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YÜKSEK LİSANS TEZİ

EFFECT OF FOREIGN EXCHANGE EXPOSURE ON STOCK RETURNS IN ISE

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Danışman

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2- Hisse Senedi Getirisi   2-Stock Return
3- Döviz Kuru   3-Exchange Rate
4- Korunma   4-Hedging
5-İhracat Yapan Firmalar   5-Exporting Firms

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ÖZET

Yüksek Lisans Tezi

Döviz Kuru Riskinin İMKB'de İşlem Gören Hisse Senetlerinin Getirileri Üzerindeki Etkisi

Pelin EVRAN

Dokuz Eylül Üniversitesi
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İngilizce İşletme Programı

Döviz kuru riski, kurdaki beklenmeyen değişmelere karşı firmaların aktifleri, pasifleri ve faaliyet gelirlerinin ulusal para cinsinden duyarlılığını ifade etmektedir. Kurdaki beklenmeyen değişmeler firmaların nakit akımını, karlılığını ve dolayısıyla firmanın değerini olumsuz etkilemektedir. Bu değişmelerin firmaların karlılığı üzerindeki etkisi firmaların üretim, satış, fiyat stratejisi ve diğer finansal faaliyet konularındaki uygulamaları için önem arz etmektedir. Ticaret globalleştikçe döviz kuru riskine dikkat edilmesi gerektiğini düşünen firma sayısı artmaktadır. Bu firmalar, kurdaki beklenmeyen değişmelere karşı kendilerini koruyabilmek için uygun korunma stratejileri tasarlayıp uygulamaktadırlar.

Literatürde döviz kuru riski üzerine yapılan geçmiş çalışmalar, döviz kurundaki değişim ile ihracat yapan firmaların hisse senetleri getirisi arasında anlamlı bir ilişkinin varlığı konusunda yeterli kanıt bulamamışlardır. Kurdaki beklenmeyen değişmelerin firmaların hisse senedi getirileri üzerindeki etkisini daha iyi anlayabilmek için firma bazında analiz yapmanın önemi artmıştır.

Bu çalışma, İstanbul Menkul Kıymetler Borsasında işlem gören firmaların hisse senetleri getirilerinin kurdaki değişmeler karşısındaki duyarlılığını sınamaktadır. Bu tezin amacı, Ocak 1999 ve Eylül 2005 yılları arasında, kurdaki değişmeler ile hisse senedi getirileri arasındaki ilişkiyi araştırmaktır. Ampirik çalışma için regresyon analizi kullanılmıştır.

Yapılan analiz sonucunda kurdaki değişmeler ile hisse senedi getirileri arasında çoğunlukla negatif ve anlamsız bir ilişki olduğu ortaya çıkmıştır. Ayrıca, sadece kurdaki değişmelerin hisse senetleri getirisini açıklamakta yetersiz kaldığı sonucuna ulaşılmıştır.

Anahtar Kelimeler: 1) Döviz Kuru Riski, **2)** Hisse Senedi Getirisi, **3)** Döviz Kuru, **4)** Korunma, **5)** İhracat Yapan Firmalar

ABSTRACT

Master Thesis

Effect of Foreign Exchange Exposure on Stock Returns in ISE

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Foreign exchange exposure is defined as the amounts of foreign currencies which represent the sensitivity of the real domestic currency (market) value of assets, liabilities or operating incomes to unanticipated changes in exchange rates. An unanticipated change in exchange rates negatively affects the firm's cash flows, its profitability and therefore its market value. The impact of exchange rate movements on the firm profitability has important implications for making financial decision about production, sales, pricing strategy, and financial operations. As businesses become increasingly global, more and more firms find it necessary to pay careful attention to foreign exchange exposure and to design and implement appropriate hedging strategies to protect the firms from unanticipated changes in exchange rates.

Previous studies in literature find weak evidence that support the significant relationship between the changes in exchange rates and stock returns of exporting firms. For understanding the effects of unanticipated changes in exchange rates on stock returns increases the importance of making an analysis at firm level.

This study provides a literature survey on the concept of the exchange rate sensitivity of stock returns of exporting and non-exporting firms that are traded in Istanbul Stock Exchange. The aim of this study is to measure foreign exchange exposure of Turkish firms whose stocks are traded in Istanbul Stock Exchange over the period of January, 1999 – September, 2005. Ordinary Least Square Regression is used in the empirical analysis.

The results of the thesis reveal mostly a negative and insignificant relationship between the changes in exchange rates and stock returns. Furthermore, a change in exchange rates alone is insufficient to explain the variation in stock returns in ISE.

<u>Key Words:</u> **1)** Foreign Exchange Exposure, **2)** Stock Return, **3)** Exchange Rate, **4)** Hedging, **5)** Exporting Firms

EFFECT OF FOREIGN EXCHANGE EXPOSURE ON STOCK RETURNS IN ISE

CHAPTER 1. FOREIGN EXCHANGE EXPOSURE

CHAPTER 2. EMPRICAL STUDIES DONE ON EXPOSURE

CHAPTER 3. TURKISH ECONOMY: 1980-2005

CHAPTER 4. ANALYSIS OF THE RELATIONSHIP BETWEEN EXCHANGE RATE EXPOSURE AND STOCK RETURNS

ABBREVIATIONS

BIS.   The Bank for International Settlements
CB.   Central Bank
CBRT.   Central Bank of The Republic of Turkey
CD.   Certificates of Deposit
CPI.   Consumer Price Index
EXCHRATE.   Exchange Rate
GNP.   Gross National Product
GDP.   Gross Domestic Product
ISE.   Istanbul Stock Exchange
MRKTRET.   Market Return
NDA.   Net Domestic Asset
SMP.   Staff Monitored Program
WTO.   World Trade Organization
SPO.   State Planning Organization
STOCKRET.   Stock Return
TurkDEX.   Turkish Derivatives Exchange
TURKSTAT   Turkish Statistical Institute

TABLES

FIGURES

INTRODUCTION

Since the breakdown of the Bretton Woods system of fixed exchange rates, both real and nominal exchange rates have fluctuated widely. The Model developed by Shapiro (1974) predicts that changes in exchange rates affect the multinational firm's cash flows, its profitability and therefore its market value, negatively. Economic theory suggests depreciation of home currency favorably affects the firm which heavily exports while unfavorably affects the firm which imports. Domestic firms that sell goods competing with imports benefit from the depreciation of home currency, because they gain competitive advantage.

However there is little empirical evidence that support these theoretical predictions. For example Jorion (1990), Bodnar and Gentry (1993), and Amihud (1994) empirically examine the relationship between changes in exchange rates and the changes in the value of the US multinational firms as measured by stock prices. They found weak evidence between contemporaneous exchange rate fluctuations and stock prices of those firms.

Pritamani, Shome, and Singal (2004) explain the cause of weak evidence of significant exchange rate exposure by ignoring the effect of domestic economy on stock prices. Because, according to the conventional expectation, increase in the value of the home currency makes exporting goods more expensive in terms of foreign currency. This may lead to a decline in foreign demand, foreign sales revenue or both. However, according to the monetary theory of exchange rates, value of the home currency is expected to increase due to an increase in domestic GDP. It means that when the home currency appreciates, foreign demand will decline due to a high export price, but this reduction is offset by an increased domestic demand in a strong domestic economy. As a result of this dual effect, insignificant exposure is expected for exporting firms.

Emerging markets draw attention of investors. The market capitalization, volatility and returns have increased greatly in these markets. Therefore many global investors diversified their portfolios among these markets in order to decrease risk

and to gain more. Turkey is a great opportunity for foreign investors due to economic developments in the recent years.

Liberal economic policies started to be implemented after 1980s in Turkey, but exchange rate policy was fully liberalized after 1988. Switching the regime had significant impact on foreign trade. Turkey experienced three severe economic crises between the years 1994-2001 and the effects of these crises still exist. The domestic macroeconomic instability and the structural problems had a role on the economic crises. On the other hand, Turkish economy was negatively affected from the crisis in the world especially Asian and Russian crisis in the context of globalization. As a result, variability in exchange rates increased and the firms operating in Turkey were negatively affected from these economic conditions. They are exposed to higher business risk and foreign exchange risk.

The aim of this study is to measure foreign exchange exposure of Turkish firms whose stocks are traded in Istanbul Stock Exchange over the period of January, 1999 – September, 2005. In order to examine foreign exchange rate exposure, 143 firms whose stocks are traded in Istanbul Stock Exchange (ISE) in 2005 are selected. These firms take part in the ISE National Industry Index. Firms are divided into two categories as exporters and non-exporters. The firm whose foreign sales level is at least 10% of total sales in the year of 2005 is defined as exporter. Firms' monthly stock returns are obtained from ISE while monthly ISE market return and Consumer Price Index (CPI) based real effective exchange rate index are obtained from Central Bank of The Republic of Turkey (CBRT). CPI based real effective exchange rate index is preferred because of high inflation rates in the Turkish economy.

Firstly, Adler and Dumas's (1984) model which describes the exposure elasticity of the firm for a given unit change in the exchange rate is used to test the significance of exposure for exporting firms in the context of dual effect hypothesis. Due to an insignificant result, another macro economic variable which is the market return is added to the regression equation by following Jorion (1990) and the prediction of the hypothesis of insignificant exchange rate exposure coefficient of

Turkish exporting firms when the value-weighted market index is used as the control portfolio is tested. Bartov and Bodnar (1994) and Amihud (1994) suggest that lagged changes in the home currency demonstrate a significant effect on abnormal stock performance. Therefore, it is examined whether such an effect can be generalized to Turkish exporting firms. However, exchange rate exposure coefficient is still insignificant.

Despite the increasing importance of foreign exchange rate exposure, there are limited studies done on this topic in Turkey. Yücel and Kurt (2003) and Kasman (2003) conduct studies on this topic. Yücel and Kurt (2003) examine the foreign exchange exposure of Turkish companies at the firm level. However, Kasman (2003) analyzes the relationship between stock prices and exchange rates by using aggregate stock indices of Turkey. This study contributes to financial literature: An empirical analysis which measures the foreign exchange rate exposure at firm and the portfolio levels.

This study is organized as follows: The definition of foreign exchange exposure and the difference between foreign exchange exposure and foreign exchange risk is covered in Chapter 1. Chapter 1 also presents the types of foreign exchange exposure. The empirical studies done on exposure are discussed in Chapter 2. Development of exchange rate policy, export and import growth and macro economic performance during 1980-2005 are discussed in Chapter 3. Chapter 4 describes the hypothesis, model, data and methodology for estimating foreign exchange exposure and also interprets the results of the analysi

CHAPTER 1
FOREIGN EXCHANGE EXPOSURE

1.1   Foreign Exchange Exposure

1.1.1   Exposure

Foreign exchange risk can be defined as the degree of risk created because of unanticipated exchange rate changes, which affects firm value (operations of the firm) over a period of time. It refers to the effect that unanticipated exchange rate changes has on the home currency value of assets, liabilities and cash flows (contractual or otherwise). Since the breakdown of the Bretton Woods system of fixed exchange rates, both real and nominal exchange rates have fluctuated widely. The model developed by Shapiro (1974) predicts that changes in exchange rates affect negatively the multinational firm's cash flows, its profitability and therefore its market value. For example, an appreciation of home currency reduces the competitiveness of the firm in foreign markets while it increases the attractiveness of the domestic market abroad. These lead to big fluctuations in firm's earnings as well as to the possibility of a decrease in the shareholder's value of the firm.

Baum, Çağlayan, Baum and Barkoulas (2006) investigate the effects of permanent and transitory component of exchange rate uncertainty on firm profitability. They find that volatility of the permanent component of the exchange rate has positive effects on the variance of the firm's growth rate of profits whereas volatility of the transitory components has negative effects.

Therefore, foreign exchange risk arises when a firm has international operations involving currencies other than the home currency, including importing, exporting, investing and financing (Moosa, 2003: 65). However, as Adler and Dumas (1984) point out firms which have no foreign operations and no foreign currency assets, liabilities or transactions can also be generally exposed to foreign exchange risk. Foreign exchange risk affects the competitiveness of those firms. When the

home currency appreciates, they should compete with the inexpensive imports. This may lead to a sharp decline in their market share and profits. If they could not cope with this competition, they would go out of business.

Kurtay (1997: 7) points out that currency exposure, currency risk and exchange rate risk terms are used interchangeably for foreign exchange risk. However, Adler and Dumas (1984) point out that the currency risk is not exposure and they explain the difference between the terms currency risk and exposure as:

"Currency risk is to be identified with statistical quantities which summarize the probability that the actual domestic purchasing power of home or foreign currency on a given future date will differ from its originally anticipated value. Exposure in contrast, should be defined in terms of what one has at risk."

As discussed above, Adler and Dumas (1984) briefly define the foreign exchange exposure in terms of what one has at risk. In detail, they define the foreign exchange exposure as the amounts of foreign currencies which represent the sensitivity of the real domestic currency (market) value of assets, liabilities or operating incomes to unanticipated changes in exchange rates. The main points of this definition can be summarized as:

First, the exposure is explained as a measure of the *sensitivity* of real domestic currency values. This means that the exposure is the extent or degree of change in the home currency value of something by exchange rate changes. Second, they point out that it is concerned with *real domestic currency values*. By this, they mean that they measure the exposure by the sensitivity of the real (inflation-adjusted) home currency values of an asset and so on, to changes in exchange rates. Third, they mention that exposure can exist on assets and liabilities or on the operating incomes of firms. It means that exposure exists on stocks and flows. Also, in their definition they do not make a differentiation between foreign or domestic assets, because unanticipated changes in exchange rates can affect domestic as well as foreign assets, liabilities, and operating incomes. Finally, in their definition, they only mention

unanticipated changes in exchange rates. This is because markets compensate the anticipated changes in exchange rates, and also it should be noted that anticipated changes are discounted and reflected in the value of the firm (Levi, 1990: 188).

Exchange rates can change by more or less than expected. In this situation, there will be gains or losses on assets, liabilities, or operating incomes. This relationship is indicated by the simple formula:

$$\text{FX Gain (Loss)}_{t,t+n} = [S_{t+n} - S_t] [\text{Exposure}_t]$$

where FX Gain (Loss)$_{t,t+n}$ is the foreign exchange gain or loss and $[S_{t+n} - S_t]$ is the change in the spot exchange rate over the period. The exposure is denominated in the underlying local currency, the exchange rates are quoted as home currency[1] units per local currency, and the foreign exchange gain or loss is denominated in home currency units (Click and Coval, 2002).

For example; Japon Tobacco INC. which is a Japanese multinational corporation is holding \$1,174 trade notes and accounts receivable on March 31, 2005. The exchange rate when it was obtained was 1\$ = ¥107.39 (as of March 30, 2005), and the exchange rate at the end of the following month (as of April 29, 2005) is 1\$ = ¥105.19 (Source: Annual Report of JTI).

$$\text{FX Gain (Loss)} = [¥105.19 - ¥107.39] [\$1,174] = \$-2,582.8$$
or loss of \$ 2,582.8.

Adler and Dumas's (1984) definition of exposure is indicated by the below formula:

Exposure of firm to e_i = (Total unexpected change in the financial position of the firm as measured in the home currency/unexpected change in e_i)

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[1] Home currency and domestic currency have the same meaning.

where "financial position" includes financial statements as well as cash flows and e_i is the exchange rate against a specific currency which is denoted by i (for instance Euros, Hong Kong dollars, etc.).

To give a very simplistic example of exposure, assume that a firm is expecting a payment of $500. The domestic currency is the YTL, this is where the money is spent. The exposure against the dollar if it is assumed that all other incomes, and net asset holdings are unaffected by the dollar exchange rate can be calculated as follows. Today, 1.5 YTL is needed to buy one US dollar, so the expected domestic currency value is 500 USD*1.5 (YTL/USD) = 750 YTL. If the dollar exchange rate increases by 0.1 YTL, the unexpected change in the value will be 500 USD*0.1 (YTL/USD) = 50 YTL. The exposure will thus be 50 YTL / (0.1 (YTL/USD)). The financial position strengthens by 50 YTL when the price of dollars increases by 0.1 YTL. The YTL cancel so the expression can be rewritten as (50/0.1) USD = 500 USD. As indicated in the example, exposure is insignificant because the dollar amount is fixed (Adopted from Frieberg, 1999: 20).

As businesses become increasingly global, more and more firms find it necessary to pay careful attention to foreign exchange exposure and to design and implement appropriate hedging strategies. For example, the US dollar was strong against the major currencies like Deutsche mark, British pound especially in 1982 and 1983 causing many US multinationals to decide to invest outside the country to have better comparative advantages against their rivals (Kurtay, 1997: 7).

1.1.2 The Exposure Line

The relationship between changes in the exchange rate and changes in the base currency value of the asset is shown by the exposure line as shown in Figure 1-1 which is called **exposure line** (Moosa, 2003: 80).

ΔV   High Exposure

Low Exposure

ΔS^u
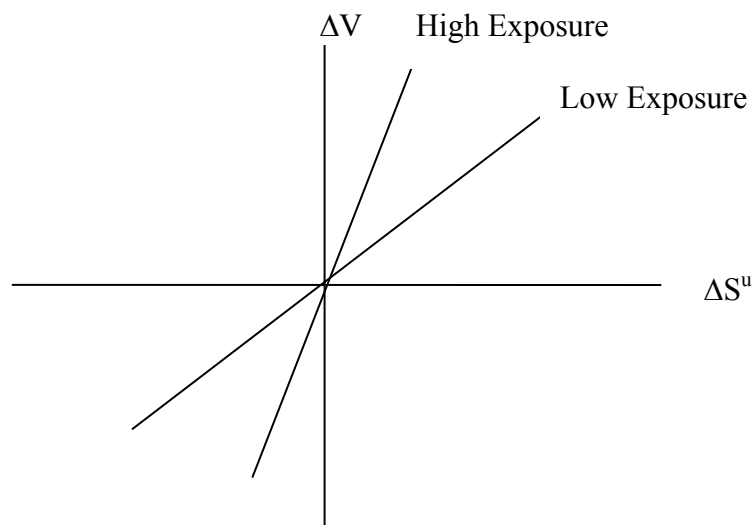
(a) Exposure line for "foreign" assets

ΛV

High Exposure

Low Exposure

ΔS^u
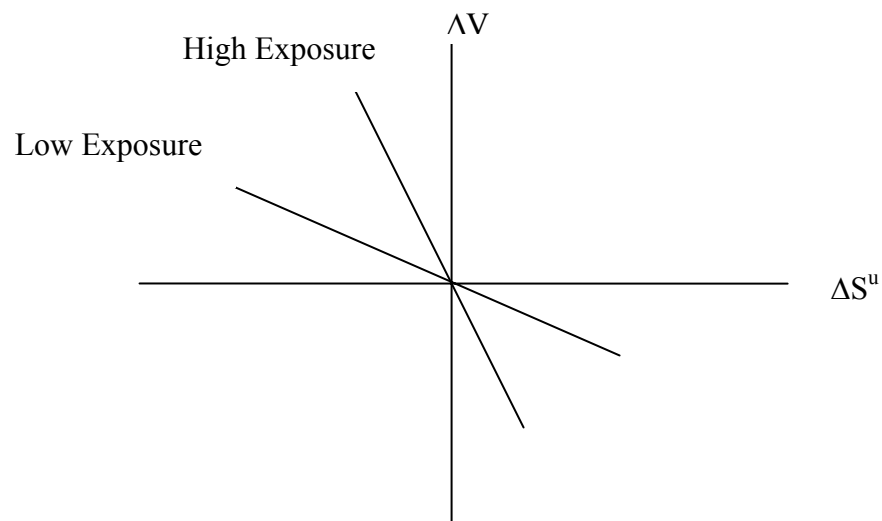
(b) Exposure line for "foreign" liabilities

Source: Moosa, 2003: 80

Figure 1-1 Exposure Line

The horizontal axis in Figure 1-1 shows unexpected changes in exchange rates, ΔS^u (YTL/\$), and positive values are on the right side of the origin and negative values are on the left side. Whereas positive values of ΔS^u (YTL/\$) are

unanticipated appreciation of the US dollar, negative values are unanticipated depreciations of the US dollar. The vertical axis of each figure shows the changes in the real values of assets, liabilities, operating incomes or profit of the Turkish firms denominated in YTL. ΔV can be interpreted by the change in the real value of particular individual assets, liabilities, operating incomes or profit or as the change in the real value of a collection of them. ΔV is in real terms means that it is adjusted for inflation (Moosa, 2003: 80). The slope of the lines, E, is the exposure. Notice that there are two lines in each figure: the steeper line is representing high exposure and flatter line representing low exposure. Hence zero exposure would be represented by a horizontal line, whereas an infinite exposure would be represented by a vertical line.

Exposure is measured by the sensitivity of the systematic relationship between ΔS^u and ΔV. With the "systematic relationship", the predictable ΔV with respect to ΔS^u is mentioned. The actual ΔV does not always associate with a given ΔS^u, because of random errors. When exposure is being measured from Turkish perspective, ΔV must be measured in YTL, and ΔS^u must be measured in YTL per dollar, and so the exposure, that is β_1, must be measured in dollars, as shown in the below regression equation:

$$\Delta V = \beta_0 + \beta_1 \Delta S^u \, (YTL/\$) + \mu \tag{1}$$

β_0 and β_1 are the regression coefficients. β_0 is the constant in the equation and shows how much ΔV changes on average when ΔS (YTL/$) is equal to zero. β_1 describes the systematic relationship between ΔV and ΔS (YTL/$), and the final term, μ, which is the random error in the relationship, is called regression error. β_1 is the sensitivity measure and it is called the foreign exchange exposure, because it is the slope of the line described by regression equation (Levi, 1990: 190).

According to these explanations, exposure can be redefined as:

"Foreign exchange exposure is the slope of the regression equation which relates changes in the real domestic currency value of assets, liabilities or operating incomes to unanticipated changes in exchange rates" (Levi, 1990: 191).

1.1.3 Exposure Against Numerous Exchange Rates

A firm can hold assets or liabilities in many countries and export to many countries or import from many countries. In this respect it earns incomes or makes payment in those countries monetary unit. In this situation, regression equation (1) must be extended to estimate the foreign exchange exposure related to each monetary unit as US dollar, Euro, Japanese yen, and so on. As a result multiple regression equation (2) can be used:

$$\Delta V = \beta_0 + \beta_1 \Delta S \, (YTL/\$) + \beta_2 \Delta S \, (YTL/\text{€}) + \beta_3 \Delta S \, (YTL/\text{¥}) + \mu \qquad (2)$$

Each slope coefficient indicates the exposure related to the foreign currency. For example β_3 gives the sensitivity of ΔV to unanticipated changes in YTL value of the Japanese yen (Moosa, 2003: 81-82).

1.1.4 Exposure on "Domestic" Assets, Liabilities and Operating Incomes

In general, all assets and liabilities like treasury bills and bonds, corporate stocks and bonds and operating incomes are exposed to exchange rates. They are systematically affected by exchange rates even they do not translate into home currency terms (Levi, 1990: 195).

Solnik (1987) analyzes the effects of interest rates and stock returns on exchange rates. The data used in the study consist of monthly and quarterly observations for the period July 1973 to December 1983. This period is chosen,

because it might be characterized as a period of flexible exchange rates. He selects eight countries as Canada, France, Germany, Japan, Netherlands, Switzerland, UK and USA due to data availability. These countries represent over ninety percent of the world market capitalization and have free capital markets. The exchange rate theory combined with the efficient market hypothesis can be tested by the following regression equation:

$$Ds_t = a + bDRS_t + cDi_t + \varepsilon_t$$

where, Ds_t is the change in the real exchange rate; s is the foreign currency price of the domestic currency;

DRS_t is the real stock return differential (domestic minus foreign); and

Di_t is the change in the interest rate differential.

When the same model holds for each country and the coefficients a, b and c are identical, a positive and significant sign for monetary coefficient c and a negative and significant sign for real coefficient b are found. Namely, if the home currency depreciates, governments will immediately increase the interest rate. Increase in the interest rates induces a capital inflow and, therefore, exchange rate movements. Since depreciation of domestic currency causes an increase in the inflation rate and also appreciation of the domestic currency may cause a loss in competitiveness of the domestic economy.

