INFORMATIONAL EFFICIENCY OF THE İSTANBUL SECURITIES EXCHANGE AND SOME RATIONALE FOR PUBLIC REGULATION

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Key words/issues: Informational efficiency, strong form efficiency, semi-strong efficiency, weak form efficiency, day of the week effects, public regulation of securities markets.

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The primary objective of this paper is to test informational efficiency of the İstanbul Securities Exchange (İSE) in terms of the Composite Index for the period January 1988-August 1994. A random walk test is performed for weak-form efficiency. In addition, day of the week effects are investigated to test semi-strong form efficiency. Empirical results verify that the İSE Composite Index is neither weak-form nor semi-strong form efficient although the nature and degree of inefficiency differ across periods. The paper also discusses policy suggestions for public regulation of financial markets in developing countries.

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I. INTRODUCTION

The issue of efficiency in financial markets has been discussed in detail in the field of financial economics. The literature of this field presents three kinds of efficiency: *allocational efficiency, operational efficiency,* and *informational efficiency.* The latter is the scope of this paper. Informational efficiency of financial markets has attracted much interest among financial scholars and practitioners. Fama (1970) has been the first to develop the *Efficient Markets Hypothesis (EMH).* After more than two decades, Fama (1991) reviews the

[1] Any opinions expressed herein are strictly those of the author and not necessarily those of the Central Bank of the Republic of Turkey or Bilkent University. This paper is an extended version of E. Balaban (1995a) Day of the Week Effects: New Evidence from an Emerging Stock Market, *Applied Economics Letters,* forthcoming. Helpful comments on the earlier versions of this paper from Ernur Abaan, Cem Aysoy, Baturalp Candemir, Mustafa Çamlıca, Hüseyin Çilli, Nuran Gökbudak, and Cevriye Özcan are gratefully appreciated. The usual disclaimers apply.

voluminous theoretical and empirical work undertaken by numerous researchers on the informational efficiency of stock markets. The basic assertion given by the EMH is that stock prices fully reflect any changes in the information set of investors. Finance literature presents three different forms of informational efficiency in stock market: *weak-form, semi-strong form,* and *strong form.*

All three forms of efficiency under the EMH depend on information sets of investors. Weak-form efficiency basically asserts that one cannot use past price changes to achieve abnormal profits out of transactions costs. Stock prices *do* follow a random walk. As such, past prices have nothing to do with future prices. Semi-strong form efficiency enhances information set to include all publicly available information. Under this form, *all publicly available information* is quickly incorporated to stock prices to prevent investors trading on this piece of information from extra profits in a stock market. According to strong-form efficiency, stock prices reflect *all information* whether publicly available or not. Strong-form efficiency *implies* semi-strong form efficiency *implies* weak-form efficiency. However, the reverse is not correct.

Emerging stock markets have recently been of great importance to the worldwide investment community. According to the International Finance Corporation (IFC), a subsidiary of the World Bank, all markets in developing countries are treated as emerging. The World Bank defines developing countries to have per capita GNP below 7,620 U.S. dollars in 1990 prices. Under these definitions, the İstanbul Securities Exchange (İSE) is an emerging market of a developing country namely Turkey.

There has been an increase in empirical and policy-oriented studies concerning emerging markets thanks to the reliable and continuous data provided by the IFC. A partial list of these studies includes WIDER (1990), Chuppe and Atkin (1992), Divecha *et al.* (1992), Pardy (1992), Singh (1992), Vittas (1992), Wilcox (1992), Claessens and Gooptu (1993), Cornelius (1993), Keane (1993), Mullin (1993), Claessens and Rheee (1994), Errunza (1994), Hauser *et al.* (1994), Kalotay and Alvarez (1994), and Satyanarayan and Varangis (1994). Unfortunately, the IFC's data set is, in general, aggregate in nature. This may prevent researchers to focus on comparative studies using high frequency data from emerging markets. However, it is feasible to provide individual country evidence to extend the results of the previous international research.

