# Impact Of Exchange Rate Fluctuations and Political Risk On The Risk Premiums Reflected in The Cross-Sections Of Individual Equity Returns

A THESIS

Özer YILMAZ

June 1996

# IMPACT OF EXCHANGE RATE FLUCTUATIONS AND POLITICAL RISK ON THE RISK PREMIUMS REFLECTED IN THE CROSS-SECTIONS OF INDIVIDUAL EQUITY RETURNS

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Submitted to the Department of Management

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For the Degree of

Master of Business Administration

By

Özer Yılmaz

June 1996

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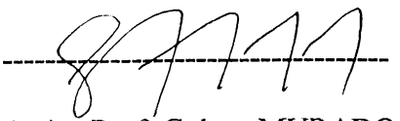

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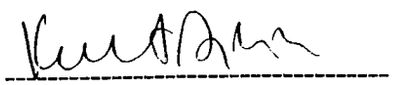

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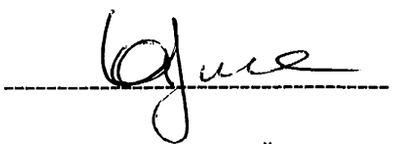

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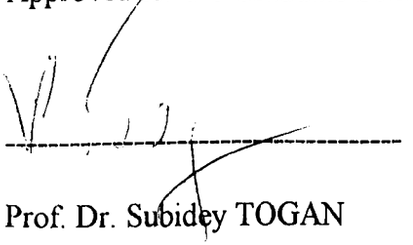

Prof. Dr. Subidey TOGAN

## ABSTRACT

The impact of exchange rate fluctuations and political risk on the risk premiums of individual equity returns trading in Istanbul Stock Exchange will be analyzed empirically. Turkey as an emerging market faced considerable monetary and political turbulence in the past decade. Variables from the currency and sovereign debt markets will be the proxies for exchange rate risk and political risks, respectively. Evidence of the risk premiums as a result of the exposure to the equity markets show valuable inferences although statistically significant conclusions are not the majority.

These results have many implications for the corporate and portfolio management. This study also provides tools and data that can be utilized by the emerging market researchers.



Key Words: Exchange rate risk, political risk, Istanbul Stock Exchange, emerging markets.

# ÖZET

Kur riski ve politik risk etkisiyle İstanbul Menkul Kıymetler Borsası'nda işlem gören hisse senetlerinin taşıdıkları risk primi ampirik olarak analiz edilmektedir. Geçen on yılda gelişen bir piyasa olarak Türkiye, önemli parasal ve siyasal çalkantılarla karşı karşıya kalmıştır. Kur riski ve politik risk için sırasıyla, kurlar ve bono ve tahvil piyasasından değişkenler bu çalışmada yer alacaklar. Türkiye'de hisse senedi piyasasına girerek risk primi ile karşı karşıya kalanlar için istatistiksel olarak kanıt gösterilebilecek değerde sonuçlar çoğunluğu oluşturmasa da, bu çalışma bazı değerli yargılara varmamıza yardımcı olmaktadır.

Bu çalışmanın sonuçlarının kurum ve portföy yönetimi açısından pek çok etkileri vardır. Aynı zamanda bu çalışma gelişen piyasalarda araştırma yapanlar tarafından kullanılabilecek araçlar ve veriler de ortaya koymaktadır.

Anahtar kelimeler: Kur riski, politik risk, İstanbul Menkul Kıymetler Borsası, gelişen piyasalar.

*To my Grandmother*

*and Grandfather ...*

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# CHAPTER 1

# INTRODUCTION

The effects of exchange rate fluctuations and the winds blowing in the political environment are substantial in leading our investment decisions. All the financial agents, including the naive investor to the multi-national conglomerates, are exposed to volatile exchange rates and risky political environment. The yield premium of the investment as a consequence of such factors is the deciding point of concern.

The exporting companies are favorably affected by the depreciation in the real value of the domestic currency assuming the unavailability of costless hedging mechanisms. Similarly, importing companies are adversely affected by the depreciation in the real value of the domestic currency given the exchange rates and the price levels are significantly volatile and costless hedging instruments are nonexistent. Thus, exchange rate risk directly relates to the value of the company since it has an impact on the cash flows.

Even if the company is not operating cross-borders currency risk has an indirect impact on the company because foreign competitors are negatively or positively affected by this economic factor. Other factors that may support the existence of an ex ante risk premium are the input costs or the aggregate demand that the company faces as a consequence of the floating exchange rate.

Similarly, political risk premium reflected in companies' share prices may be an outcome of the debt financing structure. It can also be correlated with suppliers and/or customers whether they are foreign or domestic. Also, the dependence on international transactions, or the exposure to material changes in the laws and regulations related to currency controls or capital flow barriers are delegates for the significance of the political risk premium reflected on the share prices of companies.

Economic reforms deregulating sensitive industries and breaking the free ride of monopolies and other privileges are worth searching for proxy of political risk premium. Even democratization which eliminates close ties to military circles will have major influence from this point of view.

As a consequence of the above assertions, it is worth testing the existence of ex ante equity yield risk premium to factors like currency fluctuations and political events.

A study on the search for impact of exchange rate fluctuations and political risk that are reflected in individual equity returns of Turkish companies listed with the Istanbul Stock Exchange (ISE), while Turkey is still experiencing considerable monetary and political turbulence, seemed a challenging and rewarding project.

The purpose of this empirical study is to test the extent of the exposure of stock prices of individual companies from the same country to exchange rate fluctuations and political risk.

In other words, the possible existence of risk premiums in stock prices will be questioned. The input impulses will be the currency fluctuations and political risk. The ex ante yield risk premium that is searched for in the cross-sections of share prices because of the currency volatility and changes in the political environment may lead us to interesting findings.

The results of the similar papers of this kind both for emerging markets and developed countries suggested some common implications as referred in Bailey and Chung (1994). It is aimed with this study that the evidence of such implications, if any, will help to structure our corporate and portfolio management practices and contribute as another emerging market example to the literature.

The data set uses currency market prices of Central Bank of Turkey and Treasury bill prices of Turkish Treasury to proxy for the changes in currency and political risks, respectively, and following a procedure similar to Bailey and Chung (1994) is used for equity markets to measure expected risk premiums in Turkey. It is worth mentioning that currency and debt markets provide useful information for an in depth understanding of the stock market.

This study is organized as follows: Chapter 2 reviews the literature. Chapter 3 describes the empirical methodology and the data set. The results and findings are in Chapter 4, and Chapter 5 offers some concluding remarks.

# CHAPTER 2

# LITERATURE REVIEW

There are research findings on national stock index returns converted into a common currency evidencing premium for exchange rate fluctuations, e.g. Brown and Otsuki (1993) and Ferson and Harvey (1993). However, research done on cross-sections of stock returns from the same country received relatively less attention for the priced portion of similar risks.

Bailey and Chung (1994) state that if the effects of currency and political risks do not vanish in well-diversified portfolios, exposure to these factors should yield risk premiums in an asset market in equilibrium.

In the scope of the literature, it is reported by Jorion (1990,1991) that some U.S. equity values react to fluctuations in the trade-weighted value of the dollar. On the other hand, it is also observed that exposure to exchange rate does not envisage an ex ante risk premium in the U.S. stock market as again concluded by Jorion (1990,1991).

Besides, relating to studies about nonlinear dependencies in price changes, Press (1968) and Clark (1973) report evidence that the unconditional variances are nonstationary. Neftçi (1984) concludes that there are no theoretical reasons for assuming either the linearity or the independence of price changes.

The comovement of world stock indices are examined and no significant lead and lags among developed stock exchanges are found by Agmon (1974), Granger and Morgenstein (1970). Hilliard (1979) examines the structure of international equity market indexes during the OPEC embargo. He finds no common worldwide financial market factor. Most intracontinental prices move simultaneously. Most intercontinental prices are not closely related. His results of low correlations among international markets support the previous studies.

And according to Yüce (1996) Istanbul Stock Exchange is dominated by 3 or 4 big family owned corporations and state owned companies. Their influence on the index is so pervasive that it is open to question whether Turkish investors can diversify effectively by forming portfolios of 15-20 stocks or even 30 stocks. However, Yüce (1996) concludes that diversification is possible against the presence of the public companies of the same conglomerate.

Alexakis and Petrakis (1991) analyze the behavior of returns on Greek stocks. They hypothesize that the components which affect a small capital market are more related to the existence of alternative investment opportunities and to social and political conditions, and less to economic activity and the economic profits of companies. In politically and economically unstable countries, returns on real estate and gold investments are generally higher compared to returns on stocks. Their results indicate that the alternative investment opportunities, together with socio-political factors, affect the evolution of the share price index. Foreign competition seems to have by far the greatest explanatory power followed by the socio-political factor and the domestic investment opportunities. These factors outweigh economic activity and companies' profits.

Bailey and Chung (1994) claims it is reasonable to suppose that we can learn something about the effects of these risks from non-U.S. markets where the impact of currency fluctuations and political risk may be different.

Ferson and Harvey (1991) suggest that very little of the variation in U.S. stock returns can be explained by variation in the risk exposures of those returns. The recent studies of Akgiray (1989) and Hsieh (1991) about U.S. stock prices all find nonlinear dependence in the series. However, Bailey and Chung (1994) finds it reasonable to imagine that risk exposures may be less stable in developing economies which have grown, evolved, opened to the global economy very rapidly.

Risk is defined as the uncertainty associated with the end-of-period value of an investment in an asset or portfolio of assets by Sharpe and Alexander (1990) and consequently risk exposure is holding a position in an investment carrying the mentioned uncertainty.

The purpose of this study will be to search for the ex ante risk premium as a result of the exchange rate fluctuations and political risks in the equities trading in the Istanbul Stock Exchange.

Exchange rate risk can be defined as the risk taken by being exposed to changes in the currency fluctuations by underlying effects, such as the consequences of importing and exporting relations with domestic or foreign customers or suppliers.

Political risk may be defined as the risk faced as a consequence of exposure to currency controls, capital flow barriers, governing laws and regulations by the governing body.

Focus of this study will be on the cross-sections of individual equity returns in Turkey and the risk premium from the same market. The same approach will also be applied with the same hypotheses on an industry basis.

Two groups of variables to proxy for exchange rate risk and political risk will be used. First group consists of economic risk factor variables. Second group consists of lagged information variables. Each group has three variables and each variable has a corresponding related variable from the other group. So, the two group of variables are not disjoint.

The concluding remarks will focus on the effects of the findings to the corporate portfolio manager and the individual investor exposed to such risks.

# CHAPTER 3

# METHODOLOGY

## TEST PROCEDURE

The empirical approach that is based on observation, adopted from Bailey and Chung (1994), is both simple and powerful since it uses currency market and debt market prices as proxies for changes in exchange rate and political risks to measure expected risk premium.

It is assumed that the expected return on a risky asset is determined by its exposure to systematic economic forces and by the effective expected risk premiums for exposure to those forces:

(1)

$$E_t\left(r_{i,t,t+1} / \left(\Omega_t\right)\right) = \lambda_0\left(\Omega_t\right) + \sum_{j=1}^{n} \beta_{j,i} \cdot \lambda_j\left(\Omega_t\right)$$

where,

t: is the time and t+1 is the next observation time (here the period interval is 1 month)

t, t+1: is the return for the variable subscripted

$\Omega_t$ : is the information available at time t

$E_t$ : is the expectations operator conditioned on the information $\Omega_t$

$r_{i,t,t+1}$ : is the nominal return on the ith asset in excess of the yield on a nominally riskless security

$\beta_{j,i}$ : is the sensitivity of the ith asset to the jth risk factor

$\lambda_j$ : is the expected risk premium for exposure to the jth risk factor.

Factors which proxy for exchange rate risk and political risk we are interested in will be specified as variables to this empirical study. The dependence of expected risk premiums on the current information set, $\Omega_t$, permits equity risk premiums to vary through time.

The query looked for is: to what extent do cross-sectional differences in exposures to exchange rate and political risk measures yield significant differences in stock returns. Time series regressions are used to measure risk exposures of individual security excess returns on contemporary (synchronized) changes in economic risk factors first:

(2a)

$$r_{i,t,t+1} = \beta_{0,i} + \sum_{j=1}^{n} \beta_{j,i} \cdot x_{j,t,t+1} + \varepsilon_{i,t,t+1}$$

where,

t: is the time and t+1 is the next observation time (here the period interval is 1 month)

t, t+1: is the change for the variable subscripted

$r_{i,t,t+1}$ : is the nominal return on the ith asset in excess of the yield on a nominally riskless security

$\beta_{j,i}$ : is the sensitivity of the ith asset to the jth risk factor

$\chi_{j,t,t+1}$ : represents the unexpected change in the jth economic risk factor.