This policy is especially practiced in crisis periods. Data at Table 1-1 concerning to 2000-2001 crisis period, is the substantial evidence of this policy. From the year 2000 to 2001, interest rates are almost multiplied by 1.8 whereas exchange rate increased from 0.627 to 1.231. Bond prices and interest rates always move in opposite directions.[2] When interest rates rise a bond's value will decline. Similarly when interest rates fall, bond values rise. The relationship between

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[2] Bond value = C X [1- 1 / (1 + r)^t] / r + F / (1 + r)^t F= face value paid at maturity, C = a coupon paid per period, t = periods to maturity, r = a yield per period (Ross, Westerfield and Jordan, 2003: 205)

exchange rates and interest rates and indirectly bond values, indicates that bond holders are also exposed to changes in exchange rates. In conclusion, if the exchange rate increased unexpectedly, bond holders will loose, and they will gain if it declines.

Table 1-1 Macro Indicators as Foreign Exchange Rates and Interest Rates on Government Securities

MACRO INDICATORS	Unit	2000	2001	2002	2003	2004	2005
FOREIGN EXCHANGE RATES							
YTL/$ (Annual Average Rate of Exchange)	YTL	0,627	1,231	1,513	1,500	1,446	1,354
INTEREST RATES ON GOVERNMENT SECURITIES (Annual Average Rate of Interest)	%	36,0	63,9	49,8	28,7	24,9	16,2

Source: CBRT, Turkish Treasury, TURKSTAT

Similarly, depreciation in home currency affects the stock holders, too. Many investors believe that changes in exchange rates cause a change in stock indices. For example when home currency depreciates, investors expect a decline in stock prices. Therefore, they would prefer to sell their stock to buy foreign currency. Kasman (2003) analyzes empirically the relationship between exchange rates and stock prices to investigate whether the evidence support this belief. She finds that stock indices and exchange rates move together in the long-run. Her results indicate exchange rate affects all of the stock indices, but one-way causality exists only from exchange rate to Industry sector index in Istanbul Stock Exchange.

Although, in general stock prices are declining when the home currency depreciates, some stocks may benefit from the depreciation of home currency. For example, export oriented firms benefit from this depreciation, because cheaper YTL increase the competitiveness of the firm in foreign markets. However, import-oriented firms which sell only in Turkey are negatively affected from the depreciation of YTL, because cost of goods will increase and so the price of their goods becomes more expensive. On the other hand, the firms which compete against the imported goods will gain from this depreciation.

1.2 Types of Foreign Exchange Exposure

There are three main types of foreign exchange exposure. These are shown in Figure 1-2.

Moment in Time When Exchange Rate Changes	
Translation Exposure Accounting-based changes in consolidated financial statements caused by a change in exchange rates	**Economic Exposure** Change in expected cash flows arising because of an unexpected change in exchange rates

Transaction Exposure
Impact of setting outstanding obligations entered into before change in exchange rates but to be settled after change in exchange rates

Time →

Source: Eiteman and Stonehill, 1989: 173

Figure 1-2 Conceptual Comparison of the Difference between Economic, Transaction, and Translation Exposure

Transaction exposure arises because a payable or receivable is denominated in a foreign currency. *Translation exposure* arises because accountants are translating foreign currency amounts into the home currency for financial reporting, and they

have to apply different exchange rates to different transactions at different points in time due to an exchange rate change. These translation problems constitute the main concept of translation exposure. Translation exposure also might be called accounting exposure. *Economic exposure* arises because the present value of an expected future cash flows denominated in the home currency or in a foreign currency may vary due to an exchange rate change. Transaction and economic exposures are both cash flow exposures (Buckley, 2000: 136).

1.2.1 Translation Exposure

Firms which have foreign subsidiaries need to consolidate their subsidiaries' financial statements into the parent firm's financial statements periodically. The consolidation is made by translating foreign currency values into the currency of the parent firm which is called the home currency. When the foreign currencies are translated into home currency, gains or losses are created due to the changes in exchange rates of the underlying currencies. These gains and losses take part in the parent firm's financial statements. In translation, currencies are not physically changed. The assets, liabilities, revenues and expenses originally measured in a foreign currency must be translated into home currency in order to be included in the financial statements (Kurtay, 1997: 8).

Both balance sheets and income statements must be consolidated and they both give rise to translation exposure. Some items in foreign subsidiaries' financial statements may be translated at their historical exchange rates, other items may be translated at current exchange rates. The assets and liabilities that are translated at the current exchange rate are considered to be exposed to foreign exchange risk, those translated at historical exchange rates will maintain their historical home currency values, and hence, not exposed to this risk (Buckley, 2000: 137).

If the exchange rate of the underlying currencies does not change during the reporting period, there will be no translation risk. Therefore, there will be no foreign exchange gains or losses. However, it seems that it is not possible, because exchange

rates are unstable and they are affected from several issues. Consequently, foreign exchange gains or losses are inevitable. The amount translated into the home currency will change when the exchange rates change although the values of financial statement items (consolidated at current rates) are fixed in the foreign currency. The example below illustrates an important distinction between the currency in which an account is denominated and the currency in which it is measured, in the case of the value of the bank deposit is fixed.

A Turkish firm deposited €1,000,000 in a bank in Italy at the beginning of 2005. When they deposited, 1 Euro was worth 1.8100 YTL. The bank balance would be reported on the Turkish parent's firm books at a value of 1,810,000 YTL (i.e. €1,000,000 x 1.8100 YTL). If an exchange rate decreases from YTL 1.8100 / € to YTL 1.6000 / €, then the bank balance would be reported on the Turkish parent firm's books at a value of 1,600,000 YTL (i.e. €1,000,000 x YTL1.6000). A loss of 210,000 YTL is reported (Eiteman and Stonehill, 1986: 155).

As pointed out by Kurtay (1997: 8) these gains or losses are accounting gains or losses which do not require the realization and exchange of currencies. Therefore translation exposure is also known as accounting or balance sheet exposure or balance sheet risk.

Assets and liabilities that are translated at the current exchange rate are considered to be exposed to foreign exchange risk, those translated at a historical exchange rate will maintain their historical home currency values, and hence, not exposed. Thus translation exposure is simply the difference between exposed assets and exposed liabilities (Buckley, 1996: 135).

The translation exposure may change based on the method used in the translation process. There are mainly four methods of translation: current / non-current, monetary / non- monetary, current rate (closing rate) and temporal methods.

1.2.1.1 Translation Methods

1.2.1.1.1 The Current / Non-Current Method

Theoretical basis underlying this method is maturity. Under this currency translation method, all of a foreign subsidiary's current assets and liabilities are translated into home currency at the current exchange rate while non-current assets and liabilities are translated at the historical exchange rate, that is, the rate in effect at the time the asset was acquired or the liability incurred. For this reason, when a foreign subsidiary has a positive local currency working capital (net figure of current assets less current liabilities), a translation loss (gain) will occur at the time of devaluation (revaluation) with the current / non current method. The opposite is valid if the working capital is negative. It means that in this case, devaluation causes a translation gain. Evidently, according to the current / non-current method, the sum exposed is net current assets (Buckley, 1996: 135).

One of the implications of this method of translation is that inventory is exposed to foreign exchange risk but long-term debt is not, because inventory is a current asset, so it is translated at the current rate, but long-term debt is not a current liability. Therefore, long-term debts are translated at the historical rate. Actually, it should be clear that long-term debt is very much exposed to exchange rate risk (Mengütürk, 1994: 205). Another implication of this method is revenues and expense items associated with non-current assets and liabilities such as the depreciation expense are translated at the same rates as the corresponding balance-sheet items whereas other revenues and expense items are translated at the average exchange rate of the period (Shapiro, 1994:188).

Due to the above criticism, the current / non-current method is not preferred in the recent years. The monetary and non/monetary method is mostly preferred due to an inflation adjustment policy applied in high inflationary countries as Turkey.

1.2.1.1.2 The Monetary / Non- Monetary Method

If this method is used, monetary items (for example, cash, accounts payable and receivable, and long term-debt) are translated at the current rate while non-monetary items (for example, inventory, fixed assets, and long-term investments) are translated at their historical rate (Buckley, 2000: 189).

The logic is the same as current / non-current method for the income statement items. Income statement items are translated at the average exchange rate during the period. But it is not valid for revenue and expense items associated with non-monetary assets and liabilities. Depreciation expense and cost of goods sold can be given as an example for these items. They are translated at the same rates as the corresponding balance- sheet items (Shapiro, 1994: 189).

1.2.1.1.3 Current Rate (Closing Rate) Method

The current rate method is the most popular method in the world today. Under this currency translation method, all assets and liabilities, income statement items, dividends and equity items denominated in foreign currency are translated at the current exchange rate (Moffett, Stonehill, Eiteman, 2003: 222).

"The common stock account and any additional paid-in capital are carried at the exchange rates in effect on the respective dates of issuance. Year-end retained earnings equal the beginning balance of retained earnings plus any additions for the year. A "plug" equity account named **cumulative translation adjustment (CTA)** *is used to make the balance sheet balance, since translation gains or losses do not go through the income statement according to this method"* (Eun and Resnick, 2001: 340).

According to this method, depreciation in home currency causes a loss whereas appreciation in home currency causes a gain if a firm's foreign–currency-

denominated assets exceed its foreign–currency-denominated liabilities (Shapiro, 1994: 189).

1.2.1.1.4 Temporal Method

Under this currency translation method, assets and liabilities should be translated based on how they are carried on the firm's books. Balance sheet accounts are translated at the current exchange rate if they are carried on the books at their current value. Items that are carried on the books at historical costs are translated at the historical exchange rates in effect at the time the firm placed the item on the books.

This method appears to be a modified version of the monetary / non-monetary method. If it is applied to traditional historical cost accounts, the temporal and monetary / non-monetary methods give almost the same result. The only difference is that under the monetary / non-monetary method the inventory is always translated at historical rate. However, for temporal method the same generalization cannot be made, because inventory can be translated at the current rate if it is shown on the balance sheet at market values. Under normal conditions inventory is translated at the historical rate (Moffett, Stonehill, Eiteman, 2003: 222).

In sum, there are four types of translation methods. Generally, each of these methods translates the income statement in a similar manner: a weighted average exchange rate is used to translate the subsidiary's income statement into home currency, but there are some exceptions as discussed above for each method. The principles for translating the balance sheet are different. Because some accounts in the balance-sheet are translated at the current rate whereas others are translated at the historical rate. Table 1-2 summarizes the types of exchange rates that are used to translate the various accounts in the balance sheet.

Table 1-2 Exchange Rate Used to Translate Balance Sheet Accounts

	Current / Non-Current Method	Monetary / Non-Monetary Method	Temporal Method	Current Rate Method
Cash	Current	Current	Current	Current
Accounts receivable	Current	Current	Current	Current
Inventory	Current	Historical	Historical(*)	Current
Fixed assets	Historical	Historical	Historical	Current
Current liabilities	Current	Current	Current	Current
Long-term debt	Historical	Current	Current	Current
Common stock	Historical	Historical	Historical	Historical
Retained earnings	Historical	Historical	Historical	Historical

Source: Mengütürk, 1994: 197

Note : (*) Inventory can be translated at current rate if it is shown on the balance sheet at market values. But under normal conditions inventory is again translated at historical rate.

If the value of assets exposed to foreign exchange risk exceeds the value of liabilities exposed, the firm will have a "positive exposure". In this case, appreciation of home currency results in translation loss. In contrast depreciation of home currency would produce translation gain. If the value of liabilities exposed to foreign exchange risk exceeds the value of assets exposed, the firm will have a "negative exposure". In this case, firm benefits from the appreciation of home currency whereas suffer from the depreciation. A multinational firm who has subsidiaries in several countries may have different translation exposures in each country. It may have translation gains from a subsidiary in one country while translation losses from a subsidiary in another country.

1.2.1.2 Managing Translation Exposure

1.2.1.2.1   Choices Faced by Multinational Firms

Firms have three available methods for managing their translation exposure as follows (Shapiro, 1994: 208):

➢   Adjusting Fund Flows
➢   Forward Contracts
➢   Exposure Netting

Adjust fund flows means to alter either the amounts or the currencies of the planned cash flows of the parent or its subsidiaries to reduce the firm's local currency accounting exposure. If a firm anticipates depreciation in the local currency, it should take measures to reduce translation loss. Converting its local currency assets into home currency assets before depreciation is one of the measures. Pricing exports in hard currencies and imports in local currencies are other measures of reducing translation loss. In addition to these, firms should invest in hard-currency securities, but borrow with local currency loans.

Second method is to enter into *forward contracts* for reducing a firm's translation exposure by creating an offsetting asset or liability in the foreign currency. For example, a firm has translation exposure of $396 million. This firm can eliminate its entire translation exposure by selling $396 million forward. Any loss or gain on its translation exposure can be offset by a corresponding gain or loss on the forward contract.

Exposure netting is the last method. This method involves offsetting exposures in one currency with exposures in the same or another currency, where exchange rates are expected to move in such a way that losses (gains) on the first exposed position should be offset by gains (losses) on the second currency exposure.

1.2.1.2.2   Basic Hedging Strategy for Reducing Translation Exposure

The basic hedging strategy for reducing translation exposure is indicated at Table 1-3. The term *hard currency* is defined to be a currency that is likely to appreciate, and soft currency is one that is likely to depreciate. Therefore, soft currency assets (hard currency liabilities) should be decreased and soft currency liabilities (hard currency assets) should be increased for hedging translation exposure. Depreciation in local currency causes a decrease in assets like cash and accounts receivable whereas an increase in liabilities like accounts payable and local currency borrowing as seen from Table 1-3. Appreciation will make the opposite effect. At this time, assets will increase while liabilities decrease.

Table 1-3 Basic Hedging Strategy for Reducing Translation Exposure

	Assets	*Liabilities*
Hard currencies (Likely to appreciate)	Increase	Decrease
Soft currencies (Likely to depreciate)	Decrease	Increase

Source: Shapiro, 1994: 214

Table 1-4 indicates that the basic hedging techniques whether the home currency depreciates or appreciates. On the other hand, there are some costs of these hedging techniques and these are exhibited in the same table.

Table 1-4 Basic Hedging Techniques and the Costs of Some of Basic Hedging Techniques

Appreciation	Depreciation	Costs of Depreciation
Buy local currency forward	Sell local currency forward	Transaction costs
Increase levels of local and marketable securities	Reduce levels of local currency, cash and marketable securities	Operational problems; opportunity cost
Relax local currency credit terms	Tighten credit (reduce local currency receivables)	Lost sales and profits
Reduce local borrowing	Borrow locally	Higher interest rates
Speed up payment of accounts payable	Delay payment of accounts payable	Loss of reputation
Speed up collection of hard-currency receivables	Delay collection of hard-currency receivables	Cost of financing additional receivables
Invoice exports in local currency and imports in foreign currency	Invoice exports in foreign currency and imports in local currency	Lost export sales or lower price; premium price for imports

Source: Shapiro, 1994: 215

1.2.2   Transaction Exposure

"Transaction exposure measures changes in the value of outstanding financial obligations incurred prior to a change in exchange rates but not due to be settled until after the exchange rates change. Thus it deals with changes in cash flows that result from existing contractual obligations" (Eiteman, Stonehill, Moffett, 2004: 198).

As stated in Beenhakker (2000: 151), transaction exposure arises from:

➢ Borrowing or lending funds repayment is to be made in a foreign currency.

➢ Purchasing or selling on credit goods or services denominated in foreign currency.

- ➢ Being a party to an unperformed foreign exchange forward contract, and

- ➢ Otherwise acquiring assets or incurring liabilities denominated in foreign currencies.

For example, Vestel sold white goods to European firm on three-month credit terms and invoiced Euro 1 million. When Vestel receives Euro 1 million in three months, it will have to convert (unless it hedges) the Euro into YTL at the spot exchange rate prevailing at the maturity date, which cannot be known in advance. As a result, YTL receipt from this foreign sale becomes uncertain. If the Euro appreciates against YTL, revenue will be higher and if it depreciates, revenue will be lower. The case will be opposite if a firm borrows. For example, consider Ford in Turkey entering into a loan contract with Citibank that calls for the payment of $100 million for principal and interest in one year. To the extent that YTL/$ exchange rate is uncertain, Ford does not know how much YTL it will take to buy $100 million spot in one year's time. If the YTL appreciates (depreciates) against dollar, a smaller (larger) YTL amount will needed to pay off the dollar denominated loan (Adopted from Eun and Resnick, 2001: 312).

These examples suggest that whenever the firm has foreign currency denominated receivables or payables, it is subject to transaction exposure, and their settlements are likely to affect firm's cash flow position. Therefore, it is a cash flow exposure that may be associated with trade flows (resulting from exports and imports) and capital flows (for example dividends and interest payments). Transaction exposure measures the sensitivity of the base currency value of contractual cash flows to changes in the exchange rate and it can be determined from accounting statements (Moosa, 2003: 82). As Kurtay (1997: 11) points out calculating the transaction exposure of a firm can be difficult in case of looking at only its balance sheet. Therefore, off-balance sheet items should also be analyzed in detail for calculating the transaction exposure. Net transaction exposure of the firm can be calculated after preparing the detailed transaction exposure report. The transaction exposure report is a managerial report which is prepared for the corporate

treasury office. It should be noted that it is not for public release. Treasurers use this report to get an indication of what elements of exposure will lead to realized foreign exchange gains and losses in the near future (Click and Coval, 2002: 224).

1.2.2.1 Managing Transaction Exposure

Companies that are committed to foreign currency denominated transactions should take some measures to be protected from transaction exposures. These measures include forward contracts, futures contracts, price adjustment clauses, currency options, and borrowing or lending in the foreign currency. There are also some alternative methods such as to invoice all transactions in dollars and to avoid transaction exposure entirely. However, eliminating exposure does not mean eliminating all foreign exchange risk. Longer-term operating exposure still remains (Shapiro, 1991: 212).

1.2.2.2 Methods of Hedging

1.2.2.2.1 Forward Market Hedge / Future Market Hedge

A forward hedge involves a forward (or futures) contract and a source of funds to fulfill that contract. The forward contract is entered into at time of transactions exposure is created.

In a forward market hedge, a firm which is long a foreign currency will sell the foreign currency forward, whereas a firm which is short a foreign currency will buy a foreign currency forward contract. By this way, a firm can fix home currency value of future foreign currency cash flow. If the future spot rate will be the same as anticipated, there will be no gains or losses, but if it is higher or lower than expected, gains or losses are inevitable (Shapiro, 1991; 213).

Actually, in efficient markets the cost of hedging must be zero, because forward rates and the future spot rates have to be equal. Otherwise, arbitrage opportunity would arise for investors. For example, if the management of a company

thinks that the future spot rate will be higher than the forward rate then they will buy a forward contract rather than selling. If everything goes well and the spot rate becomes as anticipated, they make profit.

Future contracts are alternative to forward contracts since the establishment of TurkDEX. A futures contract is similar to a forward contract except for two important differences. First, intermediate gains or losses are posted each day during the life of the futures contract. This feature is known as **marking to market**. The intermediate gains or losses are given by the difference between today's settlement price and yesterday's settlement price. However forwards are settled only at delivery. Second, futures contracts are traded on organized exchanges with standardized terms whereas forward contracts are traded **over-the-counter** (customized one-off transactions between a buyer and a seller). Evrim and Soydan (2002: 147) state that standardization reduces transaction costs by minimizing the number of contract elements that needs to be negotiated. Thus, a highly competitive market is created.

Futures and options exchanges are one of the main institutions of liberal economic systems. Although negative developments hurt the financial markets in recent years, trading volumes of futures exchanges have continued to increase during that period. 2005 figures indicate that trading volume of derivative financial instruments was almost $1.4 quadrillions and more than 10 billions contracts have been traded on organized exchanges in the world (BIS**,** 2006).

In a free market economy prices are determined by supply and demand. In Turkey, privatization has been gradually increasing and the governments implement policies to provide such a free market. In addition free capital flows between countries are encouraged and the restrictions on this are being abolished in relevance with new legislations enacted. As a result of such developments in terms of a free market economy almost every company in the country is becoming more sensitive to global economic fluctuations. Therefore the need for risk management tools comes into existence in Turkey in recent years. TurkDEX which is the first private exchange in Turkey is established with this intention. It started its operations on

February 4, 2005. It offers significant opportunities and instruments to individuals and firms who need to manage such risks. In order to meet these needs more efficiently, TurkDEX continues to work on both design of the exchange and development of new products. It is a great opportunity for Turkish investors and hedgers.

Exchange rate risk is a very important issue for many people. Individuals, firms or financial institutions may use the TRYUSDollar or TRYEuro future contracts to hedge themselves against the exchange rate volatility.

Exporters are able to fix their receivables in TRY by using these contracts, and also they can give price quotations to their customers for longer periods. On the other hand, importers are able to fix their future payments in TRY and be able to take future purchasing decisions without facing any currency fluctuation risk.

These contracts might also be used for investment purposes other than hedging. It is a new and alternative investment product which offers new opportunities for investors with its leverage effect.[3]

1.2.2.2.2   Money Market Hedge

"An alternative to a forward market hedge and a future market hedge is to use a money market hedge. A money market hedge involves simultaneous borrowing and lending transactions in foreign currencies to eliminate a transaction exposure by locking in the home currency value of a future foreign currency cash flow" (Shapiro, 1991; 215).

Most lending or borrowing involves interest receipt or payment at regular intervals with capital (principal) repayment at a specified date. According to the International Fisher Effect, the penalty for borrowing in a hard currency will exactly offset by the benefit of a low interest rate.

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[3] Information about TurkDEX were obtained from www.vob.org.tr.

The International Fisher Effect proposes that the changes in the spot rate of exchange between two currencies will be equal to the differences in their nominal interest rates (Sundqvist, 2002). However, a conclusion which is drawn by Sundqvist (2002) is that the International Fisher Effect seems to hold for some time periods and some country pairs, but not for others. Therefore, nominal interest differentials are not particularly accurate predictors of exchange rate changes.

1.2.2.2.3   Risk Shifting

Since the propounding of Grassman′s (1973) law, the choice of invoice currency has become an important issue of microeconomics and macroeconomics. Grassman′s law claimed that the majority of manufactured goods trades among advanced countries are denominated in the currency of the exporting country, and the rest of them are invoiced in the currency of the importing country.[4]

Exporters are exposed to the risks of production costs and exchange rates. It is impossible for them to hedge against the risk incurred by production cost change. In contrast, they can avoid exchange rate risk by choosing their own currency as an invoice currency. Unlike exporters, importers encounter only one risk: exchange rate risk. While importers also prefer to use their own currency as an invoice currency, they can pass the exchange rate risks to consumers, so they are not as concerned about the choice of invoice currency as exporters. This is why the exporting country's currency is more often used as an invoice currency for the trade among developed countries (Yun, 2006).

Bilson (1983) and Magee and Roa (1980) consider the subject from a different perspective. Their hypothesis claims that the strong currency tends to be the invoice currency when a trade is between a country with a strong currency and one with a weak currency.

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[4] It was under the fixed exchange rate regime when Grassman (1973) observed the law, and there was no exchange rate risk involved with the choice of invoice currency.

Yun (2006) analyzed the invoicing currency practices for Korean exports and drew the following results fitting to the Bilson –Magee hypothesis. The ratio of the U.S. dollar invoice currency in Korean exports is around 80%, which is relatively high. He explained this high ratio as the result of the dollar being the dominant international currency as well as the exchange rates of the Korean won against the dollar are more stable relative to those of the won' s exchange rates. Furthermore, the euro and the yen are more often used invoicing Korean trade with the EU and Japan. This is because Korea is heavily dependent on imported parts, material, and machinery from the EU and Japan.

