"The Effect of Beta Coefficients on Extreme Single-Day Stock Returns: The Case of Istanbul Stock Exchange"

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THE EFFECT OF BETA COEFFICIENTS ON EXTREME SINGLE-DAY STOCK RETURNS: THE CASE OF ISTANBUL STOCK EXCHANGE

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Abstract

This paper investigates the validity of the relationship between beta and return, for stocks traded in Istanbul Stock Exchange (ISE). In order to find out whether there are relationships between beta coefficients and stock returns, three extreme shocks to the market (a disastrous earthquake, a political crisis leading to financial turmoil, a brutal terrorist attack) are chosen and five regression models, reflecting the abrupt single day falls and recoveries, are estimated. In order to come to a sound conclusion about the relationship between beta and return ten additional regression models are estimated for the five largest ups and five largest downs in the ındex during the history of Istanbul Stock Exchange. The relationships between beta and return in ISE within the framework of extreme single day returns pose opportunities for the investor to hedge systematic risk or to generate excess returns. Empirical findings suggest that beta is remarkably valid, within the framework of extreme single day retuns, in reflecting the systematic risk of stocks in ISE.

Key words: beta coefficient, CAPM, extreme single-day return, beta-return relationship, ISE.
JEL Classification: G12, G14.

1. Introduction

The purpose of this study is to examine whether there is a significant relationship between beta coefficients and stock returns in Istanbul Stock Exchange (ISE) on the basis of a single-day framework. This study examines the effects of beta coefficients on single-day extreme returns in ISE. Although the debate on whether beta is a useful tool in forecasting stock returns continues, beta continues to be used extensively in the finance world, both in academic and the business world. The study investigates the validity of beta coefficient in ISE, via examining the relationship between beta and return during major market dips, resulting from drastic events, and the relationship between them during important recovery dates. In this respect it uses the same approach as Feinberg and Tokic (2002). The study examines three important extreme events in Turkish recent history to investigate the relationship between beta and return. The extreme events are: (1) the disastrous earthquake of August 17, 1999 in the Marmara Region, (2) the political crisis between the Turkish President and the Government on February 19, 2001 that led to a dramatic financial turmoil, and finally (3) November 20, 2003's brutal terrorist attack on the general directorate building of HSBC (The Hongkong and Shanghai Banking Corporation) Turkey in Istanbul.

On the last trading day before the disastrous earthquake of August 17, 1999 occured ISE 100 Index was at 5807 points. The market was closed from the day of the earthquake until August 26, 1999. When the market reopened on the 26th of August the index fell by 603 points corresponding to a 10.38% decline.

The financial turmoil caused by a political crisis, resulted in a decline of 1486 points in the ISE 100 Index on the 19th of February, 2001. This plunge in the index corresponded to a 14.62% loss. Following a tiny recovery of only 0.98% on the 20th of February, the index fell by 18.11% on the 21st of February. The market enjoyed a major recovery of 9.88 % on the 22nd of February, though not sufficient to cover the huge loss.

The last specific extreme event used to investigate the relationship between beta and return is the unfortunate terrorist attack on the general directorate building of HSBC in Istanbul. When the attack took place on the 20th of November, 2003, ISE 100 Index fell by 1163 points corresponding

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to a 7.37% decline. The market was closed for more than a week to avoid further huge losses. When the market reopened on the 1st of December, 2003, the index increased by 9.51%.

All of these unexpected events were important extreme shocks to the market. Extreme shocks come to the markets abruptly and are causes of systematic risk measured by beta coefficient. If there is a positive linear relationship between beta coefficient and stock return, then stocks with higher betas will fall more during declining markets and rise more during increasing markets than stocks with lower betas. Therefore investors can use this relationship to hedge risk during declining markets or increase their capital gains from stocks during increasing markets. This study investigates whether there is such an anomaly, that would be utilized by ISE investors, by examining the effects of three extreme events mentioned on the market as well 10 additional single day extreme returns.

2. Literature on the Relationship Between Beta and Stock Return

Beta is a measue of a stock's price sensitivity to a change in the general market index. In other words beta measures how an individual stock's price would react to a change in the market as a whole. The CAPM considers only systematic risk (market risk) which is measured by beta. CAPM was initially eastablished by William Sharpe (1964) and then developed by John Lintner (1965), Jack Treynor (1965) and Fischer Black (1972). According to the CAPM, unsystematic risk (unique risk), which is attributable to company specific factors, should not be compensated for. Since unsystematic risk can be eliminated through diversification, in an efficient market no risk premium is required for unsystematic risk. Therefore only systematic risk which is measured by beta should get some compensation. CAPM has established a relationship between risk and return as depicted by the equation in Figure 1 below.

As can be seen from Figure 1, according to the traditional CAPM, expected return of a stock depends on the risk-free rate and a risk premium determined by β and $(r_m - r_f)$. According to the CAPM, as beta increases so does the expected return. The investors want higher returns on their investments as the systematic risk (beta) of their stock increases. Therefore, CAPM suggests that high beta stocks' prices increase more than those of low beta stocks during an increase in the market index. By the same token, high beta stocks tend to generate greater losses than low beta stocks during a decline in the market index. These relationships between return and beta result from the upward slope of the line asserted by the traditional CAPM. However, some researchers find that the estimated slope of the line of the relationship between beta and return is lower than the slope of the line asserted by the CAPM. Of these researchers, Fama and French (1992) have been taken seriously, probably the most. In their study they find the slope of the line of the relationship between beta and return to be flat.

