

# **Financial Development, International Trade and Economic Growth: The Case of Turkey**

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## ABSTRACT

The present study investigates long run equilibrium relationship and cointegration between real income, financial development, and international trade in Turkey. Since trade volume and imports of goods and services are stationary at their levels, these two variables are excluded from further analyses according to the requirements of the Johansen methodology; therefore, international trade is proxied by exports of goods and services in the present study. Johansen cointegration test results suggest a long run relationship between real income and its regressors, namely financial development and international trade. Real income in Turkey converge to its long term equilibrium level significantly at various levels by the contribution of financial sector and international trade, which depends on the selection of financial sector proxy. Finally, Granger causality tests suggest that a change in financial sector precedes a change in real income, which supports the validity of supply leading hypothesis in Turkey. On the other hand, bidirectional causality (feedback relationship) has been investigated between real income and international trade in Turkey.

**Keywords:** financial sector development, international trade, real income.

## ÖZ

Bu çalışma, Türkiye’de reel gelir, finansal kalkınma ve uluslararası ticaret arasındaki uzun dönemli denge ilişkisini araştırmayı hedeflemiştir. Uluslararası ticaret değişkeni olarak, ticaret hacmi ve ithalat, çalışmadan, durağan oldukları gerekçesiyle, (Johansen yöntemleri gereği) çıkartılmışlardır. Bu yüzden, mevcut çalışmaya, uluslararası ticaret değişkeni olarak ihracat rakamları dâhil edilmiştir. Johansen eşbütünleşme sonuçları, Türkiye’de reel gelir’in finansal sektör gelişimi ve uluslararası ticaret ile uzun dönemli bir denge ilişkisi içerisinde olduğunu ortaya koymaktadır. Türkiye’de reel gelir, finansal sektör ile uluslararası ticaretin varlığında, uzun dönem denge değerlerine çeşitli seviyelerde yakınsayabilmektedir. Bu, seçilmiş olan finansal gelişim değişkenleri arası değişebilmektedir. Son olarak, Granger nedensellik test sonuçları, Türkiye’de finansal büyümeden reel gelire doğru tek yönlü bir nedensellik, reel gelir ile uluslararası ticaret arasında da çift yönlü bir nedensellik olduğunu ortaya koymaktadır.

## **ACKNOWLEDGMENTS**

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## LIST OF ABBREVIATIONS

ADF test	Augmented Dickey-Fuller test
AR	Auto Regressive
AIC	Akaike Information Criteria
DCPS	Domestic Credit to Private Sector
DCBS	Domestic Credit Provided by Banking Sector
ECM	Error Correction Model
ECT	Error Correction Term
EX	Exports of goods and services
GDP	Gross Domestic Product
IM	Imports of goods and services
M2	Money and Quasi Money
PP test	Phillips-Perron test
SIC	Schwartz Information Criterion
TR	Trade
VAR	Vector Auto Regressive model
VECM	Vector Error Correction Model

# Chapter 1

## INTRODUCTION

Understanding the relationship between financial development, international trade and economic growth have become important issues for the developing countries. The relationship between financial development, international trade and economic growth has been rarely investigated in the literature (Katircioglu et al. 2007; Jenkins and Katircioglu, 2010). On the other hand, the relationship between financial development and economic growth has been started as an empirical study with Cameron (1967), Goldsmith (1969) and McKinnon (1973). Goldsmith (1969) focuses on the acceleration of economic growth to the extent that the economic performance is related to the migration of funds to the best projects available. McKinnon and Shaw (1973) emphasize the effects of government interventions for the development of financial systems, for example, maximum interest rate, high reserve requirements and restriction of direct credit program for the banks have negatively effect of the improvement of financial sectors that result to decrease of economic growth. Financial systems are important elements in the process of economic growth due to the spread of new technological innovations and capital accumulation to undertake the supply function. Schumpeter (1912) states that well running banks promote technological innovation by describing and funding those entrepreneurs with the best chances of successfully implementing innovative products and production processes. According to opinion of Schumpeter, improvement of financial intermediaries has positive impact on productivity growth,

technical changes (Bloch and Tang 2003). However, Robinson (1952) argues that enterprise leads financial follows. According to his demand following opinion, financial development is a result of high growth rate and high growth rate increases the demand for financial services. Financial development is highly important for economic growth (Calderon and Liu, 2003) a necessary condition to achieve high economic growth rate (Chang, 2002), and has positive relationship with economic growth (Mazur and Alexander, 2001). In contrast, financial development, as measured by the ratio between domestic credit to private sector and GDP is negatively correlated with economic growth especially in Latin American countries due to high inflation rates (De Gregorio and Guidotti 1995). Therefore, the relationship is unclear (Calderon and Liu, 2003).

Patrick (1966) developed two hypotheses testing the possible directions of causality between financial development and economic growth, that is, supply leading hypothesis, where it assumes a causal relationship from financial development to economic growth, and the demand following hypothesis, where it postulates a causal relationship from economic growth to financial development. McKinnon (1973), Demetriades and Luintel (1996), Fry (1997), King and Levine (1993) support the supply- leading hypothesis and have found a positive relationship between financial development and economic growth. However, Goldsmith (1969), Jung (1986) and Singh (1997) support the demand-following hypothesis and have found a negative relationship between financial development and economic growth where financial development decreases the economic stability. Yildirim et al. (2008) reconfirm the 'supply leading' hypothesis for Turkey's geographical and spatial to be considered. Vuranok (2009) supports the positive links between financial development and

economic growth rate in Turkey in the short run. Demetriades and Hussein (1996) stated that financial development causes economic growth in Turkey. Kilimani (2009) states that there are other factors that financial development cause economic growth such as the Ugandan economy that depends on manufacturing and export sectors. Rioja and Valev (2004) stated that the impact of financial development on economic growth is non-linear, and can be reduced in countries with poor financial institutions.

The relationship between international trade and economic growth has also great interest in the literature. According to some authors, international trade has a positive impact on economic growth. Some of those, increasing international trade productivity by importing the new technologies may lead to economic growth (Grossman, 1991; Rivera-Batiz ve Romer, 1991; Young, 1991).

Export increases competitiveness, increased competition in international market entrance; dissemination of technical knowledge, better management based on the production of quality and advanced technology make it compulsory that result economic growth. Kletzer and Bardhan (1987) developed the Heckscher –Ohlin trade model by merging the financial sector, which suggested that financial sector development gives countries a comparative advantage in industries that rely more in external financing. Rivera-Batiz and Romer (1991) stated that increasing international trade volume leads to an increase in growth by increasing of production inputs .Some of the studies support the export-led hypothesis while other studies support the import–led hypothesis. International trade is crucial for economic growth in many countries (Chow, 1987; Marin, 1992; Roubini and Sala-i-Martin, 1992; Bahmani-Oskooee and Alse, 1993; Shan and Sun, 1998; Xu, 1996; Jin, 2000. Jung

and Marshall (1985) claim that output growth causes export growth that the growth of the economy stimulates precede trade growth. Krugman (1979), Dixit and Norman (1980) and Lancaster (1980) suggest that international trade is a major cause of economies of scale and that effect economic growth positively.

There are also some studies to investigate the relationship between financial development and international trade as well. Financial development and international trade are suggested as macroeconomic variables which contribute to the economic growth of countries (Beck, 2002). Kletzer and Bardhan (1987) and Baldwin (1989) provide evidence that the argument of financial comparative advantage is theoretically formalized. Antoine Berthou (2010) point out financial development has a positive effect on world trade of whom the results reveal that (1) the effect of financial development on both margins is highly non linear (2) the financial development on exports is low for countries with poor financial institutions, as well as for countries with advanced financial institutions in external dependent industries.

The relationship between financial development, international trade and economic growth triangle is rarely tested in the literature. Jenkins and Katircioglu (2010) have employed bounds and Granger causality tests to investigate the empirical relationship between financial development, international trade and economic growth in Cyprus. They conclude that, there is no direction of causality between financial development and international trade in Cyprus. Their further results from empirical tests show that (1) growth in real income stimulates the growth in international trade (both exports and imports) in Cyprus, (2) increasing imported goods and services stimulate the growth of export goods and services in Cyprus, (3) final results reveal that the supply-leading, export-led growth and import-led growth hypotheses are not verified

in this study. However, when money supply is taken into considerations then demand following hypothesis is affirmed in the case of Cyprus according to the results of Jenkins and Katircioglu (2010). On the other hand, Katircioglu et al. (2007) have investigated the relationship between financial development, international trade and economic growth in India. They find that long-run equilibrium relationship exists among these variables. Their further results from causality tests show that (1) economic growth in India stimulates a growth in international trade, (2) financial development is stimulated by exports while imports are stimulated by money supply, and (3) there is a feedback relationship between financial development and economic growth in the case of India.

The aim of the present thesis is to examine the relationship between financial development, international trade and real income growth in Turkey. According to the Regular Commission report, Turkey has significantly improved the functioning of its market economy, while further decisive steps towards macroeconomic stability and structural reforms are also enhancing the attractiveness of foreign investments. First half of the year of 2011, export of Turkey was increased by %25.2 in comparison to the 2010 figures. Turkey has a developing economy. Since 2002, structural reforms have integrated Turkish economy into the globalized world. The main objectives of these developments were to enhance the efficiency of financial sector and increase the role of private sector. These reforms have strengthened macro economy of Turkey. Therefore, this study will be important to utilize this relationship in the case of Turkey.