1.2.2.2.4   Pricing Decision

Top management sometimes fails to take into account anticipated exchange rate changes when they are making operating decisions. They should use forward rates to overcome this failure. The general rule on credit sales is to convert foreign price to home price using forward rate, but not spot rate. If the home price is high enough, the exporter should follow through with the sale. Similarly, if the home price is low enough, the importer should follow through on the purchase.

1.2.2.2.5   Currency Risk Sharing

Currency risk sharing is an agreement by the parties to a transaction to share the currency risk associated with the transaction. The arrangement involves a customized hedge contract embedded in the underlying transaction. This hedge contract typically takes the form of a *price adjustment clause*, whereby a base price is adjusted to reflect certain exchange rate changes. The price range between the upper and lower triggers is called the "neutral zone". Prices in this range are neither statistically favorable (low for consumers, high for producers) nor unfavorable (high for consumers, low for producers). The *neutral zone* represents the currency range in which risk is not shared.   Parties would share the currency risk beyond a neutral zone of exchange rate changes (Shapiro, 1991: 219). All of these are summarized in Figure 1-2.

Neutral Zone

| Risk sharing | | Risk sharing |

Take no action
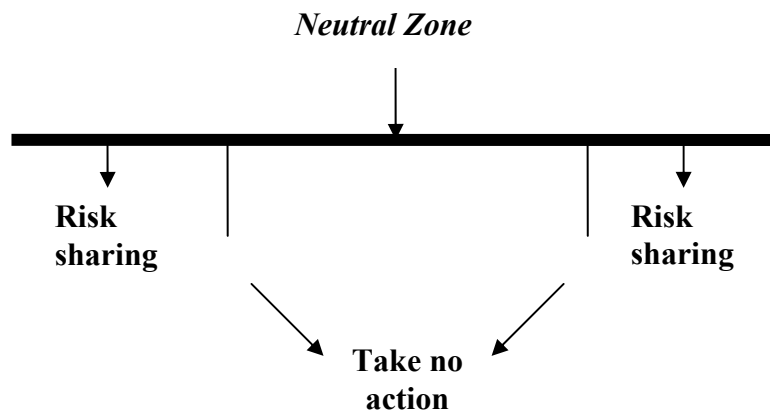
Figure 1-3 Currency Risk Sharing

1.2.2.2.6   Exposure Netting

By this portfolio approach to hedging, total variability or risk of a currency exposure portfolio should be less than the sum of the individual variabilities of each currency exposure. It should be noted that both variability and correlations vary among currencies and over time.

Protection can be gained by selecting currencies that minimize exposure. Therefore, strongly and positively correlated currencies should not be chosen. Because, if the exchange rates between the base currency and other currencies are strongly and positively correlated, then the foreign currencies will all depreciate or appreciate against the base currency more or less proportionately.

If they are positively but weakly correlated then these currencies will tend to move in the same direction but in different proportions. Negative correlation implies that other currencies move against the base currency in different directions, thus

providing some sort of natural hedge. Strongly negative correlation leads to a perfect hedge or natural hedge when there is a short position on one currency and an equivalent long position on another currency. Table 1-5 indicates the correlation between the foreign exchange rates. It should be noted that exchange rates are taken in terms of TL.

Table 1-5 Correlations between Exchange Rate Movements

	Euro	**Dollar**	**Pound**	**Yen**
Euro	1	0.273713	0.943606	0.847559
Dollar	0.273713	1	0.472199	0.677898
Pound	0.943606	0.472199	1	0.927773
Yen	0.847559	0.677898	0.927773	1

Source: Appendix 1

According to this table Euro and pound and also pound and yen are strongly and positively correlated. It means that they all depreciate or appreciate against TL proportionately. Therefore, Turkish firms or individuals can offset a long position in one currency (for example euro) with a short position in the other (for example pound). Euro and dollar also have a positive correlation, but they are weakly correlated. It means that they move in the same direction but in different proportions. As seen above, there is no negative correlation between foreign exchange rates in Turkey.

1.2.2.2.7 Foreign Currency Options

Currency options give the owner the right, but not the obligation, to buy or sell a certain amount of foreign currency at a specific exchange rate on or before a specified date. But unlike a forward foreign exchange contract or future contract, buyers (owners) are not obliged to buy the currency at the end of the period (Evrim and Soydan, 2002: 159).

The advantages of buying currency options are that: firms are protected from any adverse movements in the exchange rate, and also their business can benefit if the exchange rate moves in their favor. It's suitable for firms that want to protect themselves from unfavorable rate changes while retaining the flexibility to benefit from advantageous ones.

Since in every currency transaction one currency is bought and another is sold the same is true of options transactions. There are two basic types of options: call and put. A call option gives the holder the right, but not the obligation, to buy the foreign currency at a specified price, up to the expiration date. Therefore, when the most investors are buying call options, they are expecting an increase in the price of the foreign currency. A put option gives the buyer the right, but not the obligation, to sell the specified number of foreign currency units at a specified price, up to the expiration date. In this case traders would profit from the put option if the price of foreign currency declines. If investors buy a call option on one currency, they are by definition also buying a put option on another. By definition each currency option is a call and a put on the respective currencies as they cannot do one without the other (Kurtay, 1997: 29-30).

1.2.3 Economic Exposure

Economic exposure measures the change in value of the firm that results from changes in future operating cash flows due to an unexpected change in exchange rates. Change in exchange rates affects the sales volume, prices and costs and consequently the value of a firm (Eiteman and Stonehill, 1989: 172).

In translation exposure, the transactions on foreign currencies which are already entered into or estimated to be in the near future are taken into account. However, in economic exposure, the transactions which are not entered into and could not be estimated for the time being are considered. Economic exposure results from a change in firm's future cash flows due to a change in exchange rates.

Compared to the transaction exposure, economic exposure includes long-term effects of changes in exchange rates on the values of the firm (Kurtay, 1997: 12).

As a result, it can be said that changes in exchange rates can have a deep effect on the firm's competitive position in the world market and thus on its cash flows and market value. For example, both Jaguar and Porsche sell cars to the US market where they compete at the luxury end. Both clearly have an economic exposure to the level of the dollar against their home currencies.

The economic exposure of a firm engaged directly in international trade is complicated. Exporters are vulnerable in both foreign and domestic markets. Fluctuations in exchange rates will affect not only domestic market share but also foreign sales. For exporting firms, the adverse effects of an appreciation (strengthening) in home currency in its foreign markets is expected to be offset by gains in the stronger domestic economy associated with the stronger home currency. Importing firms, on the other hand, benefit from appreciation of home currency in both the foreign and domestic markets and are adversely affected in both markets by a depreciation of home currency.

When home currency depreciates, importers face loss of domestic markets because of an increase in price of imports and the possibility of increases in the cost of inputs. As seen in Table 1-7, appreciation of home currency affects the firms in different forms depending on their types. In addition, commitments denominated in foreign currency such as accounts payable and receivable are affected by exchange rate fluctuations. Transactions that influence the firm's home currency inflows and outflows and the impacts of home currency appreciation/depreciation on those transactions are shown in Table 1-6.

Table 1-6 Economic Exposures to Exchange Rate Fluctuations

Transactions that Influence the Firm's Home Currency Inflows	Impact of Home Currency Appreciation on Transactions	Impact of Home Currency Depreciation on Transactions
Local sales (relative to foreign competition in domestic markets)	Decrease	Increase
Firm's exports denominated in home currency	Decrease	Increase
Firm's exports denominated in foreign currency	Decrease	Increase
Transactions that Influence the Firm's Home Currency Outflows	**Impact of Home Currency Appreciation on Transactions**	**Impact of Home Currency Depreciation on Transactions**
Firm's imported supplies denominated in home currency	No change	No change
Firm's imported supplies denominated in foreign currency	Decrease	Increase

Source: Fu, 2006

Cash flows that do not require conversion of currencies do not reflect transaction exposure. Yet, these cash flows may also be influenced significantly by exchange rate movements.

1.2.3.1 Factors Affecting Economic Exposure

The nature and extent of economic exposure is a function of many factors as follows:

> ➢ Type of Firm
> ➢ Nature of Products
> ➢ Monopolies
> ➢ Size of Firm

Economic exposure depends on the *types of firms*. Some general features are summarized in Table 1-7.

Table 1-7 External of Economic Exposure vs. Types of Firms

Nature of Exposure	Type of Firm	Effect of Appreciation of Home-currency
Domestic market share	Purely domestic	Foreign firms gain advantage
	Importers	Domestic firms using foreign inputs gain advantage
	MNC'S	MNC's manufacturing in foreign countries gain advantage
Foreign market share	Exporters	Difficult to export
	MNC'S	Domestic firms using foreign inputs gain advantage
Subsidiary cash flows	MNC'S	Value of same amount of foreign currency cash flows decreases

Source: (Mengütürk, 1994: 194)

Nature of products is another factor. Service firms such as restaurants and stores are not likely to be affected by the changes in exchange rates, because service provided is in essence arranged and administered locally. In addition, some perishable products (like fresh milk) are less likely to involve foreign competition because of the difficulty and the high cost of transportation. However, improvements in technology make the shipment of more and more products to long distances easy. For example Pinar A.Ş. exports meat and especially milk to Middle East with the help of the Ultra Heating Technology (UHT) technology and aseptic packaging. Fresh fruits like orange and tangerine are also exported.

Firms possessing *monopoly power* are likely to have less economic exposure. Monopoly power can be achieved in different ways. It can be acquired through technological superiority and patents. For example, the Big Blue, IBM, before 1980 had little to worry about its market share-domestic and foreign- in response to exchange rate movements. The buyers ignored the price advantage offered by foreign competitors, because they perceived the foreign products to be of lower quality.

Some firms have achieved product differentiation by using advertising. This is called a weak monopoly. The effect of advertising is to reduce the elasticity of demand. Lower elasticity means that demand and revenue will not be significantly affected from price hikes due to a change in exchange rates. For example Coca-Cola has a weak monopoly on colas. A substantial number of consumers are convinced that Coke is very different from other colas and would be unwilling to shift even at lower prices. Monopoly power may also be created by governments. Trade barriers may effectively bar domestic firms from foreign markets or vice versa (Moosa, 2003: 147; Mengütürk, 1994: 194).

According to Mengütürk (1994; 195) small and medium size firms have greater economic exposure than large firms because large firms have large pool of resources, so they can often follow aggressive pricing and other marketing policies to prevent the negative effects of exchange rate movements on prices. Muller and Verschoor (2003) examine whether there exists any relationship between European firms' size and foreign exchange rate exposure. They come to the conclusion that European foreign exchange risk exposure increases with firm size. He and Ng (1998) also find that foreign exchange rate exposure increases with firm size. Namely, they agrree with Muller and Verschoor (2003). However, Dominguez and Tesar (2001 b) share the same argument as Mengütürk (1994). Dominguez and Tesar (2001 b) find that small firms are more likely to be exposed to foreign exchange risk rather than large and medium-sized firms. They state that the logic of this finding could be based on that larger firms have more access to mechanism for hedging exposure than small firms.

1.2.3.2 Managing Economic Exposure

"Management of economic exposure involves looking at long-term movements in exchange rates and attempting to hedge long-term exchange risk by shifting out of currencies that are moving to the detriment of the long-term profitability of the company" (Pike and Neale, 2003: 546).

The key strategy for managing economic exposure is *diversification*. Diversification strategy can be divided into two main parts as diversifying financing and diversifying operations. Diversifying financing can be done by diversifying the currencies in which a firm raises capital. As well, diversified portfolio would have minimum risk.

It is the direct conclusion of the capital asset pricing model. Diversifying operations can be done by three ways. First one is to *diversify sales*. It means that firms should make sales in as many countries as possible whose exchange rates are perfectly negatively correlated. This is important because change in the value of the money that the firm gains from sales directly affects the value of a firm. Selling the product in many countries, on the other hand, minimizes risks. Although, it minimizes the risk, this way is costly. Second way is to *diversify inputs*. This is purchasing inputs from different suppliers who are located in different countries. By this way, a firm can easily change the supplier if the exchange rate change is against the firm, because it has many substitutes of this supplier. The third and the last way are to *diversify productions*. It means locating production facilities in many different countries. This alternative is appropriate only for a multinational company. By this way a firm can stabilize its total cash flows against change in foreign exchange rates (Mengütürk, 1994: 195-196; Moosa, 2003: 147).

CHAPTER 2

EMPRICAL STUDIES DONE ON EXPOSURE

2.1   Risk and Types of Risk

"The unanticipated part of the return, the portion resulting from surprises, is the true risk of any investment. After all, if we always receive exactly what we expect, then the investment is perfectly predictable and, by definition risk-free. In other words, the risk of owning an asset comes from surprises-unanticipated events" (Ross, Westerfield, Jordan, 2003: 425).

A first type of surprise is called ***systematic risk***. Systematic risk is the risk of holding the market portfolio. As the market moves, each individual asset is more or less affected. To the extent that any asset participates in such general market moves, that asset entails systematic risk. It is sometimes called market risk. Uncertainties about general economic conditions like GDP, interest rates or inflations and political events are the examples of systematic risk. It is virtually impossible to be protected against this type of risk. The second type of surprise is called ***unsystematic risk***. It is sometimes referred to as unique or asset-specific risk. It is the risk that affects a single asset or a very small number of assets. It represents the component of an asset's return which is uncorrelated with general market moves. An example is news that affects a specific stock such as a sudden strike by employees.

Portfolio risk can be quite different from the risks of the assets that make up the portfolio. For example, value of the some of the stocks in the portfolio can go up because of positive company- specific events whereas others can go down. As a result, the net effect on the overall value of the portfolio will be relatively small. Therefore, it can be said that unsystematic risk is actually eliminated by diversification. On the other hand, systematic risk cannot be eliminated by diversification, because it affects almost all assets at some degree. As it mentioned above, unsystematic risk can be eliminated by diversification. It is almost a costless

way, so no need to reward for bearing it. However, same things can not be said for systematic risk. Thus, the expected return on an asset depends only on that asset's systematic risk. This remark increases the significance of measuring the level of systematic risk. Beta coefficient is used to measure systematic risk. The important point not to forget is that the assets with larger betas have greater systematic risk, and also their expected return will be greater. The model which shows the relationship between expected return and beta is called *capital asset pricing model (CAPM)*. The equation is as follows:

$$E(R_i) = R_f + \beta_i \times \left[E(R_M) - R_f \right]$$

$E(R_i)$ = expected return of an asset

$E(R_M)$ = expected return of a market

R_f = risk free rate

$E(R_M) - R_f$ = market risk premium. It is the reward for bearing systematic risk.

β_i = It is the amount of systematic risk.

William Sharpe (1964) introduced the capital asset pricing model which introduces the notions of systematic and unsystematic or specific risk. According to this model, when an investor holds the market portfolio, each individual asset in that portfolio entails specific risk, but through diversification, the investor's net exposure is just the systematic risk of the market portfolio. Parallel work was also performed by Lintner (1965).

Under the CAPM only the market return plays a systematic role in determining asset returns. Therefore, in order to test the exchange-rate exposure, change in exchange rate need to be included on the right-hand side of a standard CAPM regression (Dominguez and Tesar, 2001 a). The regression equation becomes as below:

$$R_{i,t} = \beta_{0,i} + \beta_{1,i} R_{m,t} + \beta_{2,i} \Delta s_t + \varepsilon_{i,t}$$

where $R_{i,t}$ is the return on firm i at time t, $R_{m,t}$ is the return on the market portfolio, $\beta_{1,i}$ is the firm's beta, Δs_t is the change in the relevant exchange rate and $\beta_{2,i}$ measures a firm's exposure to exchange-rate movement after taking into account the overall market's exposure to currency fluctuations.

If $\beta_{2,i}$ is zero, it means that firm i has the same exchange-rate exposure as the market portfolio. But it doesn't necessarily mean that the firm has no exposure. Rejection of the hypothesis that $\beta_{2,i}$ equals to zero is the evidence of the exchange rate exposure. However, it is the indicator of the existence of some form of market inefficiency, namely the investors not having fully diversified portfolios, so exchange rate risk remains, and also, firms themselves are not fully hedging their exchange rate risk (Dominguez and Tesar, 2001 b).

The foreign exchange exposure of a firm is a measure of the sensitivity of its cash flows to changes in exchange rates. However, most researchers have examined exposure by measuring the sensitivity of the firm's market value to changes in exchange rates, because cash flows are difficult to measure (Bodnar and Marston, 2000). In conclusion, it can be said that changes in exchange rates drive changes in cash flows and ultimately the value of the firm.

Shapiro (1974) argues that the impact of a devaluation (or revaluation) on the value of the firm can only be measured by examining the total effect of a devaluation (or revaluation) on future cash flows. Shapiro models the theoretical effects of changes in exchange rates on the value of an export, a purely domestic and an import firm. Export firms will gain from devaluation while import firms are loosing. A purely domestic firm with little or no foreign competition will loose out on devaluation unless real income rises.

However, there is little empirical evidence that support these theoretical predictions. For example Jorion (1990), Amihud (1994), and Bodnar and Gentry (1993), have empirically examined the relationship between changes in the value of the US dollar and the changes in the value of the firm as measured by stock prices. They found weak evidence between contemporaneous exchange rate fluctuations and stock prices of US multinational firms.

Adler and Dumas (1984) describes the exposure elasticity of the firm as the change in market value of the firm for a given unit change in the exchange rate. The exposure elasticity of the firm can be measured by the coefficient on the exchange rate variable in the following regression equation:

$$R_{it} = \beta_{0t} + \beta_{1t}R_{st} + \varepsilon_{it} \quad t = 1$$

where, R_{it} is the rate of return on the ith company's common stock and R_{st} is the rate of change in a trade-weighted exchange rate, measured as the dollar price of the foreign currency, and ε_{it} is the random error. Positive value for R_{st} indicates the depreciation of home currency.

2.2 Empirical Studies in Foreign Countries

Jorion (1990) aims to analyze the foreign exchange exposure of US multinationals. Firstly, he measures exposure by the regression coefficient of the change in the value of the firm on the change in the exchange rate. Secondly, he aims to determine whether exchange rate exposure is related to the degree of foreign involvement. The degree of foreign involvement is measured as the sum of all foreign sales divided by the sum of total sales over the same years. Volume of total sales and foreign sales are taken from financial statements.

He uses foreign involvement ratio when he is forming the sample because he eliminates the foreign firms[5]. He also eliminates the firms in the petroleum industry.

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[5] Foreign firms is defined as firms having more than %100 of sales abroad.

As a result, his sample includes 287 firms. It should be noted that the sample includes many companies with zero or low reported foreign operations. He argues that purely domestic firms may also be affected from changes in foreign exchange rates due to the effects of exchange rates on aggregate demand, cost of traded inputs and competition power of the purely domestic firms. For example, depreciation of home currency favorably affects the firms which heavily make exports while unfavorably affects the firms which import goods. Therefore domestic firms that sell goods competing with imports will be affected positively, gaining competitive advantage. Jorion's (1990) sample period starts in January 1971, which is the year when exchange rates started to float, and ends in December 1987. He also considers three subperiods as 1971-1975, 1976-1980 and 1981-1987.

He introduces another macro economic variable which is the return to a market portfolio along with the exchange rate variable to control for the common macro economic influences on the total exposure elasticities. Bodnar and Wong (2000) also prefer this model in their empirical study. Thus, they estimate the exposure coefficient that can be obtained from the following regression equation:

$$R_{it} = \beta_{0t} + \beta_{1t}R_{st} + \beta_{2t}R_{mt} + \varepsilon_{it} \quad t = 1$$

R_{mt} is the rate of return on the CRSP[6] value-weighted market index. He uses monthly data to estimate foreign exchange rate exposure. As a result, he finds that only 15 of 287 US multinational firms have significant foreign exchange rate exposure at 5% levels over the period 1971-87. He also finds a positive relationship between exchange rate exposure and foreign sales.

"Amihud (1994) finds no evidence of a significant exchange rate exposure for the 32 largest US exporting firms over the period 1982-1988" (Fraser and Pantzalis, 2004).

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[6] University of Chicago Center for Research in Security Prices (CRSP)

Bodnar and Gentry (1993) examines industry-level exchange rate exposures for Canada, Japan and the US. They find that some industries in all three countries display significant exposures for the period 1979-1988.

As a result of the weak US evidence, He and Ng (1998) decides to look for evidence in the Japanese market. They put forward several reasons for selecting this market. First, Japan's stock market ranks second in terms of market capitalization after the US. Second, importance of the Japanese share in world trade is growing from day to day. Due to this improvement Japan is positioned among the leading global economic powers. Third reason is Japan's interestingly unique corporate system which is different from other industrialized countries. Finally, they think that there is no comprehensive study about the effects of exposure on Japanese multinational corporations.

They investigate the impact of exchange rate changes on Japanese multinational corporation. They also investigate whether lagged exchange rate changes have any explanatory power for current stock returns. They select multinational firms according to their foreign activities. Foreign activities are measured by export ratio, overseas ratio or trade ratio. The export ratio is calculated as company's export divided by annual total sales. Export ratio data are drawn from unconsolidated financial statements in the sample period. They include only individual firms which have minimum 10% percent export ratios in the sample period. Thus, their sample includes 171 multinational corporations. The sample period starts in January 1979 and ends in December 1993. The sample is also divided into two approximately equal subperiods as 1979:01-1986:12, 1987:01-1993:12. The aim of dividing the sample into subsample periods is to help to reveal any structural change in the firm's exposure when the foreign exchange rate changes.

They use the same regression model as Jorion (1990) to measure foreign exchange rate exposures. Like Jorion (1990), they also use trade weighted index. Nine countries that trade with Japan are taken when the index is constructed. The weights are calculated according to each country's proportion of trade volumes to

total trade with Japan, and these weights are updated annually. Again like Jorion (1990), they use value weighted market index as a proxy for market.

Regression results show that 43 of the 171 firms have significant positive exposure. This ratio is equivalent to 25% of the firms. However, only 2 of the 171 firms have negative significant exposure. Positive beta coefficient means that depreciation of yen against other currencies favorably affects stock returns of Japanese multinationals. But it seems that there are some exceptions. These multinationals benefit from appreciation of yen. They cannot explore the cause of the observed phenomenon, because they cannot get information to distinguish net exporters from net importers. However, in general, they conclude that Japanese multinationals have positive exposure. Namely, firms benefit from the depreciation of yen whereas they suffer from its appreciation. They also examine exposure at the industry level. They select six industries like chemicals, iron and steel, machinery, electric machinery, precision equipment and transport equipment sectors. However, they find only three industries, electric machinery, precision equipment, and transport equipment, where the multinationals with significant exposure become intense.

As mentioned above, they also investigate whether lagged exchange rate changes have any explanatory power for current stock returns. In this part of the study, they follow Amihud (1994) and Bartov and Bodnar's (1994) methodology which suggests that lagged but not current, changes in home currency display a significant effect on abnormal stock performance. The reason of this suggestion is the possibility of mispricing because, they state that financial information is generally released to the public with a time lag, so investors cannot estimate the true price for stocks. Bartov and Bodnar (1994) examine the relationship between abnormal stock performance and contemporaneous changes in the dollar value of the US firms over the period 1978-1990. Regression results show that there is no correlation between them. These results are consistent with their expectations. The failure in their test leads them to measure the relationship between the lagged

changes in the dollar and firm value. They find that lagged changes in the dollar demonstrate negative and significant effect on abnormal stock performance.

In addition to these researchers, He and Ng (1998) also investigate the lagged effect on the sample firms by using the Amihud's (1994) regression equation:

$$R_{it} = \beta_{i0} + \beta_{ix} r_{xt} + \beta_{ix}^L r_{xt-1} + \beta_{im} r_{mt} + \varepsilon_{it}$$

where, the parameter β_{ix}^L measures the effect of lagged exchange rate changes on stock returns. They find only 6 of the 171 multinationals have significant β_{ix}^L estimates. The result is inconsistent with the results of Bartov and Bodnar's (1994) study.

