 0,52 | 0,74 | -0,08 | 0,76 | 0,98 | 0,78 | 0,99 | 1,00 | 0,75 | 0,93 | 0,97 | 0,23 | 0,36 | 0,89 | 0,90 | 0,84 | 0,94 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Swit | 0,86 | -0,43 | 0,93 | 0,94 | -0,53 | 0,05 | 0,92 | 0,86 | -0,21 | 0,92 | 0,75 | 0,94 | -0,21 | 0,92 | 0,95 | 0,93 | 0,93 | 0,90 | 0,84 | 0,90 | 0,81 | 0,85 | 0,93 | 0,94 | -0,31 | 0,31 | 0,57 | 0,17 | 0,65 | 0,89 | 0,64 | 0,92 | 0,97 | 0,81 | 0,83 | 0,88 | 0,10 | 0,31 | 0,77 | 0,79 | 0,70 | 0,84 | 0,96 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tur | 0,73 | 0,52 | 0,61 | 0,58 | 0,48 | 0,70 | 0,57 | 0,34 | 0,42 | 0,62 | 0,66 | 0,59 | 0,40 | 0,61 | 0,50 | 0,60 | 0,59 | 0,63 | 0,76 | 0,64 | 0,79 | 0,57 | 0,60 | 0,59 | 0,60 | 0,64 | 0,66 | -0,43 | 0,51 | 0,65 | 0,92 | 0,57 | 0,58 | 0,12 | 0,67 | 0,65 | 0,89 | 0,83 | 0,65 | 0,68 | 0,58 | 0,59 | 0,56 | 0,46 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| UK | 0,99 | 0,29 | 1,00 | 0,99 | 0,40 | 0,22 | 0,99 | 0,87 | 0,97 | 0,99 | 0,93 | 0,99 | 0,17 | 1,00 | 0,97 | 0,99 | 0,98 | 1,00 | 0,98 | 1,00 | 0,92 | 0,98 | 0,99 | 0,98 | 0,60 | 0,65 | 0,83 | -0,20 | 0,81 | 1,00 | 0,84 | 0,99 | 0,98 | 0,65 | 0,97 | 1,00 | 0,33 | 0,41 | 0,95 | 0,95 | 0,88 | 0,98 | 0,98 | 0,90 | 0,64 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| US | 0,99 | 0,78 | 0,99 | 0,98 | 0,57 | 0,34 | 0,99 | 0,86 | 0,96 | 0,98 | 0,95 | 0,98 | 0,21 | 0,99 | 0,95 | 0,99 | 0,97 | 0,99 | 0,99 | 0,99 | 0,98 | 0,99 | 0,98 | 0,97 | 0,69 | 0,68 | 0,86 | -0,39 | 0,81 | 1,00 | 0,86 | 0,99 | 0,96 | 0,59 | 0,97 | 1,00 | 0,50 | 0,49 | 0,96 | 0,95 | 0,90 | 0,98 | 0,97 | 0,86 | 0,72 | 1,00 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EU27 | 0,99 | 0,54 | 0,98 | 0,98 | 0,84 | 0,35 | 0,97 | 0,84 | 0,88 | 0,98 | 0,94 | 0,98 | 0,23 | 0,99 | 0,95 | 0,98 | 0,97 | 0,99 | 0,99 | 0,99 | 0,95 | 0,97 | 0,98 | 0,97 | 0,60 | 0,69 | 0,85 | -0,27 | 0,82 | 0,99 | 0,88 | 0,98 | 0,96 | 0,59 | 0,98 | 0,99 | 0,45 | 0,52 | 0,96 | 0,97 | 0,90 | 0,97 | 0,96 | 0,87 | 0,70 | 0,99 | 0,99 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NMC | 0,99 | 0,45 | 1,00 | 0,99 | 0,60 | 0,25 | 0,99 | 0,86 | 0,98 | 0,99 | 0,92 | 0,99 | 0,16 | 1,00 | 0,97 | 0,99 | 0,98 | 1,00 | 0,98 | 1,00 | 0,93 | 0,98 | 0,99 | 0,99 | 0,60 | 0,65 | 0,83 | -0,24 | 0,80 | 1,00 | 0,84 | 0,99 | 0,98 | 0,63 | 0,97 | 1,00 | 0,36 | 0,43 | 0,94 | 0,95 | 0,88 | 0,97 | 0,98 | 0,90 | 0,64 | 1,00 | 1,00 | 0,99 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CMC | 0,85 | 0,53 | 0,77 | 0,75 | 0,93 | 0,73 | 0,75 | 0,60 | 0,59 | 0,77 | 0,86 | 0,75 | 0,51 | 0,79 | 0,70 | 0,77 | 0,76 | 0,80 | 0,89 | 0,80 | 0,85 | 0,78 | 0,77 | 0,75 | 0,49 | 0,82 | 0,86 | -0,48 | 0,71 | 0,81 | 0,93 | 0,76 | 0,73 | 0,25 | 0,87 | 0,82 | 0,81 | 0,81 | 0,86 | 0,89 | 0,79 | 0,81 | 0,72 | 0,58 | 0,85 | 0,80 | 0,83 | 0,87 | 0,81 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SGC | 0,96 | 0,54 | 0,92 | 0,91 | 0,91 | 0,52 | 0,91 | 0,77 | 0,73 | 0,92 | 0,94 | 0,91 | 0,37 | 0,93 | 0,87 | 0,92 | 0,91 | 0,94 | 0,99 | 0,95 | 0,94 | 0,92 | 0,92 | 0,91 | 0,55 | 0,78 | 0,89 | -0,39 | 0,79 | 0,95 | 0,94 | 0,92 | 0,89 | 0,45 | 0,96 | 0,95 | 0,62 | 0,65 | 0,95 | 0,96 | 0,88 | 0,94 | 0,89 | 0,77 | 0,79 | 0,94 | 0,96 | 0,98 | 0,95 | 0,95 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 3-6 Degree of International Macroeconomic Similarities According to the Bilateral Correlation Coefficients

(Sources: Own calculations from the data in Table 3-1)

In addition, the rankings in Table 3-7-b) and Table 3-7-c) where EU27 and Euro Area countries are chosen as a benchmark for computing correlation coefficients indicate that Turkey is closer to these country groups than some of the CMCs like Latvia, Romania, Bulgaria and Estonia. However, Turkish correlation with the Eurozone and the EU member countries can be accepted as low when compared to the correlations of the EU and Eurozone member countries with the NMCs SGCs, and CMCs. Besides, Turkey has a fully different macroeconomic environment than the former EU member Luxembourg. However, as far as it can be seen in Table 3-7-b) and Table 3-7-c), Luxembourg is also the most dissimilar country to both the EU and the Eurozone countries.

| Correlation Coefficient | | | | | |
|---|---|---|---|---|---|
| a) Turkey as a Benchmark | | b) EU27 as a Benchmark | | c) EURO AREA as a Benchmark | |
| COUNTRIES | Turkey | COUNTRIES | EU 27 average | COUNTRIES | Euro Area |
| Mexico | 0,916 | Hungary | 0,994 | Austria | 0,999 |
| Romania | 0,890 | NMC | 0,994 | France | 0,998 |
| CMC | 0,846 | Portugal | 0,992 | UK | 0,998 |
| Russian Fed. | 0,828 | United States | 0,991 | NMC | 0,998 |
| SGC | 0,787 | Albania | 0,991 | Morocco | 0,998 |
| Indonesia | 0,786 | Malta | 0,991 | Italy | 0,998 |
| Hungary | 0,756 | UK | 0,991 | Greece | 0,998 |
| Albania | 0,730 | Greece | 0,990 | Belgium | 0,996 |
| EU 27 average | 0,698 | India | 0,990 | Malta | 0,996 |
| Bulgaria | 0,697 | Euro Area | 0,989 | Denmark | 0,995 |
| Slovenia | 0,681 | Austria | 0,983 | India | 0,995 |
| United States | 0,725 | France | 0,983 | Portugal | 0,994 |
| Poland | 0,671 | Morocco | 0,982 | Cyprus | 0,993 |
| Czech Rep. | 0,665 | Italy | 0,982 | Canada | 0,993 |
| Lithuania | 0,661 | Poland | 0,980 | Sweden | 0,991 |
| Portugal | 0,654 | Cyprus | 0,978 | United States | 0,991 |
| Malta | 0,654 | SGC | 0,977 | Japan | 0,990 |
| Slovak Rep. | 0,651 | Belgium | 0,976 | Germany | 0,989 |
| NMC | 0,644 | Denmark | 0,976 | EU 27 average | 0,989 |
| Latvia | 0,640 | Germany | 0,974 | Netherlands | 0,989 |
| UK | 0,639 | Canada | 0,974 | Albania | 0,984 |
| India | 0,638 | Spain | 0,973 | Finland | 0,981 |
| Greece | 0,630 | Japan | 0,971 | Korea Rep. | 0,981 |
| Cyprus | 0,615 | Ireland | 0,968 | Ireland | 0,975 |
| Euro Area | 0,614 | Slovenia | 0,966 | Hungary | 0,974 |
| Austria | 0,610 | Sweden | 0,965 | Spain | 0,974 |
| Italy | 0,604 | Netherlands | 0,964 | Poland | 0,964 |
| France | 0,601 | Slovak Rep. | 0,956 | Croatia | 0,964 |
| Korea Rep. | 0,597 | Finland | 0,952 | Slovenia | 0,941 |
| Japan | 0,592 | Indonesia | 0,945 | Slovak Rep. | 0,936 |
| Spain | 0,588 | Czech Rep. | 0,938 | SGC | 0,935 |
| Germany | 0,587 | South Africa | 0,895 | Indonesia | 0,924 |
| Denmark | 0,585 | Croatia | 0,883 | Switzerland | 0,919 |
| Netherlands | 0,581 | Mexico | 0,883 | Czech Rep. | 0,914 |
| South Africa | 0,580 | Switzerland | 0,874 | South Africa | 0,882 |
| Belgium | 0,580 | CMC | 0,872 | China | 0,871 |
| Canada | 0,574 | Lithuania | 0,853 | Mexico | 0,821 |
| Ireland | 0,570 | China | 0,843 | Macedonia | 0,809 |
| Morocco | 0,566 | Brazil | 0,842 | Lithuania | 0,806 |
| Sweden | 0,563 | Macedonia | 0,817 | CMC | 0,788 |
| Argentina | 0,521 | Turkey | 0,698 | Norway | 0,672 |
| Macedonia | 0,513 | Latvia | 0,690 | Turkey | 0,614 |
| Finland | 0,504 | Korea Rep. | 0,597 | Latvia | 0,613 |
| Brazil | 0,481 | Norway | 0,594 | Brazil | 0,437 |
| Switzerland | 0,458 | Argentina | 0,544 | Russian Fed. | 0,402 |
| Croatia | 0,425 | Russian Fed. | 0,519 | Argentina | 0,381 |
| Estonia | 0,397 | Romania | 0,449 | Romania | 0,315 |
| China | 0,339 | Bulgaria | 0,350 | Bulgaria | 0,215 |
| Norway | 0,122 | Estonia | 0,226 | Estonia | 0,125 |
| Luxembourg | -0,427 | Luxembourg | -0,266 | Luxembourg | -0,186 |

Table 3-7 International Rank of Macroeconomic Similarity

(Source: Own calculations from the data in Table 3-1)

## 3.2 SIMILARITY IN TERMS OF STABILITY OF THE MACROECONOMIC INDICATORS

Following Kibritçioğlu (2003), in this section the stability of the evolution of each macroeconomic indicator over the same period is calculated where the standard deviations of the selected variables are used as an indicator for the stability of the relevant variables. Therefore, in Table 3-8, for the countries and country groups presented, the standard deviations of each of the 9 macroeconomic indicators' data for specific time periods[26] are calculated and in Table 3-9, bilateral correlation coefficients for these standard deviation values of the selected indicators, are calculated. Then the similarities of the selected countries and country groups in terms of the stability structure are compared with the help of these bilateral correlation coefficients. Lastly, the calculated correlation coefficients for Turkey, EU27 (in average) and Euro Area (in average) in Table 3-9 are sorted and presented separately in Table 3-11, to be able to analyze the relevant data easier.

Based on the results presented in Table 3-11-a), it may be argued that the relatively high correlation coefficient of 0.76 between Turkey and CMCs indicates that Turkish macroeconomic stability characteristics are closer to that of CMCs'. However, this similarity in stability characteristics is not as obvious as the similarity in general structural characteristics (as in Table 3-7-a), the correlation coefficient value is 0.85 between Turkey and CMCs). The rankings where EU27 and Euro Area member countries are chosen as a benchmark (in Table 3-11-b) and (Table 3-11-c), respectively) for computing correlations reveal that

[26] Same time periods and same data are utilized that were used to calculate Table 3-1.

many of the CMCs have macroeconomic stability characteristics closer to that of EU27 and Euro Area countries than that of Turkey.

| | Consumer Price Inflation (1995-2008*) | Unemployment Rate (1995-2008*) | Real GDP Growth (1995-2008*) | Population Growth (1995-2008*) | Current Account Balance as % of GDP (1995-2008*) | Exchange Rate Change (1995-2008*) | Long Term Interest Rates (2001-2006*) | Total Central Government Debt as % of GDP (2001-2006*) | General Government Balance % of GDP (1997-2007*) |
|---|---|---|---|---|---|---|---|---|---|
| **Albania** | 9,41 | 1,88 | 5,55 | 0,53 | 3,06 | 14,80 | | 4,31 | 3,66 |
| **Argentina** | 7,60 | 3,26 | 6,53 | 0,11 | 4,20 | 57,24 | | | |
| **Austria** | 0,71 | 0,50 | 0,99 | 0,21 | 2,34 | 9,26 | 0,66 | 0,80 | 1,15 |
| **Belgium** | 0,88 | 2,28 | 1,03 | 0,22 | 2,38 | 9,30 | 0,65 | 4,35 | 1,01 |
| **Brazil** | 16,12 | 1,47 | 1,90 | 0,19 | 2,38 | 19,85 | | | |
| **Bulgaria** | 279,24 | 4,06 | 4,79 | 0,19 | 9,29 | 237,59 | 1,45 | 16,05 | 1,53 |
| **Canada** | 0,48 | 1,22 | 1,41 | 0,12 | 1,47 | 5,12 | 0,63 | 4,63 | 0,96 |
| **China,P.R.: Mainland** | 4,82 | 0,56 | 1,50 | 0,21 | 3,61 | 2,58 | 0,15 | 0,74 | |
| **Croatia** | 1,42 | 2,51 | 2,18 | 1,25 | 2,41 | 9,57 | 1,29 | | 2,22 |
| **Cyprus** | 0,91 | 0,61 | 1,32 | 0,46 | 2,87 | 8,15 | 1,20 | 39,07 | 2,62 |
| **Czech Republic** | 3,35 | 2,44 | 2,46 | 0,37 | 1,83 | 10,29 | 0,64 | 4,01 | 1,83 |
| **Denmark** | 0,54 | 2,21 | 1,38 | 0,12 | 1,37 | 9,03 | 0,97 | 7,74 | 2,07 |
| **Estonia** | 7,99 | 2,63 | 4,18 | 0,58 | 4,20 | 11,03 | 2,58 | 0,71 | 1,81 |
| **Euro Area** | 1,53 | 2,05 | 1,61 | 0,26 | 2,73 | 9,17 | 0,81 | 5,01 | 1,56 |
| **Finland** | 1,10 | 3,95 | 1,52 | 0,09 | 2,11 | 9,01 | 0,67 | 3,37 | 2,23 |
| **France** | 0,60 | 1,24 | 1,00 | 0,16 | 1,53 | 9,00 | 0,62 | 1,85 | 0,86 |
| **Germany** | 0,53 | 1,53 | 1,00 | 0,15 | 3,40 | 9,25 | 0,58 | 2,49 | 1,61 |
| **Greece** | 1,96 | 1,19 | 0,98 | 0,16 | 3,91 | 9,87 | 0,65 | 1,51 | 1,39 |
| **Hungary** | 7,64 | 1,43 | 1,57 | 0,32 | 1,69 | 13,27 | 0,67 | 3,89 | 2,03 |
| **India** | 2,92 | 3,02 | 2,03 | 0,17 | 1,20 | 5,88 | 1,07 | 4,98 | |
| **Indonesia** | 13,69 | 2,11 | 5,22 | 0,09 | 2,93 | 68,11 | | 18,20 | |
| **Ireland** | 6,86 | 3,26 | 3,56 | 0,56 | 2,80 | 8,37 | 0,67 | 3,69 | 1,45 |
| **Italy** | 0,98 | 1,94 | 1,17 | 0,39 | 2,06 | 8,62 | 0,62 | 2,46 | 1,01 |
| **Japan** | 0,77 | 0,71 | 1,49 | 0,13 | 0,88 | 9,48 | 0,24 | 15,98 | 1,84 |
| *** For some of variables and countries, because of the insufficiency in data, the time period changes.** | | | | | | | | | |

Table 3-8 Standard Deviations of Some Macroeconomic Indicators for Selected Countries and Country Groups and for Selected Years[27]

[27] Years that are specified under each variable are selected according to the availability of the relevant data for most of the countries.

| | Consumer Price Inflation (1995-2008*) | Unemployment Rate (1995-2008*) | Real GDP Growth (1995-2008*) | Population Growth (1995-2008*) | Current Account Balance as % of GDP (1995-2008*) | Exchange Rate Change (1995-2008*) | Long Term Interest Rates (2001-2006*) | Total Central Government Debt as % of GDP (2001-2006*) | General Government Balance % of GDP (1997-2007*) |
|---|---|---|---|---|---|---|---|---|---|
| **Korea, Republic of** | 1,62 | 1,38 | 4,05 | 0,33 | 3,77 | 16,84 | 0,95 | 5,25 | 2,25 |
| **Latvia** | 6,86 | 1,17 | 4,50 | 0,28 | 6,36 | 4,95 | 1,32 | 1,76 | 1,48 |
| **Lithuania** | 11,37 | 2,93 | 3,04 | 0,14 | 2,89 | 5,41 | 1,64 | 1,82 | 3,20 |
| **Luxembourg** | 0,75 | 0,73 | 2,80 | 0,27 | 1,86 | 9,30 | 0,99 | 0,85 | 2,34 |
| **Macedonia, FYR** | 4,42 | 2,23 | 2,79 | 0,39 | 2,98 | 11,04 | | 5,02 | 2,67 |
| **Malta** | 0,92 | 1,19 | 2,37 | 0,15 | 4,05 | 6,55 | 0,75 | 4,07 | 2,84 |
| **Mexico** | 11,03 | 0,97 | 3,33 | 0,26 | 1,15 | 6,69 | 2,44 | 0,79 | |
| **Morocco** | 1,51 | 4,11 | 4,70 | 0,21 | 2,68 | 6,53 | 1,14 | 6,79 | |
| **Netherlands** | 0,79 | 1,42 | 1,39 | 0,20 | 2,35 | 9,32 | 0,69 | 1,64 | 1,48 |
| **Norway** | 0,94 | 0,78 | 1,30 | 0,23 | 5,90 | 7,65 | 1,35 | 2,93 | 5,03 |
| **Poland** | 8,10 | 3,53 | 1,87 | 0,19 | 2,04 | 10,97 | 0,63 | 3,46 | 1,37 |
| **Portugal** | 0,68 | 1,47 | 1,80 | 0,19 | 2,97 | 8,97 | 0,66 | 5,45 | 1,01 |
| **Romania** | 38,62 | 2,33 | 4,75 | 0,06 | 3,28 | 41,15 | | 5,92 | 1,41 |
| **Russian Federation** | 50,86 | 1,95 | 4,97 | 0,17 | 5,12 | 45,25 | 5,22 | 12,66 | 4,95 |
| **Slovak Republic** | 2,93 | 3,52 | 2,73 | 0,16 | 3,52 | 11,48 | 1,68 | 3,11 | 1,71 |
| **Slovenia** | 3,11 | 2,68 | 1,13 | 0,21 | 2,11 | 11,00 | 1,21 | 0,59 | 0,49 |
| **South Africa** | 2,96 | 3,07 | 1,33 | 0,60 | 2,78 | 15,21 | 1,55 | 3,36 | |
| **Spain** | 0,77 | 5,25 | 1,01 | 0,64 | 3,46 | 9,21 | 0,70 | 4,86 | 1,81 |
| **Sweden** | 1,07 | 1,39 | 1,44 | 0,30 | 2,74 | 9,24 | 0,76 | 2,20 | 1,91 |
| **Switzerland** | 0,60 | 1,01 | 1,23 | 0,27 | 3,86 | 8,69 | 0,54 | 1,63 | 1,55 |
| **Turkey** | **32,11** | **1,92** | **4,52** | **0,12** | **2,54** | **39,83** | **32,50** | **10,85** | **3,94** |
| **United Kingdom** | 0,81 | 1,21 | 0,80 | 0,16 | 0,93 | 5,96 | 0,23 | 2,31 | 1,82 |
| **United States** | 0,67 | 0,64 | 1,37 | 0,12 | 1,58 | | 0,37 | 1,62 | 2,20 |
| **EU 27 average** | 14,45 | 2,15 | 2,09 | 0,26 | 2,98 | 18,72 | 0,92 | 4,82 | 1,68 |
| **NMC**** | 1,96 | 1,84 | 1,71 | 0,23 | 3,29 | 9,41 | 1,10 | 9,67 | 1,81 |
| **CMC**** | 39,68 | 2,52 | 3,16 | 0,25 | 3,78 | 37,74 | 1,25 | 4,85 | 1,84 |
| **SGC**** | 28,69 | 2,28 | 2,74 | 0,25 | 3,70 | 29,36 | 1,20 | 6,61 | 1,82 |

*** For some of variables and countries, because of the insufficiency in data, the time period changes.**

****NMCs are Malta, Slovenia, Slovakia, Cyprus and Greece; CMCs are Denmark, Estonia, Bulgaria, Poland, Lithuania, Romania, Latvia, Czech, Hungary and Sweden and SCG=NMC+CMC**

Table 3-8 Standard Deviations of Some Macroeconomic Indicators for Selected Countries and Country Groups and for Selected Years (Cont'd) (Sources: IMF, WB, UN, EUROSTAT and some national financial databases of the countries.)[28]

[28] In some of the cases, limitations in data are partially eliminated by using some other data sources which are stated in the references part.