The rest of the study is organized as follows: Chapter 2 presents the brief overview of financial development, international trade and economic growth in Turkey.

Chapter 3 discusses theoretical and empirical review. In Chapter 4 data and methodology of econometric analysis will be defined. Chapter 5 shows empirical results and discussion of econometric results. In chapter 6 conclusions and policy implications will be provided for the Turkish economy.



## **Chapter 2**

### **BRIEF OVERVIEW OF FINANCIAL DEVELOPMENT, INTERNATIONAL TRADE AND ECONOMIC GROWTH IN TURKEY**

#### **2.1 Republic of Turkey**

Republic of Turkey was established in 1923 from the defeated Ottoman Empire. It is located in South-eastern Europe and South-western Asia, Turkey west of the Bosphorus is geographically part of Europe. Turkey has a total population of 74 million. Turkey's 783,562.38 km<sup>2</sup> of land is divided into seven geographical regions: the Marmara, the Aegean, the Mediterranean, the South-eastern Anatolia, the Eastern Anatolia, the Central Anatolia, and the Black Sea. It has also four seas which are the Mediterranean Sea, the Aegean Sea, the Sea of Marmara, and the Black Sea. It is bordered the Black Sea between Bulgaria and Georgia, and it is also bordered the Aegean Sea with Greece and the Mediterranean Sea with between Syria. There are other contiguous countries in east, Armenia, Azerbaijan and Iran and Iraq in south.

Turkey plays an important role in that region since its location and military power. Turkey has memberships in international organizations for example; World Trade Organizations (WTO), Economic Cooperation Organization (ECO), the United Nations Conference on Trade and Development (UNCTAD), the Organization of the Black Sea Economic Cooperation (BSEC), the World Customs

Organization (WCO), the International Chamber of Commerce (ICC), D-8, Council of Europe, OECD and various other organizations.

## **2.2 Economic Outlook of Turkey**

In 1980, Turkish economic development strategy went through the important changes. Before 1980, Turkish economic policy was import-substitution industrialization and Turkey switched its policy to export led growth strategy, which brought about the introduction of liberalization in financial markets and more emphasis on trade (Doganlar, M 1998). In the last eight years, the Turkish economy has been one of the fastest growing emerging economies. Turkey is the 16<sup>th</sup> largest economy country around the world and 6th largest economy country in Europe's economy.

Turkey's economy started to grow by its industry and service sectors. Turkey has carried out an aggressive privatization program and that has caused to reduce state involvement in some sectors such as, basic industry, banking, transport, and communication and that has added dynamism to the Turkish economy. Traditional textiles and clothing sectors are represented for one-third of industrial employment. Other sectors, particularly automotive, construction, and electronics industries are gaining importance and have surpassed textiles within Turkey's export mix.

### GDP Growth Rate (Annual Average, %)

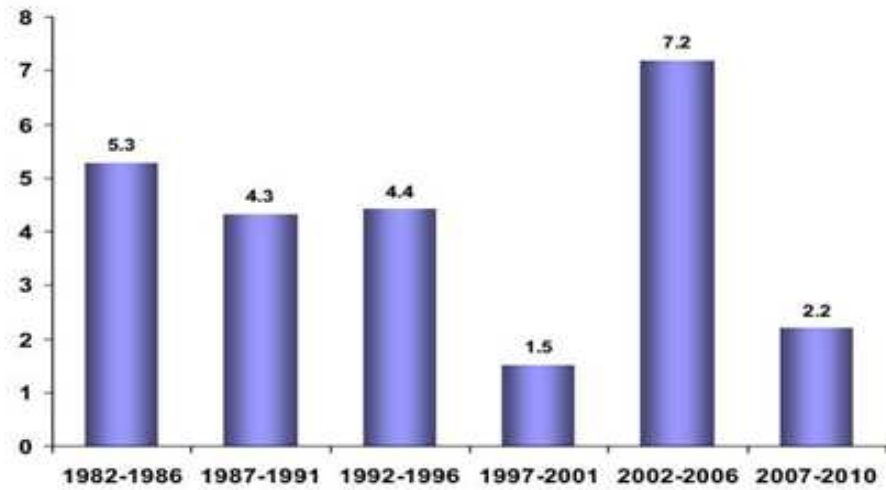


Fig. 2.1 GDP Growth Rate (Annual Average, %)

*Source: As taken from TURKSTAT (2011)*

Turkey's annual GDP growth rate fluctuates in years 1982-2010 due to different crises that affect Turkey's economy negatively such as in 1991, 1994, 1999 and 2001. In 1991, gulf war generated the gulf crisis in Iraq, due to neighbouring country to Turkey; many Iraq refugees came to Turkey and that caused 4 billion US dollar capital inflow. Therefore, Turkish lira appreciated. Increasing Turkish lira prevents growth of exports in spite of that increase import. Iraq petroleum trade had stopped in the World, which caused petroleum prices to increase. Moreover, Turkey was also encountering the terrorist problem in same year. In 1994, the impact of the crisis on the Turkish economy was devastating. The Turkish Lira depreciated by 70% against

the US Dollar in the first quarter of 1994. Ozatay (2000) states that the Central Bank lost half of its international reserves overnight interest rates increased to unprecedented levels, to almost 700% from stable pre-crisis levels of approximately 70%. Macroeconomic instability has been a fundamental problem of Turkish economic performance since the 1970s. High and persistent inflation rates were a major indicator of the macroeconomic instability during this period.

Yildirim (2000) notes that the main reason behind the high inflation rate was the high budget deficits. In 1999, Asia crisis have occurred, and World trade narrowed. This also affected Turkey's economy negatively. As a result 6 billion US dollar capital outflow transacted because of Asian crisis risk, Turkey has also faced with big earthquake in 1999, and its cost was 13 billion US Dollar. In 2001, crisis has affected Turkish economy negatively. The government was running enormous budget deficits and administration in Turkey primarily works as a debt-management program. Turkish lira depreciated against US Dollar and Turkey has switched to free floating rate system.

Since the Turkish economy has grown consistently in years 2002-2010, living standards have increased significantly. GDP per capita has increased from the level of USD 3,492 in 2002 to USD 10,079 in 2010. (See fig 2.2 for more details).

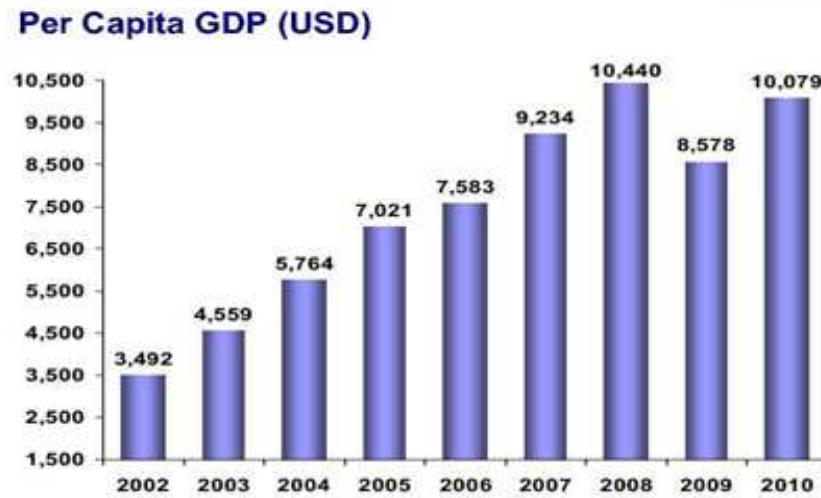


Fig. 2.2 Per Capita GDP (USD)

*Source: As taken from TURKSTAT (2011)*

One of the most remarkable aspects of the Turkish economy's recent performance has been the substantial decline in inflation in a strong growth environment with raising energy prices. The annual inflation rate declined from the level of around 70 percent at the beginning of 2002 to a single digit, 6.4 percent by the end of 2010. When it compares with World inflations such as both developing and developed countries, Turkey's annual inflation was higher than both developing and developed countries until 2010. Recent indicators show that, Turkey is reached the Worlds standards.