It has been well documented in finance literature that any predictable pattern in asset returns may be exploitable and therefore judged as evidence against semi-strong efficiency of asset markets. One statistically significant pattern in stock market returns stems from seasonality. As such, seasonal effects in securities markets have attracted much interest among both academics and practitioners. Numerous researchers have studied seasonal anomalies in developed financial markets. However, it seems more difficult to find empirical studies with special reference to daily seasonality in emerging stock markets in international literature. Although there has been an increasing trend in studies using daily data, many researchers have employed lower-frequency data. A nonexhaustive list of studies concerning daily anomalies in developed stock markets includes Cross (1973), French (1980), Gibbons and Hess (1981), Lakanishok and Levi (1982), Keim and Stambaugh

(1984), Jaffe and Westerfield (1985), Smirlock and Starks (1986), Abraham and Ikenberry (1994), and Agrawal and Tandon (1994).

Previous studies have reported that common stock returns, on average, are abnormally low on Mondays and abnormally high on Fridays. In addition, Fama (1965) reports that the variance of returns on Monday is 20% greater than the variances of returns on the other days for the U.S. stock market. The above cited references except Jaffe and Westerfield (1985), and Agrawal and Tandon (1994) provide empirical evidence from the U.S. Jaffe and Westerfield (1985) find similar results in Japanese, Canadian, and Australian stock markets as well as in the U.S. Agrawal and Tandon (1994) provide international evidence from stock markets in 18 countries in support of the day of the week effects. However, to my knowledge, the reported day of the week effects remain a puzzle to be solved given market efficiency[2].

The primary aim of this paper is to test informational efficiency of the İSE in terms of weak form and semi-strong form for the period January 1988-August 1994. With respect to weak form efficiency, a random walk test is performed. Semi-strong form efficiency is investigated under day of the week effects. The investigation of semi-strong efficiency tests in this paper is an extended version of Balaban (1995a, b). The paper also discusses some policy suggestions for public regulation of financial markets.

The paper is organized as follows: Section II outlines data set and methodology used in the paper. Section III presents the empirical results of the efficiency tests. Section IV is for general evaluation of the empirical results given in the previous section. Finally, section V

concludes with some policy suggestions for public regulation of financial markets in developing countries.

II. DATA AND METHODOLOGY

Daily observations of the İstanbul Securities Exchange Composite Index (İSECI) are employed to investigate informational efficiency of the Turkish stock market. İSECI is a weighted index using closing prices of stocks and published by the İSE. Daily index numbers provided by the Capital Market Board and the Central Bank of the Republic of Turkey ranges between January 4, 1988 and August 5, 1994. Unconditional logarithmic returns that amount to 1,646 observations are calculated as follows:

$$R_t = \log (I_t / I_{t-1}) \quad (1)$$

where I_t and R_t refer to İSECI number and return to the İSECI on day t, respectively.

A simple random walk test run to investigate weak-form efficiency for different periods is given by:

$$R_t = K^{*} R_{t-1} + e_t \quad (2)$$

where K can be considered to be the first-order autoregression coefficient. Random error term is e_t. The ordinary least squares (OLS) assumptions apply in all tests. Note that equation (2) is also a first-order Markov process. If K = 1, the null of index returns follow a random walk cannot be rejected. Otherwise, index returns can be thought as a first-order autoregressive model, a predictable pattern. Under random walk assumption, there is no difference between conditional returns based on a particular information set and unconditional returns.

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[2] In my opinion, the absence or existence of evidence for daily anomalies alone

Returns for each day of the week are separately calculated for each year as well as for the whole period. A two-sample analysis for equality of mean returns across years is employed for comparison. Variance ratios are also reported.

A sign analysis is performed to detect weekend effect, if any, in İSECI return data. Following Abraham and Ikenberry (1994), percentages of sign of Monday return in week w conditional on the sign of Friday return in week w-1 are calculated for each year and for the whole period.

