THE NEGATIVE EFFECTS OF

FOREIGN EXCHANGE RISK ON

TURKISH MANUFACTURING FIRMS

Thesis submitted to the

Institute of Social Sciences

in partial fulfillment of the requirements

for the degree of

Master of Arts

in

Management

by

Tunç Demirağ

Fatih University

January 2006

Dedicated to my parents.

APPROVAL PAGE

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Arts.

<div align="right">
Yrd. Doç. Dr. N. Gökhan TORLAK
Head of Department
</div>

This is to certify that I have read this thesis and that in my opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Arts.

<div align="right">
Yrd. Doç. Dr. M. Nihat SOLAKOĞLU
Supervisor
</div>

Examining Committee Members

Yrd. Doç. Dr. M. Nihat SOLAKOĞLU

Prof. Dr. Vildan SERİN

Doç. Dr. Selim ZAİM

It is approved that this thesis has been written in compliance with the formatting rules laid down by the Graduate Institute of Social Sciences.

<div align="right">
Yrd. Doç. Dr. Mehmet ORHAN
Director
</div>

Date
January 2006

AUTHOR DECLARATIONS

1. The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

Tunç Demirağ

January, 2006

ABSTRACT

TUNÇ DEMİRAĞ   **January 2006**

A STUDY OF THE NEGATIVE EFFECTS OF FOREIGN EXCHANGE RISK ON TURKISH MANUFACTURING FIRMS

This dissertation mainly aims to identify the negative effects of foreign exchange volatility on Turkish Manufacturing firms. In the introduction, the effects of foreign exchange rate risk on companies' future plans for production and the factors which affect the degree of firms' exposure to risk are mentioned. The first part provides information about theory, findings of the past literature, and risk measurement techniques used in measuring the effects of foreign exchange volatility on trade. The second part of this thesis includes information about Turkish foreign trade between 1980 and 2004. In the third part, data are analyzed to show the relationship between exchange rate risk and trade flows. This part includes the data, methodology and results. Fourth part includes a survey and it consists of the reason underlying the choice of sample sector, city and results.

This dissertation is finalized with a brief conclusion part concerning the results of exchange rate risk and firm behavior analysis and survey.

Key words:

Foreign Exchange Risk, Export, Import, Foreign Trade, Total Trade.

KISA ÖZET

TUNÇ DEMİRAĞ   **Ocak 2006**

DÖVİZ KURU RİSKİNİN TÜRKİYE'DEKİ ÜRETİCİ FİRMALAR ÜZERİNDEKİ NEGATİF ETKİLERİ

Bu tez temel olarak döviz kuru dalgalanmalarının Türkiye'deki üretici firmalar üzerindeki negatif etkisini açıklama gayesini gütmüştür. Giriş kısmında, döviz kuru riskinin firmaların üretim planları üzerindeki etkisine ve firmların riske maruz kalma derecelerini etkileyen faktörlere değinilmiştir. Birinci bölüm teori, geçmiş literatürlerin bulguları ve döviz kuru dalgalanmalarının ticaret üzerindeki etkisini ölçen risk ölçüm teknikleri hakkında bilgi sağlamaktadır. Bu tezin ikinci bölümü Türkiye'nin 1980 ve 2004 yılları arasındaki dış ticareti hakkında bilgi içermektedir. Üçüncü bölümde döviz kuru riski ile ticaret akışı arasındaki ilişkiyi göstermek için verilerin analizi yapılmaktadır. Bu bölüm verileri, metodolojiyi ve sonuçları içerir. Dördüncü bölüm anketi içerir ve anket, bu anketi uyguladığımız sektör ve il seçiminin altında yatan nedenlerin açıklanması ve sonuçlardan oluşur.

Tez, döviz kuru riski ve firma davranışlarının analizi ve anket sonuçlarının kısa değerlendirmesi ile son bulmaktadır.

Anahtar Kelimeler

Döviz Kuru Riski, İhracat, İthalat, Dış Ticaret, Toplam Ticaret.

LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

ARCH	Autoregressive Conditional Heteroskedasticity
ARIMA	Autoregressive Integrated Moving Average
BEC	Biogeoclimatic Ecosystem Classification
CPI	Consumer Price Index
CIS	Commonwealth of Independent States
EFTA	European Free Trade Association
EU	European Union
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GDP	Gross Domestic Products
GLS	Generalized Least Squares
LM	Lagrange Multiplier
M	Mean
MTEI	Machinery and Transport Equipment Industry
MRP	Marginal Risk Premium
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
PIC	Proportion in Cost
PIS	Proportion in Sales

TURKDEX	Turkish Derivative Exchange
USA	United States of America
WTO	World Trade Organization
VAR	Vector Autoregressive
YTL	Yeni Türk Lirası

ACKNOWLEDGEMENTS

INTRODUCTION

Following the breakdown of the Bretton Woods system of exchange rate controls, exchange rate variability, contrary to expectations, increased significantly and it added another unknown factor to the firms' future investment and financing decisions[1]. Hence, this added uncertainty may impact future plans for production. In particular, the discussion on exchange rate variability (or risk) is gathered around the relationship between exchange rate risk and trade flows. Unanticipated fluctuations in exchange rates increases profit risk. Since exporters are risk averse and hedging against exchange rate risk is costly or impossible, the increase in profit risk reduces the benefits. So risk-averse firms will be willing to incur an added cost to avoid the risk associated with the exchange rate volatility and will respond by favoring domestic to foreign trade at the margin. In a sense, trade will be reduced similarly to a reduction following an increase in transportation costs.

The level of competitiveness might also impact the firms' exposure to exchange rate risk by changing the degree of "pass through". In addition, size of the firm or the share of international operations will also impact firms' exposure to risk and their hedging activities. The exposure to exchange rate risk may have different effects to companies when considering their industry

---

[1] Table 1 in the Appendix A provides standard deviations of some macroeconomic variables for two different time periods corresponding roughly to fixed and flexible exchange rate regimes. The first two rows of numbers in A.1 indicate that variability in exchange rates has increased, compared to other macro variables.

and operations. If a firm operates in less competitive industries, they have the ability to adjust local currency prices and reduce risk, but in more competitive industries it is difficult to minimize that risk. Also highly international firms are most likely to be influenced by exchange rate changes. Furthermore, as the size or the share of international operations increases, it may be expected that firms will have higher incentives to hedge against that risk (Dominguez & Tesar, 2001).

Turkish economy has shifted from a relatively closed economy to an economy highly integrated with the world market since 1980. After this time, Turkish manufacturing companies have benefited from this opportunity. International operations of Turkish companies have increased from that year. So their exposure to foreign exchange rate risk has increased. Exchange rate risk is one of the factors contributing to the profitability of manufacturing firms. So almost every company in the country is becoming more sensitive to foreign exchange fluctuations; therefore the need for risk management is obvious for Turkish firms who would like to protect their entity and manage risks effectively against unexpected price swings of volatile business environment. Because of the reason mentioned above, foreign exchange risk play an important role in foreign operations of Turkish firms.

There is no real academic research about exchange rate risk effects on the trading activities of Turkish firms. This dissertation mainly investigates the effects of foreign exchange risk on the sectors[2] in Turkey.

---

[2] These sectors are the Construction, Manufacturing, Food, Textile, Paper and Similar Products, Chemical Materials, Electrical Machinary and Aparatus, and Transprot Equipment.

CHAPTER 1

THEORY AND REVIEW OF THE LITERATURE

In the first chapter, I will provide some theoretical information about foreign exchange risk, review the literature and examine their aims and also findings briefly and mention some of the risk measures used in this field.

1.1. Theory

Early studies that investigate the relationship between price uncertainty and firms' production decisions started in 1970s and include Sandmo (1971), Baron (1970), and Holthausen (1979). The results of this research indicated that a perfectly competitive firm under price uncertainty produces less than it would produce under certainty. Furthermore, it is found out that a mean preserving increase in the uncertainty decreases output even further, ceteris paribus. This result has been used as the main theoretical justification for the impact of exchange rate risk on trade volumes.

Consider a competitive firm producing only for export market (although this will be a simplification, it will provide the necessary information)[3]. The firm produces a quantity $\hat{x}$ and hedges $\hat{h}$ amount of that quantity prior to observing the market price, where a "^" implies that quantity is determined before the prices are observed. The product is nonstorable so that we do not

---

[3] Other than complicating the optimization problem, adding domestic market into the analysis will not be too difficult. The simple model here is based on the works of Sandmo (1971), Baron (1970), and Holthausen (1979).

have to deal with inventory costs. The goal of the firm is to maximize expected utility from profits.

$$\max_{x,h} E\{U[p(x-h)+qh-c(x)]\}$$

$$\max_{x,h} \int_0^\infty U[p(x-h)+qh-c(x)]\,f(p)dp \qquad (1)$$

where domestic price p is a random variable with mean (μ) and probability density function f(p). The firm can sell h amount of its product forward at a price q[4]. The first order conditions are given as:

$$\frac{\partial EU(\pi)}{\partial \hat{x}} = \int_0^\infty (p - c'(\hat{x}))U'(\pi)f(p)dp$$

$$\frac{\partial EU(\pi)}{\partial \hat{h}} = \int_0^\infty (q - p)U'(\pi)f(p)dp \qquad (2)$$

If hedging in the forward market is not possible, then from the first firts-order condition we get;

$$\mu = c'(\hat{x}) - \frac{Cov(U'(\pi), p)}{E(U'(\pi))} = c'(\hat{x}) + MRP \qquad (3)$$

where the marginal risk premium, MRP, represents the addition to the marginal cost due to the firm's attitude toward risk. If $U'' = 0$ (that is, the firm is risk-neutral), then MRP=0 so that firm produces such that marginal

---

[4] The domestic price can be defined as ; p = αp+(1-α)p*s, where p* is the foreign currency price of the good, s is the price of foreign currency in terms of the domestic currency, and α is a number between 0 and 1 representing the contract's currency denomination. It is assumed that only s is random in this specification. In addition, it is assumed that forward price q is not random and can be defined as q = αp+(1-α)p*s_f , where s_f is the forward price of foreign currency in terms of the domestic currency.

cost equals expected price. If $U'' < 0$, that is the firm is risk-averse, then MRP will be positive and $\mu > c'(\hat{x})$. In this case, firm produces and exports less than the certainty level when the certainty price and expected price are equal. Both increases in risk-aversion and increases in the riskiness of the environment (holding expected profit constant) affect output level negatively, by increasing MRP[5].

On the other hand, if hedging is possible in the forward market (e.g., short run trade contracts), then using both first-order conditions, we obtain;

$$q = c'(\hat{x})$$

That is, firm produces at the point where the forward price is equal to the marginal cost. The mean of the price distribution, μ, does not matter for this result. The relation of the hedged output level with the certainty output level depends upon how forward price is related with the certainty price. If the forward price is less than the certainty price -- which is a reasonable assumption under the existence of risk premium -- firm produces less than the certainty level. An increase in the risk premium caused by a more risky

---

[5]   For example, if the utility function is of the CARA (Constant Absolute Risk Aversion) type and hedging is not possible, then maximization of expected utility gives us output as a function of risk aversion parameter λ, expected price, marginal cost, and variability of domestic price. Hence, in logarithmic form, we will have

$$\log x = -\log \lambda + \log(E\overline{p} - c) - \log \sigma_p^2$$

While an increase in the risk aversion parameter and/or risk implied by the variance affects output negatively, an increase in the profit margin has positive impact on the output level.

environment, by increasing the gap between q and μ, leads to a further decrease in the output level.

Although the existing work mostly focuses on the negative effect of exchange rate risk on trade flows, there exist theoretical and empirical studies that this effect might be positive or zero. If traders have more information than the average participant in the foreign exchange market, exchange rate risk may increase the volume of trade, not decrease it, as discussed by Ascheim et al. (1993). In addition, trade can be viewed as an option held by the firms. Like other options, its value can rise with volatility (Assery and Peel (1991)). As a result, higher exchange rate risk does not necessarily leads to a decline in trade flows.

Under perfect competition, convexity in the profit function, and symmetric costs of capital adjustment and risk neutrality, increases in exchange rate volatility will positively affect exports. Relaxation of risk neutrality and symmetric costs, on the other hand, leads to the traditional results (Qian and Varangis (1994)). In the hysteretic models of trade, Baldwin and Krugman (1989) considers a model where international trade involves significant non-recoverable costs. In that case, exchange rate volatility can affect trade flows even if agents are risk-neutral. However, the direction of this effect is ambiguous.

1.2. Empirical Works

In an empirical study, Koray & Lastrapes (1989) distinguished the fixed and flexible exchange rate period and tested the relationship between real exchange rate volatility and bilateral imports of the U.S. from the United Kingdom, Germany, France, Japan and Canada using vector autoregression (VAR) model. Their estimation covered the period 1959 to 1985 and used monthly data. The estimation period for the fixed rate sample was February 1961 to July 1971; for the flexible period they used data from April 1975 to December 1985. They found a weak relationship between volatility and imports but the impact of volatility on imports increased from the fixed exchange rate regime to the flexible rate regime.

Pozo (1992) examined the influence of exchange rate volatility on the real British exports to US using annual data from 1900 to 1940. She used two measurements of exchange rate uncertainty; standard deviation of monthly real exchange rate for a period of one year and conditional variance from a GARCH process. She found via both measurements that exchange-rate volatility had a depressing effect on the volume of international trade in the early 1900s. She also used dummy variables in this model to control the changes in the international monetary system and found that the fixed and perfectly flexible exchange rate regimes are more conducive to trade than the managed floating exchange rate regime.

Dominguez & Tesar (2001) tested the relationship among exchange rate movements, firm value and trade. Their aim was to find out whether firm level exchange rate exposure is related to trade flows or not. They selected a broad sample of firms from eight countries (Chile, France, Germany, Italy, Japan, the Netherlands, Thailand and the United Kingdom) using firm and industry level information between 1980 and 1999 and they included dummy variables for firm size in their regression. Their results suggest that significant fraction of firms in these countries is exposed to exchange rate movements but there is little evidence of systematic link between exposure and trade. However, they found that firm-exposure will be lower where trade is "high" in its industry. This, in turn, suggests that firms in highly "internationalized" industries are the most aware of exchange rate risk and the most likely to hedge exchange rate exposure.

Mohsen Bahmani-Oskooee (1991) analyzed the effects of exchange rate uncertainty on the import and export volumes. Estimation sample included quarterly data for the 1975-85 period for seven developing countries (Brazil, Greece, South Korea, Pakistan, the Philippines, Thailand and Turkey). The standard deviation of the quarterly percentage changes in the real effective exchange rate is used to measure the exchange rate volatility. He found that exchange rate uncertainty had an adverse effect on the imports of Korea, Pakistan, Thailand and Turkey as well as on the exports of Greece and Turkey and a positive effect on the exports of Brazil and Korea.