## Inflation Developments in the World

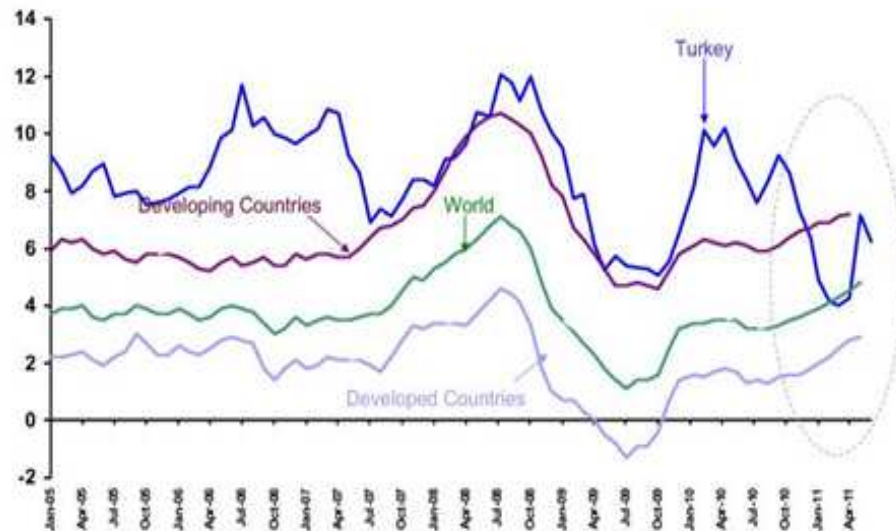


Fig. 2.3 Inflation Developments in the World

Source: IMF (2011)

### 2.3 Financial Sector Development in Turkey

There are two main financial markets in Turkey which are the capital market and the money market. In the capital market, all companies shall register and make an initial public offering to the Istanbul Stock Exchange (IMKB), even though the money market offers different kinds of credit opportunities. There are five types of banks in the Turkish money market: state-owned banks, private banks, foreign banks, development and investment banks, as well as participation banks. In general, following the local economic crisis in 2001 and the restructuring process, the banking sector posted a rapid growth performance during 2002-2008. The value of

the total assets rose from USD 130 billion to USD 465 billion, while their ratio to GDP soared from 57 percent to 77 percent. The number of branches and staff also signal rapid rise. During this period, the financial structure of the sector got much stronger. The shareholders' equity of the sector increased from USD 16 billion to USD 54 billion and its free equity from USD 3 billion to USD 40 billion. (TurkStat, 2011)

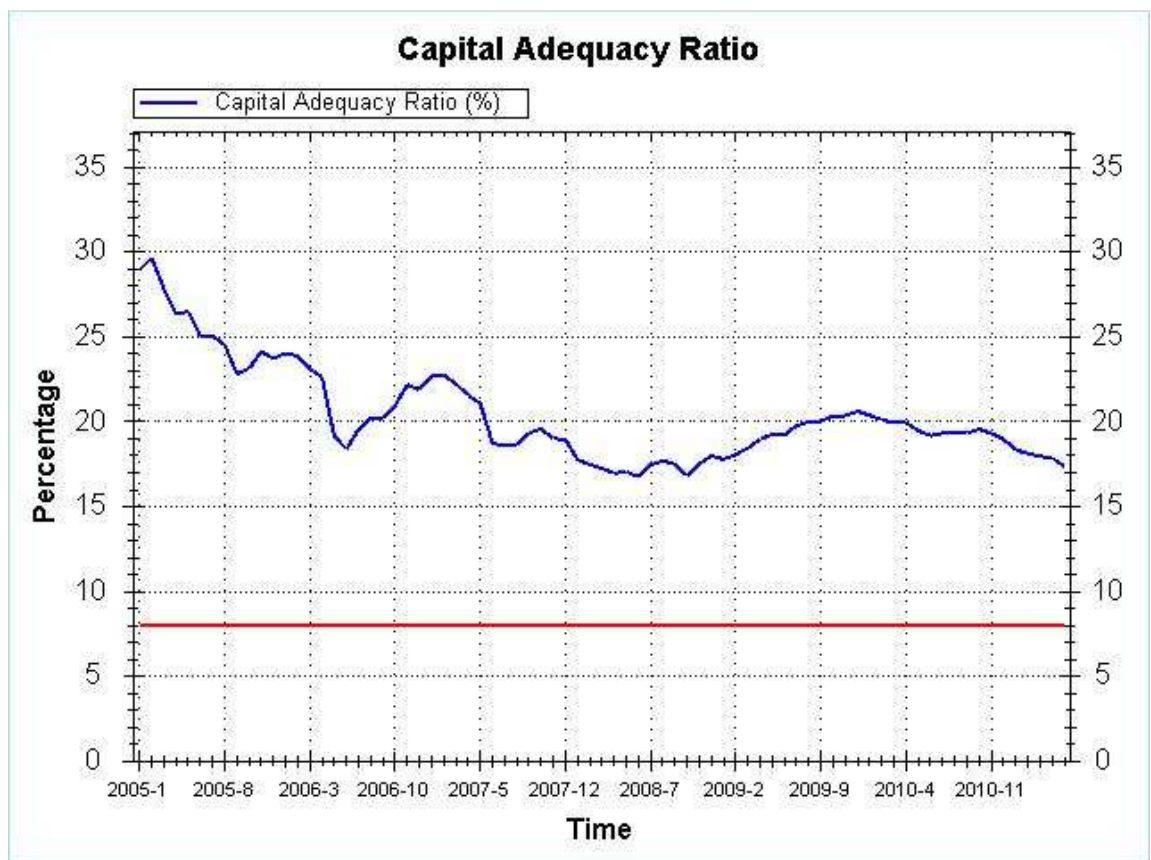


Fig. 2.4 Capital Adequacy Ratio

Source: As taken from Banking Regulation and Supervision Agency (2011)

The capital adequacy ratio is a ratio of a bank's capital to its risk. It was 18 percent in December 2008 and reached 20.6 percent at the end of 2009. The sector's capital adequacy ratio is well above the legal limit. Banking sector's capital adequacy ratio, decrease of 0.6 percentage points in the first quarter of 2010 showing, realized as 18.9 points. Supply of liquidity in the sector has a stable structure.

**Banking Sector: Loans to Assets (%)**

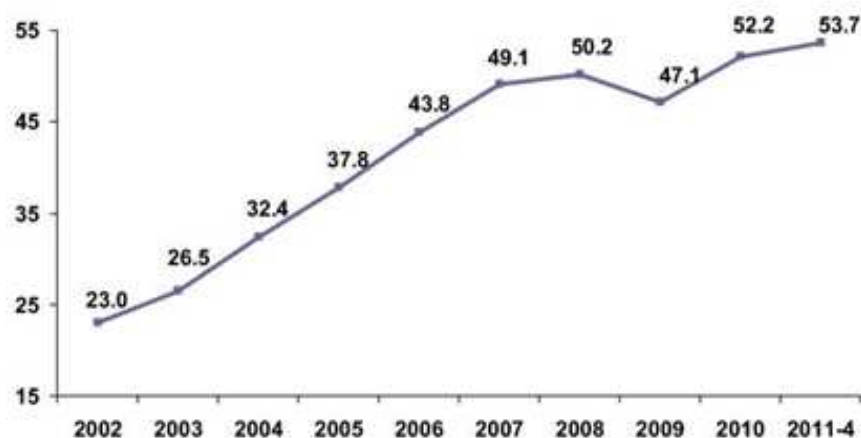


Fig. 2.5 Banking Sector: Loans to Assets

*Source: As taken from Banking Regulation and supervision agency (2011)*

Loans to assets has increased from the level of 23% in 2002 to 50.2% in 2008 and then declined in 2009 since global crisis affected loans negatively. Then it has started to rise again until now. There is a positive trend in banking sector for loans asset and it is reached 53.7% in the first quarter of 2011.



## Foreign Exchange Rates (TL/USD)

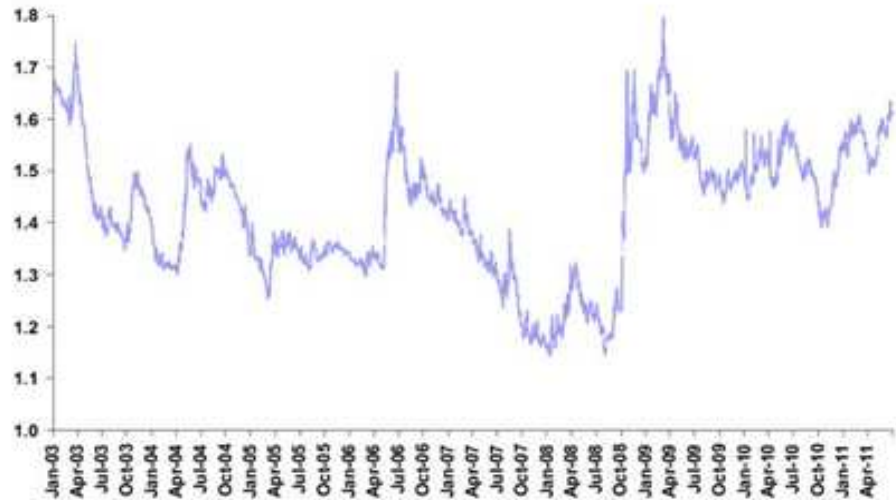


Fig. 2.6 Foreign Exchange Rates

*Source: Central Bank of the Republic of Turkey (2011)*

There are sharp fluctuations in some years because of global crises. Biggest sharp has occurred in 2008 because of global crises around the world. Turkish lira depreciated against US dollar. It was 1 US Dollar is equal to 1.1756 Turkish lira in the first quarter of the 2008 and then ratio was changed 1 US Dollar equal to 1.690 Turkish lira at the end of the quarter of 2008. Many countries especially developing countries such as Turkey were too much affected by global crises. But, Turkey got over the crises in a short time and now it has stable structure.



Fig. 2.7 Interest Rates

*Source: Undersecretariat of Treasury (2011)*

Turkey's overnight interest rate had been in double digits for the past 25 years. Last 3 years, interest rate has been going down to single digits. From 1990 until 2010, Turkey's average interest rate was 61.72 percent reaching an historical high of 500.00 percent in March of 1994 and a record low of 5.00 percent in February of 2000. The interest rate was last reported at 6.25 percent in July 2011 for Turkey.