| | Alb | Arg | Aus | Bel | Bra | Bul | Can | Chi | Cro | Cyp | Cze | Den | Est | Euro | Fin | Fra | Ger | Gre | Hun | Indi | Indo | Ire | Ita | Jap | Kor | Lat | Lit | Lux | Mac | Mal | Mex | Mor | Net | Nor | Pol | Por | Rom | Rus | Slvk | Slvn | S.Afr | Spa | Swe | Swit | Tur | UK | US | EU27 | NMC | CMC | SGC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alb | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Arg | 0,87 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aus | 0,81 | 0,98 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bel | 0,73 | 0,96 | 0,90 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bra | 0,95 | 0,78 | 0,70 | 0,67 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bul | 0,87 | 0,61 | 0,56 | 0,47 | 0,97 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Can | 0,58 | 0,96 | 0,70 | 0,92 | 0,63 | 0,29 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chi | 0,55 | 0,19 | 0,30 | 0,16 | 0,63 | 0,73 | 0,02 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cro | 0,79 | 0,98 | 0,98 | 0,99 | 0,67 | 0,52 | 0,99 | 0,18 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cyp | 0,05 | 0,96 | 0,05 | 0,42 | 0,68 | -0,06 | 0,72 | -0,18 | 0,95 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cze | 0,90 | 0,98 | 0,91 | 0,95 | 0,84 | 0,68 | 0,83 | 0,33 | 0,96 | 0,29 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Den | 0,58 | 0,97 | 0,71 | 0,92 | 0,66 | 0,31 | 0,99 | -0,03 | 0,99 | 0,71 | 0,84 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Est | 0,93 | 0,83 | 0,78 | 0,62 | 0,95 | 0,88 | 0,37 | 0,71 | 0,76 | -0,22 | 0,79 | 0,36 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Euro | 0,75 | 0,97 | 0,89 | 0,99 | 0,71 | 0,49 | 0,94 | 0,21 | 0,99 | 0,48 | 0,95 | 0,94 | 0,62 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fin | 0,70 | 0,92 | 0,89 | 0,96 | 0,62 | 0,44 | 0,83 | 0,13 | 0,96 | 0,26 | 0,93 | 0,85 | 0,63 | 0,94 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fra | 0,81 | 0,99 | 0,98 | 0,96 | 0,70 | 0,54 | 0,79 | 0,20 | 1,00 | 0,18 | 0,95 | 0,81 | 0,73 | 0,94 | 0,94 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ger | 0,74 | 0,94 | 0,97 | 0,96 | 0,63 | 0,46 | 0,80 | 0,26 | 0,97 | 0,21 | 0,91 | 0,80 | 0,69 | 0,95 | 0,93 | 0,98 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gre | 0,82 | 0,94 | 0,98 | 0,90 | 0,74 | 0,61 | 0,70 | 0,43 | 0,95 | 0,07 | 0,91 | 0,69 | 0,81 | 0,89 | 0,88 | 0,96 | 0,97 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hun | 0,97 | 0,90 | 0,83 | 0,81 | 0,98 | 0,89 | 0,66 | 0,54 | 0,83 | 0,18 | 0,94 | 0,68 | 0,88 | 0,83 | 0,78 | 0,85 | 0,79 | 0,85 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Indi | 0,71 | 0,88 | 0,63 | 0,86 | 0,81 | 0,53 | 0,89 | 0,19 | 0,87 | 0,60 | 0,88 | 0,91 | 0,52 | 0,88 | 0,84 | 0,75 | 0,71 | 0,65 | 0,79 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Indo | 0,89 | 0,99 | 0,94 | 0,93 | 0,84 | 0,66 | 0,79 | 0,22 | 0,96 | 0,22 | 0,98 | 0,82 | 0,76 | 0,93 | 0,89 | 0,97 | 0,91 | 0,91 | 0,93 | 0,80 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ire | 0,94 | 0,78 | 0,69 | 0,71 | 0,95 | 0,88 | 0,59 | 0,67 | 0,71 | 0,15 | 0,87 | 0,57 | 0,89 | 0,73 | 0,70 | 0,72 | 0,67 | 0,75 | 0,93 | 0,79 | 0,81 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ita | 0,79 | 0,98 | 0,97 | 0,98 | 0,69 | 0,53 | 0,82 | 0,22 | 0,99 | 0,23 | 0,96 | 0,83 | 0,72 | 0,96 | 0,96 | 0,99 | 0,98 | 0,96 | 0,85 | 0,78 | 0,96 | 0,74 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Jap | 0,36 | 1,00 | 0,39 | 0,70 | 0,73 | 0,16 | 0,91 | -0,10 | 0,99 | 0,93 | 0,61 | 0,91 | 0,08 | 0,75 | 0,57 | 0,52 | 0,52 | 0,39 | 0,47 | 0,81 | 0,56 | 0,40 | 0,55 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kor | 0,82 | 0,98 | 0,96 | 0,96 | 0,69 | 0,52 | 0,85 | 0,24 | 0,98 | 0,27 | 0,96 | 0,84 | 0,72 | 0,96 | 0,91 | 0,98 | 0,97 | 0,94 | 0,84 | 0,77 | 0,96 | 0,73 | 0,98 | 0,59 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lat | 0,60 | 0,27 | 0,38 | 0,25 | 0,56 | 0,65 | 0,14 | 0,95 | 0,27 | -0,15 | 0,40 | 0,04 | 0,75 | 0,30 | 0,20 | 0,30 | 0,35 | 0,50 | 0,53 | 0,21 | 0,26 | 0,69 | 0,31 | -0,04 | 0,37 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lit | 0,65 | 0,24 | 0,21 | 0,13 | 0,77 | 0,88 | 0,00 | 0,84 | 0,17 | -0,17 | 0,39 | 0,00 | 0,73 | 0,17 | 0,16 | 0,18 | 0,14 | 0,31 | 0,64 | 0,35 | 0,29 | 0,75 | 0,19 | -0,06 | 0,20 | 0,73 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lux | 0,81 | 0,97 | 0,97 | 0,85 | 0,67 | 0,50 | 0,67 | 0,24 | 0,97 | 0,00 | 0,89 | 0,67 | 0,76 | 0,84 | 0,86 | 0,95 | 0,92 | 0,92 | 0,79 | 0,62 | 0,92 | 0,66 | 0,92 | 0,36 | 1,00 | 0,35 | 0,19 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mac | 0,92 | 0,97 | 0,90 | 0,93 | 0,87 | 0,69 | 0,83 | 0,34 | 0,93 | 0,31 | 0,99 | 0,83 | 0,79 | 0,95 | 0,89 | 0,93 | 0,90 | 0,91 | 0,94 | 0,87 | 0,97 | 0,87 | 0,94 | 0,61 | 0,95 | 0,42 | 0,40 | 0,87 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mal | 0,62 | 0,84 | 0,82 | 0,88 | 0,53 | 0,28 | 0,87 | 0,29 | 0,87 | 0,44 | 0,81 | 0,83 | 0,50 | 0,91 | 0,82 | 0,82 | 0,90 | 0,84 | 0,65 | 0,73 | 0,79 | 0,57 | 0,84 | 0,67 | 0,92 | 0,39 | 0,07 | 0,80 | 0,82 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mex | 0,78 | 0,41 | 0,34 | 0,19 | 0,87 | 0,94 | 0,04 | 0,75 | 0,28 | -0,22 | 0,47 | 0,06 | 0,82 | 0,23 | 0,20 | 0,30 | 0,21 | 0,39 | 0,72 | 0,36 | 0,45 | 0,78 | 0,28 | -0,05 | 0,34 | 0,69 | 0,95 | 0,35 | 0,51 | 0,10 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mor | 0,44 | 0,73 | 0,52 | 0,77 | 0,38 | 0,12 | 0,90 | -0,02 | 0,80 | 0,65 | 0,72 | 0,87 | 0,26 | 0,80 | 0,76 | 0,63 | 0,65 | 0,52 | 0,49 | 0,86 | 0,59 | 0,54 | 0,68 | 0,80 | 0,80 | 0,11 | 0,00 | 0,57 | 0,67 | 0,79 | -0,01 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Net | 0,80 | 0,98 | 0,99 | 0,94 | 0,69 | 0,53 | 0,76 | 0,25 | 0,99 | 0,12 | 0,94 | 0,77 | 0,75 | 0,92 | 0,94 | 0,99 | 0,98 | 0,97 | 0,83 | 0,71 | 0,95 | 0,71 | 0,99 | 0,46 | 0,99 | 0,35 | 0,19 | 0,97 | 0,92 | 0,85 | 0,30 | 0,61 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nor | 0,51 | 0,76 | 0,79 | 0,72 | 0,50 | 0,25 | 0,62 | 0,40 | 0,74 | 0,17 | 0,65 | 0,61 | 0,48 | 0,74 | 0,70 | 0,73 | 0,84 | 0,82 | 0,55 | 0,53 | 0,73 | 0,40 | 0,73 | 0,39 | 0,84 | 0,38 | 0,07 | 0,76 | 0,68 | 0,90 | 0,12 | 0,53 | 0,78 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pol | 0,93 | 0,81 | 0,74 | 0,75 | 0,97 | 0,92 | 0,58 | 0,60 | 0,75 | 0,12 | 0,89 | 0,60 | 0,90 | 0,75 | 0,75 | 0,77 | 0,71 | 0,79 | 0,97 | 0,79 | 0,85 | 0,97 | 0,78 | 0,39 | 0,75 | 0,58 | 0,74 | 0,68 | 0,88 | 0,55 | 0,77 | 0,46 | 0,75 | 0,43 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Por | 0,69 | 0,96 | 0,86 | 0,98 | 0,64 | 0,40 | 0,96 | 0,15 | 0,98 | 0,54 | 0,91 | 0,94 | 0,54 | 0,99 | 0,90 | 0,91 | 0,93 | 0,86 | 0,76 | 0,85 | 0,89 | 0,67 | 0,93 | 0,79 | 0,99 | 0,28 | 0,07 | 0,81 | 0,91 | 0,92 | 0,13 | 0,82 | 0,89 | 0,73 | 0,67 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rom | 0,93 | 0,72 | 0,65 | 0,56 | 0,99 | 0,99 | 0,37 | 0,67 | 0,61 | -0,04 | 0,77 | 0,39 | 0,92 | 0,58 | 0,53 | 0,64 | 0,55 | 0,68 | 0,94 | 0,59 | 0,76 | 0,94 | 0,63 | 0,21 | 0,62 | 0,63 | 0,82 | 0,59 | 0,79 | 0,36 | 0,91 | 0,16 | 0,62 | 0,30 | 0,96 | 0,49 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rus | 0,89 | 0,63 | 0,57 | 0,52 | 0,98 | 0,99 | 0,38 | 0,71 | 0,53 | 0,06 | 0,72 | 0,39 | 0,86 | 0,55 | 0,47 | 0,57 | 0,49 | 0,62 | 0,91 | 0,61 | 0,69 | 0,90 | 0,56 | 0,28 | 0,56 | 0,65 | 0,86 | 0,51 | 0,75 | 0,36 | 0,92 | 0,21 | 0,55 | 0,29 | 0,93 | 0,46 | 0,99 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slvk | 0,85 | 0,96 | 0,96 | 0,94 | 0,75 | 0,61 | 0,77 | 0,33 | 0,97 | 0,14 | 0,96 | 0,77 | 0,82 | 0,93 | 0,95 | 0,97 | 0,96 | 0,96 | 0,87 | 0,78 | 0,94 | 0,81 | 0,98 | 0,47 | 0,97 | 0,43 | 0,32 | 0,92 | 0,95 | 0,81 | 0,40 | 0,66 | 0,97 | 0,71 | 0,84 | 0,89 | 0,70 | 0,63 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slvn | 0,87 | 0,98 | 0,94 | 0,86 | 0,82 | 0,71 | 0,61 | 0,37 | 0,95 | -0,05 | 0,92 | 0,63 | 0,88 | 0,83 | 0,88 | 0,94 | 0,90 | 0,94 | 0,90 | 0,67 | 0,92 | 0,81 | 0,94 | 0,30 | 0,94 | 0,44 | 0,41 | 0,90 | 0,90 | 0,66 | 0,51 | 0,46 | 0,94 | 0,61 | 0,87 | 0,77 | 0,79 | 0,71 | 0,97 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S.Afr | 0,84 | 0,99 | 0,97 | 0,95 | 0,78 | 0,62 | 0,76 | 0,27 | 0,98 | 0,14 | 0,96 | 0,79 | 0,78 | 0,93 | 0,94 | 0,99 | 0,96 | 0,96 | 0,90 | 0,77 | 0,97 | 0,77 | 0,99 | 0,48 | 0,96 | 0,31 | 0,29 | 0,94 | 0,95 | 0,80 | 0,40 | 0,59 | 0,98 | 0,79 | 0,84 | 0,88 | 0,71 | 0,64 | 0,98 | 0,97 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spa | 0,54 | 0,82 | 0,80 | 0,94 | 0,49 | 0,32 | 0,84 | 0,06 | 0,91 | 0,38 | 0,85 | 0,86 | 0,48 | 0,92 | 0,96 | 0,87 | 0,89 | 0,81 | 0,67 | 0,81 | 0,79 | 0,61 | 0,91 | 0,62 | 0,84 | 0,13 | 0,04 | 0,73 | 0,80 | 0,80 | 0,02 | 0,77 | 0,86 | 0,66 | 0,65 | 0,90 | 0,39 | 0,35 | 0,88 | 0,79 | 0,86 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Swe | 0,80 | 0,97 | 0,99 | 0,95 | 0,69 | 0,53 | 0,78 | 0,28 | 0,99 | 0,17 | 0,94 | 0,79 | 0,74 | 0,94 | 0,93 | 0,99 | 0,99 | 0,98 | 0,84 | 0,73 | 0,95 | 0,71 | 0,99 | 0,50 | 0,99 | 0,36 | 0,20 | 0,96 | 0,93 | 0,88 | 0,30 | 0,63 | 1,00 | 0,82 | 0,75 | 0,91 | 0,62 | 0,56 | 0,97 | 0,93 | 0,98 | 0,86 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Swit | 0,73 | 0,92 | 0,98 | 0,91 | 0,61 | 0,46 | 0,73 | 0,33 | 0,95 | 0,11 | 0,87 | 0,72 | 0,72 | 0,90 | 0,88 | 0,95 | 0,99 | 0,98 | 0,77 | 0,62 | 0,88 | 0,65 | 0,95 | 0,43 | 0,96 | 0,43 | 0,15 | 0,93 | 0,87 | 0,89 | 0,24 | 0,57 | 0,98 | 0,87 | 0,68 | 0,88 | 0,55 | 0,48 | 0,94 | 0,89 | 0,93 | 0,83 | 0,98 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tur | 0,95 | 0,78 | 0,56 | 0,47 | 1,00 | 0,76 | 0,34 | 0,34 | 0,50 | 0,02 | 0,59 | 0,37 | 0,73 | 0,48 | 0,41 | 0,56 | 0,45 | 0,55 | 0,74 | 0,46 | 0,83 | 0,61 | 0,52 | 0,22 | 0,52 | 0,37 | 0,56 | 0,51 | 0,86 | 0,26 | 0,73 | 0,09 | 0,52 | 0,24 | 0,70 | 0,41 | 0,99 | 0,79 | 0,58 | 0,66 | 0,61 | 0,28 | 0,51 | 0,44 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| UK | 0,79 | 0,99 | 0,92 | 0,96 | 0,74 | 0,52 | 0,86 | 0,19 | 0,98 | 0,33 | 0,96 | 0,89 | 0,64 | 0,96 | 0,96 | 0,96 | 0,94 | 0,90 | 0,85 | 0,86 | 0,97 | 0,71 | 0,96 | 0,64 | 0,98 | 0,22 | 0,20 | 0,90 | 0,94 | 0,86 | 0,30 | 0,74 | 0,95 | 0,76 | 0,76 | 0,92 | 0,60 | 0,56 | 0,93 | 0,86 | 0,97 | 0,88 | 0,96 | 0,90 | 0,48 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| US | 0,14 | 0,54 | 0,63 | 0,45 | -0,08 | -0,20 | 0,50 | 0,31 | 0,68 | 0,36 | 0,43 | 0,47 | -0,07 | 0,56 | 0,48 | 0,62 | 0,68 | 0,49 | 0,11 | 0,52 | 0,43 | 0,09 | 0,49 | 0,40 | 0,98 | 0,21 | -0,01 | 0,73 | 0,45 | 0,87 | -0,12 | 0,77 | 0,77 | 0,82 | -0,03 | 0,53 | -0,25 | -0,10 | 0,38 | -0,22 | 0,52 | 0,32 | 0,83 | 0,64 | -0,35 | 0,77 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EU27 | 0,95 | 0,80 | 0,74 | 0,71 | 1,00 | 0,96 | 0,54 | 0,65 | 0,72 | 0,10 | 0,86 | 0,55 | 0,91 | 0,72 | 0,67 | 0,75 | 0,69 | 0,79 | 0,98 | 0,72 | 0,85 | 0,95 | 0,75 | 0,37 | 0,74 | 0,62 | 0,76 | 0,69 | 0,87 | 0,54 | 0,83 | 0,37 | 0,73 | 0,45 | 0,98 | 0,65 | 0,99 | 0,97 | 0,80 | 0,85 | 0,81 | 0,56 | 0,74 | 0,68 | 0,76 | 0,73 | -0,04 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NMC | 0,57 | 0,97 | 0,65 | 0,88 | 0,74 | 0,34 | 0,98 | 0,11 | 0,98 | 0,78 | 0,80 | 0,97 | 0,36 | 0,92 | 0,77 | 0,74 | 0,76 | 0,67 | 0,67 | 0,89 | 0,76 | 0,60 | 0,77 | 0,94 | 0,98 | 0,19 | 0,07 | 0,59 | 0,81 | 0,84 | 0,09 | 0,85 | 0,70 | 0,61 | 0,60 | 0,94 | 0,41 | 0,44 | 0,72 | 0,57 | 0,71 | 0,80 | 0,74 | 0,69 | 0,36 | 0,81 | 0,47 | 0,57 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CMC | 0,90 | 0,67 | 0,61 | 0,53 | 0,99 | 1,00 | 0,35 | 0,72 | 0,57 | -0,03 | 0,73 | 0,37 | 0,90 | 0,55 | 0,51 | 0,60 | 0,52 | 0,66 | 0,92 | 0,58 | 0,71 | 0,91 | 0,59 | 0,21 | 0,59 | 0,66 | 0,86 | 0,55 | 0,74 | 0,35 | 0,92 | 0,19 | 0,59 | 0,30 | 0,94 | 0,46 | 1,00 | 0,99 | 0,67 | 0,76 | 0,68 | 0,38 | 0,59 | 0,52 | 0,76 | 0,57 | -0,16 | 0,97 | 0,39 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SGC | 0,92 | 0,70 | 0,64 | 0,59 | 0,99 | 0,99 | 0,43 | 0,71 | 0,61 | 0,05 | 0,78 | 0,44 | 0,90 | 0,61 | 0,55 | 0,64 | 0,57 | 0,69 | 0,94 | 0,64 | 0,75 | 0,93 | 0,64 | 0,29 | 0,63 | 0,65 | 0,83 | 0,58 | 0,79 | 0,42 | 0,89 | 0,26 | 0,62 | 0,35 | 0,96 | 0,53 | 1,00 | 0,99 | 0,70 | 0,77 | 0,71 | 0,44 | 0,63 | 0,56 | 0,77 | 0,62 | -0,11 | 0,99 | 0,47 | 1,00 | 1,00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 3-9 Degree of International Macroeconomic Similarities According to the Bilateral Correlation Coefficients in Terms of Standard Deviations

(Sources: Own calculations from the data in Table 3-8)

After detecting Turkey's deviation in macroeconomic stability characteristics, for better visualization of stability metrics, as in Kibritçioğlu (2003), eight of the stability indexes for Turkey, EU27, Euro Area, CMCs and NMCs are combined within a radar-type graph in Figure 3-5 after taking the logarithms of the relevant data for these country groups presented in Table 3-8. These stability comparisons imply that Turkish economic stability is worse than CMCs and NMCs almost for all the metrics considered. Turkey has better stability metrics than that of NMCs only for current account balance over GDP ratio. In addition, Turkey has better stability metrics than that of CMCs only for percentage CPI change rate, unemployment rate and current account balance over GDP ratio.

On the other hand, it is important to note that, higher stability does not precisely indicate better macroeconomic performance of a country. As Kibritçioğlu (2003) states;

> ***Smaller coefficients of standard deviation for a specific indicator mean more stability in terms of this variable. But more stability (smaller coefficients) in this sense does not definitely mean that this trend is better or more wishful than in the corresponding country, and vice versa. For example, a relatively high coefficient resulting from a sharp downward trend in CPI inflation in a country like A must imply a better performance in favor of this country in comparison to a country like B which has stable inflation rates but that are likely fixed at a very high level of inflation.***

In this context, as it is studied in detail in Part 6, most of the indicators (mainly those related to Maastricht Convergence Criteria) are continuously converging to the EU which is why comparatively high level of standard deviations are observed in Turkey's macroeconomic indicators.

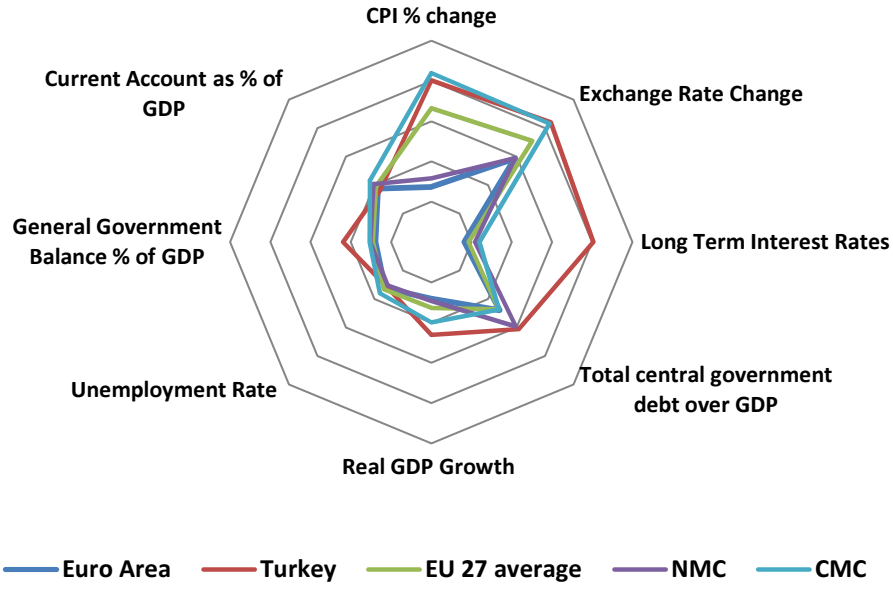



Figure 3-5 Similarities in Terms of Macroeconomic Stability between Turkey and Selected Country Groups[29]

| (logarithmic) | CPI % change | Exchange Rate Change | Long Term Interest Rates | Total central government debt over GDP | Real GDP Growth | Unemployment Rate | General Government Balance % of GDP | Current Account as % of GDP |
|---|---|---|---|---|---|---|---|---|
| Euro Area | 0,18 | 0,96 | -0,09 | 0,70 | 0,21 | 0,31 | 0,19 | 0,44 |
| Turkey | 1,51 | 1,60 | 1,51 | 1,04 | 0,66 | 0,28 | 0,60 | 0,40 |
| EU 27 average | 1,16 | 1,27 | -0,04 | 0,68 | 0,32 | 0,33 | 0,23 | 0,47 |
| NMC | 0,29 | 0,97 | 0,04 | 0,99 | 0,23 | 0,26 | 0,26 | 0,52 |
| CMC | 1,60 | 1,58 | 0,10 | 0,69 | 0,50 | 0,40 | 0,27 | 0,58 |

Table 3-10 Data for Figure 3-5: Log of Standart Deviations of Selected Indicators[29]

[29] Calculated using the data in Table 3-8

| Correlation Coefficients | | | | | |
|---|---|---|---|---|---|
| a) Turkey as a Benchmark | | b) EU27 as a Benchmark | | c) EUROAREA as a Benchmark | |
| COUNTRIES | Turkey | COUNTRIES | EU27 average | COUNTRIES | Euro Area |
| Brazil | 0,998 | Brazil | 0,999 | Belgium | 0,993 |
| Romania | 0,987 | SGC | 0,988 | Portugal | 0,990 |
| Albania | 0,952 | Romania | 0,986 | Croatia | 0,989 |
| Macedonia | 0,860 | Poland | 0,981 | Argentina | 0,974 |
| Indonesia | 0,834 | Hungary | 0,980 | Italy | 0,961 |
| Russian Fed. | 0,788 | CMC | 0,974 | UK | 0,959 |
| Argentina | 0,784 | Russian Fed. | 0,967 | Korea Rep. | 0,958 |
| SGC | 0,766 | Bulgaria | 0,955 | Czech Rep. | 0,951 |
| CMC | 0,764 | Albania | 0,951 | Macedonia | 0,948 |
| Bulgaria | 0,760 | Ireland | 0,949 | Germany | 0,947 |
| EU27 average | 0,759 | Estonia | 0,912 | France | 0,942 |
| Hungary | 0,737 | Macedonia | 0,874 | Canada | 0,940 |
| Mexico | 0,731 | Czech Rep. | 0,863 | Sweden | 0,940 |
| Estonia | 0,726 | Slovenia | 0,851 | Denmark | 0,938 |
| Poland | 0,700 | Indonesia | 0,845 | Finland | 0,938 |
| Slovenia | 0,662 | Mexico | 0,825 | Indonesia | 0,933 |
| Ireland | 0,611 | South Africa | 0,813 | Slovak Rep. | 0,929 |
| South Africa | 0,606 | Argentina | 0,805 | South Africa | 0,929 |
| Czech Rep. | 0,590 | Slovak Rep. | 0,802 | Netherlands | 0,924 |
| Slovak Rep. | 0,577 | Greece | 0,787 | Spain | 0,917 |
| Lithuania | 0,561 | Turkey | 0,759 | NMC | 0,916 |
| Austria | 0,556 | Lithuania | 0,757 | Malta | 0,906 |
| France | 0,556 | Italy | 0,749 | Switzerland | 0,900 |
| Greece | 0,547 | France | 0,749 | Greece | 0,894 |
| Netherlands | 0,522 | Austria | 0,743 | Austria | 0,887 |
| Italy | 0,516 | Korea Rep. | 0,740 | India | 0,880 |
| Korea Rep. | 0,515 | Sweden | 0,739 | Luxembourg | 0,839 |
| Sweden | 0,512 | Netherlands | 0,734 | Slovenia | 0,834 |
| Luxembourg | 0,510 | UK | 0,733 | Hungary | 0,825 |
| Croatia | 0,499 | Croatia | 0,724 | Morocco | 0,800 |
| UK | 0,481 | Euro Area | 0,722 | Poland | 0,754 |
| Euro Area | 0,476 | India | 0,718 | Albania | 0,753 |
| Belgium | 0,472 | Belgium | 0,705 | Japan | 0,748 |
| India | 0,459 | Germany | 0,689 | Norway | 0,738 |
| Germany | 0,452 | Luxembourg | 0,685 | Ireland | 0,732 |
| Switzerland | 0,437 | Switzerland | 0,676 | EU27 average | 0,722 |
| Portugal | 0,414 | Finland | 0,672 | Brazil | 0,714 |
| Finland | 0,407 | China | 0,654 | Estonia | 0,618 |
| Denmark | 0,371 | Portugal | 0,646 | SGC | 0,610 |
| Latvia | 0,366 | Latvia | 0,624 | Romania | 0,577 |
| NMC | 0,362 | NMC | 0,572 | United States | 0,557 |
| Canada | 0,338 | Spain | 0,562 | CMC | 0,549 |
| China | 0,338 | Denmark | 0,554 | Russian Fed. | 0,547 |
| Spain | 0,277 | Canada | 0,541 | Bulgaria | 0,487 |
| Malta | 0,255 | Malta | 0,535 | Turkey | 0,476 |
| Norway | 0,238 | Norway | 0,451 | Cyprus | 0,475 |
| Japan | 0,217 | Japan | 0,372 | Latvia | 0,298 |
| Morocco | 0,088 | Morocco | 0,370 | Mexico | 0,229 |
| Cyprus | 0,016 | Cyprus | 0,101 | China | 0,207 |
| United States | -0,346 | United States | -0,043 | Lithuania | 0,169 |

Table 3-11 International Rank of Macroeconomic Similarity in Terms of Standard Deviations
(Source: Own calculations from the data in Table 3-8)

## 3.3 CONCLUSION

To sum up, it is possible to state that Turkey's macroeconomic structure does not seem to be worse than not all but some of the CMCs in terms of the considered nine macroeconomic indicators. On the other hand, it may be argued that Turkish economy suffers from instability problems. In fact, existence of instability in Turkey's macroeconomic structure has been frequently mentioned in literature. Boratav and Yeldan (2002) state that although the motive behind financial liberalization for the developing countries is to restore growth and stability by raising saving and improving economic efficiency; a major consequence of this process has been the exposure of these economies to speculative short term capital movements (hot money) which increased financial instability and Turkish economy also experienced macroeconomic instability during financial liberalization attempts. Similarly, Ural (2003) indicates that since the 1990's Turkish economy got into 'growth-instability-crisis' vicious circle, because of the fluctuations in the financial structure. By employing a factor analysis (principal components analysis) the author aims to obtain the factors that affect crises in Turkey. As it is well known, economic crises are important triggers of economic instability and such crises are relatively frequent in Turkish macroeconomic history. Additionally, Kibritçioğlu (2001) provides detailed information on economic crises in Turkey between the periods of 1969-2001.

Although, Turkish economy suffers from instability problem from time to time, Turkey's macroeconomic structure is not much deviant from that of CMCs. Moreover, there are monetary union candidate countries which have worse stability characteristics than Turkey has.

Furthermore, as studied in Chapter 6 in detail, most of the indicators are converging to the EU and this is the main reason behind the high standard deviation levels observed in Turkish macroeconomic indicators. In that respect, it may be concluded that the macroeconomic deficiencies of Turkey are not in an extent that renders Turkey as an unacceptable candidate for European Monetary Union.

# CHAPTER 4

# EVOLUTION OF TRADE STRUCTURE OF TURKEY AND CHANGES IN HER EXPORT STRUCTURE BETWEEN 1995 AND 2008

## 4.1 CHANGES IN THE TRADE STRUCTURE OF TURKEY THROUGH 1995-2008

In this section, the overall foreign trade structure of Turkey through 1995 - 2008 is provided and the trends are analyzed. Previous studies in the literature that aim to demonstrate the trends in the overall foreign trade structure of a country, generally analyze the volume and dynamics of imports and exports and also present the commodity composition of foreign trade (Wang (1989), Paniak (1968), Vandendries (1967), Utkulu (2005), Hepaktan (2007)). A similar approach is followed for the Turkish case.

It may be argued that the trade structure of Turkey through 1995 and 2008 is mainly a continuation of the new trade policies that was begun to be applied in 1980. As it is well-known a new program, including

structural transformations was started on January 24th 1980. These decisions initiated a transition process from a closed economy to an open and more liberal economy. In terms of trade, import activities were liberalized and export activities were encouraged with some measures like tax decrease, low interest credits and custom dispensation to manufacturer exporters. Before 1980, except for a few and short-term periods, etatist trade policies were applied (Hepatkan, 2007).

| Year | Proportion of imports covered by exports(%) (exports/imports) | Exports (*000$) | Rate of Change in Exports (%) | Imports (*000$) | Rate of Change in Imports (%) |
|---|---|---|---|---|---|
| 1995 | 60,59 | 21637041 | 19,50 | 35709011 | 53,46 |
| 1996 | 53,23 | 23224465 | 7,34 | 43626642 | 22,17 |
| 1997 | 54,08 | 26261072 | 13,08 | 48558721 | 11,31 |
| 1998 | 58,74 | 26973952 | 2,71 | 45921392 | -5,43 |
| 1999 | 65,37 | 26587225 | -1,43 | 40671272 | -11,43 |
| 2000 | 50,96 | 27774906 | 4,47 | 54502821 | 34,01 |
| 2001 | 75,69 | 31334216 | 12,81 | 41399083 | -24,04 |
| 2002 | 69,94 | 36059089 | 15,08 | 51553797 | 24,53 |
| 2003 | 68,15 | 47252836 | 31,04 | 69339692 | 34,50 |
| 2004 | 64,76 | 63167153 | 33,68 | 97539766 | 40,67 |
| 2005 | 62,92 | 73476408 | 16,32 | 116774151 | 19,72 |
| 2006 | 61,28 | 85534676 | 16,41 | 139576174 | 19,53 |
| 2007 | 63,08 | 107271750 | 25,41 | 170062715 | 21,84 |
| 2008 | 65,37 | 132027196 | 23,08 | 201963574 | 18,76 |
| 2009 | 72,47 | 102128668 | -22,65 | 140920880 | -30,22 |

Table 4-1 Turkish Foreign Trade
(Source: TURKSTAT)

In order to analyze the evolution of Turkish trade structure, the rate of change in exports and imports and the proportion of imports covered by exports (exports/imports) from the previous years are provided, in Table

4-1 and Figure 4-1. At a first glance, Figure 4-1 reveals that between 1995 and 2008, both Turkish exports and imports increase significantly. That is, exports increase at an average annual rate of 15.7% and imports increase at an average annual rate of 18.5%. Even though in 1995 Turkish exports are 21.6 billion USD, it increases more than 4.7 times and becomes 102 billion USD in 2008. Similarly, in 1995 Turkish imports are 35.7 billion USD and in 2008 it increases more than 3.9 times and becomes 141 billion USD. As can be observed in Table 4-1, through the same period Turkish exports continuously increase except in 1999 and Turkish imports continuously increase except in 1998, 1999 and 2001.

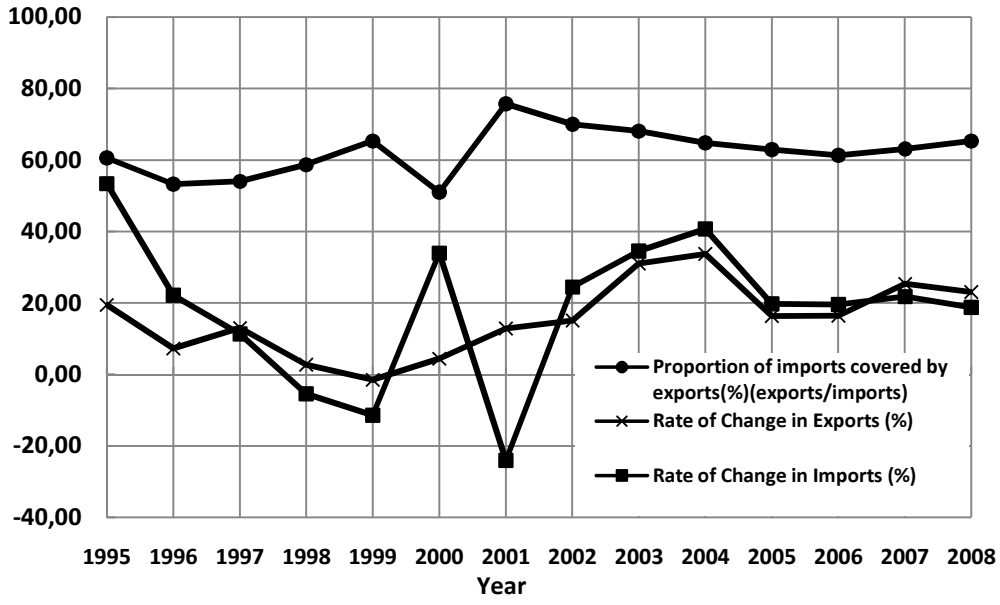



Figure 4-1 Exports Coverage Ratio Change Through 1995-2008 (Source: TURKSTAT)

Additionally, a detailed inspection on Figure 4-1 demonstrates that the rate of change in Turkish exports and imports are quite unstable through time. On the other hand, change in the export coverage rates is not as unstable as the exports and imports change rates through the same period. When considering Table 4-1, it is seen that even though the export coverage ratio increased from 60.6% in 1995 to 65.4% in 2008, it is important to note that the trade deficit increased approximately 5 times within the same period.

According to İzmen and Yılmaz (2009), when long-term performance of Turkish exports and imports are analyzed it can be seen that, efforts to increase exports are successful only to a certain degree. The authors assert that the country's large trade deficit with the rest of the world accumulates over time and often results in a crisis which reduces imports of the country and therefore reduces the trade deficit automatically (see Figure 4-2). Moreover, Akdemir and Konur (2010) claims that the foreign trade deficit in Turkish economy is largely caused by the under-valued exchange rate.

