STOCK MARKET SEASONALITY IN THE İSTANBUL STOCK EXCHANGE

BİLKENT UNIVERSITY
MBA THESIS

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Ankara, December 1993

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

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ABSTRACT

STOCK MARKET SEASONALITY IN THE İSTANBUL STOCK EXCHANGE

by
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ANKARA, DECEMBER 1993

This study empirically examines stock market seasonality in the Istanbul Stock Exchange Market (IMKB) , Turkey. Current evidence from the studies for other capital markets around the world provides that there are strong seasonalities in the stock returns in most of these capital markets. The seasonality , when it exists, is associated with the turn of the year, the week, as well as with holidays. The turn of the week effect appears to be negative on Monday or Tuesday returns; turn of the year effect appears to be high for January or April returns;and holiday effect appears to have higher returns on the trading days prior to holidays in most of the capital markets in developed countries.

This study, however, presents the evidence that so called weekend effect and the day-of-the-week effect do not exist in IMKB. The mean returns on Thursdays are negative and it cannot be accepted statistically. I find a turn of the year effect with high January returns and holiday effect with high mean returns, averaging four times the mean return for the remaining days of the year as in the other capital markets.

The returns for the IMKB daily index for 1988-1991 period are examined in this study, as well as the weekend and turn of the year effect for the individual stocks of 29 large and 34 small firms.

ÖZET

MENKUL KIYMETLER BORSALARINDAKİ MEVSİMSELLİKLERİN İSTANBUL MENKUL KIYMETLER BORSASI'NDA (İMKB) İNCELENMESİ

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ANKARA, ARALIK 1993

Bu çalışma menkul kıymetler borsalarındaki mevsimsellikleri İstanbul Menkul Kıymetler Borsa'sında (IMKB) incelemektedir. Dünyadaki mevcut çalışmalar çeşitli borsalarda bu tip mevsimsellikler olduğunu göstermiştir. Mevsimsellikler varolduğunda 'yılın dönümleri', 'haftanın dönümleri' ve 'tatiller' diye adlandırılırlar. Haftanın dönüm etkisi negatif Pazartesi veya Salı getirileri ile; yılın dönümü etkisi yüksek Ocak veya Nisan getirileri ile ; ve tatil etkisi tatilden bir gün önceki günlerin yüksek getirileri şeklinde ortaya çıkarlar.

Ancak bu çalışma İstanbul Menkul Kıymetler Borsası'nda haftanın dönüm etkisi olmadığını ortaya çıkartmıştır. Perşembe günü olan ortalama getiriler negatif olmalarına karşın, bu istatistiksel olarak ispatlanamamıştır. Yılın dönüm etkisine yüksek Ocak ayı ortalama getirileri ile ve tatil etkisine normal günlere göre ortalama dört kat fazla tatil öncesi getiriler ile rastlanmıştır.

Bu çalışmada getiriler hesaplanırken 1988-1991 yılları arasındaki günlük indeks kullanılırken, bunun yanında yılın dönümü ile haftanın dönümü etkisi için borsada işlem gören 29 büyük, 34 küçük firmanın günlük hisse senedi fiyatları kullanılmıştır.

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I - INTRODUCTION

Calendar anomalies have long been a part of market folklore. Studies of the day-of-the-week, holiday and January effects first began to appear in the 1930's. Although academics have only recently begun to seriously examine these return patterns, they have found them to withstand close analysis.

Calendar regularities generally occur at cusps in time - turn of the year, the month, the week, and they often have significant impacts. For instance in the US, the "Blue Monday" effect was so strong during the Great Depression that the whole market crash took place over one weekend, from Saturday's close to Monday's close.

Because calendar anomalies appear relatively easy to exploit, their continued existence seems unexplainable. However, whatever the reason for these anomalies, it may help the investors to forecast the stock returns. To arbitrage these effects, investors would have to increase their demand for the stocks (especially the ones with low P/E); but psychological considerations may inhibit investors from doing so.

Another difficulty with the calendar anomalies is that it is difficult to exploit as a stand-alone strategy because of transaction cost considerations. For instance, full capture of the day-of-the-week effect would require 100 per cent turnover per week.

According to some academics, however, these anomalies do not exist. The availability of a century's data brings enormous statistical power for testing calendar effects, but also increases the likelihood of "data-mining". If enough patterns are tested, some will appear significant merely by chance. Since the Turkish market is a very new one, data-mining cannot cause any problem at all, but this time another problem comes out : The newness of the market (number of observations in the sample are very limited).

Another important point about these anomalies is the market efficiency. The market efficiency is the simple statement that security prices fully reflect all available information. Efficiency hypothesis says that prices reflect information to the point where the marginal benefits of acting on information do not exceed the marginal costs.

The market efficiency is divided into three categories : (1) weak-form tests (How well do past returns predict future returns ?) , (2) semi-strong-form tests (How quickly do security prices reflect public information announcements?), and (3) strong-form tests (Do any investors have private information that is not fully reflected in market prices?)

Instead of weak-form tests, which are only concerned with the forecast power of past returns, the first category covers the more general area of tests for return predictability. The evidence that there are seasonals in returns (like January effect) and the claim that security prices are too volatile are considered under the return predictability. However these anomalies are not necessarily embarrassments for market efficiency. For example, Monday, and holiday returns deviate from normal average daily returns by less than the bid-ask spread of the average stock. Turn-of-the-year abnormal returns for small stocks are larger, but they are not large relative to the bid-ask spreads of small stocks.

In this study, the existence of above mentioned anomalies in the Turkish Market is investigated, and the reasons and the findings are presented.

II - LITERATURE SURVEY

i - Day-of-the-week Effect :

Some of the empirical findings reported in recent years indicate that the distributions of common stock returns varies by the day of the week. This daily distribution of stock returns is examined as the "Monday effect", "day-of-the-week effect", "weekend effect" in the literature.

On this topic, the first research was done by Fama (1965). While Fama does not compare daily mean returns, he does report that Mondays' variance is about 20 percent greater than other daily returns. With a different methodology Godfrey, Granger, and Morgenstern (1964) reach a similar conclusion. Fama (1965) and Granger & Morgenstren (1970) also investigate the speed of the process of stock price formation, defined as the variance per unit of time of the first differences of the price series and demonstrate that while market is closed the sthocastic (random walk) process followed by stock process continued to operate, but at a slower speed .

Cross (1973) and French (1980) uncover the evidence of negative average returns for Monday using the Standard and Poor's 500 for the US stock market.

Gibbons and Hess (1981) confirm the conclusions of the previous studies, they also find that the negative return for Monday is remarkably uniform across individual stocks and that treasury bills earn a below average return on Mondays. They also examine the impact of the-day-of-the-week effect on tests of market efficiency and find that the market adjusted returns exhibit the day-of-the-week effect, but the effect is not concentrated on a particular day of the week.

Keim & Stambough (1984) also investigate the weekend effect in stock returns. They examine additional time periods, extending to to 55 years, and they examine additional stocks, such as those of the small firms. In all cases, the data exhibit a weekend effect that is at least as strong as that reported in previous studies. They also give the explanations for the effect, such as measurement error, but conclude that none of the explanations are satisfactory.

Rogalski (1984) finds that most of the negative returns from Friday closing price to the Monday closing price take place when the market is closed over the weekend, rather than during the trading day on Monday. While the return from Friday closing price to Monday opening price is significantly negative, the return during the Monday (from opening to closing price) is not significantly different from the return during any other trading day.

Jaffe & Westerfield (1985) examine the day to day stock market returns for Japan. While they find a weekly seasonal in Japan, its nature is significantly different in a statistical sense from the American one. For example, the lowest mean return in Japan occurs on Tuesday not Monday, as in the United States. Then they examine the causes for the unique Japanese seasonal. They investigate whether the results in Japan are associated with those in the United States, and, consider whether the low Tuesday return in Japan and the low Monday return in United States are due to the time zone differences. J&W also treat the settlement process and measurement error problem. In addition to those, they document the relationship between foreign exchange returns and stock market returns. The seasonal in daily foreign exchange returns do not offset the seasonal in daily stock market returns.

Jaffe and Westerfield (1985) also examine the stock market returns in the UK, Japan, Canada, and Australia, and they find the same weekend effect in each country. In contrast to previous studies in the US, the lowest returns for both the Japanese and Australian stock markets occur on Tuesday.

Connolly (1989) finds that the Monday seasonal in NYSE returns is weaker after 1974.

Barone (1990) finds that the mean returns are negative for both Monday and especially Tuesday, and positive for Friday for the Italian stock market. Tuesdays' fall is confirmed at the 1 percent confidence level and Mondays' standard deviation is between 12 and 25 percent higher than the other returns. He also examines as a linear regression model and finds that the null hypothesis is rejected at the 95 percent confidence level : The Monday returns of change are significantly different from those of the other days of the week.

Solnik & Bousquet (1990) examine on the Paris Bourse. Contrary to the evidence on the American market, its manifestation is a strong and persistent negative return on Tuesday and they examine the higher positive returns observed on Fridays and the forward settlement procedure cannot explain the negative mean returns observed on Tuesdays.

ii - Turn-of-the-year Effect :

Rozeff and Kinney (1976) observe that in United States, stock returns for January are significantly larger than the returns for the remaining eleven months. Since then Keim (1983) discovers that the phenomenon is related to the abnormally high returns on small firm stocks observed by Bonz (1981) and Reinganum (1981). He finds a significant portion of small firms' higher risk adjusted returns occurs in the first trading week of January. Roll (1983) argues that this "January effect" is due to the tax-loss sellings at the end of the tax year. He also provides the evidence that small firm stocks are affected more by tax-loss selling than the large firm stocks are. Reignaum (1983) also reports similar findings.