Assery and Peel (1991) examined the effects of exchange rate volatility on exports using quarterly data for Australia, Japan, The United Kingdom, The United States, and West Germany over a period between 1972 and 1987. They found that real exchange rate volatility has a significant impact on exports and, except for the UK, this effect is positive.

Caporale and Doroodian (1994) tested the effects of exchange rate uncertainty on the U.S imports from Canada by using a bivariate GARCH-M model and monthly data for the period from January 1974 to December 1992. They reported that exchange rate risk has depressing effects on imports.

Chowdhurry (1993) investigated the impact of exchange rate volatility on the trade flows of G-7 countries (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) using quarterly data for 1973-1990 period. Chowdhurry used an error correction model for the analysis. The explanatory variables used in this model are the real foreign economic activity, relative price, and the moving sample standard deviation of the growth rate of the exchange rate to measure volatility. He found that exchange rate volatility has a significant and negative effect on the volume of exports for all countries.

Grobar (1992) investigated the relationship between real exchange rate uncertainty and the manufacturing exports of ten developing countries (Argentina, Brazil, Colombia, Greece, Malaysia, Mexico, Philippines, South

Africa, Thailand, Yugoslavia) using quarterly data over the period 1963-1985. She used four different uncertainty measurements in her study, all of which were highly correlated. These were: the standard deviation of the quarterly percentage change in the real exchange rate, the standard error of the real exchange rate estimated from a trend equation, the standard error of the real exchange rate estimated from a first-order autoregressive equation and estimation of an ARCH model. She found that real exchange rate uncertainty had a significant negative impact on developing country manufacturing exports.

Hasan Vergil (2002) investigated the effects of exchange rate volatility on Turkey's real exports to the United States, Germany, France, and Italy using monthly data for the period 1990:1-2000:12 in the context of a multi-variate error-correction model. He used two measurements of exchange rate uncertainty; standard deviation of the percentage change in the real exchange rate and the variance of the real exchange rate around its predicted trend. After comparing the two versions, he saw that they have very strong correlations for each country, and only the first version of the volatility measure is used as one of the explanatory variables with the foreign economic activity and the bilateral exchange rate in the real export equations. He found that long-run relationship between Turkey's real exports and its exchange rate volatility is negative and statistically significant for Germany, France and the United States while the short-run impact of the exchange rate volatility is statistically insignificant except Germany. This, in

turn, suggests that utilization of forward exchange markets to fully hedge exchange rate risk may have made exchange rate volatility less of a factor in explaining real exports to these countries in the short-run. His results provide strong evidence that exchange rate volatility has a significant negative long-run effect on real exports.

Bailey, Tavlas and Ulan (1986), examined the impact of exchange rate volatility on real exports using quarterly data for the Seven Big OECD countries – Canada, France, Germany, Italy, Japan, the U.K., and the U.S for the period 1973- 1984. The absolute value of the percentage change in the exchange rate was employed to measure the exchange rate volatility. They found that exchange-rate variability has not adversely affected exports of any of the Seven Big countries over the flexible-rate period.

Baum, Çağlayan and Özkan (2004) investigated the impact of exchange rate volatility on real international trade flows utilizing a 13 country dataset, which includes U.S., Canada, Germany, U.K., France, Italy, Japan, Finland, Netherlands, Norway, Spain, Sweden, and Switzerland on a monthly basis. They used monthly bilateral real exports in each direction for 1980-1998 period. They utilize daily spot exchange rates to compute one month-ahead exchange rate volatility from the intra-monthly variations in the exchange rate. They find that on average the total effect of exchange rate uncertainty is positive.

Cushman (1986) argued that the effect of exchange rate risk on bilateral trade flows depends on its relative relation to the other bilateral exchange rate risks. His results suggest that exchange rate risk plays an important role in depressing trade volume and "third country" effects increase the importance of these effects[6].

There is a much wider literature on the relationship between exchange rate risk and trade flows (see for example, Hooper and Kohlhagen (1978), Gagnon (1993), Thursby and Thursby (1987), Kumar and Dhawan (1991), Grobar (1993) etc). However, they all find different results using different volatility measures, different trade variables, different countries, different estimation periods, and different estimation methods. Solakoğlu (forthcoming) examines the sensitivity of the relationship between exchange rate volatility and trade flows using Extreme Bound Analysis and finds that the relationship is not robust (fragile).[7]

---

[6] The following example clarifies the meaning of third country effects. Suppose that there are three trading partners: countries A, B, and C. If exchange risk between countries A and B, $_{AB}$, increases, traditional studies assume that this depresses the trade between A and B. However, if at the same time the exchange risk between countries A and C, $_{AC}$, increases to the point where $_{AB} > _{AC}$, then trade between countries A and B may increase owing to the switching of country A's trade from country C to country B.

[7] A good but old survey is Cote (1994).

1.3. Risk Measures

As we mentioned in the previous section, all studies employ different measures/proxies of exchange rate risk in their estimations. Given that exchange rate risk is unobservable, this should be expected. However, given the wide nature of measures, one shouldn't be surprised that there is no agreement on the direction and size of the relationship. Some of the measures used in the literature is provided below.

Measure 1: Absolute value of the percentage change in the exchange rate.

Measure 2: Moving standard deviation of the exchange rate.

Measure 3: Squared residual from the ARIMA process fitted to the logarithm of real exchange rate.

Measure 4: Moving sample standard deviation of the growth rate of the real exchange rate.

Measure 5: Four-quarter standard deviation of real exchange rate.

Measure 6: Variability of the yearly percentage changes of the bilateral exchange rate between country i and j around the mean observed during subperiod k, k=a,b.

Measure 7: Variance of the spot rate for the 13 weekly observations during each quarter.

Measure 8: Variance of the forward rate for the 13 weekly observations during each quarter.

Measure 9: Average absolute difference between the previous forward rate and the current spot rate.

Measure 10: Exchange rate variability is explained by openness, terms of trade disturbances, real productivity shocks, domestic monetary disturbances, and domestic inflation disturbances.

Measure 11: A function of conditional variance from a GARCH or ARCH process.

Measure 12: Standard deviation of monthly real exchange rate for a period of one year.

Measure 13: $\frac{\max S_{t-k}^t - \min S_{t-k}^t}{\min S_{t-k}^t} + \left(1 + \frac{(X_t - X_t^p)}{X_t^p}\right)^2$ where X is nominal exchange rate, X^p is the equilibrium exchange rate, and max and min are over a given time interval of size k up to time t.

Measure 14: $\left(\sum_{i=t-10}^{t} \frac{|X_i - X_i^*|}{X_i^*}\right)\left(1 + \sum_{i=t-k}^{t} \frac{|X_i - X_i^*|}{X_i^*}\right)$ where X* is the equilibrium or PPP exchange rate, and k<10.

Measure 15: Variance of the monthly spot exchange rate around its predicted trend where trend is estimated as

$$\log s_t = a_0 + a_1\, t + a_2\, t^2 + e_t$$

The mean of these measures over a year is used as the relevant risk measure.

Measure 16: Volatility calculated from the intra-monthly variations in the exchange rate.

CHAPTER II

FOREIGN TRADE OF TURKEY

This chapter provides information about Turkey's foreign trade activities between the years 1990 and 2004.

2.1. Developments in Foreign Trade

Beginning from the year 1980, Turkey changed its economic development policy from "import substituting industrialization" to "export led growth" strategy. Trade played a minor role in the economy until 1980 but grew rapidly thereafter and Turkey became a more and more open economy as time passed. 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 dismantled. State intervention in the economy was reduced to minimum level.[8] As a result of these efforts, Turkey's foreign trade has increased between the years 1980 and 2004.[9]

As shown in Table 1, exports which were $ 13 billion in 1990 rose to $ 21.6 billion in 1995 and $ 27.8 billion in 2000. Turkey showed a great performance in exports in 2001, 2002, 2003 and 2004. Turkey's exports grew by 12.8, 15.1, 31 and 33.6 percent respectively in these four years. Imports

---

[8] http://www.dtm.gov.tr/ead/english/basinyayin.doc

[9] The volume of foreign trade consisted of 23.4 percent of the GNP in 1990 while this share rose to 40.8, and 54.7 percent in 2000 and 2004, respectively (See Appendix B Table 1).

of Turkey, which were $ 22.3 billion in 1990, grew by 12 percent annually on average between 1990 and 1995, and reached $ 35.7 billion in 1995. The average annual growth rate between 1995 and 2000 was 10,5 percent.

TABLE 1. TURKEY'S FOREIGN TRADE ($ MILLION)

	1990	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**
Exports (FOB)	12.959	21.637	27.775	31.334	36.059	47.253	63.121
% Change	-	66	28	12.8	15.1	31	33.6
Imports (CIF)	22.302	35.709	54.503	41.399	51.554	69.340	97.540
% Change	-	60	53	-24	24,5	34,5	40,4
Volume	35.261	57.346	82.278	72.733	87.613	116.593	160.661
Balance	- 9.343	- 14.072	- 26.728	- 10.065	- 15.495	- 22.087	- 34.419
Exp./Imp.	58,1	60,6	51,0	75,7	69,9	68,1	64,7

Exports of Turkey which were $ 27.775 billion in 2000 rose to $ 63.017 billion in 2004 (As shown in Figure 1).

FIGURE 1. TOTAL EXPORTS OF TURKEY BETWEEN THE YEARS 2000 AND 2004
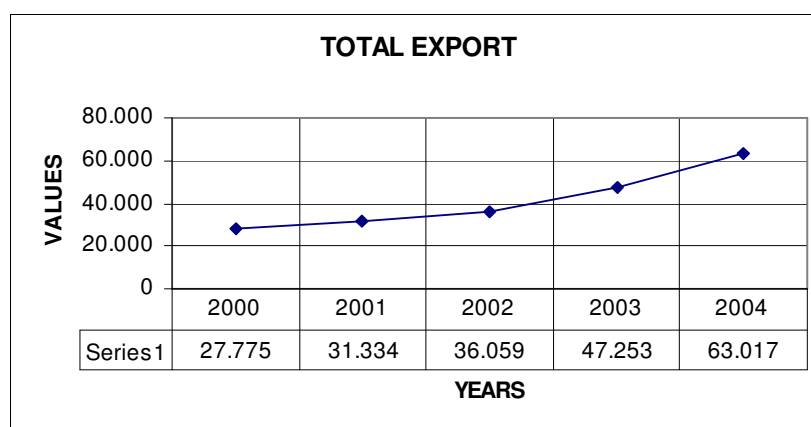
Imports of Turkey which were $ 54.503 billion in 2000 declined to 41.399 in 2001 and than rose to $ 97.341 billion in 2004 (As shown in Figure 2).

FIGURE 2. TOTAL IMPORTS OF TURKEY BETWEEN THE YEARS 2000 AND 2004

TOTAL IMPORT

	2000	2001	2002	2003	2004
Series1	54.503	41.399	51.554	69.340	97.341

YEARS
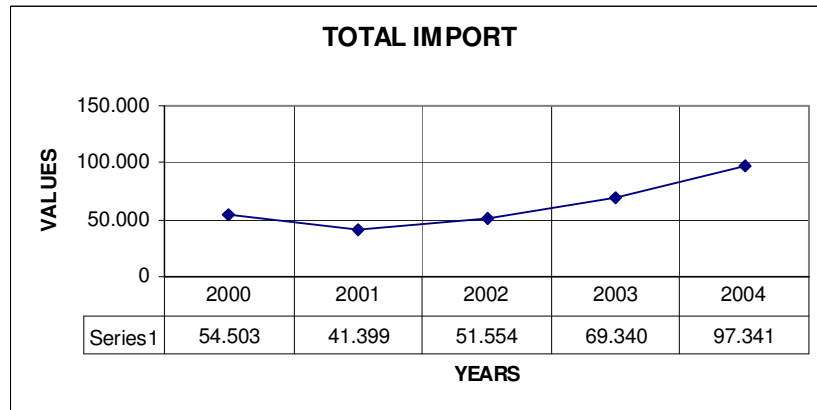
The export/import ratio declined from 58.1 percent in 1990 to 51.0 percent in 2000 as a result of the high rate of increase in imports. But then, this ratio rose to 68.1 percent by the year of 2003 and in the year 2004, export import ratio has declined to 64,7%(As shown in Figure 3).

FIGURE 3. EXPORT/IMPORT RATIO OF TURKEY BETWEEN THE YEARS 2000 AND 2004

EXPORT/IMPORT

	2000	2001	2002	2003	2004
Series1	51,0	75,7	69,9	68,1	64,7

YEARS

2.2. Main Developments In Exports

The structure of exported goods has also changed much from mainly agricultural products and raw materials to higher value added industrial products.[10] The share of export of agricultural products in total exports decreased from its %25,5 in 1990 to 10.3 percent in 2004. On the other hand, exports of agricultural products showed a good performance especially in 2003 and 2004, rised by %29,7 and %23,3 respectively. But even in these years, since increase in agricultural products exports was lower than increase of total exports, share of agricultural products continued to decline. Also the share of mining products in total exports decreased from its %6.8 in 1990 to 4,6 percent in 2004 (Table 2).

---

[10] http://www.dtm.gov.tr/ead/english/basinyayin.doc

TABLE 2. SECTORAL BREAKDOWN AND GROWTH (%) OF TURKEY'S EXPORTS BY WTO DEFINITION ($ MILLION)

	1990	(%)	1995	(%)	2000	(%)	2001	(%)	2002	(%)	2003	(%)	2004
1-Agricultural Products	3.300	7.6	4.555	-3.1	3.855	12.8	4.349	-6.8	4 052	29.7	5 257	23.3	6.484
i-Food	2.905	9.2	4.239	-3.3	3.543	12.8	3 997	-8.2	3.668	29.1	4.735	24.1	5.875
ii-Agricutural Raw Materials	395	-4.0	316	-0.2	313	12.5	352	9.1	384	36.0	522	16.6	609
2-Mining Products	876	2.9	1.003	3.1	1.157	6.8	1.236	21.1	1.497	34.3	2.011	42.8	2.871
3-Manufactures	8.778	16.6	16.064	8.3	22.699	13.0	25.661	18.0	30.288	30.7	39.594	34.8	53.476
i-Iron and Steel	1.490	6.5	1.972	-1.1	1.865	34.0	2.500	13.2	2.831	13.1	3.342	78.7	5.974
ii-Chemicals	747	3.8	890	7.9	1.243	10.0	1.367	11.4	1.523	24.3	1.893	35.4	2.563
iii-Other Semi manufactures	672	23.3	1.455	11.3	2.280	15.1	2.625	19.6	3.139	32.0	4.143	32.3	5.480
iv-Machinery and Transport Equi.	855	36.3	2.406	27.7	5.740	24.6	7.153	20.7	8.632	43.3	12.370	47.7	18.265
v-Textiles	1.440	15.2	2.532	9.3	3.706	6.4	3.943	8.2	4.268	23.3	5.262	22.1	6.426
vi-Clothing	3.331	16.8	6.121	1.5	6.586	1.1	6.661	21.5	8.094	23.1	9.962	12.3	11.191
vii-Other Consumer Goods	243	36.5	687	17.2	1.279	10.5	1.413	27.4	1.800	45.6	2.622	32.6	3.477
4-Other Products	5	40.0	15	64.0	63	41.3	89	149.4	222	76.0	391	-27.0	285
TOTAL	12.959	13.4	21.637	5.7	27.775	12.8	31.334	15.1	36.059	31.0	47.253	33.6	63.121

Note: The Growth percentages are for the years 1990 to 1995, 1995 to 2000, 2000 to 2001, 2001 to 2002, 2002 to 2003 and 2003 and 2004.