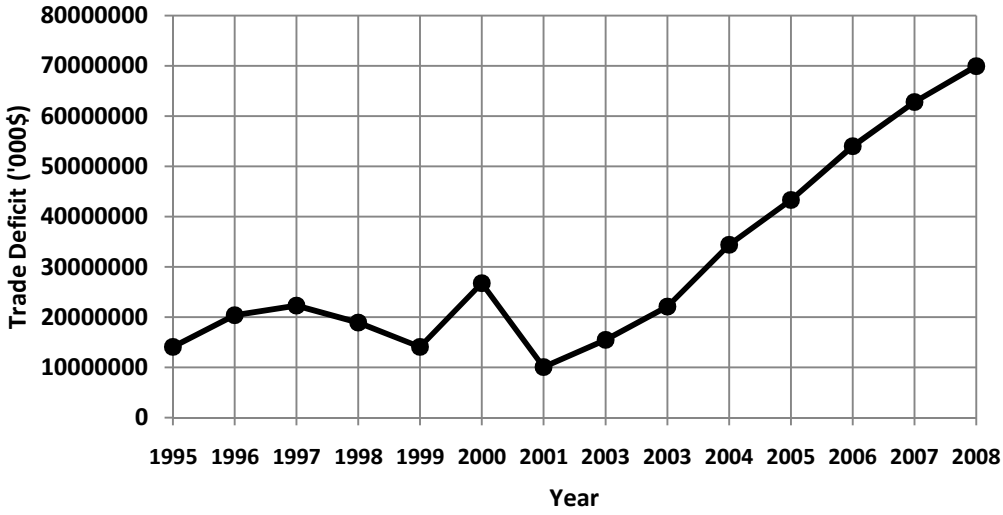



Figure 4-2 Turkish Trade Deficit ('000$)
(Source: TURKSTAT)

As expected, trade performance of a country is highly affected by various global and domestic factors and Turkey is not an exception. Within the period of interest, Aysan and Hacıhasanoğlu (2007) state that the most significant global and domestic factors affecting Turkish trade performance are the crises in Asia and Russia in 1997 and 1998, respectively, the two severe earthquakes that occurred in the Marmara region in 1999, and the financial crises that occurred in Turkey in November 2000 and February 2001. Other important factors may be considered as 2004-2006 Exports Strategic Plan prepared in 2003 and the Customs Union establishment between Turkey and the EU in 1996. With this agreement Turkey's custom duties, quantitative restrictions and some other measures with similar effects on the trade with the European Union were eliminated.

As Adam and Moutas (2005) state, the CU between Turkey and the EU goes far beyond a basic custom union with free international trade and common external tariffs and has given new impetus to the liberalization process in Turkey. Apart from the liberalization of tariffs and adoption of the EU's common external tariff for industrial products and the industrial components of processed agricultural products, the agreement also embraces a number of integration elements which include the adoption of the Community's commercial policy towards third countries including textile quotas, the adoption of the free trade agreements with all the EU's preferential partners including EFTA, CEECs and Mediterranean countries; co-operation on the harmonization of agricultural policy, mutual minimization of restriction on trade in services, harmonization of Turkey's legislation to that of the EU in the area of competition policy, state aids, anti-dumping, intellectual and industrial property rights, public procurement and technical barriers to trade (Adam and Moutas (2005).

In the rest of the chapter, the trends in Turkish trade are presented chronologically with a special emphasis on the significant factors affecting the trade performance. Turkish foreign data statistics reveal that in 1995, Turkish exports are 21.6 billion USD, Turkish imports are 35.7 billion USD and export coverage rate is 60.59%. However in 1996, as can be seen from Table 4-1, exports grow at a rate of 7.3% and become 23.2 billion USD. On the other hand, imports grow at a rate of 22.2% and become 43.6 billion USD and therefore export coverage rate falls sharply to 53.23%. Uyar (2001) explains this situation with the establishment of the Customs Union between Turkey and the EU. Uyar (2001) states that after the Customs Union in the first years of the membership, competitive strength of the Turkish economy is weaker

than that of the EU economy, i.e. imports rise more rapidly than exports. In the course of time, with the increase in common production, technology transfers, flow of information and R&D activities, Turkish economy displays a better performance. In addition, Akkoyunlu-Wigley, Mihci and Arslan (2006) suggest that although increasing import volume together with rising growth rates in Turkish economy is observed with current account deficits, productivity enlarging effects of rising import volumes should not be disregarded. The authors state that, in particular, productivity improving effects comes from the manufacturing imports from the EU countries which can be regarded as one of the positive effects of the CU on Turkish economy among the others. Furthermore, Neyaptı, Taşkın and Üngör (2003) also conclude that the CU has contributed to increasing volume of trade between Turkey and the EU; and income effect on trade has decreased over the CU period.

Although a higher rate of change in exports is observed in 1996, this increase is lower than the rate in 1995. The report by the Undersecretariat of the Prime Ministry for Foreign Trade (UPMFT, 2010)[30], which analyzes the development of Turkish exports, indicates that the main reason of this decelerating pattern is the deceleration in the growth rate of world trade.

Aysan and Hacıhasanoğlu (2007) mention the Asia crisis of 1997 as an important global factor affecting Turkish trade performance negatively. However, despite the Asian crisis, in 1998 it is seen that exports grow at a rate of 13.08% accompanied with an import growth rate of 11.31%.

[30] "The Development of Turkey's Exports" retrieved June 05, 2010 from ; http://www.dtm.gov.tr/dtmweb/index.cfm?action=detayrk&yayinID=313&icerikID=411&dil=EN

UPMFT (2010) attributes these increasing trends, in spite of the crisis environment, mainly to the significant overall economic growth in the rest of the world except Asia. But in 1998, the effects of the Asia crisis become more widespread in the whole world. The overall demand for goods and the average prices declines. World economy can only grows at a rate of 2.2% and world exports decreases at a rate of 1.6%. Moreover Russia suffers from a severe crisis in the same year (UPMFT, 2010). Because of all these developments, in 1998 Turkish exports cannot rise as targeted. That is to say, exports growth rate is only 2.71% and there exists a decline in imports at a rate of 5.43%.

Turkey suffers from a severe earthquake disaster in 1999 and an economic recession period following the earthquake. Turkish economy contracts by 6.1% and inflation rate is nearly 70%. Furthermore, budget deficit highly increases and average annual compound interest rates of domestic treasury bonds increases up to 106% (Eğilmez and Kumcu, 2004). Because of the severe economic conditions, Turkish exports decrease, for the first time since 1989, at a rate of 1.4% and become 26.6 billion USD.

Like 1999, 2000 is also a difficult year for exporters due to the developments in Euro/dollar parity against dollar and remarkable increases in per barrel oil prices (UPMFT, 2010). Moreover, as 2000 is the first year of the new Economic Program, which is implemented with the support of the 17th Stand-By Agreement signed with the IMF, the exchange rate policy conducted in line with the Program’s inflation targeting adversely influences Turkish exports. Because of all these developments in 2000, Turkish exports are recorded as 27.8 billion USD with an increase of 4.4% (UPMFT, 2010).

A severe economic-cum-political crisis starting in November 2000 is effective throughout 2001. GDP is drifted into negative rates of growth following the first quarter of 2001. Of the expenditures over GDP the deepest slump is witnessed in fixed investments, i.e. private investment expenditures contracts 41.5% in the third quarter and 50.2% in the fourth quarter of 2001 (Yeldan, 2002). Furthermore, slowdown process beginning with 2001 becomes more apparent following 9/11 attacks and world output growth records the lowest figure of the last 10 years with 2.4% (UPMFT, 2010). Despite the crisis environment and competitive depreciation of the Turkish Lira (TL) throughout 2001, exports do not score a significant downfall. Conversely, Turkish exports are recorded as 31.3 billion USD with an increase of 12.8%. On the other hand, imports shrink by as much as 24.0%.

It may be argued that 2002 is the beginning of a new economic recovery period. A notable pace of growth in exports, with a rate of 15.1%, is observed in 2002. Total exports reach 36 billion USD while total imports are recorded as 51.5 billion USD. Main reasons behind this strong export growth can be enumerated as continuous expansion of the manufacturing production in spite of weak domestic demand, decrease in real labor costs, rising productivity and the business connections made in 2001 (UPMFT, 2010).

After 2003, a steady growth rate in exports as well as the overall trade volume is seen until 2008. This performance may be attributed to the 2004-2006 Exports Strategic Plan prepared in 2003 (Pıçak, 2010). According to 2004-2006 Exports Strategic Plan, a total value of 75 billion USD exports are aimed for 2006. Indeed, by the effective coordination between the related public agencies and private sector and

the outstanding performance of the exporters, annual export volume increases year by year and the 75 billion USD target is surpassed and the total exports reach 85.5 billion USD in 2006 (UPMFT, 2010). Similar increasing patterns are seen for 2007 and 2008.

## 4.2 CHANGES IN THE VOLUME AND SHARE OF TURKISH EXPORTS THROUGH 1995-2008

In this section, first the ranking of some selected countries and country groups[31] according to the volume of exports they receive from Turkey are presented for 1995 and 2008. Secondly, the detailed sectoral breakdown of Turkish exports to ten countries with the highest order in this ranking is provided.

### 4.2.1 CLASSIFICATION OF COUNTRIES BASED ON THE VOLUME OF EXPORTS RECEIVED FROM TURKEY

In Table 4-2, Turkish export volumes are shown for some selected countries and country groups in 1995 and 2008. As it can be seen from the table, EU27 is the most important export market of Turkey which constitutes nearly half of the total exports in 2008. However, a striking point in Table 4-2 is that, even though the volume of exports to EU27 increases more than 5 times from 1995 to 2008, share of exports decreases from 56.4% in 1995 to 48.0% in 2008. Similarly, despite the volume of exports to Eurozone countries increases more than 4 times in

[31] These countries and country groups are same countries and country groups as selected in Chapter 3.

13 years, the share of exports decreases from 45.3% in 1995 to 33.1% in 2008. On the contrary, both the volumes and the shares of exports to SGCs, NMCs and CMCs increase considerably during this period. In other words, even though the shares of new member countries of the EU increased within this period, with considerable decrease in shares of some of the former EU-member countries, total export shares of EU member countries is lower in 2008 than in 1995. Furthermore, while shares of some of the countries, especially countries with the highest shares, decrease through time, some of them increase. For instance, share of exports to Germany decreases to 9.8% in 2008 from 23.3% in 1995, share of exports to United States decreases to 3.3% in 2008 from 7.0% in 1995, share of exports to Italy decreases to 5.9% in 2008 from 6.7% in 1995 and share of exports to the Russian Federation decreases to 4.9% in 2008 from 5.7% in 1995. On the other hand, share of exports to the UK increases to 6.1% in 2008 from 5.3% in 1995, share of exports to France increases to 5.0% in 2008 from 4.8% in 1995, share of exports to Spain increases to 3.0% in 2008 from 1.6% in 1995.

Dinççağ and Özlale (2010) state, there are two main reasons for the recent decrease in the percentages of Turkish exports to the EU countries. First, Turkey changes her policy towards export market diversifications as a response to the general decrease of EU market shares in the world trade. Secondly, as a result of the change in specialization strategies of multinational corporations or some other domestic corporations which do job with these multinational corporations; these companies shift their productions from EU markets to other markets. Therefore, Dinççağ and Özlale (2010) assert that there exists axial dislocation from EU markets to other markets.

| 1995 | export shares | total export value (000$) |
|---|---|---|
| EU 27 total | 56,42 | 12.206.977 |
| Euro Area | 45,30 | 9.801.911 |
| Germany | 23,28 | 5.036.269 |
| United states | 7,00 | 1.513.918 |
| Italy | 6,73 | 1.457.002 |
| SGC | 6,19 | 1.338.691 |
| Russian Federation | 5,72 | 1.238.226 |
| United Kingdom | 5,25 | 1.135.721 |
| CMC | 5,13 | 1.109.635 |
| France | 4,78 | 1.033.296 |
| Holland | 3,41 | 736.777 |
| Belgium-Luxembourg | 2,09 | 451.777 |
| Spain | 1,64 | 354.469 |
| NMC | 1,42 | 308.187 |
| Romania | 1,40 | 301.960 |
| Austria | 1,27 | 275.287 |
| Poland | 1,26 | 272.359 |
| Switzerland | 1,10 | 237.924 |
| Greece | 0,97 | 209.953 |
| Bulgaria | 0,85 | 183.176 |
| Japan | 0,83 | 180.264 |
| Hungary | 0,74 | 159.709 |
| Denmark | 0,62 | 133.267 |
| Sweden | 0,49 | 105.573 |
| Korea, Republic of | 0,46 | 99.944 |
| Canada | 0,44 | 96.098 |
| Macedonia, FYR | 0,35 | 76.467 |
| Czech Republic | 0,35 | 75.727 |
| Morocco | 0,31 | 67.269 |
| China,P.R.: Mainland | 0,31 | 66.961 |
| South Africa | 0,31 | 66.576 |
| Portugal | 0,28 | 59.666 |
| Albania | 0,26 | 56.942 |
| Norway | 0,25 | 54.261 |
| Malta | 0,23 | 49.223 |
| Ireland | 0,22 | 47.656 |
| India | 0,19 | 42.006 |
| Finland | 0,19 | 41.526 |
| Slovenia | 0,15 | 32.679 |
| Indonesia | 0,15 | 32.447 |
| Brazil | 0,13 | 28.431 |
| Lithuania | 0,13 | 28.120 |
| Croatia | 0,12 | 25.257 |
| Slovak Republic | 0,08 | 16.332 |
| Mexico | 0,04 | 7.924 |
| Latvia | 0,03 | 6.000 |
| Argentina | 0,02 | 5.258 |
| Estonia | 0,02 | 3.453 |
| Cyprus | 0,00 | 0 |

| 2008 | export shares | total export value (000$) |
|---|---|---|
| EU 27 total | 48,01 | 63.390.419 |
| Euro Area | 33,08 | 43.673.432 |
| SGC | 11,53 | 15.226.752 |
| Germany | 9,81 | 12.951.755 |
| CMC | 8,24 | 10.874.230 |
| United Kingdom | 6,18 | 8.158.669 |
| Italy | 5,92 | 7.818.988 |
| France | 5,01 | 6.617.511 |
| Russian Federation | 4,91 | 6.483.004 |
| NMC | 3,30 | 4.352.522 |
| United States | 3,26 | 4.299.941 |
| Spain | 3,07 | 4.047.267 |
| Romania | 3,02 | 3.987.476 |
| Netherlands | 2,38 | 3.143.835 |
| Switzerland | 2,16 | 2.856.787 |
| Greece | 1,84 | 2.429.968 |
| Bulgaria | 1,63 | 2.151.534 |
| Belgium | 1,61 | 2.122.434 |
| Poland | 1,20 | 1.586.772 |
| China,P.R.: Mainland | 1,09 | 1.437.204 |
| South Africa | 0,94 | 1.238.632 |
| Austria | 0,75 | 990.956 |
| Morocco | 0,73 | 957.769 |
| Malta | 0,72 | 956.354 |
| Denmark | 0,72 | 953.437 |
| Sweden | 0,70 | 918.787 |
| Czech Republic | 0,53 | 700.824 |
| Hungary | 0,52 | 684.088 |
| Ireland | 0,50 | 663.903 |
| Slovenia | 0,49 | 648.705 |
| India | 0,41 | 542.730 |
| Portugal | 0,41 | 540.744 |
| Canada | 0,38 | 501.428 |
| Norway | 0,30 | 391.174 |
| Finland | 0,28 | 367.128 |
| Japan | 0,25 | 330.462 |
| Croatia | 0,25 | 328.678 |
| Brazil | 0,24 | 318.027 |
| Slovak Republic | 0,23 | 306.631 |
| Albania | 0,23 | 305.737 |
| Macedonia, FYR | 0,22 | 296.172 |
| Indonesia | 0,22 | 284.426 |
| Korea, Republic of | 0,21 | 271.254 |
| Estonia | 0,18 | 239.707 |
| Lithuania | 0,18 | 231.397 |
| Mexico | 0,12 | 152.166 |
| Argentina | 0,08 | 107.099 |
| Latvia | 0,08 | 104.295 |
| Luxembourg | 0,04 | 56.388 |
| Cyprus | 0,01 | 10.864 |

Table 4-2 Change in Turkish Export Volumes According to Countries and Country Groups

(Source: TURKSTAT)

A second report by Undersecretariat of the Prime Ministry for Foreign Trade (UPMFT, 2009)[32], which analyzes the developments in the world trade and economy, states that the drop in the share of top countries in exports is an indication of an improvement in the regional diversification and concludes that the geographical proximity in addition to the integration with the EU and the Strategy to Improve Economic and Commercial Relationships with the Neighboring and Surrounding Countries have been effective in Turkey's export orientation.

### 4.2.2 DETAILED SECTORAL ANALYSIS OF TURKISH TOTAL EXPORTS AND EXPORTS TO THE COUNTRIES WITH THE HIGHEST EXPORT SHARES

Figure 4-3 presents the pattern of Turkish total exports comparing the shares of exports in 97 sectors for years 1995 and 2008 and Figure 4-4 through Figure 4-13 presents the pattern of Turkish exports towards ten countries[33] (Germany, the UK, Italy, France, the Russian Federation, United States, Spain, Romania, the Netherlands, Switzerland), comparing the shares of exports in 97 sectors in the year 1995 and in the year 2008. Turkish total exports' sectoral data is retrieved from Turkish Statistical Institute (TURKSTAT)[34] and the

[32] UPMFT Report titled "Foreign Trade Outlook 2008" retrieved June 18, 2010, from: http://www.dtm.gov.tr/dtmweb/index.cfm?action=detayrk&yayinID=1995&icerikID=2152&dil=EN

[33] These countries are the top ten countries in the ranking of 2008 Turkish export volumes according to countries and country groups in Table 4-2.

[34] List of these sectors is (the version which is retrieved from TURKSTAT) presented in APPENDIX C.

Turkish export data towards ten countries are retrieved from United Nations Commodity Trade Statistics Database (COMTRADE)[35]. Both data are retrieved at a 2 digits sectoral level of the 1992 version of the Harmonized System Nomenclature (HS1992)[36] (see World Custom Organization homepage for a detailed description of this system).

In Figure 4-3 it is seen that, Turkish total export shares are reasonably uniformly distributed which are mostly less than 3% and there is no sector with a share more than 16.0% in 1995 and 13.9% in 2008. However, it can also be seen that, shares of some sectors change considerably from 1995 to 2008. Shares of some sectors noticeably decrease through time. For instance, even though share of 'fruit (8)' is 5.7% in 1995 it decreases to 2.2% in 2008. Share of 'articles of apparel and clothing accessories knitted (61)' is 16.0% in 1995 but decreases to 5.9% in 2008. In addition, share of 'articles of apparel and clothing accessories not knitted' (62)' decreases from 10.2% in 1995 to 4.0% in 2008. On the contrary, there are also some sectors whose shares increase markedly in the course of time. Namely, the share of 'iron and steel (72)' is 8.1% in 1995 and it becomes 11.3% in 2008. Share of 'machineries, mechanical appliances, boilers and; parts thereof' (84)' becomes 7.8% in 2008 while it is 3.2% in 1995 and share of 'vehicles other than railway (87)' becomes 13.9% in 2008 while it is 3.0% in 1995 and lastly the sector of 'mineral fuels and oils (27)' becomes 5.7% in

[35] List of these sectors is (the version which is retrieved from COMTRADE) presented in APPENDIX D.

[36] The Harmonized Commodity Description and Coding Systems generally referred to as "Harmonized System" or simply "HS" is a multipurpose international product nomenclature developed by the World Customs Organization (WCO). The system is used by more than 200 countries and economies as a basis for their Customs tariffs and for the collection of international trade statistics.

2008, while it is 1.3% in 1995. Utkulu (2005) states that, all in all, there exists an evolution in comparative advantages of Turkey from labor intensive sectors to capital intensive sectors and as one of the dynamic effects of Customs Union, Turkish exporters are increasing their competitiveness in export markets.

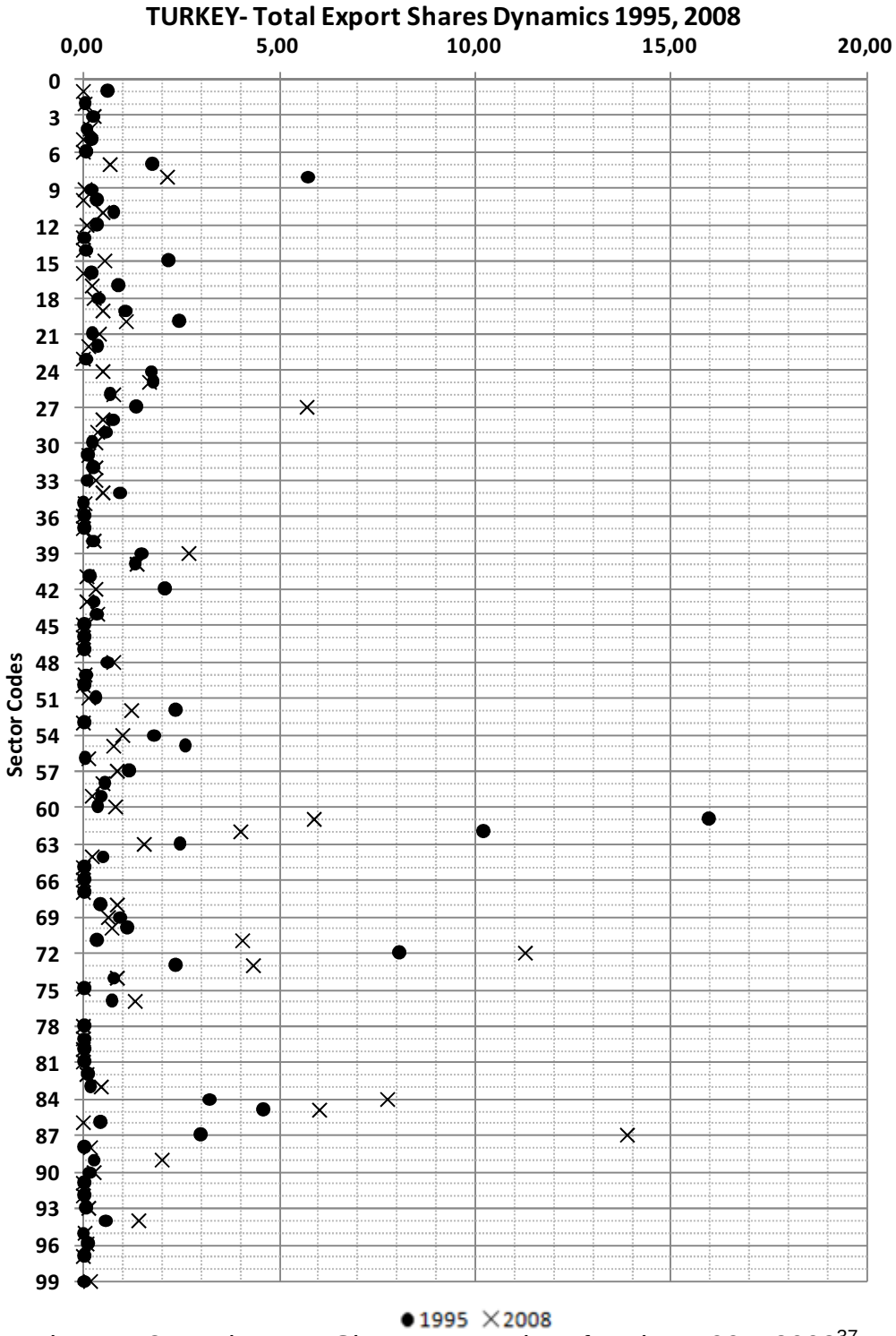



Figure 4-3 Total Export Shares Dynamics of Turkey 1995, 2008[37]

[37] Own calculations using data from TURKSTAT

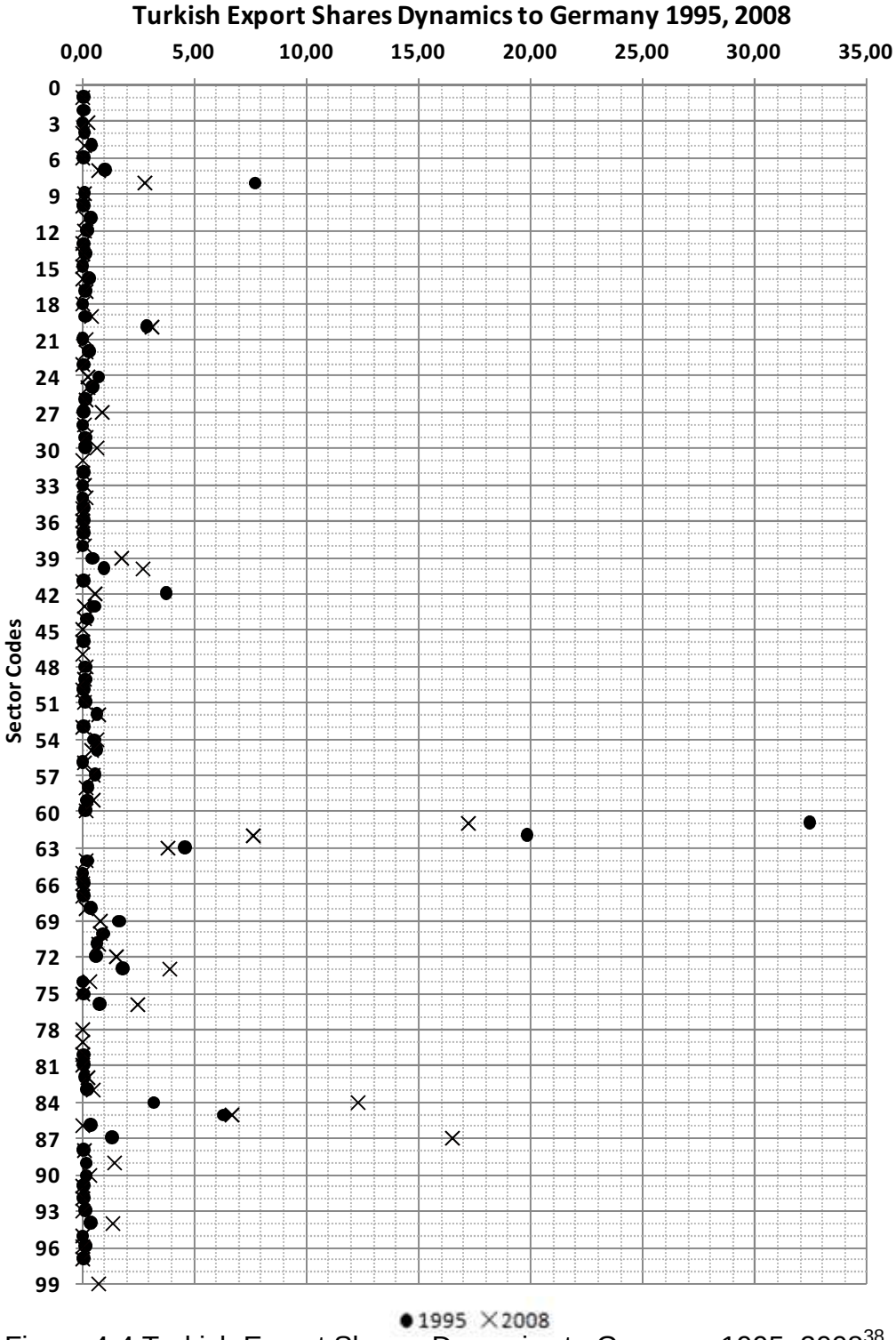



Figure 4-4 Turkish Export Shares Dynamics to Germany 1995, 2008[38]

[38] Own calculations using data from COMTRADE

In Figure 4-4 through Figure 4-13, the detailed sectoral analysis of Turkish exports to ten countries, which have the highest places according to ranking of the volume of exports from Turkey, are revealed respectively. In all of the figures, it is common that sector shares of Turkish exports are generally uniformly distributed with a share of less than 3%. For all ten countries only some sectors have comparatively important shares and only some of the sectors' shares changed considerably from 1995 to 2008.

In Figure 4-4, Turkish export share dynamics to Germany in the years 1995 and 2008 is presented. In 1995, the most important sectors in Turkish exports to Germany are the 'articles of apparel, accessories, knit or crochet (61)' with a share of 32.5% and the 'articles of apparel, accessories, not knit or crochet (62)' with a share of 19.9%. Also, 'edible fruit, nuts, peel of citrus fruit, and melons (8)' with a share of 7.8% has a comparative importance in 1995. Notwithstanding the decrease in their importance in the length of time, some of these sectors still have important shares in 2008. That is, share of 'articles of apparel, accessories, knit or crochet (61)' becomes 17.3%, share of 'articles of apparel, accessories, not knit or crochet (62)' becomes 7.7%. In addition to these two sectors, 'nuclear reactors, boilers, machinery, etc (84)' with a share of 12.3% and 'vehicles other than railway, tramway (87)' with a share of 16.5% becomes important in 2008.