Fig. 2.8 Credit Rating

*Source: Bloomberg (2011)*

Standard & Poor's rates Turkey with BB as a positive Outlook, Moody's rates Turkey's credibility with Ba2 also with positive Outlook and Fitch Ratings ranks the country at BB+ also with positive Outlook.

## 2.4 International Trade in Turkey

Turkish economy has experienced a period of high growth due to the implementation of the liberalization process since the 1980s. Foreign trade, both in exports and imports, has grown rapidly and notable changes in the structure of exports have been observed. In this respect, industrial products have gained significance over agricultural products.

### Annual Exports (Billion USD)

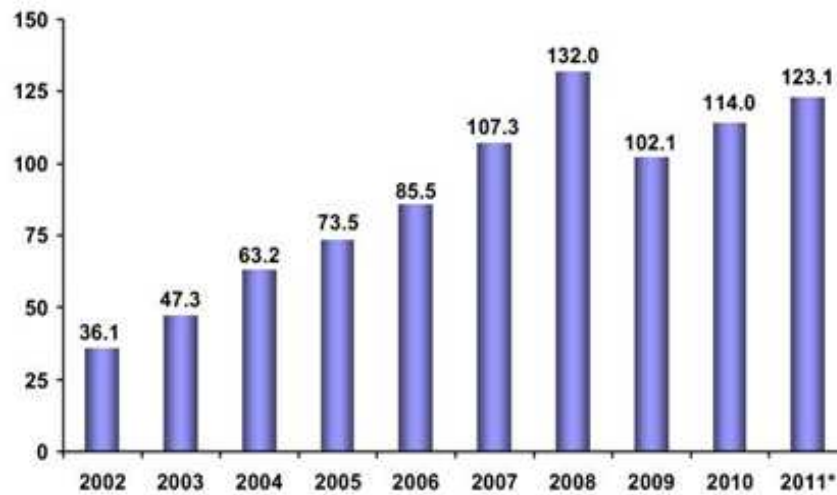


Fig. 2.9 Annual Exports (Billion USD)

(\* Annualized as of May 2011)

*Source: Turkish Statistical Institute*

#### 2.4.1 Exports of Turkey

In 1996, with the establishment of a Customs Union with the European Union, Turkey's exports entered a new structural transformation process. In 2002, manufacturing had biggest portion in exports which was 33.702 billion USD. It can be observed that the export market share of manufactured industrial products has increased, where goods include electrical and electronic machinery and equipment, as well as in the automotive industry. It was increased until 2008 which was 125.188 billion USD and then decreased in 2009 and 2010, since global crises affected Turkey's export volume negatively. Respectively followed by manufacturing in

exports are agriculture and forestry, mining and quarrying, other and fishery. Those all were increased from 2002 to 2008 and then started to fall up to 2011, except agriculture and forestry. Agriculture and forestry were continuous increased from 2002 to 2010 which was 4.941 billion USD in 2010 Turkey's total annual export is announced 123.1 billion USD in May 2011 (TurkStat, 2011).

#### **2.4.2 Imports of Turkey**

Turkey has made necessary modifications to its import regime in 1996 when the Customs Union with the EU became effective. As it can be seen in fig. 2.10, Turkey's imports continuous increase year by year, biggest portion in imports have mineral fuels and oils in 2007 and rest of imports as follows respectively; machineries, mechanical appliances and boilers, iron and steel, electrical machinery and equipment and vehicles were main imports for Turkey. In 2008, imports of mineral fuels and oils have increased almost by 50% and rest of imports respectively; iron and steel, machineries, mechanical appliances and boilers, electrical machinery and equipment and vehicles other than railway were main import products. In 2009, Turkey's imports decreased by 30% due to global crises.

One of the biggest changes in import product was mineral fuels and oils; it was 48281.193 billion USD in 2008 and 29905.305 billion USD in 2009. In 2010, Turkey's imports have raised to 185.5 billion USD. Main import products were same as for the last 3 years. In May 2011 imports figure announced, it is 98 billion USD and expected to reach 215.4 billion USD at the end of the year (TurkStat, 2011).

### Annual Imports (Billion USD)

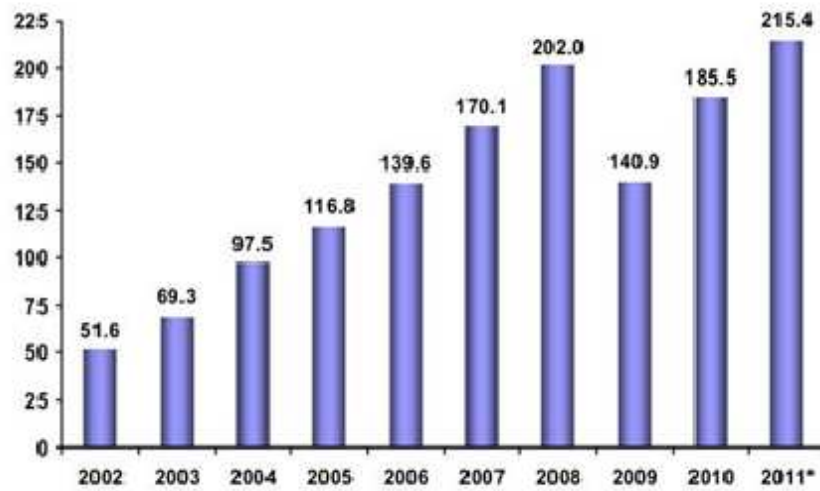


Fig. 2.10 Annual Imports (Billion USD)

(\* ) Annualized as of May 2011

Source: As taken from TURKSTAT

## **Chapter 3**

### **LITERATURE REVIEW**

#### **3.1 Relationship between Financial Development and Economic Growth**

In the literature, the relationship between financial development and economic growth has been discussed both theoretically and empirically. There is no consensus about the exact relationship between financial development and economic growth. There are some studies to link between financial sector development and economic growth in Turkey. Kar and Pentecost (2002) examined the causal relationship between financial development and economic growth in Turkey. They conclude that financial liberalization has no effect on growth in Turkey. Yucel (2009) also examine the causality relations between financial development, trade openness and economic growth in Turkey. He finds that financial development has positive effect on economic growth in Turkey.

Goldsmith (1969) argues that financial development has begun especially effectively running the banking sector. He also founds that positive correlation between financial development and economic growth as a result of his analysis of 35 countries between 1860 and 1963. According to recent empirical studies, for example, King and Levine (1993) studied link between financial indicator and economic growth of 80 countries. They find that, the link between financial indicators and economic performance are strongly and robustly correlated for 80

countries. Gregorio and Guidotti (1995) have studied 100 countries between the years 1960-1989 and conclude that financial development leads to economic growth. Levine and Zervos (1998) find the positive correlation between stock market and banking development and GDP per capita growth. They conclude that improvements of stock market and banking sector development results lead to higher economic growth. Kenourgios and Samitas (2007) examined the long-run relationship between finance and economic growth for Poland. They conclude that credit to the private sector is the most significant impetus of long-run growth in Poland. Hagmayr et al. (2007) investigated the relations between finance and growth in four emerging economies in South-eastern Europe for the period 1995-2005. They found a positive and significant effect of bond markets and the capital stock on growth. Rousseau and Sylla (2001) find a correlation between financial factors and economic growth for 17 economics over 1850-1997 and suggest that the improvement of the Atlantic economies might have been finance led.

Katircioglu et al. (2007) investigate the relationship between financial development, international trade and economic growth in India. They find a feedback relationship between financial development and economic growth in India. In contrast, Arestis and Demetriades (1997) Shan et al. (2001) and Shan and Morris (2002) argue that the positive correlation between financial development and economic growth was supported a couple of countries and not reached a general conclusion. Roubini and Sala-i Martin (1995) point out that growth is negatively correlated with bank reserve ratio and that was not likely to be affected by economic growth.



### **3.2 Relationship between International Trade and Economic Growth**

The relationship between international trade and economic growth has gained substantial importance in the literature. Smith (1776) was first to point out that, international trade has positive effect on economic growth. According to Robertson (1938) international trade has gained an important place for economic growth. This process was during the post World War 2 period. Utkulu and Özdemir (2004) searched the relationship between financial development and economic growth in Turkey. They concluded that the relationship between openness and growth is theoretically plausible, while a causal link from declining trade distortions to growth is also consistent with the hypothesised role of trade policy in the 'new' growth theory. Trade policy affects growth in both the short and long run. Yucel (2009) find that trade openness has a positive effect for the Turkish economy. Jenkins and Katircioglu (2010) employ bound test for Cyprus and find that, real income growth stimulates international trade and money supply in Cyprus.

Katircioglu et al. (2007) also investigated the relationship between financial development, international trade and economic growth in India. They find that economic growth in India stimulates a growth in international trade. According to some studies, international trade is momentous for economic growth of many countries (Chow, 1987; Marin, 1992; Bahmani-Oskooee and Alse, 1993; Jin, 1995; Xu, 1996; Shan and Sun, 1998). Edwards (1998) has researched the link between international trade and economic growth in 93 advanced and developing countries and founded that, there is positive relationship between international trade and economic growth. Loots (2000) argue that international trade has a positive impact on economic growth in South Africa. Frankel and Romer (1999) searched the

relationship between economic growth and international trade and they search about the geographic characteristics of various countries to explain trade and these featured variables in determining the impact of trade on real income growth. They conclude that trade had a positive effect on real income growth by stimulating investment in physical and human capital. Furthermore, trade appears to increase output for given levels of capital.