One key characteristic of the above studies is measuring foreign exchange exposure by using a common exchange rate index that is applied to all of the companies in the sample. Therefore, little significance is normal because companies operate in different and distinct international locations. For this reason, Fraser and Pantzalis (2004) form and use firm-specific foreign exchange rate index based on the structure of each company's geographic network of foreign subsidiaries. They estimate the increase in significance of exposure when firm-specific index is used. They examine whether the stock returns of US Multinational Corporations are influenced by changes in foreign exchange rates. They use a least square regression similar to those implemented by Jorion (1990) and He and Ng (1998).

$$R_{it} = \beta_0 + \beta_1 FX_t + \beta_2 MKT + \varepsilon$$

where R_{it} is the return for the individual firm i at time t, FX_t the foreign exchange rate index variable, and MKT is a domestic value-weighted market index. They use two main types of indices to measure foreign exchange exposure. These are firm-specific indices and common indices. Firm-specific index is divided into two parts as subsidiary-weighted index and equally-weighted index. Common indices include Broad index and Major Currencies (MAJCUR) index.

By the above equation, only contemporaneous effect of exchange rates on stock prices can be analyzed. As mentioned above, Bartov and Bodnar (1994) find a significant effect of one-period lagged changes on stock prices whereas He and Ng (1998) find little effect. In order to examine this effect, they add a lagged component to the regression and the regression equation becomes as below:

$$R_{it} = \beta_0 + \beta_1 FX_t + \beta_2 FX_{t-1} + \beta_3 MKT_t + \varepsilon$$

where FX_{t-1} is the one period lagged value of the foreign exchange rate index variable and other variables are as explained above.

The sample includes manufacturing and mining firms whose foreign sales are at least US $ 10 million, which paid some foreign taxes and trade publicly. They find 310 firms that match the criteria. Sample period is 5 year. They obtain monthly return data. Table 2-1 shows the number of firms with significant exposure when each of the four foreign exchange measures is used for both models.

As shown in above Table 2-1, when the firm specific index is used, they find 60% more firms with significant exposure as opposed to when MAJCUR index is used. Results are consistent with the past studies done by Jorion (1990), Amihud (1994), and Bodnar and Gentry (1993). It is important, because MAJCUR index most closely resembles the common index used in past studies. The results from model 1 indicates that there is more even distribution between the number of firms with significant positive $\hat{\beta}_1$ and the number of firms with significant negative $\hat{\beta}_1$ when the firm-specific measures are used. However, the $\hat{\beta}_1$ is dominantly negative when the common indices are used. Negative exposure coefficient means that firms' stock price will decline when the home currency appreciates or stock prices will increase when the home currency depreciates. They also test the lagged effect of changes in exchange rates on abnormal returns. They find that only 11 firms have significant exposure to past changes in exchange rates when the BROAD index is used. This

number increases to 18 for the three other measures. It should be recalled, He and Ng (1998) also finds little evidence.

Table 2-1 Foreign Exchange Exposure Results

	Firms	β_1		β_2	
		N -	N +	N -	N +
Model:1 $R_{it} = \beta_0 + \beta_1 FX_t + \beta_2 MKT + \varepsilon$					
FX = firm-specific SUB	310	14	12		
FX = firm-specific EQU		14	13		
FX = common BROAD	311	37	2		
FX = common MAJCUR		14	3		
Model: 2 $R_{it} = \beta_0 + \beta_1 FX_t + \beta_2 FX_{t-1} + \beta_3 MKT_t + \varepsilon$					
FX = firm-specific SUB	308	12	12	6	12
FX = firm-specific EQU		13	11	6	12
FX = common BROAD	309	28	1	3	8
FX = common MAJCUR		15	8	7	11

Source: Fraser and Pantzalis, 2004

NOTE: N - reports the number of firms with negative $\hat{\beta}$ significant at 5% level and **N +** reports the number of firms with positive $\hat{\beta}$ significant at 5% level. SUB and EQU are the subsidiary and equally weighted firm-specific foreign exchange measures while BROAD and MAJCUR are common indices.

Ihrig (2001) estimates monthly exchange rate exposure accounting for two items. First, like Fraser and Pantzalis (2004), she also introduced multinational specific exchange rates in the analysis. Second she adjusts the model to indicate the differences in exposure during the periods of normal exchange rate fluctuations and during the crisis periods. She starts with simple Jorion (1990) model to estimate the exposure.

$$ R_t^i = \alpha_0^i + \alpha_1^i R_t^m + \beta^i \Delta e_t + \varepsilon_t^i $$

where R^i is firm i's return, R^m is the market return and Δe is the change in exchange rate. In this regression exchange rate is typically a trade weighted exchange

rate that is the same series used for each firm. She uses monthly value weighted market index to proxy for a market portfolio.

For the first analysis, she adjusts the simple Jorion (1990) model to allow for a multinational specific exchange rate. Instead of using the same exchange rate for each multinational, she uses a multinational specific exchange rate which is represented by Δe^i in below regression equation. As a result, the new model, Jorion's exchange rate adjusted regression is obtained.

$$R_t^i = \alpha_0^i + \alpha_1^i R_t^m + \beta^i \Delta e_t^i + \varepsilon_t^i$$

She does not use broad exchange rate because multinationals have operations in different countries. She analyzes the effects of as well. Because exchange rate crisis period may affect the balance sheet more severe than normal exchange rate movements. As a result the model is changed to incorporate the crisis as follows:

$$R_t^i = \alpha_0^i + \alpha_1^i R_t^m + (\beta_1^i + \beta_2^i I_t^i)\Delta e_t^i + \varepsilon_t^i$$

where I^i is an exchange rate crisis indicator factor. If there isn't any multinational's subsidiary in crisis countries, this rate will be zero and the regression equation will reduce to Jorion's model. Value of the indicator factor lies between the limits of zero and one. This value indicates the ratio of multinational's subsidiaries in crisis countries to all total number of subsidiaries.

Ihrig's sample includes 226 US nonfinancial multinationals The sample period starts in 1995 and ends in 1999. She obtains monthly data. Thus, there are 13,560 (226*12*5) firm-year observations in the sample. When she runs the standard Jorion's regression equation, she finds 23 of the 226 firms having significant exposure at 10% level. When she runs the Jorion's exchange rate adjusted regression, she finds 36 of the 226 firms have significant exposure at 10% level. As seen, when the firm-specific exchange rate is used, the number of US multinationals with significant exposure rises from 10% percent to 16%. This is an important change,

and this evidence is consistent with Fraser and Pantzalis's (2004) theory which argues that the significance of exposure increases when firm-specific index is used. When she runs the last regression equation, number of firms in the sample decreases from 226 to 137 because 89 multinationals do not have any one of their subsidiaries located in a crisis country during 1995-1999. The results show that 18 (13.14%) of the 137 firms' returns are significantly affected by exchange rate crisis.

Dominguez and Tesar (2001 b) aim to see whether the weak evidence of systematic exchange rate exposure reported in the literature generalizes to countries other than the US. Therefore, they select a broad sample of firms from eight industrialized and developing countries including Chile, France, Germany, Italy, Japan, Netherlands, Thailand, UK. They select representative firms according to their market capitalizations and industry affiliations for large countries (Germany, Japan, and the UK). As seen in Table 2-2, the representative sample covers approximately 25% of the population. For the remaining countries they take almost the whole population of firms.

Table 2-2 Data Coverage

Coverage of Population of Firms	# of firms in sample	# of firms in population	% coverage
Chile	199	225	88.4
France	228	228	100
Germany	204	897	22.7
Italy	278	301	92.4
Japan	488	1942	25.1
Netherlands	213	248	85.9
Thailand	389	409	95.1
UK	388	1550	25

Source: Dominguez and Tesar, 2001 b

Sample period covers a long period starting from 1980 and ending in 1999. To test the exchange rate exposure, they add a new independent variable, which represents the change in exchange rate, on the right-hand-side of the standard CAPM regression. By this way, they test whether its coefficient is significantly different

from zero. They make the analysis at both firm and industry levels. They use an equally-weighted market return index, and they obtain weakly return data.

Table 2-3 Firm and Industry Level Exposure

| Countries | Percentage of Significant Exposure | | | |
| | Industry | | Firm | |
	Any	TW	Any	TW
Chile	17.4	4.4	13.6	5
France	17.1	5.6	18.9	7.9
Germany	64.7	26.5	20.6	13.7
Italy	32.3	19.4	26.3	13.7
Japan	59.5	58.3	31.1	26.2
Netherlands	40	20.7	26.3	15
Thailand	25	20	21.3	14.7
UK	46.2	35.9	18.8	11.1
All	39.6	25.4	23	14.8

Source: Dominguez and Tesar, 2001 b

NOTES: The columns labeled "TW" show the percent (industries or firms) exposed to a trade-weighted exchange rate; "any" show the percent exposed to at least one of the following: the TW, the US dollar and the currency of the country's major trading partner.

Table 2-3 shows the percentage of industries and firms within a country with significant exposure at 5% level. At the industry level, percentage of significant exposure in "any" exchange rate column ranges from 17.1% to 64.7% whereas at the firm level it ranges from 13.6% to 31.1%. Both at the industry and firm levels, Japan has maximum percentage of significant exposure and Chile is the one which has the minimum percentage of significant exposure. As seen above, when trade weighted exchange rate is used to measure exposure, percentage of significant exposure decreases at both the industry and firm levels. Finally, it can be concluded that they find a statistically significant level of exposure, because 23 percent of firms and 39.6 percent of industries are exposed to any of the exchange rates.

Pritamani, Shome, and Singal (2004) explain the cause of weak evidence of significant exchange rate exposure by ignoring the effect of domestic economy on stock prices. According to the conventional expectation increase in the value of the

home currency makes exporting goods more expensive in terms of foreign currency. This may lead to a decline in foreign demand, foreign sales revenue or both. It means that appreciation of home currency negatively affects the stock prices of multinational firms that export to foreign market.

In this case they do not take into consideration the effect of domestic demand due to an appreciation of home currency. According to the monetary theory of exchange rates, value of the home currency is expected to increase due to an increase in domestic GDP. Opposite of this case is also valid. Thus, it can be said that an increase in the value of the home currency causes a reduction in the demand for higher priced exporting goods, but this reduction is offset by an increased demand in a strong domestic economy. On the other hand, importing firms would benefit from the appreciation of a home currency, because their imports become cheaper in terms of the home currency. Lower priced imports lead to an increase in demand for their products. Consequently, value of importing firms increases. Strong domestic economy strengthens the positive effect of a strengthening home currency on the value of the firm. The hypothesis of a dual-effect of exchange rate changes on stock returns arising from changes in the domestic economy and foreign markets. They test the dual-effect hypothesis to prove the insignificant exposure of exporting firms and significant exposure of importing firms.

Their sample includes export oriented firms, import oriented firms and domestic firms. Export oriented firms are defined as having at least %50 of total sales in foreign countries or and/or at least 50% of their assets located overseas. Import oriented firms are defined as importing a significant part of their sales. Domestic firms have insignificant foreign trade and foreign assets (generally 10%), little foreign competition. They exclude the firms that do not fall into one of these categories as financial institutions such as banks, foreign firms and airlines. They also exclude the oil and metal firms, because they either trade or are heavily dependent on internationally traded commodities priced in dollars. As it must be recalled, Jorion (1990) also excludes oil firms. Pritamani, Shome, and Singal's (2004) sample period starts in January 1975 and ends in December 1997. They use

monthly data and two indices to measure foreign exchange exposure. One of them is the Major Currency index and other one is the Special Drawing Rights (SDR) index.

First, they estimate the total exposure or elasticity as the coefficient in the univariate regression is as below:

$$R_{i,t} = \alpha_i + \beta_i G_i + e_{i,t}$$

where $R_{i,t}$ is the return of stock i in period t and G_t is the change in exchange rate over the same period, measured in foreign currency per dollar. Test results for this regression equation are shown in Table 2-4.

Table 2-4 Estimates of Total Exchange Rate Exposure, βi

	FX index	
	Major	**SDR**
Importers	0.3402*	0.496**
	-0.198	-0.24
Exporters	-0.0593	0.044
	(0.151)	(0.183)

Source: Pritamani, Shome, and Singal, 2004

NOTE: An increase in G_i represents an appreciation of the US dollar.
**, * indicate statistical significance at the 5% and 10% level, respectively.

The results show that the coefficient of exchange rate variable is insignificantly different from zero for the sample of exporting firms. It is insignificant for both measures of exchange rates.

Then, they estimate ''residual'' exposure, or deviation from the market exposure, as the regression coefficient of exchange rate changes, G_t, in the multivariate regression

$$R_{i,t} = \alpha_i + \beta_i G_i + \gamma_i R_{m,t} + e_{i,t}$$

where $R_{m,t}$ is the return on the control portfolio in period t and other variables are as defined above. They use both value-weighted portfolio index and equally-weighted portfolio index to proxy for the market.

Test results for this regression equation are exhibited in Table 2-5. Importing firms have a significant exposure at 10% level. Also, the stock returns are positively correlated with contemporaneous changes in exchange rates for both measure of exchange rates. These results are consistent with the dual-effect hypothesis.

Table 2-5 Estimates of Residual Exchange Rate Exposure, βi

	FX index	
	Major	**SDR**
Panel A. Market portfolio = CRSP value-weighted portfolio		
Importers	0.3440***	0.3902***
	(0.114)	(0.139)
Exporters	-0.0560	-0.0480
	(0.055)	(0.066)
Panel B. Market portfolio = CRSP equally-weighted portfolio		
Importers	0.1733	0.1554
	(0.123)	(0.150)
Exporters	-0.1870**	-0.2174*
	(0.093)	(0.113)

Source: Pritamani, Shome, and Singal, 2004

NOTE: An increase in G_i represents an appreciation of the US dollar.
***, **, * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Above Table 2-5 shows that when the value-weighted market index is used the residual exposure coefficients are insignificant for exporters and significantly positive at 1% level for importers. When the value-weighted market index is replaced with an equally-weighted market index, it generates an opposite bias. In this case, residual exposure coefficients are negatively significant for exporters and insignificant for importers. These results are consistent with expectations.

The impact of exchange rate movements on the firm profitability has important implications for decisions about production, sales, pricing strategy, and

financial operations. Gao (2000) focuses on two major channels as foreign sales and foreign production. These channels are two important determinants of multinationals exchange rate exposure, because exchange rate movements directly affect the revenues and production costs through these two channels. He selects a sample of eighty US manufacturing multinational firms. These firms have relatively large volumes of foreign operations. They directly estimate the effects of exchange rate movements on stock returns through foreign sales and production. Theory predicts that unanticipated depreciation of the home currency will cause a positive effect on the abnormal returns on the stocks of multinationals through foreign sales and a negative effect through foreign production. Findings of this study show that stock market correctly reveals the profitability effects of unanticipated exchange rate changes predicted by theory. Results also indicate that these effects are statistically significant.

2.3   Empirical Studies in Turkey

Yücel and Kurt (2003) aim to measure foreign exchange exposure of Turkish firms in their study. They use two different models to measure foreign exchange exposure. In the first model, they only examine the relationship between stock return and percentage change in exchange rates. Then, in their second model, they apply Jorion's (1990) approach. In order to examine Turkish firms foreign exchange exposure they construct a sample from medium and big sized 152 firms whose stocks are traded in Istanbul Stock Exchange. Their sample period starts in January 2000 and finishes in October 2002. Monthly data are utilized to estimate foreign exchange rate exposure. Real effective exchange rate is used to eliminate the effects of high inflation rates in the Turkish economy. ISE 100 index is used to proxy for the market index. They separate the sample firms into two groups as exporter and non-exporter firms, and moreover banking sector companies are excluded. Exporters defined as the firms that have at least 20% of their total sales in foreign countries in 2000.

They examine the results in two steps. The result of the first model shows that 18 (11.8%) of the 152 firms have significant exposure. As seen in Table 2-6

exporters and non-exporters have different exposure patterns in the sample. 16 (18.6%) exporter firms have significant exposure whereas only 2 (3%) of the non-exporter firms have significant exposure. β coefficients positive signs. It means that stock returns for exporter firms increases due to a depreciation of TL.

Table 2-6 Foreign Exchange Exposure of Turkish Firms (Model 1)

Model 1: $R_{it} = \alpha_i + \beta_i e_t + e_{it}$			
	All Firms	**Exporters**	**Non-Exporters**
Sample Size	152	86	66
Mean Exposure Coefficient	0.168	0.194	0.136
Significant Exposure **Number of Firms** **Percent of Total**	18 11.8%	16 18.6%	2 3%
Significant at 5 percent **Number of Firms** **Percent of Total**	11 7%	9 10.5%	2 3%
Significant at 10 percent **Number of Firms** **Percent of Total**	7 4.6%	7 8.1%	0 0

Source: Yücel and Kurt, 2003

Result of model 2, which includes the market return, is indicated in Table 2-7. Market return variable does not alter the number of firms exposed to foreign exchange risk. Again, 18 of the 152 firms have significant exposure. However, mean exposure coefficient of all firms, exporters and non-exporters, are smaller than their coefficients when model 1 is applied.

The results of Model 1 and Model 2 indicate that the mean exposure coefficient is higher for exporters. In addition, Yücel and Kurt (2003) also analyze lagged response of stock prices to exchange rate changes. However they do not find a significant difference, so they did not include these results in their study.

Table 2-7 Foreign Exchange Exposure of Turkish Firms (Model 2)

Model 2: $R_{i,t} = \alpha_i + \beta_{1i}e_t + \beta_{2i}R_{mt} + e_{it}$			
	All Firms	**Exporters**	**Non-Exporters**
Sample Size	152	86	66
Mean Exposure Coefficient	0.076	0.112	0.036
Significant Exposure Number of Firms Percent of Total	18 11.8%	17 19.8%	1 1.5%
Significant at 5 percent Number of Firms Percent of Total	15 7%	14 10.5%	1 1.5%
Significant at 10 percent Number of Firms Percent of Total	3 1.9%	3 3.4%	0 0

Source: Yücel and Kurt, 2003

Kasman (2003) conducts a similar study with Yücel and Kurt (2003). However, she analyzes empirically the relationship between exchange rates and stock prices by using aggregate stock indices of ISE. She finds that stock indices and exchange rates move together in the long-run. Her results indicate that exchange rate affects all of the stock indices, but one-way causality exists only from exchange rate to Industry sector index in Istanbul Stock Exchange.

Vergil (2006) and Özbay (1999) measure foreign exchange rate exposure in terms of exports. Vergil (2006) analyzes the impact of real exchange rate volatility on the export flows of Turkey to the US and its three major trading partners in the European Union- Germany, France and Italy- for the period of January, 1990 to December, 2000. He finds negative and significant long-run relationship between Turkey's real exports and its exchange rate volatility for Germany, France and the US. However, he finds significant and negative short-run relationship between these terms only for Germany. For the rest of the countries, short-run effect of exchange rate volatility is statistically insignificant.

Özbay (1999) investigates possible effects of exchange rate uncertainty on exports for the 1988:II - 1997:II period. She finds real exchange rate uncertainty significantly adversely affects the exports while insignificantly affects the imports. The other finding of this paper is that the real exchange rate and foreign incomes have significant effect on export demand.

Merkez Menkul (2006) analyzes the economic developments in Turkey in June, 2006. Analysts in Merkez Menkul measure the effects of depreciation in YTL on stock returns in terms of firms and sectors. They suggest that banking sector will be mostly affected from those developments because banks are very sensitive to foreign exchange and interest rates. On the other hand, when they examine holdings, it is observed that holdings need huge amounts of credits to finance their purchasing which they made recently. As a result of the significant purchasing, their open positions in foreign exchange increased. Therefore, holdings will also be affected from the depreciation in YTL negatively. They indicate that insurance sector may fall into financial difficulties, because this sector is closely interested in economic growth. When they make analysis in terms of firms, they find that firms which have excessive foreign exchange position and make exports will benefit from this situation.

Table 2-8 summarizes some of the studies discussed in this part in terms of their countries, sample sizes and sample periods, Table 2-9 summarizes market index types and Table 2-10 summarizes in terms of exchange rate indices types.

Table 2-8 Country, Sample Size and Sample Period

	Country	Sample Size	Sample Period
Jorion (1990)	US Multinationals	287	1971-1987
He&Ng (1998)	Japanese Multinationals	171	1979-1993
Fraser&Pantzalis (2004)	US Multinationals	310	1995-1999
Jane Ihrig (2001)	US Multinationals	226	1995-1999
Dominguez&Tesar (2001 b)	Chile, France, Germany, Italy, Japan, Netherlands, Thailand, UK	199, 228, 204, 278, 488, 213, 389, 388	1980-1999
Pritamani&Shome &Singal (2004)	Export-oriented US Firms, Import-oriented US Firms, Domestic Frms	67, 28, 91	1975-1997
Yücel&Kurt (2003)	Turkish firms	152	January, 2000 - October, 2002

Table 2-9 Types of Market Indices

	Value-Weighted Market Index	Equally-Weighted Market Index
Jorion (1990)	x	
He&Ng (1998)	x	
Fraser&Pantzalis (2004)	x	
Jane Ihrig (2001)	x	
Dominguez&Tesar (2001 b)		x
Pritamani&Shome&Singal (2004)	x	x
Yücel&Kurt (2003)	x	

Table 2-10 Types of Exchange Rate Indices

	Trade-Weighted Exchange Rate Index	Common Indices			Firm-Specific Indices
		BROAD	MAJCUR	SDR Index	
Jorion (1990)	x				
He&Ng (1998)	x				
Fraser&Pantzalis (2004)		x	x		x
Jane Ihrig (2001)	x				x
Dominguez&Tesar (2001 b)	x				x
Pritamani&Shome&Singal (2004)			x	x	
Yücel&Kurt (2003)	x				

CHAPTER 3

TURKISH ECONOMY: 1980-2005

By the late 1970s, Turkey's economy had perhaps reached its worst crisis since the fall of the Ottoman Empire. Turkish authorities had failed to take sufficient measures to adjust to the effects of the sharp increase in world oil prices in 1973-74 and had financed the resulting deficits with short-term loans from foreign lenders. As stated by Bayazıtoğlu, Ersel and Öztürk (1991), 1970s can be characterized by negative real interest rates, credit rationing, undeveloped capital markets, excessive reliance on Central Bank resources for public sector financing requirements, severe restrictions on foreign exchange operations, and a high level of taxation on financial income and transactions. Interest rates on deposits and loans were determined directly by the government. Therefore, interest rates were not responding to the current inflation rate. Moreover, under protectionist economic policies, some sectors had priory, and a number of complicated selective credit schemes were introduced in order to assure financial support for the import substituting sectors. By the effect of these applications in 1979 inflation had reached triple-digit levels, unemployment had risen to about 15 percent, industry was using only half its capacity, Consequently, the government was unable to pay even the interest on foreign loans.

However, changes in the world economic conditions after mid-1970s and the domestic economic crisis ensuing these developments led the governments to review the traditional economic policies. As Kotan and Saygılı (1999) point out after experiencing a severe balance of payments crisis in the late 1970s, Turkey changed its policies in a radical manner in 1980, shifting from an import substitution program to a more outward oriented program which was called an export promotion program.

3.1 Development of Exchange Rate Policy

As mentioned by Bayazıtoğlu, Ersel and Öztürk (1991), the Turkish Lira (TL) was often kept overvalued and devalued irregularly until 1980. From the beginning of the reform attempts, the government decided that the exchange rate should reflect the real value of the domestic currency.

Therefore, as reported in Undersecretariat of the Prime Ministry for Foreign Trade Report (2006), it first began by eliminating multiple exchange rates, which ranged from 35 TL to 47 TL per dollar and one dollar was fixed to 70 TL on the 24th of January, 1980. This was a large devaluation. Shortly afterwards, in May 1981, Central bank took a first step towards financial liberalization by implementing adjustable peg policy which the Turkish Lira was daily adjusted in the form of devaluations. In 1984, exchange rate policy became more flexible. For foreign exchanges, commercial banks were allowed to determine their own exchange rates 6 percentages above or below the official rates and for effectives this rate increased to 8 percent, but the difference between ask prices and bid prices would not exceed 2 percent.