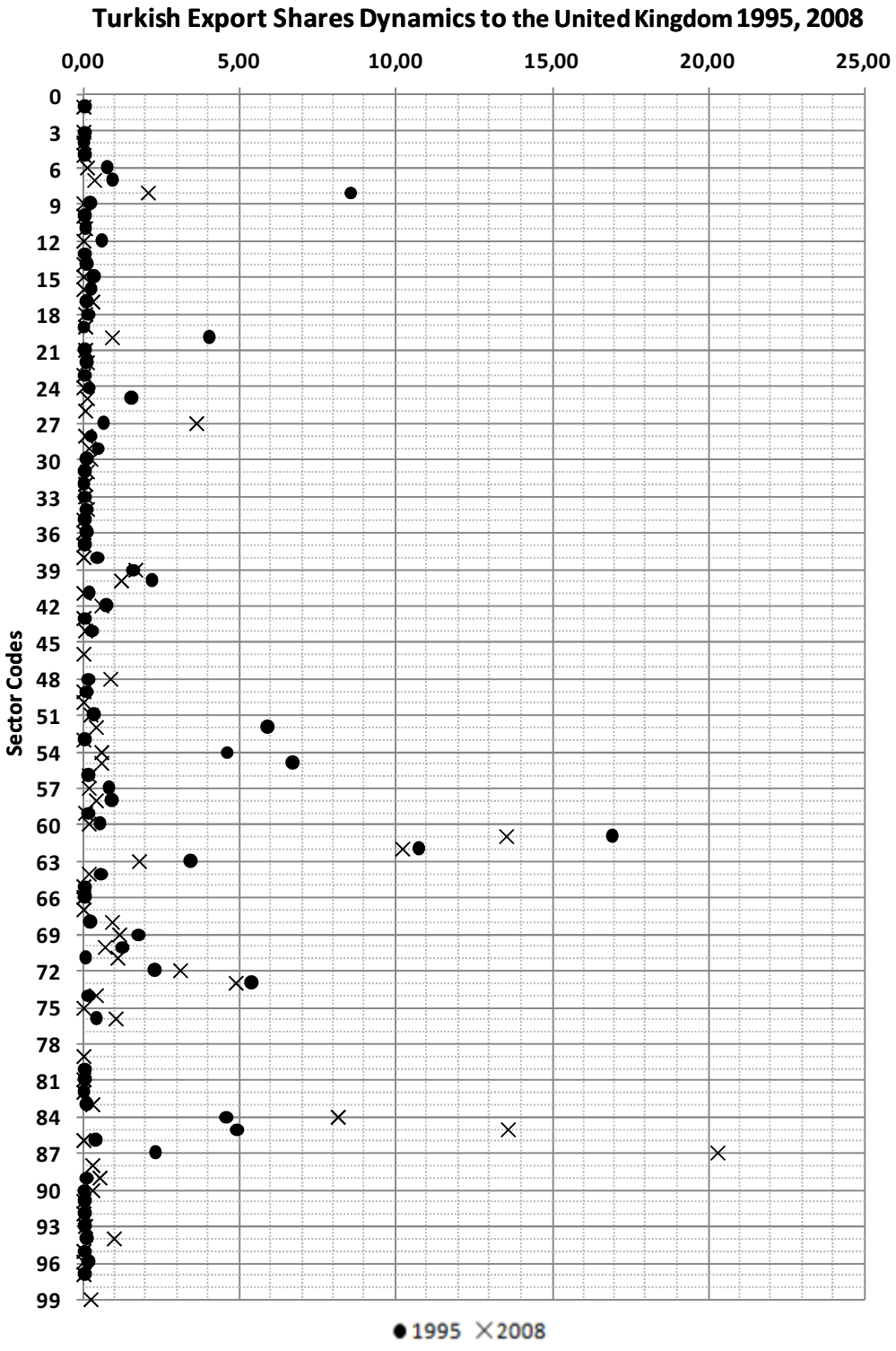



Figure 4-5 Turkish Export Shares Dynamics to the UK 1995, 2008[38]

In Figure 4-5, Turkish export share dynamics to the UK in the years 1995 and 2008 are presented. In 1995, same as Germany, the most important sectors are ‘articles of apparel, accessories, knit or crochet (61)’ with a share of 16.9%, ‘articles of apparel, accessories, not knit or crochet (62)’ with a share of 10.7% and ‘edible fruit, nuts, peel of citrus fruit, and melons (8)’ with a share of 8.6%. In 2008, export shares of ‘articles of apparel, accessories, knit or crochet (61)’ and ‘articles of apparel, accessories, not knit or crochet (62)’ decreases but still have relatively high shares. In addition to these sectors, ‘nuclear reactors, boilers, machinery, etc (84)’ (8.2%), ‘vehicles other than railway, tramway (87)’ (20.3%) and ‘electrical, electronic equipment (85)’ (13.6%) increase their shares in 2008.

In Figure 4-6, Turkish export share dynamics to Italy in the years 1995 and 2008 are presented. In this case, the sectors with the highest shares are somewhat different from Germany and the UK. That is, the most important sectors of 1995 were ‘vehicles other than railway, tramway (87)’ with a share of 11.4%, ‘mineral fuels, oils, distillation products, etc (27)’ with a share of 10.8%, ‘edible fruit, nuts, peel of citrus fruit, melons (8)’ with a share of 9.1% and lastly ‘cotton (52)’ sector with a share of 6.9%. In 2008 all of these sectors lose their importance except ‘vehicles other than railway, tramway (87)’. It becomes the most important sector of 2008 with a share of 27.3%. ‘Mineral fuels, oils, distillation products, etc (27)’ loses its share but still have comparative importance with a share of 8.8% and lastly ‘nuclear reactors, boilers, machinery, etc’ (84) with a share of 6.7% also gains importance in 2008.

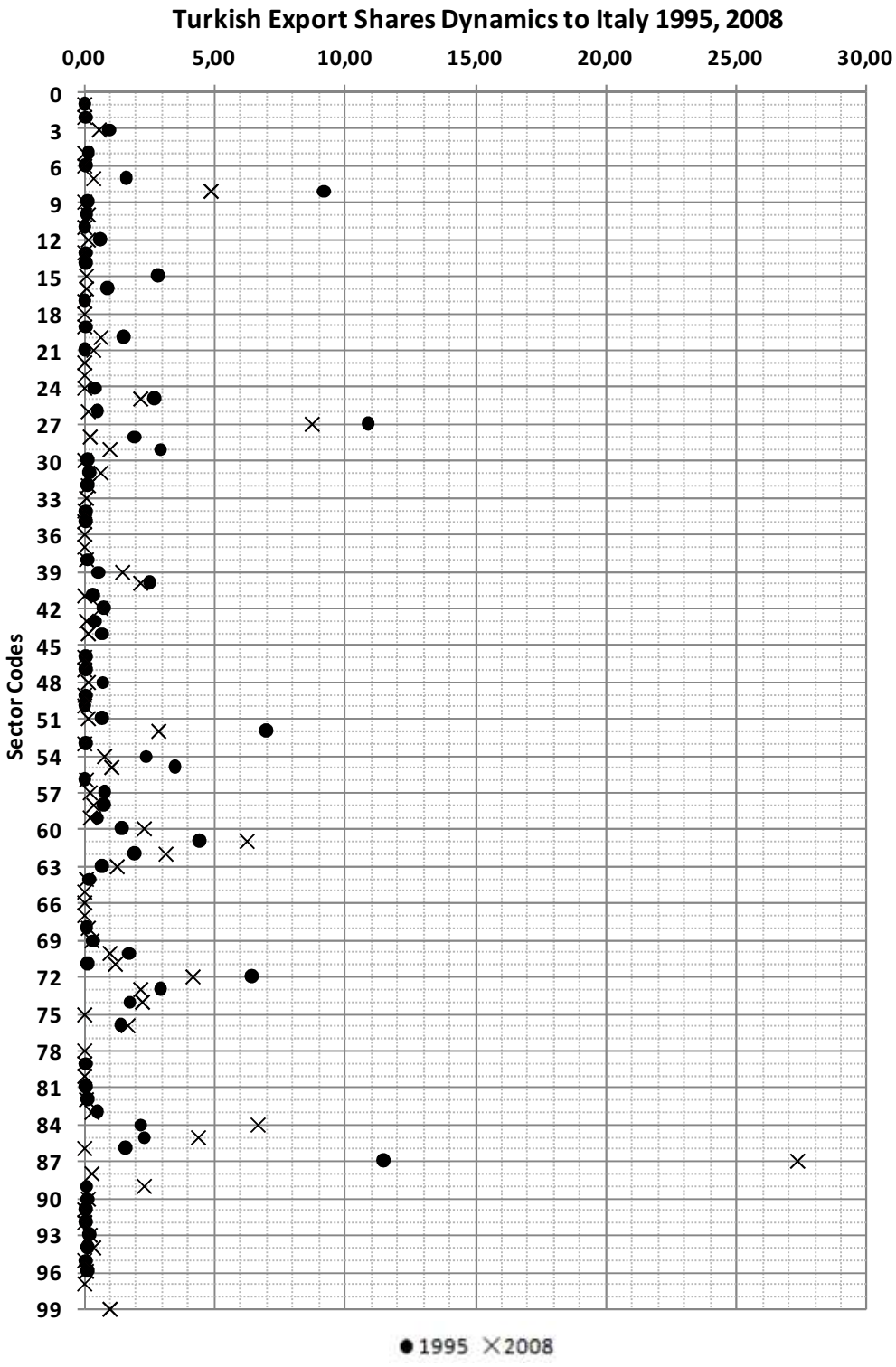



Figure 4-6 Turkish Export Shares Dynamics to Italy 1995, 2008[38]

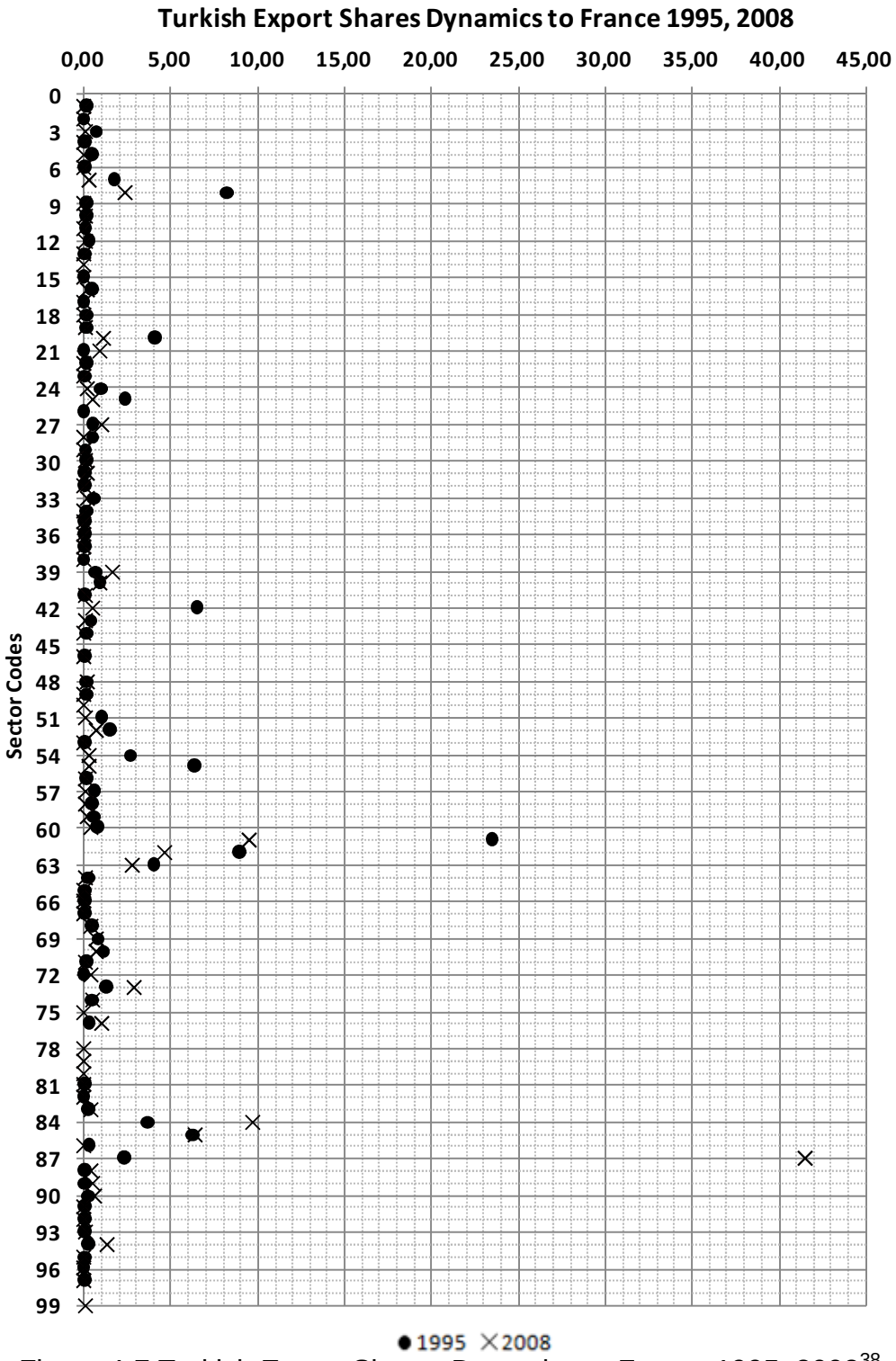



Figure 4-7 Turkish Export Shares Dynamics to France 1995, 2008[38]

In Figure 4-7, Turkish export share dynamics to France in the years 1995 and 2008 are presented. Although the most important sector of exports is ‘articles of apparel, accessories, knit or crochet (61)’ with a share of 23.5%, its importance decreases and its share becomes 9.5% in 2008. On the other hand, even though ‘vehicles other than railway, tramway (87)’ with a share of 2.3% could be called as unimportant when compared to other sectors, this sector rapidly comes into prominence through time and its share becomes 41.5% in 2008.

In Figure 4-8, Turkish export share dynamics to the Russian Federation in the years 1995 and 2008 are presented. In 1995 the most important sectors were ‘articles of apparel, accessories, knit or crochet (61)’ with a share of 16.3%, ‘articles of apparel, accessories, not knit or crochet (62)’ with a share of 13.1% and ‘sugars and sugar confectionery (17)’ with a share of 6.1%. In 2008, all of these sectors lose their priority and Turkey starts to orient its exports to new sectors. ‘vehicles other than railway, tramway (87)’ with a share of 21.4%, ‘nuclear reactors, boilers, machinery, etc (84)’ with a share of 7.1% and ‘edible fruit, nuts, peel of citrus fruit, melons (8)’ with a share of 6.6% becomes the most important exporting sectors in 2008.

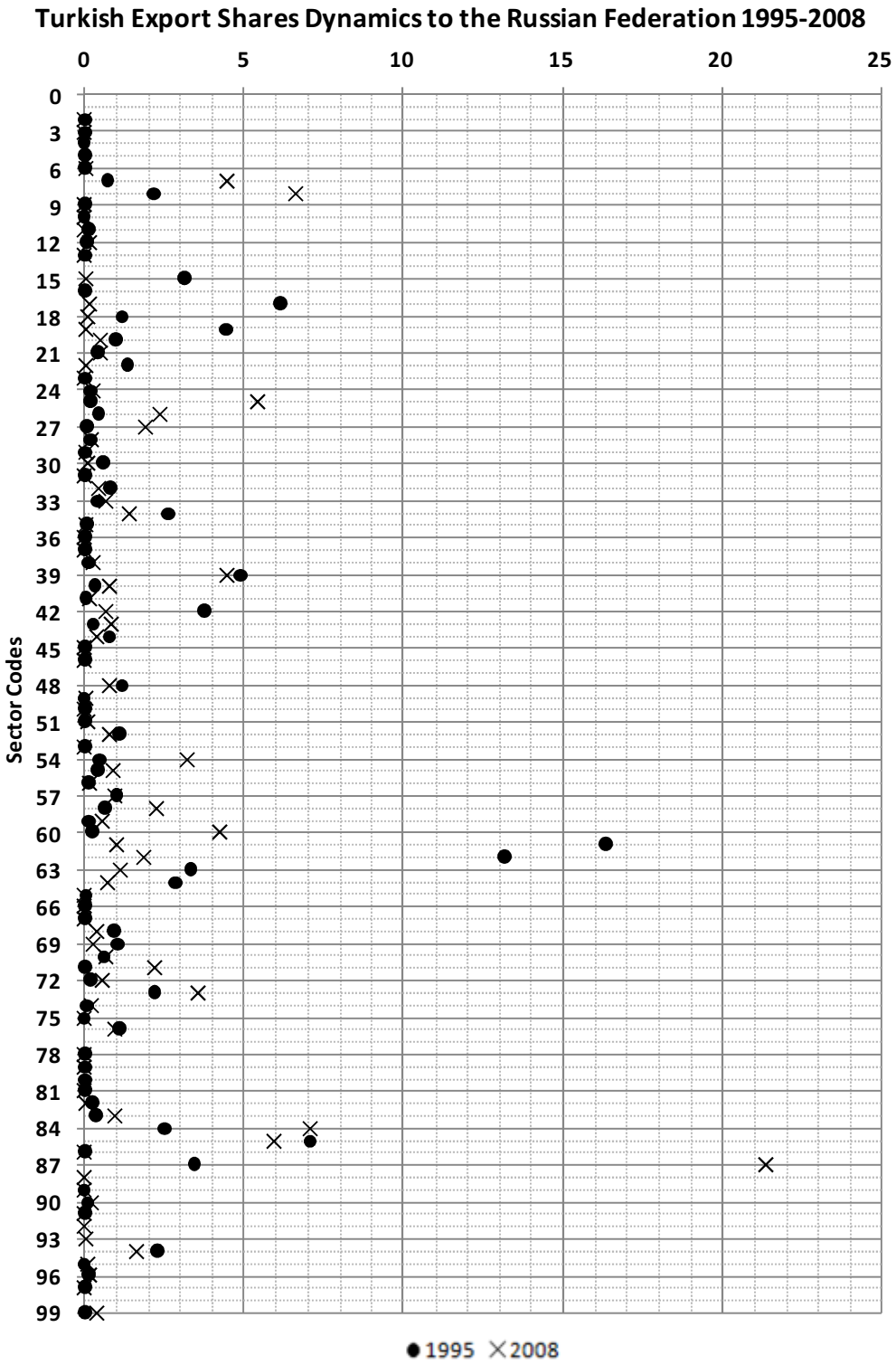



Figure 4-8 Turkish Export Shares Dynamics to the Russian Federation 1995, 2008[38]

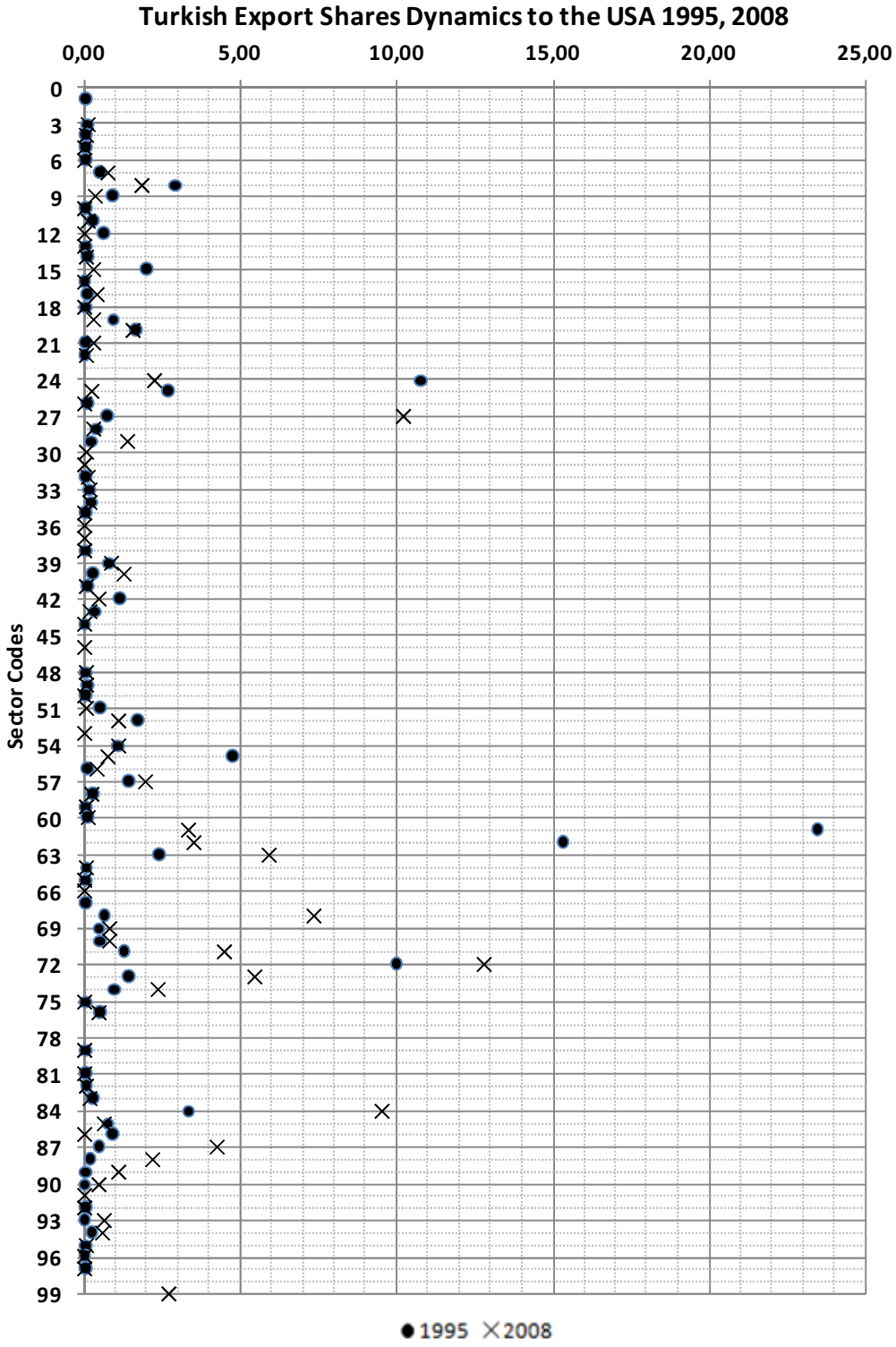



Figure 4-9 Turkish Export Shares Dynamics to the United States 1995, 2008[38]

In Figure 4-9, Turkish export share dynamics to United States in the years 1995 and 2008 are presented. In 1995, the sectors with the highest shares are ‘articles of apparel, accessories, knit or crochet (61)’ with a share of 23.5%, ‘articles of apparel, accessories, not knit or crochet (62)’ with a share of 15.3%, ‘tobacco and manufactured tobacco substitutes (24)’ with a share of 10.8% and ‘iron and steel (72)’ with a share of 10%. In 2008, only ‘iron and steel (72)’ sustains its importance with a share of 12.8%. Furthermore, new sectors become more important in 2008. That is, ‘mineral fuels, oils, distillation products, etc (27)’ with a share of 10.2% and ‘nuclear reactors, boilers, machinery, etc (84)’ with a share of 9.5% increases its rank in sectoral classification of export shares.

In Figure 4-10, Turkish export share dynamics to Spain in the years 1995 and 2008 are presented. ‘Animal, vegetable fats and oils, cleavage products, etc (15)’ with 12.4% share and ‘salt, sulphur, earth, stone, plaster, lime and cement (25)’ with 12.4% share are the most important sectors in 1995. In 2008, the distribution of sector shares according to years is a bit different than other countries. Namely, as it is explained for most of the countries, shares of ‘articles of apparel, accessories, knit or crochet (61)’ and ‘articles of apparel, accessories, not knit or crochet (62)’ lose their importance through time. However, for Spain these sectors become the most important sectors of 2008, after ‘vehicles other than railway, tramway (87)’ (with a share of 21.3%), with shares of 11.5% and 10.5%, respectively.

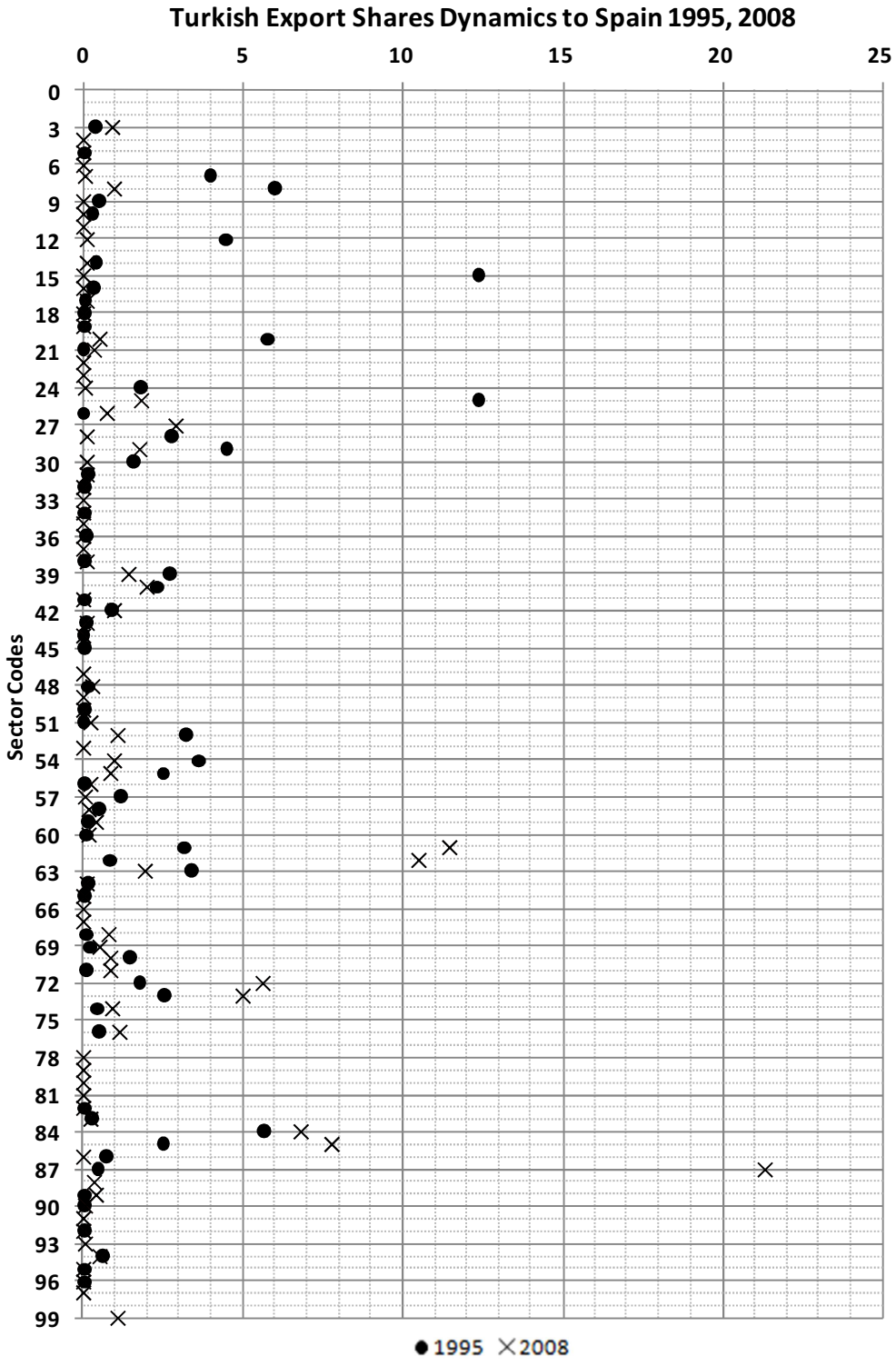



Figure 4-10 Turkish Export Shares Dynamics to Spain 1995, 2008[38]

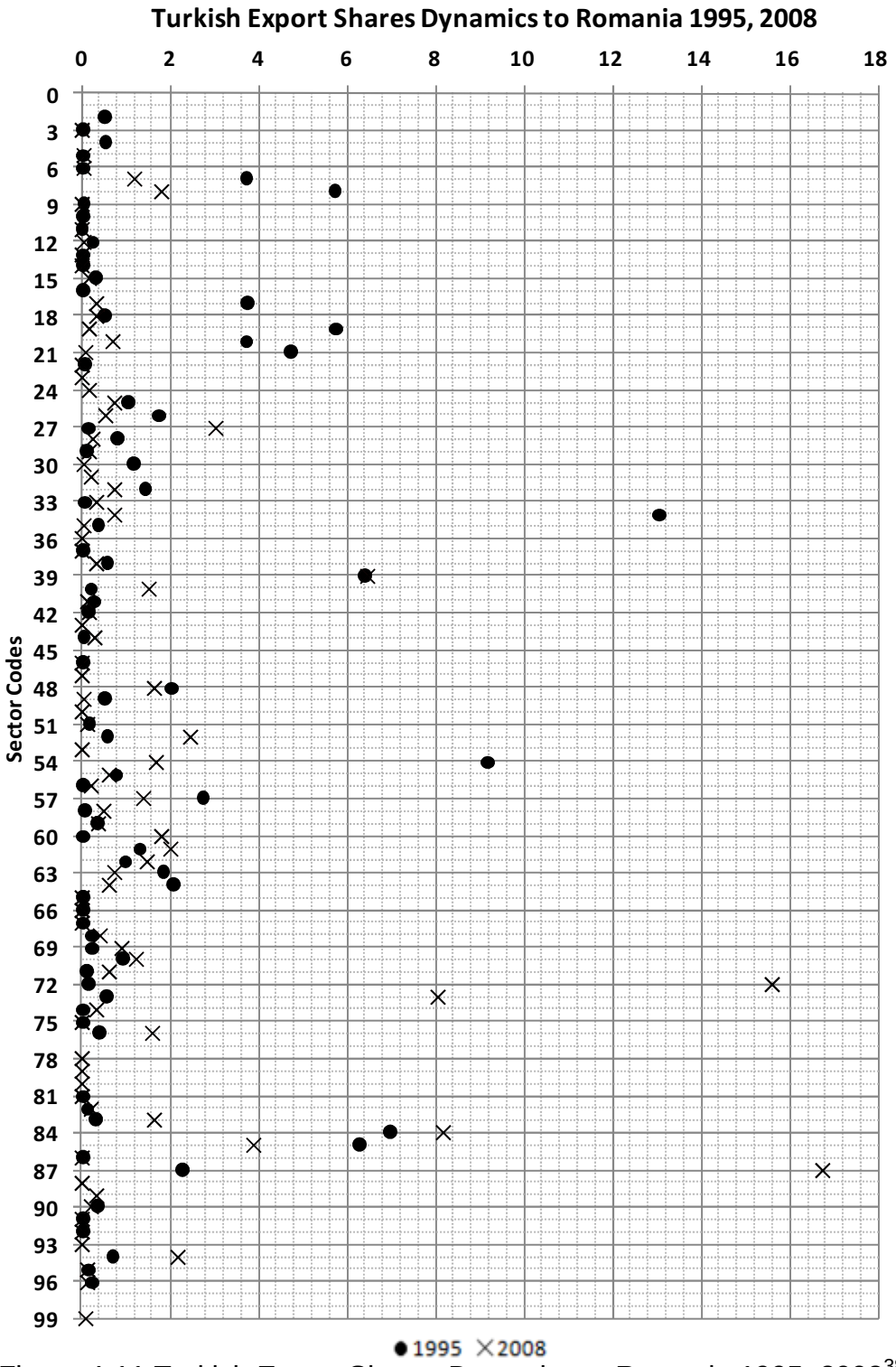



Figure 4-11 Turkish Export Shares Dynamics to Romania 1995, 2008[38]

In Figure 4-11, Turkish export share dynamics to Romania in the years 1995 and 2008 are presented. The sectors with highest shares in 1995 are ‘soaps, lubricants, waxes, candles, modelling pastes (34)’ with a share of 13.0% and ‘manmade filaments (54)’ with a share of 9.2%. On the other hand, in 2008, ‘vehicles other than railway, tramway (87)’ with 16.7% share and ‘iron and steel (72)’ with 15.6% share becomes the most important sectors.