### **3.3 Relationship between Financial Development and International Trade**

The relationship between financial development and international trade has received less and limited attention in the literature. Beck (2002) explores the possible relation between financial development and international trade. Baldwin (1989) and Kletzer and Bardhan(1987) provide evidence that the argument of financial comparative advantage is theoretically formalized. (Beck, 2003) supported the theoretical model by Kletzer and Bardhan (1987) countries with better developed financial sectors have higher exports and better trade balances in industries that rely more on external financing. Slaveryd and Vlachos (2005), Ju and Wei (2005), Wynne (2005), Becker and Greenberg (2005), Ribeiro de Lucinda (2003) investigated the relationship between financial development and international trade. Their final results are in line with those of Beck (2002, 2003).

Katircioglu et al. (2007) investigated the relationship between financial development and international trade in India. They find that financial development is stimulated by exports while imports are stimulated by money supply in India. Jenkins and Katircioglu (2010) have also used bound test to investigate the relationship between

financial development, international trade and economic growth in Cyprus. They suggest that, there is no any direction of causality between financial development and economic growth in Cyprus. By the way, there have been numerous studies carried out by the authors that revealed reverse relation between financial development and international trade. Slaveryd and Vlachos (2002) point out trade openness might be associated with greater risk that consist foreign competition and exposure to external shocks.

## Chapter 4

### DATA AND METHODOLOGY

#### 4.1 Data

This study is carried out in the case of Turkey, for the period 1960-2008. Data used in this study are annually and have been taken from World Bank Development Indicators (WDI) of the World Bank (2009). The variables of the study are measured as follows; economic growth is proxied by real gross domestic product (GDP) based on 2000 constant US\$ prices. There are various measures for financial development proxy as advised in the literature (Beck, 2002). It is also advised that any improvement or increases in the volume of those proxies are assumed to be a development in the financial sector.

Therefore, as also Beck (2002) advises the ratio of broad money to GDP (M2) has been selected as a first financial proxy in this thesis, which means the supply of money in circulation in a given country's economy at a given time. M2 includes notes and coins (currency) in circulation, traveller's checks of non-bank issuers, demand deposits, savings deposits, other checkable deposits and other time deposits. The second financial proxy is the ratio of domestic credit to private sector to GDP (DCPS), which means that domestic credit to private sector refers to financial resources provided to the private sector, such as through loans, purchases of nonequity securities and trade credits and other accounts receivable, that establish a claim for repayment. The third financial proxy is the ratio of domestic credit provided by banking sector to GDP (DCBS) (which means domestic credit provided

by the banking sector to the whole system (both public and private)). Trade variable is proxied by the exports of goods and services as ratio to GDP (EX). All of the variables are at their natural logarithms to estimate growth effects of regressors on dependent variable (Katircioglu, 2010).

## 4.2 Empirical Model

Many studies in the economics literature have attempted to investigate the determinants of economic growth for countries. Some focused on times series evidence while some other focused on panel or cross-section evidence. In this thesis, it is proposed that financial development and international trade are likely to be determinants of real income in the case of Turkey. It is important to mention that financial sector is proxied by domestic credit to private sector, domestic credit provided by banking sector and money supply in this thesis while international trade is proxied by exports. Therefore, the following functional relationships have been put forward using proxies for financial sector and international trade:

$$[\text{GDP} = f(\text{FD}, \text{T})] \tag{1}$$

where real income (GDP) is a function of financial development proxies and trade proxies.

The functional relationships in equations (1) can be shown in logarithmic form to capture the growth impacts (Katircioglu, 2010):

$$(\ln \text{GDP}_t = \beta_0 + \beta_1 \ln \text{FD}_t + \beta_2 T_t + \varepsilon_t) \tag{2}$$

Where at period  $t$ ,  $\ln\text{GDP}$  is the natural log of real income;  $\ln\text{FD}$  is the natural log of the financial development proxy;  $\ln\text{T}$  is the natural log of the international trade proxy and  $\varepsilon$  is the error disturbance (Katircioglu, 2010).

### 4.3 Methodology

There are four models in this study and all of them are subjected to three tests as follows: the Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) unit root tests have been examined. Second, Johansen Co integration test has been used to investigate the long run relationship between financial development, international trade and economic growth for the models. Lastly, Granger Causality tests have been used to define the direction of causality among the variables.

#### 4.3.1 Unit Root Tests

Before estimating econometric modelling and in order to perform co-integration test between financial development, international trade and economic growth, we need to know series are stationary that ensures there are long run relationship between financial development, international trade and economic growth. In order to determine the series are stationary, unit root by using Augmented Dickey-Fuller tests (ADF) and Philips-Perron tests (PP) are considered in this thesis. The PP procedures are executed to test for unit roots as an alternative to ADF unit root tests. The general unit root test in the series is showed on the following model:

$$\Delta y_t = a_0 + \gamma y_{t-1} + a_2 t + \sum_{i=2}^p \beta_j \Delta y_{t-i-1} + \varepsilon_t \quad (3)$$

Where  $y$  is the series;  $t$  = time (trend factor);  $a$  = constant term (drift);  $\varepsilon_t$  = Gaussian white noise and  $p$  = the lag order and the number of lags “ $p$ ” in the dependent variable was chosen by the Akaike Information Criteria (AIC) to ensure that the

errors are white noise (Katircioglu et al. 2007). The null hypothesis ( $H_0$ ) says that the series is non-stationary (has unit root) whereas the alternative suggest that the series is stationary (has no unit root). If the coefficient is greater than critical values for the test, then rejects  $H_0$  and considered variable is stationary, if not it is not stationary. If the series is non-stationary, then we take the differences eliminate non-stationary problem. If the series are integrated of order 1 that means it is not stationary and becomes stationary after take first differences (See Gujarati, 2003).

The PP test makes a correction to the t-statistic of the coefficient from the AR (1) regression to account for the serial correlation in  $e_t$ . The correction is nonparametric since we use an estimate of the spectrum of  $\gamma$  coefficient at frequency zero this is robust to heteroscedasticity and autocorrelation of unknown form  $e_t$ . Phillips and Perron's test statistics can be showed as Dickey–Fuller statistics that have been made robust to serial correlation by using the Newey–West (1987) heteroscedasticity- and autocorrelation (Katircioglu et al. 2007). The widely used method is Newey- West heteroscedasticity autocorrelation consistent estimate of the form.

$$\omega^2 = \gamma_0 + 2 \sum_{j=1}^q \left(1 - \frac{j}{q+1}\right) \gamma_j \quad (4)$$

$$\gamma_j = \frac{1}{T} \sum_{t=j+1}^T \tilde{\varepsilon}_t \tilde{\varepsilon}_{t-j} \quad (5)$$

Where  $q$  is the truncation lag,  $\gamma_j$  is the covariance of estimated residuals  $j$ -lag apart and  $T$  is the sample size. The PP t-statistic is computed as

$$t_{pp} = \frac{\gamma_0^{\frac{1}{2}} t_b}{\omega} - \frac{(\omega^2 - \gamma_0) T s_b}{2\omega \hat{\sigma}} \quad (6)$$

### 4.3.2 Co-integration Test

Co-integration is the test for investigating long run equilibrium relationship between series (Gujarati, 2003). Johansen procedure is used to identify co integration among the variables (Katircioglu et al., 2007). Johansen test uses both the trace test and the maximum eigenvalue test for co integration. Trace test is more robust than maximum eigenvalue and also give better result for co integration (Cheung and Lai, 1993).

The Johansen (1988) and Johansen and Juselius (1990) approach allows the estimating of all possible co integrating vectors between set of variables (Katircioglu et al., 2007). Moreover, eliminates problems which stems from Engle and Granger (1987) procedure. The procedure can be shown as in the following Vector Auto Regressive (VAR) model:

$$X_t = \Pi_1 X_{t-1} + \dots + \Pi_K X_{t-K} + \mu + e_t \quad (\text{for } t=1, \dots, T) \quad (7)$$

Where  $X_t, X_{t-1}, \dots, X_{t-K}$  are vectors of current and lagged values of  $P$  variables respectively which are  $I(1)$  in the model;  $\Pi_1, \dots, \Pi_K$  are known as matrices of coefficients with  $(P \times P)$  dimensions;  $\mu$  is an intercept vector<sup>1</sup>; and  $e_t$  is a vector of random errors (Katircioglu et., 2007). The number of lagged values is found in such a way that error terms are not auto correlated. The rank of  $\Pi$  shows the number of co-integrating relationship(s) (i.e.  $r$ ) which is determined by testing whether its Eigen values ( $\lambda_i$ ) are different from zero. Johansen (1988) and Johansen and Juselius (1990) suggest that using the Eigen values of  $\Pi$  ordered from the largest to the smallest is

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<sup>1</sup>  $\mu$  is a vector of  $I(0)$  variables which represent dummy variables as well. This ensures that errors  $e_t$  are white noise.



for computation of trace statistics<sup>2</sup> (Katırcıoğlu et al. 2007). The trace statistic ( $\lambda_{trace}$ ) is computed by the following formula<sup>3</sup>:

$$\lambda_{trace} = -T \sum L_n(1 - \lambda_i), i = r+1, \dots, n-1 \text{ and the hypotheses are :} \quad (8)$$

$$H_0: r = 0 \quad H_1: r \geq 1$$

$$H_0: r \leq 1 \quad H_1: r \geq 2$$

$$H_0: r \leq 2 \quad H_1: r \geq 3$$

### 4.3.3 Error-Correction Model

There is an assumption that the real income in equations (2) may not immediately adjust to their long-run equilibrium levels following a change in any of their factors (Katırcıoğlu, 2010). Furthermore, the speed of adjustment between the short-run and the long-run levels of real income can be captured in the following error correction models:

$$\Delta \ln GDP_t = \beta_0 + \sum_{i=1}^n \beta_1 \Delta \ln GDP_{t-j} + \sum_{i=0}^n \beta_2 \Delta \ln FD_{t-j} + \sum_{i=0}^n \beta_3 \Delta \ln T_{t-j} + \beta_4 \varepsilon_{t-1} + u_t \quad (9)$$

---

<sup>2</sup> Asymptotic critical values are gathered from Osterwald-Lenum (1992).