On the contrary, export of manufactured products increased its share in total exports from 1990 to 2004. This share rose from 67.7 percent in 1990 to 84.7 percent in 2004. The rate of increase in the exports of manufactured goods reached to 30.7 percent annual growth rate in the year 2003 and 34.8 percent in 2004.

The machinery and transport equipment sector had the most significant share in exports in 2003 and 2004 and its share in total exports increased to 29 percent from its level of 6.6 percent in the year 1990. Export of clothing sector made up 28.3 percent of total exports in 1995 but its share decreased to 17.8 percent in 2004 (Table 3).

TABLE 3. SECTORAL SHARE OF TURKEY'S EXPORTS BY WTO DEFINITION (%)

	1990	1995	2000	2001	2002	2003	2004
1-Agricultural Products	25.5	21.1	13.9	13.9	11.2	11.1	10.3
i-Food	22.4	19.6	12.8	12.8	10.2	10.0	9.3
ii-Agricutural Raw Materials	3.0	1.5	1.1	1.1	1.1	1.1	1.0
2-Mining Products	6.8	4.6	4.2	3.9	4.2	4.3	4.6
3-Manufacturing	67.7	74.2	81.7	81.9	84.0	83.8	84.7
i-Iron and Steel	11.5	9.1	6.7	8.0	7.9	7.1	9.5
ii-Chemicals	5.8	4.1	4.5	4.4	4.2	4.0	4.1
iii-Other Semi manufactures	5.2	6.7	8.2	8.4	8.7	8.8	8.7
iv-Machinery and Transport Equi.	6.6	11.1	20.7	22.8	23.9	26.2	29.0
v-Textiles	11.1	11.7	13.3	12.6	11.8	11.1	10.2
vi-Clothing	25.7	28.3	23.7	21.3	22.4	21.1	17.8
vii-Other Consumer Goods	1.9	3.2	4.6	4.5	5.0	5.5	5.5
4-Other Products	0.0	0.1	0.2	0.3	0.6	0.8	0.5
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: We made our survey for textile and clothing industries.

2.3. Exports By Country Groups

Europe is the most important market for Turkish exports. In particular, European Union (EU) members are a country group that has a major share in Turkey's exports. Exports to the EU (25) were 7.3 billion dollars in 1990 and

reached to 34.4 billion dollars at the end of 2004. It's share in total exports were 56.5 percent in 1990, but fell down to 54.6 percent at the end of 2004.

Middle East countries and North America (especially USA) are another important country groups for Turkey's exports. Exports to these country groups were 7.2 and 5.2 billion dollars respectively (Table 4).

TABLE 4. EXPORTS BY COUNTRY GROUPS ($ MILLION) AND ITS % SHARE

	1990	(%)	1995	(%)	2000	(%)	2001	(%)	2002	(%)	2003	(%)	2004	(%)
EU (25)	7.327	56.5	11.722	54.2	15.085	54.3	16.854	53.8	19.468	54.0	25.899	54.8	34.399	54.6
EU (15)	7.177	55.4	11.078	51.2	14.510	52.2	16.118	51.4	18.459	51.2	24.484	51.8	32.538	51.6
Europea Free Trade Association	333	2.6	294	1.4	324	1.2	316	1.0	409	1.1	538	1.1	657	1.0
Commonwealth of Independent States	531	4.1	2.066	9.5	1.649	5.9	1.978	6.3	2.279	6.3	2.963	6.3	3.956	6.3
Russia		0.0	1.238	5.7	644	2.3	924	2.9	1.172	3.3	1.368	2.9	1.859	2.9
North America	1.032	8.0	1.610	7.4	3.309	11.9	3.297	10.5	3.596	10.0	3.973	8.4	5.174	8.2
USA	968	7.5	1.514	7.0	3.135	11.3	3.126	10.0	3.356	9.3	3.752	7.9	4.832	7.7
Latin America	44	0.3	110	0.5	239	0.9	329	1.0	257	0.7	215	0.5	420	0.7
Africa	747	5.8	1.062	4.9	1.373	4.9	1.521	4.9	1.697	4.7	2.131	4.5	2.963	4.7
Middle East	1.527	11.8	1.944	9.0	2.211	8.0	2.892	9.2	3.105	8.6	4.994	10.6	7.238	11.5
Others	1.417	10.9	2.829	13.1	3.586	12.9	4.146	13.2	5.248	14.6	6.540	13.8	8.315	13.0
Total	12.959	100	21.637	100	27.775	100	31.334	100	36.059	100	47.253	100	63.121	100

Table 5 presents the 10 leading countries in Turkey's exports between the years 2001 and 2003. They had an average amount of 59.63 percent of Turkey's exports for the years 2001, 2002 and 2003. The seven European

Union countries had the 45.45 percent of total exports in 2003 and Germany was the leader country with 15.9 percent. Euro and dollar is the commonly used currencies by these countries (70% uses $ and € in their transactions). This supports the idea that Turkey's exports are influenced mainly by the change in Euro and Dollar values.

TABLE 5. LEADING 10 COUNTRIES IN TURKEY'S EXPORTS FOR THE YEARS 2001-2003 ($ MILLION)

NO	COUNTRIES	2001	SHARE IN TOTAL EXPORTS	2002	SHARE IN TOTAL EXPORTS	2003	SHARE IN TOTAL EXPORTS	CURRENCY
1	Germany	5.367	17.13	5.869	16.28	7.453	15.90	Euro
2	USA	3.126	9.98	3.356	9.31	3.736	7.97	Dollar
3	United Kingdom	2.175	6.94	3.025	8.39	3.659	7.81	Pound Sterling
4	Italy	2.342	7.47	2.376	6.59	3.167	6.76	Euro
5	France	1.895	6.05	2.135	5.92	2.818	6.01	Euro
6	Spain	950	3.03	1.125	3.12	1.781	3.80	Euro
7	Netherlands	892	2.85	1.056	2.93	1.520	3.24	Euro
8	Russia	924	2.95	1.172	3.25	1.363	2.91	Rouble
9	Israel	805	2.57	861	2.39	1.067	2.28	New Shekel
10	Greece	476	1.52	590	1.64	903	1.93	Euro
TOTAL		18.953	60.49	21.565	59.80	27.467	58.59	Euro + Dollar %70
First 18 Countries		22.056	70.39	25.218	69.94	32.634	69.94	70.04%
Total Exports		31.334	100	36.059	100	46.878	100	
2001/2002/2003 Average Exports For 10 Countries in Million Dollars				22.662	2001/2002/2003 AVERAGE % For 10 Countries Share in Total Exports			59,63

2.4. Basic Developments in Imports

The import of intermediate goods constitutes an important part of total imports. In the first half of 1990s, the share of the import of intermediate goods was 72.3% and decreased to 68.8 percent at the end of 2004. The share of investment good and consumption goods were 18.1 and 12.6 percent respectively.

In 2001, Turkey went into an economic crisis[11] and the amount of import decreased from its 54.503 billion dollars in 2000 to 41.399 billion dollars in 2001(Table 6).

**TABLE 6. SECTORAL BREAKDOWN ($ MILLION) AND SHARES (%)
OF TURKEY'S IMPORTS BY BEC CLASSIFICATION**

	1990	(%)	1995	(%)	2000	(%)	2001	(%)	2002	(%)	2003	(%)	2004	(%)
Investment Goods	4.038	18.1	8.119	22.7	11.346	20.8	6.967	16.8	8.496	16.5	11.475	16.5	17.659	18.1
Intermediate Goods	16.114	72.3	25.035	70.1	35.708	65.5	29.970	72.4	37.443	72.6	49.490	71.4	67.035	68.8
Consumption Goods	2.114	9.5	2.456	6.9	7.218	13.2	4.082	9.9	5.004	9.7	7.899	11.4	12.345	12.6
Others	32	0.1	95	0.3	231	0.4	380	0.9	610	1.2	475	0.7	500	0.5
Total Imports	22.298	100.0	35.705	100.0	54.503	100.0	41.399	100.0	51.554	100.0	69.340	100.0	97.540	100.0

2.5. Turkey's Imports by Country Groups

European Countries have an important share in Turkey's imports as shown in table 7. Commonwealth of Independent States (CIS)[12] and Middle East

---

[11] http://www.dtm.gov.tr/ead/english/basinyayin.doc

countries are coming next. North America is in the fourth place as a result of the Turkey's intense trade relationships with the USA. The import shares of EU in 2004 is nearly the same amount when compared with its shares in 1990's. European Free Trade Association (EFTA)[13], CIS (especially Russia) and other countries; North America (especially USA), Latin America, Africa and Middle East countries have lost some of their shares in Turkey's import.

TABLE 7. TURKEY'S IMPORTS ($ MILLION) AND SHARES (%) BY COUNTRY GROUPS

	1990	(%)	1995	(%)	2000	(%)	2001	(%)	2002	(%)	2003	(%)	2004	(%)
EU (25)	10.219	45.8	17.255	48.3	27.388	50.2	18.949	45.8	24.519	47.6	33.495	48.3	45.428	46.7
EU (15)	9.898	44.4	16.861	47.2	26.610	48.8	18.280	44.2	23.321	45.2	31.696	45.7	42.347	43.5
European Free Trade Association	597	2.7	892	2.5	1.155	2.1	1.481	3.6	2.512	4.9	3.396	4.9	3.890	4.0
North America	2.464	11.0	4.017	11.2	4.167	7.6	3.390	8.2	3.421	6.6	3.741	5.4	5.066	5.2
USA	2.282	10.2	3.724	10.4	3.911	7.2	3.261	7.9	3.099	6.0	3.496	5.0	4.697	4.8
Commonwealth of Independent States	1.247	5.6	3.315	9.3	5.693	10.4	4.630	11.2	5.555	10.8	7.777	11.2	12.886	13.2
Russia			2.082	5.8	3.887	7.1	3.436	8.3	3.892	7.5	5.451	7.9	9.027	9.3
Latin America	546	2.4	704	2.0	620	1.1	447	1.1	635	1.2	1.169	1.7	1.470	1.5
Africa	1.336	6.0	1.384	3.9	2.714	5.0	2.819	6.8	2.696	5.2	3.338	4.8	4.781	4.9
Middle East	2.513	11.3	2.645	7.4	3.122	5.7	2.811	6.8	2.983	5.8	4.059	5.9	5.139	5.3
Others	3.380	15.2	5.497	15.4	9.643	17.7	6.872	16.6	9.234	17.9	12.365	17.8	18.880	19.2
Total	22.302	100.0	35.709	100.0	54.503	100.0	41.399	100.0	51.554	100.0	69.340	100.0	97.540	100.0

---

[12] CIS countries are Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.
[13] EFTA countries are Iceland, Liechtenstein, Norway, and Switzerland.

Table 8 presents the 10 leading countries in Turkey's imports between the years 2001 and 2003. 10 leading countries had an average amount of 58.68 percent of Turkey's imports for the years 2001, 2002 and 2003. The six European Union countries had the 39.84 percent of total imports in 2003 and Germany was the leader country with 13.68 percent. Euro and dollar is the commonly used currencies by these countries with a percentage of 60.

TABLE 8. LEADING 10 COUNTRIES IN TURKEY'S IMPORTS FOR THE YEARS 2001-2003 ($ MILLION)

NO	Countries	2001	SHARE IN TOTAL IMPORTS	2002	SHARE IN TOTAL IMPORTS	2003	SHARE IN TOTAL IMPORTS	CURRENCY
1	Germany	5.335	12.89	7.042	13.66	9.400	13.68	Euro
2	Italy	3.484	8.42	4.097	7.95	5.446	7.92	Euro
3	Russia	3.436	8.30	3.892	7.55	5.420	7.89	Rouble
4	France	2.284	5.52	3.053	5.92	4.158	6.05	Euro
5	United Kingdom	1.914	4.62	2.438	4.73	3.471	5.05	Pound Sterling
6	USA	3.261	7.88	3.099	6.01	3.420	4.98	Dollar
7	Switzerland	1.227	2.96	2.143	4.16	2.957	4.30	Euro
8	People's Republic of China	926	2.24	1.368	2.65	2.596	3.78	Renminbi-Yuan
9	Spain	1.066	2.57	1.419	2.75	1.953	2.84	Euro
10	Japan	1.307	3.16	1.466	2.84	1.914	2.78	Yen
Total		24.240	58.55	30.017	58.22	40.735	59.26	Euro+Dollar %60
First 18 Countries		31.266	75.52	37.964	73.64	51.394	74.77	74.64%
Total Imports		41.399	100	51.554	100	68.734	100	
2001/2002/2003 Average Exports For 10 Countries in Million Dollars			31.664	2001/2002/2003 Average % For 10 Countries Share in Total Imports				58,68

CHAPTER III

EXCHANGE RATE RISK AND FIRM BEHAVIOUR:

CASE OF TURKISH FIRMS

In this chapter, the relationship between exchange rate risk and trade flows is tested using firm level data from Turkey. This relationship is examined for imports, exports and total trade.