In Figure 4-12, Turkish export share dynamics to the Netherlands in the years 1995 and 2008 are presented. In 1995, same as most of other countries the sectors with highest export shares are ‘articles of apparel, accessories, knit or crochet (61)’ with 21.7% and ‘articles of apparel, accessories, not knit or crochet (62)’ with 19.4%. In 2008, the composition of sectors with highest shares does not change however their shares decrease. That is to say, the share of ‘articles of apparel, accessories, knit or crochet (61)’ decreases to 16.3% and share of ‘articles of apparel, accessories, not knit or crochet (62)’ decreases to 12.9%. In addition, ‘vehicles other than railway, tramway (87)’ gains importance with a share of 10.0%.

Lastly, in Figure 4-13, Turkish export share dynamics to Switzerland in the years 1995 and 2008 are presented. The most striking point in this figure is that, in 2008 the 77.8% of Turkish exports to Switzerland is composed of just one sector which is ‘pearls, precious stones, metals, coins, etc (71)’, although the share of this sector is nearly 0, in 1995.

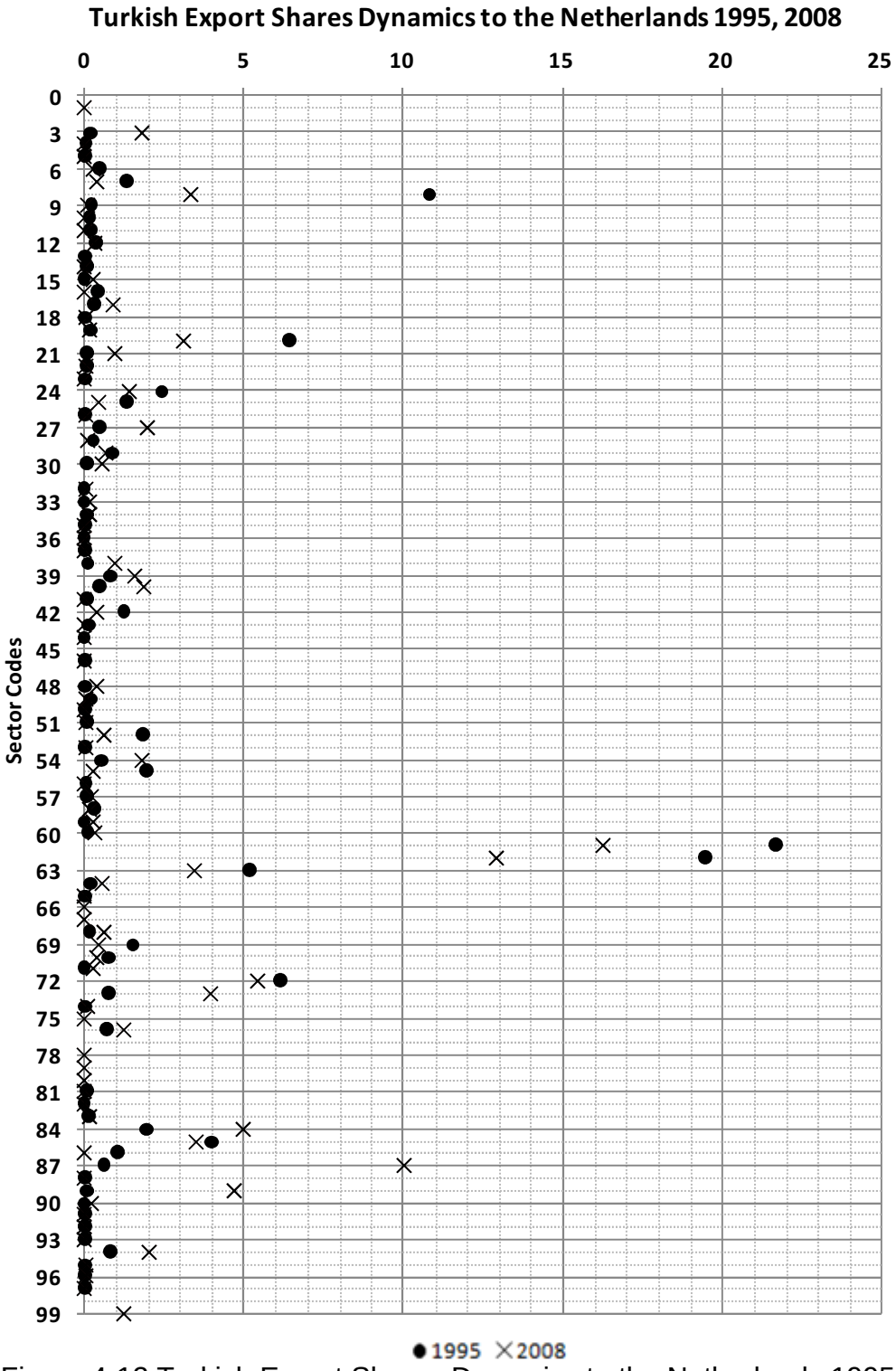



Figure 4-12 Turkish Export Shares Dynamics to the Netherlands 1995, 2008[38]

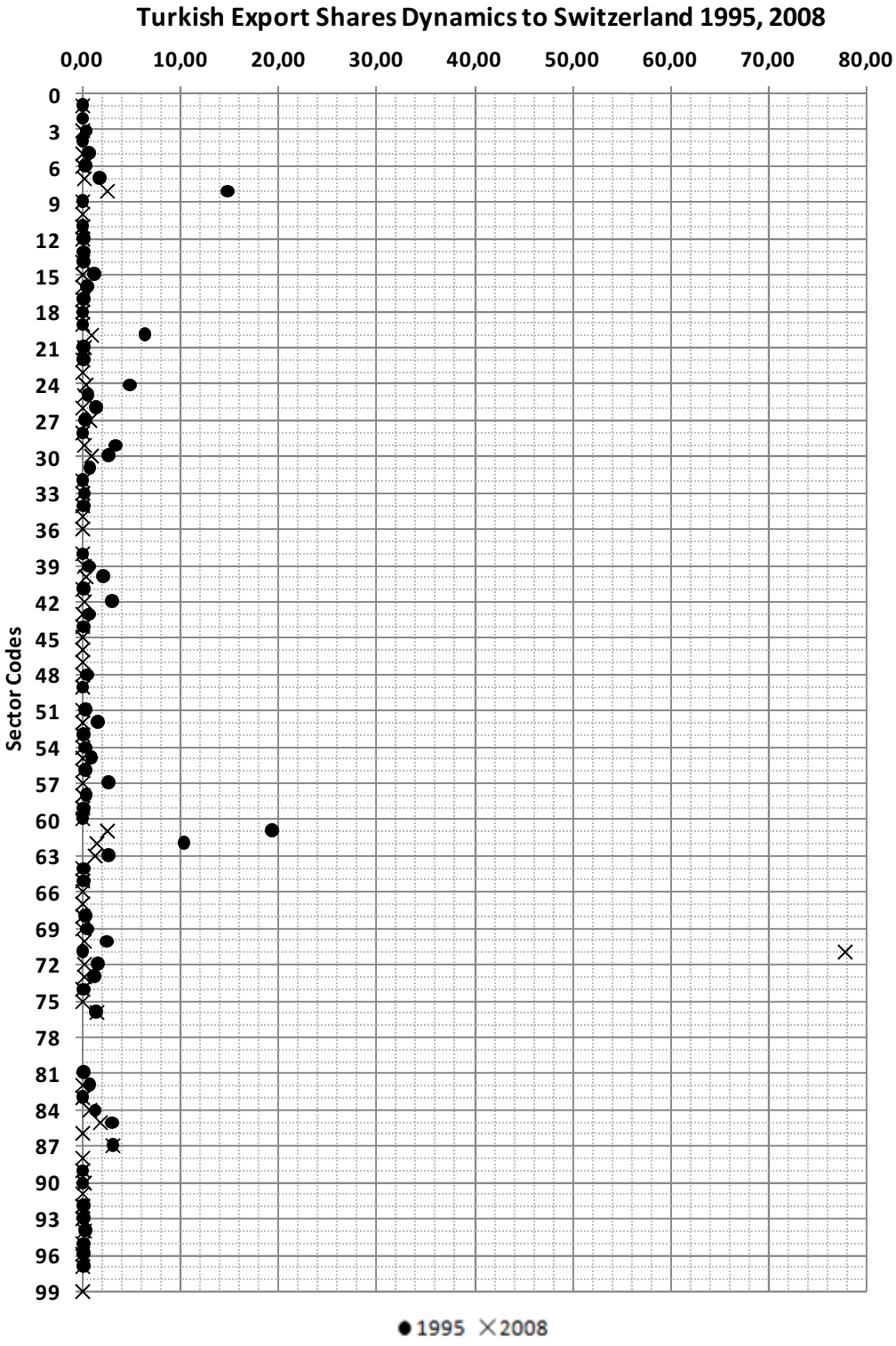



Figure 4-13 Turkish Export Shares Dynamics to Switzerland 1995, 2008[38]

Based on the preceding analysis it may be concluded that there has been significant changes in the sectoral composition of Turkish exports. Mainly, share of the agricultural products exports diminished while the share of the industrial products exports increased. Although there are minor exceptions, this trend in the general export pattern is also true for the top ten ranking countries.

# CHAPTER 5

# SIMILARITY AND CONVERGENCE IN THE TRADE STRUCTURES OF EU15 AND TURKEY

In this chapter, based on the analysis by De Benedictis and Tajoli (2003), the similarity and convergence between EU15 and Turkey in terms of trade patterns are investigated. De Benedictis and Tajoli (2003) in their paper titled "Economic integration, similarity and convergence in the EU and CEECs trade structures" examine the evolution of similarity and convergence between the EU and four of the accession countries[39] of Central and Eastern Europe (CEECs) in terms of trade patterns from 1989 to 2000. They consider both self-similarity and EU-similarity of these countries in the paper. In other words, in their paper the authors consider first, how the export structure of each of these countries has changed with respect to the beginning of the transition process and second, how the export structure of each of these countries has changed with respect to the EU export structure.

[39] Poland, Hungary, Romania and Bulgaria which were the accession countries during that period.

Investigation of trade similarity is important for various reasons. De Benedictis and Tajoli (2003) indicate that similarity in production and trade structures among countries would ease the integration process between these countries. According to the authors, trade flows affirm the comparative advantage of countries; hence they can provide useful indications on whether these countries can cope with "the competitive pressure and market forces within the Union", and about the future division of labour in the EU. Clark and Wincoop (2000) mention that greater similarity in production structures is likely to increase business cycle correlations. Furthermore, Brülhart (2000) asserts that the more similar countries are, the less likely they will be exposed to asymmetric shocks. Because of the abovementioned effects, trade similarity is also important to evaluate the performance of a currency union. Babetskin, Boone and Maurel (2003) assert that the closer the fluctuations of countries, the more they will benefit from a common policy response, i.e. a group of countries, to constitute an optimal currency area, should be exposed to similar shocks and their pattern of growth should require similar monetary policies. Therefore, it can be assumed that the trade similarity analysis between Turkey and EU15 is extremely useful to draw conclusions about Turkey – Eurozone integration in the form of joining the EU and EMU[40].

[40] EU 15 data is used instead of Eurozone data in Chapter 5. Because, it is assumed that using the data of EU15 countries would give more healthy results than using Eurozone data in drawing conclusions about the similarity of Turkey to the EU and the Euro Area countries as EU15 member countries include Denmark, Sweden and the UK which are not Euro Area members but were members of the EU before Euro was introduced. Furthermore, as can be seen in Table 3.3 in Chapter 3, Denmark, Sweden and the UK have comparatively higher correlations with the Euro Area than Malta, Slovenia and Slovakia (which are the current Eurozone members that are not included in the EU15 member countries) have in general.

As De Benedictis and Tajoli (2003), to be able to get a healthy conclusion, two different class of similarity indices which are plain and rank correlation indices, and two distance metrics which are Euclidean index and the Bray-Curtis index are utilized to measure the similarity in export structures.

## 5.1 CHANGES IN THE PATTERNS OF EU15'S IMPORTS FROM TURKEY

### 5.1.1 DATA

This section focuses on the changes in imports of EU15 from Turkey[41] and exports of EU15 to EU15 between 1995 and 2008. For this purpose, the patterns of total imports of EU15 from Turkey and total exports of EU15 to EU15 are considered by comparing the shares of exports in 97 sectors[42]. The flow values are calculated in thousand of Euros and come from the Eurostat Reference Database for External Trade (COMEXT). In addition, the dynamics of the total imports of EU15 from Turkey and the dynamics of the total exports of EU15 to EU15 are taken as an aggregate.

[41] Here, as there exists no direct data in COMEXT database about the exports of Turkey to EU15 on sectoral basis, this problem is resolved indirectly by analyzing the data of imports of EU15 from Turkey on a sectoral basis instead of the Turkish exports data to EU15. Therefore, these two terms may be used interchangeably throughout the paper.

[42] List of these sectors is (the version which is retrieved from COMEXT) presented in APPENDIX E.

In Figure 5-1, changes in total imports of EU15 from Turkey through time are presented in which the import flows are measured relative to the value of imports from Turkey in 2000[43]. From 1995 to 2008, as it can be seen from the Figure 5-1, the value of total import flows increase more than 300%. The trend in data is positive and highly consistent in general. It turns into negative only in the period 2007-2008. Acar (2009) states that, the reason of decrease in the growth of Turkish exports to the EU member countries in 2008, was the global financial crisis that affected many countries during the period. As the global financial crisis affected the EU countries negatively and caused economic stagnation in the region, the growth rate of Turkish exports to these countries decreased rapidly mainly after October 2008.

In Table 5-1, as in the paper by De Benedictis and Tajoli (2003), a simple linear regression of total imports on a linear time trend is given, in order to be able to obtain an estimate of the dynamics of total imports of EU15 from Turkey. The trend coefficient is positive and highly significant indicating an annual increase of 14% in imports of EU15 from Turkey and the adjusted $R^2$ statistics is 0.97 which indicates that the true dynamics of imports of EU15 from Turkey is well represented by a linear time trend.

[43] The choice of 2000 as the base year is only suggestive and the value in 2000 is set to 1 in Figure 5-1

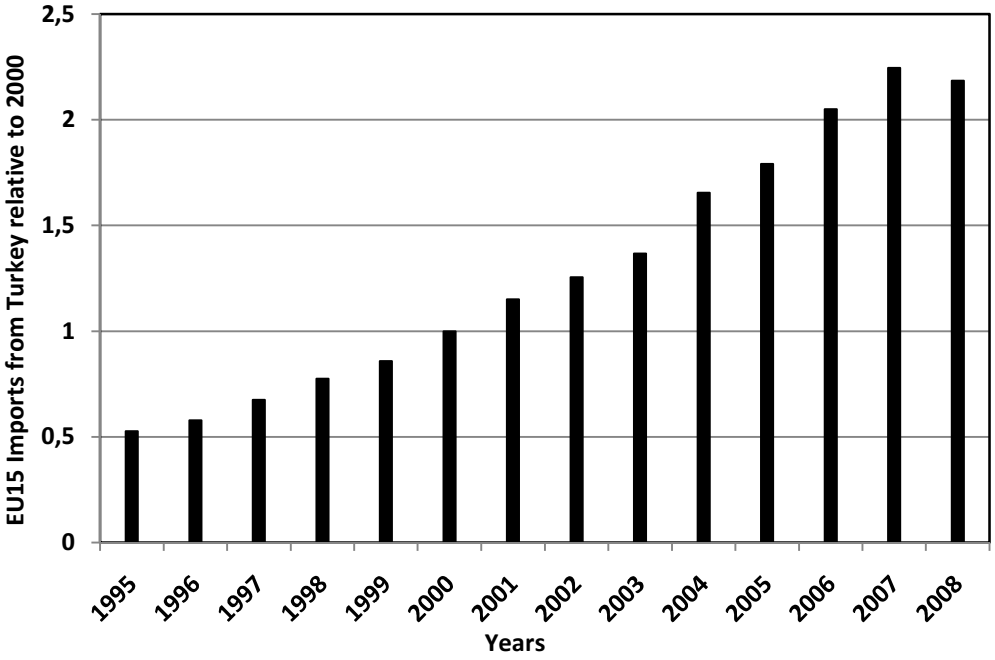



Figure 5-1**:** Total imports of EU15 from Turkey for the period 1995–2008
(Source: COMEXT)

| | Estimate | Std. Error | t value | Pr(>ItI) | Adjusted-$R^2$ |
|---|---|---|---|---|---|
| Turkey (Time Trend) | 0,1419 | 0,0067 | 21,14 | 0,0000 | 0,9717 |

Table 5-1 Regressions of Total Imports of EU15 from Turkey on a Linear Time Trend
(Source: COMEXT)[44]

Figure 5-2 shows the pattern of imports of EU15 from Turkey, by comparing the shares of imports in 97 sectors in years 1995 and 2008.

[44] Own calculations using data from COMEXT

As it can be seen from Figure 5-2, the shares of EU15 imports from Turkey are generally uniformly distributed among sectors. Most of the sectors contribute to total imports with a small share which is below 0.5%. Furthermore, only two sectors contribute to total imports with a share over 10% both in 1995 and in 2008 (in 1995 ‘knitted apparel (61)’ and ‘apparel (62)’ sectors; in 2008 ‘autovehicles (87)’ and ‘knitted apparel (61)’ sectors).

In 1995, only a few sectors are comparatively more important than the rest of the sectors. That is, ‘knitted apparel (61)’, with an import share of 20% of total imports, is the most important sector in the supply of Turkish products to EU15. Furthermore imports of ‘apparel (62)’ with a share of 14% of total imports, and ‘fruit (8)’ imports with a share of 8% of total imports are also other main sectors with comparatively higher shares than other sectors in 1995.

In addition, in 2008, as shown in Figure 5-2, the import shares remain stable in nearly half of the sectors. Only small changes occur in some of the sector shares and visible changes appear only in few sectors. That is to say, in 2008, sectors with the highest import shares are ‘autovehicles (87)’ with a share of 21% of total imports, ‘knitted apparel (61)’ with a share of 12% of total imports, ‘apparel (62)’ with a share of 8% of total imports, 'machinery (84)’ with a share of 9% total imports and lastly ‘electrical machinery (85)’ with a share of 8% of total imports.

As can be seen from Figure 5-2, in 1995 ‘apparel (62)’ and ‘knitted apparel (61)’ sectors have higher shares than they have in 2008. However, in 2008 these sectors still maintain their importance among other sectors in total imports of EU15 from Turkey. In addition

‘machinery (84)’, ‘autovehicles (87)’ and ‘electrical machinery (85)’ sectors increase their shares through time.

According to Sezgin (2009), main reasons behind the decrease in the share of exports of agricultural products in total exports to the EU mainly after 1980s were incentives given to encourage exports of industrial products, the exchange rate adjustments and the measures used to direct industrial production to foreign markets by reducing domestic demand. Furthermore, Utkulu and Seymen (2004) state that the decrease in the share of textile and clothing exports to the EU and the increase in the share of machinery and transport exports to the EU through time might be considered as a sign of a gradual change of the Turkish exports to the EU towards higher value-added products.

Figure 5-3 shows the pattern of exports of EU15 to EU15, by comparing the shares of exports in 97 sectors for the same period. As it can be clearly seen from Figure 5-3, EU15 seems quite consistent in its self-export structure only with minor changes in most of the sector shares from 1995 to 2008. It can be said that the most important changes occurred in ‘fuels (27)’ sector (whose share increased from 2.9% to 8.5%) and ‘pharmaceutical (30)’ sector (whose share increased from 1.7% to 5.4%). In other sectors, only small changes occurred through time.

In 1995, sectors with highest export shares, exceeding 10% share of total exports were ‘machinery (84)’ with a share of 13.3% and ‘autovehicles (87)’ with a share of 13.1%. Also ‘electrical machinery (85)’ with a share of 8.7% of total exports had a relatively higher share compared to other sectors. In addition, in 2008, ‘machinery (84)’ with

12.5% and ‘autovehicles (87)’ with 12.4% share of total exports were again the most important sectors that had the highest export shares of total exports. Moreover, ‘fuels (27) with 8.5%, ‘electrical machinery’ with 7.8% and lastly ‘pharmaceutical (30)’ with 5.4% share of total exports were also important sectors in 2008, whose shares were between 5% and 10% share of total exports.

As a result, it can be seen that Turkish export structure has changed more than that of EU15 through this period and this change was mostly focused on few sectors which are high value added, technology intensive industries.

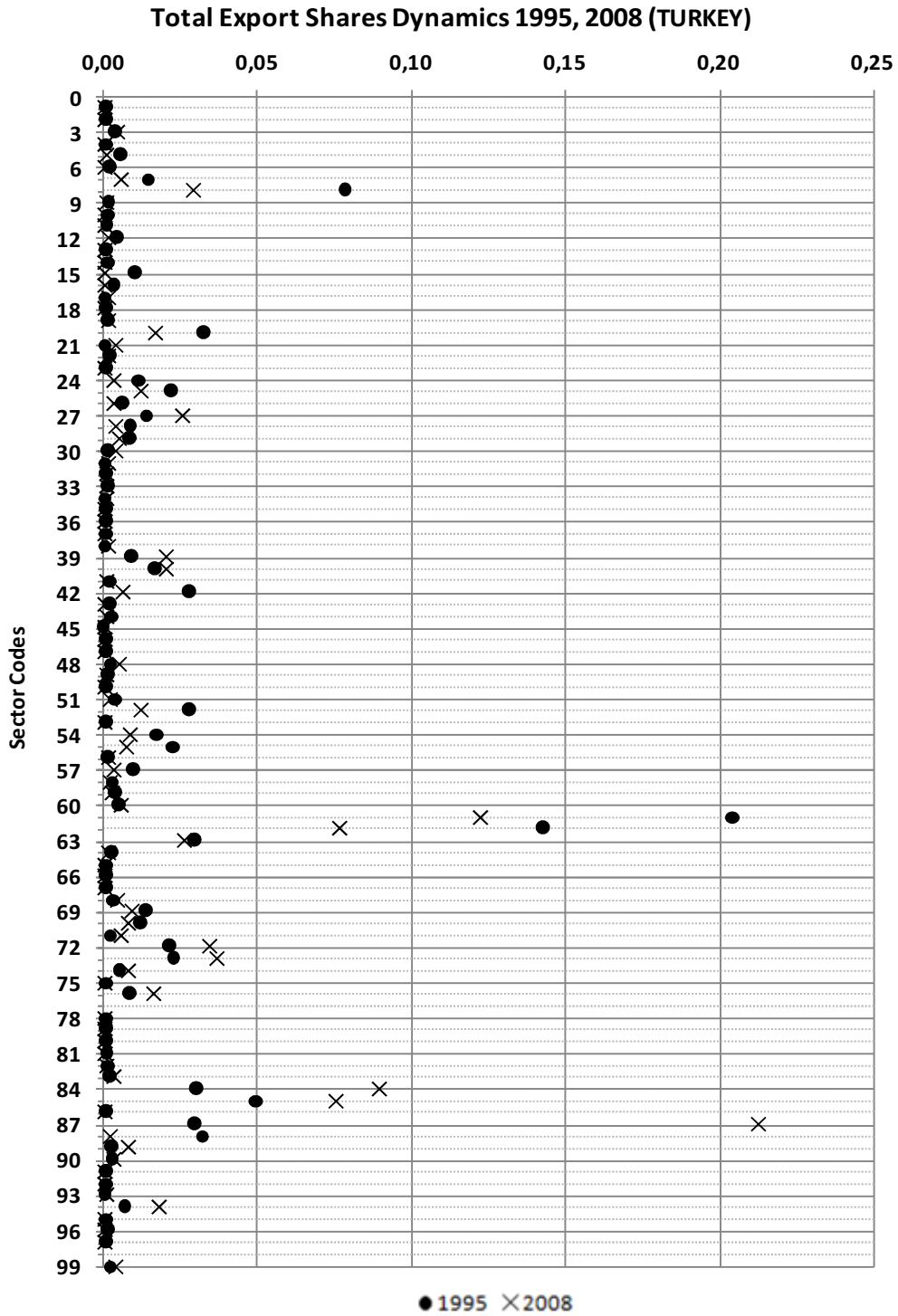



Figure 5-2: Total Import Shares Dynamics of EU15 from Turkey 1995, 2008[44, 45]

[45] Definitions of sector codes can be found in APPENDIX E.

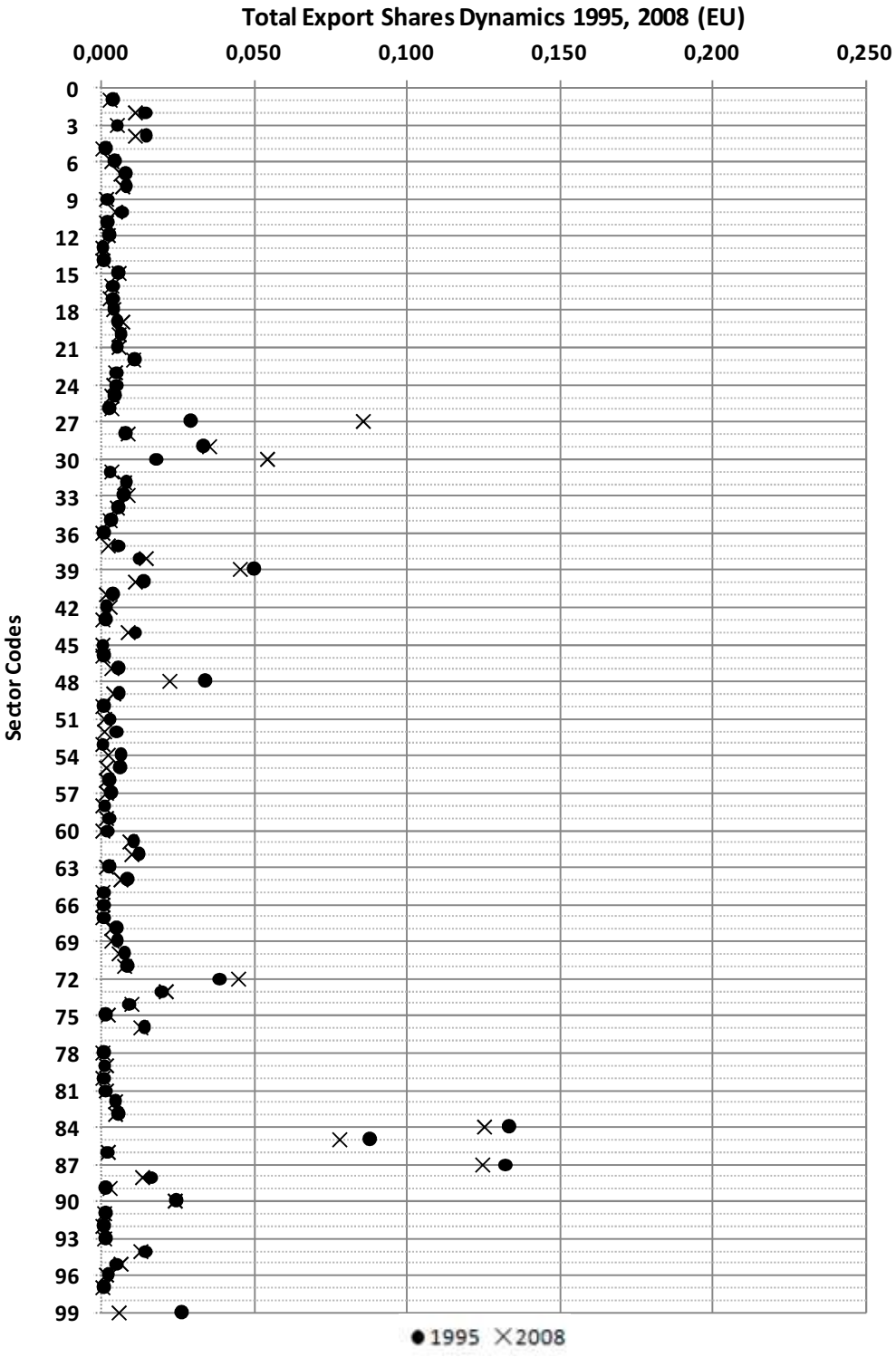



Figure 5-3**:** Total Export Shares Dynamics of EU15 to EU15 1995, 2008[44]

### 5.1.2 TUKEY'S BOXPLOT

In order to demonstrate the statistical characteristics of imports of EU15 from Turkey, Tukey's Boxplots for each year are presented in Figure 5-4, graphically.