Although empirical research suggest a close association between tax-loss selling and the January seasonality in the US, the anomaly is not yet fully understood. Brown, Keim, Kleida, and Marsh (1983) find that while Australia has similar tax laws but a July-June tax year, Australian returns have December-January and July-August seasonals.

Roll (1983) and Keim (1983) also document that much of the higher January returns on small stocks come on the last trading day in December and the first 5 trading days in January.

Gültekin & Gültekin (1983) examine stock market seasonality in major industrialized countries. They find that the season of pattern observed in the United States is also present in market indices of many other countries with the exception of Australia. Seasonalities, if they exist, are caused by the abnormally high mean returns at the turn of tax year in most countries.

Jeffe & Westerfield (1985) investigate the "turn-of-the- year" effect. Japanese stock returns in January are significantly above the returns during the rest of the year. However, unlike some reports using United States data, they find no interaction in Japan between the Monday effect and January effect.

Barone (1990) finds that the Italian stock market also has a pronounced seasonal pattern with the daily changes in stock prices during January account equal on average to 0.33 percent and significantly different from zero at a level of confidence of less than 0.001.

iii - Holiday Effect :

Intimations of pre-holiday strength have appeared in the academic literature.

Merill (1966) finds a disappropriate frequency of Dow Jones Industrial Average advances on days preceding holidays during the 1897 to 1965 period and Fosback (1976) has noted high preholiday returns S&P 500 index return.

Roll (1983) finds high returns accruing to small firms on the trading day prior to New Year's Day. Lakonishok & Smidt (1984) note that "prices also rise in all deciles on the last trading day before Christmas" and conclude that " the high Christmas returns of large companies might be considered ... mystery".

Jacobs & Levy (1988), in the United States market, 35 percent of the rise in stock prices in the period 1963-1982 occurred on the eight trading days before a public holiday.

Barone (1990) finds that, on the average, the rates of change on the days preceding on public holiday is higher than that for the other trading days in Italian stock market.

Ariel (1990) documents that the high mean return accruing to the CRSP (Center for Research in Security Prices for Dow Jones Industrial Average) equally and value weighted indices on the trading day prior to holidays is statistically significant for the United States market; on average the preholiday return equals nine to fourteen times the return accruing on non-preholidays.

III - THE DATA

This thesis uses the daily values from 1988 to December 91, for the IMKB index, and daily closing prices for 63 securities in the IMKB. The IMKB index has different number of securities depending on the year . While it contained a small number of securities in 1988, it reached to around 150 securities lately. The number of securities in the IMKB during different years do not affect the index used in the test. It does have an effect on the test outcome of individual stocks because almost all of the securities have different number of observations individually.

During the entire sample period, the Turkish market was open from Monday through Friday.

In order to test three calendar anomalies, 1000 observations were considered. For the first anomaly, the-day-of-the-week effect, whole sample was separated into subsamples based on the day of the week. That is, Mondays were in subsample 1, Tuesdays were in subsample 2 etc. Table 1 summarizes the number of observations in each subsample.

Table 1

SAMPLE	# of Observations
Whole Sample	1000
Monday	197
Tuesday	199
Wednesday	201
Thursday	202
Friday	201

For the second anomaly, turn of the year effect, the same sample was separated into subsamples in a similar way as in the above. Then I found the following number of observations for each of the month of the year. Table 2 gives the number of the observations in each subsample.

Table 2 summarizes the number of observations for both the whole period and the subperiods.

Table 2

SAMPLE	# of Observations
Whole Sample	1000
January	85
February	81
March	89
April	71
May	86
June	82
July	77
August	87
September	84
October	86
November	87
December	85

For the last anomaly, holiday effect, all the trading days preceding the public holidays when market is closed, were taken as one subsample, and the remaining values were the other one. The public holidays considered are : New Year's Day, Apr. 23rd, May 19th, Kurban and Şeker Bayramları (two religious holidays), Aug. 30th, and Oct. 29th. some of these holidays may fall on weekends and therefore would not always cause an extra market closing. In my sample for this anomaly, there were 24 observations for the pre-holidays and 976 observations for the non-pre-holidays.

For a detailed analysis of day-of-the-week and turn-of- the-year effects, I separated the whole period (1988-1991) into two subperiods, each being two year long. First subperiod contains the data for the period 1988 to 1989, and the second contains for the period 1990-1991.

In addition to separating the period into two subperiods, I used the daily closing prices of 63 securities in the IMKB. 34 of them are of small companies with 40 billion TL nominal capital or less; 29 of them are of large companies with 100 billion TL nominal capital or more. These data were used for the analysis of the day of the week effect and turn of the year effect. (See App.1 for the names of the companies of these securities)

IV - METHODOLOGY

The use of daily data makes it possible to examine the relationship between the changes that occur in stock prices or index from one trading day to the next. Therefore it is possible to test whether they change abnormally over weekends; different months, or over holidays. The methodologies that have been used for this purpose are explained in sections IV-i, ii and iii separately.

However, before I start to discuss these methodologies, I want to introduce the formulas and symbols which are used in each methodology commonly.

Using each day's closing price or index value for that day, a return is computed as the percentage change in the value of the index or in the price from the previous day. Therefore the return for day t is :

$$r_t = (v_t - v_{t-1}) / v_{t-1} * 100 \qquad \text{(IV-1)}$$

where r_t is the return on day t, v_t is the value of the index or closing price on day t.

Using the returns for each day, mean return for a period, p, of N days starting day 1 to N is :

$$\bar{r}_p = \sum_{t=1}^{N} r_t / N \qquad \text{(IV-2)}$$

where $\bar{r}_p$ mean return for period p, N number of days for that period.

Standard deviation for period p is:

$$\sigma_p = \sqrt{\sum_{t=1}^{N} (r_t - \bar{r}_p)^2 / (N-1)} \qquad \text{(IV-3)}$$

where σ_p is the standard deviation of the returns in period having N days.

trimmed mean : Mean that drops the highest and the lowest extreme values and averages the rest. (IV-4)

quartiles : the extreme values that pull the mean in the direction of the quartiles, thus distorting the mean as a measure of the central value. (IV-5)

median : the middle value when the measurements are arranged from lowest to highest. (IV-6)

In addition to above, to test the normality of the data, I used Kolgomorov-Smirnov Goodness of Fit Test. This test is required since in the further analysis of data, it is sometimes essential that data should be normally distributed.

Besides, after checking the distribution if it is a normally one, histogram are used to see the distribution visually.

i - The Day-of-the-week Effect :

I first investigate the existence of the day-of-the-week effect anomaly in IMKB among the other anomalies. This anomaly implies ,in theory, that there are significant difference in the day-to-day mean returns.

The methodology that I have used is as follows : First I have found the general description of data for each day, Monday through Friday, for the period 1988-1991. The general description implies the mean, standard deviation, trimmed mean, median and quartiles as explained in the formulas IV-1 to 6. I have also found the number of observations of each day for this period. Then I have checked the normality of the data. The Kolgomorov-Smirnov test has been applied to each day to see whether the data are distributed based on the normal distribution. In addition to this, I have drawn the histograms of the days for the same purpose. (Data should be normally distributed to be able to apply some parametric tests, that's why, I have had to check the normality)

After checking the normality, I have applied two different methods to test differences in mean return of the data for each day. One of these method is a parametric one, the other is a non-parametric one.

Parametric methods involve testing the existence of seasonality and the differences in day-to-day mean returns using a regression model, and the mean returns for each day are tested as a hypothesis whether they are different from each other.

For the parametric method, I have constructed a test for differences in mean return across the days of week by computing the following regression :

$$R_t = \alpha_1 d_{1t} + \alpha_2 d_{2t} + \alpha_3 d_{3t} + \alpha_4 d_{4t} + \alpha_5 d_{5t} + U_t \qquad \text{(IV-i-1)}$$

where R_t is the return at date t (from day t-1 to day t) and d_{it} is a dummy variable equal to 1 if date t falls on the i'th day of the week and equal to 0 otherwise, in other words, d_{it} =1 if day t is a Monday, and d_{it} =0 otherwise; d_{it}=1 if t is a Tuesday etc. *Ut* is a disturbance and assumed to be independently and identically distributed as normally with zero mean. The coefficients $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$ are the mean returns for Monday to Friday. If the daily returns were drawn from an identical distribution, we would expect the regression coefficients to be equal. Therefore, I have tested the hypothesis that $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5$ for IMKB. The F- statistic is computed for this regression and I have checked when it is rejected at different significance levels. (see section V-i for the empirical results)

In addition to the above parametric test, I have used another parametric test to check whether the mean returns of a specific day is different from the rest of the data, that is, whether Monday mean return , for example, is different from the mean returns of all remaining days, Tuesday through Friday. I have applied this two-sample method for each of the five days with respect to the remaining data.

In the above method, t-test is used. This test finds if there exists a difference in means of two samples. This test, in this study, is applied for 5 times. In each try, first sample is one day, the other sample is the all remaining data. Therefore we can easily can find out that the mean returns of a day is different from the other days.

I have also used a non-parametric test developed by Kruskal and Wallis [henceforth K-W]. In this method, consider an arrangement of daily stock market returns as Tx5 matrix, R=[r_{tm}]. Rows of R represent the weeks and each column represents the day of a week. Each element , r_{tm}, of the matrix R, then, is a return realized in day m of the week t. The K-W procedure is used to test the hypothesis that all 5 of the samples (i.e. columns of R) are drawn from the same population. Specifically, I test the hypothesis that the 5 days have identical means.

The basic model of the returns is

$$r_{tm} = \mu + \tau_m + e_{tm} \qquad t=1,\dots,T_m \qquad m=1,\dots,5 \qquad \text{(IV-i-2)}$$

where μ is the (unknown) overall mean, τ_m is the unknown day m effect and $\sum_{m=1}^{5} \tau_m = 0$. I assume that the error term, e_{tm} , is independent of the other terms. Moreover, all of the error terms are drawn from the same continuous distribution.