<sup>3</sup> At the beginning of the procedure, we test the null hypothesis that there are not any co-integrating relationships. If it is rejected, the alternative hypothesis (i.e.  $r \leq 1, \dots, r \leq n$ ) are to be tested sequentially. If  $r=0$  cannot be rejected in the first place, then it means that there is not any co-integrating relationship among the variables.

Where  $\Delta$  indicates a change in the GDP, FD and T variables and  $\varepsilon_{t-1}$  is the one period lagged error correction term (ECT), which is estimated from equations (2). ECT in equations (9) displays how fast the disequilibrium between the short-run and the long-run values of dependent variable is eliminated each period. The expected sign of ECT is negative (Katircioglu, 2010).

#### 4.3.4 Granger Causality Tests

The Granger Causality test is a statistical analysis to estimate the direction of the relationship between the variables (Granger, 1969). Granger Causality tests require a Vector Error Correction Mechanism (VECM) in the existence of co-integration. The Granger test focuses on t-test for error correction term in VECM. Error Correction Term (ECT) is generated from the residuals of the co integration relationship to test for causality:

$$\Delta \ln Y_t = C_0 + \sum_{i=1}^k \beta_i \Delta \ln Y_{t-i} + \sum_{i=1}^k \alpha_i \Delta \ln X_{t-i} + \rho_i ECT_{t-1} + u_t \quad (10)$$

$$\Delta \ln X_t = C_0 + \sum_{i=1}^k \gamma_i \Delta \ln X_{t-i} + \sum_{i=1}^k \zeta_i \Delta \ln Y_{t-i} + \eta_i ECT_{t-1} + \varepsilon_t \quad (11)$$

Where Y and X are the variables under consideration, and  $\rho_i$  is the adjustment coefficient while  $ECT_{t-1}$  expresses the error correction term of the VECM model. The ECT shows how fast dependent variable (Y in equating (10) and X in equation (11) converge to its long term equilibrium level in percentage terms.  $\Delta$  is the first difference operator. In equation (10), X Granger causes Y if  $\rho_i$  is significantly different from zero. In equation (11), Y Granger causes X if  $\eta_i$  is significantly different from zero (Katircioglu et al. 2007).

## Chapter 5

### DATA ANALYSIS AND EMPIRICAL RESULTS

#### 5.1 Unit root Tests

We use unit root tests for investigating stationarity of variables. Augmented Dickey Fuller (ADF) and Philips-Perron were used for unit root process. These tests have been done at both levels and first differences which are shown in Table 5.1. According to Table 5.1, ADF and PP test indicates that, Trade volume and Imports are stationary at their levels, that variables are integrated of order I (0) while the rest of the variables; GDP, Domestic Credit to Private Sector, Domestic Credit Provided by Banking Sector, Broad Money (M2) and Exports are non-stationary at their levels, but become stationary at their first differences. These variables are integrated of order I (1) in the case of Turkey for sample period.

The ADF and PP test have provided different conclusions for the DCPS variable, but the study take the conclusion of the PP test into account for final decision. This is since PP is superior to ADF test (See Katircioglu, 2009).

Table 5.1 ADF and PP Tests for Unit Root

Statistics (Level)	ln GDP	lag	ln DCPS	lag	ln DCBS	lag	lnM2	lag	ln Tr	lag	ln EX	lag	ln IM	lag
$\tau_T$ (ADF)	-2.517	(0)	-3.202***	(1)	-1.828	(0)	1.886	(0)	-3.611**	(1)	-2.767	(0)	-3.455***	(0)
$\tau_\mu$ (ADF)	-0.968	(0)	-2.772***	(1)	-1.094	(0)	0.372	(0)	-1.815	(0)	-1.780	(0)	-1.847	(0)
$\tau$ (ADF)	8.218	(0)	0.575	(0)	0.866	(0)	1.644	(0)	1.317	(0)	0.951	(0)	1.084	(0)
$\tau_T$ (PP)	-2.526	(1)	-2.619	(1)	-2.028	(2)	1.930	(5)	-3.394***	(1)	-3.069	(2)	-3.455***	(0)
$\tau_\mu$ (PP)	-0.985	(1)	-1.964	(2)	-1.187	(3)	0.127	(14)	1.825	(3)	-1.796	(1)	-1.839	(4)
$\tau$ (PP)	8.218	(0)	0.685	(6)	0.972	(5)	2.637	(19)	1.494	(5)	0.888	(1)	1.844	(7)

Statistics (First Difference)	$\Delta$ ln GDP	lag	$\Delta$ ln DCPS	lag	$\Delta$ ln DCBS	lag	$\Delta$ lnM2	lag	$\Delta$ ln Tr	lag	$\Delta$ ln EX	lag	$\Delta$ ln IM	lag
$\tau_T$ (ADF)	-7.065*	(0)	-5.351*	(1)	-6.581*	(0)	-6.360*	(0)	-6.679*	(0)	-7.289*	(0)	-6.754*	(0)
$\tau_\mu$ (ADF)	-7.008*	(0)	-6.304*	(0)	-6.634*	(0)	-6.384*	(0)	-6.837*	(0)	-7.451*	(0)	-6.880*	(0)
$\tau$ (ADF)	-2.002**	(1)	-6.238*	(0)	-6.553*	(0)	-6.081*	(0)	-6.787*	(0)	-7.402*	(0)	-6.824*	(0)
$\tau_T$ (PP)	-7.065*	(0)	-6.420*	(8)	-6.610*	(6)	-7.123*	(21)	-6.715*	(3)	-7.289*	(0)	-6.945*	(4)
$\tau_\mu$ (PP)	-7.008*	(0)	-6.527*	(8)	-6.649*	(5)	-6.734*	(19)	-6.874*	(3)	-7.451*	(0)	-7.095*	(4)
$\tau$ (PP)	-3.508*	(4)	-6.255*	(6)	-6.547*	(4)	-6.049*	(8)	-6.774*	(2)	-7.390*	(1)	-6.933*	(3)

Note:

GDP represents real gross domestic product; DCPS is the domestic credit to private sector; DCBS is the domestic credit providing by banking sector. M2 is the money and quasi money. TR is the Trade as %of GDP. EX represent as exports of goods and services. IM represents as imports of goods and services. All of the series are at their natural logarithms.  $\tau_T$  represents the most general model with a drift and trend;  $\tau_\mu$  is the model with a drift and without trend;  $\tau$  is the most restricted model without a drift and trend. Numbers in brackets are lag lengths used in ADF test (as determined by AIC set to maximum 3) to remove serial correlation in the residuals. When using PP test, numbers in brackets represent Newey-West Bandwith (as determined by Bartlett-Kernel). Both in ADF and PP tests, unit root tests were performed from the most general to the least specific model by eliminating trend and intercept across the models (See Enders, 1995: 254-255). \*, \*\* and \*\*\* denote rejection of the null hypothesis at the 1 percent, 5 percent and 10 percent levels respectively. Tests for unit roots have been carried out in E-VIEWS 6.0.

## 5.2 Co-integration Tests

In the next step, the study proceeds with co-integration test by the approach of Johansen (1988) and Johansen and Juselius (1990). I must mentioned that variables of trade and imports are omitted from further analyses since they are stationary and integrated of order I (0) that Johansen Methodology requires the variables to be integrated of the same order (Katircioglu, 2009). Rest of the variables are integrated of order I(1). Co integration test were employed to real GDP (dependent variable), Domestic Credit to Private Sector (DCPS), Domestic Credit provided by Banking Sector (DCBS), Broad Money (M2) and Exports for searching the co integration among those variables. I run co integration test for four models. In the first model, real GDP, Domestic Credit to private sector, Domestic credit provided by banking sector, Broad (M2) and Exports are found as the non-stationary variables and integrated of order 1, i.e. I(1), Therefore, I can test whether they are co integrated or not (Engel and Granger, 1987) in table 5.2 for model 1.