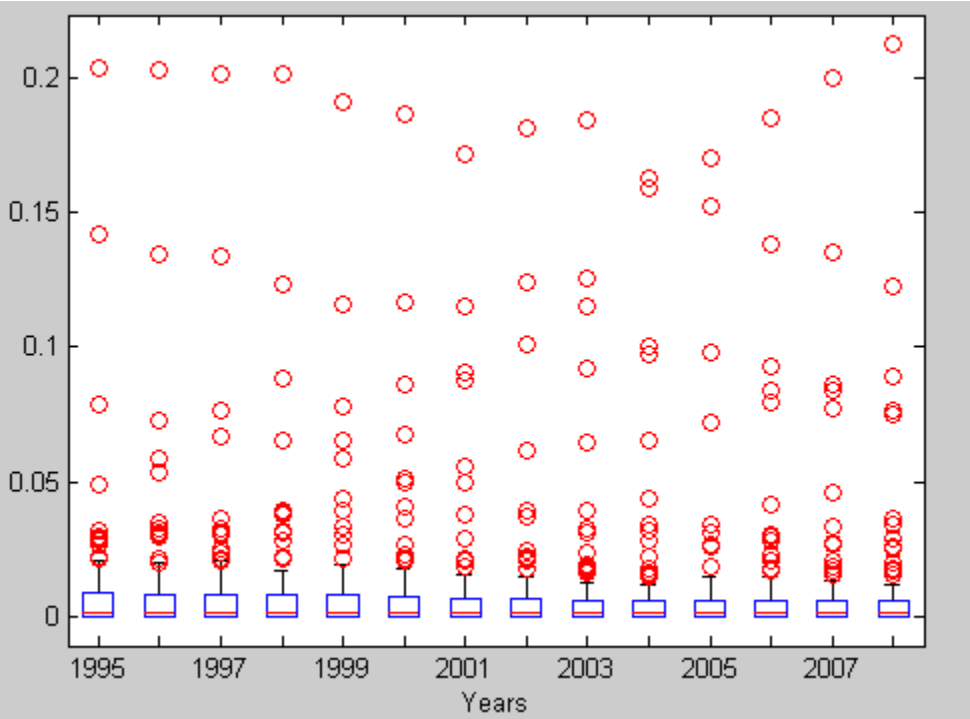



Figure 5-4**:** Tukey's Boxplot for imports of EU15 from Turkey[44]

Box plots typically provide important information such as median of the data and spread of the quartiles. The horizontal red line that divides each box in Figure 5-4 is the median of the distribution of sectoral total exports shares, for every year considered, and indicates the location of

the distribution. The upper and lower ends of the box are the upper and lower quartiles, respectively. The distance between the upper and lower quartile with the median provides a measure of the spread of the trade data and indicate the shape of the distribution[46]. In Figure 5-4, whisker lengths are provided as a ratio of the interquartile range. The lower whisker length (not perceivable in Figure 5-4) represents lowest data within 1.5 times of the interquartile range from the lower quartile, whereas upper whisker length represents highest data within 1.5 times of the interquartile range from the upper quartile. Any data not included between the whiskers is considered as an outlier and individually plotted as a red circle.

A deeper investigation of Figure 5-4 reveals that the vertical size of the boxes does not alter very much with time which means that the distribution characteristics do not change very much with time. The median of the distribution is also stable and quite small. A striking property of the boxplot is the presence of two distinct outliers in every year, one in the 20% band and the other in the 15% band. Existence of these outliers together with the other outliers tend to stretch the right tail of the distribution for all years depicted. For example in 2008, there are five sectors out of 97 accounting for more than half of the total exports.

[46] If the distance between the lower quantile and median is larger than the distance between the upper quantile and median, the left tail of the distribution is longer and the distribution is negatively skewed. Conversely, if the distance between the lower quantile and median is smaller than the distance between the upper quantile and median, the right tail of the distribution is longer and the distribution is positively skewed.

## 5.2 SIMILARITY IN TRADE STRUCTURE

In this section imports of EU15 from Turkey are analyzed in detail. Following the methodology in De Benedictis and Tajoli (2003), first, in order to evaluate the evolution of imports of EU15 from Turkey, self-similarity metrics between Turkish exports structure to its initial exports structure through time is provided and then, the EU-similarity matrices by measuring the distance between structure of imports of EU15 from Turkey and the structure of the exports of EU15 within herself are calculated.

In Section 5.2.1 the metrics used during the analysis are defined. In Section 5.2.2 and Section 5.2.3 the results of the study with these metrics are interpreted.

### 5.2.1 METRICS

Using the same similarity metrics as in De Benedictis and Tajoli (2003), metrics are calculated for each year. First the Pearson's correlation coefficient ($r$), which is used as a measure of the degree of the relationship between the linear related variables is calculated. The Pearson's correlation coefficient ($r$) is defined as;

$$r = \frac{\sum_i (x_{ik} - \overline{x_k})(y_{im} - \overline{y_m})}{\sqrt{\sum_i (x_{ik} - \overline{x_k})^2 \sum_i (y_{im} - \overline{y_m})^2}}$$ Equation 5-1

where $i$ is a specific sector, $r$ is the rank assigned to a specific year t (t ϵ [1995, 2008]). For self-similarity analysis; $x_{ik}$ is the share of sector $i$ in year $k$ ($k$ is 1995), $\overline{x_k}$ is the mean of $x_{ik}$, $y_{im}$ is the share of sector $i$ in year $m$ ($m$ ϵ [1995, 2008]) and $\overline{y_m}$ is the mean of $y_{im}$. On the other hand, for Turkey-EU similarity analysis, $x_{ik}$ is the share of sector $i$ for country $k$ ($k$ is Turkey), $\overline{x_k}$ is the mean of $x_{ik}$, $y_{im}$ is the share of sector $i$ for country $m$ ($m$ is EU) and $\overline{y_m}$ is the mean of $y_{im}$.

Secondly, the Spearman's Rank Correlation coefficient ($\rho$) is calculated. The Spearman's Rank Correlation coefficient ($\rho$) is defined as;

$$\rho = \frac{6\sum_i (r_{ik} - r_{im})^2}{N(N^2-1)} \qquad \text{Equation 5-2}$$

where $i$ is a specific sector, $\rho$ is the rank assigned to a specific year t (t ϵ [1995, 2008]) and $N$ is the total number of sectors. For self-similarity analysis, $r_{ik}$ is the rank assigned to sector $i$ in year $k$ ($k$ is 1995), and $r_{im}$ is the rank assigned to sector $i$ in year $m$ ($m$ ϵ [1995, 2008]). On the other hand, for Turkey-EU similarity analysis, $k$ is Turkey and $m$ is EU15, $r_{ik}$ is the rank assigned to sector $i$ in Turkey and $r_{im}$ is the rank assigned to sector $i$ in EU15.

De Benedictis and Tajoli (2003) indicate that, for skewed distributions, the mean overestimates the location of the distribution and therefore they resort to Spearman's Rank Correlation coefficient in order to overcome the problem of comparison of asymmetric distributions. In fact, this enables them to obtain higher values of Spearman's Rank Correlation coefficients compared to Pearson's correlation coefficient for CEECs. However, in this study the results for Turkish case indicate that Spearman's Rank Correlation coefficients are very close to 1 and therefore they are not considered as reliable or discriminative metrics for measuring similarity. On the other hand, Spearman's Rank Correlation coefficients that are very close to 1 provide information by demonstrating the fact that there is only a small change in the ranks of sectors in the years of interest and also by verifying the observation of steady vertical size of the boxes in Figure 5-4. Since the Pearson's correlation coefficient assumes normality between the variables, the quality of this metric could be questionable if normalized data was not used in the present study. However, in this study, the shares are already normalized so the usage of Pearson's correlation coefficient as a similarity metric is justified.

After computation of two correlation indices, as in De Benedictis and Tajoli (2003), the two distance metrics, the Euclidean index and the Bray-Curtis index are calculated to be able to analyze the similarity in export structures of Turkey and EU15 in terms of distance.

Euclidean index is calculated as the square root of the sum of the squares of the differences between corresponding sector shares of Turkey and EU15;

$$d = \sqrt{\sum_i (x_{ik} - x_{im})^2}$$ Equation 5-3

where $i$ is a specific sector and $d$ is the Euclidean index for a specific year t (t ϵ [1995, 2008]). For self-similarity analysis, $x_{ik}$ is the share of specific sector $i$ in year $k$ ($k$ is 1995), and $x_{im}$ is the share of specific sector $i$ in year $m$. On the other hand, for Turkey-EU similarity analysis, $k$ is Turkey and $m$ is EU15, $x_{im}$ is the share of specific sector $i$ of country $k$, $x_{im}$ is the share of specific sector $i$ of country $m$. But here, De Benedictis and Tajoli (2003) also state that:

> ***…the Euclidean distance, used as a measure of similarity - among countries (the EU- similarity) or the same country in different points in time (self-similarity) - on the basis of sectors relative weight, may lead to the double-zeros paradox of two countries without any sectors in common being at a smaller distance than another pair of countries characterized by the same structure of sectoral exports. In general, double-zeros lead to reduction in distances.***

Therefore, they use another metric to cope with this problem, which normalizes Manhattan distance according to the Bray-Curtis formula, as this metric is not subject to the double-zero paradox. Following De Benedictis and Tajoli (2003), the Bray-Curtis distance is calculated as;

$$d = \frac{\sum_i |x_{ik} - x_{im}|}{\sum_i (x_{ik} + x_{im})}$$ Equation 5-4

where again $i$ is a specific sector and $d$ is the Bray-Curtis index. For self-similarity analysis $x_{ik}$ is the share of specific sector $i$ in year $k$ ($k$ is 1995), and $x_{im}$ is the share of specific sector $i$ in year $m$. On the other hand, for Turkey-EU similarity analysis, $k$ is Turkey and $m$ is EU15, $x_{im}$ is the share of specific sector $i$ of country $k$, $x_{im}$ is the share of specific sector $i$ of country $m$

### 5.2.2 SELF SIMILARITY ANALYSIS

In Figure 5-5, the similarity of Turkish exports structure to its initial exports structure through time is presented, by using the correlation and distance metrics that are explained in the above section. As can be seen from the first graph of Figure 5-5, the Pearson correlation coefficient continuously declines. That is, the shares of exporting sectors continuously changes. This change is softer until 2003 and after then it accelerates. That is, Pearson coefficient decreases only 0.12 units between 1995 and 2003 whereas between 2003 and 2008, it decreases 0.25 units. In the same way, the distance metrics increase continuously through time. In other words, the distance of the trade pattern of Turkey from the starting trade pattern[47] rises every year. Only in the Euclidean distance index there is a little fall in 1997 but then it keeps ascending. The total increase in the Euclidean distance index between 1995 and 2008 is 0.23 units. Lastly when considering the Bray- Curtis index in the last graph of Figure 5-5, it can be seen that the outlook of the graph is similar to the Euclidean distance graph.

[47] Trade pattern in 1995 is called as starting trade pattern.

However, there exists no decrease in the Bray-Curtis index through time and it continuously increases. The total increase in the Bray-Curtis index between 1995 and 2008 is 0.38 units. To conclude, it seems that in 2008 the overall Turkish specialization is highly different from the one in 1995.

In Figure 5-6 the similarity of EU15 self-exports structure through time by using the same metrics, is presented. Figure 5-6 suggests that, as in the case of Turkey, Pearson correlation coefficient continuously declines through time. This decrease is softer until 2004 and it is faster after 2004. That is, the Pearson correlation coefficient decreases 0.019 units between 1995 and 2004 and it decreases 0.041 units between 2004 and 2008. When the graphs of Euclidean distance index and Bray-Curtis index are considered, it is seen that the change in their patterns is similar through time. They continuously increase and while total increase in the Euclidean distance index between 1995 and 2008 is 0.074 units; the total increase in the Bray-Curtis index between 1995 and 2008 is 0.124 units. As a conclusion, as can be seen from the results of the metrics, the overall specialization of EU15 in 2008 seems different from the one in 1995. However, the results also indicates that the specialization of the export structure of EU15 among its member states between the years 1995 and 2008 is less than the specialization of the import structure of EU15 from Turkey for the same period, i.e. Turkish export structure specialized more rapidly than that of EU15 between from 1995 to 2008.

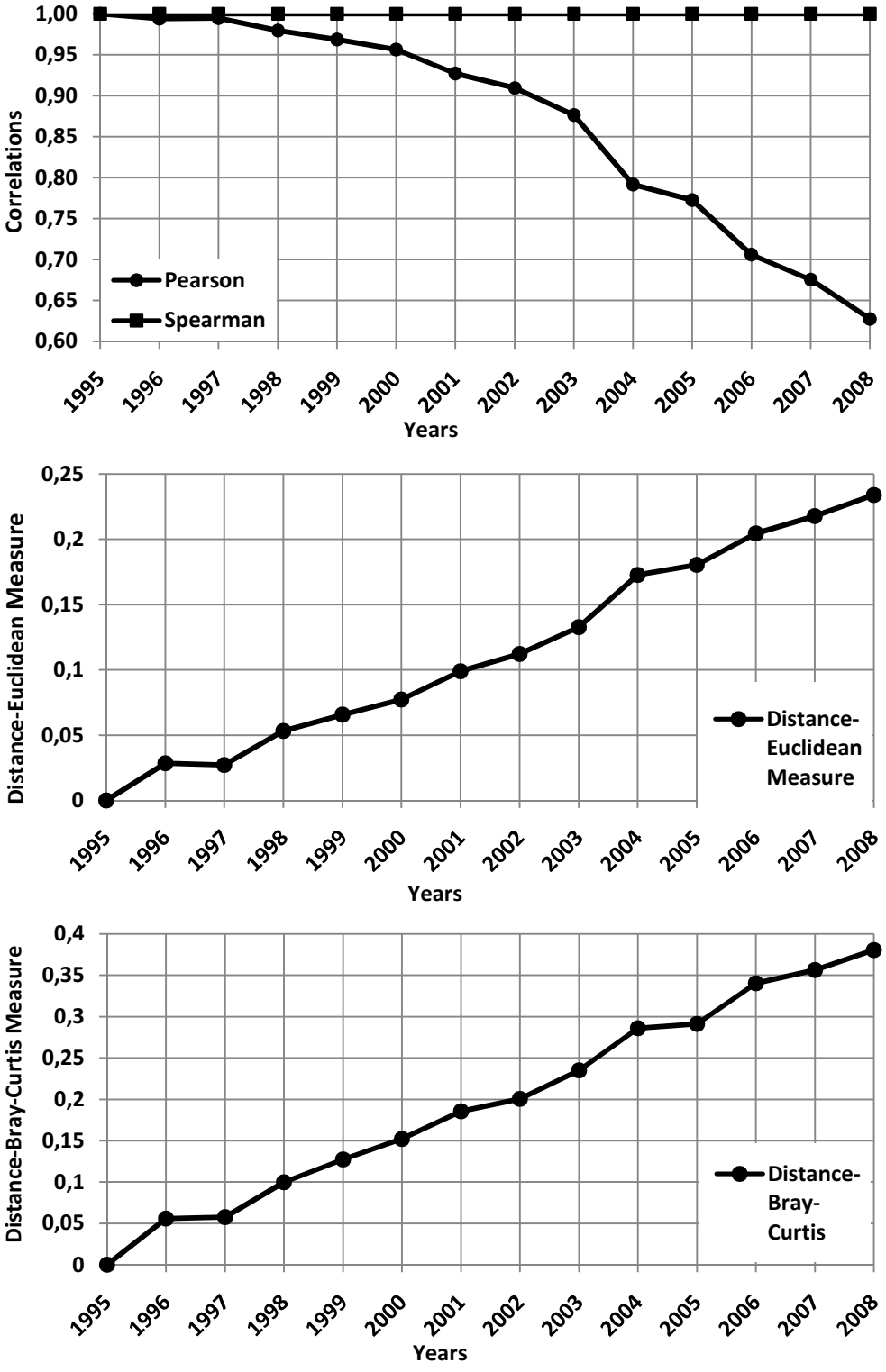



Figure 5-5**:** Turkey - Distance Dynamics[44]

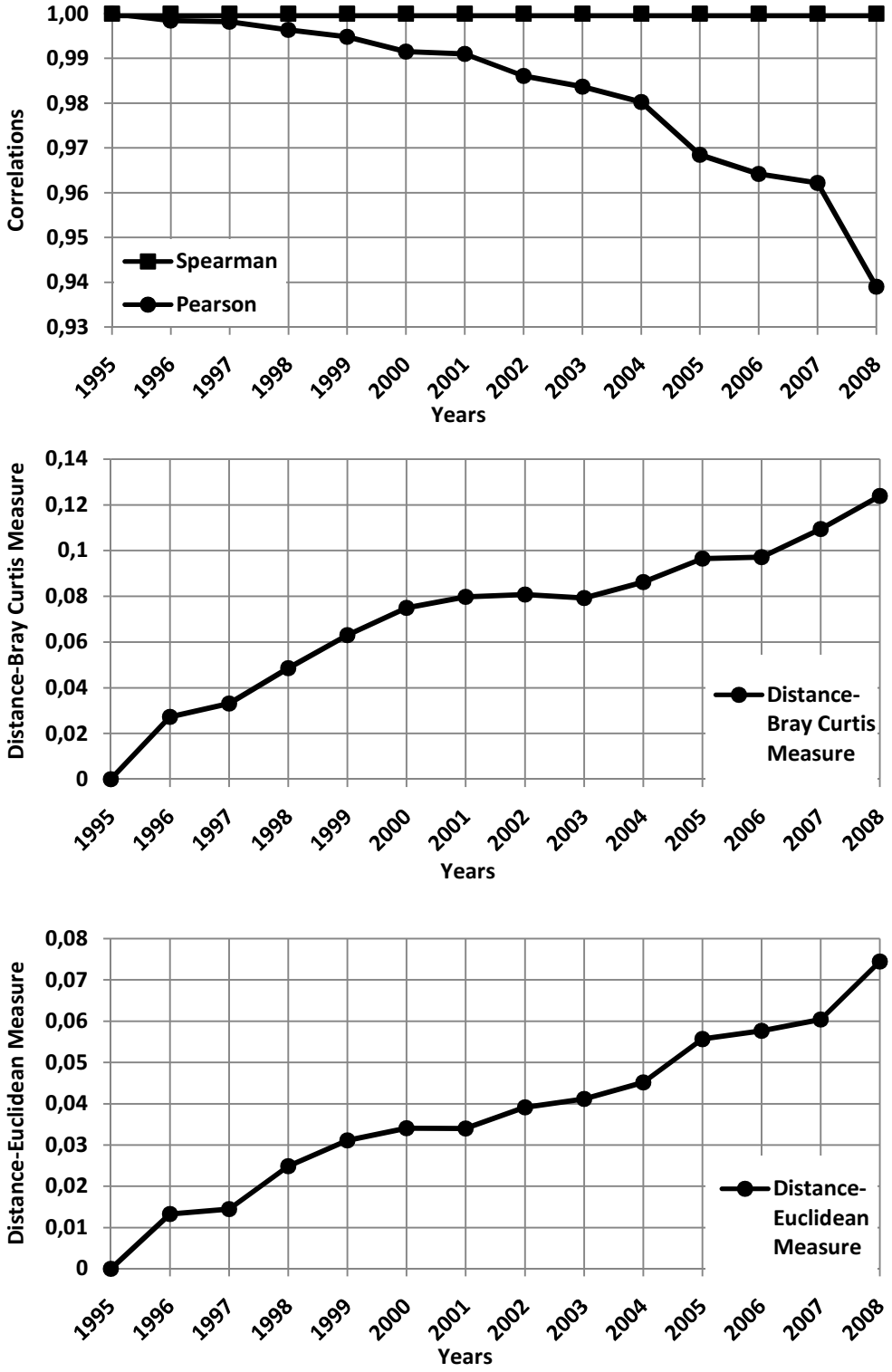



Figure 5-6**:** the EU – Distance Dynamics[44]

### 5.2.3 EU15-TURKEY SIMILARITY ANALYSIS

In Section 5.2.4, whether Turkish export structure has converged to the exports structure of EU15 between 1995 and 2008 is analyzed by using the same correlation and distance metrics that are used in the previous section. In Figure 5-7, the results of these metrics are presented. As can be seen from Figure 5-7, there is a stable and continuous convergence in all metrics.

In all graphs, this continuous convergence a little slowed down, mainly after 2004. In addition, in 2002 and 2007 a minimal divergence according to Euclidean index can be observed and in 2008 a minimal divergence according to Bray-Curtis index can be observed, i.e. according to Euclidean index in 2002 and 2007, the distance of Turkish export structure to EU15 export structure increased slightly, furthermore according to Bray-Curtis index there is again a minor increase in the distance of Turkish export structure to the EU export structure in 2008. However, when all graphs in Figure 5-7 are considered together, it is clear that Turkish export structure is slowly but constantly converging to the EU15's export structure.

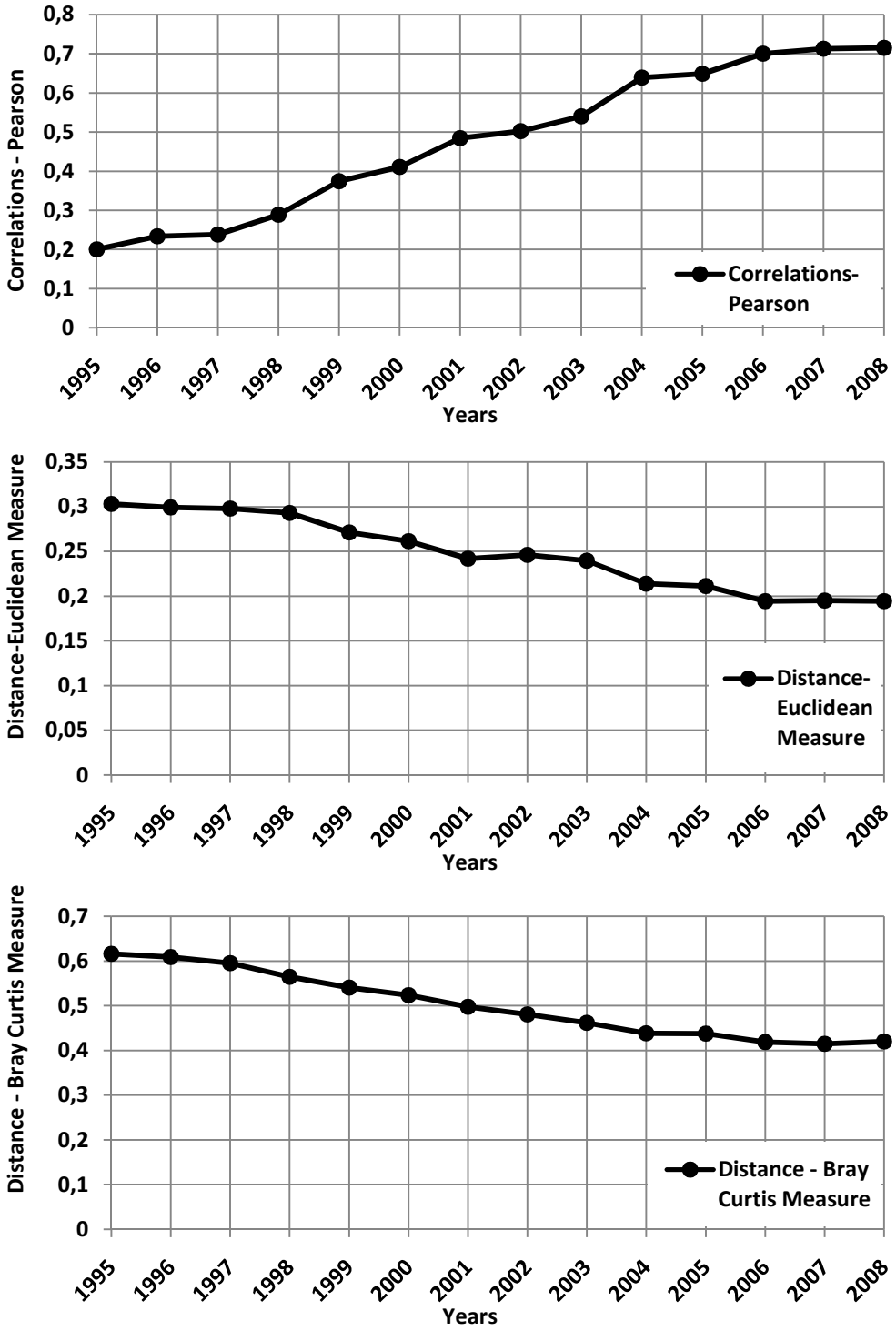



Figure 5-7**:** Turkey – the EU Similarity[44]

Specialization of Turkey and its convergence to EU15 are presented together in Figure 5-8. On the horizontal axis, the similarity of Turkey's export structure with the EU15 is measured and on the vertical axis, Turkey's self-similarity with respect to its own initial export structure is measured. In the first graph, similarity in terms of Pearson correlation metric is presented, whereas in the second graph, similarity in terms of Bray-Curtis Distance metric is presented.

As can be seen from first graph of Figure 5-8, while Turkish export structure is clearly diverging from its starting export pattern, it is converging to the export structure of EU15. Similarly, in the second graph of Figure 5-8, while the distance of Turkish export structure from the beginning is increasing, the distance of Turkish export structure from the export structure of EU15 is decreasing. To sum up, it can be said that while the similarity of Turkish export structure is decreasing to its beginning export structure; its similarity to the export structure of EU15 is increasing.

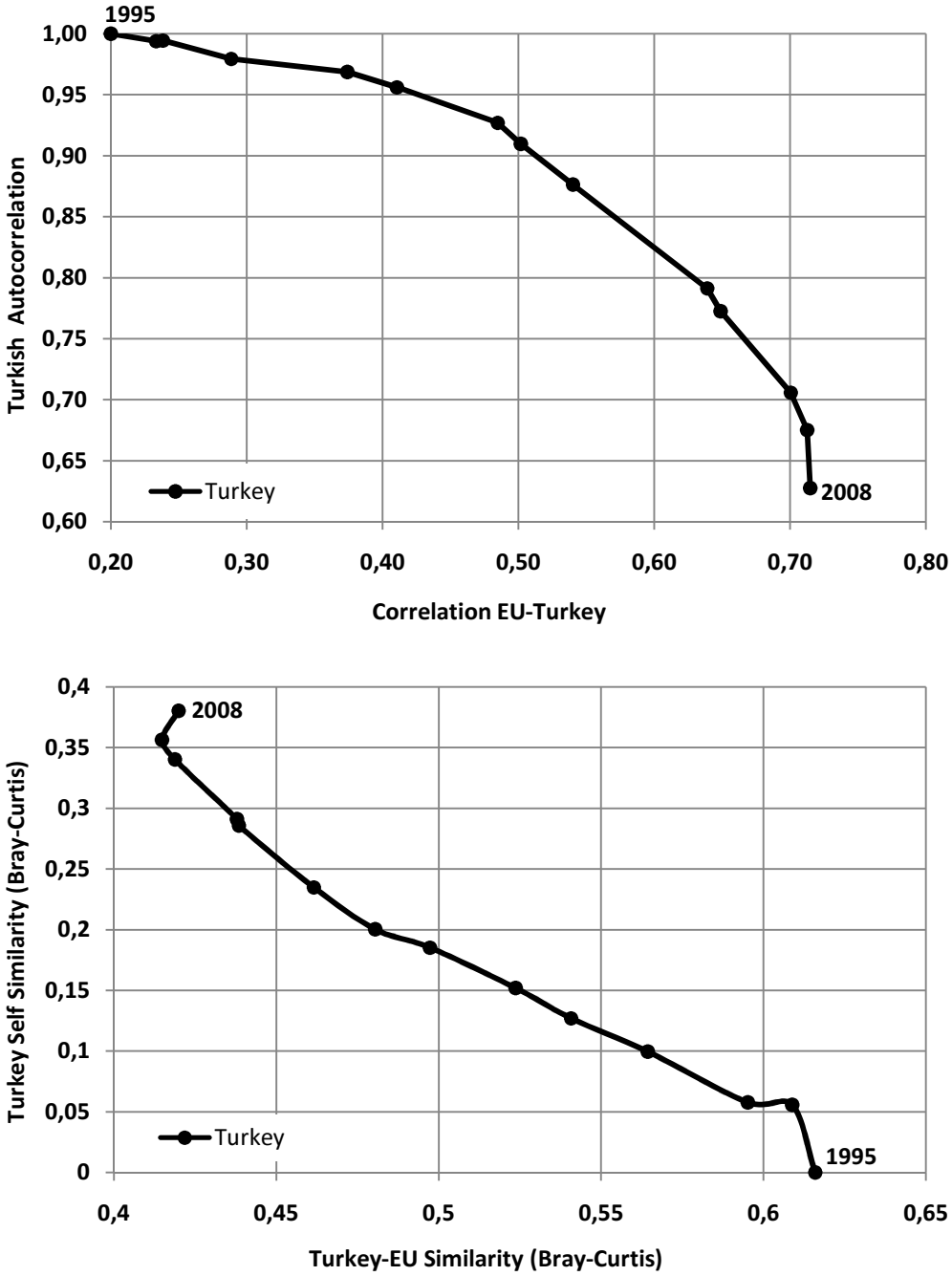



Figure 5-8**:** Self and EU15 Similarities[44]

## 5.3 CONCLUSION

First of all, the shares of sectors for Turkish exports to the EU15 are presented and it is concluded that sectoral composition of Turkish exports is changing in favor of medium and high technology products from low technology products. Furthermore, as Kaminski and Ng (2007) state, it is seen that although low technology and unskilled labor-intensive products together with resource-based products still constitutes a substantial amount of Turkish exports to the EU markets, exports of medium-to-high technology products with high content of capital and skilled labor were the levers of the recent export expansion.