Then I test the null hypothesis that

$$H_0 : \tau_1 = \tau_2 = \tau_3 = \tau_4 = \tau_5 = 0 \qquad \text{(IV-i-3)}$$

against the alternatives that all τ's are not equal. Rejection of the null hypothesis implies that stock returns exhibit seasonality.

The K-W test first ranks the M observations ($M = \sum_{m=1}^{5} \tau_m$) jointly from least to greatest. Let x_{tm} denote the rank of r_{tm} in this joint ranking; the test statistic is

$$H = \frac{5}{M(M+1)} \sum_{m=1}^{5} T_m (\bar{X} - \bar{X}_m)^2 \qquad \text{(IV-i-4)}$$

where $\bar{X}_m$ is the average rank received by the returns in the mth day such that

$$\bar{X}_m = \frac{1}{T_m} \sum_{t=1}^{T_m} x_{tm} \qquad \text{(IV-i-5)}$$

and $\bar{X}$ = (M+1)/2 which the average rank of all M observations. When H_0 is true, the statistic H has an asymptotic chi-square distribution with 4 degrees of freedom. The appropriate α-level test is

reject H_0 if H $\geq$ $\chi^2(4,\alpha)$

where $\chi^2(4,\alpha)$ is the upper α percentile point of a χ^2 distribution with 4 degrees of freedom.

Since this procedure uses the rankings of the observations, it is not sensitive to outliers. Furthermore, the K-W test requires no distributional assumptions about the stock returns (such as normality of data). Therefore it is less restrictive than parametric tests. (see section V-i for the empirical results)

For a detailed analysis of the sample, I have separated the sample into two subsamples. The first subsample contains the index returns for the period 1988-1989 and the second contains the index returns for 1990-1991.

For each of these subsamples, I have used the same methodology that I have explained above. In other words, for each period, I have found the general description, checked the normality and applied both parametric (regression) and non-parametric (K-W) methods for the index returns.

Finally, instead of index returns, I have examined the day-of-the-week seasonality of the stock returns for 63 securities in IMKB. (see app I and section III) At this step, again, I have used the same methodology (as above) for each of these securities.

All the findings and results are represented in section V-i and discussed again in the same section and section VI.

ii - The Turn-of-the-year effect :

Second seasonality of that I investigate the existence is the turn of the year effect in IMKB. This anomaly implies that there are significant differences in the month-to-month mean returns.

Below I give the explanation of the methodology, which has been used :

As in the first anomaly, I have determined the general description of the sample. In other words, I have found the mean, standard deviation, median, quartiles etc. of index return of the sample for each month of the year, January through December for the period 1988-1991.

Afterwards, I have applied the Kolgomorov-Smirnov to test if the index returns for each month are distributed normally. For the returns, I have also drawn the histograms of the months. (see section IV-i for this test)

Both parametric and non-parametric methods have also been used for the test of existence of turn of the year anomaly in the sample. For parametric method, I have used the regression model and , moreover, two-sample t-test. For non-parametric one, I have ,again, applied Kruskal-Wallis test.

In the parametric method, this time the regression model to test the differences in mean returns across months of year as follows :

$$R_t = \alpha_1 d_{1t} + \alpha_2 d_{2t} + \alpha_3 d_{3t} + \ldots\ldots + \alpha_{12} d_{12t} + U_t \quad \text{(IV-ii-1)}$$

where R_t is the return at date t (from day t-1 to t) and d_{it} is a dummy variable equal to 1 if date t falls on the ith month of the year and equal to 0 otherwise, in other words, d_{it}=1 if day t falls in January and d_{it}=0 otherwise etc. *Ut*, similar to the first regression model, is a disturbance and normally distributed with zero mean, and also it is independent. The coefficients $\alpha_1, \alpha_2, \alpha_3, \ldots, \alpha_{12}$ are the mean returns from January to December. If the monthly returns were drawn from an identical distribution, we would expect the regression coefficients to be equal. As a result, we have to test the hypothesis that $\alpha_1 = \alpha_2 = \alpha_3 = \ldots\ldots = \alpha_{12}$ against the alternative one that they are not equal.

$$H_o : \alpha_1 = \alpha_2 = \alpha_3 = \ldots\ldots = \alpha_{11} = \alpha_{12}$$
$$H_1 : \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \ldots\ldots \neq \alpha_{11} \neq \alpha_{12} \quad \text{(IV-ii-2)}$$

The F-statistic is computed for this purpose and it is compared with the table values for different significance levels to reject or not to reject. (see section V-ii for the results)

As a second parametric test, I have applied two-sample t-test. In this method, one sample is taken as a specific month such as January, and the all remaining data are taken as the second sample, then these two samples are compared to test whether the mean return in the first sample is different from the mean return in the second sample. I have applied this test for twelve times for each of the months. The results are presented in section V-ii.

The non-parametric Kruskal-Wallis [K-W] is the same as in the methodology for day-of-the-week effect with the following differences:

This time, I have arranged the monthly returns as a Tx12 matrix, R=[r_{tm}]. Rows of R represent the years and each column represents the month of a year. Each element, r_{tm} , of matrix R is a return realized in month m of the year t. The K-W procedure is used to test the hypothesis again if all 12 of the samples are drawn from the same population. The model is the same as in previous case, however, this time for 12 months :

$$r_{tm} = \mu + \tau_m + e_{tm} \qquad t=1,....,T_m \qquad m=1,...,12 \qquad \text{(IV-ii-3)}$$

where μ is the (unknown) overall mean, τ_m is the unknown day m effect and $\sum_{m=1}^{12} \tau_m = 0$.

Then I test the null hypothesis H_0 against $H_{..}$:

$$H_0: \tau_1 = \tau_2 = \tau_3 = \ldots\ldots = \tau_{12} = 0$$
$$H_1: \tau_1 \neq \tau_2 \neq \tau_3 \neq \ldots\ldots \neq \tau_{12} \neq 0 \qquad \text{(IV-ii-4)}$$

Rejection of null hypothesis implies the seasonality.

The K-W test ranks the M observations where $M = \sum_{m=1}^{12} \tau_m$ from least to greatest. X_{tm} denotes the rank of r_{tm} and the test statistic is

$$H = \frac{12}{M(M+1)} \sum_{m=1}^{12} T_m (\bar{X}_m - \bar{X})^2 \qquad \text{(IV-ii-5)}$$

where $\bar{X}_m$ is the average rank received by the returns in the m^{th} month such that

$$\bar{X}_m = \frac{1}{T_m} \sum_{t=1}^{T_m} x_{tm} \qquad \text{(IV-ii-6)}$$

and $\bar{X}$ = (M+1)/2 which is the average rank of all M observations. When H_0 is true, the statistic H_0 has an asymptotic chi- square distribution with 11 degrees of freedom. The appropriate α-level test is

reject H_0 if $H \geq \chi^2(11, \alpha)$, where $\chi^2(11,\alpha)$ is the upper α percentile point of a χ^2 distribution with 11 degrees of freedom. (results of this method s also presented in section V-ii)

The two methods, splitting into periods and using the returns of some securities, for further detailed analysis have also been examined for this anomaly.

As in the first anomaly, I have divided the period into two subperiods and all the steps in the above methodology have been applied to each subperiods. (It includes general description of data, normality tests, two parametric tests, and nonparametric K-W test)

Finally, as a second analysis, the above methodology has been utilized for the returns of 63 individual securities. (All the findings and analysis are presented in section V-ii and VI)

iii - Holiday Effect :

I finally investigate the existence of the holiday effect. This anomaly implies that there are significant differences between the returns of the days which are preholidays and of non-preholidays.

The methodology is somehow different than the methodology which has been used in the first two anomalies, although it has some common points.

First step in the methodology of this anomaly is to find out the general description of the data. In this case, data is composed of two parts. First part contains all the returns of the trading days before a public holiday and the second part contains all the remaining returns. Therefore for each of these parts, mean, std,..etc have been calculated.

As in the methodology applied to the first two anomalies, I have found out whether pre-holiday returns and non- preholiday returns are distributed normally. Kolgomorov- Smirnov has been applied and histograms have been drawn for each part of the data.

In this methodology, as a parametric test, "two sample" t-test has been examined. First sample is the returns of the preholidays, and the second is of all remaining days. This method tests whether the mean returns of preholidays are different from the returns of the remaining days. t-test values is calculated and this values is compared with t- values for different significance levels. (see section V-iii for the empirical results)

Finally, in this methodology, the frequency of advances has been examined. First step is to count the positive returns days among whole sample and find the fraction of positive days. Then I have counted the positive return days among the preholidays and found out the fraction of these positive days for the subsamples containing the preholidays returns.