3.1. Data

The main source of the firm level data is from Istanbul Stock Exchange official web site.[14] Data is obtained for the period 2001-2003. Out of the 500 largest companies, only 143 companies had international transactions within this period and hence included in our analysis. To use a similar, to some degree, functional forms, country level data is also obtained for gross domestic product and consumer price indices for the same period for major trading partners[15]. Gross Domestic Products (GDP) data is obtained from World Bank[16] and Consumer Price Index (CPI) data (except for Turkey) is obtained from Bureau of Labor Statistics official web site;[17] Consumer Price Indexes, Sixteen Countries, 1950-2004. These data prepared by the U.S. department of Labor, Bureau of Labor Statistics, and Office of Productivity and Technology in June 6, 2005. the CPI data of Turkey is obtained from the

---

[14] http://www.imkb.gov.tr/sirket/sy.htm
[15] For major trading partners, we obtained information for Germany, United Kingdom, United States, Italy, Netherlands, Spain, France and Sweden. However, we used information for the 5 major trading partners in the estimations. These countries were: Germany, France, Spain, the UK and the US.
[16] http://devdata.worldbank.org/data-query/
[17] http://www.bls.gov/fls/flscpian.pdf

official Web site of Republic Of Turkey, Prime Ministry State Institute Of Statistics.[18]

On average, companies that we included had an age of 35 years. In other words, these companies have been operating for 35 years and they had experience to manage crises and risks in their operating life. Average number of employees was 890 in 2001-2002 periods and it decreased to 862 in 2002-2003. As expected, they carried a loss, on average, in the operating year of 2001 due to the financial crisis in Turkey, but they had profitable operations in 2002 and 2003. While exports increased by 64 percent from 2001 to 2003, imports also increased by about 60 percentage points.

Sectoral breakdown of the firms was as follows: 19.6% of the companies were operating in textile/clothing industry. While Food industry companies constituted 11.2% of the total, constructions industry had 9.8 % of the total. Paper and similar products (including printing and publication) and electrical machinery and apparatus had 13 firms and 9.1%. 10 firms were operating in chemical materials sector and in transport equipment sectors, both constituting 7% of the total.

---

[18] http://www.die.gov.tr/

TABLE 9. DISTRIBUTION OF SECTORS

NO	SECTOR	FREQUENCY	PERCENT	CUMULATIVE PERCENT
1	TEXTILE/CLOTHING INDUSTRY	28	19,6	19,6
2	FOOD AND SIMILAR PRODUCTS	16	11,2	30,8
3	CONSTRUCTIONS	14	9,8	40,6
4	PAPER AND SIMILAR PRODUCTS(INCLUDING PRINTING AND PUBLICATION)	13	9,1	49,7
5	ELECTRICAL MACHINERY AND APARATUS	13	9,1	58,8
6	CHEMICAL MATERIALS	10	7,0	65,8
7	TRANSPORT EQUIPMENT	10	7,0	72,8
8	OTHER SECTORS	39	27,2	100

46.9% of the companies had their headquarters in Istanbul. Third largest city in Turkey, Izmir, was the home of 21 companies' headquarters and was second in the ranking. Third and fourth in ranking were İzmit and Bursa with 12 and 10 companies, respectively. Remaining 33 companies had their headquarters in other cities of Turkey.

TABLE 10. DISTRIBUTION OF CENTERS

NO	CENTER	FREQUENCY	PERCENT	CUMULATIVE PERCENT
1	İSTANBUL	67	46,9	46,9
2	İZMİR	21	14,7	61,6
3	İZMİT	12	8,4	70
4	BURSA	10	7	77
5	OTHER CITIES	33	23	100

3.2. Modeling Methodology

Our sample data consists of multiple observations, over time, on many observational units, companies. By combining time-series and cross-section information in a panel data analysis, we will have flexibility in modeling the relationship. In panel data estimation, one can either use **fixed effects** model or **random effects** model. In fixed effects model, company specific effects are taken as constant over-time and specific to the company (or cross-section unit of the analysis). In that case, having company-specific dummy variables will serve the purpose. In the random effects specification, company-specific effects are drawn randomly from a distribution that enters the model identically in each period[19].

In the following analysis, we test the effect of exchange rate volatility on trade flows by estimating the following regression equation;

$$Q_{it} = \mu + \mathbf{X}_{it}\beta + \varepsilon_{it}, \quad i=1,\dots143 \text{ and } t=2001,2002, \text{ and } 2003$$

---

[19] For a detailed discussion of Panel data estimation, see Econometric Analysis by W. Green (1997)

where Q_{it} is log of trade flows (export, import or trade volume) for company i for year t. The vector $\mathbf{X}_{it}$ includes a measure of economic activity in the importing country[20], a relative price measure expressed as the ratio of foreign to domestic prices[21], the bilateral exchange rate measured as the price of foreign currencies in terms of the local currency[22], and a measure of volatility, all in natural logarithm, for the export equation. For import equation, measure of economic activity is proxied by the GDP levels in Turkey, again in natural logarithm. Exchange rate volatility is measured by the standard deviation of the monthly bilateral exchange rate in a particular year[23].

In different specifications, we also tried to test the impact of two factors:

(a) for export equation, the dependence on foreign sales by interacting percent in sales (PIS) with volatility measure. For import equation, percent in cost (PIC) measure is used.

(b) the coverage ratio of imports to exports (or inverse for import euqation). Again, this variable (COVER) is interacted with the risk measure. For total trade flow, we used [1+abs(cover-1)] to give the lowest value for the case where import value matches export value.

---

[20] In obtaining the proxy for measure of economic activity in the importing country, we used GDP figures for the 5 major trading partners by calculating a weighted average GDP with equal weights.
[21] In calculating relative price, we used an average price index calculated for the 5 major trading partners. We used consumer price indices.
[22] Since 5 major trading partners have US dollars and Euros as their currency, YTL/$ and YTL/€ are used in the estimations.
[23] Price of US dollar and Euro volatility average is used as the proxy in estimations.

3.3. Results and Discussion

3.3.1. Exports and Volatility

Table 11 presents estimation results for export equation for three different specification. All firms are included in this estimation. For all specifications, Ordinary Least Squares (OLS), fixed and random effects model results are provided.

TABLE 11. EXPORTS AND EXCHANGE RATE RISK - ALL SECTOR

	Specification 1			Specification 2			Specification 3		
Variable	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0012	-.0791	-.0717	.0411	-.0403	-.0339	.2672	.0025	.0181
Standard error	.2272	.8198	.0819	.2206	.0725	.0724	.2215	.0754	.0753
VOLCOV				.0026 ***	.0023 ***	.0023 ***	.0025 ***	.0023 ***	.0023 *
Standard error				.0005	.0003	.0003	.0005	.0003	.0003
VOL*PIS							-.0032 ***	-.0007 *	-.0008 **
Standard error							.0007	.0003	.0003
LM test			295.64***			309.71 ***			275.37 ***
Hausman Test			9.47***			9.86 ***			26.00 ***
Wald				.0392	.2747	.1894	1.4485	.0031	.0682

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.

Model 1 specification includes relative prices, level of economic activity, exchange rates, and volatility variable in the estimation[24]. LVOL represents

---

[24] Given that rlative prices, level of economic activity, and exchange rates are same for all cross-section units, it is not possible to complete the estimation in one step due to singularity problem. Hence, we use a two-step approach and regress dependent variable on these variables individually

log volatility, and although it is negative, it is not significant. This result is true under OLS, fixed and random effect estimation. Lagrange Multiplier (LM) test indicates Generalized Least Squares (GLS), not OLS, should be used for this data. Hausman test, which tests whether fixed or random effects model should be used, shows that fixed effects model should be preferred.

In second specification, we add coverage level as an interaction variable with volatility. One of the best hedging tool is to use export revenue to cover import expenses. Hence, higher the ratio of import to exports, lower the impact of exchange rate volatility on the revenue stream in local currency in the future[25]. As before LM test indicates we should use GLS, and Hausman test indicates we should use Fixed effects model. LVOL is negative but still insignificant. The coefficient on the intearction term (VOLCOV) is positive and significant indicating that higher the imports, lower the impact of volatility on exports. Nevertheless, total effect of volatility (-0.0380), as indicated by the Wald test, is not significant.

In Model 3 specification, we include PIS (percent in sales) as a second interaction. By doing this, we would like to see whether the impact of volatility changes as the share of exports in total sales increases. One might argue that as this share increase, firms will try to hedge their risk exposure, and hence firms with higher PIS value shouldn't be impacted from exchange

---

first, and then use the error term, information that cannot be explained by them, as our dependent variable. Although this causes coefficients to be inefficient, they will still be consistent.

[25] This strategy will not eliminate all the impact of volatility on exports as future planning might still be impacted.

rate volatility. However, if hedging is expensive or hedging tools are not existent, we might see a magnified effect of volatility on exports (hence, a negative sign). Again, LM and Hausman test indicates we should use fixed effects model. Coefficient on VOLCOV is still positive and significant, while the new interaction is negative, in fixed effects model, and significant. However, total effect is still insignificant.

TABLE 12. EXPORTS AND EXCHANGE RATE RISK - CONSTRUCTION SECTOR

Variable	Specification 1			Specification2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0013	-.0798	-.0723	.0417	-.0404	-.0338	.2648	.0027	.0181
Standard error	.2277	.08257	.0825	.2211	.0730	.0730	.2223	.0760	.0759
VOLCOV				.0026 ***	.0023 ***	.0023 ***	.0025 ***	.0023 ***	.0023 ***
Standard error				.0005	.0003	.0003	.0005	.0003	.0003
VOL*PIS							-.0031 ***	-.0006 *	-.0008 **
Standard error							.0007	.0003	.0003
LM test			292.35 ***			306.32 ***			273.30 ***
Hausman Test			9.52 ***			9.92 ***			25.48 ***
Wald				.0402	.2716	.1859	1.4143	.0033	.0675

Note: Wald test provides test statistic on $B_1+B_2*Cover+B_3*PIS$, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.

Table 12 and 13 provides the model results for Construction and Manufacturing sectors, respectively. Neither for Construction nor for manufacturing, results are different than overall results. Results of some manufacturing sub-sectors are provided in Appendix Tables F.1 to F.6.

TABLE 13. EXPORTS AND EXCHANGE RATE RISK – MANUFACTURING SECTOR

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0045	-.0909	-.0835	.0297	-.0603	-.0537	.2644	-.0149	.0001
Standard error	.2453	.0843	.0843	.2390	.0755	.0754	.2404	.0786	.0784
VOLCOV				.0024 ***	.0021 ***	.0021 ***	.0023 ***	.0021 ***	.0021 ***
Standard error				.0005	.0003	.0003	.0005	.0003	.0003
VOL*PIS							-.0031 ***	-.0006 *	-.0008 **
Standard error							.0007	.0003	.0003
LM test			272.68 ***			282.92 ***			252.46 ***
Hausman Test			8.95 ***			9.34 ***			23.75 ***
Wald				.0181	.5947	.4682	1.2036	.0294	.0010

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.

3.3.2. Imports and Volatility

In a similar way, the relationship between exchange rate volatility and imports by these firms are analyzed and results are provided in tables 14, 15 and 16. In table 14, instead of using share of exports in sales, we used share of imports in cost and inverse of coverage ratio (exports over imports).

TABLE 14. IMPORTS AND VOLATILITY - ALL SECTOR

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0065	-.1310	-.1233	-.1762	-.2388 ***	-.2416 ***	.5230 **	-.1782 *	.0148
Standard error	.2578	.0897	.0895	.2216	.0744	.0742	.2047	.0948	.0907
VOLCOV				.0332 ***	.0174 ***	.0193 ***	.0233 ***	.0172 ***	.0186 ***
Standard error				.0029	.0016	.0016	.0027	.0016	.0016
VOL*PIC							-.0215 ***	-.0018	-.0075 ***
Standard error							.0020	.0017	.0015
LM test			249.48 ***			230.56 ***			199.53 ***
Hausman Test			1.99			21.50 ***			58.10 ***
Wald				.4167	8.8999***	9.0153***	6.6411***	3.0336*	.0834
Note: Wald test provides test statistic on B1+B2*Cover+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.									

In table 14, results for whole sample are provided. In the first specification, there is no significant relationship between volatility and imports. However, in specification 2, volatility has a negative and significant impact on imports under fixed effect model (which was preferred based on LM and Hausman tests). Furthermore, as the coverage level increases volatility loses its negative effect, as shown by positive and significant coefficient on VOLCOV. Total effect, -0.2214, is negative and significant as indicated by the Wald test. In the last specification, as the share of imports in cost increases, negative impact of volatility on imports increases. Total effect, -0.1628, is negative and significant at 10% level.

For construction sector (Table 15), we do not find any relationship between volatility and imports. Although coefficient on VOLCOV is positive and significant, total effect is insignificant in all specifications.

TABLE 15. IMPORTS AND VOLATILITY - CONSTRUCTION SECTOR

	Specification 1			Specification 2			Specification 3		
Variable	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	.0012	-.0396	-.0367	.0153	-.0577	-.0427	.0891	-.0708	.0483
Standard error	.6639	.2503	.2502	.3433	.2066	.2059	.3487	.2480	.2246
VOLCOV				.0326 ***	.0148 ***	.0257 ***	.0313 ***	.0148 ***	.0245 ***
Standard error				.0035	.0045	.0032	.0036	.0046	.0034
VOL*PIC							-.0041	.0006	-.0046
Standard error							.0037	.0062	.0038
LM test			26.73 ***			3.93 **			.4.32 **
Hausman Test			.09			16.13 ***			13.26 ***
Wald				.0195	.0431	.0068	.1118	.0512	.0936
Note: Wald test provides test statistic on B1+B2*Cover+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.									

In table 6, results for manufacturing sector are provided. Only in second specification, we find that volatility has a negative impact on imports. Results for some sub-sectors of this relationship are also provided in the Appendix Tables G.1 to G.6.

TABLE 16. IMPORTS AND VOLATILITY - PRODUCTION SECTOR

Variable	Speccification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0093	-.1101	-.1036	-.1892	-.2315 ***	-.2351 ***	.5996 ***	-.1589	.0332
Standard error	.2753	.0976	.0974	.2417	.0811	.0809	.2254	.1042	.1001
VOLCOV				.0327 ***	.0178 ***	.0194***	.0223 ***	.0175 ***	.0185 ***
Standard error				.0032	.0017	.0017	.0030	.0018	.0017
VOL*PIC							-.0228 ***	-.2051	-.0076 ***
Standard error							.0023	.0019	.0017
LM test			217.45 ***			208.77 ***			175.17 ***
1 df, prob value test			.000000			.000000			.000000
Hausman Test			1.08			15.47 ***			50.53 ***
Wald				.4204	6.9878***	7.1528***	7.1502***	1.9520	.1995

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.

3.3.3. Total Trade and Volatility

Instead of investigating exports or imports only, we focus on total trade of a firm (exports plus imports) and try to see whether there is a negative and significant relationship between volatility and trade. In specification 3, we use both share of exports in sales and share of imports in cost as interaction variables. In addition, coverage level is defined differently and takes the value of 1 if exports and imports are equal in value and greater than 1 if it is different which indicates some level of exposure to risk.