Then, the return series are regressed with lagged information variables, $z_t$ instead of $x_t$. Again, time series regressions are used to measure risk exposures of individual security excess returns on changes in lagged information variables:

(2b)

$$r_{i,t,t+1} = \beta_{0,i} + \sum_{j=1}^{n} \beta_{j,i} \cdot z_{j,t} + \varepsilon_{i,t,t+1}$$

where,

t: is the time and t+1 is the next observation time (here the period interval is 1 month)

t, t+1: is the change for the variable subscripted

$r_{i,t,t+1}$ : is the nominal return on the ith asset in excess of the yield on a nominally riskless security

$\beta_{j,i}$ : is the sensitivity of the ith asset to the jth risk factor

$z_{j,t}$ : represents the unexpected change in the jth lagged information variable

The lagged information variables, $z_t$, will explicitly be defined in the data set section. The results suggest whether the exchange rate and political risk factors selected are significant. They provide coefficients to be used in the following tests.

The regression part is repeated once more for the equally weighted industry portfolios rather than the individual stock returns both with the economic risk factors and the lagged information variables. The aim here is to interpret the findings on an industry basis and eliminating the potential problems leading to deviations like missing observations for individual stocks and noise in individual stock returns.

## DATA SET

The sample period spans from January 1990 to October 1994. Monthly data for the following variables are extracted as of the last working day or the last available data of the respective month where applicable and except where noted. A total of 58 observations for each of the variables are included in this study.

Table 1-a in Appendix A, lists the 43 stock price sample with summarized characteristics; the tick mark indicates that specific stock is calculated and 33 of them has weight in the ISE composite index. Most of the stocks have full set of observation data of 58. Table 1-b presents the stock price sample grouped by industries. The stock price sample is formed from 10 different industries formed as consequence of the stock selection process.

Table 1-c in Appendix A lists the real return series of all the stocks used in this study.

### Stock Prices

Monthly stock prices with a precision of 1 Turkish Lira (TL) are obtained from Bilkent University Faculty of Business Administration database as softcopy. The monthly prices were adjusted for splits dividends and rights offerings. If the individual stock did not trade on the last day of the month it is recorded as a missing observation for that stock following the tests of Bailey and Chung (1994).

Selected number of equities are 43 for the sample period spanned of which 33 are used in the weighted average composite index calculation of ISE. None of the equities are trading in the regional market, where all are trading within the national market. Number of missing observations was the deciding factor of the selection process. Stocks with more than 4 missing observations are not included which resulted a stock data set consisting of 43 equities. 11 of the equities have 1 and 1 of the equity has 4 missing observations where the remaining 32 stocks have full number of observations during the sample period covering 58 months. So, the stock with minimum number of observations has 54 observations. Arithmetic average of the one-month preceding and one month following observations are interpolated to be able to calculate the monthly return series and to complete the regressions.

Real returns of stock prices are expressed with nominal stock returns in excess of the yield on a one-month treasury bill (if there is no one month T-bill auction for that month, monthly compounded return for the three months T-bill rates are used).

(3)

$$r_{i,t+1} = \frac{p_{i,t+1} - p_{i,t}}{p_{i,t}} - r_{f,t,t+1}$$

where,

t: is the time and t+1 is the next observation time

t, t+1: is the percent change for the variable subscripted

$p_{i,t}$: is the price of the ith stock at time t

$r_{f,t,t+1}$: is the monthly yield of the Turkish treasury T-bill

$r_{i,t+1}$ : is the excess return on the ith asset in excess of the yield on a nominally riskless security

**Economic Risk Factors**

Three economic risk factors are specified to represent the general economic trends, currency fluctuations, and political risk. They proxy for the economic shocks, $x_t$, defined in equation 2a.

The first variable in $x_j$ is, RFX, official foreign exchange return, that represents the monthly percent change in the official TL per U.S. dollar foreign exchange rate.

The expression for RFX is:

(4)

$$RFX_{t+1} = \frac{OfficialTL/\$Rate_{t+1} - OfficialTL/\$Rate_t}{OfficialTL/\$Rate_t}$$

where, Official TL/$ Rate is the official exchange rate announced by the Central Bank of Turkey.

The second economic risk factor variable, DFXPREM is the monthly change in the free market premium for dollars. The free market premium equals the spread between free and official exchange rates divided by the official exchange rate.

(5)

$$DFXPREM_{t+1} = \frac{\frac{FreeTL/\$Rate_{t+1} - OfficialTL/\$Rate_{t+1}}{OfficialTL/\$Rate_{t+1}} - \frac{FreeTL/\$Rate_t - OfficialTL/\$Rate_t}{OfficialTL/\$Rate_t}}{\frac{FreeTL/\$Rate_t - OfficialTL/\$Rate_t}{OfficialTL/\$Rate_t}}$$

where, Free TL/$ Rate is the free market exchange rate as printed in Hürriyet newspaper and Official TL/$ Rate is the official exchange rate announced by the Central Bank of Turkey.

The official rate governs exports, most imports and debt service. The free rate applies to tourism receipts, foreign travel by Turkish citizens abroad, and other imports. The premium for dollars in the free market resides the likelihood of increased capital controls, the pressure of flight capital given political and economic uncertainty, and expectations about forthcoming currency devaluation.

Thus, changes in the dollar premium reflect changes in a combination of legal, political, and currency factors. As a consequence, the dollar premium increases as the risk of capital controls, political turbulence, or devaluation increase.

The third economic risk factor variable, RMKT, real market return, is the monthly log-change in the ISE composite index in excess of the yield on a one-month treasury bill of Turkish Government. ISE composite index is the capitalization-weighted average of prices of exactly 100 most liquid equities, also known as the ISE 100.

RMKT is expressed as:

(6)

$$RMKT_{t+1} = \ln\left(\left|\frac{ISEindex_{t+1} - ISEindex_t}{ISEindex_t} * 100 - onemonthTbillyield_{t,t+1}\right|\right)$$

where, ISE index are the Istanbul Stock Exchange composite index and one month T-bill yield is the Turkish treasury one month T-bill yield.

**Lagged Information Variables**

The lagged information variables can be interpreted as a subset of the elements of the information set, $\Omega_t$ in Equation 1 or as proxies for the expected risk premiums, $z_j$ as expressed in Equation 2b. These variables are used to impose the significance of time-varying equity market risk premiums. These will also be used to derive the presence of currency and political risk premiums common to the stock, and currency markets. One lagged information variable, $z_t$ is selected for each of the three economic risk factors, $x_t$.

FORWARD, the yield spread between one-month Turkish and U.S. own-currency Treasury bills is the lagged exchange rate information variable. As the name given to the information variable implies, the yield spread is an indicator of the expected inflation differential.

(7)

$FORWARD_t$ = 1m Turkish treasury T-bill $rate_t$ - 1m US treasury T-bill $rate_t$

It also equals the forward premium for dollars and can be thought of as the sum of the expected future exchange rate and risk premium. To the extent that the Central bank of Turkey uses interest rates to manage the exchange rate, FORWARD is also positively correlated with efforts to control the depreciation of the TL.

FXPREM is the corresponding lagged information variable of the economic risk variable DFXPREM, monthly percent change in the free market premium for dollars. FXPREM is the premium for U.S. dollars at the free market rate, defined as the difference between the free market TL per dollars rate and official TL per dollars rate.

(8)

$FXPREM_t$ = Free TL/$ $Rate_t$ - Official TL/$ $Rate_t$

Similarly, FXPREM is high when currency and political risks are high.

Finally, the lagged equity market information variable DIVYIELD is the average annualized dividend yield data from ISE and is an outcome of the calculations based on the stocks trading on national market and the regional market published periodically in the monthly bulletin of ISE.

# CHAPTER 4

# FINDINGS

## Summary Statistics

Table 2 presents summary statistics for monthly series of economic risk factors and information variables. It is seen that the mean value for RFX, monthly percent change in the official TL per US dollar foreign exchange rate, is 5.14% during the sample period. Since this is a monthly figure, the average annualized compounded devaluation is over 82% during the sample period. Mean of FORWARD at 5.19%, the spread between Turkish and U.S. T-bill yield, roughly equals average annualized interest rate differential of 83.5%. However, 5.19% monthly interest rate differential is meaningful when compared to the 5.14% monthly appreciation of dollar against the domestic currency since it indicates an explanation to uncovered interest rate parity. It is also meaningful considering the low level of inflation in the United States. Figure 1 in Appendix C plots the official exchange rate with its corresponding lagged information variable namely, RFX and FORWARD.

The mean of DFXPREM, monthly percent change in the free market premium for dollars is at 3.29% and less than the mean of RFX, official dollar return being 5.4%.

Autocorrelation is calculated for lags of 1, 2, 3, 4, 5, and 12 for monthly series of economic risk factors. Seasonal or quarterly movements or patterns repeated year after year could not be observed for the economic risk factors within the significance level of 5%. However, two of the lagged information variables, FORWARD and DIVYIELD, show persistent serial correlation for first four of the lags calculated and all three lagged information variables show significant autocorrelation coefficients at the first lag. Significant autocorrelation lags are indicated with an asterisk under the coefficient.

Cross-correlations between the variables can be found in Table 2-c. Again, to a significance level of 5% it is seen that RFX and FORWARD are relatively correlated among other variables that can be interpreted as the obedience of official exchange rate to uncovered interest rate parity.

The expression for interest rate differential is:

(9)

$$\frac{1+r_{TL}}{1+r_{\$}} = \frac{f_{TL/\$}}{s_{TL/\$}}$$

where, $f_{TL/\$}$ is the forward TL per dollar exchange rate and $s_{TL/\$}$ is the spot TL per dollar exchange rate. Also, $r_{TL}$ and $r_{\$}$ are the interest rates for the Turkish and U.S. markets, respectively.

Also it is seen that FORWARD and DIVYIELD have cross correlation significant at the 5% level.

Figure 2 plots the free market premium relative to the official dollar rate (FXPREM, DFXPREM) and finally Figure 3 shows the dividend yield and monthly rate of change of the ISE composite index (RMKT, DIVYIELD).

Table - 2 Summary Statistics for Monthly Series of Economic Risk Factors and Information Variables

Table - 2.a Economic Risk Factors Summary Statistics

| Variable | Description | Mean | Standard Deviation | Autocorrelation at Lag: | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 | 4 | 5 | 12 |
| RFX | Monthly percent change in the official TL per US dollar foreign exchange rate | 0.0514 | 0.0782 | 0.155 | -0.026 | 0.108 | -0.050 | -0.044 | -0.054 |
| DFXPREM | Monthly percent change in the free market premium for dollars | 3.2991 | 39.6745 | -0.011 | -0.009 | -0.014 | 0.021 | 0.002 | -0.007 |
| RMKT | Monthly log-change in the ISE composite index in excess of the riskless T-bill rate | 2.1915 | 1.1057 | -0.039 | -0.120 | 0.026 | -0.009 | 0.097 | 0.116 |

Table - 2.b Information Variables Summary Statistics

| Variable | Description | Mean | Standard Deviation | Autocorrelation at Lag: | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 | 4 | 5 | 12 |
| FORWARD | Monthly yield spread between Turkish and U.S. own currency Treasury bills | 5.1907 | 1.6311 | **0.893** * | **0.756** * | **0.642** * | **0.511** * | **0.386** * | 0.020 |
| FXPREM | Premium for U.S. dollars at the free market rate relative to the official rate | 49.0467 | 326.3960 | **0.302** * | -0.219 | -0.153 | 0.007 | 0.022 | -0.014 |
| DIVYIELD | Annualized dividend yield on the ISE composite index | 0.0450 | 0.0172 | **0.822** * | **0.684** * | **0.509** * | **0.355** * | 0.221 | -0.015 |

* indicates significance at the 5% level

Table - 2.c Cross-correlations

| | RFX | DFXPREM | RMKT | FORWARD | FXPREM | DIVYIELD |
|---|---|---|---|---|---|---|
| RFX | 1.0000 | | | | | |
| DFXPREM | 0.0680 | 1.0000 | | | | |
| RMKT | -0.0960 | -0.0306 | 1.0000 | | | |
| FORWARD | **0.2983** * | 0.0079 | -0.0035 | 1.0000 | | |
| FXPREM | 0.1450 | 0.0210 | 0.1118 | -0.1596 | 1.0000 | |
| DIVYIELD | 0.1540 | 0.0512 | -0.0063 | **0.4544** * | 0.0411 | 1.0000 |

* indicates significance at the 5% level

**The Behavior of Monthly Security Returns**

Table 3-a, Table 3-b and Table 3-c presents the results of the tests run besides summary statistics for individual stock returns. In all of the tables cross-sectional distributions are presented. In other words, percentile ranks of 43 individual equities in quartiles are presented. In Tables 3-b and 3-c, 43 regressions are ran and the resulting quartile figures are presented. Mean and the standard deviations of cross-section of individual stocks and the number of firms with beta coefficients significant at 5% level are also presented. Adjusted R-square output and Durbin-Watson Statistics are also used to support our conclusions.

Table 3-b presents the cross-sectional distribution of regression results for the economic risk factors while Table 3-c presents the cross-sectional distribution of regression results for the lagged information variables.