Then χ^2 and t-statistic values are calculated as follows: Let O signify the observed number of preholidays with positive return and E signify the expected number of positive pre-holidays on the null hypothesis that pre-holidays are randomly drawn from the global sample, then χ^2 is calculated as :

$$\chi^2 = 2(O - E)^2 / E \qquad \text{(IV-iii-1)}$$

the degrees of freedom is 2 and t-statistic is the square root of χ^2 statistic and it can be interpreted as a t- statistic for a two tailed t-test. (see section V-iii for the empirical results)

V - EMPIRICAL RESULTS

The tests are conducted with the IMKB daily index for the period between 1988-1991. Table 3 lists the general description of the whole data set. (1988-1991)

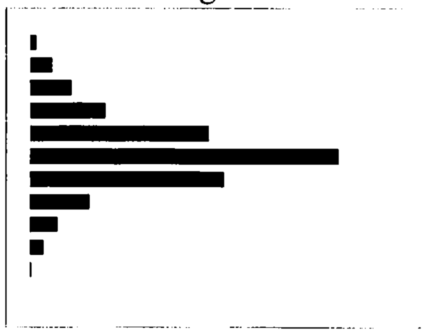
Table 3

# of Observations	1000
Mean	0.00234
Median	-0.00017
Trimmed Mean	0.00204
St. Deviation	0.03136
Semean	0.00099
Max	0.10814
Min	-0.11831
Q3 (Quartile)	0.01848
Q1 (Quartile)	-0.01445

General Description of Data

Figure 1 shows the distribution of the whole set. It looks like a right skewed normal curve, and the result of Kolgomorov-Smirnov goodness of fit test rejects at 95 % confidence level that "the data is normally distributed". However this does not affect the tests that will be applied since this set will be divided into some subsets and the normality of these subsets are important (see App. II for Kolgomorov-Smirnov test results)

Figure - 1



Histogram of Whole Data Set

In the following sections, empirical results for each of the calendar anomalies will be presented.

i - The Day-of-the-Week Effect :

Table 4 displays sample values of average return, number of observations, standard deviation... by the day of the week for IMKB index. Moreover, Figure 2 shows the daily average distributions based on the results of Kolgomorov- Smirnov goodness of fit test, and the distributions of each day shows a normal distribution an this is accepted at 95 % significance level for each day. (see App II for the details of Kolgomorov-Smirnov test)

In figure 3, the average return for the days are presented. Since I find a negative average Thursday return and high average Friday and Monday returns, this is inconsistent with the previous research on the US stock markets and this so-called weekend or day-of-the-week effect is not significant in Turkish market.

Table 4

	Mon.	Tue.	Wed.	Thu.	Fri.
# of Observations	197	199	201	202	201
Mean	0.0039	0.0006	0.0027	-0.0008	0.0053
Median	0.0013	-0.0005	-0.0006	-0.0022	0.0028
Trimmed Mean	0.0040	0.0001	0.0022	-0.0008	0.0044
St. Deviation	0.0377	0.0329	0.0291	0.0209	0.0272
Semean	0.0027	0.0023	0.0020	0.0020	0.0019
Max	0.0989	0.1032	0.0830	0.0959	0.1081
Min	-0.1183	-0.0826	-0.0870	-0.1019	-0.0837
Q3 (Quartile)	0.0270	0.0195	0.0172	0.0157	0.0180
Q1 (Quartile)	-0.0146	-0.0190	-0.0141	-0.0160	-0.0102

General Description of Daily Returns

Figure 2
Daily Histograms

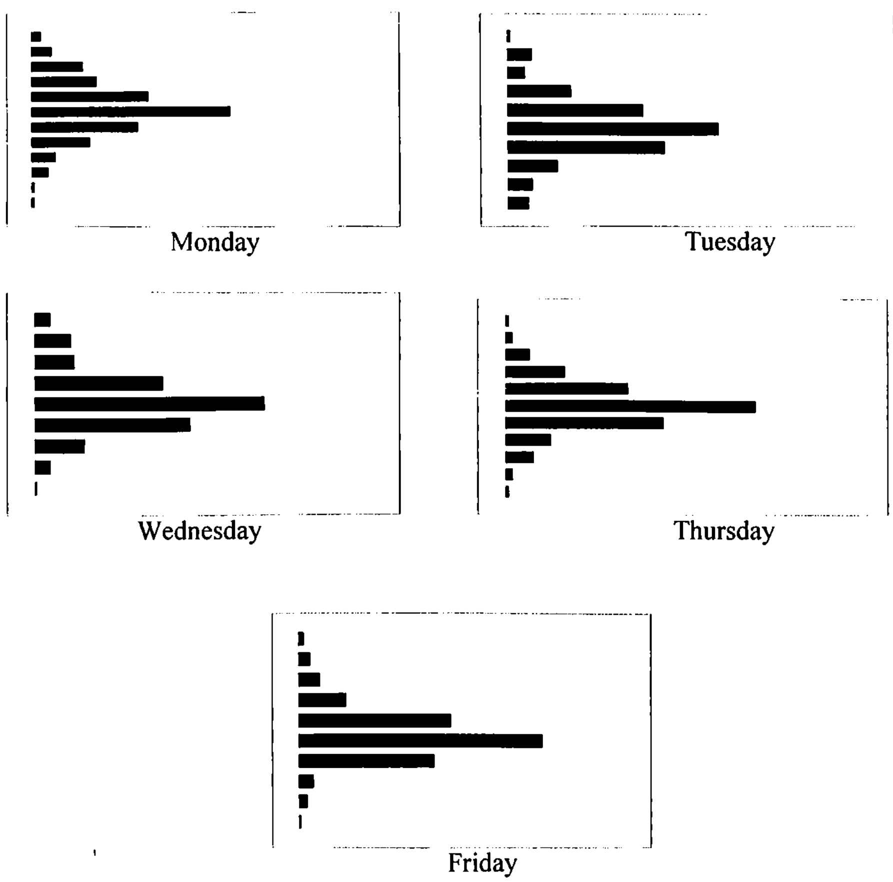
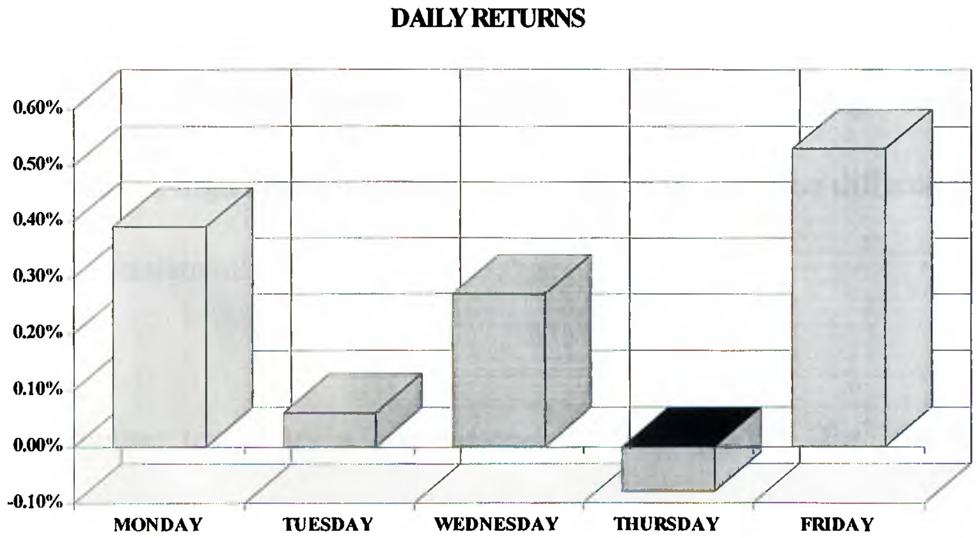


Figure 3



To test if there exists any difference among the daily average returns statistically, as a parametric test, one-way analysis of variance test is performed by using the following model :

$$R_t = \alpha_1 d_{1t} + \alpha_2 d_{2t} + \alpha_3 d_{3t} + \alpha_4 d_{4t} + \alpha_5 d_{5t} + U_t \qquad \text{(V-i-1)}$$

(see section IV-i for details)

Table 5 reports the test statistic of one way analysis of variance test for daily returns :

Degrees of Freedom		F-Value	Acc/Rej
Factor	4	1.25	Acc (at 75 %)
Error	995		

Table 5 - one way analysis of variance test results

These statistics show that the hypothesis of equality of daily average returns cannot be rejected even at 75% confidence level, in other words there is no evidence to reject the hypothesis. therefore, I can state that although data shows a different pattern for the days of the week (e.g. negative Thursday returns, high Friday returns ...). We cannot prove these differences to be significant statistically.

As another test, I try a non-parametric test (K-W) for the same purpose , that is, to test the daily average return differences. (see section IV-i for the details) The K-W test statistic is 5.817. Since this value is smaller than the chi-square values which are for 90% and above significance levels, we cannot reject the hypothesis for 90% and significance levels. As a result, in addition to parametric results, non-parametric test results cannot differentiate the daily average returns from each other either.

In addition to parametric and non-parametric test, I conduct two different group of t-tests. First group takes Thursday average returns and compares with the average returns for the remaining four days. In other words, this group contains four individual t-tests :

. Thursday avg. returns Vs Monday avg. returns
. Thursday avg. returns Vs Tuesday avg. returns
. Thursday avg. returns Vs Wednesday avg. returns
. Thursday avg. returns Vs Friday avg. returns

Second group contains five individual t-tests but things are a little bit different this time. Each t-test compares the average returns of a day with the remaining data. Therefore these five tests :

. Monday returns Vs rest of data
. Tuesday "" Vs "" "" ""
. Wednesday "" Vs "" "" ""
. Thursday "" Vs "" "" ""
. Friday "" Vs "" "" ""

The findings of the first group of tests are presented in Table 6.

Table 6 - Result of First Group of t-tests

	t-value	p-value	d.f.	Rej/Acc(90%)
Mon - Thu	1.39	0.17	367.2	Acc
Tue - Thu	0.45	0.65	391.2	Acc
Wed - Thu	1.21	0.23	401.0	Acc
Fri - Thu	2.2	0.03	399.7	Acc

Any of these tests can reject the hypothesis at 90% level. As a result, I can conclude that negative average Thursday returns are not different from the other days of the week significantly.

The findings of the second group of t-tests are as in the table 7.

These results again show that there is no significant difference among the days of the week statistically although Thursday and Friday returns seem to be different from the other days graphically (fig. 3).

Table 7 - Results of second group of t-tests

	t-value	p-value	d.f.	Rej/Acc(90%)
Mon - Rest	0.67	0.5	258	Acc
Tue - Rest	-0.85	0.4	291	Acc
Wed - Rest	0.19	0.85	332	Acc
Thu - Rest	-1.69	0.09	335	Acc
Fri - Rest	1.69	0.09	355	Acc

As I mention in the section IV-i, I have separated whole period into two subperiods.