In addition to these, Pongsaparn (2002) states banks were allowed to take foreign currency deposit from residents, at the same time, non-residents were able to hold Turkish Lira account in 1984. Non-residents were also able to purchase foreign denominated securities. At the same time, securities quoted at the foreign stock exchange and foreign treasury and government bonds could be purchased and sold by residents. Imports and exports in all kinds of securities were permitted.

As Denizer, Gültekin and Gültekin (2000) mentioned banks were allowed to freely determine the foreign exchange rates that they use in their operations in June 1985. But in 1986, as reported by Undersecretariat of the Prime Ministry for Foreign Trade Report (2006), this freedom was limited and the exchange rates, determined by the banks, should be one percentage above or below the official rates. In the same

year, system was scrutinized again. Thereupon, governments explained that banks could set the ask price freely, in case of bid price didn't exceed the official rates.

As Bayazıtoğlu, Ersel and Öztürk (1991) states an important development in the context of liberalization was the opening of official foreign exchange market under the auspices of the Central Bank in September 1988. Banks and authorized foreign exchange bureaus are the participants of this market. The opening of this market was important, because the exchange rate for the Turkish Lira would be determined according to demand and supply conditions. Also, it was important for the efficient management of foreign exchange and the currency reserves of the banking sector. Following these major steps, banks' operations in foreign currency have grown substantially.

Although, liberal economic policies were adopted after 1980, exchange rate policy was fully liberalized after 1988. The Decree No.32, which was issued in August 1989, constituted a very important step towards the liberalization of the exchange regime. The decree is relating with the protection of the value of the Turkish currency (Koska, 2006). This was followed in February 1990, by an application to the International Monetary Fund for full convertibility of the Turkish currency (within the framework of Article 8).

Department of money market was established at the Central Bank of the Republic of Turkey with the aim of determining the exchange rate in the market and bringing stability to the foreign exchange market. Role of the Central Bank was to regulate the market and avoid volatilities (Özbay, 1999).

1991 Gulf Crisis and the 1994 currency Crisis led to a decrease in TL from 14,500 in January 1st to 39,850 on the 7th of April, 1994 against the dollar. It means that TL depreciated by more than 100 % (Gümüş, 2006).

Turkish government launched a new comprehensive stabilization program with the guidance of the International Monetary Fund (IMF) in December 1999. It

was basically an exchange rate based stabilization program, which announced the implementation of crawling peg regime.

"*A crawling peg is monetary regime whereby a domestic currency is allowed to appreciate or depreciate against another currency or basket of currencies, over a set period of time. The currency or basket of currencies[7] to which the domestic currency are tied in the peg arrangement, is known as the "anchor""* (Muhammad, 2000).

As a result of severe economic crisis suffered by the country, on the 22nd of February, 2001, the exchange rate regime in Turkey has changed over from a crawling peg regime to an independent floating regime. The US dollar rate instantly moved from 686,500 thousand Turkish liras on the 19th of February to 920 thousand Turkish liras on the 23rd of February (Uygur, 2001).

3.2 Macro Economic Developments in the Turkish Economy

Domestic financial liberalization was a reform component of the 1980s. As Altınkemer and Ekinci (1992) points out, in June 1981, a major step was taken towards financial liberalization and interest rate restrictions on bank lending and deposits were lifted. The early phase of financial liberalization turned out to be a painful process as explained by Boratav and Yeldan (2001), Bayazıtoğlu, Ersel and Öztürk (1991) and Damar (2004). The speedy lifting of controls on deposit and loan interest rates and the introduction of certificates of deposits (CDs) had led to the financial scandal of 1982 because soon after the reform program was announced, smaller banks and numerous money brokers (called "bankers") started to compete for deposits by offering very high interest rates. On the other hand, several companies found themselves in financial distress due to high credit interest rates and poor earnings performance. All these developments brought the financial system to a crisis in 1982, and as a result some of the smaller banks and most of the brokerage

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[7] A currency basket is made up of the US dollar and the European Union Euro.

houses collapsed during the crisis. Then, Central Bank started to regulate the interest rates on deposit in 1983, again. In spite of high and volatile inflation rates, governments tried to maintain positive real interest rates on savings deposits to stimulate financial savings that would make larger funds available for fixed investments. However as Uygur (1991) points out this did not materialize in Turkey in the first half of the 1980s and in fact private savings rate declined until 1986, in spite of the considerable increase in time deposits.

This development can be explained by the redistribution of income from corporate sector to rentiers through higher interest rates since the savings rate of the latter is lower than that of the former. Uygur (1991) also argues that in the first half of the 1980s, interest payments were treated as disposable income and used partly for consumption particularly by the small savers. He points out that portfolio shifts from real to financial assets implied erosion of the real wealth of this group and their real savings declined.

In February 1988, the government announced a comprehensive package of measures to mop up the excess liquidity and to reestablish stability in the financial markets. Higher interest rates were started to applied to all deposits by this package in order to stabilizing the financial markets. However, government also increased the banks' cost of funds. This increase in costs put the banks into financial difficulties in placing these funds. As a result, the difficulties the banking sector was facing led the authorities to reconsider the level of interest rates, this time in downward direction. However the continuing rise in inflation rate did not produce the expected results and the disequilibrium in the financial market continued. The most obvious indicator of that disequilibrium was the heavy speculation by banks in foreign exchange. The instability was finally put to an end by freeing the interest rates on all types of deposits in October 1988 (Bayazıtoğlu, Ersel and Öztürk, 1991). As Denizer, Gültekin and Gültekin (2000) discussed, it nearly took eight years for the short-term interest rates to be market determined until the Treasury debt markets were well established.

When the recent history of Turkey was examined in terms of inflation rates, Sakallıoglu and Yeldan (1999) addressed the dynamics of ongoing price inflation as a direct attribute of the macroeconomic mis-management and disequilibria in the commodity and financial markets. Turkish price inflation, as revealed in the annual rate of change in consumer prices, was observed to continue in high rates since the beginning of the structural adjustment reforms in 1980.

As Boratav and Yeldan (2001) pointed out liberalization of domestic markets eliminated the painful shortages in basic commodities, and the major realignment in relative prices took place relatively smoothly. Consequently, the rate of inflation which had almost reached three digit figures in 1980 was reduced to two-digit numbers (amounts) after the structural adjustment reforms had started to apply.

The decline in inflation was achieved with the help of restrictive monetary and fiscal policies. Restrictive Fiscal policies were somewhat relaxed from 1983 onwards in order to raise public investment expenditure to meet the infrastructure requirements of the country. By the effect of this decision inflation rate increased to almost 50% in 1984. With the further relaxation of the fiscal policies due to election considerations, public sector deficits increased in 1987. Therefore, inflation again accelerated rapidly from 1987 onwards, exceeding on average, 60 per cent during the last three years of the decade. As shown in the below Table 3-1, in the initial years, the adjustment program just as anticipated, but at the end of the 1980s, inflation rate was almost 64.28 % (Akyüz and Boratav, 2006).

Table 3-1 Consumer Price Index

| | | | | | | | | | | | | (Cumulative Percentage Change Over the Previous End Year) |
	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1983	4.20	6.61	8.99	10.59	11.33	12.80	13.97	16.63	20.40	26.79	31.54	37.06
1984	3.45	5.03	8.28	15.03	20.61	28.43	29.61	32.84	35.59	41.50	46.95	49.68
1985	5.57	9.06	14.27	15.22	17.99	17.09	18.76	21.83	27.62	35.61	41.90	44.19
1986	3.20	4.99	6.36	6.77	8.79	11.39	13.48	14.47	17.10	25.70	28.56	30.67
1987	2.94	5.72	9.67	11.97	17.49	17.37	19.62	21.67	25.23	31.24	39.44	55.05
1988	16.19	20.53	27.21	35.14	39.82	41.07	43.32	46.74	55.43	64.11	72.87	77.13
1989	6.60	11.69	15.08	22.24	25.97	28.61	32.52	37.18	44.91	53.86	60.56	64.28
1990	3.84	8.43	14.06	21.63	25.44	27.25	26.08	29.29	40.53	50.14	57.66	60.41
1991	4.86	10.55	15.38	22.94	27.04	30.79	32.51	37.79	46.17	55.81	63.98	71.14
1992	9.37	14.88	20.47	24.99	26.09	26.71	28.38	33.28	43.21	54.03	61.55	65.97
1993	5.29	9.48	14.69	19.73	25.38	27.68	33.91	37.49	45.17	55.18	65.10	71.08
1994	4.41	10.68	16.42	45.18	59.63	61.08	63.87	67.20	79.17	96.17	112.05	125.49
1995	7.05	12.27	17.34	24.17	28.29	31.59	35.64	41.51	52.39	62.01	69.65	76.05
1996	8.31	13.19	19.53	27.55	33.31	36.69	39.61	46.24	55.22	65.28	73.83	79.76
1997	5.87	11.86	17.90	25.70	31.60	35.38	43.86	52.77	63.94	77.59	89.37	99.09
1998	7.22	11.95	16.77	22.22	26.50	29.57	33.92	39.22	48.57	57.56	64.33	69.73
1999	4.80	8.13	12.51	17.99	21.46	25.41	30.20	35.67	43.80	52.89	59.32	68.79
2000	4.86	8.74	11.91	14.52	17.06	17.85	20.50	23.11	26.90	30.83	35.69	39.03
2001	2.51	4.35	10.69	22.13	28.30	32.32	35.49	39.47	47.68	56.65	63.27	68.53
2002	5.32	7.17	8.44	10.67	11.31	11.96	13.57	16.06	20.09	24.04	27.65	29.75
2003	2.59	4.90	8.16	10.42	12.16	11.97	11.55	11.73	13.84	15.46	17.33	18.36
2004	0.74	1.29	2.19	2.79	3.18	3.05	3.28	3.87	4.85	7.18	8.83	9.32
2005	0.55	0.57	0.83	1.55	2.49	2.59	2.00	2.87	3.93	5.79	7.27	7.72

Source : TURKSTAT

Note : For the period of 1983-1987 1978-79=100 index, for the period of 1988-1994 1987=100 index, for the period of 1995-2004 1994=100 index and for the period after 2004 2003=100 index is used.

Turkey registered relatively high rates of GNP growth with the introduction of market oriented reforms in 1980s. At the same time Turkey experienced large and growing fiscal and external imbalances following the capital account liberalization in 1989 until the first quarter of 1994. These imbalances resulted in high inflation of 60-70 percent a year between the years of 1990-1993 and weakening of external balances which culminated in 1994 crisis (Demirkol, 2000). Between the years of 1990 and 1993, there was a huge increase in capital inflows due to the capital

account liberalization. The boom in capital inflows was associated with an appreciation of the currency. Current account deficits widened due to a strong recovery during 1992-1993 (Akyüz and Boratav, 2006).

The Central Bank, aiming to defend the exchange rate by selling foreign currency; simultaneously they were trying to keep the interest rates at their artificially low levels. Thus, the Central Bank lost reserves due to the sale of foreign currency to the commercial banks. The commercial banks also lost their own reserves, because residents started to withdraw their foreign currency deposits. As a result, it turned to an overall liquidity crisis in the system (Celasun, 1998). As Gümüş (2006) pointed out parallel to these, the TL decreased from 14,500 in January 1st to 39,850 on the 7th of April, 1994 against the dollar. It means that TL depreciated by more than 100 %.

Government launched a stabilization program on 5th of April, 1994 to cease recession. The new monetary program prepared in line with the IMF stand-by agreement was put into effect in May. As noted in the book of Central Bank of the Republic of Turkey (2002), the aim of this agreement was to regain credibility. By this agreement two measures were also introduced: a) Deposits within the banking system were put under "full insurance" coverage. b) The government passed a bill with the aim of the gradual elimination of public sector borrowing from the Central Bank. The pressure on the exchange rate began to reduce with these measures. Thus exchange rate declines between May and August. The international reserves also started to increase from May onwards.

"The downturn was short-lived and the recovery rapid. Capital flows returned during 1995-1997 when the economy enjoyed three successive years of growth in excess of 7 per cent. During that period currency appreciation was generally avoided as the Central Bank of Turkey (CBRT) effectively pursued a policy of real peg. This together with the initial real depreciation of the lira meant a sharp recovery in exports which helped to keep the current account at sustainable levels despite rapid growth. As net capital outflows by residents also slowed down, much

of the capital inflows were absorbed by increases in international reserves" (Akyüz and Boratav, 2006).

After unsuccessful stabilization attempts in the past, a comprehensive disinflation program known as Staff Monitored Program (SMP) was launched by Turkish authorities in 1998. The aim of this program was to reduce inflation and improve the fiscal performance of the country. However, the political uncertainties and the earthquakes in August and November 1999 prevented the government from obtaining the expected results from the program. Moreover, the Asian and the Russian crisis also undermined the performance of the program severely (The book of Central Bank of the Republic of Turkey, 2002).

Thereafter, Turkish government launched a new comprehensive stabilization program with the guidance of the International Monetary Fund (IMF) in December 1999. With this stabilization program, governments aimed to decrease inflation to single digits until the end of 2002, decreasing the real interest rates and thus providing a stable macroeconomic environment in order to improve the long-term growth potential of the country. It was basically an exchange rate based stabilization program, which announced the value of the exchange rate basket for the first one and a half year period. A gradual shift toward a more flexible exchange rate regime would begin in July 2001 with the introduction of a symmetric, progressively widening band about the central exchange rate (Akyüz and Boratav, 2006).

Announcement of the stabilization program positively effected the economic expectations. Increase in inflation rates slowed down beginning from March and with the realization of postponed consumption and investment expenditures real sector started to become active. Low level of interest rates caused a rise in sales of durable goods and cars. Stagnation in the inflation rates was the major reason of the real appreciation of the exchange rates. Price of the foreign goods became cheaper with the appreciation of home currency. Appreciated home currency (hard currency) coupled with low interests, finally caused a considerable increase in import expenditures.

The worsening of the current account deficit coupled with the delays in the privatization efforts and the structural reforms during the second half of the year affected both foreign and domestic investors negatively. They attempted to reduce their assets denominated in TL. This created a serious liquidity problem. In this period, Central Bank realized high quantity of foreign exchange sales and as a result foreign exchange reserves of CB decreased. This led to a sharp increase in the short-term interest rates in August 2000. The rise in interest rates had an adverse effect on the financial structures of some banks that had a high share of government securities in their portfolios and financed those securities with rather short maturity resources (The book of Central Bank of the Republic of Turkey, 2002).

The overall confidence in the financial markets in regards to the sustainability of the program in November was deteriorated due to the deterioration in banks' balance sheets. The lack of confidence towards those banks combined with a sudden rise in the liquidity needs of these banks' led to a sharp increase in short-term interest rates in the second half of November, 2000. Following the hike in short-term interest rates, the prices of both public securities and stock prices went down (The book of Central Bank of the Republic of Turkey, 2002). In conclusion, growing current account deficit, the weak banking system led to revise IMF program in 2000.

As Uygur (2001) pointed out Central Bank partially removed the fluctuations in the market by the help of high interest rates and also providing liquidity to the markets by breaching NDA[8] corridors limits on the 22nd of November, 2000. For this reason, also an enhanced policy package was put into effect in December 2000 and the IMF's support in the form of Supplementary Reserve Facility whose maturity was rather short and cost was high helped to restore the confidence in the program. The Central Bank reserves were restored in a short time and interest rates declined significantly, although still higher than the pre-crisis levels. Imports slowed down

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[8] NET DOMESTIC ASSET: The net domestic assets (NDA) of the Central Bank of The Republic of Turkey (CBRT) are defined as base money less the net foreign assets of the CBRT valued in Turkish lira at end-month actual exchange rates.

and the decline in inflation continued even though the inflation rate was still higher than the rate of depreciation of TL.

Since there still appeared serious problems in the fundamentals of the economy, the stability did not last long. A rise in the average interest rates, both the overnight rate and secondary market bond rate and also the decline in the maturity caused suspicions about the public debt sustainability. Furthermore, the increase in the public debt, high inflation rates and appreciation of TL against the basket generated suspicions about the peg sustainability. Shortly after the rearrangement of the targets of the program with the IMF officials, a political dispute in the coalition government eroded the market confidence totally and caused an immense foreign exchange demand. Consequently, this unsustainable situation ended on February 19, 2001 (The book of Central Bank of the Republic of Turkey, 2002; Özatay and Sak, 2002).

The Central Bank attempted to defend the foreign exchange rate with a squeeze in liquidity that was followed by another hike in short-term interest rates. Overnight interbank rates reached 6200% on 21st of February, 2001. This sharp increase in the interest rates could not impede the capital outflows. In addition to this, the whole payments system was locked up by the excessive liquidity needs of public banks. Thus, the unsustainability of the foreign exchange regime became rapidly apparent and the crawling peg regime was abandoned on 22nd February, which was the basic pillar of the 1999 disinflation program. The US dollar rate instantly moved from 686,500 thousand Turkish liras on the 19th of February to 920 thousand Turkish liras on the 23rd of February (Uygur, 2001).

The result of this crisis was a sharp increase in inflation and a deep economic downturn (GNP[9] fell 9.5% in 2001) as indicated in Figure 3-1. Severe banking crisis and a massive rise in domestic public debt followed the crisis.

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[9] GNP increased %7.9 in 2002, %5.9 in 2003, %9.9 in 2004 and %7.6 in 2005. 1987=100 index is used (Source: TURKSTAT).
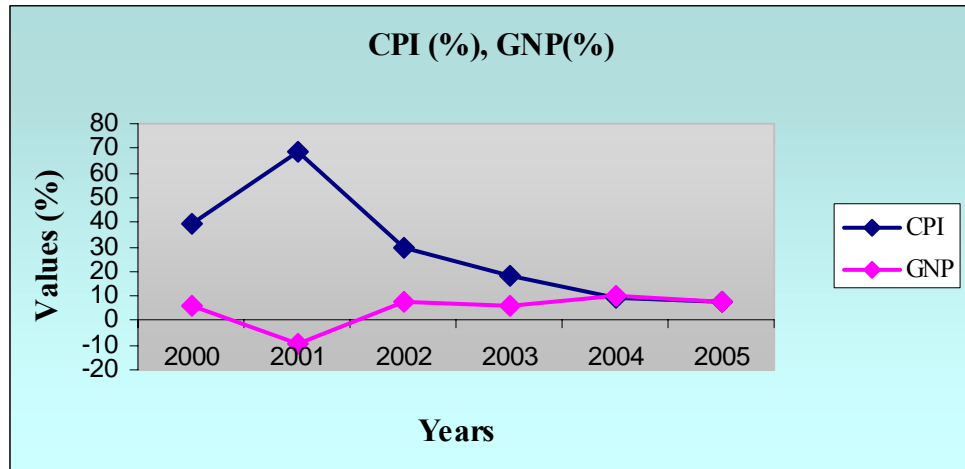
Source: TURKSTAT for GNP, Table 3-1 for CPI

Figure 3-1 Consumer Price Index and Gross National Product Changes

After the collapse of the exchange rate-based stabilization program in February 2001, a new agreement was made with the IMF in May 2001 and a new program, "Turkey's Program for Transition to a Strong Economy" which has been more decisive to implement immediately some regulatory and structural reforms, was announced. First, the CBRT announced that a floating exchange rate regime was to be implemented. Next, the government presented an ambitious structural agenda focusing on immediate banking sector restructuring, transparent public accounting, enhanced privatization and promoted foreign direct investment. Under the new regime, more specifically, the primary objective of CBRT can be summarized in two steps: Firstly, bringing inflation down to single digits over the medium term; secondly, maintaining price stability (Akıncı, Çulha, Özlale, Şahinbeyoğlu, 2005).

Large IMF loans which were tied to the implementation of ambitious economic reforms enabled Turkey to stabilize interest rates and the currency and to meet its debt obligations. In 2002 and 2003, the reforms began to yield results. Turkey's economy grew an average of 7.5 % per year from 2002 through 2005[10].

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[10] Gross Domestic Product grew %7.9 in 2002, %5.8 in 2003, %9 in 2004 and %7.4 in 2005. 1987=100 index is used. (Source: TURKSTAT)

Inflation[11] and interest rates[12] fell significantly, the currency stabilized and government debt has declined to more supportable levels. Therefore, business and consumer confidence began to return except during the period of Iraq war.

After years of low levels of foreign direct investment (FDI), in 2005 Turkey succeeded in attracting $9.7 billion in FDI[13] and is expected to attract a similar level in 2006. A series of large privatizations, the stability fostered by the start of Turkey's EU accession negotiations, strong and stable growth, and structural changes in the banking, retail, and telecommunications sectors have all contributed to the rise in foreign investment. At the same time, the booming economy and large inflows of portfolio investment have contributed to a growing current account deficit. Though Turkey's vulnerabilities have been greatly reduced, the economy could still face problems in the event there is a sudden change in investor sentiment that leads to a sharp fall in the exchange rate. Continued implementation of reforms, including tight fiscal policy, is essential to sustain growth and stability.

3.3   Export and Import Growth

The 1980s was a period of rapid change in Turkey, with remarkable economic development, high rates of growth and industrialization. In this period, economy opened up to world trade, export-promoting incentives were initiated (including tax exemptions, rebates and favorable credit terms), direct import controls have been eliminated, and quantity restrictions have been removed together with the managed floating of the exchange rate and regulated capital movements. All of these mean that state intervention in the economy was reduced to minimum level. One of the pillars of the policy orientation was the gradual, but significant depreciation of the Turkish lira (TL) more than inflation to maintain export competitiveness as supported by Boratav and Yeldan (2001) and Denizer, Gültekin and Gültekin (2000).

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[11] Inflation rates take part in Table 3-1.
[12] Interest rates take part in Appendix 2
[13] Source: http://www.oecd.org/dataoecd/13/30/35439819.pdf

As a result of these liberal economic policies implemented, volume of foreign trade expanded rapidly in 1980's as shown in Table 3-2. While the exports value was $ 2.9 billion at the beginning of 1980's, it reached almost to $ 11.6 billion in 1989. Namely, the export value quadrupled during this period. Similarly share of exports to GNP increased from 4.2% to 10.7% in the same period.[14] In 1990 value of exports was 13 billion dollars while this rate rose to $ 21.6 billion in 1995, $ 27.8 billion in 2000, and reached to $ 73.5 billion in 2005.

During the 1990-1995 periods, the average annual growth rate of exports was 11.1 %. This rate decreased to 7.6 % between 1995 and 2000. The primary reason of high growth rate of exports during the period of 1990-1995 was a considerable increase in the import demand of European Union. A stabilization program was announced by the government on April 5, 1994. This stabilization program which was intended to reduce the domestic demand and increase exports via the real depreciation of the TL had an important impact on this development. Moreover, the devaluation of TL gave a substantial competitiveness to Turkish exporters. Therefore, exports expanded substantially in 1994. This policy continued until the end of 1994 and expansionary measures were pursued with an expansion in domestic activity in 1995, and especially in 1996-1997 periods (Şahinbeyoğlu and Ulaşan, 1999).

However, in 1997 and 1998 as a result of economic crises in Newly Industrialized Asian Countries and in Russian Federation, increase in the world trade and world demand shrank. These had a significant impact on Turkey's export performance in 1997, 1998 and 1999. Therefore, value of exports increased only 1.24 percent in 3 years. On the other hand, after 2000, Turkey's exports growth rate accelerated at an important pace as indicated in Figure 3-2. Turkey showed a great performance in exports especially in 2003 and 2004. In these years, Turkey's exports grew by 31 % and 33.4 % respectively (byegm, 2006).