Table 3-a presents the cross-sectional distribution of univariate statistics on monthly real stock returns. Even though the real stock returns are expressed in excess of the risk-free market rate the median return is more than one percent (1.11%). This can be interpreted as the availability of real growth potential in stock market prices. Second interpretation may be the existence of risk premium due to high and unexpected inflation during the period. The volatility are substantial as expected from an emerging market given in the standard deviation column. Serial correlation in monthly stock returns is evident in first and second lags for only 4 of the stocks out of 43.

Table 3-b and Table 3-c summarizes coefficients of the regression (Equation 2a and Equation 2b) of stock returns on the economic risk factors and lagged information variables, respectively. Again, cross-sectional distribution of coefficients are presented of the 43 regressions for each table. It is observed that RFX, the change in the official exchange rate is significant for 37 out of 43 of the stocks in the sample. This variable will lead us to crucial inferences when we consider the equally weighted industry analysis in the next section.

And it is apparent that none of the stocks show significant exposure to DFXPREM, the change in the free market dollar premium and RMKT, real market return. This means that local investors are insensitive to increases in currency risk and political risk as measured by DFXPREM: They do not sell stocks and be exposed to dollars with devaluation expectations.

Among the three lagged variables, DIVYIELD exhibits significant forecast power for selected stocks (42 out of 43). This feature will also be observed with industry portfolio analysis in the next section. Other than that, namely FORWARD and FXPREM, slope coefficients show little explanatory power.

Also, it is observed that the residuals of the regressions for both economic risk factors and the lagged information variables are uncorrelated since the Durbin-Watson d Statistic is around 2.

Table - 3 The Behaviour of the Monthly Stock Returns

Table - 3.a Cross-sectional distribution of univariate statistics on monthly stock returns

| | Mean | Standard Deviation | Autocorrelation at Lag: | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 12 |
| Minimum | -0.0209 | 0.1830 | -0.2510 | -0.3370 | -0.2510 | -0.2910 | -0.2180 | -0.2740 |
| First Quartile | 0.0037 | 0.2349 | -0.0420 | -0.0510 | -0.1355 | -0.1815 | -0.0920 | -0.1120 |
| Median | 0.0111 | 0.2617 | 0.0370 | 0.0190 | -0.0580 | -0.1200 | -0.0330 | -0.0590 |
| Third Quartile | 0.0243 | 0.3109 | 0.1345 | 0.1345 | 0.0050 | -0.0435 | 0.0285 | 0.0060 |
| Maximum | 0.0639 | 0.3745 | 0.3540 | 0.3330 | 0.1700 | 0.1730 | 0.1810 | 0.1950 |
| Cross-sectional Mean | 0.0145 | 0.2700 | 0.0473 | 0.0245 | -0.0630 | -0.1120 | -0.0252 | -0.0490 |
| Cross-sectional Standard Deviation | 0.0179 | 0.0460 | 0.1373 | 0.1473 | 0.1047 | 0.0994 | 0.0992 | 0.1070 |
| Number of Firms with Autocorrelation ssignificant at the 5% level | | | 4 out of 43 | 4 out of 43 | 0 out of 43 | 2 out of 43 | 0 out of 43 | 1 out of 43 |

Table - 3.b

Cross-sectional distribution of coefficients from regressions of monthly sto unanticipated changes in risk factors

| | Slope Coefficients on: | | | Adjusted $R^2$ | Durbin-Watson Statistics |
|---|---|---|---|---|---|
| | RFX | DFXPREM | RMKT | | |
| Minimum | -0.9384 | -0.0003 | -0.0404 | -0.0562 | 1.2700 |
| First Quartile | -0.6682 | 0.0001 | -0.0010 | -0.0325 | 1.6950 |
| Median | -0.4558 | 0.0004 | 0.0079 | -0.0168 | 1.9200 |
| Third Quartile | -0.1676 | 0.0009 | 0.0221 | 0.0062 | 2.0800 |
| Maximum | 1.2269 | 0.0017 | 0.0608 | 0.1394 | 2.5200 |
| Cross-sectional Mean | -0.3412 | 0.0005 | 0.0095 | -0.0079 | 1.8967 |
| Cross-sectional Standard Deviation | 0.4715 | 0.0005 | 0.0215 | 0.0379 | 0.2773 |
| Number of firms with Beta coefficients significant at the 5% level | 37 out of 43 | 0 out of 43 | 0 out of 43 | | |

Table - 3.c

Cross-sectional distribution of coefficients from forecasting regressions of monthly stock returns on lagged information variables

| | Slope Coefficients on: | | | Adjusted $R^2$ | Durbin-Watson Statistics |
|---|---|---|---|---|---|
| | FORWARD | FXPREM | DIVYIELD | | |
| Minimum | -0.0379 | -0.0003 | -8.5179 | -0.0530 | 1.3600 |
| First Quartile | -0.0118 | -0.0002 | -4.4182 | -0.0147 | 1.7550 |
| Median | 0.0044 | -0.0001 | -2.4528 | 0.0093 | 1.9300 |
| Third Quartile | 0.0131 | -0.0001 | -1.0749 | 0.0455 | 2.0800 |
| Maximum | 0.0458 | 0.0001 | 0.6565 | 0.1843 | 2.6100 |
| Cross-sectional Mean | 0.0031 | -0.0001 | -2.6985 | 0.0244 | 1.9367 |
| Cross-sectional Standard Deviation | 0.0198 | 0.0001 | 2.2207 | 0.0621 | 0.2699 |
| Number of firms with Beta coefficients significant at the 5% level | 0 out of 43 | 0 out of 43 | 42 out of 43 | | |

**Industry Portfolio Return Behavior**

Table 4-a and Table 4-b presents the results of the tests run for equally weighted industry returns composed as a consequence of the stock selection process. Equally weighted industry portfolio are formed by totaling all the real stock returns composing the industry divided by the number of stocks in that specific industry.

Regression coefficients significant at the 5% level are indicated by bold face and underlined characters. Adjusted R-square and Durbin-Watson Statistics are also used to support our conclusions.

Table 4-a presents the cross-sectional distribution of regression results for the economic risk factors while Table 4-b presents the cross-sectional distribution of regression results for the lagged information variables

Equally weighted industry portfolios report similar results overall, as shown in Table 4-a, which deviates with RFX. This economic risk factor is relatively significant; as official dollar rate increases there is tendency to affect industry returns of individual stock returns negatively. In industries with exporting capabilities, however, this coefficient is lower in absolute terms as seen with the food, beverage and tobacco producers and textile, clothing and leather industry.

Among lagged information variables, as presented in Table 4-b, DIVYIELD is significant for conglomerates and investment companies and textile, clothing and leather industry and negatively affecting the stock returns with a negative slope coefficient. This mirroring relation as in the specific stock return analysis can be interpreted as: the increase of DIVYIELD decreases stock returns which can also be observed from Figure 3 in the Appendices.

The other proxying variables for equally weighted industries do not infer statistically significant coefficients at a 5% level.

Since the Durbin-Watson d Statistic is around 2 within a probable range from 0 to 4, it can be concluded that the residuals of the regressions ran for the classified industries are uncorrelated.

The results of the industry portfolio are not deviated from the inferences of individual stock behavior analysis.

Table - 4 Risk Exposures and Forecastibility of Monthly Industry Portfolio Returns

Table - 4.a Regressions of Portfolio Returns on Risk Factors

| Portfolio | Number of Shares in the Portfolio | Slope Coefficients (Standard Error) on: | | | Adjusted $R^2$ | Durbin-Watson Statistics |
|---|---|---|---|---|---|---|
| | | RFX | DFXPREM | RMKT | | |
| Banks | 2 | -0.4125<br>*0.3925* | -0.0002<br>*0.0008* | -0.0025<br>*0.0277* | -0.0326 | 1.7100 |
| Chemicals, Oil, Hard Rubber and Plastic Producers | 8 | -0.6757<br>*0.3710* | 0.0009<br>*0.0007* | 0.0003<br>*0.0262* | 0.0255 | 1.5700 |
| Conglomerates and Investment Companies | 5 | -0.4886<br>*0.4132* | 0.0009<br>*0.0008* | 0.0232<br>*0.0292* | 0.0023 | 1.9900 |
| Electiricity, Gas and Water | 2 | -0.6773<br>*0.3682* | 0.0003<br>*0.0007* | 0.0093<br>*0.0260* | 0.0133 | 2.3300 |
| Food, Beverage and Tobacco Producers | 4 | 0.0042<br>*0.3292* | 0.0002<br>*0.0006* | 0.0240<br>*0.0232* | -0.0335 | 2.0400 |
| Metal Goods, Machinery and Equipment Manufacturers | 6 | -0.3675<br>*0.3813* | 0.0006<br>*0.0007* | 0.0074<br>*0.0269* | -0.0253 | 1.8000 |
| Metal Main Industry | 6 | -0.4438<br>*0.4144* | 0.0004<br>*0.0008* | 0.0294<br>*0.0293* | -0.0084 | 1.9700 |
| Paper and Paper Products, Printing and Distribution | 3 | 0.5290<br>*0.3601* | 0.0004<br>*0.0007* | -0.0058<br>*0.0254* | -0.0060 | 1.7800 |
| Manufacture of Non-Metallic Mineral Products | 4 | -0.1893<br>*0.3281* | 0.0003<br>*0.0006* | 0.0088<br>*0.0232* | -0.0437 | 1.7700 |
| Textile, Clothing and Leather Industry | 3 | -0.2079<br>*0.4012* | 0.0003<br>*0.0008* | -0.0192<br>*0.0283* | -0.0400 | 1.5300 |

Beta coefficients significant at the 5% level are indicated with bold face and underline.

Table - 4.b

Regressions of Portfolio Returns on Lagged Information Variables

| Portfolio | Number of Shares in the Portfolio | Slope Coefficients (Standard Error) on: | | | Adjusted $R^2$ | Durbin-Watson Statistics |
|---|---|---|---|---|---|---|
| | | FORWARD | FXPREM | DIVYIELD | | |
| Banks | 2 | 0.0066<br>*0.0205* | -0.0002<br>*0.0001* | -3.0397<br>*1.9266* | 0.0539 | 1.6800 |
| Chemicals, Oil, Hard Rubber and Plastic Producers | 8 | 0.0053<br>*0.0202* | -0.0001<br>*0.0001* | -2.8272<br>*1.9018* | 0.0263 | 1.5800 |
| Conglomerates and Investment Companies | 5 | -0.0106<br>*0.0209* | -0.0002<br>*0.0001* | **-4.6924**<br>***1.9673*** | 0.1402 | 1.9500 |
| Electiricity, Gas and Water | 2 | -0.0140<br>*0.0207* | 0.0000<br>*0.0001* | -0.1567<br>*1.9415* | -0.0434 | 2.2200 |
| Food, Beverage and Tobacco Producers | 4 | 0.0000<br>*0.0180* | -0.0001<br>*0.0001* | -0.6256<br>*1.6882* | -0.0334 | 2.0300 |
| Metal Goods, Machinery and Equipment Manufacturers | 6 | -0.0158<br>*0.0204* | -0.0001<br>*0.0001* | -1.8511<br>*1.9148* | 0.0167 | 1.7300 |
| Metal Main Industry | 6 | 0.0068<br>*0.0228* | -0.0001<br>*0.0001* | -2.1546<br>*2.1451* | -0.0274 | 1.9700 |
| Paper and Paper Products, Printing and Distribution | 3 | 0.0341<br>*0.0183* | **-0.0002**<br>***0.0001*** | -2.9232<br>*1.7186* | 0.1289 | 2.1900 |
| Manufacture of Non-Metallic Mineral Products | 4 | 0.0143<br>*0.0174* | 0.0000<br>*0.0001* | -2.8411<br>*1.6360* | 0.0133 | 1.7800 |
| Textile, Clothing and Leather Industry | 3 | 0.0175<br>*0.0200* | -0.0001<br>*0.0001* | **-5.6308**<br>***1.8776*** | 0.1341 | 1.7100 |

Beta coefficients significant at the 5% level are indicated with bold face and underline.

# CHAPTER 5

# CONCLUSION AND RECOMMENDATIONS

The effects of exposure to exchange rate risk and political risk on equity market risk premium are investigated in an emerging market: Turkey. We have defined two sets of proxying variables to forecast currency risk and political risk. There were three economic risk factor variables and three lagged information variables. The empirical tests for equity market risk premium is structured in two phases. In the first phase, exposure of cross-sectional individual equity returns to exchange rate risk and political risk are analyzed. In the second phase, tests are repeated for equally weighted industry portfolio.

It is observed that there is evidence of equity market premiums for exposure to fluctuations in the free market dollar premium and annualized dividend yield of the ISE composite index. Particular evidence of unconditional equity market premium is observed with three of the six variables used in the study. These variables are the official change in the TL per dollar rate; premium for US dollars at the free market rate; and annualized dividend yield on the ISE composite index. Official change in the TL per dollar rate is the variable proxying for the economic risk factors where premium for US dollars at the free market rate and annualized dividend yield on the ISE composite index were proxy for the lagged information variables.