Figure 4 shows the daily average returns for these two different periods. The bars which are on the left hand side are for the first subperiod and the ones on the right side are for the second subperiod.

For 88-89 period, all the daily average returns are positive however for the second subperiod we have negative Tuesday and Thursday average returns and high Friday average returns.

To test the significance of these differences, I conduct again the same parametric and non-parametric tests.

Parametric one-way analysis of variance test's results are as in table 8.

Figure 4

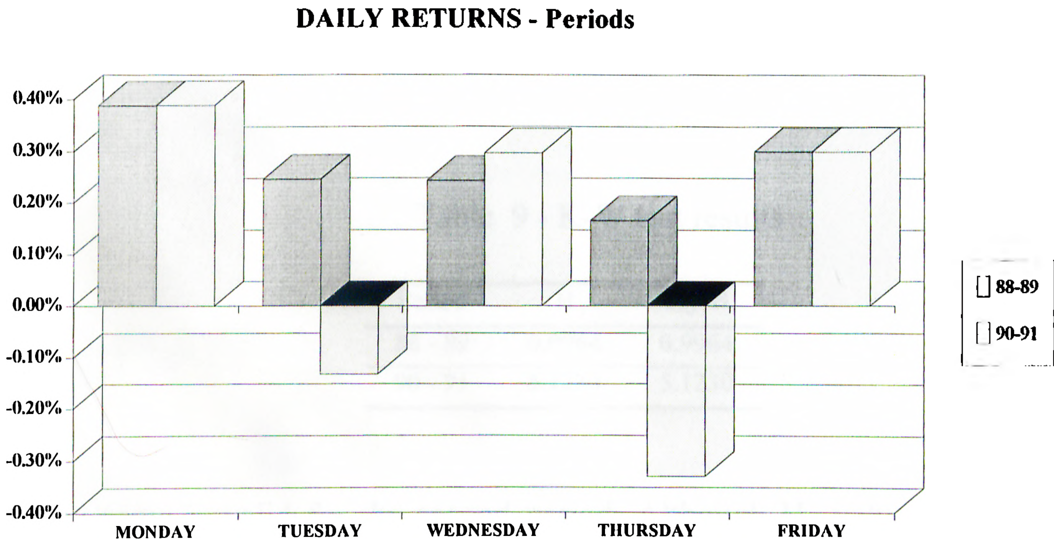


Table 8 - one-way-analysis of variance test results

Period	D.F.	F-value	p-value	Acc/Rej
88 - 89	4 : 502	0.09	0.986	Acc
90 - 91	4 : 491	0.9	0.464	Acc

Based on the F-values resulting from these tests, I can state that it is not possible to reject the hypothesis (at 95% level) which proposes "all the days' average returns are the same". So, dividing the whole sample into two gives us the same conclusion : For each subperiod, there is not any significant difference among the days of the week statistically.

Non-parametric Kruskal-Wallis test results support the same conclusion with the parametric one-way analysis of variance test. As it can be seen from table 9, the H value for the first period, which can be approximated to chi-square with degrees of freedom 4 (see section IV-i methodology) is too low to reject at 90% level that the average returns for the weekdays are the same.

Table 9 - K-W test results

Period	H	adj. H
88 - 89	0.9964	0.9964
90 - 91	5.1230	5.1230

The same is valid for the second period. Although H value is much larger than the previous one, it is still impossible to reject the hypothesis.

As a result, this non-parametric test, which is more flexible than the parametric tests, produces the same results for both subperiods. Therefore I can conclude that even dividing the whole period into two cannot help us to say that the average returns for the weekdays are different from each other.

Finally I conduct same tests, on the returns of 63 securities in IMKB. (29 of 63 are large, remaining are small firms)

For none of the small firms and none of the large firms, we can reject the hypothesis at 90 % level based on the results of the one-way analysis of variance test.

For the non-parametric test, only 4 of small and 5 of large firms show a daily pattern, that is, for only a small fraction of the firms it is possible to say that there exists a difference among the days of the week.

In figure 5, the daily mean returns of each of these groups (large and small firms) are depicted.

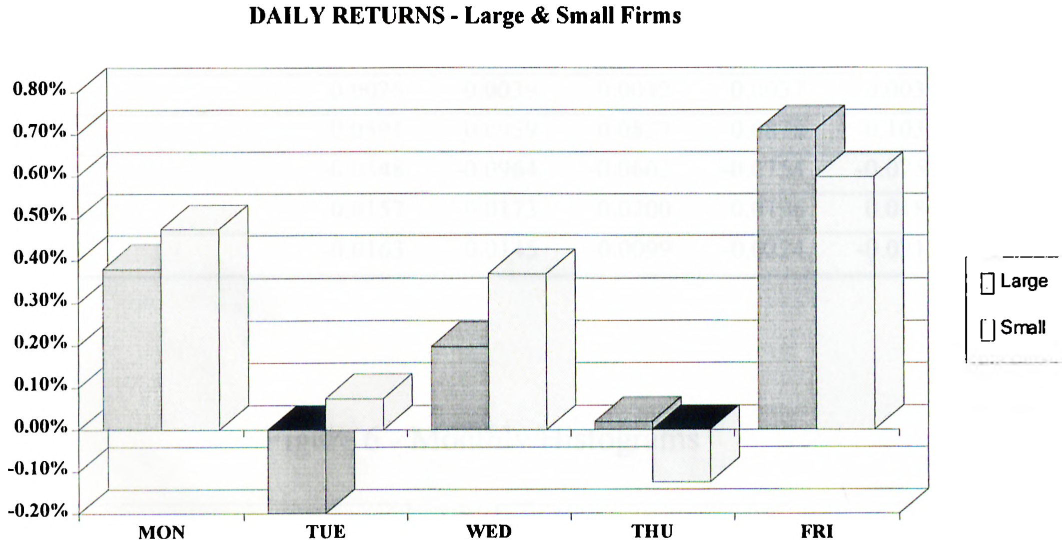
As a result of all these tests, the so called day-of-the-week or weekend effect does not in the Turkish market as we can see from each different case above.

ii - Turn-of-the-year Effect :

In this part, I introduce the empirical results from different tests and studies for the turn-of-the-year anomaly.

Table 10 displays the general information such as the monthly average returns, standard deviations etc. Time period is taken as the whole period that is 1988-1991.

Figure 5



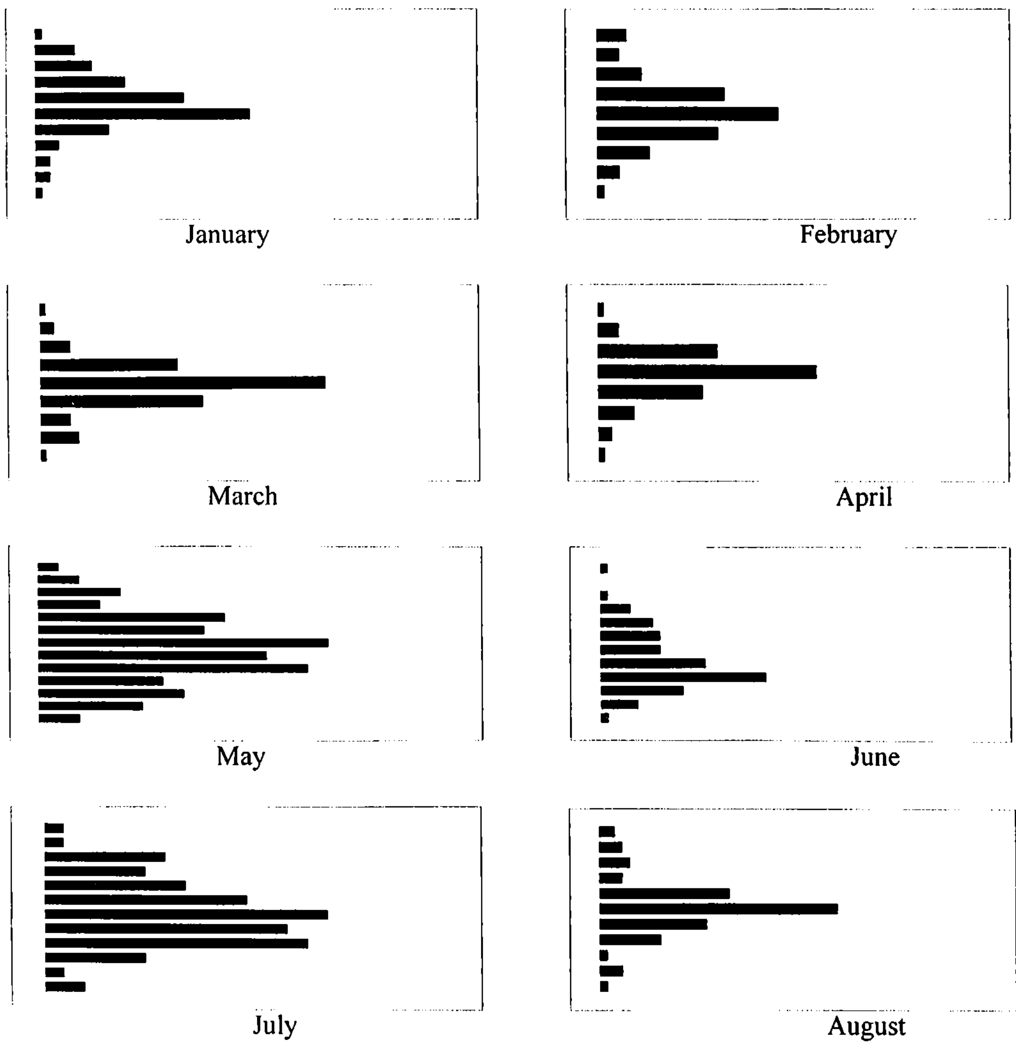
In figure 6, the monthly average distributions are presented. Their distributions are normal and this has been proved at 95% confidence level by Kolgomorov-Smirnov goodness of fit test. For each of the distributions of months, there is no evidence to reject that the data is normally distributed. (see App II for the result of the test)