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[14] Source: SPO, SIS

Foreign Trade by Years
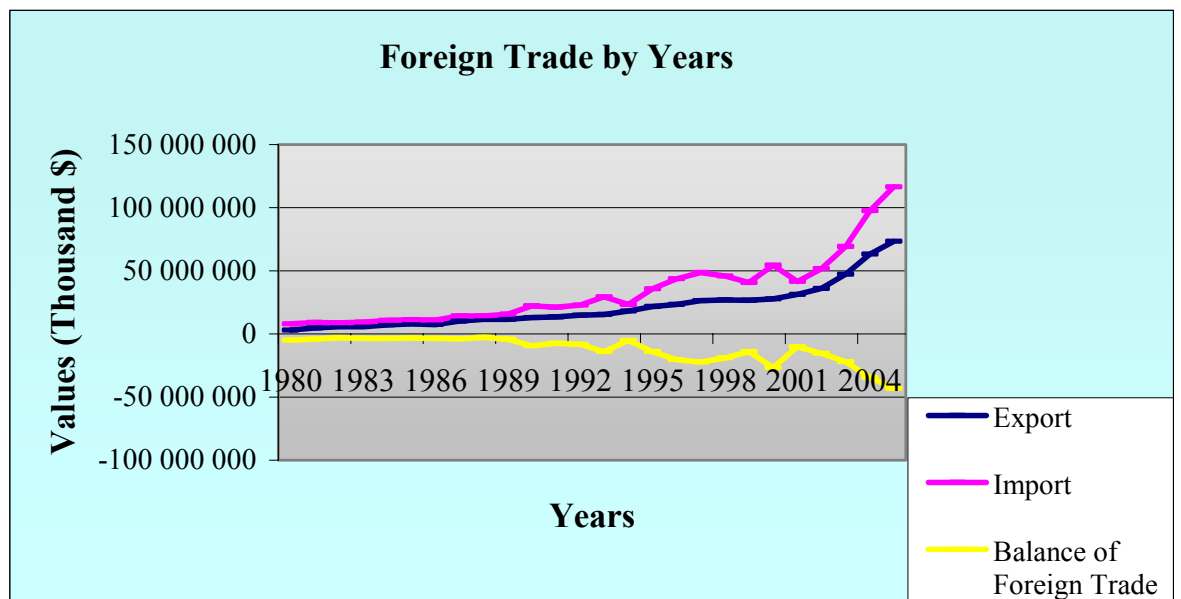
Source: Table 3-2

Figure 3-2 Foreign Trade by Years (1980-2005)

As Undersecreteriat of Foreign Trade (2006) explains, the record rate of export growth in the year 2004 may be attributed to many factors such as: a) Turkish industrial production gained some competitiveness, despite appreciation of TL, as a result of low real wages and stagnant energy prices (mainly electricity). b) Low real interest rates in comparison to previous years lowered borrowing cost for producers and exporters. c) Technological improvements have increased either by transfers because of joint ventures (especially in automotive industry) or imports of technology. d) Productivity accelerated in recent years while consumption was stagnant until mid 2003. This created excess supply, which was in turn directed towards exports. In Turkey imports of intermediate and capital goods are important in production. So, Turkey benefited from importing cheaper intermediate goods from countries where prices are set according to US dollar (like East Asian countries – especially China-) and exporting final products mainly to EU countries due to the depreciation of dollar against EURO and TL.

Table 3-2 Foreign Trade by Years

Years	Exports		Imports		Balance of Foreign Trade	Volume of Foreign Trade	Proportion of Imports covered by Exports
	Value	Change	Value	Change	Value	Value	Change
	'000 $	%	'000 $	%	'000 $	'000 $	%
1979	2 261 195	-1.2	5 069 432	10.2	-2 808 236	7 330 627	44.6
1980	2 910 122	28.7	7 909 364	56.0	-4 999 242	10 819 486	36.8
1981	4 702 934	61.6	8 933 374	12.9	-4 230 439	13 636 308	52.6
1982	5 745 973	22.2	8 842 665	-1.0	-3 096 692	14 588 639	65.0
1983	5 727 834	-0.3	9 235 002	4.4	-3 507 168	14 962 836	62.0
1984	7 133 604	24.5	10 757 032	16.5	-3 623 429	17 890 636	66.3
1985	7 958 010	11.6	11 343 376	5.5	-3 385 367	19 301 386	70.2
1986	7 456 726	-6.3	11 104 771	-2.1	-3 648 046	18 561 497	67.1
1987	10 190 049	36.7	14 157 807	27.5	-3 967 757	24 347 856	72.0
1988	11 662 024	14.4	14 335 398	1.3	-2 673 374	25 997 422	81.4
1989	11 624 692	-0.3	15 792 143	10.2	-4 167 451	27 416 835	73.6
1990	12 959 288	11.5	22 302 126	41.2	-9 342 838	35 261 413	58.1
1991	13 593 462	4.9	21 047 014	-5.6	-7 453 552	34 640 476	64.6
1992	14 714 629	8.2	22 871 055	8.7	-8 156 426	37 585 684	64.3
1993	15 345 067	4.3	29 428 370	28.7	-14 083 303	44 773 436	52.1
1994	18 105 872	18.0	23 270 019	-20.9	-5 164 147	41 375 891	77.8
1995	21 637 041	19.5	35 709 011	53.5	-14 071 970	57 346 052	60.6
1996	23 224 465	7.3	43 626 642	22.2	-20 402 178	66 851 107	53.2
1997	26 261 072	13.1	48 558 721	11.3	-22 297 649	74 819 792	54.1
1998	26 973 952	2.7	45 921 392	-5.4	-18 947 440	72 895 344	58.7
1999	26 587 225	-1.4	40 671 272	-11.4	-14 084 047	67 258 497	65.4
2000	27 774 906	4.5	54 502 821	34.0	-26 727 914	82 277 727	51.0
2001	31 334 216	12.8	41 399 083	-24.0	-10 064 867	72 733 299	75.7
2002	36 059 089	15.1	51 553 797	24.5	-15 494 708	87 612 886	69.9
2003	47 252 836	31.0	69 339 692	34.5	-22 086 856	116 592 528	68.1
2004	63 167 153	33.7	97 539 766	40.7	-34 372 613	160 706 919	64.8
2005	73 472 289	16.3	116 562 532	19.5	-43 090 243	190 034 821	63.0

Source: www.tuik.gov.tr

71

When exports by main sectors are examined there seems to be a steady decrease in the share of exports of agricultural products until 2004 as exhibited in Table 3-3. The commodity composition of exports has shifted substantially from agricultural products to industrial products. Turkey has been self-sufficient in food production since the 1980s. The agricultural output has been growing at a respectable rate. However, since the 1980s agriculture has been in a state of decline in comparison to the total economy due to a decline in agricultural support measures. Agriculture exports accounted for 17.4 % of total exports while industrial exports accounted for 79.9 % in 1990. The share of export of agricultural products in total exports decreased 4 % in 2004. On the other hand, exports of agricultural products showed a good performance especially in 2003 and 2004, but increase in agricultural products exports was lower than increase of total exports.

The value of exports of mining products has increased from 191 million dollars in 1980 to 649 million dollars in 2004. However, the share of these products in total exports decreased from 6.6 % to 1% in the mean time.

Import value has also risen parallel to export value in 1980's. Imports of Turkey, which were $ 7.9 billion in 1980, reached to $ 15.8 billion at the end of 1980's as shown in Table 3-2. Over the 10 year period, it decreased only two times in 1982 and 1986. In the year 1986 import value decreased as a result of an increase in crude oil prices. Balance of foreign trade has not changed so much between the years of 1980 and 1989 as shown in Figure 3-2. Although there was a declining tendency at the beginning of 1980's, it again came closer to the starting values in 1989. However, in 1990 there was a sharp increase in balance of foreign trade. Thus, current account balance was affected negatively. According to Uygur (1990) one of the major aims of the reforms was to promote exports though exchange rate adjustments and export incentives and also liberalize imports. Governments planned to reduce and eventually eliminate the current account deficits by these reforms Uygur (1991).

Table 3-3 Exports by Main Sectors (*)

							(MILLIONS OF $)
	Agriculture	% Share in Total	Mining	% Share in Total	Industry	% Share in Total	Total
1980	1,672	57.4	191	6.6	1,047	36.0	2,910
1983	1,881	32.8	189	3.3	3,658	63.9	5,728
1984	1,749	24.5	240	3.4	5,145	72.1	7,134
1985	1,719	21.6	244	3.1	5,995	75.3	7,958
1986	1,886	25.3	247	3.3	5,324	71.4	7,457
1987	1,853	18.2	272	2.7	8,065	79.1	10,190
1988	2,341	20.1	377	3.2	8,943	76.7	11,662
1989	2,012	17.3	411	3.5	9,170	78.9	11,625
1990	2,249	17.4	326	2.5	10,349	79.9	12,959
1991	2,585	19.0	285	2.1	10,686	78.6	13,593
1992	2,134	14.5	267	1.8	12,286	83.5	14,715
1993	2,292	14.9	233	1.5	12,794	83.4	15,345
1994	2,301	12.7	263	1.5	15,518	85.7	18,106
1995	2,133	9.9	391	1.8	19,089	88.2	21,636
1996	2,153	9.3	369	1.6	20,526	88.4	23,225
1997	2,354	9.0	404	1.5	23,313	88.8	26,261
1998	2,357	8.7	364	1.3	24,065	89.2	26,974
1999	2,058	7.7	385	1.4	23,958	90.1	26,587
2000	1,659	6.0	400	1.4	25,518	91.9	27,775
2001	1,976	6.3	349	1.1	28,826	92.0	31,334
2002	1,754	4.9	387	1.1	33,702	93.5	36,059
2003	2,121	4.5	469	1.0	44,378	93.9	47,253
2004	2,541	4.0	649	1.0	59,533	94.3	63,121

Source: SPO, SIS

Notes: Data is missing belong the years of 1981 and 1982.
   (*) Based On Isic-Rev3 Classification from 1989 Onward

However, successful performance of the exports under the regime of aggressive real devaluation of the TL lasted until 1988. By then, government had shifted its priorities to control inflation with restrictive fiscal and monetary policies. The Central Bank did not intervene to the foreign exchange markets and the TL appreciated in real terms considerably in 1989. Governments did not want to interfere with the appreciation of TL, because they thought that strengthening of

home currency is an opportunity for fighting against inflation. As a result of these efforts imports stagnated during mid-1988 to mid-1989. Another important development in 1989 was further liberalization of the capital account, which was fully liberalized the following year. Switching the regime had significant impact on external balances. Consequently, current account showed surpluses in 1988-1989 by the help of higher than expected increases in tourism earnings and workers remittance as seen in Table 3-4. However, the important thing to note is that by 1989 Turkey had a liberalized and open economy and a rapidly growing private sector (Denizer, Gültekin and Gültekin, 2000).

Table 3-4 Balance of Payments and Foreign Debt, $ Million

Years	Trade Deficit	Tourism Rev. Net	Worker Remittance	Interest Payment	Current Acc. Bal.
1980	-4,999	222	2,071	-1,138	-3,408
1981	-4,231	277	2,49	-1,443	-1,936
1982	-3,065	224	2,14	-1,565	-952
1983	-3,464	292	1,513	-1,511	-1,923
1984	-3,561	271	1,807	-1,586	-1,439
1985	-3,585	770	1,714	-1,753	-1,013
1986	-3,721	637	1,634	-2,134	-1,465
1987	-4,045	1,028	2,021	-2,387	-806
1988	-2,599	1,997	1,776	-2,799	1,596
1989	-5,126	1,992	3,04	-2,907	966
1990	-10,853	2,705	3,246	-3,264	-2,611

Sources: Balance of payments figures are from Ministry of Finance (1980), SPO (1985) and Central Bank, Quarterly Bulletin. Foreign debt figures for the period 1977-80 are from Rodrik (1988) and Celasun and Rodrik (1989); for 1981-1983 from SIS, Statistical Year Book of Turkey, for 1984-90 they are from central Bank, Quarterly Bulletin.

Notes: (1) Export and Import Figures in trade deficit include transit trade but exclude trade in gold.

Import value of Turkey, which was $22.3 billion in 1990, increased to $35.7 billion in 1995, $54.5 billion in 2000 and $116.6 billion in 2005. From the year of 1993 to 1994 imports decreased by almost 21 % due to a crisis in 1994. Imports grew

by 53.5 % from 1994 to 1995 and 22.2 % from 1995 to 1996. Turkey's membership to the World Trade Organization in 1995 and the entrance to the final stage of Customs Union with the European Union in 1996 and the growing economy were reasons of this rapid growth rate of Turkey's imports in these two years (Undersecretariat of Foreign Trade, 2006).

The year 2000 was an important step for the development of Turkey. GNP grew by 6.3 percent and reached almost $ 200 billion[15]. Monthly interest rates on deposits fell sharply at the beginning of the year 2000.[16] TL[17] appreciated in real terms, while Euro depreciated against US Dollar as exhibited in Appendix 3. As a result of these, import increased by almost 34 percent with respect to 1999 and reached $ 54.5 billion.

In the year 2000, the increase in oil prices in international markets caused an increase in import expenditures. Furthermore, rapid appreciation of TL against Euro negatively affected Turkish export especially in textile industry since it encouraged imports from Euro region. All of these negative circumstances almost doubled the trade deficit in the year 2000. As a result, current account deficit affected negatively as indicated in Table 3-5.

After such a steep increase, imports decreased by 24 percent and reached $41.4 billion in the following year because of the economic crisis in November, 2000 and in February, 2001. 2002 and 2003 were the years of recovery after the crisis, when imports and the economy grew together. The increase in imports was 24.5 percent in 2002, 34.5 percent in 2003 and 40.7 percent in 2005. In the year 2005, imports increased by 19.5 percent and reached $116.5 billion. According to Undersecreteriat of Foreign Trade (2006) high rate of increase in private investment,

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[15] Source: TURKSTAT, SPO, OECD
[16] Source: CBRT (Weighted Averages of 1-Month Deposit: Averages of maximum deposit rates as reported by banks to be effective during the month of reporting and weighted by volume of deposits and number of days of maturity.)
[17] Source: CBRT (CPI based real effective exchange rate index is increased in this year. An increase in the index denotes an appreciation.)

refreshed private consumption and revaluation of TL were the cause of the increase of imports in those years.

Table 3-5 Balance of Foreign Trade and Current Account Balance

	(Million $)	
Years	**Balance of Foreign Trade**	**Current Acc. Bal.**
1991	-7,454	250
1992	-8,156	-974
1993	-14,083	-6,433
1994	-5,164	2,631
1995	-14,072	-2,339
1996	-20,402	-2,437
1997	-22,298	-2,638
1998	-18,947	1,984
1999	-14,084	-1,340
2000	-26,728	-9,821
2001	-10,065	3,392
2002	-15,495	-1,524
2003	-22,087	-8,036
2004	-34,373	-15,604
2005	-43,090	-23,031

Source: Table 3-2 for Balance of Foreign Trade and CBRT for Current Account Balance

Tariff rates were reduced in both 1989 and 1990. Low tariff rates threatened domestic producers, because they had only one chance which was to restrain price rises. Otherwise they would go out of business. Consequently, as Celasun (1998) stated tariff reductions combined with currency appreciation led to an import boom and deteriorated the trade balance in 1990. The deficit doubled in 1990 with respect to the previous year. All of these affected current accounts balance negatively and caused a large current account deficit which was also negatively affected by Iraqi crisis. It was the largest deficit since 1980 as seen in table 3-4. Balance of trade grew

by 72.7 percent in 1993 and reached the maximum point before 1994 crisis. From the year 1995 to 2000 balance of trade continued to grow and reached to 11.1% of the GNP in the year 2000.[18] There was a sharp decrease in balance of trade as a consequence of 2001 crisis. Balance of foreign trade has begun to rise again after the 2001 crisis and showed $43 billion deficit in the year 2005.

Table 3-6 Imports by Commodity Groups

							(MILLIONS OF US$)
	Inv. Goods	% Share In Total	Intm. Goods	% Share In Total	Consmp. Goods	% Share In Total	Total
1980	1,581	20.0	6,158	77.9	170	2.2	7,909
1983	1,327	14.4	7,795	84.4	114	1.2	9,235
1984	1,495	13.9	9,039	84.0	223	2.1	10,757
1985	1,830	16.1	9,052	79.8	461	4.1	11,344
1986	2,382	21.4	8,232	74.1	482	4.3	11,105
1987	2,423	17.1	11,044	78.0	690	4.9	14,158
1988	2,662	18.6	11,059	77.1	612	4.3	14,335
1989	2,548	16.1	12,500	79.2	738	4.7	15,792
1990	4,041	18.1	16,154	72.4	2,076	9.3	22,302
1991	4,296	20.4	15,053	71.5	1,575	7.5	21,047
1992	4,826	21.1	16,185	70.8	1,772	7.7	22,871
1993	7,358	25.0	19,403	65.9	2,526	8.6	29,428
1994	5,220	22.4	16,565	71.2	1,381	5.9	23,270
1995	8,119	22.7	25,078	70.2	2,416	6.8	35,709
1996	10,336	23.7	28,736	65.9	4,424	10.1	43,627
1997	11,109	22.9	32,119	66.1	5,052	10.4	48,559
1998	10,624	23.1	29,562	64.4	5,364	11.7	45,921
1999	8,727	21.5	26,854	66.0	4,820	11.9	40,671
2000	11,365	20.9	36,010	66.1	6,928	12.7	54,503
2001	6,940	16.8	30,301	73.2	3,813	9.2	41,399
2002	8,400	16.3	37,656	73.0	4,898	9.5	51,554
2003	11,326	16.3	49,735	71.7	7,813	11.3	69,340
2004	17,397	17.8	67,549	69.3	12,100	12.4	97,540

Source: www.dpt.gov.tr

Notes: (1)   Based on un-broad economic categories (BEC) classification from 1983 onward
(2)   Non-monetary gold included since 2001
Data is missing belong the years of 1981 and 1982. INV. GOODS: Investment Goods, INTM. GOODS : Intermediate Goods, CONSMP. GOODS : Consumption Goods

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[18] Data is obtained from SPO, SIS and it includes shuttle trade.

During 1980-2004 periods, a share of intermediate goods in total was greater than shares of other commodity groups as indicated in Table 3-6. The share of intermediate goods in total imports was 77.9 % in 1980. This rate was recorded at 73.2 % in 2001. In the year 2002, it decreased slightly. However, the decrease continued in the year 2003 and 2004. Then as of 2004 share of intermediate goods in imports is 69.3 %.

One of the main developments in 1990s was the increase in the import of consumption goods. Import of consumption goods increased sharply in the period of 1995-2000 due to the World Trade Organization (WTO) membership and entering the final stage of customs union with European Union. The imports of consumer goods increased by 59.5 % in 2003 and almost 55 % in 2004 related with the economic recovery after the crisis periods and rising income levels (Undersecreteriat of Foreign Trade, 2006).

During 1980-2004 periods, a share of investment goods in total was greater than shares of consumption goods whereas lower than share of intermediate goods. Imports of investment goods increased sharply in the period of 1980-1995 and in 1995 it reached $ 8,119 millions. Between 1995 and 2002 investment goods imports increased at lower rate compared to total imports, while the trend changed in 2003. It was recorded $ 17,397 millions.

CHAPTER 4

ANALYSIS OF THE RELATIONSHIP BETWEEN
EXCHANGE RATE EXPOSURE AND STOCK RETURNS

4.1   Hypothesis

A higher income induces a higher money demand relative to supply, and this causes an increase in interest rates. A higher interest rate causes a capital inflow, and hence a stronger currency. However, an appreciation of home currency makes exporting goods more expensive in terms of foreign currency. This may lead to a decline in foreign demand, foreign sales revenue or both. The positive association between GDP changes and exchange rate movements is directly relevant to dual-effect hypothesis. Pritamani, Shome, and Singal (2004) argue that for exporting firms negative effects of a strengthening home currency are at least partially offset by the gains in the stronger domestic economy. Similarly the benefits of a weakening home currency in the foreign markets are at least partially offset in the weaker domestic market. Thus, the exchange rate exposure coefficient for exporting firms is expected to be insignificant, on average due to a dual effect hypothesis that suggests the offsetting foreign and domestic market effects for exporting firms. Following Pritamani, Shome, and Singal (2004), dual effect hypothesis for Turkish exporting and non-exporting firms is tested, in this analysis.

H_0 : The exchange rate exposure coefficient for Turkish exporting firms is zero.

H_1 : The exchange rate exposure coefficient for exporting firms is significantly different from zero.

Previous empirical studies such as Jorion (1990), He and Ng (1998), Ihrig (2001), Fraser and Pantzalis (2004) add returns on a value-weighted market index as the control variable in order to control macroeconomic effects and thereby isolating the firm-specific exposure. Bodnar and Wong (2000) explain that the value-weighted market index is dominated by large firms that are more likely to be multinational

and/or export oriented. These large firms experience more negative cash flow reactions to home currency appreciations than other firms. Thus, including the value-weighted market return index in an exposure test not only removes the macroeconomic effects from the exposure estimates, but also a more negative cash flow effects of the larger firms. Consequently, test results are expected to be insignificant for exporting firms. It means no exposure. Validity of Bodnar and Wong's (2000) argument for Turkish exporting firms can be tested by the following hypothesis:

H_0 : When a value-weighted market index is used as the control portfolio, exchange rate exposure coefficient estimates are expected to be zero for Turkish exporting firms.

H_1 : When a value-weighted market index is used as the control portfolio, exchange rate exposure coefficient estimates for exporting firms are significantly different from zero.

4.2   Sample

In order to examine foreign exchange rate exposure of Turkish firms, a sample is constructed from 143 firms whose stocks are traded in Istanbul Stock Exchange in 2005. These firms take part in an ISE National Industry Index. Firms are divided into two categories according to their export ratio. The export ratio is calculated as the company's exports divided by its annual total sales. A total sale is the sum of the foreign sales and domestic sales. Export ratio data are drawn from consolidated and unconsolidated financial statements published at the end of 2005.

Exporters (E) are firms that have at least 10% of their total sales in foreign countries. Foreign sales include exports as well as goods produced and sold overseas. This ratio is determined based on Jorion (1990) and He and Ng (1998).

Non-exporters are the firms with insignificant foreign trade, typically less than 10%. Non-exporters also include pure domestic firms which make only domestic sales.

The firms that do not fall into above categories are excluded from the analysis. These are financial institutions, holding firms and foreign firms as in most studies. Pritamani, Shome and Singal (2004) exclude both oil and metal firms because they either trade or are heavily dependent on internationally traded commodities priced in dollars. In addition to these firms they also exclude airlines. Jorion (1990) also excludes oil firms. Consequently, oil firms, metal processors and airlines are also excluded from the analysis following Pritamani, Shome and Singal (2004) and Jorion (1990). Furthermore, there is no available data for some firms for the sample period, and also there are some firms that the volume of foreign sales in YTL is not available in financial statements. When all of these firms are excluded, 117 firms remain in the sample. Table 4-1 indicates categories along with number of firms in each category. It also indicates the average export ratio and the standard deviation of export ratio for exporters and non-exporters.

Table 4-1 Distribution of Sample Firms

	No. Of firms	Export Ratio	Average Export Ratio	Std. Deviation
Exporters	74	>= 10%	39.34%	0.2109
Non-Exporters	43	<10	3.72%	0.0337

In addition to the firm level analysis, a portfolio level analysis is also done. Equally-weighted portfolio is constituted for 74 exporting and 43 non-exporting firms respectively.

4.3   Methodology

In order to measure Turkish firms' exchange rate exposure Adler and Dumas's (1984) model which describes the exposure elasticity of the firm for a given unit change in the exchange rate is used. The exposure elasticity of the firm is measured by the coefficient on the exchange rate variable in the following regression:

$$R_{i,t} = \beta_{0,i} + \beta_{1,i}\Delta s_t + \varepsilon_{i,t} \qquad (1)$$

where R_{it} is the return on firm i at time t, Δs_t is the change in the value of the CPI based real effective exchange rate index, $\beta_{1,i}$ measures firm i's exposure to exchange rate movements after taking into account the overall market's exposure to currency fluctuations, and $\varepsilon_{i,t}$ is the random error. An increase in the foreign exchange rate index denotes an appreciation.