TABLE 17. VOLATILITY AND TRADE - ALL SECTORS

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0030	-.1276 **	-.1214 *	-.0018	-.1292 **	-.1232 *	.8129 ***	-.0381	.2123 **
Standard error	.2089	.0647	.0646	.2088	.0648	.0647	.1895	.0980	.0897
VOLCOVT				.0007	.0002	.0002	.0005	.0002	.0002
Standard error				.0007	.0003	.0003	.0006	.0003	.0003
VOL*PIS							-.0127 ***	-.0025	-.0063 ***
Standard error							.0015	.0017	.0014
VOL*PIC							-.0145 ***	-.0006	-.0045 ***
Standard error							.0017	.0015	.0013
LM test			267.18 ***			267.31 ***			220.28 ***
Hausman Test			2.67			3.77			43.87 ***
Wald				.0010	3.9647**	3.6158*	17.3572***	.1815	5.2099**
Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS+B*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS and PIC are not İncluded.									

Table 17 provides estimation results for whole sample. When we use specification 1, we notice that volatility impacts trade negatively and significantly. This finding still holds in specification 2. However, coverage interaction is close to zero and insignificant. In the last specification, there is no significant association between volatility and trade under fixed effects model which was selected by Hausman test.

TABLE 18. VOLATILITY AND TRADE - CONSTRUCTION SECTOR

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0025	-.0760	-.0691	.0644	-.0606	-.0485	.4274	.4905 ***	.4840 ***
Standard error	.3123	.1296	.1294	.3195	.1364	.1362	.3183	.1355	.1306
VOLCOVT				.0015	.0004	.0005	.0006	.0007	.0006
Standard error				.0015	.0008	.0008	.0014	.0005	.0005
VOL*PIS							-.0136 ***	-.0172 ***	-.0169 ***
Standard error							.0045	.0028	.0027
VOL*PIC							.0006	.0010	.0009
Standard error							.0029	.0023	.0022
LM test			21.64 ***			20.35 ***			28.54 ***
Hausman Test			1.50			2.21			.74
Wald				.0425	.1946	.1242	1.7219	12.8040***	13.3957***
Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS and PIC are not İncluded.									

For construction and manufacturing sectors, findings are provided in table 18 and 19, respectively. In table 19, we find a surprising result where the relationship is positive in model specification 3 under random effects model. Although we have similar results in table 19 for manufacturing sector in random effects model, we select fixed effects model by using Hausman test. This specification, on the other hand, indicates that there is no relationship between volatility and trade. Results for some sub-sectors of this relationship are also provided in the Appendix Tables H.1 to H.6.

TABLE 19. VOLATILITY AND TRADE – PRODUCTION SECTOR

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0037	-.1169	-.1111	-.0053	-.1195 *	-.1142	.8884 ***	-.0375	.2311 **
Standard error	.2273	.0716	.0714	.2274	.0718	.0716	.2076	.1089	.0998
VOLCOVT				.0007	.0002	.0002	.0005	.0002	.0002
Standard error				.0007	.0003	.0003	.0006	.0003	.0003
VOL*PIS							-.0122 ***	-.0019	-.0058 ***
Standard error							.0016	.0018	.0015
VOL*PIC							-.0161 ***	-.0008	-.0050 ***
Standard error							.0019	.0016	.0015
LM test			234.15 ***			234.37 ***			186.88 ***
Hausman Test			1.75			2.67			42.31 ***
Wald				.0010	2.7625*	2.5294	17.3296***	.1400	5.0341**

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS and PIC are not İncluded.

CHAPTER IV

CASE: TEXTILE INDUSTRY

In this chapter we aim to understand textile companies attitudes toward foreign exchange risk. We prepare a survey and it consists of five section. First of all, foreign trade activities of companies (their exports, imports and commonly used currencies) are investigated; in the second section we try to measure their knowledge about risk. Thirdly, we bring to light which hedging tools are used by these companies. In the fourth section, their toughts about future values of foreign currencies and how they estimate this value is analyzed. In the last section, we investigate whether they manage the risk or not.

4.1. The Choice of Sector

We selected textile sector for two reasons: there are two big industries in Turkey's export, first one is the machinery and transport equipment industry (MTEI) and the second one is the textile and clothing industries. 29 percent of the total exports were maid by MTEI and 28 percent of the total exports maid by textile and clothing industries in 2004. In MTEI there are few companies and all of them are managed with important capital but in textile and clothing industries there are many small and large companies operating in these industries and they mainly depend on international trade either for raw raw materials or for the sale of final goods. Hence, it will be important to

examine the relationship between exchange rate risk and trade specifically in this chapter.

TABLE 20. SECTORAL SHARE OF TURKEY'S EXPORTS BY WTO DEFINITION (%)

	1990	1995	2000	2001	2002	2003	2004
1-Agricultural Products	25.5	21.1	13.9	13.9	11.2	11.1	10.3
i-Food	22.4	19.6	12.8	12.8	10.2	10.0	9.3
ii-Agricutural Raw Materials	3.0	1.5	1.1	1.1	1.1	1.1	1.0
2-Mining Products	6.8	4.6	4.2	3.9	4.2	4.3	4.6
3-Manufacturing	67.7	74.2	81.7	81.9	84.0	83.8	84.7
i-Iron and Steel	11.5	9.1	6.7	8.0	7.9	7.1	9.5
ii-Chemicals	5.8	4.1	4.5	4.4	4.2	4.0	4.1
iii-Other Semi manufactures	5.2	6.7	8.2	8.4	8.7	8.8	8.7
iv-Machinery and Transport Equi.	**6.6**	**11.1**	**20.7**	**22.8**	**23.9**	**26.2**	**29.0**
v-Textiles	**11.1**	**11.7**	**13.3**	**12.6**	**11.8**	**11.1**	**10.2**
vi-Clothing	**25.7**	**28.3**	**23.7**	**21.3**	**22.4**	**21.1**	**17.8**
vii-Other Consumer Goods	1.9	3.2	4.6	4.5	5.0	5.5	5.5
4-Other Products	0.0	0.1	0.2	0.3	0.6	0.8	0.5
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 21. COMPARISION OF CLOTHING AND TEXTILE INDUSTRY WITH MACINERY AND TRANSPORT EQUIPMENT INDUSTRY

	1990	G.R. (%)	1995	G.R. (%)	2000	G.R. (%)	2001	G.R. (%)	2002	G.R. (%)	2003	G.R. (%)	2004
1-Agricultural Products	3.300	7.6	4.555	-3.1	3.855	12.8	4.349	-6.8	4 052	29.7	5 257	23.3	6.484
i-Food	2.905	9.2	4.239	-3.3	3.543	12.8	3 997	-8.2	3.668	29.1	4.735	24.1	5.875
ii-Agricutural Raw Materials	395	-4.0	316	-0.2	313	12.5	352	9.1	384	36.0	522	16.6	609
2-Mining Products	876	2.9	1.003	3.1	1.157	6.8	1.236	21.1	1.497	34.3	2.011	42.8	2.871
3-Manufactures	8.778	16.6	16.064	8.3	22.699	13.0	25.661	18.0	30.288	30.7	39.594	34.8	53.476
i-Iron and Steel	1.490	6.5	1.972	-1.1	1.865	34.0	2.500	13.2	2.831	13.1	3.342	78.7	5.974
ii-Chemicals	747	3.8	890	7.9	1.243	10.0	1.367	11.4	1.523	24.3	1.893	35.4	2.563
iii-Other Semi manufactures	672	23.3	1.455	11.3	2.280	15.1	2.625	19.6	3.139	32.0	4.143	32.3	5.480
iv-Machinery and Transport Equi.	**855**	**36.3**	**2.406**	**27.7**	**5.740**	**24.6**	**7.153**	**20.7**	**8.632**	**43.3**	**12.370**	**47.7**	**18.265**
v-Textiles	**1.440**	**15.2**	**2.532**	**9.3**	**3.706**	**6.4**	**3.943**	**8.2**	**4.268**	**23.3**	**5.262**	**22.1**	**6.426**
vi-Clothing	**3.331**	**16.8**	**6.121**	**1.5**	**6.586**	**1.1**	**6.661**	**21.5**	**8.094**	**23.1**	**9.962**	**12.3**	**11.191**
vii-Other Consumer Goods	243	36.5	687	17.2	1.279	10.5	1.413	27.4	1.800	45.6	2.622	32.6	3.477
4-Other Products	5	40.0	15	64.0	63	41.3	89	149.4	222	76.0	391	-27.0	285
TOTAL	12.959	13.4	21.637	5.7	27.775	12.8	31.334	15.1	36.059	31.0	47.253	33.6	63.121

Note: G.R. is the growth rate of industries.

4.2. Data

First, a list of companies operating in these industry and their addresses are obtained from the After selecting the sector which we apply our survey we decided to reach all firm by sending post to each of them. To do this, we need company addresses and we gathered companies' address data form the

General Secretariat of Istanbul Textile & Apparel Exporters' Associations[26] official web site. We found 12.018 exporter companies; 10.913 are from Istanbul and 4239 importer companies; 3144 are from Istanbul as shown in table 22. We combined export and import firms into one pool and looked at the frequency of this pool. 86% of firms are operating in Istanbul which is the biggest city and center of business environment in Turkey and textile sector. We randomly select 333 firms from exporters which is nearly 3.1 percent of the total and 325 firms from importers which is 10 percent of the total importers operating in Istanbul. So we totally selected 654 firms and send the survey through mail. After waiting the survey results for two weeks, we initiated the second phrase of data collection and reached the firms that did not respond. After survey has been applied, the data are written in Microsoft Excel spreadsheets and exported to SPPS for analyzing the information.

Overall, we acquired responses for 50 firms. Although the response rate of the survey was 7.6 percent which is lower than the expected, given the small size of the firms in this industry, it shouldn't be surprising.

---

[26] http://www.itkib.org.tr

TABLE 22. CENTER OF THE TEXTILE COMPANIES

CITY	TOTAL	%	EXPORT	%	IMPORT	%
ISTANBUL	14.057	82.4	10.913	90.8	3.144	74.1
BURSA	417	3.5	191	1.6	226	5.3
ANKARA	324	2.4	190	1.6	134	3.2
İZMİR	254	2.7	37	0.3	217	5.1
Others	2.200	9	1.105	5.7	1.095	12.2

4.3. Survey Results

In our sample 44 companies have exporting activities and 37 companies have importing activities with a percentage of 88% and 74% respectively.

TABLE 23. Q1 AND 2. DO YOU EXPORT AND IMPORT?

	EXPORT		IMPORT	
	Frequency	Percent	FREQEUNCY	PERCENT
Yes	44	88	37	74
No	6	12	11	22
Missing	0	0	2	4
Total	50	100	50	50

As shown in table 24, euro and dollar are the mainly used currencies by the exporter textile companies. 24% of the companies carries out their

activities only with euro, 14% only with dollar, 26% uses dollar and euro together.

TABLE 24. Q3. WHICH CURRENCIES DO YOU USE WHEN YOU ARE EXPORTING?

	EXPORT	
	Frequency	Percent
-	6	12,0
Dollar	7	14,0
Dollar-Euro	13	26,0
Dollar-Euro-Another	5	10,0
Euro	12	24,0
Euro-Another	6	12,0
Another	1	2,0
Total	50	100,0

Importer companies also use euro and dollar mostly. 26% of the companies use dollar, 24% use only euro and 10% use dollar and euro together (table 25). This is because of Turkeys' strong trade relationship with European Countries and USA. The big part of Turkey's exports and imports are from these countries(as shown in Chapter 2). In table 5 and 8, the 10 leading coutries in Turkeys exports and imports are put in order. Totally, 65% of them use euro and dollar in their home land. Our finding shows that 79% of the companies use euro and dollar when they export and import.

TABLE 25. Q4. WHICH CURRENCIES DO YOU USE WHEN YOU ARE IMPORTING?

	IMPORT	
	Frequency	Percent
-	13	26,0
Dollar	13	26,0
Dollar-Euro	5	10,0
Dollar-Euro-Ytl	1	2,0
Dollar-Euro-Another	4	8,0
Euro	12	24,0
Euro-Another	1	2,0
Another	1	2,0
Total	50	100,0

Table 26 indicated that they commonly use YTL while selling their products to domestic markets, 60 percent of companies only use YTL, 10 percent of companies only use dollar. On the other hand, 14% of them don't sell their products to domestic markets; they only work with foreign firms.

TABLE 26. Q5. WHICH CURRENCIES DO YOU USE WHEN YOU ARE SELLING PRODUCTS TO DOMESTIC MARKET?

	DOMESTIC MARKET	
	Frequency	Percent
-	7	14,0
Dollar	5	10,0
Dollar-Euro	1	2,0
Ytl-Dollar-Euro	2	4,0
Euro-Dollar-Ytl-Another	1	2,0
Ytl-Dollar	2	4,0
Euro	1	2,0
Ytl-Euro	1	2,0
Ytl	30	60,0
Total	50	100,0

As shown in table 27, YTL is frequently used currency when purchasing raw materials; dollar is coming secondly and than euro. So this shows us most of the textile companies are purchasing their raw materials in Turkey. 30% of the companies use only YTL, 16% only dollar and 12% only euro. 10 percent of the companies use dollar, euro and YTL together. Turkish textile companies commonly use euro and dollar when they are exporting or importing but they use mostly YTL when they are selling products to domestic markets and purchasing raw materials.

TABLE 27. Q6. WHICH CURRENCIES DO YOU USE WHEN YOU ARE PURCHASING RAW MATERIALS?

	RAW MATERIALS	
	Frequency	Percent
-	4	8,0
Dollar	8	16,0
Euro-Dollar	2	4,0
Ytl-Euro-Dollar	5	10,0
Euro-Dollar-Ytl-Another	2	4,0
Euro-Dollar	1	2,0
Dollar-Ytl	7	14,0
Euro	6	12,0
Ytl	15	30,0
Total	50	100,0

Table 28 demonstrated that all firms in our sample are aware of the foreign exchange risks and its importance in competition. 66% of them says that foreign exchange risk affects their profitability at 1-25 percentages, and 18% says that the margin is between 26-50 percentage. Only 10% of them says that they isn't affected by the risk.

TABLE 28. Q8. HOW FOREIGN EXCHANGE RISKS EFFECT YOUR COMPANIES PROFITABILITY ACCORDING TO YOU?