Table 10 - Description of Monthly Data

	Jan.	Feb.	Mar.	Apr.	May	Jun.
# of Observations	85	81	89	71	86	82
Mean	0.0124	0.0034	-0.0037	-0.0030	0.0047	0.0013
Median	0.0090	0.0029	-0.0047	-0.0013	0.0034	-0.0035
Trimmed Mean	0.0133	0.0031	-0.0037	-0.0022	0.0042	0.0006
St. Deviation	0.0372	0.3280	0.0264	0.0242	0.0276	0.0210
Semean	0.0040	0.0036	0.0028	0.0029	0.0030	0.0023
Max	0.0990	0.0830	0.0799	0.6240	0.0801	0.0668
Min	-0.1019	-0.0845	-0.0737	-0.0783	-0.0512	-0.0382
Q3 (Quartile)	0.0316	0.0233	0.0112	0.0110	0.0206	0.0156
Q1 (Quartile)	-0.0063	-0.0194	-0.0135	-0.0127	-0.0131	-0.0134

	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
# of Observations	77	87	84	86	87	85
Mean	0.0006	0.0015	0.0063	-0.0014	0.0002	0.0051
Median	-0.0014	-0.0015	-0.0057	-0.0026	-0.0022	0.0055
Trimmed Mean	0.0002	0.0015	0.0061	-0.0019	-0.0010	0.0051
St. Deviation	0.0232	0.0360	0.0296	0.0343	0.0367	0.0375
Semean	0.0026	0.0039	0.0032	0.0037	0.0039	0.0041
Max	0.0591	0.0959	0.0827	0.0878	0.1032	0.1081
Min	-0.0548	-0.0964	-0.0603	-0.0754	-0.0757	-0.1183
Q3 (Quartile)	0.0157	0.0173	0.0200	0.0196	0.0186	0.0232
Q1 (Quartile)	-0.0163	-0.0145	-0.0099	-0.0224	-0.0217	-0.0159

Figure 6 - Monthly Histograms



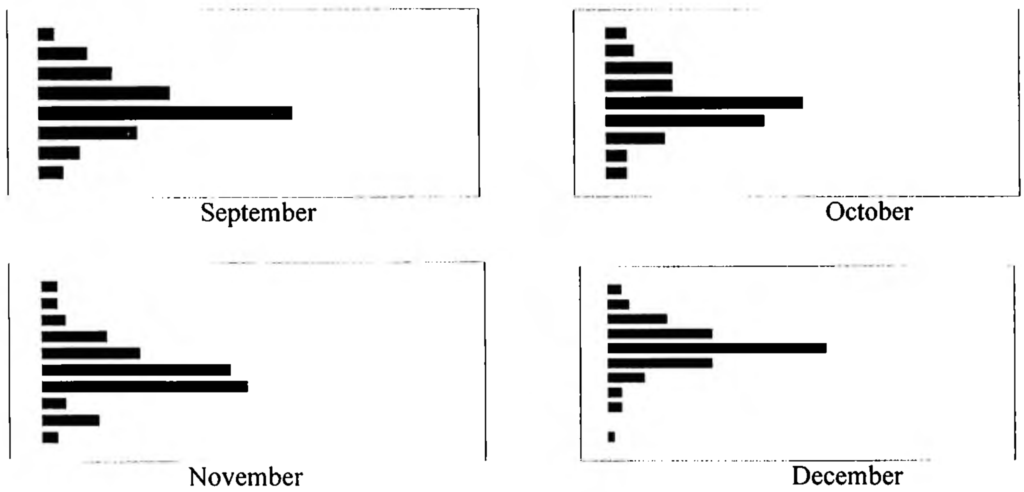
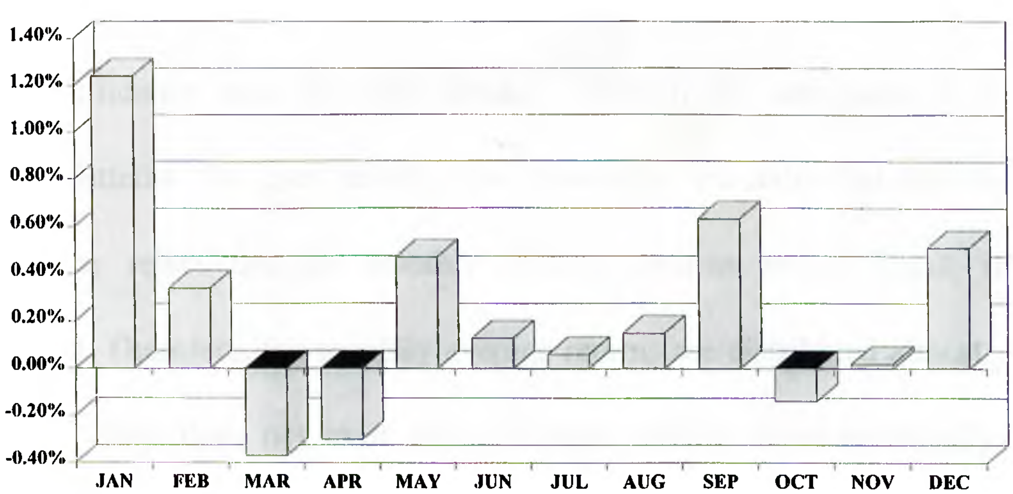


Figure 7 displays the average returns for the months of the year. Based on the information presented on this graph, we have high positive January returns and negative March and April returns in Turkish market. This high January returns fits with the previous research that has been for the world markets.

Figure 7

MONTHLY RETURNS



To test if this high January average returns are significant and the average returns for each month is different from each other, I use the following model to apply one-way analysis of variance test which is a parametric one. (Since monthly average returns are distributed normally, this parametric test applied without any problem, and for the details of the model see Sec.IV-ii)

$$R_t = \alpha_1 d_{1t} + \alpha_2 d_{2t} + \alpha_3 d_{3t} + \ldots\ldots + \alpha_{12} d_{12t} + U_t \qquad \text{(V-ii-1)}$$

The F-statistic is as in table 11.

Table 11 - One Way Analysis of Variance Test Results

Degrees of Freedom		F-Value	Acc / Rej
Factor	11	1.72	Acc (at 75 %)
Error	988		

With this F-statistic, it is impossible to reject the hypothesis even at 75% confidence level. In other words, although the data seem to show different patterns for each month, this parametric test states that there is no evidence to reject that the monthly average returns are different from each other. Therefore, the monthly average returns are distributed almost the same, and there does not exist any difference among them statistically.

Besides this parametric test, I perform a non-parametric test (Kruskal-Wallis) to test whether there exists any difference among the monthly average returns or not. (see Section V-ii methodology) The H statistic of K-W test is 21.18 which can be approximated to chi-square with a degrees of freedom 11, and based on the chi-square distribution we can reject the same hypothesis at 95% level. In other words, this non-parametric K-W test says that the monthly average returns are different from each other.

The details why these two tests (parametric and non- parametric) give different results are discussed in section VI-ii discussion of the findings section.

In addition to above tests, I conduct a group of t-tests for monthly data. In each of these test, the data of a month are taken as the first group and the remaining data (data of the remaining eleven months) are taken as the second group, and the mean differences of these two are compared. I conduct twelve different t-tests, as follows :

. January Vs rest
. February Vs rest
. March Vs rest

. December Vs rest

The findings of these tests are presented in table 12.

Table 12 - Results of t - tests

	t-value	p-value	d.f.	Rej/Acc(90%)
Jan - Rest	2.64	0.01	94	Rej
Feb - Rest	0.30	0.76	93	Acc
Mar - Rest	-2.20	0.03	114	Rej
Apr - Rest	-1.90	0.06	89	Rej
May - Rest	0.83	0.41	107	Acc
June - Rest	-0.43	0.67	117	Acc
Jul. - Rest	-0.68	0.50	101	Acc
Aug. - Rest	-0.22	0.82	98	Acc
Sep - Rest	1.29	0.20	101	Acc
Octt - Rest	-1.07	0.29	98	Acc
Nov. - Rest	-0.59	0.56	97	Acc
Dec - Rest	0.73	0.47	94	Acc

According to the t-statistic, the hypothesis can be rejected for January, March, April returns at 95% confidence level. In other words, the monthly average returns of these three months are different from the average returns of the remaining months, and this has been proven statistically at 95% confidence level.

The following gives the results after the whole data set is splitted into two periods. (88 to 89, other from 90 to 91)

The average monthly returns of these two periods (means) are depicted in Figure 8. The bars at left are for the first subperiod, the ones at right are for the second subperiod.

January, March and April average returns are much more significant in the second subperiod than in the first one and interestingly the September average returns are very high in the first subperiod.

To test the significance of these differences in monthly means, I perform again both parametric and non-parametric tests.