Secondly, the similarity between export structures of Turkey and the EU15 is analyzed. It is concluded that for the period between 1995 and 2008, according to self-similarity analysis of both Turkey's and the EU15's export structures, the results mostly show that while the Pearson correlation coefficient is decreasing, Euclidean distance and Bray-Curtis index are increasing continuously through time, i.e. the overall specialization of the export structures of both the EU15 and Turkey seems continuously changing for the considered time period. Furthermore, results also show that Turkish export structure specialization is more than the EU15 export structure specialization for the same period.

Lastly, by using the same metrics, whether there was a convergence between these two export structures for the same period is questioned. It is concluded that there exists a clear and continuous convergence between the exports structures of Turkey and the EU15, even though this convergence slows down occasionally.

# CHAPTER 6

# ON THE WAY TO THE ECONOMIC AND MONETARY UNION

In this chapter the maturity of Turkey for EMU membership is analyzed by referring to both macroeconomic performance of Turkey in terms of Maastricht convergence criteria and to the similarity of trade structures of Turkey and EU15 in terms of trade convergence. Then, the required policies and preconditions which are important in better positioning to benefit more from EMU membership is discussed and in the last section the benefits and costs of Euro adoption is covered in general.

## 6.1 MATURITY OF TURKEY FOR THE EMU MEMBERSHIP

### 6.1.1 NOMINAL CONVERGENCE IN TERMS OF MAASTRICHT CONVERGENCE CRITERIA

In Chapter 3, the similarity and convergence of Turkish macroeconomic performance, mainly to the EU and Euro Area countries, is compared

with some selected countries and country groups. Within this comparison, indicators of the Maastricht Criteria are also covered[48].

The Maastricht convergence criteria are the criteria for the EU member states to enter the third stage of EMU and adopt the euro as their currency ("Euro convergence criteria", 2005). These criteria are identified as follows: 1) Inflation should be no more than 1.5 percentage points above the average rate of the three EU member states with the best inflation performance over the previous year. 2) National budget deficit as a percent of GDP should be at or below 3 percent. 3) Government debt should not exceed 60 percent of gross domestic product; however a country with a higher level of debt can still adopt the euro if its debt level is falling steadily. 4) Long-term interest rates should be no more than two percentage points above the rate in the three countries with the best inflation performance over the previous year. 5) The national currency is required to enter the ERM II exchange rate mechanism two years prior to the entry ("Maastricht Criteria", 2009).

In Chapter 3, it is found that, within all selected countries and country groups, Turkey has the highest average CPI growth (after Bulgaria) of 45.26% for the period between 1995 and 2008. However as can be seen from Figure 6-1, this high value of average CPI rate results from the very high inflation rates observed mainly before 2003, also it can be seen from Figure 6-1 that, annual averages of CPI rates of Turkey

[48] In Chapter 3, the Central Government Debt/GDP is used instead of General Government Debt/GDP as an indicator as the data of general government debt/GDP of countries was highly limited by both the availability and the reliability of the data. Furthermore, data of other indicators may also vary due to different definitions of treatment of indicator's components in various resources.

continuously decreases except in 1997, 2006 and 2008 and stabilizes at around 10% after 2004.

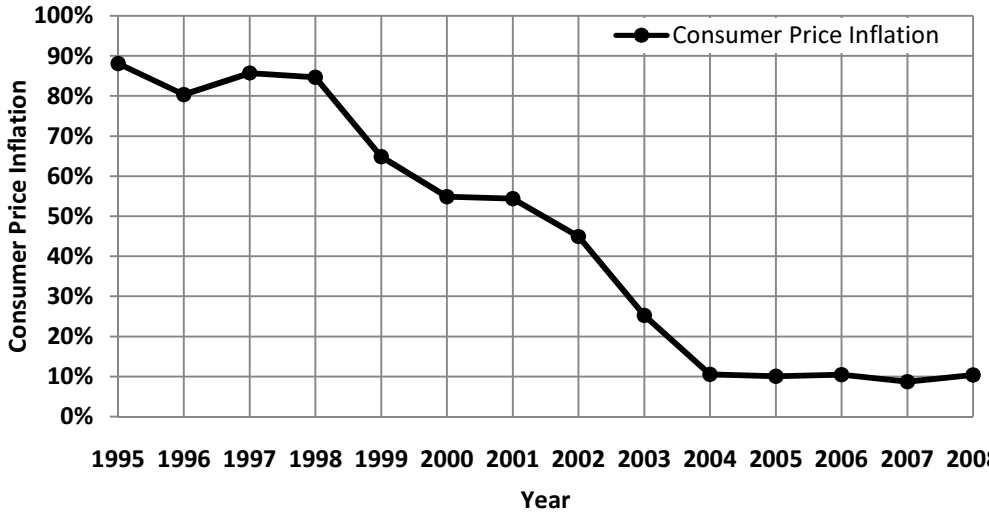



Figure 6-1 Evolution of the Annual Average of Consumer Price Inflation (Source: IFS)

Togan and Ersel (2005) state that in the medium and long term there exists a close correlation between the rate of growth of monetary aggregates and inflation and also there exists a close relation between the annual inflation rate and the annual depreciation rate of TL on a monthly basis over the same period. The authors add that in Turkey, public sector deficits and exchange rate developments seem to be the major factors affecting the rate of inflation in addition to the relation between the aggregate demand and supply. When considering the development of Turkish inflation policies after 1995, as documented by

Yiğit (2009), after the economic crisis of 1994, until 1999 there is no effort to have single digit inflation rates. In the beginning of 2000 Turkish government launches a stability program which also includes structural reforms. The mainstay of the program is to keep exchange rates under control while decreasing inflation rates. With the implementation of the program, the inflation rate starts declining. However, the program experiences some serious problems in November 2000 and because of budget deficit and current account deficit, it collapses completely in February 2001 (Badurlar, 2009).

After the economic crises in November 2000 and February 2001, TL is left to fluctuate and "Transition to Strong Economy Program" is put into effect. Within the framework of this program, in the beginning of 2002, the Central Bank of Turkey (CBT) announces that it is going to implement implicit inflation targeting and as a result of this program the inflationary expectations curbs and risk premiums decrease, TL appreciates and interest rates decline. With the success of this program, CBT starts to implement formal inflation targeting in the beginning of 2006 (Badurlar, 2009).

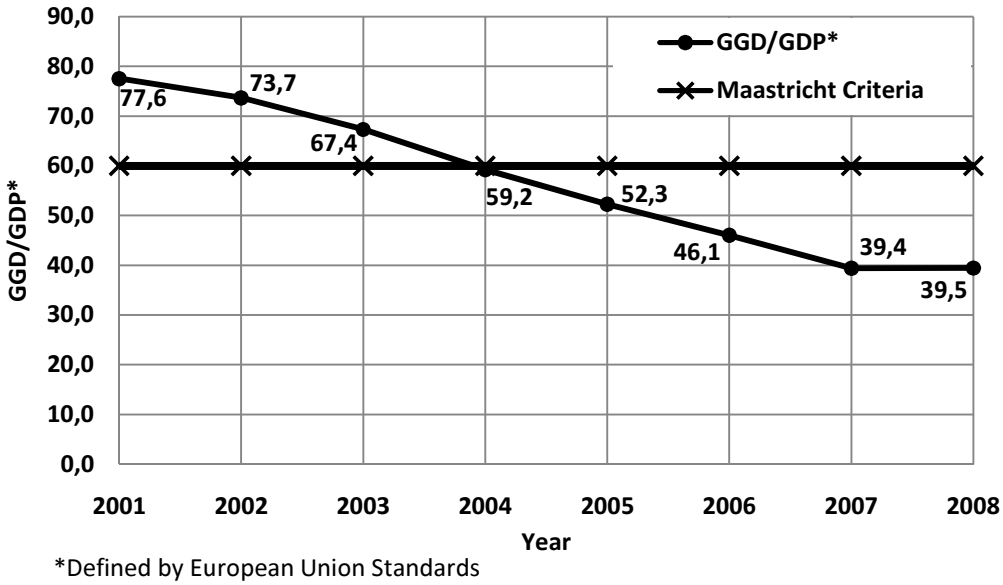
As Kava (2005) states, in the course of time Turkish average inflation rate is approaching to the Maastricht inflation criteria. However, he adds that after facing high inflation rates more than three decades, it would not be easy for this problem to be solved easily. On the other hand, Togan and Ersel (2005) states that the reduction in the inflation rate in Turkey is achieved partially through the decrease in the cost of imported goods, achieved as a result of real appreciation of TL which is not sustainable in the long run as it will lead to problems of sustainability of the current account in the future.

Kapusuz (2006) states Turkish economy has experienced serious instability problems for a long time because of the chronic budget deficits. According to the author, reasons of these excessive deficits were; ineffective and cumbersome structure of the public sector, need to finance the huge deficits of state economic enterprises, over-employment in public sector, applications about social securities, support prices on some of the agricultural goods which were set much higher than the international level of prices, and lastly insufficiency in expanding the public revenues of the country. As a conclusion, public sector borrowing requirements increased resulting in a pressure on the interest rates and boost in inflation rate.

However, as Kava (2005) suggests, when considering the ratio of annual government deficit to GDP which is one of the most important Maastricht convergence criteria, Turkey makes a significant progress after economic crisis she faces in 2001 and converges rapidly to the criteria (see Table 6-1). Aytaç (2006) emphasizes that Turkey should converge its budgetary disciplines to the criteria not only for fulfilling the EU membership requirements but also for achieving a sustainable budgetary policy and economic stability. Reforms, about the public expenditures are laid special emphasis within the structural reforms which are going to be realized in the medium term in accordance with Pre-Accession Economic Programme. Furthermore, the interest burden on the budget is tried to be decreased within the framework of an effective budget keeping and primary surplus policies are more emphasized (Aytaç, 2006).

| Year | General Government Balance* / GDP[1] | EU defined General Government Balance* / GDP[2] |
|---|---|---|
| 1999 | -8,75 | |
| 2000 | -7,96 | |
| 2001 | -12,09 | -24,50 |
| 2002 | -11,44 | -10,20 |
| 2003 | -8,84 | -9,00 |
| 2004 | -5,42 | -4,50 |
| 2005 | -1,25 | -0,60 |
| 2006 | -0,76 | 1,20 |
| 2007 | -1,72 | -1,00 |
| * In the table two different versions of the annual changes in General Government Balance to GDP ratios data are presented. Because there exists different data for the same variables in different sources and it would be useful to present both of the data sets together. | | |
| Sources: [1] EBRD<br>[2] The Undersecretariat Turkish Treasury (UT) | | |

Table 6-1 Evolution of General Government Balance/GDP




*Defined by European Union Standards

Figure 6-2 Evolution of General Government Debt/GDP

(Source: UT)

In Figure 6-2, the annual change of General Government Debt to GDP ratio is given[49]. As can be seen from Figure 6-2, general government debt to GDP ratio continuously decreases and satisfies the Maastricht convergence requirements after 2004. Özpençe (2009) states that the rapid decrease in the public debt after 2001 economic crisis can be accepted as an evidence for the success of fiscal discipline targets within the EU-negotiation period. However, Üçer (2010) argues that although the Public Debt to GDP ratio has been relatively low in recent years, in the medium and long term it would not be surprising if this ratio starts increasing. In addition, Togan (2005) states, as in the case of the reduction in inflation rates, the reduction in debt to GDP ratio was achieved partially through real appreciation of the currency and he claims that this may not be sustainable in the long run.

According to Özpençe (2009), there are some microeconomic and macroeconomic reasons for interest rates to be chosen as convergence criteria. From microeconomic perspective, increase in interest rates decreases marginal efficiency of capital and leads to a drift of funds at disposal from real production to speculative areas which affects the economy of the country negatively in the long term. From macroeconomic perspective, high level of long term interest rates in a country indicates a problem in the stability of fiscal balance in that country. In addition, interest differentials cause concentration of capital in countries with high interest rates and create important deviations for the EMU (Özpençe, 2009).

[49] For this indicator, again there exists different data available in different sources for the same period. Here, the data in the Undersecretariat Turkish Treasury is selected as reference.

When long-term interest rates in Turkey are considered, as can be seen from Figure 6-3, after the 2001 economic crisis, Turkey converges to the EMU member countries rapidly and continuously. Kava (2005) states that decrease in inflation risk premium is influential on the decrease in interest rates. However, as Özpençe (2009) states, this convergence is not sufficient and therefore, Turkey should increase its performance by diminishing its high (around 20%) level of long-term interest rates to lower (around 5%) levels in the near future.

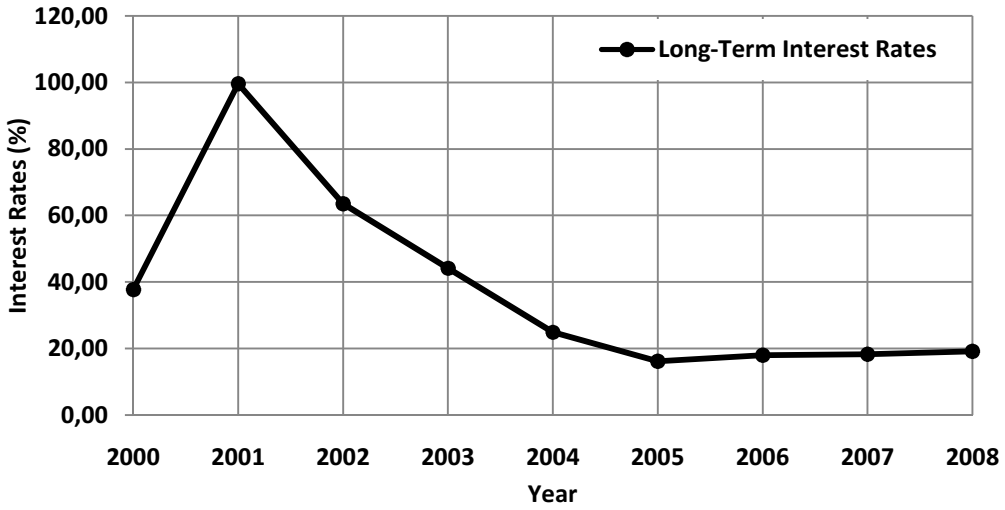



Figure 6-3 Evolution of Long Term Interest Rates[50]

(Source: OECD Economic Outlook 87 database)

[50] In OECD Database, for long term interest rate data, treasury bills and bonds 6-months or closest maturity, traded in the secondary market, compounded and weighted by the volumes. Issuance of 3-year Government bonds started in 2004 and the issuance of 5-year government bond started in 2005.

With the fail of the inflation stabilization program based on fixed exchange rates in 2001, Turkish economic policy makers establishes an alternative progam based on floating exchange rates, where the exchange markets determine the local currency value against major world currencies such as the U.S. dollar (Korap, Saatçioğlu and Volkan, 2007). Atalay (2007) states that after 2001, the CBT intervenes to the exchange rates only in excessively volatile periods to increase the foreign exchange reserves. As can be seen from Figure 6-4, between 1999 and 2002 exchange rate fluctuation is high which may be attributed to successive economic crises that Turkey faces during that period. In addition, exchange rate fluctuations decrease mainly after the beginning of the third quarter in 2002 with the decrease in negative effects of these economic crises. Furthermore, as Kava (2005) states, when the course of Turkish exchange rate is considered, except for some of the periods, it can be seen from Figure 6-4 that, exchange rate fluctuates mostly within a band of ±15 percent which makes an impression that CBT is unintentionally under an informal ERM II control with wide bands.

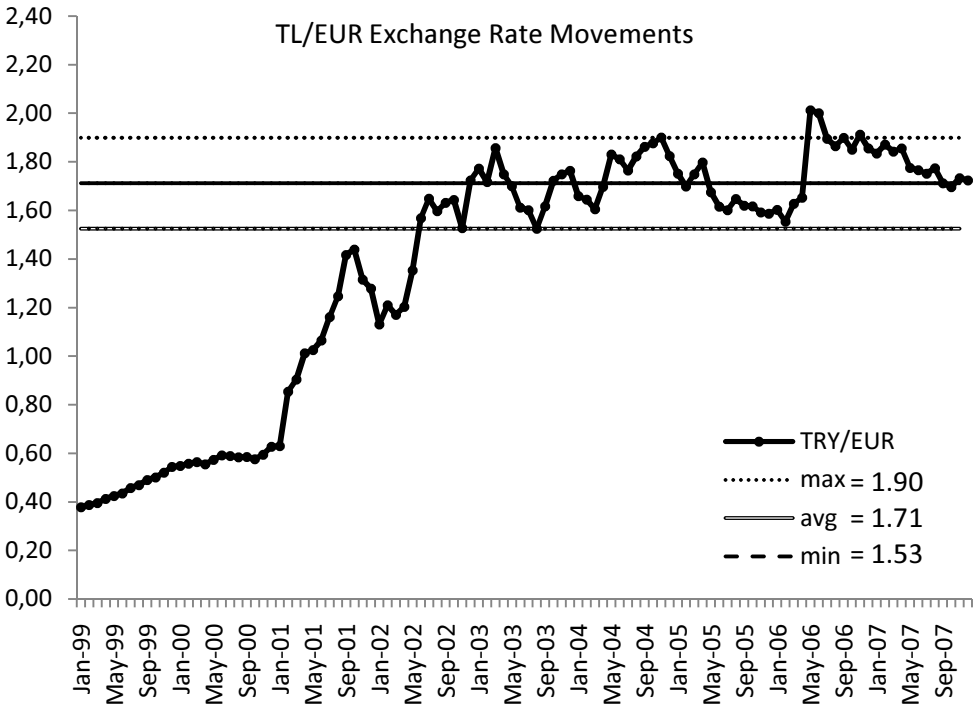



Figure 6-4 TL/EUR Exchange Rate Movements

(Source: IFS)

To sum up, when Turkish macroeconomic performance is considered with respect to the Maastricht convergence criteria, it is seen that even though Turkey does not meet all of the convergence criteria perfectly, indicators are getting better continiously and in the length of time Turkey steadily converges to the EU in terms of the indicators considered.

### 6.1.2 TRADE CONVERGENCE

Mongelli (2002) defines an OCA as the optimal geographic domain of a single currency, or of several currencies whose exchange rates are irrevocably pegged and might be unified. The OCA theory is first developed by Mundell (1961), McKinnon (1963), and Kenen (1969) and it is widely used in many analyzes for examining the advantages and disadvantages of a monetary integration (mainly EMU). Samsar (2003) states that there are several studies which use different criteria of OCA theory for examining whether a region is an OCA or not. In one of these criteria which is about the effects of shocks on countries and regions, it is stated that if there exists symmetry of shocks between countries or regions of a country, then these countries are closer to form an OCA (Samsar, 2003). Fidrmuc (2002) defines the basic point of the OCA theory as; countries or regions exposed to symmetric shocks, or possessing mechanisms for the absorption of asymmetric shocks, may find it optimal to adopt a common currency. Frankel and Rose (1997) claims that countries with close international trade links would benefit from a common currency and are more likely to be members of an OCA. Thus, the nature and extent of international trade is one criterion for EMU entry, or, more generally, membership in an OCA (Frankel and Rose, 1997). In addition, the endogenous optimal currency area hypothesis states that an increasing degree of trade integration between two countries will increase the degree of correlation (convergence) between their business cycles (Hallett and Pisciletti, 2002). The results of the detailed analysis in Chapter 5 reveal that in addition to the increasing trade integration between Turkey and EU15, the similarity of Turkish export structure is continuously increasing when compared to the export structure of EU15 for the same period.

Therefore, it can be argued that Turkey is closing the gaps for European integration according to the OCA criteria[51].

Other than the OCA measure, similarity in trade patterns of EU15 and Turkey is beneficial to European integration for other several reasons. As indicated in De Benedictis and Tajoli (2003), it is generally agreed that adjustment costs are smaller when integration occurs between countries that are relatively alike. Krugman (1981) mentions that as similarities in relative factor endowments between countries increase, the trade between the countries tends to become intra-industry in character and if intra-industry trade is sufficiently dominant, the advantages of extending the market will outweigh the distributional effects. Menon and Dixon (1997) also argue that the adjustment costs associated with trade liberalization depend on the extent of intra-industry trade. For these reasons, it is assumed that similarity in production and trade structures among countries allows improving resource exploitation while requiring relatively small industry reallocations and therefore makes the integration process easier (De Benedictis and Tajoli, 2006).

Another reason to believe that similarity in trade patterns of EU15 and Turkey is more likely to make European integration successful for Turkey is that identical techniques of production allow the theoretical possibility to achieve factor price equalization through trade (Deardorff, 1994). De Benedictis and Tajoli (2003) mention even if not all the assumptions, leading to factor price equalization, are maintained; trade among similar countries can reduce factor prices' differences. When

[51] There are also opposing studies which examine whether an OCA between Turkey and the Euro Area exists and conclude that they do not constitute an OCA, currently. See Samsar (2003), Şimşek (2005), Utkulu (2006).

applied to Turkish case, this means a more successful European integration since this would attenuate concerns about the potential migration flows expected from Turkey to the European countries.

Considering all of the arguments so far, it may be concluded that the changes in trade structure of Turkey (the increasing similarities with EU15 trade structures) are more likely to ease the European integration process.

## 6.2 WHAT POLICIES AND PRECONDITIONS ARE NEEDED IN BETTER POSITIONING TO BENEFIT MORE FROM EMU MEMBERSHIP

Owing to the EU-Turkish Customs Union, Ülgen and Zahariadis (2004) assert that there is already a considerable degree of convergence between Turkey and the EU in the area of trade. However, in general sense, although it is found that Turkey is converging to the EU in terms of both macroeconomic indicators and trade similarity, this convergence still can be considered as insufficient.

In this context, Us (2007) gives some advice to economic policy makers for better convergence in terms of Maastricht criteria. According to Us (2007), tight monetary policy which aims price stability must be continued and supplemented with strict fiscal policies. Furthermore financial markets should be strengthened to be able to increase the efficiency of the monetary policies. Kava (2005) states that in the coming years, especially exchange rate volatility should decrease, banking and financial sector should be deepened, intermediary costs

should decrease, foreign direct investment (FDI) should be attracted and reforms which will bring high burden on government budget should be realized as soon as possible.

In addition, there are also some structural improvements in Turkish trade which are required for better convergence. According to Özdamar and Albeni (2009), if the share of the number of sectors with high intra-industry trade levels increases within the foreign trade between two countries, then the development levels of these countries can be expected to converge. In this respect, when the structure of the Turkish foreign exports is considered, according to the authors, it can be claimed that Turkey achieves a high technological level at capital-intensive goods and also technological convergence occurs between exports of the EU and Turkey in easily imitable research-oriented goods. However, it is also seen that Turkey falls behind the technological level of the EU in quality/diversity of products which are not easily imitated and require high technology (Özdamar and Albeni, 2009). Therefore, authors state that, in order to converge to the EU development level in higher value added, hardly imitated, research based products; Turkey should improve her technological development infrastructure, speed up research and development activities, rearrange its national innovation network and implement institutional and legal arrangements. Turkey has an improvement in the technological level and quality/diversity of the products of which the EU production has started to decrease. Although, this can be considered as a positive development, if measures which will ensure Turkey to be a production and technology base in the long term are not taken immediately, Turkey will become the main supplier of the EU in the low value added products (Özdamar and Albeni, 2009).

Yılmaz (2008) examines the foreign trade patterns and specialization in foreign trade of the three EU member countries (Greece, Portugal, and Spain) and Turkey (candidate country) to compare the foreign trade patterns with the EU12 in the period 1995-2005. According to the research results of the study, Yılmaz (2008) states that the Turkish economy is showing a remarkable performance in the export of commodities and it has already been challenging the economies of Greece and Portugal, and is trying to catch up Spain in the coming decades. Yılmaz (2008) claims that, an efficient export diversification policy can only be achieved by attracting more world-market oriented FDI inflow and intensifying technical progress, which depends on the education of a highly qualified labor force. In addition, he suggests that Turkey should continue to reform its economic institutions and adjust to the norms and regulations set by the acquis communautaire in order to close economic deficiencies in the coming years as the political integration of Turkey into the EU requires sustainable and stable economic development in the first place.

## 6.3 ADOPTING EURO: EXPECTED ECONOMIC EFFECTS

Following the accession to the EU, for new member countries adopting euro will not be an option but an obligation. Therefore, countries try to investigate the best time of joining the EMU and; to be able to find the most appropriate time, they first analyze the potential benefits and costs of joining the EMU for their countries. In this section, potential economic effects of adopting the euro as a national currency will be identified in general.

### 6.3.1 EXPECTED ECONOMIC BENEFITS

According to Borowski (2004);

> ***The direct effects of euro area membership refer to the effects of the one-off and permanent change in business conditions in the short run, which will occur directly after the entry into the euro zone.***

One of these direct effects would be the elimination of TL/euro exchange rate which entails the elimination of transaction costs and exchange rate risk within the single currency area. Furthermore, elimination of exchange rate risk and the related exchange rate risk premium leads to a fall in the interest rate (Borowski, 2004).

According to Csajbók and Csermely (2002) maintaining a country's own currency can be viewed as an administrative restriction causing welfare losses to society, since part of the physical and human resources are tied up due to this very restriction and these losses appear in the form of transaction costs incurred by firms and households. Csajbók and Csermely (2002) divide these costs into two groups. One of these groups contains conversion costs, comprising fees and commissions charged by banks and other financial intermediaries for converting Euros into TL (and vice versa) and of bid-ask spreads. The other group contains in-house costs incurred by companies engaged in foreign currency transactions, due to extra administration and risk management tasks associated with these transactions. According to Csajbók and Csermely (2002), giving up a national currency will reduce these transaction costs and the reallocation of resources released in this way

may raise the level of GDP. Borowski (2004) also emphasizes that the impact of the elimination of transaction costs on GDP depends on the economy's ability to relocate labor and capital resources that have so far been employed in conduct of foreign exchange operations. The greater the benefits arising from savings in transaction costs following the accession to the monetary union, the higher the extent to which such resources are productively re-employed will be.

Second direct effect of joining EMU is the elimination of exchange rate risk. Akhtar and Hilton (1984) argue that exchange rate uncertainty negatively affects the volume of trade. Exchange rate uncertainty may directly reduce trade flows due to indeterminate or uncertain product prices and profits for importers or exporters. In addition, over the medium term, exchange rate uncertainty may also lower trade indirectly by affecting direct investment decisions of importers or exporters. If switching from domestic to foreign producers or vice versa is very expensive, in such a situation buyers would be wary of this change to be able to abstain from additional costs and these situations would cause international trade to decrease, through longer periods (Akhtar and Hilton, 1984). Even though the enterprises can hedge against exchange rate risk using appropriate derivatives, most enterprises are not using hedging strategies against exchange rate risk because either the price is too high or they are discouraged by administrative costs (Šuster, 2006). Elimination of exchange rate risk improves business conditions, triggering adjustment processes in trade and foreign and domestic investment (Borowski, 2004).

Another benefit of adopting euro will be the decrease in interest rates. Domestic interest rates currently contain a risk premium component to

compensate non-resident investors for the uncertainty about movements in the exchange rate. When euro is adopted this premium will be removed from domestic nominal rates, causing real rates to be lower (Csajbók and Csermely, 2002). This in turn, will induce investment, thus strengthening the productive capacity of the economy and making higher output and consumption possible (Rybiński,2007).

Borowski (2004) states that the abovementioned direct effects (reduction of transaction costs, elimination of exchange rate risk and decline in interest rates) will lead to long term benefits which are, an expansion in international trade, increased investment, greater macroeconomic stability of the country, development of financial markets and increasing competition in the goods and services market.

One other direct benefit of euro adoption is the increased transparency of prices. As Ganev (2009) states, consumers will be able to compare relative prices more easily in the domestic and the Eurozone market, and will respectively apply some pressure to producers and suppliers to improve efficiency in order to provide competitive pricing. In the long run, this will lead to efficiency and allocative gains with an additional positive growth effect (Ganev, 2009).

European Commission (EC) (2007) mentions a further benefit of adopting euro, which is job creation. EC argues that being a part of the EMU means a stable economy which fosters certainty for business activities, boosts trade, provides sustainable low interest rates, particularly long-term interest rates and strengthens investors' confidence. As a result of all these developments, economic growth accelerates and more jobs will be created. EC (2007) also adds that in

the Euro Area, job creation has been significantly higher since the introduction of the euro.

Furthermore, Šuster (2006) suggests that with the Euro adoption, more favorable conditions of financing will lead to lower capital costs for enterprises and thus foster investment activities and consequently facilitate faster GDP growth. The author also notes that faster growth of capital investment will simultaneously lead to an increase of overall productivity of factors of production, and thus to the growth of living standard. The growth of living standard will be positively influenced also by favorable impact of investment increase on the employment rate (Šuster, 2006).