Table 5.2 Johansen Co-integration Test

Model 1 [GDP: F (DCPS, DCBS, M2, EX)]

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.835825	131.9479	68.52	76.07
At most 1 *	0.598624	54.25453	47.21	54.46
At most 2	0.240009	15.00169	29.68	35.65
At most 3	0.066676	3.200371	15.41	20.04
At most 4	0.005410	0.233241	3.76	6.65

Trace test indicates 2 cointegrating equation(s) at the 5% level

Trace test indicates 1 cointegrating equation(s) at the 1% level

\*(\*\*) denotes rejection of the hypothesis at the 5%(1%) level

According to table 5.2 for model 1, there are co-integrating relationships among the variables since trace statistic in the 1% significance level can be rejected. Therefore, I conclude that there are long run relationship between GDP and its regressors in Model 1.

Table 5.2 Johansen Co integration Test (Continued)

Model 2 [GDP: F (DCPS, EX)]

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.424748	39.54056	29.68	35.65
At most 1	0.283556	15.21091	15.41	20.04
At most 2	0.012172	0.538871	3.76	6.65

Trace test indicates 1 cointegrating equation(s) at both 5% and 1% levels

\*(\*\*) denotes rejection of the hypothesis at the 5%(1%) level

In the second model, Co-integration test were employed for GDP and DCPS and Exports in above the table. According to results, the null hypothesis of no co-integration is again rejected at 0.01 level. Therefore, long run equilibrium relationship has been investigated between GDP and its regressors (DCPS and EX).

Table 5.2 Johansen Co integration Test (Continued)

Model 3 [GDP: F (DCBS, EX)]

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.410030	38.48862	29.68	35.65
At most 1 *	0.281776	17.38127	15.41	20.04
At most 2 *	0.098376	4.142300	3.76	6.65

Trace test indicates 3 cointegrating equation(s) at the 5% level

Trace test indicates 1 cointegrating equation(s) at the 1% level

\*(\*\*) denotes rejection of the hypothesis at the 5%(1%) level

For model 3, GDP is the dependent variable and regressors are DCBS and EX. According to these results, the null hypothesis can be rejected again. Therefore, a cointegrating vector has also been founded in Model 3.

The fourth model consists of real GDP and its regressors, M2 and EX. According to results in Table 5.2, the null hypothesis of no co-integrating vector can be rejected at 0.01 level. Therefore, long run equilibrium relationship has been founded in Model 4 where dependent variable is GDP and regressors are M2 and EX.

Table 5.2 Johansen Co integration Test (Continued)

Model 4 [GDP: F (M2, EX)]

Hypothesized		Trace	5 Percent	1
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Percent Critical Value
None **	0.559923	47.56471	29.68	35.65
At most 1	0.248507	14.73253	15.41	20.04
At most 2	0.079298	3.304769	3.76	6.65

Trace test indicates 1 cointegrating equation(s) at both 5% and 1% levels

\*(\*\*) denotes rejection of the hypothesis at the 5%(1%) level

### 5.3 Level Equations and Error Correction Models

The co-integration relationships have been found for all models in the present study. The next step is to estimate level coefficients in the four models and ECMS for short run coefficients plus ECTS. In Model 1, a 1% increase in DCPS leads to a decrease in GDP by 0.34% and this is statistically significant at  $\alpha=0.05$ . A 1% increase in DCBS leads to a increase in GDP by 0.006% and it is not statistically significant. A 1% increase in M2 leads to an increase in GDP by 0.32% and it is not statistically significant. A 1% increase in EX leads to an increase in GDP by 0.29% and it is statistically significant at  $\alpha=0.01$ . In model 2, a 1% increase in DCPS leads to an increase in GDP by 0.67% and it is statistically significant at  $\alpha=0.05$ . A 1% increase in EX leads to an increase in GDP by 0.36% and it is statistically significant at  $\alpha=0.01$ . In model 3, a 1% increase in DCBS leads to an increase in GDP by 0.30% and statistically significant at  $\alpha=0.05$ . A 1% increase in EX leads to an increase in GDP by 0.37% and it is statistically significant at level  $\alpha=0.05$ . In model 4, a 1% increase



in M2 leads to an increase by 0.56 and it is statistically significant at  $\alpha=0.05$ . An 1% increase in EX leads to an increase by 0.25 and it is statistically significant at  $\alpha=0.05$ . According to t statistics of the error correction model, model 1 is statistically significant at lag 1 and coefficient of 0.142 which means that short run values of GDP converge to its long run equilibrium level by 14,2% speed of adjustment every year by the contributions of financial development (DCPS, DCBS, M2) and Exports. DCPS is statistically significant at  $\alpha: 0.05$ . DCBS, M2 and EX variables are not statistically significant in the short run period in the first model. Model 2 is statistically significant at lag 1 and coefficient of 0.085 shows that short run values of GDP converge to its long run equilibrium level by 8.5% speed of adjustment every year by contributions of financial development (DCPS) and Exports. DCPS is statistically significant  $\alpha: 0.05$  in the short run period, however, EX is not statistically significant in the short run period. Model 3 is statistically significant at lag 1 and coefficient of 0.129 that shows the short run values of GDP converge to its long run equilibrium level by 12.9% speed of adjustment every year by the contributions of financial development (DCBS) and Exports. DCBS and EX are not statistically significant in short run period of the third model. Model 4 is statistically significant at lag 1 and coefficient of 0.132 which states that short run values of GDP converge to its long run equilibrium level by 13.2% speed of adjustment every year by the contributions of financial development (M2) and Exports. M2 and EX are not statistically significant in short run period of the fourth model.

Table 5.3 Level Equations and Error Correction Model

Model 1

Cointegrating Eq:		ECT
LOGGDP(-1)		-1.000000
LOGDCPS(-1)		-0.346283 (0.16303) [-2.12410]
LOGDCBS(-1)		+0.006317 (0.12728) [-0.04963]
LOGM2(-1)		+0.321164 (0.18702) [-1.71726]
LOGEX(-1)		+0.294413 (0.04926) [-5.97682]
C		-5.259352
Error Correction:		D(LOGGDP)
CointEq1		-0.142743 (0.04596) [-3.10588]
D(LOGGDP(-1))		-0.511347 (0.19901) [-2.56939]
D(LOGDCPS(-1))		0.161856 (0.06515) [ 2.48451]
D(LOGDCBS(-1))		-0.005479 (0.04802) [-0.11409]
D(LOGM2(-1))		-0.043853 (0.08579) [-0.51115]
D(LOGEX(-1))		-0.047038 (0.02923) [-1.60924]
C		0.037900 (0.00744) [ 5.09670]
R-squared		0.377273
Adj. R-squared		0.281469
Sum sq. Resids		0.039107
S.E. equation		0.031666
F-statistic		3.937958
Log likelihood		97.34091
Akaike AIC		-3.927866
Schwarz SC		-3.649594
Mean dependent		0.025068
S.D. dependent		0.037357
Determinant resid covariance (dof adj.)		1.22E-11
Determinant resid covariance		5.35E-12
Log likelihood		270.5718
Akaike information criterion		-10.02486
Schwarz criterion		-8.434739

Table 5.3 Level Equations and Error Correction Model (Continued)

Model 2

Cointegrating Eq:	ECT
LOGGDP(-1)	-1.000000
LOGDCPS(-1)	+0.672640 (0.20939) [-3.21244]
LOGEX(-1)	+0.360621 (0.04140) [-8.71020]
C	-5.176884

Error Correction:	D(LOGGDP)
CointEq1	-0.085725 (0.03921) [-2.18649]
D(LOGGDP(-1))	-0.386936 (0.16895) [-2.29018]
D(LOGDCPS(-1))	0.116069 (0.04443) [ 2.61260]
D(LOGEX(-1))	-0.019430 (0.02601) [-0.74703]
C	0.034524 (0.00676) [ 5.10614]

R-squared	0.261895
Adj. R-squared	0.191599
Sum sq. Resids	0.046364
S.E. equation	0.033225
F-statistic	3.725621
Log likelihood	95.96242
Akaike AIC	-3.870741
Schwarz SC	-3.673917
Mean dependent	0.025151
S.D. dependent	0.036953

Determinant resid covariance (dof adj.)	2.88E-07
Determinant resid covariance	2.05E-07
Log likelihood	161.8104
Akaike information criterion	-6.119591
Schwarz criterion	-5.411024

Table 5.3 Level Equations and Error Correction Model (Continued)

Model 3

Cointegrating Eq:	ECT
LOGGDP(-1)	-1.000000
LOGDCBS(-1)	+0.301856 (0.15843) [-1.90533]
LOGEX(-1)	+0.379422 (0.05133) [-7.39191]
C	-6.035267
Error Correction:	D(LOGGDP)
CointEq1	-0.129165 (0.03958) [-3.26298]
D(LOGGDP(-1))	-0.073641 (0.14611) [-0.50401]
D(LOGDCBS(-1))	0.047730 (0.04240) [ 1.12572]
D(LOGEX(-1))	-0.036016 (0.02691) [-1.33850]
C	0.028086 (0.00664) [ 4.22765]
R-squared	0.237333
Adj. R-squared	0.164698
Sum sq. Resids	0.047907
S.E. equation	0.033773
F-statistic	3.267474
Log likelihood	95.19313
Akaike AIC	-3.838005
Schwarz SC	-3.641181
Mean dependent	0.025151
S.D. dependent	0.036953
Determinant resid covariance (dof adj.)	5.06E-07
Determinant resid covariance	3.61E-07
Log likelihood	148.5193
Akaike information criterion	-5.554011
Schwarz criterion	-4.845444

Table 5.3 Level Equations and Error Correction Model (Continued)