Effects of Risk (%)	Frequency	Percent
0	5	10,0
1-25	33	66,0
26-50	9	18,0
51-75	1	2,0
76-100	2	4,0
Total	50	100,0

Table 29 showed that the majority of the companies also think that they can not protect their firms from foreign exchange risk. 36% of the companies told us that they can protect their firms.

TABLE 29. Q9. DO YOU THINK THAT YOUR COMPANY IS PROTECTED ITSELF FROM FOREIGN EXCHANGE RISKS?

	Frequency	Percent
-	1	2,0
Yes	18	36,0
No	31	62,0
Total	50	100,0

56% of them only changing their selling prices with the foreign exchange rates, 24% of them doing nothing to minimize the risk, 10 percent of them

only use forvered contracts, 4% of them changing their selling prices and use forward contracts, 4% balance their exports and imports to protect themselves from risk and changes their selling prices when volatility increases (Table 30). Minimum number of companies uses derivatives because there is no dynamic and efficient futures and options market for a long time in Turkey and investors' educational problem play important role. Turkish Derivatives Exchange (TURKDEX) has started its operation on July 4, 2001.[27]

TABLE 30. Q10. WHICH ACTIVITIES DO YOU APPLY TO PROTECT YOUR COMPANY FROM FOREIGN EXCHANGE RISKS?

	Frequency	Percent
-	1	2,0
Balancing exports and imports Changing the selling price	2	4,0
Forward Contract	5	10,0
Forward Contract Changing the selling price	2	2,0
Changing the selling price	28	56,0
Anything	12	24,0
Total	50	100,0

Many of the companies in our survey indicated that they do not shift their exports or imports from one country to another country because of foreign exchange risk. Only 4 percent of the firms shift their exports from one country to another country when risk increases (See Appendix E, Q13.A).

---

[27] www.vob.gov..tr

Also they don't reduce their planned exports and imports quantities when exchange rate risks increase. Only %8 percent of the companies reduce their planned exports and imports quantity(See Appendix E, Q14.A and B).

Table 31 indicated %84 of the companies do not change their transaction currencies. Only %16 of them change currencies to protect themselves from foreign exchange exposure. It is because of Turkeys' exports and imports are mainly made with European Union Countries and North America (especially USA) and they use their own currencies when they prepare the agreements.

TABLE 31. Q15. DO YOU CHANGE YOUR BUYING OR SELLING CURRENCIES BECAUSE OF FOREIGN EXCHANGE RISKS?

	Frequency	Percent
Yes	8	16,0
No	42	84,0
Total	50	100,0

%60 of the companies use periodic foreign exchange estimates, %56 get this data from outside (commercial banks) and 18% obtain it from inside. According to the most firms the difference between the real and estimate values was little, only %10 think that the difference was very high. Most of them do not have foreign exchange management department, and only 12% have a department and %8 work with a consulting firm.

Companies have 166 employees on average. The smallest one has 3 employees and the biggest one has 1700 employees. First 10 companies

have employees between 3-9, second have employees between 13 and 40, third have employees between 41 and 115, fourth have employees between 120 and 200 and the last 10 have employees between 250 and 1700.

TABLE 32. Q22. HOW MANY EMPLOYEES DO YOU HAVE?

N	Minimum	Maximum	Mean	Std. Deviation
49	3	1700	166,35	289,845

CHAPTER V

CONCLUSION

In this thesis, the effects of foreign exchange risk on Turkish manufacturing firms were investigated.

In chapter 1, we explained the theory, emprical studies and the risk measure technics used in the analysis of foreign exchange risk.

Chapter 2 contains information about Turkish Foreign Trade activities between the dates 1980 and 2004. It has seen that importance of foreign trade increased overtime in Turkey as Turkey changed its economic development policy from "import substituting industrialization" to "export led growth" strategy.

In chapter three we analyzed the relationship between exchange rate risk and trade flows using firm level data from Turkey. We combined time-series and cross-section information of firms in a panel data analysis to explain the relationships between foreign exchange volatility and exports, imports and total trades of that companies. Overall we found that exchange rate volatility had not a depressing effect on the volume of Turkey export, import and total trade but in one estimation we found negative relationship in total trade volume and risk when all sectors were in consideration. Our analysis also proves that volatility losses its negative effect while the coverage level increases. It demonstrate that one of the best hedging tool is to use export

revenues to cover import expenses. On the other hand, the negative impact of volatility increases when the share of exports in total sales increases. In the same way, when the share of imports in total costs increaes the negative impact of volatility increases.

We also collected information on textile firms through a questionnarry to understand their thoughts and attitudes toward foreign exchange risk.

European Union Countries and USA have the considerable part of Turkey's export and imports. Hence, euro and dollar are the mainly used currencies in Turkey's foreign trade. They commonly use YTL while they are selling products to domestic markets and purchasing raw materials. So they are effected mainly from the volatility of these three currencies.

Another fact revealed in the survey is that they accept foreign exchange risk importance in competition but most of them only change their selling prices to protect their companies from foreign exchange risk. A few number of companies try to balance their exports and imports quantities which is the easiest way to minimize foreign exchange exposure as indicated in our analysis. Also most of them do not use derivatives. It should be a reason that there is no dynamic and efficient futures and options market for a long time in Turkey and investors' educational problem play an important role.

A majority of the companies use periodic foreign exchange estimates and most them get this data from commercial banks and most of them are enjoyed from the estimates. This shows us textile companies have strong

relationship with commercial banks and trust their estimates but commercial banks can not pursued them for using derivatives to protect their customers from foreign exchange exposure.

Most of them do not have foreign exchange management department, only 12% have a department and %8 work with a conlsulting firm. It proves the fact that whether the cost of risk management is costly than the risk or they do not give adequate importance to foreign exchange risk.

Further work in foreign exchange risk effects on trade flows should be consider two aspects which are omitted from this analysis. First one is the size of the firm or the share of international operations and its effects on risk, because highly international firms are most likely to be influenced by exchange rate changes but as the size or the share of international operations increases, it may be expected that firms will have higher incentives to hedge against that risk. The second one is the market structure, because the level of competitiveness in any market might also impact the firms' exposure to exchange rate risk. If a firm operates in less competitive industries, they have the ability to adjust local currency prices and reduce risk, but in more competitive industries it is difficult to minimize that risk.

APPENDIX A

EXCHANGE RATE VARIABILITY

A.1: EXCHANGE RATE VARIABILITY

	S_{jp}	S_{fr}	S_{gm}	S_c	S_{uk}
57:1-72:12	0.15	0.42	0.27	0.05	0.03
73:1-96:7	0.67	1.33	0.46	0.13	0.10
	$\square_{jp}$	$\square_{fr}$	$\square_{gm}$	$\square_c$	$\square_{uk}$
57:1-72:12	0.40	0.22	0.16	0.14	0.25
73:1-96:7	0.32	0.18	0.13[a]	0.18	0.33
	SP_{jp}	SP_{fr}	SP_{gm}	SP_c	SP_{uk}
57:1-72:12	2.24	2.01	2.20	1.60	1.66
73:1-96:3	1.77	2.89	1.75	2.07	2.30
	Y_{jp}	Y_{fr}	Y_{gm}	Y_c	Y_{uk}
57:1-72:12	0.63	1.66	0.92	0.49	0.69
73:1-95:10	0.63	0.75	0.83[b]	0.51	0.70

S_j: Price of US dollar in terms of country j's money.
$\square$: Monthly price changes, calculated by using CPI.
SP: Monthly changes in the stock price index.
Y: Monthly changes in industrial production.
JP: Japan ; FR: France ; GM: Germany ; C: Canada ; UK: United Kingdom
(a): 73:1-95:8 ; (b): 73:1-94:12

APPENDIX B

FOREIGN TRADE OF TURKEY

B.1: THE SHARE OF FOREIGN TRADE IN GNP OF TURKEY BETWEEN THE YEARS 1990 AND 2005

	Share in GNP (%)						
	1990	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**
Exports (FOB)	8,6	12,7	13,8	21,1	19,9	19,8	21,5
Imports (CIF)	14,8	21,0	27,1	27,9	28,5	29,0	33,2
Volume	23,4	33,7	40,8	49,1	48,4	48,7	54,7
Deficit	-6,2	-8,3	-13,3	-6,8	-8,6	-9,2	-11,7
GNP	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

APPENDIX C

FREQUENCY AND DESCRIPTIVE ANALYSIS OF DATA

C.1: ESTABLISH DATES

MEAN	1970,36

C.2: NUMBER OF EMPLOYEES

YEARS	MEAN
2001-2002	890,20
2002-2003	862,91

C.3: REVENUES

YEARS	MEAN
2001	-304.466,82
2002	7.147.442,12
2003	13.880.316,40

C.4: EXPORTS

YEARS	MEAN
2001	37.939,8263
2002	47.568,5059
2003	62.165,4687

C.5: EXPORT PROPORTION IN SALES

YEARS	MEAN %
2001	33,7296
2002	32,5233
2003	30,0338
AVERAGE	32,1

C.6: IMPORTS

YEARS	MEAN
2001	58.427,9905
2002	66.075,9544
2003	93.561,7893

C.7: IMPORT PROPORTION IN COSTS

YEARS	MEAN %
2001	30,2541
2002	29,2217
2003	30,0472
AVERAGE	29,8

APPENDIX D

THE QUESTIONNAIRE (TURKISH)

DÖVİZ KURU RİSKİ

Lütfen aşağıda sorulan firmanızın döviz kuru riski ile ilgili düşüncelerini öğrenmeye yönelik hazırlanan soruları cevaplayınız.

I. Genel Sorular

1. İhracat yapıyor musunuz?

   a. Evet   b. Hayır

2. İthalat yapıyor musunuz?

   a. Evet   b. Hayır

Eğer 1. ve 2. soruya evet yanıtını verdiyseniz;

3. İhracat yaparken hangi para birimlerini kullanıyorsunuz?

   a. Dolar   b. Euro   c. Ytl   d. Diğer

4. İthalat yaparken hangi para birimlerini kullanıyorsunuz?

   a. Dolar   b. Euro   c. Ytl   d. Diğer

5. İç piyasaya satış yaparken hangi para birimlerini kullanıyorsunuz?

   a. Dolar   b. Euro   c. Ytl   d. Diğer

6. Ham madde alımlarınızda hangi para birimlerini kullanıyorsunuz?

   a. Dolar   b. Euro   c. Ytl   d. Diğer

II. Döviz kuru riskinin algılanması

7. Döviz kuru riskinin ne olduğunu biliyor musunuz?

    a. Evet   b. Hayır

8. Sizce döviz kuru riski karlılığınızı ne kadar etkiliyor? (%)

    a. 0   b. 1-25   c. 26-50   d. 51-75   e. 76-100

III. Döviz kuru riskinden korunma

9. Şirketinizin döviz kuru riskinden korunduğunu düşünüyor musunuz?

    a. Evet   b. Hayır

10. Döviz kuru riskinden korunmak için ne tür aktivitelere başvuruyorsunuz?

    a. İthalat ve ihracat dengesi ile   b. Forward Contract
    c. Satış fiyatlarını değiştirerek   d. Diğer
    f. Hiçbiri

11. Döviz kuru riskinden korunma yöntemlerine başvuran bildiğiniz şirketler var mı?

    a. Var   b. Yok

12. Döviz kuru riskinden korunmanın ileride rekabet açısından daha önemli rol oynayacağını düşünüyor musunuz?

    a. Evet   b. Hayır

13. a) Döviz kuru riskindeki artıştan dolayı ihracatınızı bir ülkeden başka bir ülkeye kaydırıyor musunuz?

    a. Evet   b. Hayır

13. b) Döviz kuru riskindeki artıştan dolayı ithalatınızı bir ülkeden başka bir ülkeye kaydırıyor musunuz?

    a. Evet   b. Hayır

14. a) Döviz kuru riskinin artacağını düşündüğünüz zaman planladığınız ihracat miktarlarını azaltıyor musunuz?

    a. Evet   b. Hayır

14. b) Döviz kuru riskinin artacağını düşündüğünüz zaman planladığınız ithalat miktarlarını azaltıyor musunuz?

    a. Evet   b. Hayır

15. Risk yüzünden satış ve alışlarınızda kullandığınız para birimlerini değiştiriyor musunuz?

    a. Evet   b. Hayır

IV. Döviz Kuru Tahminleri

16. Periyodik olarak yapılan döviz kuru tahminlerini kullanıyor musunuz?

    a. Evet   b. Hayır

17. Periyodik döviz kuru tahminlerini dışardan mı yoksa içerden mi temin ediyorsunuz?

    a. Dışardan   b. İçerden

18. Eğer tahminleri dışardan sağlıyorsanız, hangi kurumlardan?

    a. Devletten   b. Çalıştığınız Bankalardan
    c. Danışman firmalardan   d. Tahtakale'den

19. Döviz kuru tahminleriyle gerçek değerler arasında oluşan fark ne boyuttadır?

    a. Hiç   b. Az   c. Orta   d. Çok

V. Döviz kuru yönetimi

20. Döviz kuru yönetiminden sorumlu bir departmanınız var mı?

    a. Var   b. Yok

21. Döviz kuru riskinin yönetiminde, danışman firmalardan yararlanıyor musunuz?

    a. Evet   b. Hayır

22. Şirketinizde çalışan personel sayısı kaç?

    Çalışan Sayısı :

APPENDIX E

FREQUENCY ANALYSIS OF SURVEY

E.1[28]: DO YOU KNOW THAT WHAT DO FOREIGN EXCHANGE RISKS MEAN?

	Frequency	Percent
Yes	50	100

E.2[29]: DO YOU KNOW ANY COMPANIES WHICH APPLY METHODS TO PROTECT THEMSELVES FROM FOREIGN EXCHANGE RISKS?

	Frequency	Percent
Yes, we have	7	14,0
No, we don't have	43	86,0
Total	50	100,0

E.3[30]: DO YOU THINK THAT PROTECTING COMPANIES FROM FOREIGN EXCHANGE RISKS PLAY AN IMPORTANT ROLE IN COMPETITION?

	Frequency	Percent
Yes	39	78,0
No	11	22,0
Total	50	100,0

---

[28] Seventh question of Questionnaire.
[29] Eleventh question of Questionnaire.
[30] Twelfth question of Questionnaire.

E.4[31]: DO YOU SHIFT YOUR EXPORTS FROM ONE COUNTRY TO ANOTHER BECAUSE OF THE INCREASING RISKS IN FOREIGN EXCHANGE RISKS?

	Frequency	Percent
-	3	6,0
Yes	2	4,0
No	45	90,0
Total	50	100,0

E.5[32]: DO YOU SHIFT YOUR IMPORTS FROM ONE COUNTRY TO ANOTHER BECAUSE OF THE INCREASING RISKS IN FOREIGN EXCHANGE RISKS?