Then, another macro economic variable which is the return to a market portfolio is added to the regression equation (1) to control for the common macro economic influences on the total exposure elasticities following Jorion (1990). Most researchers like He and Ng (1998), Fraser and Pantzalis (2004) and Bodnar and Wong (2000) include the market return in their empirical models. For each firm in the sample, exchange-rate exposure is estimated by regressing the stock return on the market return and exchange rate movement. Thus, exposure can be measured by the following regression model:

$$R_{i,t} = \beta_{0,i} + \beta_{1,i}\Delta s_t + \beta_{2,i}R_{m,t} + \varepsilon_{i,t} \qquad (2)$$

where $R_{m,t}$ is the return on market portfolio and $\beta_{2,i}$ is the firm's market beta. Explanation of other variables and coefficients are same as above. An increase in the foreign exchange rate index denotes an appreciation. Therefore, it is expected to find negative exposure coefficients following Jorion (1990) and Bartov and Bodnar (1994). It means that an appreciation of YTL makes exporting goods more expensive

in terms of foreign currency, and this may lead to a fall in foreign demand, foreign sales revenue, or both. As a result stock return of an individual firm will decline.

Investors have difficulties describing the relationship between changes in home currency and firm performance and value because of mispricing. Extent of mispricing should be reduced and there are two alternatives. First, investors learn the full impact of changes in home currency on firm value measured by market value of equity only in the case when they obtain the information about the past performance of the firm. This leads to a lagged relation between changes in home currency and firm value. Second, obtaining more time series data as the market and gaining more experience with this relation. By this way the importance of the lagged relation decreases while contemporaneous relation increases.

Bartov and Bodnar (1994) and Amihud (1994) suggest that lagged changes in the home currency demonstrate a significant effect on abnormal stock performance. Because financial information is generally released to the public with a time lag, so the effects of exchange rate changes on companies' cash flows takes a long time. He and Ng (1998) analyze this effect on Japanese multinationals, but they find very little evidence. Fraser and Pantzalis (2004) make analysis on US multinationals, and they also find smaller number of firms with significant exposure according (relative) to the number of firms that are significantly exposed to contemporaneous changes in exchange rates. In this analysis, it is examined that whether such an effect can be generalized to Turkish exporting firms. Following Amihud (1994) and Bartov and Bodnar (1994) in order to examine this effect, a lagged component is added to the regression and the new regression equation becomes as below:

$$R_{i,t} = \beta_{0,i} + \beta_{1,i}\Delta s_t + \beta_{2,i}\Delta s_{t-1} + \beta_{3,i}R_{m,t} + \varepsilon_{i,t} \qquad (3)$$

where, the parameter $\beta_{2,i}$ measures the effect of lagged exchange rate changes on stock returns and Δs_{t-1} the change in the one-period lagged value of the CPI based real effective exchange rate index. Other variables are the same as the above equation (2).

Although regression analysis deals with dependence of one variable on other variables, it does not necessarily imply causation. Therefore, existence of causality relation between exchange rates and stock returns and the direction of this relation are also observed in this analysis. In order to answer these questions the Granger causality test is used. It should be noted that Granger causality test is very sensitive to the number of lags used in the analysis (Gujarati, 1995: 623). The test involves estimating the following regressions.

$$R_t = \sum_{i=1}^{n} \alpha_i \Delta s_{t-i} + \sum_{j=1}^{n} \beta_j R_{t-j} + u_{1t} \qquad (4)$$

$$\Delta s_t = \sum_{i=1}^{m} \lambda_i \Delta s_{t-i} + \sum_{j=1}^{m} \delta_j R_{t-j} + u_{2t} \qquad (5)$$

Equation (4) postulates that current stock return R is related to the past values of R itself as well as of Δs, and equation (5) postulates a similar behaviour for Δs_t.

4.4   Variable Description and Data Sources

Ordinary least squares regression is used to estimate regression equations. Equation 1 is estimated using monthly data for the sample period. Data for the dependent variable, measured as the individual firm's monthly stock returns are obtained from Istanbul Stock Exchange (ISE). Data for the independent variable, measured as the rate of return on a market portfolio are obtained from the Central Bank of The Republic of Turkey. However the original data source is the ISE. ISE National 100 index is used as a proxy for the market index. ISE National 100 Index which is the main index of Istanbul Stock Exchange is composed of National market firms, and it should be noted that it is a value-weighted market index.

Monthly data for the other independent variable, measured as the change in the relevant exchange rate are also obtained from the Central Bank of The Republic of Turkey. Yamak and Korkmaz (2005) attempt to determine the effect of real exchange rate on the trade balance for the Turkish economy by regarding to different

commodity groups. Özbay (1999) investigates the possible effects of exchange rate uncertainty on exports. And they all use the trade weighted real exchange rate based on Consumer Price Index (CPI). Therefore, CPI based real effective exchange rate index is used in the analysis following Yamak and Korkmaz (2005) and Özbay (1999). CPI based real effective exchange rate index is calculated using the IMF weights for 19 countries including Germany, US, Italy, France, UK, Japan, Netherlands, Belgium, Switzerland, Austria, Spain, Canada, Korea, Sweden, Taiwan, Iran, Brazil, China and Greece. 1995 is the base year and the base value is 100. It is calculated by the Turkish Central Bank, so data for the dependent variable, as measured as the foreign exchange rate index, are obtained from Turkish Central Bank. Real effective exchange rate is preferred because of an existence of high inflation rates in the Turkish economy.

The starting date and the ending date of the sample have been determined according to the data availability. The data for CPI based real effective exchange rate index starts from January, 1980 whereas the data for the return indices of ISE National 100 Index start from 2nd of January, 1997. They all lie down up to now, but the last date for the stock returns is September, 2005. There are also missing values for some firms during the period 1997-1999. Therefore, the sample period is determined to be between January, 1999 and September, 2005. Two sets of this data set are analyzed for exporting firms: the full data set consisting of all monthly values of variables and the subset covering the financial crisis from 2000 to 2002. The analysis is done for non-exporting firms are only for the whole period.

4.5   Empirical Findings

Regression equation (1) is estimated for the ***portfolio returns*** of exporting firms in moth *t* against the rate of change in real effective exchange rate index in month *t* and the results are indicated in Table 4-2. For the sample of exporting firms, significance of the coefficient of the exchange rate variable is tested by using Student's t distribution and p values. In Table 4-2, estimated standard errors of the regression coefficients, estimated t values and the estimated p values are exhibited.

Thus, for 79 (81-2=79) df the probability of obtaining a t value of -0.330566 or smaller is 0.74180.[19] Therefore if the null hypothesis is rejected, the probability of committing a **type 1** error is about 74 in 100.[20] It is a very high probability indeed. Consequently it can be said that the null hypothesis which is the exchange rate exposure coefficient for Turkish exporting firms is zero can not be rejected.

Table 4-2 Test Results of Regression Equation (1) for Exporting Firms

Dependent Variable: STOCKRET
Method: Least Squares
Sample: 1999:01 2005:09
Included observations: 81

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.87730	1.72409	2.82891	0.00590
EXCHRATE	-0.12010	0.36333	-0.33057	0.74180
R-squared	0.00138	F-statistic		0.10927
Adjusted R-squared	-0.01126	Prob(F-statistic)		0.74185

Estimation has been performed with EVIEWS 3.0.

Adjusted R-squared is denoted by $\bar{R}^2$. $\bar{R}^2 = 1 - (1 - R^2)(n - 1)/(n - k)$, so $\bar{R}^2$ can be negative, although R^2 is necessarily nonnegative.

Overall significance of the observed or estimated regression line which is whether portfolio return is linearly related to exchange rate can be tested by using the F-test. If 5 percent level of significance is used, the critical F value (F-table value) for 1 (2-1=1) and 79 (81-2=79) df is between 3.92 and 4.00 (3.92 < $F_{0.05}$ (1,79) < 4.00).[21] Obviously the computed F value which is 0.10927 is smaller than the critical F value. Thus F value is insignificant at 5% level. Thus, if the null hypothesis is rejected, the probability of committing a type 1 error is about 74.185%. It is a very high probability indeed. In conclusion, it can be said that null hypothesis can not be rejected.

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[19] Df: The term number of degrees of freedom means the total number of observations in the sample (=n) less the number of independent (linear) constraints or restrictions put on them. (df = n – k) (Gujarati, 1995; 70)
[20] **Type 1** error- the probability of rejecting the true hypothesis. (Gujarati, 1995: 131)
[21] (k-1) is the numerator df and (n-k) is the denominator df (Gujarati, 1995: 247)

According to Table 4-2 regression equation (1) can be rewritten as below.

$$R_{i,t} = 4.87730 - 0.12010\Delta s_t$$

The interpretation of above regression equation is as follows: If Δs_t is zero, portfolio return will be 4.87730. The partial regression coefficient -0.12010 means that if exchange rate declined by 1%, portfolio return will decrease by 0.12010 %.

The R-squared value is 0.138 %. It means that about 0.138 percent of the variation in portfolio return is explained by the variation in exchange rate. The R-squared value is very low. Therefore, another independent variable which is called the market return is added to the regression equation (1), and the regression equation (2) is tested.

Table 4-3 indicates the results from the regression equation (2) at the **portfolio level** for exporting firms using a control variable which is the return on the value-weighted market index. Significance of the coefficient of the exchange rate variable is tested by using Student's t distribution and p values. If $\alpha = 5\%$, that is 95% confidence coefficient, then the t-table shows that for 78 df the critical value is between -1.980 and -2.000 ($-2.000 < t_{\alpha/2} = t_{0.025} < -1.980$). The calculated t value of this variable is -0.57169. -0.57169 is bigger than the critical value, so we do not reject Ho which says that when a value-weighted market index is used as the control portfolio, exchange rate exposure coefficient estimates are zero for Turkish exporting firms. Furthermore, for 78 df the probability of obtaining a t value of -0.57169 or smaller is 0.56920. Therefore, if the null hypothesis is rejected, the probability of committing a **type 1** error is about 57 in 100. It is a very high probability indeed.

Finally, according to the test results it can be said that when the control portfolio is the value-weighted market index the exposure coefficient estimates are insignificant for exporting firms at 5% level.[22] Contrary to exchange rate exposure

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[22] Results remain unchanged if $\alpha = \%10$ and $\alpha = \%50$. T- table: ($-1.671 < t_{\alpha/2} = t_{0.05} < -1.658$) and

coefficient, coefficient of the market portfolio is significantly positive for exporting firms at the 1 % level since the calculated t value of this variable is higher than the critical value and also p value is zero percent.

Table 4-3 Test Results of Regression Equation (2) for Exporting Firms

Dependent Variable: STOCKRET
Method: Least Squares
Sample: 1999:01 2005:09
Included observations: 81

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.64074	0.84568	1.94015	0.05600
MRKTRET	0.77057	0.04696	16.40852	0.00000
EXCHRATE	-0.09908	0.17331	-0.57169	0.56920
R-squared	0.77568	F-statistic		134.85990
Adjusted R-squared	0.76993	Prob(F-statistic)		0.00000

Estimation has been performed with EVIEWS 3.0.

Up to now the significance of the estimated partial regression coefficients is tested by using t-test. From now on, overall significance of the observed or estimated regression line, that is whether portfolio return is linearly related to both market return and exchange rate, will be tested by using the F-test. If 5 percent level of significance is used, the critical F value (F-table value) for 2 (3-1=2) and 78 (81-3=78) df is between 3.07 and 3.15 ($3.07 < F_{0.05}$ (2,78) < 3.15). Obviously the computed F value which is 134.8599 is higher than the critical F value. Thus F value is significant. If the level of significance is assumed to be 1%[23], F value is still significant and the null hypothesis can still be rejected. The same result can be obtained by taking into account the probability of F-statistic. Therefore, if the null hypothesis is rejected, the probability of committing a type 1 error is zero percent. In conclusion, it can be said that portfolio return depends on market return and exchange rate.

($-0.677 < t_{\alpha/2} = t_{0.25} < -0.679$)
[23] The critical F value for (2,78) df at 1% level: ($4.79 < F_{0.01}$ (2,78) < 4.98)

According to Table 4-3 regression equation (2) can be rewritten as below:

$$R_{i,t} = 1.64074 - 0.09908\Delta s_t + 0.77057 R_{m,t}$$

The interpretation of above regression equation is as follows: If Δs_t and $R_{m,t}$ are both fixed at zero, portfolio return will be 1.64074. The partial regression coefficient -0.09908 means that holding $R_{m,t}$ constant and if home currency appreciates by 1%, portfolio return will decrease by 0.09908 %. If the change in exchange rate is held constant, portfolio return is estimated to increase 0.77057 % per month due to an increase in market return by 1 %.

The R-squared value of 0.77568 shows that the two explanatory variables explain about 78 percent of the variation in portfolio return over the sample period. The adjusted R-squared shows that after taking into account the df, exchange rate and market return explain about 77 percent of the variation in portfolio return. When the R^2 values of regression equation (1) and (2) are compared, R^2 value of regression equation (2) is so high according to regression equation (1).[24] This is the result of adding the market return variable.

Regression equation (2) is also tested for non- exporting firms in order to put forth whether the exchange rate exposure coefficient estimates are significant for non-exporting firms at portfolio level. Results are indicated in Table 4-4. For the sample of non-exporting firms, portfolio return is positively correlated with contemporaneous changes in exchange rates. 1% appreciation of YTL causes 0.06745 % increase in the portfolio return. Exposure coefficient is still insignificant at 5 % level. Because the calculated t value of this variable is 0.36194 and it is smaller than the critical value (for 78 df, $1.980 < t_{\alpha/2} = t_{0.025} < 2.000$). Furthermore, portfolio returns are positively correlated with market return. T-calculation $(15.78116) >$ T-table $(1.980 < t_{\alpha/2} = t_{0.025} < 2.000)$ and so the correlation is

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[24] It should be noted that in order to compare two R^2 values, the sample size n and dependent variable must be the same. (Gujarati,1995: 209)

statistically significant at 5 % level. If market return increases 1 %, portfolio return will increase by 0.79696 %.

Table 4-4 Test Results of Regression Equation (2) for Non-Exporting Firms

Dependent Variable: STOCKRET
Method: Least Squares
Sample: 1999:01 2005:09
Included observations: 81

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.73656	0.90941	1.90954	0.05990
MRKTRET	0.79696	0.05050	15.78116	0.00000
EXCHRATE	0.06745	0.18637	0.36194	0.71840
R-squared	0.76155	F-statistic		124.55270
Adjusted R-squared	0.75543	Prob(F-statistic)		0.00000

Estimation has been performed with EVIEWS 3.0.

As seen in below Table 4-4, calculated F value which is 124.55270 is higher than the critical F value which is between 3.07 and 3.15. In addition, probability of (F-statistic) is zero. According to these results, it can be said that F-statistic is significant. Namely, portfolio return is linearly related to both market return and exchange rate.

The R-squared value of 0.76155 shows that the market return and exchange rate variables explain about 76 percent of the variation in portfolio return over the sample period. The adjusted R-squared value is 0.75543.

Regression equation (2) is estimated for each individual firm separately for the study period. Table 4-5 indicates the results of the regression of stock returns for exporting and non-exporting firms in moth t against the rate of change in real effective exchange rate index in month t. Regressions at the individual firm level show statistically significant negative exposure for only 12.16 % (9 out of 74 firms)

of the firms in a two-tailed t-test at 10 %significance level while 6.76 % (5 out of 74 firms) of firms at 5% significance level when CPI based real effective exchange rate index is used to measure exchange rate changes. Also, 5.41 % (4 out of 74 firms) of the firms show statistically significant positive exposure at 10 % significance level while 4.05 % (3 out of 74 firms) of the firms at 5 % significance level. The majority of firms with significant exposure have negative exposure coefficients β_1. This suggests firms' stock returns decreases (increases) when YTL appreciates (depreciates). Obtaining positive β_1 suggest that there are exceptions. These firms benefit when YTL appreciates. The reason for this observed phenomenon cannot be explored, because information that helps to distinguish net-exporters from net-importers cannot be obtained.

As seen in Table 4-5, number of non-exporting firms with significant exposure at both 5 % level and 10 % level is lower relative to number of exporting firms. The results of regression equation (2) for non-exporting firms reveal an even distribution of exposure with respect to the signs of the coefficients. Only 13.95 % (6 out of the 43 firms) of the firms exhibit statistically significant exposure at 10 % level and 9.30 % (4 out of the 43 firms) of the firms exhibit statistically significant exposure at 5 % level.

Table 4-5 Estimates of Exchange Rate Exposure, β_1

(January, 1999 - September, 2005)

$R_{i,t} = \beta_{0,i} + \beta_{1,i}\Delta s_t + \beta_{2,i}R_{m,t} + \varepsilon_{i,t}$	Firms	β_1			
		N -	%	N +	%
Significance, number of exporting firms with significant exposure at 5 % level	74	5	6.76%	3	4.05%
Significance, number of exporting firms with significant exposure at 10 % level	74	9	12.16%	4	5.41%
Significance, number of non-exporting firms with significant exposure at 5 % level	43	2	4.65%	2	4.65%
Significance, number of non-exporting firms with significant exposure at 10 % level	43	3	6.98%	3	6.98%

Estimation has been performed with SPSS 10.0 for Windows.

Exposure coefficients estimated using ordinary least squares (OLS): $R_{i,t} = \beta_{0,i} + \beta_{1,i}\Delta s_t + \beta_{2,i}R_{m,t} + \varepsilon_{i,t}$ where R_i is the return on firm i, Δs is the change in the relevant exchange rate (CPI based real effective exchange rate index is used. An increase in the index denotes an appreciation.) β_1 is the exchange rate exposure coefficient. R_m is the return on market portfolio. (Value weighted market index is used as proxy for market.) Monthly data are obtained. The sample includes 74 exporting firms and 43 non-exporting firms. Exporting firms' exports form at least 10 % of their annual total sales. Sample period starts in January, 1999 and ends in September, 2005.

Subset covering the financial crisis from 2000 to 2002 is also constituted. Table 4-6 shows the results of the regression equation (2) of stock returns for exporting and non-exporting firms covering the period of 2000-2002. 5.41 % (4 out of 74 firms) of exporting firms show statistically significant negative exposure at 5 % level, and none of the firms have significant positive exposure at this significance level. Number of firms with significant negative exposure is increased to 5 (6.76 %) while number of firms with significant positive exposure is increased to 2 (2.70 %) at 10% significance level. Only 11.63 % (5 out of 43 firms) of the firms exhibit statistically significant exposure at 10 % level and 6.98 % (3 out of 43 firms) of the firms exhibit statistically significant exposure at 5 % level. Most of these firms have significant negative exposure coefficient.

Table 4-6 Estimates of Exchange Rate Exposure, β_1 (2000 - 2002)

	Firms	β_1			
$R_{i,t} = \beta_{0,i} + \beta_{1,i}\Delta s_t + \beta_{2,i}R_{m,t} + \varepsilon_{i,t}$		N -	%	N +	%
Significance, number of exporting firms with significant exposure at 5 % level	74	4	5.41%	0	0.00%
Significance, number of exporting firms with significant exposure at 10 % level	74	5	6.76%	2	2.70%
Significance, number of non-exporting firms with significant exposure at 5 % level	43	2	4.65%	1	2.33%
Significance, number of non-exporting firms with significant exposure at 10 % level	43	3	6.98%	2	4.65%

Estimation has been performed with SPSS 10.0 for Windows.

As seen in Table 4-7, when the regression equation (3) is tested, only 6.76 % (5 out of 74 firms) of firms have significant exposure at 10% level to past changes in exchange rates. Four out of five firms have negative exposure coefficients while one of them has positive exposure coefficient. In addition, 4.05 % (3 out of 74) of the firms have significant exposure at 5 % level to past changes in exchange rates. Two of those firms have negative exposure coefficient while one of them has positive exposure coefficient. Furthermore, adding Δs_{t-1} to the regression equation (2) has negative effect on the stocks' exposure to current exchange rate fluctuations since the number of firms with significant exposure coefficients (β_1) decrease according to the test results in regression equation (2). Also, lagged response of stock returns to exchange rate changes is analyzed for non-exporting firms. Only 4.65 % (2 out of 43 firms) of firms have significant exposure at 10% significance level to past changes in exchange rates. All of them have positive exposure. There is no firm that has significant exposure at 5% significance level.

Table 4-7 Estimates of Exchange Rate Exposure, β_1 and Lagged Exchange Rate Exposure, β_2

	Firms	β_1		β_2	
		N -	N +	N -	N +
$R_{i,t} = \beta_{0,i} + \beta_{1,i}\Delta s_t + \beta_{2,i}\Delta s_{t-1} + \beta_{3,i}R_{m,t} + \varepsilon_{i,t}$					
Significance, number of exporting firms with significant exposure at 5% level	74	1 (1.35%)	2 (2.70%)	2 (2.70%)	1 (1.35%)
Significance, number of exporting firms with significant exposure at 10% level	74	3 (4.05%)	4 (5.41%)	4 (5.41%)	1 (1.35%)
Significance, number of non-exporting firms with significant exposure at 5% level	43	1 (2.33%)	2 (4.65%)	0 (0.00%)	0 (0.00%)
Significance, number of non-exporting firms with significant exposure at 10% level	43	1 (2.33%)	3 (6.98%)	2 (4.65%)	0 (0.00%)

Estimation has been performed with SPSS 10.0 for Windows.

Additionally, it should be noted that firms showing significant lagged exposure are not necessarily the same firms that exhibit contemporaneous exposure.

Granger causality test is used to find out the presence of the causality between stock return and exchange rate for exporting firms for the sample period. One lagged values of the two variables are used.[25] Table 4-8 reports the F-statistic and probability values constructed under the null hypothesis of noncausality.

Table 4-8 Granger Causality Test Results for Exporting Firms

Null Hypothesis:	Obs	F-Statistic	Probability
EXCHRATE does not Granger Cause STOCKRET	80	1.53657	0.21889
STOCKRET does not Granger Cause EXCHRATE		16.0609	0.00014

Estimation has been performed with EVIEWS 3.0.

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[25] Note: Computed F value is decreasing when the number of lags increases.

These results suggest that the direction of causality is from stock return to exchange rate since the estimated F value is significant at the 5 % level; computed F value exceeds the critical F value which is between 3.92 and 4 (for 1,78 df)[26]. Therefore, the null hypothesis which says that stock return does not Granger cause exchange rates is rejected. However there is no reverse causation from exchange rate to stock return since computed F value is smaller than the critical F value. It means that the computed F value is statistically insignificant. In this case null hypothesis which says that exchange rate does not Granger cause stock return cannot be rejected. However, Kasman (2003) finds change in exchange rate causes, in Granger sense, change in industry sector index.

For non- exporting firms again one-way causality is found from stock return to exchange rate according to F-statistic as indicated in below Table 4-9. For the first null hypothesis calculated F value is 0.84 which is smaller than the critical F value which is between 3.92 and 4 (for 1,78 df) at 5% level. Therefore, the null hypothesis which says that stock return does not Granger cause exchange rates cannot be rejected. However, the second null hypothesis which says that the stock return does not Granger Cause exchange rate can be rejected according to F-statistic. Because calculated F value (15.88) is higher than the critical F value which is between 3.92 and 4 (for 1,78 df) at 5% level.

Table 4-9 Granger Causality Test Results for Non-Exporting Firms

Null Hypothesis:	Obs	F-Statistic	Probability
EXCHRATE does not Granger Cause STOCKRET	80.00	0.84	0.36
STOCKRET does not Granger Cause EXCHRATE		15.88	0.00

Estimation has been performed with EVIEWS 3.0.

In sum, the univariate regression equation (1) is estimated at the portfolio level and the results are presented in Table 4-2. According to the test results, the first hypothesis which is the exchange rate exposure coefficient for Turkish exporting

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[26] (m) is the numerator of df and (n-k) is the denominator of df. (m) is equal to number of lags. (Gujarati,1995: 621)

firms is zero cannot be rejected. Then, another macro economic variable which is the market return is added to the regression equation (1) to control for the common macro economic influences on exposure and the new regression equation (2) is estimated again at portfolio level. However exchange rate exposure coefficient is still insignificant. Thus, the second hypothesis which says when a value-weighted market index is used as the control portfolio, exchange rate exposure estimates are zero for Turkish exporting firms cannot be rejected. Regression equation (2) is also estimated at the firm level. Weak evidence is found between the contemporaneous changes in exchange rates and stock returns of exporting and non exporting firms. Whether the effect of lagged exchange rate changes has any explanatory power on current stock returns is investigated at the firm level for exporting and non exporting firms and results are presented in Table 4-7. It can be said that exposure coefficient is still insignificant. Finally, Granger Causality Test is performed. As a result of Granger Causality Test, one-way causality is found from stock return to exchange rate for both exporting and non-exporting firms.