The following regression for the whole period is run to test whether there is any statistically significant difference among index returns on different days of the week:

$$R_t = B_1D_{1t} + B_2D_{2t} + B_3D_{3t} + B_4D_{4t} + B_5D_{5t} + u_t \quad (3)$$

where D_{1t} = 1 if day t is a Monday and 0 otherwise; D_{2t} = 1 if t is a Tuesday and 0 otherwise; and so on. The OLS coefficients B_1 to B_5 are the mean returns for Monday through Friday, respectively. The stochastic disturbance term is indicated by u_t. The hypothesis to be tested is:

$$B_1 = B_2 = B_3 = B_4 = B_5 \quad (4)$$

The same regression is repeated for each individual year and for two sub-periods, 1988-91 and 1992-94, to detect whether day of the week effect, if any, is stable through different periods.

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should not be considered as conclusive for market efficiency or inefficiency.

III. EMPIRICAL RESULTS

The empirical results of this paper are summarized in five tables. *Table 1* presents the results of random walk tests. The first order autoregression coefficient, K, is found to be different from unity as well as zero for each year and for the whole period. Note that all coefficients are positive but differ in magnitude. The highest K, approximately 0.42, is found for 1994. More than 17% of the returns on İSECI during 1994 is explained by the previous day returns. For the whole period, the previous day returns could explain almost 7% of the following day returns with a K of 0.264. Although not reported in Table 1, the higher lags are also found to be statistically significant for all periods. As such, the findings of the tests run culminate in the rejection of weak-form efficiency of the İSE. This result conflicts with that of Alparslan (1989) who reports that the İSE is weak-form efficient, a result quoted from Muradoğlu Şengül and Önkal (1992).

Table 2 is intended to provide summary statistics for daily index returns through different time periods. The reported significance levels are due to one-sample analysis. The first order autocorrelation coefficients are positive and significant for the whole period and for each year except 1993. The coefficient of variation, CV, is a measure of return obtained per unit of risk. Standard deviation or variance is a measure of absolute risk whereas CV is a relative measure of risk. Therefore, it is useful to compare risk-return trade-off across days as well as years.

For the period 1988-94, the lowest and negative average return, although not significant, is observed on Tuesday. Average returns are all negative on Tuesdays for each year except 1989 and 1993. The highest average return, significant at 1%, is on Friday for

the same period. In addition, it is more than two times greater than the average return if all days are included. Friday is the only day for which average returns are all positive for individual periods. The highest volatility is observed on Monday for each year as well as for the whole period. Friday has the lowest volatility for the period 1988-94. Consistent with the findings of Fama (1965), the variance of Monday returns is approximately 25%, 31%, 28%, and 42% greater than the variances of Tuesday, Wednesday, Thursday, and Friday returns, respectively, for the whole period. Highest return and lowest volatility observations on Fridays are followed by the second highest and lowest corresponding observations on Wednesdays (significant at 5%). These findings are consistent with those of Agrawal and Tandon (1994) who report lowest and negative returns on Tuesdays in 12 countries among which 8 are significant, and large and significantly positive returns on Fridays and on Wednesdays in 17 and 13 countries, respectively. In addition, they find that variance of stock returns is highest on Mondays and lowest on Fridays in all countries.

The findings of this paper in some cases conflict with those of Erbil (1993) who employ the same data using percentage returns for the period 1988-91. Aydoğan (1994), in his reference to Erbil (1993), notes that highest and lowest average returns are on Fridays and Thursdays, respectively. Monday has the highest standard deviation. In addition, lowest volatility is observed on Thursday. Although it is not reported in Table 2, for the period investigated by Erbil (1993) this study finds that Friday return is large and positive (significant at 5%). Besides, the lowest standard deviation is observed on Friday.

The results of tests for equality of mean returns across years are provided in *Table 3.* In 16 of 28 cases, the null of equality of

mean returns cannot be rejected. Although some pairs of years are reported to have equal means, they differ in variance ratios. For example, mean returns in 1990 and 1992 cannot be rejected to differ but year 1990 is almost 2.5 times more volatile than 1992. This finding is consistent with that of Özer and Yamak (1992) who report that the volatility of stocks in the İSE increased and risk-return relationship was destroyed due to the Gulf Crisis. Similarly, volatility in 1992 is only one-fourth of that in 1994. This finding is significant to investigate risk-return trade-off in financial markets. A detailed investigation of the term structure of daily volatility of the İSECI can be found in Balaban (1995c).