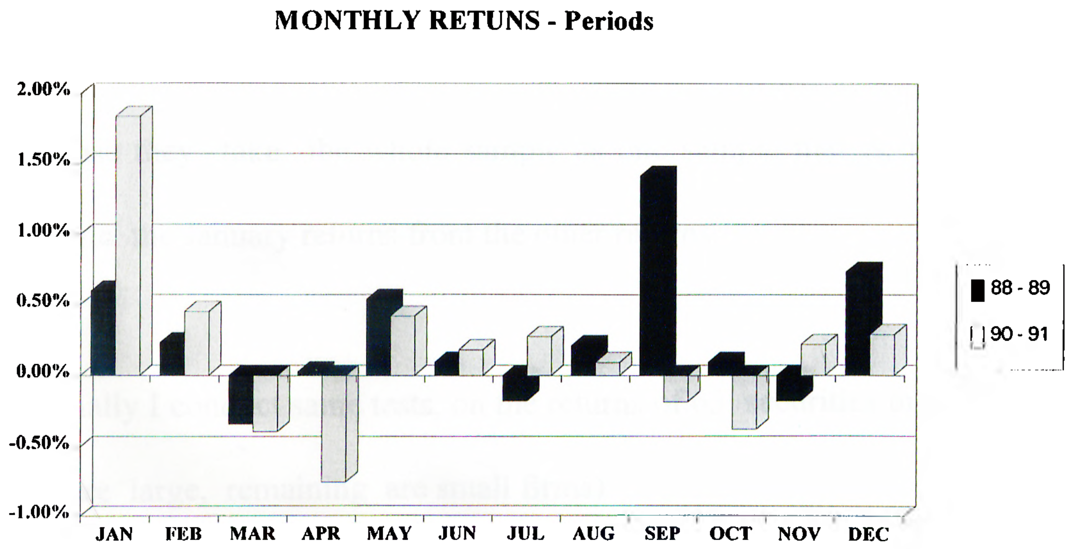
Parametric one-way analysis of variance test results for both subperiods are as in table 13.

These F-values state that we cannot, again, reject the hypothesis which is that the monthly average returns are different from each other for each periods. Therefore, dividing the period into two did not help to prove that there exists a significant difference among the monthly average returns or among the months.

Table 13 - One Way Analysis of Variance Test Results

Period	D.F.	F-value	p-value	Acc/Rej
88 - 89	11:495	1.36	0.186	Acc
90 - 91	11:481	1.40	0.17	Acc

Figure 8



Non-parametric K-W test results suggest the same findings with the parametric one-way analysis of variance test. As it can be seen from the following H values in table 14, the H values are not large enough to reject our hypothesis (which is that the months of the year are statistically different from each other). (As we know, these H values can be approximated to chi-square with degrees of freedom 11, see sections IV-i and IV-ii for details of K-W)

Table 14 - K - W Test Results

Period	H	adj. H
88 - 81	16.80	16.80
90 - 91	16.52	16.52

The above test for two subperiods prove that there is no significant difference in the monthly average returns for a year, however, they don't tell anything about whether January returns are significant from the remaining or not, because they take the whole sample as one sample that is, it does not differentiate the January returns from the other returns.

Finally I conduct same tests, on the returns of 63 securities in IMKB. (29 of 63 are large, remaining are small firms)

For the parametric test results, we can reject the hypothesis for none of the small firms and only 1 of large firms.

For the non-parametric test, we can only reject the hypothesis with 2 small and 5 large firms. That is, only a small fraction of the firms show a monthly pattern and the remaining don't. Fig. 9 shows the monthly mean returns of large and small firms.

iii - Holiday Effect :

In this part, the empirical results of the studies on the holiday anomaly are presented.

Figure 9

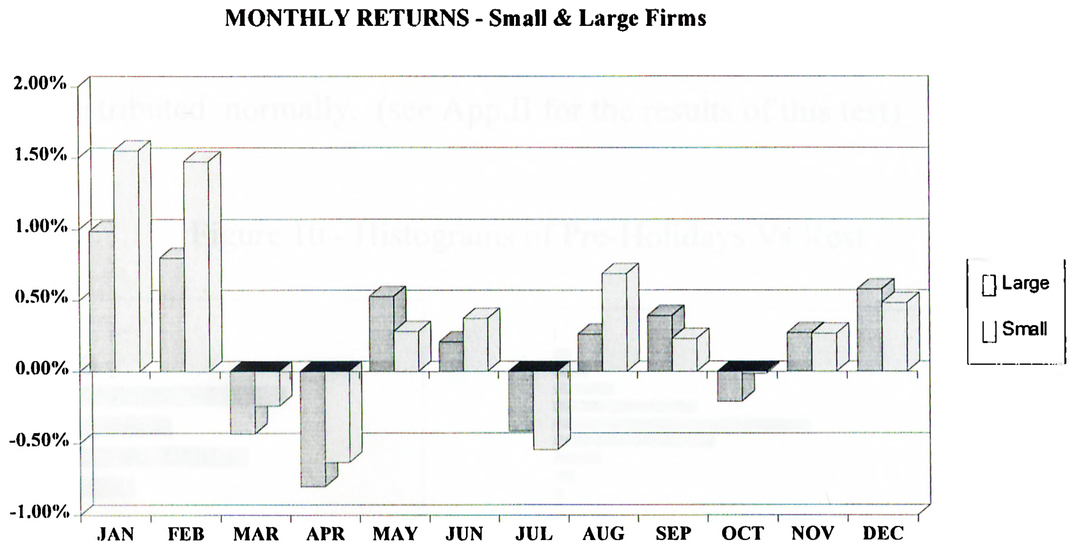


Table 15 displays the general characteristics of two data groups. First group contains the returns on the trading days before public holidays, the second group has the all remaining data.

Table 15 - Description of Holiday Data

	Pre. Hol.	Rest
# of Observations	24	976
Mean	0.0092	0.0022
Median	0.0105	-0.0005
Trimmed Mean	0.0091	0.0019
St. Deviation	0.0151	0.0316
Semean	0.0031	0.0010
Max	0.0404	0.1081
Min	-0.0205	-0.1183
Q3 (Quartile)	0.0199	0.0185
Q1 (Quartile)	-0.0022	-0.0147

The distribution of these groups are depicted in fig. 10. In addition, these two distributions are shown at 95% level by Kolgomorov-Smirnov test that they are distributed normally. (see App.II for the results of this test)

Figure 10 - Histograms of Pre-Holidays Vs Rest

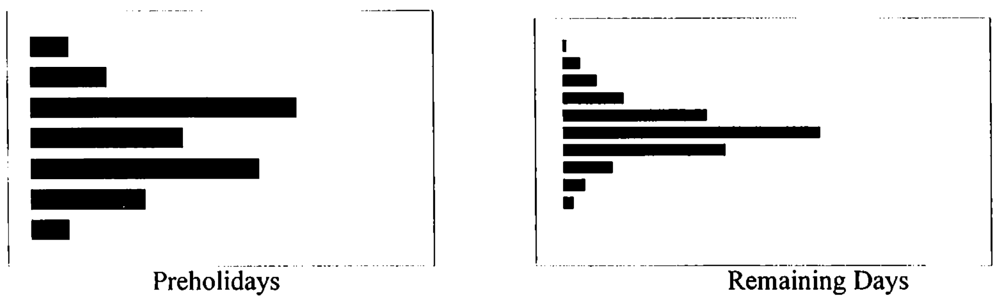


Figure 11 displays the average returns on the trading days before holidays and the average returns on non-holiday days. As we can see from the graph, the average returns before holiday are considerably higher than those of non- holidays. This is exactly the same that the previous research find out for the world markets.

To test whether these high average returns on preholidays differ from each other significantly or not, I conduct a t- test. For this t-test, I take the returns of the days before holidays and the remaining returns as the second group. The result is as follows :

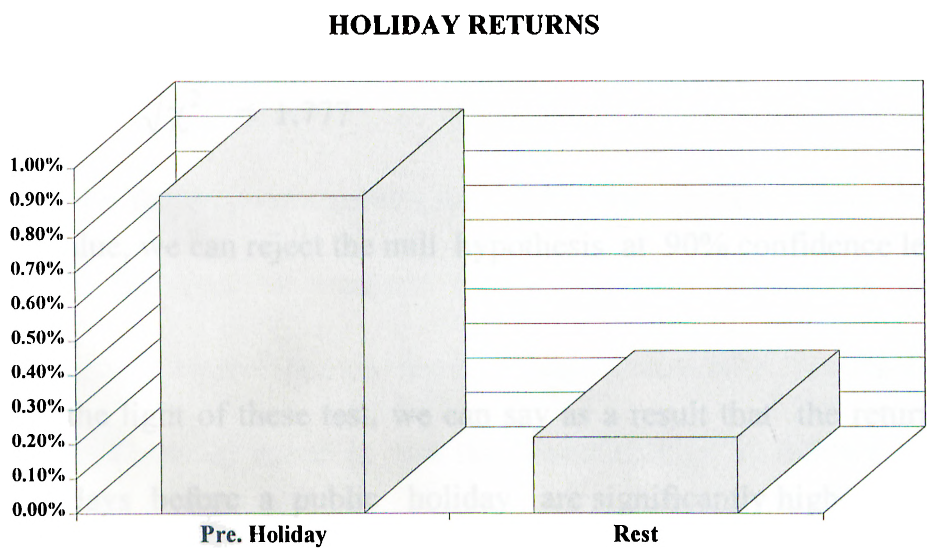
t - value : - 2.160

p - value : 0.040

deg.of fr.: 28.2

(in this test the null hypothesis is that the means of two groups are equal, the alternative one is the returns are not equal)

Figure 11



This t-value helps us to reject the null hypothesis at 95% confidence level. In other words, we can say statistically that the average returns before holidays are not equal to the average returns of the remaining days at 95% confidence level.

As a final test, I try the frequency of advances. The detailed information about this test is presented in section IV-iii. The result is as in table 16 :

Table 16 - Frequency Advances

Sample	Size	Positive Returns	Fraction
Pre Holidays	24	16	66.67%
Remaining Days	976	476	48.77%

* positive returns give the number of days with positive return among the sample
* fraction is the # of positive returns/sample size

Chi-Square value : χ^2 : 3.160

Deg. of Freedom : 2

The square root of χ^2 statistic can be taken as t-test value.

t-statistic : $\sqrt{\chi^2}$ = 1.777

With this t-value, we can reject the null hypothesis at 90% confidence level.