Model 4

Cointegrating Eq:	ECT
LOGGDP(-1)	-1.000000
LOGM2(-1)	+0.564564 (0.17285) [-3.26613]
LOGEX(-1)	+0.254554 (0.06209) [-4.09961]
C	-5.619815
Error Correction:	D(LOGGDP)
CointEq1	-0.132909 (0.04343) [-3.06028]
D(LOGGDP(-1))	-0.113755 (0.14091) [-0.80731]
D(LOGM2(-1))	0.088264 (0.05841) [ 1.51119]
D(LOGEX(-1))	-0.038871 (0.02931) [-1.32633]
C	0.027272 (0.00641) [ 4.25138]
R-squared	0.313563
Adj. R-squared	0.246594
Sum sq. Resids	0.043108
S.E. equation	0.032426
F-statistic	4.682188
Log likelihood	95.10059
Akaike AIC	-3.917417
Schwarz SC	-3.718651
Mean dependent	0.025068
S.D. dependent	0.037357
Determinant resid covariance (dof adj.)	2.59E-07
Determinant resid covariance	1.83E-07
Log likelihood	160.9721
Akaike information criterion	-6.216176
Schwarz criterion	-5.500621

## 5.4 Granger Causality Tests

Co-integration test examine whether they have the stable long-term relations, however, it does not tell us about the direction of causality among the variables. If the variables are co-integrated each other, there need to be at least one direction of causality among the variables (Enders, 1995). The causality among the variables was assessed under the VECM since we found co-integration in all of the four models. In this study, Granger Causality Tests were applied to four different models which real GDP is dependent variable in the models. Test results suggest that unidirectional causality runs from M2 to GDP which means that a change in M2 stimulates a change in GDP. Bi-directional causality is obtained between GDP and Exports in the first model which means that there is feedback relationship (impact) between these two variables. In the second model, the variables are real GDP, DCPS and EX. Test results reveal that unidirectional causality runs from DCPS to GDP which states that a change in DCPS stimulates a change in GDP. Bi-directional causality obtains between GDP and Exports in the second model which means that there is a feedback relationship (impact) between these two variables. In the third model, variables are real GDP, DCBS and EX. The result suggests that there is only unidirectional causality runs from Exports to GDP that shows a change in Exports stimulates a change in GDP. In the last model, real GDP, M2 and Exports are the variables. The result show that unidirectional causality runs from M2 to GDP (a change in M2 spur a change in GDP), from M2 to Exports (a change in M2 stimulates a change in Exports.) Bi-directional causality has attained between GDP and Exports which conclude that there is a feedback relationship (impact) between these two variables.

Table 5.4 Granger Causality Tests under Block Exogeneity Approach

Model 1

<b>Dependent variable: LOGGDP</b>			
<b>Excluded</b>	<b>Chi-sq</b>	<b>df</b>	<b>Prob.</b>
LOGDCPS	0.092509	1	0.7610
LOGDCBS	1.25E-05	1	0.9972
LOGM2	3.524100	1	0.0605*
LOGEX	4.325178	1	0.0376*
ALL	12.89427	4	0.0118
<b>Dependent variable: LOGDCPS</b>			
LOGGDP	0.000169	1	0.9896
LOGDSBS	0.039470	1	0.8425
LOGM2	0.593199	1	0.4412
LOGEX	0.000168	1	0.9896
ALL	2.030464	4	0.7302
<b>Dependent variable: LOGDCBS</b>			
LOGGDP	1.821790	1	0.1771
LOGDCPS	0.469187	1	0.4934
LOGM2	0.386316	1	0.5342
LOGEX	1.461753	1	0.2267
ALL	3.434406	4	0.4879
<b>Dependent variable: LOGM2</b>			
LOGGDP	1.189767	1	0.2754
LOGDCPS	0.636820	1	0.4249
LOGDCBS	0.025318	1	0.8736
LOGEX	0.085947	1	0.7694
ALL	3.728605	4	0.4440

Table 5.4 Granger Causality Tests under Block Exogeneity Approach (continued)

Model 1

<b>Dependent variable: LOGEX</b>			
LOGGDP	4.831324	1	0.0279*
LOGDCPS	0.135985	1	0.7123
LOGDCBS	0.614887	1	0.4330
LOGM2	2.520169	1	0.1124
ALL	6.086498	4	0.1928

Table 5.4 Granger Causality Tests under Block Exogeneity Approach (continued)

Model 2

<b>Dependent variable: LOGGDP</b>			
<b>Excluded</b>	<b>Chi-sq</b>	<b>df</b>	<b>Prob.</b>
LOGDCPS	13.09034	2	0.0014**
LOGEX	8.789932	2	0.0123**
ALL	23.40689	4	0.0001
<b>Dependent variable: LOGDCPS</b>			
LOGGDP	1.179752	2	0.5544
LOGEX	0.857603	2	0.6513
ALL	3.170848	4	0.5297
<b>Dependent variable: LOGEX</b>			
LOGGDP	7.128682	2	0.0283**
LOGDCPS	3.496174	2	0.1741
ALL	8.359184	4	0.0793



Table 5.4 Granger Causality Tests under Block Exogeneity Approach (continued)

Model 3

<b>Dependent variable: LOGGDP</b>			
<b>Excluded</b>	<b>Chi-sq</b>	<b>df</b>	<b>Prob.</b>
LOGDCBS	1.744090	1	0.1866
LOGEX	9.346357	1	0.0022*
ALL	9.948321	2	0.0069
<b>Dependent variable: LOGDCBS</b>			
LOGGDP	2.434227	1	0.1187
LOGEX	0.718224	1	0.3967
ALL	3.267558	2	0.1952
<b>Dependent variable: LOGEX</b>			
LOGGDP	1.856684	2	0.1730
LOGDCBS	0.072896	2	0.1741
ALL	2.012747	4	0.3655

Table 5.4 Granger Causality Tests under Block Exogeneity Approach (continued)

Model 4

<b>Dependent variable: LOGGDP</b>			
<b>Excluded</b>	<b>Chi-sq</b>	<b>df</b>	<b>Prob.</b>
LOGM2	5.557944	1	0.0184*
LOGEX	6.156175	1	0.0131*
ALL	13.39499	2	0.0012

Table 5.4 Granger Causality Tests under Block Exogeneity Approach (continued)

Model 4

<b>Dependent variable: LOGM2</b>			
LOGGDP	0.928412	1	0.3353
LOGEX	0.320038	1	0.5716
ALL	3.128878	2	0.2092
<b>Dependent variable: LOGEX</b>			
LOGGDP	5.273895	1	0.0216*
LOGM2	2.765458	1	0.0963*
ALL	5.418218	2	0.0666

## Chapter 6

### CONCLUSION AND POLICY IMPLICATIONS

#### 6.1 Conclusion

This study investigates long run equilibrium relationship and cointegration between real income growth and two important regressors in the case of Turkey: financial development and international trade. Unit root tests have revealed that trade volume and imports of goods and services are stationary variables at their levels; therefore, they could not be included in further analyses due to the fact that Johansen methodology requires the variables to be integrated of the same order. So, international trade is proxied by exports of goods and services only in the present study. On the other hand, financial development is proxied by multiple variables like M2, domestic credits by banking sector, and domestic credits to private sector as advised in the literature (See Jenkins and Katircioglu, 2009). Johansen cointegration tests confirm long run equilibrium relationship between real income growth and its regressors: financial development and international trade. Depending on the selection of the type of financial sector proxy, real income in Turkey converge towards its long term equilibrium levels significantly at different levels by the contribution of financial sector and international trade. Finally, various Granger causality tests in the selected alternative models suggest unidirectional causality that runs from financial sector development to real income growth, which supports the validity of supply leading hypothesis; and bidirectional causality (feedback relationship) between real income growth and international trade (exports) in the long term period. Results

clearly show that financial sector development and exporting activity in Turkey are catalysts for real income growth in Turkey; which also prove that financial development and trade are significant sources of growth in this developing country.

## **6.2 Policy Implications**

This study has proved the importance of financial sector development and international trade in the case of Turkey, which achieved economic stability and stability in financial markets apart from 2000s as a result of political stability. This study has also proved that financial sector and exports are catalyst for real income growth. On the other hand, real income is also catalyst for exports in return. Financial sector is proxied by money supply (M2) and domestic credits; therefore, an expansion in the volume of money leads to more economic and financial activities which enhance higher growth in the economy. This is what was experienced in Turkey since 2000s as a result of stock market development and foreign investments. It is also important that Central Bank of Turkey should control inflationary pressures as a result of expansion in the volume of money in the circulation. Till the moment, it can be said that this is achieved. But, it is also very important that there is also huge amount of foreign hot money in the Turkish stock market. Various authorities state that amount of foreign hot money constitutes almost 75% of the total volume in Istanbul Stock Market, which is very dangerous. These carry cash should be directed towards investment in the real sectors by the monetary authorities in Turkey. Both domestic and foreign investors should be encouraged to place their investments mainly in the real sector. Furthermore, this study has also proven that exports and real income have feedback relationship. Exports lead to increases in real income while increases in real income lead to increases in exports in return. Therefore, exporting is a major determinant of real income in Turkey as proved by the

econometric analysis in the present study; therefore, encouraging domestic and foreign investors to place their investments mainly in real sectors would be a correct behaviour or policy.

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