Table 4 is for sign analysis. Abraham and Ikenberry (1994) find that when Friday's return is negative, Monday's return is negative nearly 80% of the time. When Friday's return is positive, Monday's return is positive nearly 56% the time. For the period 1988-94, positive Friday returns are followed by a positive and a negative return on Mondays 32.5% and 21.9% of the time, respectively. For the negative Friday returns, percentages for positive and negative Monday returns are 18.6 and 27, respectively. Thus, there is a positive relation between signs of Friday return and of subsequent Monday return. This result is even stronger for all individual years except 1992 and 1994. However, the results of this table should be interpreted with caution since no significance levels are reported.

The results of regressions with binary dummy variables for days are presented in *Table 5.* For the whole period, positive and statistically significant coefficients (nearly 0.0015 and 0.0019, respectively) are reported for Wednesday and Friday. This leads to higher returns on these days compared to the others. Although it is not significant, coefficient for Tuesday is negative. These results are

consistent with those presented in Table 2. In the case of separate regressions for each year, the results are mixed in terms of sign and magnitude. Note that (significant) negative coefficients for Tuesday and Wednesday in 1988 turn out to be positive in 1989. No significant coefficients are found for 1990 and 1994. All days are reported to be significant at least once. Also note that Friday returns significantly differ from those on the other days for the period 1988-91, a contrary result to that given by Aydoğan (1994).

IV. CONCLUSION AND FURTHER RESEARCH

This paper concludes that the İSE is neither weak-form nor semi-strong form efficient. Random walk model is rejected for all periods under consideration. This is in conflict with Alparslan (1989) who concludes that the null of weak-form efficiency of the İSE could not be rejected. The other empirical results of the paper contribute to the previous research findings that daily anomalies in stock markets are an international phenomenon. The results of Agrawal and Tandon (1994) among others are extended to present evidence in support of day of the week effects from an emerging stock market of a developing country namely Turkey for the period 1988-94 as well as for different sub-periods. One interesting result also founded for major developed markets is that reported daily seasonals are not constant in direction and magnitude through different time periods. The inefficiency of the İSE in the sense of semi-strong form is also reported by Muradoğlu Şengül and Önkal (1992) who employ a different methodology.

This paper documents some contrary evidence to those results reviewed by Aydoğan (1994) who stresses that both parametric and non-parametric tests show that there are no statistically significant

differences among daily returns on İSECI. This contradiction may stem from data set employed or using percentage returns in Erbil (1993). With reference to the former, this paper employs a data set at least 65% larger than that of Erbil (1993) in addition to analysis of sub-periods, missing in Erbil (1993). Moreover, even for the period investigated by Erbil (1993), this paper reports significant day of the week effects. Although it is not reported to save space, using percentage returns do not change any results of significance presented here.

Further research studies can and should be constructed to investigate whether reported daily anomalies are valid for individual shares in addition to search for possible sources of these anomalies in an emerging market. Another fruitful area of research can be testing whether a trading strategy based on an autoregressive model and/or daily seasonals are profitable out of transactions costs. For example, such an active portfolio strategy as "buy an index-representative portfolio of stocks on Tuesdays and sell it on Fridays" can be investigated to outperform a passive strategy such as "buy-and-hold." Finally, it is important for potential researchers to check validity of the conflicting results presented in this paper, Alparslan (1989), and Erbil (1993).

The validity of the results of this paper should be checked by employing different methodologies for weak-form and semi-strong form efficiency including such calendar effects as January effect, holiday effect, turn of the month effect, Friday-the-thirteen effect and the other anomalies like size effect and price-earnings anomalies among others. To this end, Aysoy *et al.* (1995) and Balaban (1995d) have been in progress.