Borowski (2004) mentions the effect of monetary union membership on a country's macroeconomic risk as another benefit and states that the credibility of macroeconomic policy will be enhanced and the risk of sudden capital flows with their destabilizing impact on the economy will diminish after country becomes a member of the Euro Area. The author also notes that rating institutions consider advantages associated with participation in the currency union more dominant vis-à-vis potential costs stemming from relinquishing independent monetary policy. Furthermore, as Turkey is still a developing country, risk of exposure to financial contagion of Turkey is higher than the EU countries and therefore foreign investors are still cautious about their plans on investing in Turkey. Therefore, as Csajbók and Csermely (2002) argue, by joining the Eurozone, Turkey will raise her status from emerging country to developed country and as a consequence, foreign investors would react less sensitively to unfavorable emerging market events and to shocks from developed capital markets in deciding about entering the

Turkish financial market. Consequently, the probability of shocks caused by financial contagion and their severity would decrease.

Major benefit of the EMU was considered as its positive effect on the bilateral trade among its members and this topic was studied by many researchers and academicians[52]. In his article, Rose (2000) argued that the effect of currency unions on trade was economically large, that is, countries with the same currency trade with each other over three times more than as non-member countries of the currency union do. Rose's (2000) paper called many economists' attention and received many criticisms and responses. For instance, some authors[53] criticized Rose's (2000) article claiming that most country pairs with the same currencies in his sample were either very small and proximate or small and developing countries that have adopted the currencies of the very big countries. Still, most of the early literature on this issue concluded that there exists a positive and economically significant impact of EMU on intra-Eurozone trade.

Aristotelous (2008) stated that the elimination of exchange rate uncertainty and associated costs would increase trade among Eurozone countries and lead to direct welfare gains for them. Bun and

[52] In the context of the theoretical view, some authors such as Bun and Klaassen (2002), Micco, Stein and Ordoñez (2003), De Sousa and Lochard (2004), Baldwin, Skudelny and Taglioni (2005), Aristotelous (2006) tried to explain theoretically, how euro could affect international trade among EMU countries in their papers. There were also some studies which focused on a specific country case and studied the effect of EMU on that single country such as the one written by Aristotelous (2008) about the effects of EMU on Greece's exports to Eurozone. In addition, some papers such as, Rose(2000), Flam and Nordström (2003), Faruqee (2004), Barr, Breedon and Miles (2003), Chintrakarn (2008) have empirically tested the models which they have formed in the theoretical parts of their papers and the authors mostly concluded in favor of the existence of a positive effect of EMU on trade.

[53] See, for example, Chintrakarn (2008) or Micco et al. (2003).

Klaassen (2002) argued that the effect of the euro on intra-EMU trade could come through two channels; first one was due to the reduction of real exchange rate volatility which could affect exports. The second way was due to the other changes such as the perfect credibility of the nominal exchange rate fix, the reduction of transactions costs and the capital market integration.

De Sousa and Lochard (2004) look at the issue from a different aspect and argue that part of the currency union effect on trade was indirect. Even though some potential explanations emphasize direct effects of adopting a common currency, such as the reduction of exchange rate transaction costs and volatility, De Sousa and Lochard (2004) state that approximately half of the EMU effect on trade is indirect. That is, currency union tends to raise FDI and that additional FDI creates trade. According to the authors, monetary integration can affect FDI through different ways. First of all, they assert that monetary integration reduces uncertainty related to price variables and changes in policies and rules; as a result, it increases FDI. Secondly, they state that currency union removes exchange rate volatility and this increases the certainty-equivalence value of expected profits of risk-averse firms and fosters FDI. In addition, they think that a decrease of exchange rate volatility could favor vertical FDI as a complement to trade. And lastly, single currency could foster FDI by easing comparison of international costs and price decisions and by reducing transaction costs.

Csajbók and Csermely (2002), on the other hand states that, the second component of the effect of a common currency, which creates a boost in the growth of the country with the expansion of foreign trade, is primarily explained by factors playing a role in endogenous growth

theories, such as technology transfer, adaptation of know-how and intensifying competition.

### 6.3.2 EXPECTED ECONOMIC COSTS

The most significant economic cost of adopting euro comes from losing autonomous monetary policy. As Csajbók and Csermely (2002) states, when a country joins EMU, it abandons independent exchange rate and monetary policy, and imports a monetary policy that takes into consideration economic developments within the entire euro area. As monetary autonomy is a device which helps to manage certain kinds of shocks affecting the economy, thereby dampening business cycle fluctuations, the size of costs arising from giving up monetary autonomy broadly depends on whether there is an increase or a decrease in the volatility of the country's business cycles following entry into the monetary union. The more similar the development of the country's economy to that of the euro area is, the less important the loss of independent monetary policy will be. This is because the probability of asymmetric shocks occurring depends primarily on the similarity, the degree of integration and diversification of production structures (Csajbók and Csermely, 2002). Even though Samsar (2005) concluded that for Turkey, it would be costly to give up independent monetary policy with the adoption of euro; as Šuster (2006) states for the case of Slovakia, in the future, an increased symmetry can be expected since the trade with euro area partners will develop fast, in particular intra-industry trade, and the structure of the Turkish economy will approximate to the core euro area.

Rybiński (2007) defines asymmetric shocks as the shocks that affect only selected member(s) of a monetary union and states that common currency area substantially reduces the set of policy tools which could be used to mitigate the impact of the shock. The author then describes a situation where a negative demand shock affects a member country. With a negative demand shock, in the short and medium run there exists a reduction in output and higher unemployment in the member country. As long as the country has its own currency, it can use both monetary and fiscal policy to stimulate demand and reduce the impact of the shock on output and employment. Moreover, the exchange rate might depreciate and thus make the country's exports more price-competitive. However, once, in the Eurozone, these two channels are closed for the country, i.e. there is no independent domestic monetary policy which could lower interest rates; one should not expect the ECB to react to a local shock. Second, after joining the Eurozone the exchange rate disappears, so there can be no exchange rate adjustments. As a result, the only policy tool left after euro area accession is fiscal policy. For this reason, it is of crucial importance to run a balanced budget in the medium run, so that in case of negative shocks, there is room for increasing the deficit and thus buffer the shock (Rybiński, 2007). Furthermore, the author states that there are also economic forces which can bring the economy back to equilibrium. The most prominent of these forces is wage adjustment where after a negative shock falling wages can help reduce the cost of production and as a consequence reduce prices. According to Rybiński (2007) this will increase demand and help the economy return to equilibrium. However Rybiński (2007) also notes that a crucial prerequisite for this channel to operate smoothly is a flexible labor market, i.e. only if wages adjust immediately, an increasing unemployment and an economic

slowdown can be avoided and adds that this downward wage flexibility is rarely seen in real life.

In addition to the above factors, another cost arises from adopting euro as a national currency is the loss of seigniorage revenues. According to Csajbók and Csermely (2002) after becoming a member of the euro area, the share of the seigniorage revenue gained from the use of euro notes and coins will be lower compared to a Central Bank retaining its right of issue.

There will be also a cost of monetary changeover when adopting euro. However, in Turkey, a changeover has already been experienced two times in recent past. In January 1, 2005 six zeroes are removed from TL and a new currency is created for 3 years, named as “New Turkish Lira” (YTL), through a transitional period. Then beginning from January 1, 2009 the word "New" is removed from Lira and its name became "Turkish Lira" (TL) again. According to Şen and Keskin (2004), the cost of the changeover in 2005 is expected to be 10 billion US Dollars which is considered as reasonable according to CBT. Because, as currency in circulation is depreciating with a rate of 80% every year and the renovation cost of the depreciated currency is approximately at the same level with this changeover cost, Şen and Keskin (2004) states that CBT expected no extra cost to the Bank as a result of the changeover from TL to the YTL in 2005.

There is also a cost of adopting euro as a national currency related to the requirement of decreasing inflation rate in order to meet the inflation criterion which will create a possible and temporary slowdown of economic growth for a short-term period (Borowski, 2004).

To sum up, there is an abundant literature pertaining to the potential effects arising from the adoption of the euro. However, as every country has different macroeconomic conditions, to be able to draw a conclusion about the expected net economic effects of adoption of euro, for Turkey, a detailed analysis is required which is out of the scope of this study.

# CHAPTER 7

# CONCLUSION

The aim of this study was to conduct a comparative and descriptive analysis for the sufficiency of Turkey for the EMU membership with respect to the macroeconomic convergence and trade similarity which are recommended and considered necessary for the EMU membership of a country. Although there exists a number of studies with narrower contents on these issues separately, with the examination of these two topics together, it is intended to present Turkey's position on the way to EMU membership within a wider framework.

In Chapter 2, an overview of the literature is given associated with main areas of interest in this study. The literature concerned with macroeconomic convergence, the similarities in trade structures of countries and the relationship between international trade and economic convergence is reviewed in this chapter.

In Chapter 3, by referring the article by Kibritçioğlu (2003) as a starting point, macroeconomic similarity and convergence of Turkey to some selected countries are analyzed. Furthermore, the sufficiency of Turkey for the EU and especially Eurozone membership is examined from a

macroeconomic perspective and results are compared with the results of NMCs and CMCs of the Eurozone. So far, as the country groups – which are specified in Chapter 3 - are considered, it is observed that Turkish economy displays comparatively negative outlook in consumer price inflation, population growth rate, general government deficit over GDP ratio, exchange rate changes and total central government debt over GDP ratio. In addition, after a detailed analysis of the data, it is concluded that Turkish macroeconomic structure is worse than not all but some of the CMCs' macroeconomic structures in terms of the considered nine macroeconomic indicators. On the other hand, Turkish economy has comparatively lower unemployment rates, higher real GDP growth and comparable or relatively lower current account deficit over GDP ratios.

Secondly, to be able to better understand the results, bilateral correlation coefficients for each country pair are computed from the annual averages of nine macroeconomic indicators for the period between 1995 and 2008. These coefficients are then used as indicators for the level of bilateral macroeconomic similarities between countries. When considering the results, correlations of Turkey with the Eurozone and the EU can be accepted as low in comparison with the correlations of the EU and the Eurozone with NMCs, SGCs, and CMCs. However, it can also be seen that Turkey is closer to the EU and the Eurozone than some of the CMCs like Latvia, Romania, Bulgaria and Estonia are.

Next, the bilateral correlation coefficients for each country pair are computed from the averages of standard deviations of these nine macroeconomic indicators for the same period and these coefficients are used as indicators for the level of bilateral similarities in

macroeconomic stabilities of countries. The results showed that Turkish economy suffers from instability problem time to time and in terms of macroeconomic stability characteristics, many of the CMCs are closer to the EU and Euro Area than Turkey is. The results also showed that some of the CMCs have worse stability characteristics than Turkey has. Furthermore, as it is analyzed in detail in Chapter 6, most of the unstable view in Turkish data is caused by the continuous change in macroeconomic indicators of Turkey through increasing convergence of Turkey to the EU and Eurozone countries. Therefore, while interpreting the results, one should approach to this issue with caution. When all of the results in Chapter 3 considered together, it is concluded that macroeconomic deficiencies of Turkey are not in an extent that characterizes Turkey as a totally insufficient candidate for EMU.

In Chapter 4, first, Turkish foreign trade structure through the period between 1995 and 2008 is presented and the trends are analyzed. Since from 1980, a transition in the Turkish economy towards a more open economy is started, it is seen that both import and export levels increased considerably between these years. Second, after presenting the ranking of the selected countries in Chapter 3 according to the volume of exports they receive from Turkey for 1995 and 2008, a detailed sectoral breakdown of Turkish exports to ten countries with the highest order (respectively, Germany, the UK, Italy, France, the Russian Federation, United States, Spain, Romania, the Netherlands, and Switzerland) in this ranking is provided. It is seen that there has been significant changes in the sectoral composition of Turkish exports through this period where the share of agricultural products' exports diminished while the share of industrial products' exports increased, mainly.

The second main part of this thesis -the analysis of similarity and convergence in terms of trade patterns between Eurozone and Turkey- is performed in Chapter 5. EU15 data is used instead of Eurozone data in this chapter due to better data availability.

Based on the paper by De Benedictis and Tajoli (2003), different forms of similarity metrics are used in the study (Spearman rank and Pearson correlation indices and also metrics that measure similarity in terms of distance which are Euclidean index and the Bray-Curtis index). First, self-similarities of the exports structures of Turkey and EU15 for the period between 1995 and 2008 are measured separately. For both cases, mostly the results showed that, while the Pearson correlation coefficient is continuously declining, Euclidean distance and Bray-Curtis index are continuously increasing through time. That is, the overall specialization of both the EU15 and Turkey in 2008 seems different from the one in 1995. Additionally, the results also showed that, Turkish export structure specialization is more than the EU15 export structure specialization for the specified time period.

In addition, by using the same metrics, how the export structure of Turkey has changed with respect to the EU export structure and whether there was a convergence between these two export structures for the same period are examined. It is concluded that Turkish export structure is clearly converging to the export structure of EU15 in the length of time.

Chapter 6 may be interpreted as a concluding and combining chapter of the previous chapters. First, nominal convergence of Turkey to the EU is analyzed in terms of Maastricht convergence criteria where the

results indicated a continuous convergence in all of the indicators for most of the time, even though Turkey still does not meet all of the convergence criteria perfectly. Next, the reasons are explained for the necessity of trade convergence (which is analyzed in detail in Chapter 5) for an easier integration. Then, some suggestions are made for better macroeconomic and trade convergence which would facilitate EMU membership of Turkey. Namely, for better macroeconomic convergence, it is advised that tight monetary policy which aims price stability must be continued and supplemented with strict fiscal policies, financial markets should be strengthened to be able to increase the efficiency of these monetary policies, exchange rate volatility should decrease, banking and financial sector should be deepened, intermediary costs should decrease, FDI should be attracted and reforms which will bring high burden on government budget should be realized as soon as possible (Us (2007), Kava (2005)). On the other hand, for better trade convergence, it is suggested to improve technological development infrastructure, speed up research and development activities, rearrange national innovation network, implement institutional and legal arrangements, attract more world-market oriented FDI inflow and intensify technical progress and continue to reform the economic institutions and adjust to the norms and regulations set by the acquis communautaire (Özdamar and Albeni (2009), Yılmaz (2008)). In the last section of Chapter 6, likely economic costs and benefits of joining the euro area for Turkey are covered in general.

As an overall conclusion, there is noticeable increase in macroeconomic convergence and also trade convergence between Turkey and the EU for the period between 1995 and 2008. If Turkey

takes advantage of this situation and tries for further convergence with the help of new economic policies and strategies, it would be affected from the negative aspects of possible EMU membership at a minimum level. In the light of this study, for further researches it is highly recommended to analyze the abovementioned potential economic effects of EMU membership of Turkey in detail to define and implement the proper choice of medium-term economic policy strategies in Turkey.

# A. APPENDIX A

| Country | GDP (current billion US$) |
|---|---|
| United States | 14093300 |
| Japan | 4910840 |
| China | 4327000 |
| Germany | 3649490 |
| France | 2856560 |
| the UK | 2674060 |
| Italy | 2303080 |
| the Russian Federation | 1679480 |

Table A-1 Top Eight Countries in the World according to their ranking of 2008-GDP levels (current billion US$)

Source: WB (Retrieved from: http://data.worldbank.org/indicator/NY.GDP.MKTP.CD)

# B. APPENDIX B

In this section a more detailed analysis of Figure 3-1 - Figure 3-4 of Chapter 3 are provided.

For a country group $A$ and two macroeconomic indicators $i, j$ the spread of the data combinations in country group $A$ is directly proportional to the surface area of the rectangle drawn by setting the extremum values of the indicators as the corner points of the rectangle. Let us denote the surface area for country $A$ in terms of the two macroeconomic indicators $i, j$ by $S\ (A_{ij})$. Then $S\ \left(A_{ij}\right)$ is simply computed by

$$S\ (A_{ij})\ =\ |max_i - min_i|\ *\ |max_j - min_j| \qquad \text{(Equation B-1)}$$

where $max_i$ is the maximum value of the indicator i for all the countries in group $A$ and similarly, $min_i$ is the minimum value of the indicator i for all the countries in group $A$ and |.| is the absolute difference function.

Based on the above explanations, surface areas and related metrics for each group of countries in each graph is computed as below. In order to provide a quantitative measure for the similarity in surface areas of the EU countries and SGCs, $max(S$(the EU countries), $S$(SGCs))/ $min(S$(the EU countries), $S$(SGCs)) ratios are also calculated where $max()$ is the maximum function and $min()$ is the minimum function. To sum up, as it is clearly seen in Figure 3-1 and Figure 3-4, SGCs have similar surface

areas with the EU member countries in the pair of CPI-unemployment rate indicators and in the pair of central government debt over GDP ratio-exchange rate change indicators. What is more, the main reason behind this similarity is that, the countries that have maximum and minimum levels of these indicators in SGCs also constitutes the countries that have maximum and minimum levels of these indicators in the EU member countries. As an example,

Figure 3-1:

$$S(EU\ countries) = |94.88 - 1.37| * |14.81 - 3.43| = 1064.14$$

$$S(SGCs) = |94.88 - 2.64| * |14.81 - 3.56| = 1037.70$$

$$S(Eurozone) = |11.88 - 10.39| * |14.00 - 3.43| = 15.75$$

$$max(S(EU\ countries), S(SGCs)) / min(S(EU\ countries), S(SGCs)) = 1064.14 / 1037.70 = 1.02$$

# C. APPENDIX C

| Code | Name | Code | Name | Code | Name |
|---|---|---|---|---|---|
| 1 | Live animals | 16 | Preparations of meat, of fish and of molluses | 31 | Fertilizers |
| 2 | Meat | 17 | Sugars and sugar confectionery | 32 | Tanning or dyeing extracts |
| 3 | Fish | 18 | Cocoa and cocoa preparations | 33 | Essential oils and resinoids |
| 4 | Dairy produce, eggs, honey | 19 | Preparations of cereals, flour, starch or milk | 34 | Soap |
| 5 | Other products of animal origin | 20 | Preparations of vegetables and fruits | 35 | Albuminoidal substances |
| 6 | Live trees and other plants | 21 | Miscellaneous edible preparations | 36 | Explosives |
| 7 | Vegetables | 22 | Beverages, spirits and vinegar | 37 | Photographic or cinematographic goods |
| 8 | Fruit | 23 | Waste from the food industries, animal fodder | 38 | Miscellaneous chemical products |
| 9 | Coffee, tea, spices | 24 | Tobacco and manufactured tobacco substitutes | 39 | Plastics and articles thereof, |
| 10 | Cereals | 25 | Salt, sulphur, earth, plastering mat., lime,cement | 40 | Rubber and articles thereof |
| 11 | Products of the milling industry | 26 | Ores, slag and ash | 41 | Raw hides, skins and leather |
| 12 | Oil seeds and oleaginous fruits | 27 | Mineral fuels and oils | 42 | Articles of leather |
| 13 | Vegetable saps and extracts | 28 | Inorganic chemicals | 43 | Furskins and artificial fur |
| 14 | Vegetable plaiting materials | 29 | Organic chemicals | 44 | Wood and articles of wood |
| 15 | Animal or vegetable fats and oils | 30 | Pharmaceutical products | 45 | Cork and articles of cork |

Table C-1 Sector Codes - TURKSTAT
(Source: TURKSTAT)

| Code | Name | Code | Name | Code | Name |
|---|---|---|---|---|---|
| 46 | Manufactures of plaiting materials | 64 | Footwear and the like | 83 | Miscellaneous articles of base metal |
| 47 | Pulp of cellulosic material and waste of paper | 65 | Headgear and parts thereof | 84 | Machineries, mechanical appliances, boilers and; parts thereof |
| 48 | Paper and paperboard | 66 | Umbrellas, walking-sticks, whips | 85 | Electrical machinery and equipment |
| 49 | Printed books, newspapers etc | 67 | Feathers and down and artificial flowers | 86 | Railway or tramway locomotives |
| 50 | Silk | 68 | Articles of stone, plaster or similar materials | 87 | Vehicles other than railway |
| 51 | Wool | 69 | Ceramic products | 88 | Aircraft |
| 52 | Cotton. cotton yarn and cotton fabric | 70 | Glass and glassware | 89 | Ships, boats and floating structures |
| 53 | Paper yarn and woven fabrics | 71 | Pearls, precious stones, coin | 90 | Optical instruments and apparatus |
| 54 | Man-made filaments | 72 | Iron and steel | 91 | Clocks |
| 55 | Man-made staple fibres | 73 | Articles of iron and steel | 92 | Musical instruments |
| 56 | Wadding, felt and nonwovens | 74 | Copper and articles thereof | 93 | Arms and ammunition |
| 57 | Carpets and other floor coverings | 75 | Nickel and articles thereof | 94 | Furniture |
| 58 | Special woven fabrics | 76 | Aluminium and articles thereof | 95 | Toys, games and sports equipment |
| 59 | Impregnated, coated etc fabrics | 78 | Lead and articles thereof | 96 | Miscellaneous manufactured articles |
| 60 | Knitted or crocheted fabrics | 79 | Zinc and articles thereof | 97 | Works of art and collectors pieces |
| 61 | Articles of apparel and clothing accessories knitted | 80 | Tin and articles thereof | 99 | Other products |
| 62 | Articles of apparel and clothing acc.not knitted | 81 | Other base metals, cermets, articles thereof | | |
| 63 | Other made-up textile articles | 82 | Tools of base metal | | |

Table C-1 Sector Codes - TURKSTAT (cont'd)
(Source: TURKSTAT)

# D. APPENDIX D

| Code | Name | Code | Name | Code | Name |
|---|---|---|---|---|---|
| 1 | Live animals | 12 | Oil seed, oleagic fruits, grain, seed, fruit, etc, ne | 23 | Residues, wastes of food industry, animal fodder |
| 2 | Meat and edible meat offal | 13 | Lac, gums, resins, vegetable saps and extracts nes | 24 | Tobacco and manufactured tobacco substitutes |
| 3 | Fish, crustaceans, molluscs, aquatic invertebrates ne | 14 | Vegetable plaiting materials, vegetable products nes | 25 | Salt, sulphur, earth, stone, plaster, lime and cement |
| 4 | Dairy products, eggs, honey, edible animal product nes | 15 | Animal,vegetable fats and oils, cleavage products, et | 26 | Ores, slag and ash |
| 5 | Products of animal origin, nes | 16 | Meat, fish and seafood food preparations nes | 27 | Mineral fuels, oils, distillation products, etc |
| 6 | Live trees, plants, bulbs, roots, cut flowers etc | 17 | Sugars and sugar confectionery | 28 | Inorganic chemicals, precious metal compound, isotope |
| 7 | Edible vegetables and certain roots and tubers | 18 | Cocoa and cocoa preparations | 29 | Organic chemicals |
| 8 | Edible fruit, nuts, peel of citrus fruit, melons | 19 | Cereal, flour, starch, milk preparations and products | 30 | Pharmaceutical products |
| 9 | Coffee, tea, mate and spices | 20 | Vegetable, fruit, nut, etc food preparations | 31 | Fertilizers |
| 10 | Cereals | 21 | Miscellaneous edible preparations | 32 | Tanning, dyeing extracts, tannins, derivs,pigments et |
| 11 | Milling products, malt, starches, inulin, wheat glute | 22 | Beverages, spirits and vinegar | 33 | Essential oils, perfumes, cosmetics, toileteries |

Table D-1 Sector Codes - COMTRADE
(Source: COMTRADE)

| Code | Name | Code | Name | Code | Name |
|---|---|---|---|---|---|
| 34 | Soaps, lubricants, waxes, candles, modelling pastes | 47 | Pulp of wood, fibrous cellulosic material, waste etc | 60 | Knitted or crocheted fabric |
| 35 | Albuminoids, modified starches, glues, enzymes | 48 | Paper & paperboard, articles of pulp, paper and board | 61 | Articles of apparel, accessories, knit or crochet |
| 36 | Explosives, pyrotechnics, matches, pyrophorics, etc | 49 | Printed books, newspapers, pictures etc | 62 | Articles of apparel, accessories, not knit or crochet |
| 37 | Photographic or cinematographic goods | 50 | Silk | 63 | Other made textile articles, sets, worn clothing etc |
| 38 | Miscellaneous chemical products | 51 | Wool, animal hair, horsehair yarn and fabric thereof | 64 | Footwear, gaiters and the like, parts thereof |
| 39 | Plastics and articles thereof | 52 | Cotton | 65 | Headgear and parts thereof |
| 40 | Rubber and articles thereof | 53 | Vegetable textile fibres nes, paper yarn, woven fabri | 66 | Umbrellas, walking-sticks, seat-sticks, whips, etc |
| 41 | Raw hides and skins (other than furskins) and leather | 54 | manmade filaments | 67 | Bird skin, feathers, artificial flowers, human hair |
| 42 | Articles of leather, animal gut, harness, travel good | 55 | manmade staple fibres | 68 | Stone, plaster, cement, asbestos, mica, etc articles |
| 43 | Furskins and artificial fur, manufactures thereof | 56 | Wadding, felt, nonwovens, yarns, twine, cordage, etc | 69 | Ceramic products |
| 44 | Wood and articles of wood, wood charcoal | 57 | Carpets and other textile floor coverings | 70 | Glass and glassware |
| 45 | Cork and articles of cork | 58 | Special woven or tufted fabric, lace, tapestry etc | 71 | Pearls, precious stones, metals, coins, etc |
| 46 | Manufactures of plaiting material, basketwork, etc. | 59 | Impregnated, coated or laminated textile fabric | 72 | Iron and steel |

Table D-1 Sector Codes - COMTRADE (cont'd)
(Source: COMTRADE)

| Code | Name | Code | Name | Code | Name |
|---|---|---|---|---|---|
| 73 | Articles of iron or steel | 83 | Miscellaneous articles of base metal | 92 | Musical instruments, parts and accessories |
| 74 | Copper and articles thereof | 84 | Nuclear reactors, boilers, machinery, etc | 93 | Arms and ammunition, parts and accessories thereof |
| 75 | Nickel and articles thereof | 85 | Electrical, electronic equipment | 94 | Furniture, lighting, signs, prefabricated buildings |
| 76 | Aluminium and articles thereof | 86 | Railway, tramway locomotives, rolling stock, equipmen | 95 | Toys, games, sports requisites |
| 78 | Lead and articles thereof | 87 | Vehicles other than railway, tramway | 96 | Miscellaneous manufactured articles |
| 79 | Zinc and articles thereof | 88 | Aircraft, spacecraft, and parts thereof | 97 | Works of art, collectors pieces and antiques |
| 80 | Tin and articles thereof | 89 | Ships, boats and other floating structures | 99 | Commodities not specified according to kind |
| 81 | Other base metals, cermets, articles thereof | 90 | Optical, photo, technical, medical, etc apparatus | | |
| 82 | Tools, implements, cutlery, etc of base metal | 91 | Clocks and watches and parts thereof | | |

Table D-1 Sector Codes - COMTRADE (cont'd)
(Source: COMTRADE)

# E. APPENDIX E

| Code | Name | Code | Name | Code | Name |
|---|---|---|---|---|---|
| 1 | Animals | 34 | Soaps | 67 | Feather articles |
| 2 | Meat | 35 | Glues | 68 | Cement |
| 3 | Fish | 36 | Explosives | 69 | Ceramics |
| 4 | Dairies | 37 | Photog.Products | 70 | Glass |
| 5 | Other animal prods. | 38 | Other chem. | 71 | Jewellery |
| 6 | Plants | 39 | Plastics | 72 | Iron |
| 7 | Vegetables | 40 | Rubber | 73 | Iron articles |
| 8 | Fruit | 41 | Leather | 74 | Copper |
| 9 | Coffee and spices | 42 | Leather goods | 75 | Nickel |
| 10 | Cereals | 43 | Furs | 76 | Aluminium |
| 11 | Flours | 44 | Wood | 78 | Lead |
| 12 | Seeds | 45 | Cork | 79 | Zinc |
| 13 | Resins | 46 | Wickerwork | 80 | Tin |
| 14 | Other vegetal prods | 47 | Cellulose | 81 | Other metals |
| 15 | Fats and oils | 48 | Paper | 82 | Cutllery and tools |
| 16 | Meat preparations | 49 | Printing | 83 | Other metal articles |
| 17 | Sugar | 50 | Silk | 84 | Machinery |
| 18 | Cocoa | 51 | Wool | 85 | Electrical machinery |
| 19 | Cereal preparations | 52 | Cotton | 86 | Railway |
| 20 | Veget. Preparations | 53 | Textile Fibres | 87 | Autovehicles |
| 21 | Other edibles | 54 | Filaments | 88 | Aircraft |
| 22 | Beverages | 55 | Staples | 89 | Ships |
| 23 | Resid. food ind. | 56 | Special yarns | 90 | Precision tools |
| 24 | Tobacco | 57 | Carpets | 91 | Clocks |
| 25 | Raw minerals | 58 | Tapestries | 92 | Musical Articles |
| 26 | Ores | 59 | Coated fabrics | 93 | Arms |
| 27 | Fuels | 60 | Knitted fabrics | 94 | Furniture |
| 28 | Inorganic chem. | 61 | Knitted apparel | 95 | Toys |
| 29 | Organic chem. | 62 | Apparel | 96 | Other Manuf |
| 30 | Pharmaceuticals | 63 | Other textiles | 97 | Art Pieces |
| 31 | Fertilizers | 64 | Footwear | 99 | Others |
| 32 | Dyes | 65 | Hats | | |
| 33 | Cosmetics | 66 | Umbrellas | | |

Table E-1 Sector Codes - COMEXT [54]
Source: COMEXT

[54] "EU27 TRADE SINCE 1995 BY CN8" classification is used in which the commodities are divided by 8-digit commodity numbers (Combined Nomenclature).

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