	Frequency	Percent
-	3	6,0
No	47	94,0
Total	50	100,0

E.6[33]: DO YOU REDUCE YOUR PLANED EXPORTS WHEN YOU THING THAT FOREIGN EXCHANGE RISKS COULD INCREASE?

	Frequency	Percent
-	3	6,0
Yes	4	8,0
No	43	86,0
Total	50	100,0

---

[31] Question 13.A.
[32] Qurstion 13.B.
[33] Question 14.A.

E.7[34]: DO YOU REDUCE YOUR PLANED IMPORTS WHEN YOU THING THAT FOREIGN EXCHANGE RISKS COULD INCREASE?

	Frequency	Percent
-	3	6,0
Yes	4	8,0
No	43	86,0
Total	50	100,0

E.8[35]: DO YOU USE ANY PERIODIC ESTIMATES OF FOREIGN EXCHANGE?

	Frequency	Percent
Yes	30	60,0
No	20	40,0
Total	50	100,0

E.9[36]: DO YOU PROVIDE THE PERIODIC FOREIGN EXCHANGE ESTIMATES FROM OUTSIDE OR INSIDE?

	Frequency	Percent
-	11	22,0
Outside	28	56,0
Outside – Inside	2	4,0
Inside	9	18,0
Total	50	100,0

---

[34] Question 14.B.
[35] Question 16.
[36] Question 17.

E.10[37]: FROM WHICH INSTITUTIONS DO YOU GET THE ESTIMATES?

	Frequency	Percent
-	20	40,0
From Government	3	6,0
From Banks – From Government	5	10,0
From Government – From Banks From Counselor Firms – From Tahtakale	1	2,0
From Government – From Banks – From Tahtakale	1	2,0
From Banks	11	22,0
From Banks – From Counselor Firms	1	2,0
From Tahtakale – From Banks	5	10,0
From Counselor Firms	1	2,0
From Tahtakale	2	4,0
Total	50	100,0

E.11[38]: WHAT IS THE DIFFERENCE BETWEEN THE REAL AND ESTIMATE VALUES ACCORDING TO YOU?

	Frequency	Percent
-	6	12,0
Any	1	2,0
Little	24	48,0
Middle	14	28,0
Many	5	10,0
Total	50	100,0

---

[37] Question 18.
[38] Question 19.

E.12[39]: DOU YOU A DEPARTMENT WHICH IS RESPONSIBLE FOR MANAGING FOREIGN EXCHANGE RISKS?

	Frequency	Percent
Yes, we have	6	12,0
No, we don't have	43	86,0
Total	49	98,0
Missing System	1	2,0
Total	50	100,0

E.13[40]: DO YOU WORK WITH A COUNSELOR FIRM WHILE MANAGING FOREIGN EXCHANGE RISKS?

	Frequency	Percent
Yes	4	8,0
No	45	90,0
Total	49	98,0
Missing System	1	2,0
Total	50	100,0

---

[39] Question 20.
[40] Question 21.

APPENDIX F

EXPORT AND VOLATILITY

F.1: EXPORTS AND EXCHANGE RATE RISK
FOOD INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0045	-.0909	-.0835	.0297	-.0603	-.0537	.2644	-.0149	.0001
Standard error	.2453	.0843	.0843	.2390	.0755	.0754	.2404	.0786	.0784
VOLCOV				.0024 ***	.0021 ***	.0021 ***	.0023 ***	.0021 ***	.0021 ***
Standard error				.0005	.0003	.0003	.0005	.0003	.0003
VOL*PIS							-.0031 ***	-.0006 *	-.0008 **
Standard error							.0007	.0003	.0003
LM test			272.68 ***			282.92 ***			252.46 ***
Hausman Test			8.85 ***			9.34 ***			23.75 ***
Wald				.0181	.5947	.4682	1.2036	.0294	.0010

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.

F.2: EXPORTS AND EXCHANGE RATE RISK
TEXTILE INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0036	-.1029	-.0938	.0367	-.0674	-.0593	.2574	-.0094	.0037
Standard error	.2702	.0958	.0957	.2625	.0855	.0855	.2644	.0884	.0882
VOLCOV				.0024 ***	.0021 ***	.0021 ***	.0023 ***	.0021 ***	.0021 ***
Standard error				.0005	.0003	.0003	.0005	.0003	.0003
VOL*PIS							-.0033 ***	-.0010 **	-.0010 **
Standard error							.0009	.0004	.0004
LM test			232.20 ***			241.12 ***			217.21 ***
Hausman Test			8.56 ***			9.02 **			19.91 ***
Wald				.0222	.5835	.4475	.9426	.0089	.0030

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.

F.3: EXPORTS AND EXCHANGE RATE RISK
PAPER AND SIMILAR PRODUCTS INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0031	-.0856	-.0828	.0142	-.0749	-.0714	.2733	-.0143	-.0024
Standard error	.3221	.0812	.0811	.3215	.0812	.0812	.3216	.0833	.0832
VOLCOV				.0015	.0009	.0010	.0014	.0009	.0010 *
Standard error				.0010	.0006	.0006	.0011	.0006	.0006
VOL*PIS							-.0037 ***	-.0009 **	-.0010 ***
Standard error							.0010	.0003	.0003
LM test			193.97 ***			193.73 ***			181.56 ***
Hausman Test			3.58 *			3.62			11.10 **
Wald				.0024	.8296	.7517	.7106	.0293	.0010

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS, where B1 is the coefficient on risk variable. In Model 2, PIS is not included.

F.4: EXPORTS AND EXCHANGE RATE RISK
CHEMICAL MATERIALS INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	.0017	-.0176	-.0167	.0229	-.0034	-.0015	.2114	.0677	.0751
Standard error	.3171	.0912	.0912	.3162	.0913	.0913	.3219	.0939	.0937
VOLCOV				.0015	.0009	.0010 *	.0014	.0010	.0010 *
Standard error				.0010	.0006	.0006	.0009	.0006	.0006
VOL*PIS							-.0023 **	-.0009 **	-.0010 ***
Standard error							.0010	.0003	.0003
LM test			159.34 ***			159.10 ***			156.02 ***
Hausman Test			.27			.35			2.67
Wald				.0059	.0010	.0010	.4279	.5219	.6444

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.

F.5: EXPORTS AND EXCHANGE RATE RISK
ELECTRICAL MACHINERY AND APARATUS INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0035	-.0044	-.0044	-.2431	-.1183	-.1209	-.0220	-.0481	-.0462
Standard error	.6029	.1332	.1332	.6174	.1335	.1334	.6427	.1385	.1384
VOLCOV				.0784	.3723 **	.0381 ***	.0641	.0347 **	.0353 **
Standard error				.0511	.1452	.0144	.0524	.0144	.0143
VOL*PIS							-.0027	-.0010	-.0010 *
Standard error							.0023	.0006	.0006
LM test			61.93 ***			60.78 ***			60.76 ***
Hausman Test			2.61			3.41			3.37
Wald				.0738	.3921	.4096	.0039	.0115	.0078

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.

F.6: EXPORTS AND EXCHANGE RATE RISK
TRANSPORT EQUIPMENT INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	.0204	.0204	.0204	-.5412	-.3275 *	-.3320 **	.9921	.0473	.1121
Standard error	.9123	.2199	.2199	.8984	.1680	.1678	.7973	.2117	.2079
VOLCOV				.1985 **	.1230 ***	.1246 ***	-.0848	.0749 **	.0670 **
Standard error				.0886	.0244	.0243	.0954	.0290	.0286
VOL*PIS							-.0411 ***	-.0134 **	-.0158 ***
Standard error							.0093	.0053	.0051
LM test			31.88 ***			32.82 ***			28.93 ***
Hausman Test			.00			.35			2.80
Wald				.1524	1.6433	1.6921	1.3231	.3295	.7666

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.

APPENDIX G

IMPORT AND VOLATILITY

G.1: IMPORTS AND VOLATILITY
FOOD INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0060	.1903	.1684	-.2986	-.6316	-.1209	-.0965	.0906	.0447
Standard error	.5712	.2423	.2421	.4395	.2080	.2057	.4728	.2250	.2225
VOLCOV				.0195 ***	.0106 ***	.0127 ***	.0182 ***	.0099 ***	.0117 ***
Standard error				.0034	.0027	.0025	.0036	.0027	.0025
VOL*PIC							-.0061	-.0047	-.4851 *
Standard error							.0054	.0029	.0029
LM test			26.27 ***			24.96 ***			25.65 ***
Hausman Test			4.76 **			3.75			3.48
Wald				.4040	.0642	.2788	.0322	.1847	.0547

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS is not İncluded.

G.2: IMPORTS AND VOLATILITY
TEXTILE INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	.0229	-.0559	-.0395	-.2549	-.1683	-.2012	.0637	-.5043 *	-.2017
Standard error	.5213	.2659	.2648	.4419	.2588	.2564	.4414	.2855	.2702
VOLCOV				.0313 ***	.0129 **	.0191 ***	.0252 ***	.0145 ***	.0194 ***
Standard error				.0057	.0055	.0049	.0059	.0053	.0047
VOL*PIC							-.0130 **	.0132 **	-.0000
Standard error							.0049	.0056	.0045
LM test			42.97 ***			27.33 ***			18.66 ***
Hausman Test			.46			6.14 **			17.78 ***
Wald				.2566	.3633	.5071	.0299	2.8662	.4655

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIC is not İncluded.

G.3: IMPORTS AND VOLATILITY
PAPER AND SIMILAR PRODUCTS INDUSTRY

	Specification 1			Specification 2			Specification 3		
Variable	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	.0028	-.1036	-.0997	.0088	-.1041	-.1004	.2749	.0984	.1193
Standard error	.4560	.1228	.1227	.4602	.1225	.1224	.5275	.2280	.2185
VOLCOV				.0840	.0735	.0730	.0657	.0613	.0600
Standard error				.1305	.0696	.0672	.1316	.0704	.0682
VOL*PIC							-.0054	-.0038	-.0042
Standard error							.0053	.0036	.0034
LM test			28.57 ***			28.39 ***			29.37 ***
Hausman Test			1.32			1.41			.94
Wald				.0372	.0476	.0385	.3924	.4754	.6485
Note: Wald test provides test statistic on B1+B2*Cover+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIC is not İncluded.									

G.4: IMPORTS AND VOLATILITY
CHEMICAL MATERIALS INDUSTRY

	Specification 1			Specification 2			Specification 3		
Variable	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0139	-.0139	-.0139	-.0311	-.1466	-.1457	1.2895	-.0301	.0032
Standard error	.7583	.1510	.1510	.7851	.0928	.0928	.8034	.1724	.1711
VOLCOV				.0337	.2610 ***	.2592 ***	-.4667	.2150 ***	.2001 ***
Standard error				.2629	.0461	.0460	.2798	.0737	.0731
VOL*PIC							-.0273 ***	-.0024	-.0030
Standard error							.0089	.0030	.0029
LM test			24.86 ***			25.20 ***			20.61 ***
Hausman Test			-.01			-.15			-.03
Wald				.0010	1.5260	1.5030	1.2060	2.0918	2.5412
Note: Wald test provides test statistic on B1+B2*Cover+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIC is not İncluded.									

G.5: IMPORTS AND VOLATILITY
ELECTRICAL MACHINERY AND APARATUS INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	.0023	.2247	.2052	-1.0190	-.0262	-.1685	1.0440	1.1122 **	1.5006 ***
Standard error	1.0165	.2934	.2928	.8351	.2882	.2854	.7687	.5058	.4101
VOLCOV				.2574 ***	.0588 **	.0832 ***	.1889 ***	.0414 *	.0630 ***
Standard error				.0580	.0257	.0250	.0464	.0235	.0224
VOL*PIC							-.0333 ***	-.0202 **	-.0301 ***
Standard error							.0070	.0078	.0056
LM test			25.24 ***			10.08 ***			8.04 ***
Hausman Test			1.14			16.58 ***			22.62 ***
Wald				.8607	.0136	.0947	2.5725	5.3637**	14.9646***

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIC is not İncluded.

G.6: IMPORTS AND VOLATILITY
TRANSPORT EQUIPMENT INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0007	-.1847	-.1840	-.4254	-.1835	-.2028	.8901	.1089	.1395
Standard error	.8990	.1162	.1161	.7027	.1257	.1253	.8605	.1486	.1480
VOLCOV				.5743 ***	-.0025	.0379	.2667	.0191	.0476
Standard error				.1387	.0727	.0703	.1843	.0605	.0587
VOL*PIC							-.0306 **	-.00857 **	-.0098 ***
Standard error							.0133	.0031	.0031
LM test			23.07 ***			13.42 ***			15.07 ***
Hausman Test			.03			4.76 **			4.98
Wald				.0458	2.1952	1.7398	2.1603	.6175	1.4044

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIC is not İncluded.

APPENDIX H

TOTAL TRADE AND VOLATILITY

H.1: VOLATILITY AND TRADE - FOOD INDUSTRY

	Specification 1			Specification 2			Specification 3		
Variable	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	-.0197	-.1245	-.1195	-.1852	.0018	-.0149	.2538	.0725	.1652
Standard error	.4462	.1409	.1407	.4647	.1459	.1453	.4630	.1997	.1842
VOLCOVT				.0772	-.0640 **	-.0530 *	.0540	-.0614	-.0430
Standard error				.0642	.0304	.0297	.0719	.0430	.0410
VOL*PIS							-.0096 ***	-.0026	-.0061 *
Standard error							.0033	.0045	.0035
VOL*PIC							-.0058	-.0003	-.0014
Standard error							.0057	.0028	.0027
LM test			36.57 ***			32.23 ***			35.02 ***
Hausman Test			.60			3.09			2.49
Wald				.0576	.2087	.2493	.4145	.0017	.3983

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS and PIC are not İncluded.

H.2: VOLATILITY AND TRADE - TEXTILE INDUSTRY

	Specification 1			Specification 2			Specification 3		
Variable	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	.0093	-.0272	-.0164	.0069	-.0357	-.0289	.7027	-.2660	.4498
Standard error	.4212	.2427	.2414	.4215	.2465	.2445	.3760	.3787	.2817
VOLCOVT				.0006	.0002	.0003	.0002	-.0000	.0001
Standard error				.0006	.0005	.0005	.0005	.0005	.0004
VOL*PIS							-.0139 ***	-.0023	-.0122 ***
Standard error							.0027	.0061	.0033
VOL*PIC							-.0067 *	.0137 **	.0016
Standard error							.0039	.0054	.0040
LM test			34.06 ***			33.89 ***			15.48 ***
Hausman Test			.19			1.25			12.72 **
Wald				.0010	.0208	.0137	3.3172*	.4679	2.4791

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS and PIC are not İncluded.