V. PUBLIC REGULATION OF FINANCIAL MARKETS

The empirical results of this paper provide evidence against weak-form and semi-strong form efficiency in the Turkish stock market. Informational efficiency of capital markets is of great importance in order to achieve allocational efficiency in an economy. This is more particular for developing countries with emerging stock markets. As such, regulatory institutions are assigned an active role to develop informational efficiency in these countries. Main economic functions of securities markets enumerated by Cox and Rubinstein (1985) are as follows:

1. *Individual wealth allocation:* By issuing and purchasing securities, households are able to affect the timing of their consumption of real goods and services over their lifetimes and are able to pool and redistribute among themselves the risks of fluctuation in the value of the economy's real assets.

2. *Firm resource allocation:* By issuing securities, producers are able to raise capital from diverse sources. The securities market, by implicitly charging firms different prices, allocates scarce capital among competing uses.

3. *Source of information:* The securities market provides information in the form of prices, which can be useful for making a variety of important economic decisions.

Policy-oriented studies concerning emerging securities markets offer competing views on encouragement of capital markets in developing countries. It seems beneficial to note key points in some of these studies. The interested reader should refer to the original sources for further details. Pardy (1992) asserts that there is need for legal, institutional and regulatory changes in order to achieve desired

results of financial liberalization in developing countries. Chuppe and Atkin (1992) suggest that there should not be any regulatory discrimination for particular interest groups in an economy.

Claessens and Rhee (1994) provide empirical evidence for significant decrease in risk-adjusted cost of capital in developing countries if foreign investors have face less restrictions in emerging markets. Vittas (1992) points out that institutional investments in emerging markets have recently been of great importance to the worldwide investment community. Therefore, liberalization policies should be encouraged to increase such institutional securities investments.

Increasing tendency towards financial liberalization in emerging securities markets has not been out of question. A recent objection comes from Singh (1992) who claims that financial liberalization policies, and in particular, elimination of restrictions on foreign investors may adversely affect economic development in countries with emerging stock markets. During the last decade, financial liberalization has also been in agenda in Turkey. The interested reader should refer to Akyüz (1989) and Uygur (1993) on excellent reviews of financial liberalization policies and their consequences in Turkey. In addition, Divitoğlu (1994) and Mercimekçi (1994) discuss taxation of capital and dividends gains of domestic and foreign investors. Yelmenoğlu and Yılmaz (1994) propose a transactions tax in the İSE.

Stiglitz (1994) discusses the role of the state in financial markets. It is particularly significant from the point of view of regulatory institutions. Stiglitz (1994) emphasizes that informational inefficiency is a significant case which necessitates government

regulation to decrease its level. Therefore, public regulation of financial markets is of particular importance to developing countries with emerging markets where informational inefficiencies may frequently appear.

Together with this paper, recent empirical research on Turkish financial markets indicates that money market [Abaan (1991)], foreign exchange market [Abaan (1994)], and capital market [Muradoğlu Şengül and (1992)] are not informationally efficient. As such, perhaps, scarce resources of economy are not efficiently allocated. In my opinion, degree of informational efficiency in financial markets should be increased through financial regulation to achieve allocational efficiency in Turkish economy. It should be noted that financial innovation has accelerated during the last decade in Turkey. In addition, there is still room for new financial instruments such as derivative securities. Possible introduction of derivatives into the financial system in the near future makes regulation of financial markets even more significant as well as more necessary for an emerging market of a developing country namely Turkey. This paper suggests a well-defined public regulation of financial institutions and markets to achieve informational efficiency. I presently remain silent to answer the question of how to regulate and leave it for further research.