With the light of these test, we can say as a result that the returns on the trading days before a public holiday are significantly higher than the returns on the remaining days although our sample (number of days in the sample) is limited.

VI - DISCUSSION OF FINDINGS

i - Day-of-the-Week Effect :

Based on the empirical results for the Turkish market, there does not exist a day-of-the-week or weekend effect. Although Thursday is the only day with negative return, this is not significant statistically. The reason why this negative Thursday return is not significant may be as follows : In the first two year period (88-89) Thursday average returns are positive, however in the second two-year period (90-91) they are highly negative. Moreover Friday average returns for the second period is also very high. This is the same effect seem in previous studies for the world markets. Therefore, I can state that when the Turkish stock exchange becomes more experienced and efficient after some time , these Thursday average returns may become more significant and cause the day-of-the-week effect for the Turkish market.

According to the studies for the world markets, this anomaly is more significant with the securities of small firms. Again with the results of empirical studies on small and large firms, only a small fraction of the small firms in the Turkish market show the weekly pattern. However the majority of these small firms follow a normal pattern which rejects the existence of a difference among the days of the week.

With these findings, there comes a question: "Is the Turkish market efficient ?" It is very obvious that it is impossible to say that the Turkish market is efficient by checking only the calendar anomalies. One requirement of market efficiency is that the returns can be predicted by asset-pricing models and the returns do not show a seasonal pattern. In this manner, since the Turkish market does not have the day of the week anomaly, "can we say that the returns are predicted correctly by asset-pricing model ?". The answer to this question is beyond the subject of this thesis, since there are many more factors affecting market efficiency and it requires some additional research.

From this point on, I would like to give some information about the reasons of this anomaly in the world markets.

Although researchers discussed many reasons for this anomaly, so far, no satisfactory explanation has been found. Authors have given as a reason the "psychological" explanations such as tendency of managers to announce good news immediately but delay announcing bad news until weekend. If we thought that we have Thursday effect in Turkish market, this would not be the correct explanation.

Another reason is the measurement errors. This has often been suggested as a cause of the observed pattern, especially because the effect appears stronger for small-firm stocks. But this has been rejected by many researchers. The ones who support the measurement error as a reason for this anomaly use the frequency of closing at bid versus ask prices.

Some researchers have proposed trade settlement rules as a partial explanation for stock value fluctuations across days of the week. (Settlement rules define the procedure and timing of delivery and payment of stocks from the exchange market. For example, in Italian market, delivery and payment are deferred until the settlement day which normally coincides with the last trading day of the calendar month.)

Similar arguments apply to explanations based on inventory adjustments. Short-sellers might cover positions prior to the weekend , and short again on Monday mornings.

ii - Turn-of-the-year Effect :

The empirical results for this anomaly show that the January effect exists in Turkish market. Although the parametric one-way analysis of variance test does not claim so, the other tests such as non-parametric and some t-tests claim that this anomaly does exist.

We can ignore the one-way analysis variance test results, because it deals with the whole sample and does not take the January returns separated from the sample, therefore January returns with the returns of the remaining eleven months are taken as one sample and lose its significance in the sample.

Another reason: January returns are much more significant in the second period (1990-1991), while they are not so significant in the first one (1988-1989). Therefore splitting into two periods can affect the results of the test.

One more reason supporting the above discussion is the results of t-test which have applied by taking the January returns alone as one sample and the rest as another. It is logical that the result of this test more meaningful because it compares the January returns with the remaining data. And, the result of this test supports that the anomaly exists.

Since non-parametric tests are more flexible than the parametric ones and more sensitive to the extreme points, this could explain the anomaly too. (Because we have unordinary January returns)

Now, it is time to discuss the rationales about the January or turn-of-the-year effect.

The most commonly cited reason for the January return seasonal is tax-loss-selling rebound. That is, taxable investors dump losers in December for tax purposes, and sell in January. Therefore this causes higher returns in January.

Another rationale for the January effect is year-end "window dressing". In this view, some portfolio managers dump stocks at the end of the year-end to avoid their appearance on the annual report. Similar stocks are repurchased in the new year, resulting January effect.

Cash-flow patterns at the turn of the year may produce the return seasonal. Annual bonuses and profit dividends to the workers might be invested in the stock market.

In Turkey, the speed of the devaluation of Turkish lira against US dollar & DM and inflation increases after October and reaches maximum in January. In this periods, many investors prefer not to invest on deposit accounts at banks but invest on foreign exchange or stock markets. Therefore, this supports the January effect too.

Another reason might be that the government announces its annual program in the beginning of the year. The information in the government program about the stock market affects the market directly. (For example, in January of 1992, Minister Tansu Çiller announced that her government will support the stock market effectively, and the index increased rapidly)

Financial statements of the firms are presented to the public in the first month of the year. This may help the public decisions about the firms and their stocks, therefore they might invest on stock market after they comment on theses statements.

iii - Holiday Effect :

Under the light of the empirical findings, holiday effect exists in Turkish Stock Exchange Market. That is, the returns on the trading days before a public holiday is considerably high than the returns of the remaining days (more than four times).

One reason why the pre-holiday returns are higher may be that some firms might invest on stock market before holidays to get some profit instead of getting nothing ! Therefore they use the stock market as an investment tool for a short period. (Since almost all the investments are done for short term in Turkey)

Another reason may be the short sellers desire to close their short positions before holidays, therefore they buy (not sell) before holidays and the index increases. However this might not be suitable for Turkish market where short- selling is illegal.(But still many broker make short-selling)

Abnormal pre-holiday returns are not attributable to increased risk. In fact the standard deviation of pre-holiday returns (.0151) is less than the non-holiday returns (.0316, more than twice)

For the world markets, this anomaly is explained with the some settlement rules. Since Turkish market does not have such rules, this cannot be a reason.

But we should keep in mind that the sample used in this study is a very limited one. (since the market is a new one) The sample contains only 24 of them which are just before a public holiday (excluding the weekends). Therefore the results of this test may mislead us, because the returns of these days may be very high just coincidentally ? As a result, a further study, when the market becomes more experienced and efficient, may result with better and more accurate results.

VII - CONCLUSION

The purpose of the study is to point out the existence of what have been called here "calendar anomalies" in stock returns. Three of so-called calendar anomalies have been examined : Day-of-the-week, turn-of-the-year and holiday effects. For the Turkish market, there is no significant day-of- the-week effect unlike the stock markets of developed countries around world with high Friday returns. Although it is not statistically significant, the Turkish market has only one day with average negative return which is Thursday.

The second anomaly, turn-of-the-year effect, is usually manifested in a significant high mean return at the turn of the year. For most countries, including Turkey, this high return occurs in January.

For the last anomaly tested, holiday effect, the high return accruing to the IMKB index on the trading day prior to holidays is statistically significant; on average the pre- holiday return equals four times the return accruing on non- pre-holidays.

However, with these findings, we should keep in mind that the sample used in this study is very narrow because of the newness of the stock market.

When the market gets more professional and experienced, we will need a further study to investigate for more accurate results for these calendar anomalies. Perhaps, the results of the studies which will be held in the near future will be completely different from the ones discovered in this one.

Another important point is the market efficiency. In this study, bid-ask spreads of the stocks have not been included. According to some researchers, Monday, and holiday returns deviate from normal average daily returns by less than the bid-ask spread of the stock. In the same way, turn-of-the-year abnormal returns for small stocks are larger, but they are not large relative to the bid-ask spreads of small stocks. Moreover, all the research on anomalies center on small stocks. In every market, number of small stocks are very high but they are very small part of market wealth.

As a final word, the existence of abnormal returns at calendar turning points is apparent. Moreover these effects are not illogical. A return occurring at an arbitrary time on an arbitrary day might be regarded with suspicion. But calendar anomalies occur at points in time, and they evoke special investor behavior. Psychology appears to offer the most promising explanations for this behavior.

APP. I
NAME of the LARGE & SMALL FIRMS

SMALL	LARGE
Afyon Çimento	Akbank
Alarko	Aksa
Doğusan	Arçelik
Eczacıbaşı Yatırım	Aselsan
Ege Biracılık	Bağfaş
Ege Endüstri	Brisa
Ege Gübre	Çanakkale Çimento
Enka Holding	Çukurova Çelik
Erciyas Biracılık	Demirbank
Gentaş	Dışbank
Gorbon Işıl	Ereğli Demir Çelik
Güney Biracılık	Finansbank
Hektaş	Garanti Bankası
İntema	İzmir Demir
İzocam	Kartonsan
Kav	Koç Holding
Kelebek Mobilya	Kordsa
Koç Yatırım	Mensucat
Konya Çimento	Peg Profilo
Koruma Tarım	Pınar Et
Köytaş	Sabah
Makina Takım	Santral Holding
Mardin Çimento	Şişe Cam
Marshall	Trakya Yağ
Migros	TSKB
Niğde Çimento	Tüpraş
Parsan	Tütünbank
Pınar Su	Vestel
Pınar Un	
Sarkuysan	
Sifaş	
Sun Elektrik	
Vakıf Yatırım	

APP. II
KOLGOMOROV SMIRNOV TEST RESULTS

		Kolgomorov Smirnov Z Value
ALL DATA		2.026
MONTHS	Jan	1.073
	Feb	0.747
	Mar	1.108
	Apr	0.913
	May	0.674
	Jun	0.981
	Jul	0.826
	Aug	0.928
	Sep	0.833
	Oct	0.977
	Nov	0.942
	Dec	0.762
DAYS	Mon	1.002
	Tue	0.934
	Wed	1.137
	Thu	0.986
	Fri	1.152
HOLIDAYS	Pre Holiday	0.403
	Rest	2.046

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