For the cross-sections of individual equity returns part; RFX and DIVYIELD were significant variables. This implies that policies of Central Bank of Turkey is an important factor affecting the equity prices. Also, dividend policies of the stocks trading have inverse proportion with the stock returns; as stock returns increase there is tendency for the DIVYIELD to decrease.

Similar results have been obtained for the equally weighted industry portfolio analysis. FXPREM, the free market premium of dollar rate is found significant for Paper and Paper Products, Printing and Distribution industry. DIVYIELD is found significant for Conglomerates and Investment Companies that is very meaningful due to the nature of their sources of revenues from dividends of their participations and affiliates. DIVYIELD is also found significant for Textile, Clothing and Leather industry that also makes sense given the high dividends they pay when the stock underperformed or vice versa.

Since the stock market is moving in line with the policies of Central Bank of Turkey, international portfolio and fund managers may diversify their portfolio with exposure to ISE. In the Mexican case Bailey and Chung (1994) found significant associations between equity market premiums for currency and political risks. However, they find no evidence of either unconditional or conditional risk premiums for exposure to changes in the official exchange rate. This implies that unlike the Turkish case, central bank of Mexico does not have significant effect on their stock market.

For the individual investor it is evident that the Turkish stock market offers a premium. However, each individual has to decide whether this premium is sufficient for his risk aversion policy.

It is worth reminding here that, comparison with other developing countries and for longer sample periods can be designed with the addition of new proxying variables, and with larger sets of stock for longer sample periods .

Although, extreme care is given to the formation of the data set, limitations faced have to be kept in mind. Missing observations, thinly traded or volatile stocks have been the limitations of the data set.

## LIST OF REFERENCES


AGMON, Tamir. (1972) "The Relations Among Equity Markets in the United States, United Kingdom, Germany, and Japan", Journal of Finance 27, 839-855

AKGIRAY, Vedat. (1989) "Conditional Heteroskedasticity in Time Series of Stock Returns: Evidence and Forecasts", Journal of Business 62, 55-80

ALEXAKIS, Panayotis and Petrakis, P. (1991) "Analysing Stock Market Behaviour in Small Capital Market", Journal of Banking and Finance 15, 471-483

BAILEY, Warren and Chung, Y. Peter. (1994) "Exchange Rate Fluctuations, Political Risk, and Stock Returns: Some Evidence from an Emerging Market", as presented in the meeting of AFA at ASSA in 1994

BROWN, Stephen J. and Otsuki Toshiyuki. (1990) "Macroeconomic Factors and the Japanese Equity Markets: The CAPMD Project", Japanese Capital Markets, Elton E. J., and M. J. Gruber, eds. New York: Harper and Row, (1990) 175-92

CLARK, P.K. (1973) "A Subordinated Stochastic Process Model with Finite Variance for Speculative Prices", Econometrica 41, 135-155

FERSON, Wayne E. and Harvey. Campbell R. (1991) "The Variation of Economic Risk Premiums", Journal of Political Economy 99, 385-415

FERSON, Wayne E. and Harvey. Campbell R. (1993) "The Risk and Variability of International Equity Returns", Review of Financial Studies 6, 527-66

GRANGER, C.W.J. and Morgenstern, O. (1970) "Predictability of Stock Market Prices", Lexington

HILLIARD, J.E. (1979) "The Relationship Between Equity Indices on World Exchanges", Journal of Finance 34, 103-114

HSIEH, David. (1991) "Chaos and Nonlinear Dynamics: Application to Financial Markets", Journal of Finance 46, 1839-1877

JORION, Philipe. (1990) "The Exchange Rate Exposure of U.S. Multinationals", Journal of Business 63, 331-45

JORION, Philipe. (1991) "The Pricing of Exchange Rate Risk in the Stock Market", Journal of Financial and Quantitative Analysis 26, 363-76

NEFTCI, Salih. (1984) "Are Econometric Time Series Asymmetric over the Business Cycles?", Journal of Political Economy 92, 307-328

PRESS, S.J. (1968) "A Compound Events Model for Security Prices", Journal of Business 41, 317-335

SHARPE, William F. and Alexander, Gordon J. (1990) "Investments", Prentice Hall International Editions, Fourth Edition, 810-811

YUCE, Ayşe. (1996) An Examination of an Emerging Stock Exchange: The Case of Turkish Stock Market , Capital Markets Board of Turkey, Ankara (1996), Publication No:39

# APPENDICES

# APPENDIX A

## Overview of the Stock Price Sample

Table - 1.a Overview of the Stock Price Sample

| | Company | Ticker Symbol | Industry Classification according to ISE | ISE Composite Index | Monthly Observations |
|---|---|---|---|---|---|
| 1 | Alarko Holding | ALARK | Conglomerates and Investment Companies | | 58 |
| 2 | Anadolu Cam | ANACM | Manufacture of Non-Metallic Mineral Products | ☑ | 57 |
| 3 | Arçelik | ARÇLK | Metal Goods, Machinery and Equipment Manufacturers | ☑ | 58 |
| 4 | Bagfaş | BAGFS | Chemicals, Oil, Hard Rubber and Plastic Producers | ☑ | 58 |
| 5 | Bolu Çimento | BOLUÇ | Manufacture of Non-Metallic Mineral Products | | 58 |
| 6 | Brisa | BRISA | Chemicals, Oil, Hard Rubber and Plastic Producers | ☑ | 58 |
| 7 | Çelik Halat | ÇELHA | Metal Main Industry | ☑ | 58 |
| 8 | Çimsa | ÇİMSA | Manufacture of Non-Metallic Mineral Products | | 58 |
| 9 | Çukurova Elektrik | ÇUKEL | Electiricity, Gas and Water | ☑ | 58 |
| 10 | Deva Holding | DEVA | Chemicals, Oil, Hard Rubber and Plastic Producers | ☑ | 58 |
| 11 | Döktaş | DOKTS | Metal Main Industry | | 58 |
| 12 | Eczacıbaşı Yatırım | ECZYT | Conglomerates and Investment Companies | ☑ | 58 |
| 13 | Ege Biracılık | EGBRA | Food, Beverage and Tobacco Producers | ☑ | 58 |
| 14 | Ege Gübre | EGGUB | Chemicals, Oil, Hard Rubber and Plastic Producers | ☑ | 58 |
| 15 | Ereğli Demir Çelik | EREGL | Metal Main Industry | ☑ | 58 |
| 16 | Goodyear | GOODY | Chemicals, Oil, Hard Rubber and Plastic Producers | | 58 |
| 17 | Gübre Fabrikaları | GÜBRF | Chemicals, Oil, Hard Rubber and Plastic Producers | ☑ | 58 |
| 18 | Güney Biracılık | GUNEY | Food, Beverage and Tobacco Producers | | 58 |
| 19 | Hektaş | HEKTS | Chemicals, Oil, Hard Rubber and Plastic Producers | ☑ | 58 |
| 20 | İzmir Demir Çelik | İZMDC | Metal Main Industry | ☑ | 58 |
| 21 | İzocam | İZOMC | Manufacture of Non-Metallic Mineral Products | ☑ | 57 |
| 22 | Kartonsan | KARTN | Paper and Paper Products, Printing and Distribution | ☑ | 58 |

| | Company | Ticker Symbol | Industry Classification according to ISE | ISE Composite Index | Monthly Observations |
|---|---|---|---|---|---|
| 23 | Kav | KAVOR | Paper and Paper Products, Printing and Distribution | ☑ | 58 |
| 24 | Koç Holding | KCHOL | Conglomerates and Investment Companies | ☑ | 58 |
| 25 | Koç Yatırım | KCYAT | Conglomerates and Investment Companies | ☑ | 58 |
| 26 | Kepez Elektrik | KEPEZ | Electiricity, Gas and Water | ☑ | 58 |
| 27 | Kordsa | KORDS | Textile, Clothing and Leather Industry | ☑ | 58 |
| 28 | Koytas Tekstil | KÖYTS | Textile, Clothing and Leather Industry | | 57 |
| 29 | Makina Takım | MAKTK | Metal Goods, Machinery and Equipment Manufacturers | ☑ | 57 |
| 30 | Maret | MARET | Food, Beverage and Tobacco Producers | | 57 |
| 31 | Metaş | METAS | Metal Main Industry | ☑ | 57 |
| 32 | Olmuksa | OLMKS | Paper and Paper Products, Printing and Distribution | ☑ | 57 |
| 33 | Otosan | OTOSN | Metal Goods, Machinery and Equipment Manufacturers | ☑ | 57 |
| 34 | Pınar Süt | PNSUT | Food, Beverage and Tobacco Producers | ☑ | 57 |
| 35 | Sarkuysan | SARKY | Metal Main Industry | ☑ | 57 |
| 36 | Sifaş | SIFAS | Textile, Clothing and Leather Industry | ☑ | 58 |
| 37 | Şişe Cam | ŞİŞE | Conglomerates and Investment Companies | ☑ | 57 |
| 38 | Siemens | SMENS | Metal Goods, Machinery and Equipment Manufacturers | ☑ | 58 |
| 39 | Teletaş | TLTS | Metal Goods, Machinery and Equipment Manufacturers | ☑ | 58 |
| 40 | T.S.K.B. | T.S.K.B. | Banking | ☑ | 54 |
| 41 | T.Demir Döküm | TUDDF | Metal Goods, Machinery and Equipment Manufacturers | | 57 |
| 42 | Yasaş | YASAS | Chemicals, Oil, Hard Rubber and Plastic Producers | | 58 |
| 43 | Yapı ve Kredi Bankası | YKBNK | Banking | ☑ | 58 |
| | | | | ☑ | 58 |
| | | | | 33 | |

Table - 1.b List of the Stock Price Sample grouped by Industry Classification according to ISE

**Banking**

1 T.S.K.B.
2 Yapı ve Kredi Bankası

**Chemicals, Oil, Hard Rubber and Plastic Producers**

1 Bagfaş
2 Brisa
3 Deva Holding
4 Ege Gübre
5 Gübre Fabrikaları
6 Goodyear
7 Hektaş
8 Yasaş

**Conglomerates and Investment Companies**

1 Alarko Holding
2 Eczacıbaşı Yatırım
3 Koç Holding
4 Koç Yatırım
5 Şişe Cam

**Electiricity, Gas and Water**

1 Çukurova Elektrik
2 Kepez Elektrik

**Food, Beverage and Tobacco Producers**

1 Ege Biracılık
2 Güney Biracılık
3 Maret
4 Pınar Süt

**Metal Goods, Machinery and Equipment Manufacturers**

1 Arçelik
2 Makina Takım
3 Otosan
4 Siemens
5 T.Demir Döküm
6 Teletaş

**Metal Main Industry**

1 Çelik Halat
2 Döktaş
3 Ereğli Demir Çelik
4 İzmir Demir Çelik
5 Metaş
6 Sarkuysan