Table 1. *Random Walk Tests*

$$R_t = K \times R_{t-1} + e_t$$

	K[a]	SE[b]	*t*-cal.[c]	R^2 (%)[d]	p-value (%)[e]
1988	0.221	0.062	3.594	4.91	0.04
1989	0.380	0.058	6.520	14.39	0.00
1990	0.324	0.060	5.367	10.52	0.00
1991	0.116	0.063	1.825	1.35	6.92
1992	0.128	0.063	2.038	1.64	4.26
1993	0.132	0.063	2.082	1.75	3.84
1994	0.417	0.075	5.595	17.56	0.00
1988-94	0.264	0.024	11.088	6.96	0.00

[a] First order autoregression coefficient; [b] standard error; [c] calculated *t*-value in two-tailed tests based on the *t*-statistics for the difference of K from zero; [d] coefficient of determination; [e] significance level.

Table 2. *Logarithmic Returns on İSECI by Day of Week*

	1988	1989	1990	1991	1992	1993	1994	1988-94
Monday[a]								
# Obs.[b]	50	51	48	48	51	50	29	327
Average[b]	.047	.242	.163	.097	-.300 *	.390 *	-.117	.086
SD[c]	1.299	1.496	1.801	1.879	1.196	1.531	2.304	1.643
CV[d]	.036	.162	.091	.051	-.251	.255	-.051	.052
% (+)[d]	42.0	62.7	58.3	45.8	39.2	64.0	48.3	51.7
Tuesday								
# Obs.	49	52	50	48	51	50	29	329
Average	-.326 *	.479 **	-.054	-.119	-.154	.100	-.260	-.030
SD	1.069	1.295	1.631	1.491	.901	.969	1.653	1.318
CV	-.305	.370	-.033	-.080	-.171	.104	-.157	-.023
% (+)	32.7	69.2	44.0	43.8	47.1	52.0	44.8	48.0
Wednesday								
# Obs.	50	51	50	50	50	49	31	331
Average	-.270 *	.438 **	.185	.036	.193	.391 **	.113	.153 **
SD	.994	1.360	1.384	1.108	.781	1.064	1.968	1.253
CV	-.271	.322	.133	.032	.247	.367	.057	.122
% (+)	38.0	60.8	46.0	48.0	54.0	59.2	58.1	51.7
Thursday								
# Obs.	51	51	49	51	50	49	30	331
Average	-.127	.247 *	-.160	-.176	.112	.331 **	.334	.064
SD	.959	1.040	1.388	1.508	1.100	.943	1.952	1.284
CV	-.132	.238	-.115	-.117	.101	.350	.171	.050
% (+)	39.2	54.9	44.9	41.2	56.0	59.2	63.3	50.5
Friday								
# Obs.	52	50	50	49	49	48	30	328
Average	.136	.103	.203	.430 *	.089	.266	.013	.186 ***
SD	.820	1.031	1.347	1.358	.685	1.113	1.659	1.157
CV	.166	.100	.151	.316	.130	.239	.008	.161
% (+)	51.9	60.0	50.0	55.1	53.1	60.4	50.0	54.6
All Days								
# Obs.	252	255	247	246	251	246	149	1646
Average	-.105	.303 ***	.068	.052	-.015	.290 ***	.020	.092 ***
SD	1.053	1.266	1.526	1.502	.972	1.143	1.932	1.343
CV	-.100	.239	.044	.035	-.016	.254	.010	.068
% (+)	40.9 ***	61.6 ***	48.6 ***	46.7 *	49.8 **	58.9	53.0 ***	51.3 ***
AC[e]	.213	.344	.322	.114	.128	.077	.417	.260

[a] Number of observations; [b] average and standard deviation, SD, in percentages; [c] coefficient of variation, CV, average divided by standard deviation; [d] percentage of positive returns; [e] first order autocorrelation coefficient; ***, **, and * denote statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively, in two-tailed tests, based on the *t*-statistic for the difference of the mean return and first order autocorrelation coefficient from zero.