H.3: VOLATILITY AND TRADE
PAPER AND SIMILAR PRODUCTS INDUSTRY

	Specification 1			Specification 2			Specification 3		
Variable	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	.0033	-.1266	-.1215	-.1233	-.0695	-.1290	.5195	.0553	.1428
Standard error	.4723	.1307	.1306	.4296	.1400	.1366	.4402	.2502	.2335
VOLCOVT				.0185 ***	-.0089	.0013	.0212 ***	-.0105	.0013
Standard error				.0064	.0081	.0065	.0072	.0089	.0073
VOL*PIS							-.0092	-.0053	-.0063*
Standard error							.0057	.0038	.0036
VOL*PIC							-.0109 **	-.0006	-.0032
Standard error							.0052	.0042	.0038
LM test			27.37 ***			23.20 ***			21.66 ***
Hausman Test			1.90			6.61 **			6.64
Wald				.05966	.3266	.8987	1.4098	.0250	.3411

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS and PIC are not İncluded.

H.4: VOLATILITY AND TRADE
CHEMICAL MATERIALS INDUSTRY

	Specification 1			Specification 2			Specification 3		
Variable	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	.0014	.0014	.0014	.0030	.0017	.0018	1.0634	.1043	.1150
Standard error	.7675	.0777	.0777	.7793	.0798	.0798	.7658	.1161	.1159
VOLCOVT				-.0044	-.0010	-.0010	.0011	.0004	.0004
Standard error				.0089	.0027	.0027	.0091	.0030	.0030
VOL*PIS							-.0181 **	-.0008	-.0010
Standard error							.0065	.0013	.0013
VOL*PIC							-.0211 **	-.0024	-.0026
Standard error							.0089	.0019	.0019
LM test			26.44 ***			26.38 ***			16.24 ***
Hausman Test			.00			.00			.10
Wald				.0010	.0010	.0010	1.8102	.7778	.9477

Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS and PIC are not İncluded.

H.5. VOLATILITY AND TRADE
ELECTRICAL MACHINERY AND APARATUS INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	.0121	.1749	.1638	.0836	.4569 **	.4484 ***	1.9457 **	.6177 *	.9633 ***
Standard error	.8755	.2212	.2209	.9389	.1704	.1702	.7641	.3188	.2950
VOLCOVT				-.0162	-.0639 ***	-.0632 ***	.0288	-.0827 ***	-.0556 ***
Standard error				.0683	.0143	.0142	.0532	.0235	.0215
VOL*PIS							.0109	-.0127	-.0054
Standard error							.0091	.0076	.0069
VOL*PIC							-.0461 ***	.0078	-.0065
Standard error							.0101	.0100	.0087
LM test			27.45 ***			28.22 ***			24.78 ***
Hausman Test			.85			1.34			9.14 *
Wald				.0054	5.6288**	5.4175**	6.6988***	2.6930	9.0802***
Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS and PIC are not İncluded.									

H.6: VOLATILITY AND TRADE
TRANSPORT EQUIPMENT INDUSTRY

Variable	Specification 1			Specification 2			Specification 3		
	OLS	Fixed	Random	OLS	Fixed	Random	OLS	Fixed	Random
LVOL	.0224	-.1252	-.1239	-.0747	-.2464	-.2456	1.6977 **	.2632	.3815 **
Standard error	.7895	.1704	.1701	.8442	.1712	.1709	.7191	.1894	.1858
VOLCOVT				.0365	.0413 *	.0414 *	.0538	.0120	.0127
Standard error				.0967	.0224	.0223	.0777	.0230	.0218
VOL*PIS							-.0163 **	-.0081 *	-.0080 **
Standard error							.0073	.0044	.0039
VOL*PIC							-.0404 ***	-.0082 *	-.0114 ***
Standard error							.0087	.0041	.0038
LM test			19.74 ***			20.24 ***			8.66 ***
Hausman Test			.02			.04			17.31 ***
Wald				.0022	1.5640	1.5547	5.9786**	2.0988	4.5695**
Note: Wald test provides test statistic on B1+B2*Cover+B3*PIS+B3*PIC, where B1 is the coefficient on risk variable. In Model 2, PIS and PIC are not İncluded.									

APPENDIX I

YEARLY EURO AND DOLLAR VALUES

I.1: GRAPHICAL ILLUSTRATION OF EURO VALUES BETWEEN THE YEARS 2001 AND 2004
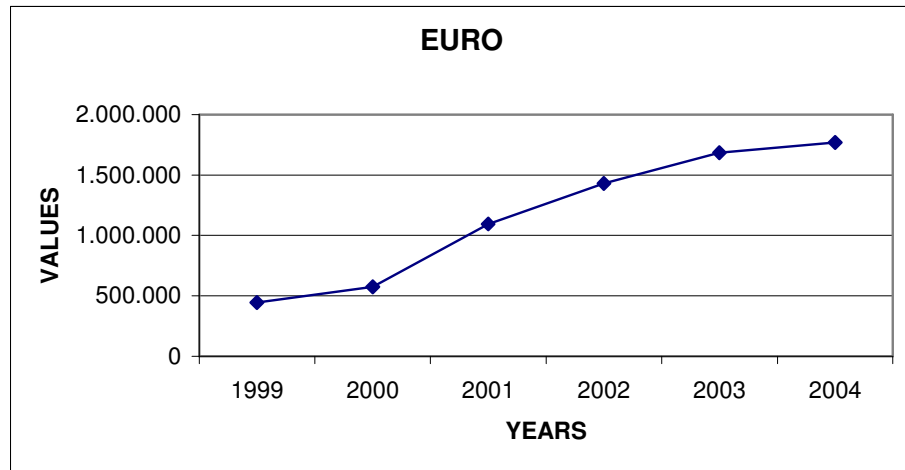
I.2: EURO VALUES AND ITS PERCENTAGE CHANGES BETWEEN THE YEARS 1999 AND 2004

YEARS	VALUES	DIFFERENCES	%CHANGE
1999	445.677,00	0,00	0,00%
2000	573.942,00	128.265,00	1,29%
2001	1.093.683,00	519.741,00	1,91%
2002	1.429.766,00	336.083,00	1,31%
2003	1.685.301,00	255.535,00	1,18%
2004	1.767.685,88	82.384,88	1,05%

I.3: GRAPHICAL ILLUSTRATION OF DOLLAR VALUES BETWEEN THE YEARS 2001 AND 2004
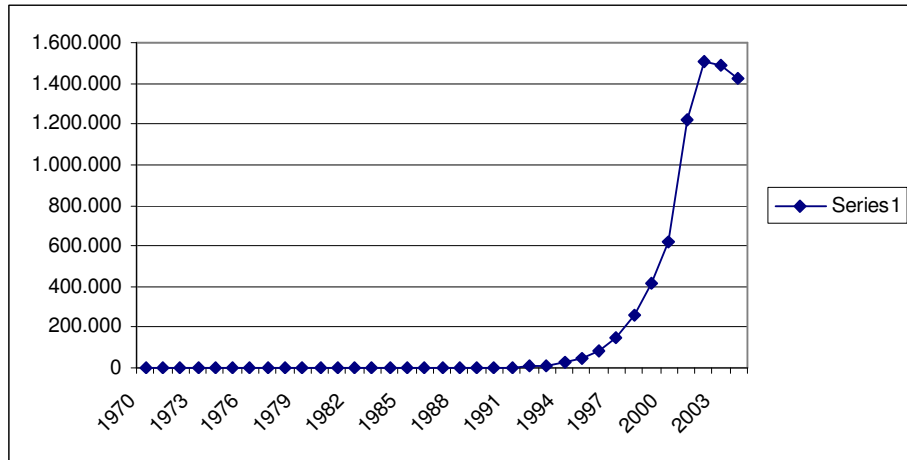
I.4: DOLLAR VALUES AND ITS PERCENTAGE CHANGES BETWEEN THE YEARS 1999 AND 2004

YEARS	AVERAGE VALUES	DIFFERNCE	%CHANGE
1970	11,3	0,0	0
1971	14,8	3,5	1,31%
1972	14,0	-0,8	0,94%
1973	14,0	0,0	1,00%
1974	13,8	-0,2	0,98%
1975	14,3	0,5	1,04%
1976	15,9	1,6	1,11%
1977	19,3	3,4	1,21%
1978	24,0	4,8	1,25%
1979	30,8	6,7	1,28%
1980	75,1	44,4	2,44%
1981	110,2	35,1	1,47%
1982	160,9	50,6	1,46%
1983	224,0	63,1	1,39%
1984	364,3	140,4	1,63%
1985	519,5	155,2	1,43%
1986	669,4	149,9	1,29%
1987	856,2	186,8	1,28%
1988	1.425,7	569,5	1,67%
1989	2.120,8	695,1	1,49%
1990	2.606,3	485,5	1,23%
1991	4.175,3	1.569,0	1,60%
1992	6.874,4	2.699,1	1,65%
1993	11.035,7	4.161,3	1,61%
1994	29.788,3	18.752,7	2,70%
1995	45.738,5	15.950,2	1,54%
1996	81.386,2	35.647,6	1,78%
1997	152.071,3	70.685,1	1,87%
1998	260.974,4	108.903,1	1,72%
1999	420.126,2	159.151,8	1,61%
2000	623.704,0	203.577,8	1,48%
2001	1.225.411,8	601.707,8	1,96%
2002	1.505.839,5	280.427,7	1,23%
2003	1.493.067,8	-12.771,8	0,99%
2004	1.422.341,2	-70.726,5	0,95%

BIBLIOGRAPHY

Ascheim, J.; G.S. Tavlas, and M. Ulan (1993), "The Relationship Between Exchange-Rate Variability and Protection", in D. Salvatore (ed.), Protectionism and World Welfare, Cambridge University Press.

Assery, A and D. A. Peel (1991), "The Effects of Exchange Rate Volatility on Exports: Some new estimates", Economics Letters, 37, pp. 173-177.

Bailey, Martin J; Tavlas, George S; Ulan, Michael. (1986) "Exchange-Rate Variability and Trade Performance: Evidence for the Big Seven Industrial Countries", Weltwirtschaftliches Archiv, 122, pp. 466-447.

Baldwin, R. and P. Krugman (1989), "Persistent Trade Effects of Large Exchange Rate Shocks," The Quarterly Journal of Economics, Vol. CIV, Nov.,Issue 4, pp. 635-654.

Baron, D. (1970), "Price Uncertainty, Utility, and Industry Equilibrium", International Economic Review, Oct., 11, pp. 463-480.

Baum, Christopher F., Çağlayan, Mustafa, and Özkan, Neslihan (2004), "Nonlinear effects of exchange rate volatility on the volume of bilateral exports", Journal of Applied Econometrics, 19, pp. 1-23.

Caporale, Tony and Khosrow Doroodian (1994), "Exchange Rate Variability and The Flow of International Trade" Economics Letters, 46, pp.49-54.

Chowdhurry, Abdur R. (1993), "Does Exchange Rate Volatility Depress Trade Flows? Evidence From Error Correction Models", The Review of Economics and Statistics.

Consumer Price Indexes, Sixteen Countries, 1950-2004, http://www.bls.gov/fls/flscpian.pdf, (15.09.2004)

Cote, Agathe (1994), "Exchange Rate Volatility and Trade, A Survey", International Department Bank of Canada.

Cushman, D. O. (1986), "Has Exchange Risk Depressed International Trade? The Impact of Third Country Exchange Risk", Journal of International Money and Finance, 5, pp. 361-378.

Domingues, Kathryn M. E. & Tesar, Linda L. (2001) "Trade and Exposure", The American Economic Review.

Gagnon (1993) Gagnon, J.E. (1993), "Exchange Rate Variability and the Level of International Trade," Journal of International Economics, 34, pp. 269-287.

Green, W., Econometric Analysis (1997)

Grobar, Lisa Morris. (1992) "The Effect of Real Exchange Rate Uncertainty on LCD Manufactured Exports", Journal of Development Economics, 41, pp.367-376.

Hasan vergil (2002), "Exchange Rate Volatility in Turkey and Its Effect on Trade Flows" Journal of Economic and Social Research.

Holthausen, D.M. (1979), "Hedging and the Competitive Firm Under Price Uncertainty", American Economic Review, Dec., 69, pp. 989-995.

Hooper, P. and S. W. Kohlhagen (1978), " The Effect of Exchange Rate Uncertainty on the Prices and Volume of International Trade", Journal of International Econoics, 8, pp.483-511.

Istanbul Stock Exchange, Year Book of Companies, http://www.imkb.gov.tr/sirket/sy (06.09.2004)

Koray, Faik & Lastrapes, William D. (1989), " Real Exchange Rate Volatility and U.S. Bilateral Trade: A Var Approach" The Review of Economics and Statistics.

Kumar R. and R. Dhawan (1991) Kumar, R. and R. Dhawan (1991), "Exchange Rate Volatility and Pakistan's Exports to the Developed World, 1974-1985," World Development, Vol. 19, No. 9, pp. 1225-1240.

Mohsen Bahmani-Oskooee (1991), "Exchange Rate Uncertainty and Trade Flows of Developing Countries", The Journal of Developing Areas.

Poso, Susan (1992), "Conditional Exchange-Rate Volatility and The Volume of International Trade: Evidence From The Early 1900s", The Review of Economics and Statistics, pp. 325-329.

Qian and Varangis (1994),"Does Exchange Rate Volatility Hinder Export Growth? Additional Evidence", Emprical Economics, 19, pp. 371-396.

Republic Of Turkey, Prime Ministry State Institute Of Statistics, http://www.die.gov.tr/, (05.03.2005)

Sandmo, A. (1971), "On the Theory of the Competitive Firm Under Price Uncertainty", American Economic Review, March, 61, pp. 65-73.

The General Secretariat Of Istanbul Textile & Apparel Exporters' Associatıons, http://www.itkib.org.tr, (11.03.2005)

Thursby, Jerry G. and Thursby, Marie C. (1987), "Bilateral Trade Flows, The Linder Hypothesis, and Exchange Risk", Review of Economics and Statistics pp. 488-495.

Turkish Deraivatives Exchange, www.vob.gov..tr, (08.11.2005)

Undersecreteriat of Prime Ministry for Foreign Trade (2005), Turkey's Foreıgn Trade 1990-2004, http://www.dtm.gov.tr/ead/english/basinyayin.doc (13.07.2005).

World bank, Online Data Query, http://devdata.worldbank.org/data-query/ (11.10.2004)