**Paper and Paper Products, Printing and Distribution**

1 Kartonsan
2 Kav
3 Olmuksa

**Manufacture of Non-Metallic Mineral Products**

1 Anadolu Cam
2 Bolu Çimento
3 Çimsa
4 İzocam

**Textile, Clothing and Leather Industry**

1 Kordsa
2 Koytas Tekstil
3 Sifaş

Table 1-c

List of All the Stock Returns During the Sample Period

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alark | Anacm | Arçelik | Bagfs | Boluç | Brisa | Çelha | Çimsa | Çukel | Deva |
| 2/28/90 | 58.0% | -5.3% | 17.3% | 6.7% | -15.4% | 6.6% | -20.4% | 5.6% | -12.7% | 13.6% |
| 3/30/90 | 12.7% | 5.0% | -11.0% | -17.4% | 56.5% | -12.3% | -3.3% | -11.4% | 0.9% | 19.1% |
| 4/30/90 | 101.6% | -10.9% | -15.3% | -6.8% | -34.3% | 7.4% | -8.6% | 21.5% | -3.3% | 3.6% |
| 5/31/90 | -19.2% | 9.2% | 50.7% | 64.5% | 2.7% | 19.8% | 38.1% | 10.0% | 2.7% | 17.4% |
| 6/29/90 | -1.9% | -9.2% | 26.2% | 11.3% | -1.4% | -2.0% | -12.7% | -12.9% | -5.1% | 6.7% |
| 7/31/90 | 25.4% | -9.7% | 27.2% | -8.2% | -10.8% | -9.6% | -3.4% | -4.6% | -5.4% | -9.3% |
| 8/31/90 | 25.5% | -14.5% | -15.9% | -2.7% | -21.9% | -3.6% | -18.6% | -21.5% | 0.3% | 21.4% |
| 9/28/90 | -7.0% | -10.6% | -8.4% | 11.5% | 34.4% | -19.6% | -10.4% | -11.0% | 7.5% | -8.8% |
| 10/31/90 | -10.5% | -11.1% | -8.7% | -20.0% | 1.6% | -30.4% | -12.7% | -25.7% | -10.6% | -3.8% |
| 11/30/90 | -23.7% | -13.4% | -24.5% | -32.1% | -19.3% | -24.2% | -24.6% | -6.0% | -25.8% | -26.3% |
| 12/28/90 | -17.7% | -16.4% | -18.9% | -9.7% | 7.6% | -3.3% | 1.7% | -5.4% | -6.8% | 7.9% |
| 1/31/91 | 39.2% | 21.1% | 61.6% | 24.5% | 18.9% | 19.5% | 68.9% | 31.7% | 21.8% | 12.7% |
| 2/28/91 | 20.3% | 7.8% | 33.9% | 7.3% | 19.8% | 12.3% | 12.2% | 31.6% | 14.2% | 30.7% |
| 3/29/91 | -5.1% | -19.0% | -10.0% | -17.6% | -20.2% | -14.3% | -19.6% | -18.4% | -11.5% | -10.8% |
| 4/30/91 | -28.2% | -34.4% | -22.6% | -31.9% | -34.2% | -24.3% | -30.2% | -32.3% | -34.2% | -34.4% |
| 5/31/91 | 1.7% | -18.1% | 14.8% | -11.2% | 4.0% | -5.6% | -4.3% | -2.1% | 6.3% | 5.8% |
| 6/28/91 | 1.6% | -6.8% | 10.2% | -8.9% | -8.4% | 0.9% | -17.1% | -3.6% | -21.2% | 4.4% |
| 7/31/91 | -33.2% | -37.8% | -5.4% | -46.2% | -44.5% | -22.1% | -28.3% | -26.1% | -28.0% | -43.1% |
| 8/29/91 | 1.5% | -27.6% | -3.3% | 5.9% | 21.2% | -25.3% | 7.5% | -7.5% | 41.4% | 13.4% |
| 9/30/91 | -9.7% | -10.0% | -16.8% | -15.4% | -16.0% | -23.1% | -12.8% | -18.7% | -12.6% | -24.6% |
| 10/31/91 | -22.9% | -0.9% | -10.0% | -5.7% | -19.2% | -3.5% | -26.2% | 9.7% | -32.2% | 3.2% |
| 11/29/91 | 94.0% | 22.8% | 43.1% | 27.4% | 84.6% | 19.7% | 22.3% | 43.0% | 40.7% | 77.8% |
| 12/31/91 | 2.1% | -12.8% | 9.5% | 16.8% | -5.4% | 6.3% | 2.7% | 30.4% | -10.9% | -1.2% |
| 1/31/92 | 50.5% | 26.6% | 14.1% | -3.1% | 0.7% | 26.4% | 3.9% | -6.4% | 8.1% | 0.9% |
| 2/28/92 | -48.0% | -26.5% | -29.3% | -32.0% | -35.1% | -43.3% | -30.7% | -17.6% | -24.0% | -40.7% |
| 3/31/92 | 32.7% | 2.4% | 1.8% | -2.3% | 15.9% | 20.6% | 19.6% | -7.9% | 13.4% | 6.8% |
| 4/30/92 | -18.6% | 23.3% | -14.8% | -17.2% | -28.3% | -27.5% | -5.4% | -5.4% | -3.7% | -36.3% |
| 5/29/92 | -31.0% | -28.0% | -23.6% | -22.4% | -19.4% | -21.0% | -12.0% | -8.3% | -12.6% | -19.4% |
| 6/30/92 | 27.9% | 79.7% | 34.4% | 18.0% | 28.4% | 21.3% | 38.7% | 1.0% | 44.0% | 10.7% |
| 7/31/92 | -16.9% | 9.4% | -8.1% | 3.7% | -24.6% | -11.5% | -4.4% | -8.6% | -0.2% | -15.5% |
| 8/31/92 | -9.2% | -16.0% | -11.4% | -20.6% | -5.9% | -5.9% | -24.8% | 2.1% | -3.2% | -24.5% |
| 9/30/92 | -8.0% | -5.9% | -10.4% | -25.1% | -20.6% | 14.9% | -13.0% | -5.9% | -4.5% | -5.9% |
| 10/27/92 | -4.8% | -35.5% | -17.9% | -10.6% | -5.9% | 0.5% | -3.9% | -9.6% | -13.7% | -15.3% |
| 11/30/92 | -17.8% | -8.4% | -8.6% | 9.2% | -1.7% | -5.9% | -11.7% | -11.0% | 5.6% | 22.7% |
| 12/31/92 | -7.2% | -12.9% | 0.6% | -5.9% | -1.9% | -3.0% | 10.0% | 2.2% | -7.2% | -8.8% |
| 1/29/93 | -12.1% | 0.9% | -4.3% | 7.1% | -1.6% | -4.5% | 23.5% | 10.4% | 21.4% | -8.9% |
| 2/26/93 | 25.2% | 9.4% | 24.3% | 19.5% | 28.9% | 72.1% | 18.6% | 28.9% | 25.9% | 30.3% |
| 3/31/93 | -11.3% | -5.2% | -11.2% | 24.1% | -7.9% | 9.1% | 6.6% | -9.2% | -4.0% | -11.8% |
| 4/30/93 | 7.8% | 1.0% | 45.4% | 85.2% | 0.6% | -17.5% | 64.1% | 1.0% | -16.2% | 18.1% |
| 5/28/93 | 8.1% | 0.5% | 9.5% | 4.6% | 7.2% | 12.9% | 8.7% | 61.8% | 10.6% | 2.1% |
| 6/30/93 | 45.6% | 31.8% | 28.9% | 17.4% | 55.8% | 32.1% | 9.3% | 10.8% | 25.0% | 35.0% |
| 7/30/93 | -0.8% | -9.3% | -12.1% | -17.3% | -19.1% | -14.0% | -31.7% | 3.2% | -11.4% | 6.1% |
| 8/31/93 | 24.8% | 91.9% | 9.5% | 32.2% | 16.1% | 32.5% | 14.6% | 6.6% | 11.5% | 1.5% |
| 9/30/93 | 32.1% | 13.5% | 18.3% | 17.4% | 42.2% | 7.1% | 44.3% | 1.9% | -3.1% | 27.5% |
| 10/27/93 | 11.1% | 14.3% | 26.0% | -11.6% | -29.7% | -15.9% | -40.8% | 11.4% | -15.0% | -6.6% |
| 11/30/93 | 54.0% | 3.5% | -9.5% | 32.5% | 48.9% | 29.1% | 20.8% | 46.5% | 47.8% | 29.8% |
| 12/31/93 | 34.5% | 1.9% | 0.0% | 9.3% | 32.9% | 39.9% | 26.4% | -6.4% | 7.5% | 2.8% |
| 1/31/94 | 5.3% | 5.5% | 3.8% | -30.1% | -2.9% | 20.5% | 42.7% | -10.3% | -27.1% | 39.1% |
| 2/28/94 | -24.7% | -46.9% | -11.2% | -57.7% | -49.6% | -49.2% | -44.3% | -13.5% | -11.6% | -49.6% |
| 3/31/94 | -51.2% | -14.0% | -21.1% | -21.6% | -21.5% | -21.2% | 0.2% | 9.9% | 9.0% | -12.2% |
| 4/29/94 | 3.9% | -32.7% | -5.5% | -7.1% | 24.2% | -27.5% | -48.8% | 8.1% | -52.0% | -51.5% |
| 5/31/94 | 38.1% | -27.6% | 12.9% | 6.6% | -10.5% | 23.0% | -5.8% | -19.6% | -48.1% | -35.3% |
| 6/30/94 | 32.6% | 91.2% | -16.9% | 37.9% | 67.4% | 48.5% | 12.0% | -5.4% | 41.2% | 28.3% |
| 7/29/94 | -8.8% | 34.0% | -9.9% | -15.2% | 16.4% | 29.5% | 45.5% | -1.2% | 24.6% | 6.6% |
| 8/31/94 | 14.9% | 69.6% | 29.4% | 17.7% | 13.5% | 20.2% | -15.1% | 11.3% | -24.4% | 51.3% |
| 9/30/94 | 4.5% | 1.6% | -1.3% | 11.8% | 2.1% | 17.8% | 11.0% | 4.7% | 0.3% | -3.8% |
| 10/31/94 | -23.4% | -10.3% | -11.2% | -10.0% | -16.3% | -19.6% | -13.4% | 0.5% | -29.5% | -26.8% |

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|
| Dokts | Eczyat | Egebr | Egegb | Eregli | Goodyr | Gübre | Güney | Hektas | İzmdc | İzocam |
| 17.1% | 1.5% | 20.2% | -17.3% | -3.3% | -33.4% | -16.3% | 30.4% | -3.3% | -12.6% | 5.5% |
| 12.1% | 13.0% | -9.3% | 14.3% | -24.3% | 19.0% | -5.8% | -1.0% | -1.0% | 0.2% | 2.0% |
| -3.3% | 69.0% | -5.3% | -5.4% | 5.5% | 5.2% | -3.3% | -9.8% | -1.2% | -40.0% | -1.9% |
| 25.5% | 29.1% | -1.2% | 46.8% | -3.3% | 6.5% | 58.3% | 15.0% | 16.0% | 12.5% | 38.5% |
| 17.8% | 16.6% | 5.2% | 2.4% | -1.0% | -8.6% | -11.3% | -5.3% | -1.6% | -3.3% | -12.4% |
| 37.9% | 165.1% | 57.8% | -22.6% | -15.9% | -12.9% | -21.5% | -4.6% | -10.3% | -19.2% | 2.5% |
| -14.4% | 21.1% | -33.7% | 3.2% | 1.0% | -18.2% | -22.3% | -17.9% | -12.8% | -20.1% | -9.3% |
| -7.3% | -10.6% | 15.9% | -38.8% | 7.7% | -1.4% | -18.0% | 5.8% | -9.7% | -0.4% | -10.5% |
| -19.9% | 19.7% | -3.8% | -35.1% | -3.8% | -26.6% | -17.1% | -1.8% | -8.4% | -32.1% | -18.7% |
| -42.7% | -38.5% | -18.9% | -29.0% | -45.3% | -34.6% | -28.9% | -18.7% | -31.4% | -30.1% | -33.1% |
| -18.3% | -9.9% | -4.4% | 7.7% | -16.8% | 7.6% | -12.0% | 2.8% | 2.2% | -4.4% | -4.4% |
| 125.4% | 100.0% | 37.6% | 9.1% | 30.5% | 2.8% | 28.8% | 19.0% | 22.8% | 72.2% | 61.2% |
| 21.6% | 6.8% | 26.1% | 19.2% | -1.3% | 5.4% | 24.3% | 65.3% | 55.0% | 128.5% | 20.8% |
| -13.5% | -10.3% | -10.8% | -20.6% | -18.1% | 5.9% | -11.5% | -7.4% | -20.0% | -33.6% | -20.4% |
| -29.6% | -38.1% | -7.4% | -25.7% | -24.1% | -18.1% | -29.4% | -21.2% | -28.0% | -29.5% | -17.3% |
| 34.3% | 37.6% | 23.0% | -8.5% | -12.1% | 13.2% | -10.2% | 5.1% | -5.6% | -2.9% | 28.5% |
| 9.5% | -1.5% | -10.1% | 0.5% | -12.5% | -5.4% | -5.4% | -2.8% | -3.2% | -2.9% | 2.9% |
| -37.9% | -16.5% | -11.6% | -33.2% | 0.6% | -17.7% | -31.7% | -41.0% | -39.4% | -27.9% | -27.1% |
| 25.0% | -9.5% | -7.2% | 2.7% | 41.1% | 4.7% | -2.1% | 11.9% | -11.8% | -14.8% | -17.8% |
| -16.3% | -14.1% | -20.2% | -19.6% | -9.0% | -27.2% | -17.8% | -15.2% | -8.8% | -12.5% | -14.9% |
| -2.6% | -21.2% | 9.5% | -10.1% | -26.0% | 9.4% | -2.1% | 17.8% | -16.3% | -25.1% | 17.0% |
| 47.0% | 40.6% | 41.2% | 7.1% | 68.6% | 124.3% | 7.8% | 82.4% | 17.8% | 32.1% | 51.2% |
| 9.2% | 11.9% | 12.5% | -5.4% | -9.0% | -8.1% | -2.4% | 2.5% | 1.2% | -1.8% | 49.2% |
| 20.2% | 18.0% | 3.4% | 29.4% | -5.4% | 4.2% | 24.3% | 30.9% | 38.4% | 18.1% | 7.9% |
| -37.6% | -41.5% | -0.4% | -28.1% | -32.7% | -20.2% | -23.4% | -23.5% | -37.9% | -29.7% | -26.1% |
| 19.7% | 12.1% | -0.6% | -5.3% | -2.7% | 32.3% | 2.9% | 9.0% | -0.7% | -5.3% | 9.4% |
| -10.1% | -24.4% | 12.7% | -24.1% | -22.4% | -1.7% | -10.5% | -5.4% | -29.3% | -12.5% | -6.8% |
| -17.4% | -22.1% | 9.7% | -23.8% | 7.8% | -28.6% | -32.9% | -1.1% | -24.2% | -28.7% | -9.6% |
| 22.0% | 8.8% | 45.5% | 10.7% | 34.5% | 46.1% | 1.4% | 24.4% | 23.2% | 4.0% | 23.7% |
| -14.0% | -27.4% | 3.1% | -6.0% | -14.6% | 2.9% | 21.9% | -1.0% | -6.0% | -10.8% | -3.6% |
| -19.7% | -9.6% | -3.8% | -10.7% | -15.2% | -5.9% | -27.7% | 8.3% | -16.0% | -15.4% | -3.6% |
| -18.9% | -22.8% | -5.3% | -10.8% | -21.2% | -4.2% | -16.2% | -15.5% | -8.6% | -26.8% | -1.3% |
| -27.5% | -18.3% | -15.5% | -11.1% | -19.4% | -16.7% | -9.7% | -29.9% | -11.5% | -12.9% | -35.4% |
| 0.5% | 13.6% | -0.5% | 5.2% | -7.8% | -3.2% | 6.1% | -3.3% | 3.1% | 1.7% | 2.7% |
| 10.1% | -4.8% | 2.6% | 49.3% | -5.9% | 8.6% | -5.9% | 14.6% | 10.8% | -12.9% | -1.3% |
| 21.7% | -19.8% | 5.1% | -6.6% | -24.5% | 6.7% | -1.9% | 31.6% | 25.2% | -2.5% | 13.7% |
| 53.3% | 32.0% | 22.7% | 56.9% | 39.4% | 19.5% | 5.6% | 50.9% | 12.7% | 47.3% | 35.4% |
| -5.2% | -27.0% | -4.1% | 41.6% | -24.8% | -9.3% | 24.8% | -13.3% | -3.5% | -6.8% | -22.9% |
| 33.3% | 38.9% | 57.8% | 145.1% | 27.8% | 15.0% | 56.3% | 26.4% | 46.1% | 40.7% | -9.1% |
| -3.3% | 1.7% | -1.4% | 21.3% | -17.9% | -5.4% | 41.8% | 6.1% | -0.8% | 30.5% | 9.4% |
| 11.4% | 12.8% | -9.2% | 15.8% | 66.1% | 18.8% | 8.6% | -3.6% | 19.0% | 50.6% | 15.0% |
| -24.9% | -30.8% | -2.6% | -5.3% | -15.9% | 15.6% | 3.9% | -17.1% | -7.4% | -20.0% | -10.5% |
| 10.4% | 11.2% | -10.5% | 1.3% | 20.1% | -10.1% | 43.2% | -5.3% | 5.9% | 43.8% | 5.9% |
| 6.4% | 36.1% | 6.0% | 25.5% | 65.1% | 15.7% | 16.6% | 0.8% | 12.9% | 11.9% | 4.9% |
| -13.6% | -28.3% | -12.5% | -12.8% | -10.0% | 22.4% | 32.5% | -17.5% | 1.8% | -13.0% | -0.4% |
| 19.0% | 37.9% | -6.9% | 31.7% | 107.6% | 21.0% | 47.0% | -0.8% | 21.4% | 51.0% | 44.4% |
| 17.2% | 49.0% | 12.3% | 11.8% | -17.9% | 24.5% | 8.8% | 12.7% | 9.5% | 26.5% | -8.4% |
| -15.2% | -20.3% | -27.5% | -36.1% | 10.3% | -3.5% | -33.7% | 3.7% | -25.1% | -1.3% | -27.5% |
| -18.5% | -40.6% | 45.3% | -56.9% | -64.3% | -27.1% | -64.5% | 8.6% | -52.4% | -39.7% | -15.2% |
| -30.4% | -43.2% | -11.5% | -34.9% | 6.3% | -29.9% | -23.5% | -35.6% | -30.5% | -0.3% | -3.6% |
| -16.7% | -11.1% | 30.2% | -18.8% | -17.1% | -23.3% | -36.8% | 20.8% | -41.0% | -30.3% | -9.0% |
| 24.8% | -24.8% | -39.3% | 1.4% | -7.9% | -18.7% | -32.2% | -11.7% | -14.4% | -34.3% | -11.1% |
| 27.8% | 55.2% | 39.2% | 43.8% | 73.5% | 19.3% | 94.3% | 93.4% | 34.5% | 49.1% | 8.6% |
| 28.1% | 20.4% | 12.6% | 34.2% | -34.0% | 25.7% | -11.3% | -15.2% | -15.7% | 12.1% | 2.6% |
| -22.7% | 57.1% | 22.3% | 57.3% | 28.9% | 3.8% | 116.2% | 19.5% | 59.7% | 36.7% | -5.9% |
| -17.7% | -17.3% | -15.5% | 4.7% | -5.6% | -3.6% | 5.3% | -22.8% | 16.3% | 32.8% | -3.7% |
| -18.7% | -26.6% | -23.9% | -20.2% | 6.9% | -14.2% | -26.4% | -16.0% | -36.4% | -34.0% | -22.3% |