CONCLUSION

Management of foreign exchange rate exposure centres on the concept of hedging which is a process protecting the firms from unanticipated changes in exchange rates. As businesses become increasingly global, more and more firms find it necessary to pay careful attention to foreign exchange exposure and to design and implement appropriate hedging strategies. Investors and managers are interested in foreign exchange exposure in order to make their financial decisions such as risk management.

The literature mostly reports insignificant negative exchange rate exposure coefficient for multinationals and exporting firms. In this study, it is examined whether such an effect can be generalized to Turkish exporting firms.

The aim of this study is to measure foreign exchange exposure of Turkish firms whose stocks are traded in Istanbul Stock Exchange over the period of January, 1999 – September, 2005. Therefore, 143 firms that take part in ISE National Industry Index in 2005 are selected. 36 firms are eliminated because of missing data; as a result 117 firms remain in the sample. Firms are divided into two categories as exporters and non-exporters according to their export ratio. 74 firms whose foreign sales level is at least 10% of total sales in the year of 2005 is defined as exporter, and remaining 43 firms is defined as non-exporters. Non-exporters include the firms with insignificant foreign trade, typically less than 10% and also pure domestic firms which make only domestic sales.

Monthly data is used to estimate the exchange rate sensitivity of stocks over the period of January, 1999 – September, 2005. ISE National 100 index and the CPI based real effective exchange rate index are used in the analysis. ISE National 100 index is a value-weighted market index and CPI based real effective exchange rate index is a trade-weighted exchange rate index. CPI based real effective exchange rate index is preferred because of high inflation rates in Turkish economy. Firm's stock returns are obtained from ISE while ISE market return and CPI based real effective

exchange rate index are obtained from Central Bank of The Republic of Turkey. Two sets of this data set are analyzed: full data set and the subset covering the financial crisis from 2000 to 2002. Ordinary Least Square Regression is used in estimations.

Two types of analysis are conducted. First, real effective exchange rate sensitivity of stock returns of exporting firms is measured at portfolio level. For the portfolio of exporting firms, exchange rate exposure coefficient is insignificant and has a negative sign. Therefore, the null hypothesis which is the exchange rate exposure coefficient for Turkish exporting firms is zero can not be rejected. This result is consistent with the dual effect hypothesis of offsetting domestic and foreign market effects for exporting firms. In detail, appreciation of YTL makes exporting goods more expensive in terms of foreign currency. This may lead to a decline in foreign demand, foreign sales revenue or both; as a result value of the firm will reduce. It makes a negative effect on stock returns. Negative sign of exchange rate coefficient is the indicator of this negative effect. On the other hand, appreciation of home currency is the outcome of strong domestic economy according to the monetary theory of exchange rates. Strong economy causes an increase in domestic demand. In conclusion, when YTL appreciates, foreign demand will decline due to a high export price, but this reduction is offset by an increased in domestic demand in a strong domestic economy.

In the following analysis another macro economic variable which is the market return is added to the first regression equation to control for the common macro economic influences on the exposure elasticities. The second regression equation is tested again at portfolio level for exporting firms. Results are similar with the first regression equation results. Namely, exchange rate exposure coefficient is found negatively insignificant when the Student's t distribution is used. Therefore, second hypothesis which is the exposure coefficient estimates are expected to be zero for Turkish exporting firms when a value-weighted market index is used as the control portfolio can not be rejected.

Second regression equation is also tested for non- exporting firms in order to put forth whether the exchange rate exposure coefficient estimates are significant for non-exporting firms at portfolio level. The result does not change. When the Student's t distribution is used, exchange rate exposure coefficient is found insignificant, but this time it is positive. Positive relationship shows that when YTL appreciates, stock returns will increase. It is consistent with expectations, because non-exporting firms include importing firms. When YTL appreciates, price of imports will be cheaper, so imports will increase. Appreciation of YTL favorably affects the firm which makes imports.

Second regression is also estimated at firm level for exporting and non-exporting firms. Regression at the individual firm level show statistically significant negative exposure for only 12.16% (9 put of 74 firms) of the exporting firms and positive exposure for only 5.41% (4 out of 74) of the exporting firms at a 10% significance level. These rates are smaller at a 5% significance level, but number of firms with significant negative exposure is sill more than the number of firms with significant positive exposure. The firms which heavily make exports can also make imports, but net exporters are not distinguished from net importers in this analysis. Therefore, there are some firms with significant positive exposure. The results of the second regression for non-exporting firms reveal an even distribution of exposure with respect to the signs of the coefficients.

Subset covering the financial crisis from 2000 to 2002 is also constituted. Analysis is made for both exporting and non-exporting firms. But results are similar with the results obtained from the full data set. It is consistent with Kasman (2003). She also finds similar results in two subsets that covering two the financial crisis.

Lagged response of stock returns to exchange rate change is also analyzed with using the third regression. Because financial information is generally released to the public with a time lag, so the effects of exchange rate changes on companies' cash flows takes a long time. There are opposite opinions and results about this topic in literature. Some of the researchers find strong evidence whereas some of them find

weak evidence as He and Ng (1998) and Fraser and Pantzalis (2004). Only 6.76 % (5 out of 74 firms) of the exporting firms show statistically significant exposure whereas only 4.65% (2 out of 43 firms) of the non-exporting firms show statistically significant exposure at 10% significance level. At 5% significance level, none of the non-exporting firms have significant exposure. As a result, effect of lagged changes is weak on stock returns of exporting and importing firms.

Many investors in Turkey believe that any change in exchange rates will cause a change in stock returns. Namely, if exchange rate (YTL/$) starts to increase, investors expect a decrease in stock returns, and so they prefer to sell their stock to buy a foreign currency. But statistical evidence in this thesis does not support this belief, because weak evidence is found between the real effective exchange rate changes and the stock returns. Therefore, in order to find the causality relationship between these variables and to find the direction of causality, Granger causality test is performed. Interesting evidence is found. The result indicates that one-way causality exists from stock returns to exchange rate. Namely, changes in stock returns affect the exchange rates. It can be also the cause of the insignificant exposure coefficient.

Actually, this result is not surprising, because proportion of foreign investors in ISE is increasing from year to year. In 2003, the proportion of foreign investors in volume of trade is 9%; this rate increased to 13% in 2004 and reached 21% in 2005. On the other hand, the average day which they keep the stocks in reserve is decreasing continuously. For example, they keep the stock in reserve averagely 213 days in 2003, 207 days in 2004 and 196 days in 2005.[27] These movements affect exchange rates negatively.

For further research, another macro economic variable as interest rates should be added to regression equation to control for the common macro economic influences on the total exposure elasticities. Exchange rate exposure might be measured at ISE Stock Indices level.

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[27] www.tspakb.org.tr

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APPENDIX

Appendix 1: Effective Exchange Rates (Selling)

Date	Euro	US Dollar	Yen	Pound Sterling
2-Jan	1,215,609	1,374,535	10,398	1,971,574
2-Feb	1,178,980	1,355,253	10,173	1,927,120
2-Mar	1,192,126	1,362,298	10,410	1,937,347
2-Apr	1,169,381	1,322,890	10,114	1,905,238
2-May	1,276,572	1,394,987	11,042	2,035,888
2-Jun	1,458,277	1,529,897	12,407	2,265,452
2-Jul	1,648,195	1,659,561	14,099	2,577,188
2-Aug	1,607,883	1,645,850	13,843	2,529,628
2-Sep	1,621,758	1,653,409	13,750	2,569,772
2-Oct	1,626,231	1,657,323	13,416	2,581,755
2-Nov	1,615,917	1,614,047	13,311	2,538,029
2-Dec	1,624,752	1,593,639	13,132	2,527,368
3-Jan	1,767,427	1,666,318	14,066	2,690,115
3-Feb	1,761,005	1,633,507	13,755	2,633,363
3-Mar	1,799,442	1,665,866	14,078	2,636,747
3-Apr	1,774,907	1,637,497	13,696	2,576,033
3-May	1,726,750	1,499,812	12,799	2,428,650
3-Jun	1,669,440	1,428,083	12,104	2,371,529
3-Jul	1,600,030	1,405,952	11,875	2,286,525
3-Aug	1,570,018	1,405,947	11,845	2,243,404
3-Sep	1,545,183	1,381,033	12,010	2,218,540
3-Oct	1,674,457	1,430,268	13,072	2,395,705
3-Nov	1,728,038	1,481,775	13,604	2,497,086
3-Dec	1,763,993	1,438,163	13,362	2,514,084
4-Jan	1,706,955	1,351,925	12,732	2,460,860
4-Feb	1,687,968	1,332,210	12,533	2,493,509
4-Mar	1,625,684	1,324,187	12,203	2,421,020
4-Apr	1,633,756	1,359,920	12,722	2,460,234
4-May	1,812,951	1,510,846	13,521	2,696,656
4-Jun	1,819,197	1,498,170	13,717	2,739,873

Date	Euro	US Dollar	Yen	Pound Sterling
4-Jul	1,788,671	1,457,407	13,375	2,684,427
4-Aug	1,799,367	1,476,656	13,389	2,690,395
4-Sep	1,840,179	1,507,828	13,734	2,703,039
4-Oct	1,861,838	1,494,180	13,706	2,695,233
4-Nov	1,885,404	1,454,573	13,892	2,699,996
4-Dec	1,877,729	1,402,156	13,538	2,703,574
5-Jan	1,789,980	1,358,570	13,179	2,556,400
5-Feb	1,714,780	1,318,460	12,605	2,485,730
5-Mar	1,732,790	1,313,210	12,512	2,501,770
5-Apr	1,763,110	1,362,070	12,718	2,579,250
5-May	1,748,570	1,373,700	12,933	2,557,150
5-Jun	1,660,560	1,363,250	12,587	2,481,400
5-Jul	1,615,180	1,341,150	12,017	2,351,470
5-Aug	1,653,940	1,345,100	12,187	2,411,690
5-Sep	1,646,810	1,342,640	12,126	2,429,690
5-Oct	1,634,520	1,359,720	11,883	2,397,510
5-Nov	1,605,600	1,362,220	11,539	2,363,570
5-Dec	1,606,210	1,354,200	11,450	2,364,570

Source: www.tcmb.gov.tr

Notes: 1) Indicative CBRT Exchange Rates determined previous working day.
      2) Values are given as TL (Turkish Lira).

Appendix 2: Interest Rates (1980-2005)

Years	Saving Deposits Interest Rates	Interest Rates on CBRT Discount	Interbank Overnight Interest Rates	CBRT O/N Interest Rate (*)
				(PERCENTAGE)
1980	33	26	----	
1981	35	31.5	----	
1982	50	31.5	----	
1983	45	48.5	----	
1984	45	52	----	
1985	55	52	----	
1986	48	48	39.09	
1987	58	45	42.36	
1988	83.9	54	46.77	
1989	58.8	54	26.87	
1990	59.4	50.75	62.72	
1991	72.7	54.5	59.87	
1992	74.2	54.5	67.77	
1993	74.8	54.5	69.93	
1994	95.56	64	92.05	
1995	92.32	57	106.31	
1996	93.77	57	74.33	
1997	96.6	80	77.93	
1998	94.8	80	79	
1999	46.7	80	69.9	
2000	45.6	70	198.95	54.1
2001	62.5	70	59	93.2
2002	48.19	64	44	49.5
2003				36
2004				21.8
2005				14.8

SOURCE: CBRT

Notes: Interest rates are the current rates of the last months of the years. For saving deposits interest rates, interest rates on 1 year have been used. Monthly average overnight interest rates have been used for interbank overnight rates.

(*) Weighted Simple Interest Rate

Appendix 3: Yearly Average Exchange Rates and Real Exchange Rate

YEARS	YEAR AVERAGE US$ RATE	YEAR AVERAGE DM RATE	YEAR AVERAGE EURO RATE	REAL EXCHANGE RATE 1982 JAN. = 100
1981	110.2	48.9		
1982	160.9	66.2		95.8
1983	224.0	87.6		89.6
1984	364.9	128.0		82.8
1985	518.3	179.3		83.2
1986	669.4	310.6		78.6
1987	855.7	477.8		77.2
1988	1,420.8	809.9		77.7
1989	2,120.8	1,130.0		81.8
1990	2,607.6	1,620.6		94.5
1991	4,169.9	2,511.5		91.4
1992	6,887.5	4,419.8		87.4
1993	10,986.0	6,635.8		86.6
1994	29,704.3	18,498.8		66.7
1995	45,673.5	31,916.3		75.9
1996	81,083.6	53,799.6		74.4
1997	151,429.0	87,084.2		74.0
1998	260,040.1	148,440.2		74.9
1999	417,581.0	226,835.0	443,650.0	71.2
2000	623,749.0	293,662.0	574,354.0	71.5
2001	1,222,921.1	558,660.1	1,092,644.0	59.4
2002	1,504,598.0		1,428,767.0	71.1
2003	1,495,307.0		1,687,189.0	84.0

Source: DPT, MB

Notes: 1) The weights in the currency basket are 0.75 for US$ and 0.25 for EUR

2) In the relative price calculations, producers prices for USA, producer prices for EURO area and wholesale prices for Turkey are used (Source: IFS, SIS)

Appendix 4: The List of the Sample 143 Firms in ISE National Industry Index

Firms Code	Firms	Sectors	E/N-E
ADANA	ADANA ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Exporter
ANACM	ANADOLU CAM	*NON-METALLIC MINERAL PRODUCTS*	Exporter
BSOKE	BATISÖKE ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Exporter
BTCIM	BATI ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Exporter
BUCIM	BURSA ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Exporter
CIMSA	ÇİMSA	*NON-METALLIC MINERAL PRODUCTS*	Exporter
CMENT	ÇİMENTAŞ	*NON-METALLIC MINERAL PRODUCTS*	Exporter
DENCM	DENİZLİ CAM	*NON-METALLIC MINERAL PRODUCTS*	Exporter
ECYAP	ECZACIBAŞI YAPI	*NON-METALLIC MINERAL PRODUCTS*	Exporter
EGSER	EGE SERAMİK	*NON-METALLIC MINERAL PRODUCTS*	Exporter
HZNDR	HAZNEDAR REFRAKTER	*NON-METALLIC MINERAL PRODUCTS*	Exporter
IZOCM	İZOCAM	*NON-METALLIC MINERAL PRODUCTS*	Exporter
KUTPO	KÜTAHYA PORSELEN	*NON-METALLIC MINERAL PRODUCTS*	Exporter
MRDIN	MARDİN ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Exporter
NUHCM	NUH ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Exporter
TRKCM	TRAKYA CAM	*NON-METALLIC MINERAL PRODUCTS*	Exporter
UNYEC	ÜNYE ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Exporter
USAK	UŞAK SERAMİK	*NON-METALLIC MINERAL PRODUCTS*	Exporter
GOLTS	GÖLTAŞ ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Exporter
AFYON	AFYON ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Non-Exporter
AKCNS	AKÇANSA	*NON-METALLIC MINERAL PRODUCTS*	Non-Exporter
BOLUC	BOLU ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Non-Exporter
CMBTN	ÇİMBETON	*NON-METALLIC MINERAL PRODUCTS*	Non-Exporter
CYTAS	CEYTAŞ MADENCİLİK	*NON-METALLIC MINERAL PRODUCTS*	Non-Exporter
KONYA	KONYA ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Non-Exporter
OYSAC	OYSA ÇİMENTO	*NON-METALLIC MINERAL PRODUCTS*	Non-Exporter
PRKTE	PARK ELEKTRİK MADENCİLİK	*NON-METALLIC MINERAL PRODUCTS*	Non-Exporter
ADEL	ADEL KALEMCİLİK	*OTHER MANUFACTURING INDUSTRY*	Non-Exporter
GOLDS	GOLDAS KUYUMCULUK	*OTHER MANUFACTURING INDUSTRY*	Non-Exporter
SERVE	SERVE KIRTASİYE	*OTHER MANUFACTURING INDUSTRY*	Non-Exporter
AEFES	ANADOLU EFES	*FOOD, BEVERAGE AND TOBACCO*	Exporter
ALYAG	ALTINYAĞ	*FOOD, BEVERAGE AND TOBACCO*	Exporter

Firms Code	Firms	Sectors	E/N-E
DARDL	DARDANEL	*FOOD, BEVERAGE AND TOBACCO*	Exporter
ERSU	ERSU GIDA	*FOOD, BEVERAGE AND TOBACCO*	Exporter
FRIGO	FRİGO PAK GIDA	*FOOD, BEVERAGE AND TOBACCO*	Exporter
KENT	KENT GIDA	*FOOD, BEVERAGE AND TOBACCO*	Exporter
PENGD	PENGUEN GIDA	*FOOD, BEVERAGE AND TOBACCO*	Exporter
SELGD	SELÇUK GIDA	*FOOD, BEVERAGE AND TOBACCO*	Exporter
TUKAS	TUKAŞ	*FOOD, BEVERAGE AND TOBACCO*	Exporter
UNTAR	ÜNAL TARIM ÜRÜN.	*FOOD, BEVERAGE AND TOBACCO*	Exporter
ULKER	ÜLKER GIDA	*FOOD, BEVERAGE AND TOBACCO*	Exporter
BANVT	BANVİT	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
KERVT	KEREVİTAŞ GIDA	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
KNFRT	KONFRUT GIDA	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
KRSTL	KRİSTAL KOLA	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
LIOYS	LİO YAĞ	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
MERKO	MERKO GIDA	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
PETUN	PINAR ET VE UN	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
PINSU	PINAR SU	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
PNSUT	PINAR SÜT	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
SKPLC	ŞEKER PİLİÇ	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
TATKS	TAT KONSERVE	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
TBORG	T.TUBORG	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
VANET	VANET	*FOOD, BEVERAGE AND TOBACCO*	Non-Exporter
AKALT	AKAL TEKSTİL	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
AKIPD	AKSU İPLİK	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
ALTIN	ALTINYILDIZ	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
ARAT	ARAT TEKSTİL	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
ARSAN	ARSAN TEKSTİL	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
ATEKS	AKIN TEKSTİL	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
BERDN	BERDAN TEKSTİL	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter

114

Firms Code	Firms	Sectors	E/N-E
BISAS	BISAŞ TEKSTİL	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
BOSSA	BOSSA	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
CEYLN	CEYLAN GİYİM	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
EDIP	EDİP İPLİK	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
IDAS	İDAŞ	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
KOTKS	KONİTEKS	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
KRTEK	KARSU TEKSTİL	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
LUKSK	LÜKS KADİFE	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
MEMSA	MENSA MENSUCAT	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
MNDRS	MENDERES TEKSTİL	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
MTEKS	METEMTEKS	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
SKTAS	SÖKTAŞ	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
UKIM	UKİ KONFEKSİYON	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
YUNSA	YÜNSA	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
DESA	DESA DERİ	*TEXTILE, WEARING APPAREL AND LEATHER*	Exporter
DERIM	DERİMOD	*TEXTILE, WEARING APPAREL AND LEATHER*	Non-Exporter
ESEMS	ESEM SPOR GİYİM	*TEXTILE, WEARING APPAREL AND LEATHER*	Non-Exporter
GEDIZ	GEDİZ İPLİK	*TEXTILE, WEARING APPAREL AND LEATHER*	Non-Exporter
KORDS	KORDSA SABANCI DUPONT	*TEXTILE, WEARING APPAREL AND LEATHER*	Non-Exporter
SONME	SÖNMEZ FİLAMENT	*TEXTILE, WEARING APPAREL AND LEATHER*	Non-Exporter
VAKKO	VAKKO TEKSTİL	*TEXTILE, WEARING APPAREL AND LEATHER*	Non-Exporter
OKANT	OKAN TEKSTİL	*TEXTILE, WEARING APPAREL AND LEATHER*	Non-Exporter
EMKEL	EMEK ELEKTRİK	ELECTRICITY GAS AND WATER	Exporter
GEREL	GERSAN ELEKTRİK	ELECTRICITY GAS AND WATER	Exporter
AKSA	AKSA	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Exporter
ALKIM	ALKİM KİMYA	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Exporter

Firms Code	Firms	Sectors	E/N-E
BAKAB	BAK AMBALAJ	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Exporter
BRISA	BRİSA	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Exporter
GOODY	GOOD-YEAR	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Exporter
PIMAS	PİMAŞ	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Exporter
SASA	ADVANSA SASA	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Exporter
SODA	SODA SANAYİİ	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Exporter
AYGAZ	AYGAZ	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
BAGFS	BAGFAŞ	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
CBSBO	ÇBS BOYA	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
DEVA	DEVA HOLDİNG	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
DYOBY	DYO BOYA	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
ECILC	ECZACIBAŞI İLAÇ	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
EGGUB	EGE GÜBRE	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
EPLAS	EGEPLAST	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
GUBRF	GÜBRE FABRİK.	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
HEKTS	HEKTAŞ	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
MRSHL	MARSHALL	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
PRTAS	ÇBS PRİNTAŞ	*CHEMICALS PETROLEUM, RUBBER AND PLASTIC PRODUCTS*	Non-Exporter
ALKA	ALKİM KAĞIT	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Exporter
ISAMB	IŞIKLAR AMBALAJ	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Exporter
VKING	VİKİNG KAĞIT	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Exporter
DURDO	DURAN DOĞAN BASIM	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Exporter
DENTA	DENTAŞ AMBALAJ	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Non-Exporter
DOBUR	DOĞAN BURDA	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Non-Exporter
HURGZ	HÜRRİYET GZT.	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Non-Exporter

Firms Code	Firms	Sectors	E/N-E
KAPLM	KAPLAMİN	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Non-Exporter
OLMKS	OLMUKSA	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Non-Exporter
TIRE	TİRE KUTSAN	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Non-Exporter
KOZAD	KOZA DAVETİYE	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Non-Exporter
DGZTE	DOĞAN GAZETECİLİK	*PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING*	Non-Exporter
ARCLK	ARÇELİK	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
ASUZU	ANADOLU ISUZU	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
BEKO	BEKO ELEKTRONİK	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
BFREN	BOSCH FREN SİSTEMLERİ	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
DITAS	DİTAŞ DOĞAN	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
EGEEN	EGE ENDÜSTRİ	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
FMIZP	F-M İZMİT PİSTON	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
FROTO	FORD OTOSAN	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
KLMSN	KLİMASAN KLİMA	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
MUTLU	MUTLU AKÜ	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
OTKAR	OTOKAR	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
PARSN	PARSAN	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
PRKAB	TÜRK PRYSMİAN KABLO	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
TOASO	TOFAŞ OTO. FAB.	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
TUDDF	T.DEMİR DÖKÜM	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
UZEL	UZEL MAKİNA	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
VESTL	VESTEL	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
BSHEV	BSH EV ALETLERİ	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
TTRAK	TÜRK TRAKTÖR	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Exporter
EMNIS	EMİNİŞ AMBALAJ	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Non-Exporter

Firms Code	Firms	Sectors	E/N-E
IHEVA	İHLAS EV ALETLERİ	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Non-Exporter
KARSN	KARSAN OTOMOTİV	*FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT*	Non-Exporter
GENTS	GENTAŞ	*WOOD PRODUCTS INCLUDING FURNITURE*	Exporter
KARTN	KARTONSAN	*WOOD PRODUCTS INCLUDING FURNITURE*	Exporter
KLBMO	KELEBEK MOBİLYA	*WOOD PRODUCTS INCLUDING FURNITURE*	Exporter
YATAS	YATAŞ	*CONSUMER TRADE*	Non-Exporter