Table 3. *Two-Sample Analysis for Equality of Mean Returns Across Years*

	1988	1989	1990	1991	1992	1993	1994
1989	-3.938*** (0.69)[b]						
1990	-1.471 (0.48)	1.882 * (0.69)					
1991	-1.352 (0.49)	2.023** (0.71)	0.114 (1.03)				
1992	-.995 (1.17)	3.161*** (1.70)	0.720 (2.46)	0.590 (2.39)			
1993	-4.004*** (0.85)	0.123 (1.23)	-1.827 * (1.78)	-1.973** (1.73)	-3.199*** (0.72)		
1994	-0.836 (0.30)	1.774 * (0.43)	0.272 (0.62)	0.184 (0.60)	-0.239 (0.25)	1.741 * (0.35)	
WP[a]	-2.531** (0.58)	2.742*** (0.88)	-0.305 (1.36)	-0.502 (1.31)	-1.367 (0.49)	2.515** (0.70)	-0.684 (2.33)

[a] Whole period excluding year at column; [b] variance ratio, VR, between year at column and year at row; eg., $VR_{1988/1989}$ = $variance_{1988}$ / $variance_{1989}$ = 0.69; ***, **, and * denote statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, in two-tailed tests, respectively, based on the *t*-statistic for equality of mean returns across years. The top number is calculated *t*-value.

Table 4. *Analysis of Sign of Monday Return Conditional on the Sign of the Preceding Friday Return*

(Sign of R_{w-1}^{F} / Sign of R_{w}^{M})*				
	(+ / +)	(- / -)	(- / +)	(+ / -)
1988	27.5	33.3	15.7	23.5
1989	43.8	18.8	20.8	16.6
1990	29.8	23.4	27.7	19.1
1991	32.6	30.4	17.4	19.6
1992	24.5	32.6	14.3	28.6
1993	45.7	21.7	15.2	17.4
1994	16.7	29.2	20.8	33.3
1988-94	32.5	27.0	18.6	21.9

* Percentage of sign of Friday return in week w-1 versus sign of Monday return in week w at each column for each year.

Table 5. *Test for Equality of Mean Return on İSECI Across Days of the Week (B_i x 10^{-4})*

$$R_t = B_1D_{1t} + B_2D_{2t} + B_3D_{3t} + B_4D_{4t} + B_5D_{5t} + u_t$$

	B_1	B_2	B_3	B_4	B_5	R^2-ADJ.[a]	F-value	p-value
1988	4.66	-32.6 **	-26.97 *	-12.67	13.61	2.24	1.952	0.0864
	0.314[b]	-2.176	-1.819	-0.863	0.936			
1989	24.20	47.90***	43.75 **	24.73	10.27	5.06	3.505	0.0044
	1.360	2.717	2.458	1.389	0.571			
1990	16.31	-5.41	18.47	-15.98	20.29	0.00	0.547	0.7403
	0.737	-0.249	0.852	-0.729	0.935			
1991	9.67	-11.92	3.57	-17.6	42.95 **	0.50	1.047	0.3907
	0.446	-0.550	0.168	-0.837	2.001			
1992	-29.95 **	-15.36	18.73	11.17	8.92	2.03	1.837	0.1062
	-2.218	-1.137	1.373	0.819	0.647			
1993	38.98 **	10.04	36.38 **	33.05 **	26.62	5.27	3.527	0.0043
	2.396	0.617	2.214	2.011	1.603			
1994	-11.71	-26.03	11.26	33.40	1.27	0.00	0.320	0.9005
	-0.323	-0.717	0.321	0.936	0.036			
1988-91	13.78	-0.33	9.88	-5.28	21.57 **	0.45	1.699	0.1320
	1.425	-0.034	1.032	-0.552	2.257			
1992-94	0.63	-7.97	23.60 **	24.65 **	13.8	01.00	2.102	0.0634
	0.053	-0.688	2.038	2.120	1.178			
1988-94	8.55	-2.30	15.27 **	6.39	18.58 **	0.07	1.285	0.2740
	1.152	-0.404	2.069	0.865	2.505			

[a] Adjusted R^2, in percentages; [b] calculated *t*-value; ***, **, and * denote statistical significance at the 1 per cent, 5 percent, and 10 per ent levels, in two-tailed tests, respectively, based on the *t*-statistic for difference of coefficient B_i from zero where i = 1,..., 5.

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