| 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
|---|---|---|---|---|---|---|---|---|---|---|
| Kartn | Kavor | Koçhl | Kocyt | Kepez | Kordsa | Koyiş | Maktk | Maret | Metaş | Olmksa |
| -9.6% | 0.6% | -1.7% | 15.9% | -21.3% | 9.2% | 28.6% | 22.2% | -13.7% | -15.3% | 24.6% |
| 5.6% | -10.8% | 7.7% | -8.1% | 28.7% | -12.2% | 15.4% | -11.4% | -4.9% | 0.6% | 12.1% |
| 0.8% | -7.3% | 5.2% | 12.0% | -10.8% | -1.2% | 44.3% | 52.7% | -18.6% | -37.2% | -12.8% |
| 5.4% | 28.6% | 24.0% | 12.3% | 18.3% | 10.1% | 60.9% | 2.4% | 16.8% | -14.7% | 10.1% |
| -12.1% | -8.1% | 33.0% | 6.5% | -1.9% | -16.3% | -14.8% | -5.1% | 13.3% | 3.1% | -12.1% |
| -14.5% | 29.1% | 155.5% | 44.8% | -7.7% | -16.8% | -18.0% | 22.0% | -35.6% | -3.2% | -13.2% |
| -1.9% | -24.1% | -21.2% | -4.9% | -13.9% | -5.4% | -11.0% | 5.1% | -20.8% | -0.9% | -32.2% |
| -10.7% | -13.5% | -4.8% | -8.6% | 12.6% | -17.9% | -13.5% | -11.8% | -16.2% | -20.3% | -6.3% |
| -13.3% | -21.7% | -18.7% | -15.4% | -8.1% | -22.2% | -25.2% | 7.0% | 19.9% | -24.0% | -17.9% |
| -20.7% | -37.9% | -36.5% | -25.8% | -21.7% | -19.0% | -24.5% | -26.4% | -4.0% | -28.8% | -29.4% |
| 1.8% | -10.9% | -8.1% | 12.3% | 2.7% | 3.0% | -21.6% | -30.6% | -23.6% | -10.2% | -10.3% |
| 3.9% | 78.7% | 38.0% | 57.6% | 10.7% | 17.5% | 37.1% | 66.9% | 67.0% | 148.8% | 8.3% |
| 19.1% | 3.0% | 8.8% | -0.8% | 2.5% | 14.4% | 26.9% | 9.3% | -0.6% | -21.0% | 16.0% |
| 0.2% | -15.8% | -14.7% | -12.7% | -17.3% | -18.3% | 37.6% | -31.8% | -3.8% | 6.1% | -16.0% |
| -22.0% | -37.4% | -21.1% | -23.7% | -31.5% | -22.2% | -30.1% | -38.7% | -30.4% | -32.9% | -35.2% |
| -10.1% | 0.3% | -2.5% | 15.9% | -2.3% | -1.8% | 2.9% | -19.9% | -0.4% | -2.0% | -0.6% |
| -5.4% | 19.6% | 6.8% | 18.4% | -13.4% | 2.0% | -16.4% | -5.4% | 9.7% | -18.8% | -10.1% |
| -16.3% | -31.6% | -1.7% | -4.1% | -36.1% | -3.6% | -42.8% | -35.9% | -19.9% | -28.6% | -17.8% |
| -10.1% | -13.7% | -12.3% | -4.0% | 26.4% | -0.2% | 3.3% | -17.3% | -1.8% | 4.8% | -13.8% |
| 2.2% | -3.3% | -18.6% | -12.9% | -10.2% | -15.0% | -23.8% | -21.3% | -25.3% | -18.9% | -11.7% |
| -5.7% | -17.1% | -7.9% | -8.4% | -23.9% | 12.1% | -0.5% | 10.5% | 25.5% | -21.4% | 5.6% |
| 25.1% | 18.3% | 43.0% | 55.2% | 22.5% | 27.4% | 31.6% | -26.8% | 56.1% | 56.4% | -11.9% |
| 3.7% | 23.2% | -2.4% | 13.6% | -5.4% | 2.5% | 0.9% | 3.4% | 3.4% | -1.7% | -1.2% |
| 1.4% | 30.0% | 25.1% | 6.2% | 0.4% | 12.6% | 17.5% | 46.1% | 6.8% | 6.0% | 19.6% |
| -39.8% | -41.2% | -35.3% | -24.8% | -33.4% | -25.0% | -61.2% | -46.4% | -21.0% | -28.7% | -25.3% |
| -2.8% | 17.9% | 13.7% | 20.4% | 0.9% | -3.1% | 4.7% | 27.9% | 3.3% | 20.5% | -9.4% |
| -17.1% | -36.5% | -6.8% | -22.3% | 16.1% | 3.8% | -10.1% | -37.2% | 1.2% | -8.7% | 2.5% |
| -16.3% | -18.1% | -7.8% | -22.9% | -11.0% | -13.1% | -25.6% | -29.0% | -39.0% | -20.1% | -18.4% |
| 14.7% | 31.7% | 35.6% | 28.0% | 97.8% | -2.5% | 22.1% | 7.1% | 31.2% | 6.5% | 17.9% |
| -11.4% | -31.0% | -23.3% | -13.0% | -22.4% | -13.7% | -13.2% | -9.8% | -24.0% | -17.0% | -13.5% |
| -5.9% | -10.0% | -8.0% | -7.4% | -13.6% | -21.4% | -21.7% | -21.9% | 7.6% | -14.3% | 43.9% |
| -14.4% | -3.7% | -24.1% | -16.6% | -14.1% | -18.5% | 9.8% | 3.6% | -1.4% | 14.2% | -8.6% |
| 19.1% | -22.9% | -22.5% | -14.5% | 0.6% | -25.2% | 3.2% | -27.5% | -25.9% | 30.5% | -17.3% |
| -5.9% | -5.9% | -4.6% | 14.9% | 7.8% | -15.9% | 32.9% | -17.4% | -16.6% | -5.9% | -18.7% |
| -5.9% | 4.3% | -4.7% | -2.8% | -9.6% | -12.5% | -5.9% | -5.9% | -1.9% | -19.2% | -9.7% |
| -8.4% | -5.9% | -4.6% | 0.2% | 11.0% | -19.0% | 18.2% | -5.9% | -20.3% | 17.2% | -7.8% |
| 40.7% | 35.5% | 12.0% | 40.2% | 27.8% | 20.5% | 18.7% | 24.8% | 42.8% | 52.0% | 28.0% |
| -5.2% | 55.3% | 2.5% | -16.9% | 14.8% | 1.4% | 10.5% | -14.8% | 28.1% | -17.9% | -17.0% |
| 57.9% | 2.5% | 111.5% | 31.8% | -5.2% | -7.5% | -23.3% | 31.1% | -2.9% | 53.0% | -12.4% |
| 40.9% | -8.3% | -10.2% | 14.0% | -1.3% | 4.8% | 6.9% | 49.1% | 7.9% | 72.7% | 6.2% |
| 31.1% | 27.1% | 9.7% | 22.6% | 81.4% | 34.9% | -12.6% | 84.1% | 12.4% | 41.5% | 49.8% |
| -19.9% | -32.0% | -12.5% | -19.8% | -14.2% | -31.7% | 5.2% | 4.7% | -20.3% | -31.7% | -11.9% |
| 39.5% | 16.0% | 1.0% | -0.9% | -1.2% | 22.7% | -6.4% | 40.2% | 4.6% | 27.6% | 37.6% |
| 4.0% | 12.4% | 21.3% | 7.1% | -3.2% | 37.1% | 40.3% | 4.9% | 12.7% | 14.0% | 4.9% |
| 1.2% | -10.3% | 4.3% | -17.7% | -16.5% | -3.9% | -0.1% | -24.3% | 10.2% | -12.5% | -0.4% |
| 14.0% | 40.5% | 11.4% | 27.8% | 46.6% | 31.4% | 27.8% | 81.7% | 52.3% | 59.7% | 24.9% |
| 9.3% | 9.9% | 19.9% | 19.5% | 3.1% | 23.1% | 75.4% | 17.6% | -6.5% | -6.7% | 17.8% |
| -15.2% | -1.3% | -18.2% | -17.8% | -34.2% | 15.6% | -27.6% | 12.2% | -7.6% | -7.8% | 12.3% |
| -37.4% | -31.7% | -1.1% | 5.0% | -42.2% | -51.8% | -51.0% | -30.0% | -38.7% | -45.7% | -53.2% |
| 23.4% | -45.1% | -40.0% | -18.9% | -24.3% | -15.3% | -28.3% | -56.0% | -16.3% | -20.9% | -47.9% |
| 80.1% | 98.2% | 1.6% | 15.5% | -16.4% | 43.8% | -13.5% | -18.0% | 17.3% | -25.1% | -12.1% |
| -24.4% | -13.2% | 7.6% | -11.9% | 1.3% | 1.3% | -17.6% | -53.3% | -10.8% | -24.4% | -4.0% |
| 35.5% | 76.3% | 49.9% | 3.3% | 26.1% | 66.2% | 56.5% | 25.4% | 32.7% | 65.8% | 70.5% |
| -2.3% | -9.4% | 18.5% | -1.5% | -6.5% | 13.8% | 28.2% | 35.5% | -0.1% | 21.5% | 81.1% |
| 20.2% | -3.4% | -20.7% | -18.5% | -6.8% | -5.0% | 100.3% | 61.3% | 1.5% | 4.3% | 25.9% |
| 7.9% | 1.8% | -22.8% | -26.5% | -8.1% | 22.0% | -34.0% | -15.3% | -0.3% | -0.5% | 55.0% |
| -16.9% | -14.4% | 3.1% | -8.5% | -9.0% | -13.9% | -30.1% | -47.7% | -24.7% | -29.1% | -14.8% |

| 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 |
|---|---|---|---|---|---|---|---|---|---|---|
| Otosan | Pnsut | Sarky | Sifas | Sisec | Siemens | Teletas | Tskb | Tuddf | Yasas | Ykbnak |
| -4.5% | 0.8% | -0.2% | 23.2% | -38.4% | -20.3% | -0.3% | -11.2% | -8.4% | -4.8% | -29.8% |
| -3.3% | -12.1% | -20.1% | 3.4% | 0.3% | -13.8% | -3.3% | -17.4% | -3.3% | 0.0% | -20.3% |
| 2.9% | -8.8% | 0.4% | -3.3% | 4.7% | 20.3% | 10.0% | -18.0% | -0.1% | 1.4% | 10.4% |
| 33.4% | 1.1% | 31.8% | 42.6% | 2.1% | 11.1% | 2.4% | 40.6% | 39.3% | 22.1% | 17.4% |
| -3.3% | 9.3% | -4.7% | 37.8% | 24.2% | 0.8% | -8.4% | 4.1% | 0.4% | 8.6% | 10.7% |
| 45.3% | -11.2% | 23.2% | 25.7% | 41.6% | 53.9% | -6.1% | -6.9% | 36.8% | -24.5% | 21.1% |
| -17.4% | -32.6% | -18.1% | -19.7% | -9.1% | -24.8% | -10.5% | -23.3% | -12.0% | -5.9% | -4.7% |
| 2.3% | -4.7% | 1.5% | -3.8% | 47.7% | -2.7% | -17.0% | -8.2% | -17.4% | -30.7% | -19.3% |
| -33.1% | -0.8% | -8.8% | -15.4% | -13.3% | -18.8% | -33.6% | -11.9% | -15.4% | -10.5% | -15.7% |
| -44.8% | -34.1% | -20.9% | -29.3% | -29.0% | -37.8% | -22.1% | -34.4% | -32.6% | -18.2% | -27.8% |
| -11.2% | -4.4% | -20.0% | -12.5% | 1.2% | -11.9% | -10.3% | 4.7% | -7.8% | -12.9% | 9.3% |
| 80.3% | 30.2% | 62.3% | 41.2% | -1.8% | 44.6% | 53.5% | 10.6% | 102.6% | 32.2% | 6.0% |
| -0.6% | 39.9% | 35.3% | 14.8% | -2.2% | 13.1% | 22.0% | 19.9% | 9.8% | 8.6% | 10.8% |
| -1.2% | -2.2% | -9.9% | -8.8% | -25.1% | -21.4% | 7.4% | -29.2% | -17.8% | -18.9% | -22.6% |
| -33.7% | -12.5% | -37.0% | -29.9% | -31.4% | -34.0% | -35.9% | -32.4% | -34.6% | -18.9% | -16.8% |
| 1.5% | -35.5% | 25.4% | -5.6% | -16.5% | 20.4% | -15.0% | -12.0% | 15.9% | -13.5% | -5.6% |
| 16.8% | -7.6% | -15.1% | -11.3% | 6.1% | -2.2% | 27.3% | 1.4% | 26.1% | -0.6% | -12.0% |
| -37.7% | -25.8% | -27.0% | -33.9% | -32.9% | -25.3% | -3.7% | -20.4% | -21.4% | -29.7% | -22.7% |
| -6.6% | -9.5% | 0.0% | -17.3% | -9.2% | -5.3% | 1.6% | -6.1% | 2.2% | -9.1% | 43.0% |
| -18.8% | -26.2% | -17.8% | -7.2% | -24.3% | -20.8% | -5.4% | -2.4% | -25.1% | 15.4% | -18.6% |
| -11.8% | 6.4% | 1.4% | -16.8% | -5.7% | -14.9% | 0.7% | -3.6% | 22.3% | -9.2% | -2.4% |
| 82.4% | -23.5% | 54.1% | -13.7% | 35.3% | 79.2% | 35.0% | 17.2% | 50.3% | 47.8% | 14.6% |
| 27.3% | 26.4% | -1.2% | 26.8% | -5.4% | 29.7% | 10.2% | 0.8% | 19.6% | -7.8% | 1.8% |
| -6.5% | -1.4% | 4.6% | 2.3% | 30.9% | 0.6% | 29.6% | -2.4% | 10.7% | 49.4% | -14.3% |
| -34.7% | -13.0% | -41.4% | -44.6% | -30.6% | -35.5% | -39.1% | -28.2% | -38.1% | -39.2% | -20.3% |
| 22.4% | 15.4% | 6.0% | 14.2% | 5.2% | 8.2% | 19.7% | 12.9% | 15.1% | 8.6% | -5.3% |
| 15.0% | 8.6% | -14.6% | -21.8% | -34.4% | 0.8% | -7.5% | -10.0% | 3.1% | -27.9% | -20.2% |
| -19.5% | -24.0% | -23.6% | -62.6% | -26.5% | -21.8% | -24.0% | -19.9% | -26.1% | -29.3% | -10.3% |
| 61.8% | 45.9% | 45.3% | 30.5% | -1.3% | 25.2% | 47.7% | 2.5% | 51.8% | 35.5% | 14.9% |
| -11.7% | -35.3% | -6.5% | -16.0% | -14.6% | 69.0% | -12.8% | -18.7% | -3.6% | -6.0% | -13.3% |
| -5.9% | 4.6% | -9.3% | -5.9% | -13.2% | -16.6% | -20.5% | -5.9% | -11.6% | -15.6% | -19.0% |
| -15.8% | 21.0% | -11.0% | 8.0% | -8.5% | -9.8% | -24.3% | 8.7% | -16.0% | 36.9% | 33.2% |
| -12.5% | -11.1% | -11.1% | -20.9% | -10.9% | -16.3% | -32.3% | -2.1% | -21.6% | -5.9% | -14.3% |
| -5.9% | 2.8% | -3.7% | -17.7% | -11.5% | -8.2% | -8.4% | -2.2% | -3.2% | -10.1% | -15.5% |
| 22.6% | -23.5% | -0.4% | -9.2% | -8.9% | 10.8% | -11.1% | -1.1% | 14.9% | -18.9% | 2.0% |
| 5.2% | 24.6% | -5.9% | 0.5% | 9.2% | -5.9% | -0.3% | 1.0% | 0.6% | 1.6% | -16.1% |
| 64.5% | 27.7% | 61.2% | 17.9% | 57.8% | 34.2% | 60.3% | 0.9% | 28.3% | 41.1% | 19.4% |
| 4.6% | 19.9% | 8.9% | -19.9% | -10.1% | -5.2% | -19.5% | -1.1% | -3.3% | -9.9% | 16.7% |
| 101.9% | 60.5% | 20.8% | 8.3% | -2.5% | 13.0% | 67.0% | 0.6% | 2.2% | 108.0% | 73.1% |
| 1.6% | 4.3% | 7.6% | 25.1% | -1.9% | -18.2% | 87.2% | 29.2% | 38.9% | 58.5% | -16.2% |
| -5.3% | 107.8% | 28.1% | 42.7% | 125.6% | 12.4% | -26.0% | 77.6% | -7.3% | 29.4% | 122.2% |
| -18.4% | 2.4% | 9.4% | -3.9% | -24.7% | -20.3% | -2.4% | 1.1% | -19.9% | -15.9% | -8.8% |
| 6.1% | 9.1% | -11.6% | -5.3% | 44.8% | 11.3% | -3.8% | 14.8% | 9.4% | -1.8% | 33.0% |
| -3.4% | 4.2% | -1.0% | 74.2% | 15.9% | 16.1% | 22.6% | 26.6% | 28.9% | 12.9% | 52.7% |
| -5.0% | 6.4% | -5.0% | -34.8% | -8.1% | -0.8% | -5.0% | 6.4% | -11.4% | -25.8% | -27.5% |
| 19.4% | 84.2% | 23.4% | 97.2% | 25.0% | 22.4% | 60.2% | 21.7% | 8.0% | 29.5% | 19.1% |
| 21.2% | 10.0% | -11.6% | -6.9% | 13.8% | 13.2% | 25.6% | 15.9% | 2.0% | 11.4% | -8.9% |
| 14.5% | 6.9% | 32.6% | -9.3% | 3.8% | 0.4% | -10.3% | 11.1% | 5.9% | -28.8% | -22.7% |
| -40.7% | -48.9% | -43.6% | -61.2% | -48.6% | -33.0% | -20.7% | -45.2% | -23.7% | -47.7% | -42.8% |
| -12.8% | -34.0% | -5.2% | -4.6% | -16.6% | -24.9% | -46.8% | -33.8% | -20.9% | -6.5% | -39.6% |
| -18.0% | -22.9% | -9.8% | -33.3% | -8.3% | 14.8% | -2.2% | 3.8% | -36.9% | -32.1% | -26.7% |
| -37.2% | -59.8% | -3.4% | -54.2% | -26.6% | -17.1% | -11.9% | -10.2% | -7.2% | -19.4% | 15.7% |
| -11.7% | 57.0% | 71.8% | 16.6% | 53.3% | 44.0% | -8.8% | -10.4% | -20.8% | 68.6% | 9.5% |
| 47.0% | 19.7% | -1.5% | 67.9% | 11.5% | -0.8% | -7.6% | 23.2% | -4.1% | 29.9% | 36.6% |
| 53.1% | 2.6% | 7.6% | 50.7% | 7.4% | 16.5% | 0.1% | 17.7% | 5.3% | 52.2% | 10.4% |
| -28.5% | 46.8% | 14.7% | 93.2% | 10.4% | -1.6% | -8.9% | -11.5% | 16.3% | 12.2% | 44.4% |
| -29.8% | -39.5% | -21.0% | 7.0% | -21.1% | 19.8% | -23.8% | -23.5% | -16.6% | 13.6% | -30.2% |

# APPENDIX B

Data Set

| Date | 1<br>RFX | 2<br>DFXPREM | 4<br>RMKT | 5<br>FORWAR | 6<br>FXPREM | 8<br>DIVYIELD |
|---|---|---|---|---|---|---|
| Jan-90 | | | | | | |
| Feb-90 | 0.026 | -19.942 | 1.905 | 2.695 | 5.830 | 0.030 |
| Mar-90 | 0.031 | 1.325 | 2.260 | 2.620 | 13.980 | 0.032 |
| Apr-90 | 0.015 | 0.272 | 1.045 | 2.660 | 18.050 | 0.031 |
| May-90 | 0.027 | -0.882 | 2.578 | 2.741 | 2.190 | 0.027 |
| Jun-90 | 0.025 | -3.977 | 1.385 | 2.707 | -6.680 | 0.025 |
| Jul-90 | 0.006 | -1.796 | 3.290 | 2.845 | 5.350 | 0.020 |
| Aug-90 | 0.007 | 0.928 | 2.476 | 3.028 | 10.390 | 0.021 |
| Sep-90 | 0.016 | -0.386 | -0.182 | 3.220 | 6.480 | 0.020 |
| Oct-90 | 0.015 | -1.371 | 2.637 | 3.316 | -2.440 | 0.021 |
| Nov-90 | 0.013 | -13.393 | 3.490 | 3.470 | 30.630 | 0.028 |
| Dec-90 | 0.041 | -0.346 | 1.489 | 3.954 | 20.870 | 0.026 |
| Jan-91 | 0.039 | 1.587 | 3.222 | 3.890 | 56.100 | 0.049 |
| Feb-91 | 0.095 | 3.146 | 2.795 | 4.301 | 254.670 | 0.035 |
| Mar-91 | 0.111 | -0.525 | 2.805 | 4.640 | 134.420 | 0.040 |
| Apr-91 | 0.068 | -0.116 | 3.286 | 4.920 | 126.920 | 0.046 |
| May-91 | 0.025 | -0.776 | 1.281 | 5.276 | 29.120 | 0.047 |
| Jun-91 | 0.069 | -1.332 | 1.861 | 4.932 | -10.320 | 0.047 |
| Jul-91 | 0.015 | -2.414 | 3.024 | 4.905 | 14.810 | 0.055 |
| Aug-91 | 0.045 | 3.731 | 1.181 | 4.855 | 73.200 | 0.053 |
| Sep-91 | 0.028 | -0.781 | 2.798 | 4.984 | 16.460 | 0.057 |
| Oct-91 | 0.044 | 1.088 | 2.501 | 5.315 | 35.870 | 0.060 |
| Nov-91 | 0.028 | -0.399 | 3.734 | 5.576 | 22.150 | 0.041 |
| Dec-91 | 0.002 | -0.992 | 0.811 | 5.101 | 0.170 | 0.040 |
| Jan-92 | 0.081 | 292.785 | 2.001 | 5.066 | 53.990 | 0.051 |
| Feb-92 | 0.069 | -0.259 | 3.433 | 5.040 | 42.760 | 0.069 |
| Mar-92 | 0.064 | -1.472 | 1.776 | 5.018 | -21.490 | 0.061 |
| Apr-92 | 0.056 | -1.494 | 2.707 | 5.140 | 11.210 | 0.068 |
| May-92 | 0.034 | 8.889 | 2.788 | 5.431 | 114.670 | 0.075 |
| Jun-92 | 0.007 | -1.028 | 3.322 | 5.643 | -3.240 | 0.057 |
| Jul-92 | 0.028 | -1.345 | 2.224 | 5.753 | 1.150 | 0.059 |
| Aug-92 | -0.001 | -45.285 | 2.130 | 5.677 | -50.870 | 0.059 |
| Sep-92 | 0.038 | -0.861 | 2.324 | 5.638 | -7.340 | 0.062 |
| Oct-92 | 0.071 | -8.849 | 2.656 | 5.641 | 61.710 | 0.066 |
| Nov-92 | 0.051 | 0.057 | 0.655 | 5.646 | 68.600 | 0.063 |
| Dec-92 | 0.038 | 0.533 | -2.107 | 5.651 | 109.150 | 0.064 |
| Jan-93 | 0.030 | -0.505 | 1.276 | 5.670 | 55.660 | 0.090 |
| Feb-93 | 0.042 | -2.045 | 3.390 | 5.271 | -60.590 | 0.065 |
| Mar-93 | 0.029 | -2.106 | 1.820 | 4.945 | 68.940 | 0.066 |
| Apr-93 | 0.021 | -0.143 | 3.330 | 4.991 | 60.340 | 0.046 |
| May-93 | 0.049 | -1.059 | 0.620 | 5.178 | -3.710 | 0.045 |
| Jun-93 | 0.073 | -10.990 | 3.153 | 5.057 | 39.760 | 0.035 |
| Jul-93 | 0.062 | -1.992 | 2.467 | 5.054 | -41.890 | 0.038 |
| Aug-93 | 0.019 | -4.130 | 2.857 | 4.969 | 133.540 | 0.031 |
| Sep-93 | 0.029 | -0.576 | 2.828 | 4.928 | 58.210 | 0.024 |
| Oct-93 | 0.073 | 4.330 | 2.179 | 4.772 | 332.990 | 0.024 |
| Nov-93 | 0.058 | -0.499 | 3.231 | 5.350 | 176.500 | 0.019 |
| Dec-93 | 0.054 | 0.167 | 1.246 | 5.276 | 216.970 | 0.017 |
| Jan-94 | 0.190 | -0.316 | 2.239 | 6.362 | 176.480 | 0.042 |
| Feb-94 | 0.061 | 3.749 | 3.498 | 7.437 | 889.590 | 0.056 |
| Mar-94 | 0.212 | 0.727 | 2.622 | 7.376 | 1862.400 | 0.063 |
| Apr-94 | 0.540 | -1.205 | 0.953 | 9.483 | -586.690 | 0.061 |
| May-94 | -0.069 | 0.704 | 2.651 | 11.559 | -930.410 | 0.061 |
| Jun-94 | -0.019 | -0.577 | 3.229 | 8.471 | -386.350 | 0.045 |
| Jul-94 | -0.004 | -0.826 | 1.533 | 7.318 | -66.840 | 0.039 |
| Aug-94 | 0.062 | 0.774 | 1.947 | 6.577 | -125.970 | 0.033 |
| Sep-94 | 0.033 | 0.067 | -0.350 | 6.455 | -138.790 | 0.032 |
| Oct-94 | 0.052 | 0.184 | 2.614 | 6.079 | -173.000 | 0.032 |

# APPENDIX C

Figures

Figure - 1
Monthly Forward Premium and Rate of Change of Official TL/$ Exchange Rate

## Monthly Forward Premium and Rate of Change of Official TL/$ Exchange Rate

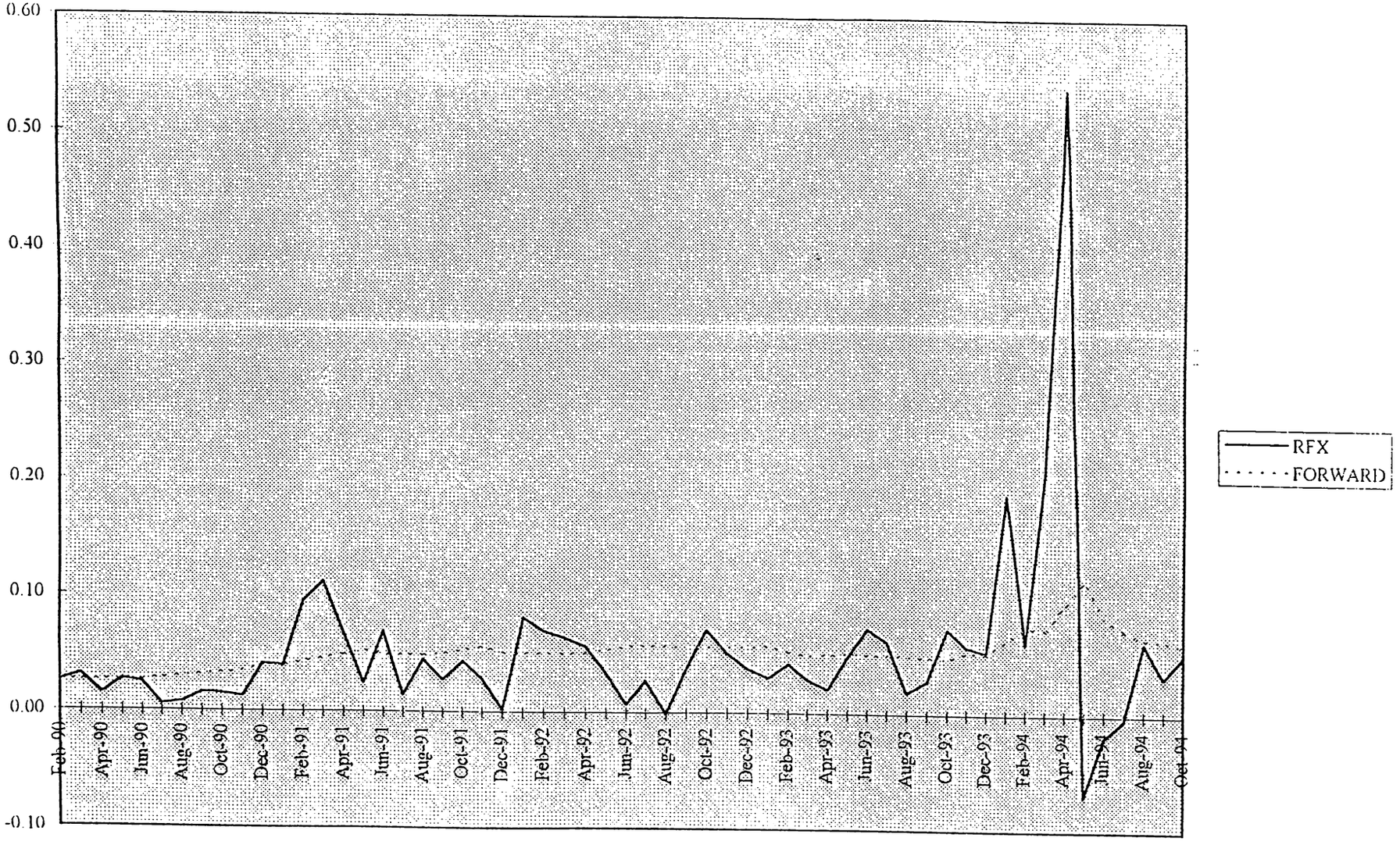

Figure - 2
Monthly Free Market Dollar Premium Expressed as a Fraction of the Official TL/$ Rate

Monthly Free Market Dollar Premium Expressed as a Fraction of the Official TL/$ Rate

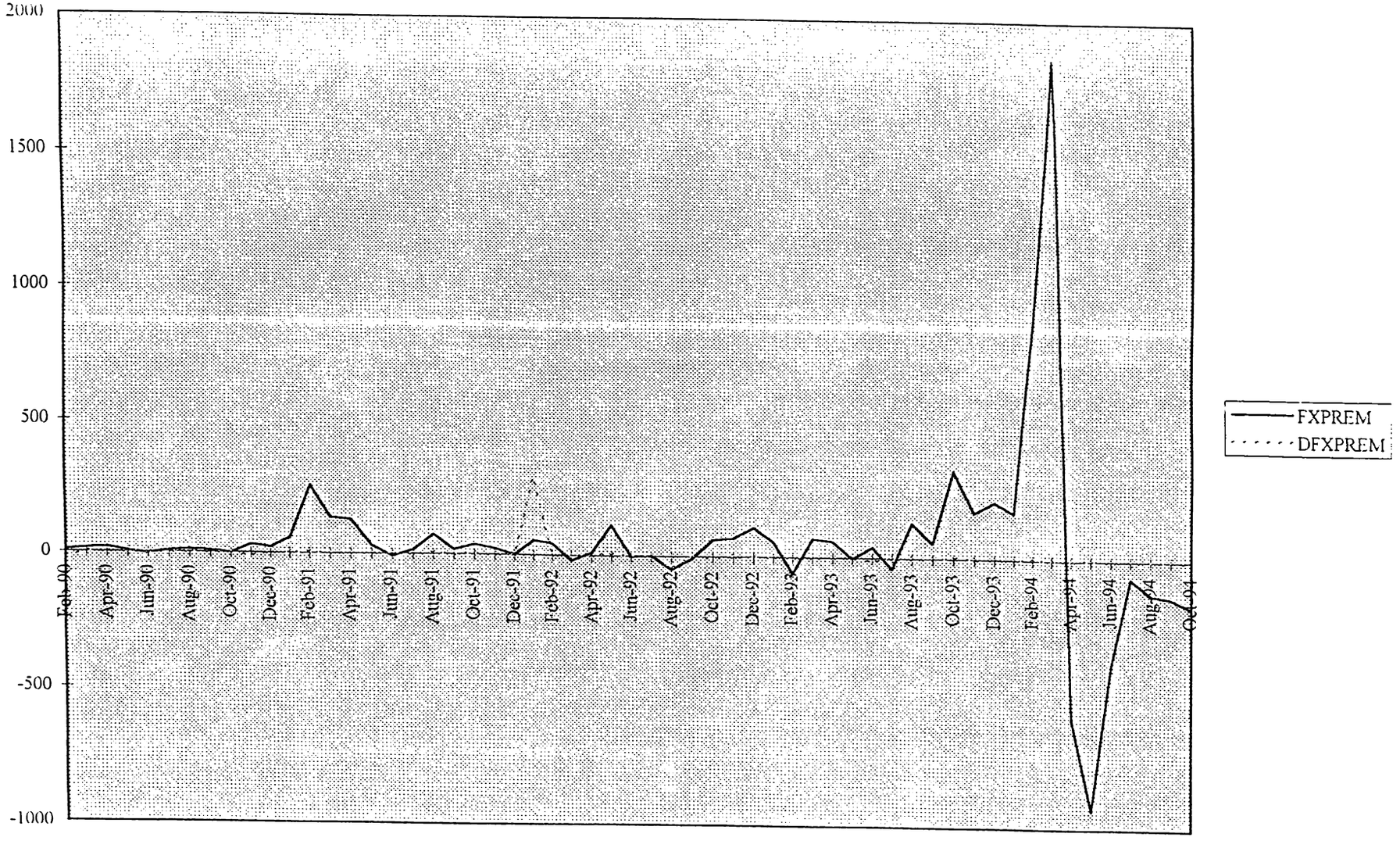

Figure - 3
Monthly Turkish Stock Market Index

## Monthly Turkish Stock Market Index