After the study of Fama and French many of the researchers have become ready to discard beta as a measure of risk and as an important determinant of stock returns. The investment world almost abondened beta coefficient, after their study. On the other hand, ever since their study has been released there have been authors who tried to prove the opposite of their findings. As one of the most prominent authors of those, Black (1993) links the finding, that the line of the relationship between beta and return is flat, to data mining. He also concludes that even if high beta stocks' prices increase the same as low beta stocks' prices as a result of the flatness of the line as Fama and French suggest, beta might still guide investors. If low beta stocks generated nearly the same rate of return as high beta stocks, Black says that this would pose an opportunity for the investor to invest in low beta stocks and to gain the same rate of return that would have been gained by investing in riskier stocks (high beta stocks).

Shanken (1987) and Kandel and Stambaugh (1987) find no strong evidence that CAPM holds. However, Kothari and Shanken (1999) find that annual beta coefficients have more power in explaining returns than size.

Haugen and Baker (1991) find no relation between beta and return for the 1972-1989 period contrary to what is expected according to CAPM.

Wiggins (1992) finds that high historical beta stocks tend to have higher systematic risk during rising markets than during dropping markets.
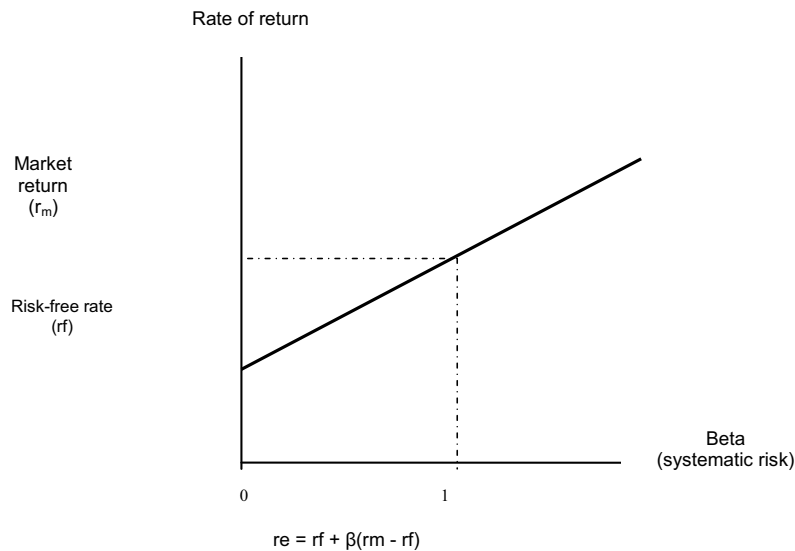
Fig. 1. Risk and return relationship In the capital asset pricing model

Chan and Lakonishok (1993) could not come to a clear-cut conclusion on whether to credit or discredit beta's role in explaining stock returns. In their study in which they have taken 1926 through 1991 as the sample period, they find that until 1982 there seemed to be a close correlation between realized market premium (r_m-r_f) and estimated compensation for beta risk (slope of the line predicted by Sharpe-Lintner CAPM). However, starting from 1982 the gap between the above mentioned seems to have widened which Chan and Lakonishok consider as an indication of decrease in beta's role in explaining stock returns. As a consequence, while accepting the role of beta, they reserve the idea that different periods might result in different conclusions and the likely role of other variables in explaining stock returns. In their study where they examine the CAPM debate, Jagannathan and McGrattan (1995) use the average return history for types of assets: stocks for large and small companies, long-term U.S. Treasury bonds, and short-term Treasury bills. The conclusion they have reached emphasizes different findings for different sample periods. They find a positive linear relationship between beta and return for long periods like 1926-1991 and 1926-1975, but a flat relationship for subperiods like 1976-1980 and 1981-1991.

In another study to test the claim that beta is no longer useful in explaining stock returns, Grundy and Malkiel (1996) replicate Fama and French's techniques and use a time frame similar to their study. Grundy and Malkiel conclude that, there is a clear relationship between beta and return when the market is declining and therefore beta is a useful tool in declining markets. Employing a methodology that considers the positive relationship between beta and return during rising markets and the negative relationship during declining markets, Pettengill, Sundaram and Mathur (1995) find a consistent and significant relationship between beta and return both for the entire sample and for subperiods. Examining the reaction of S&P 500 stocks to the market crash of October 1987, Harris and Spivey (1990) find a significant correlation between the percentage decline in stock prices on the crash day and historical beta coefficients of the stocks. Feinberg and Tokic (2002) investigate the relationship between beta and return for stocks of 30 companies listed in the Dow Jones Industrial Index and find evidence that beta is a valid measure of systematic risk in an extreme single-day setting. Feinberg and Tokic (2002) calculate the single-day return on a security as well as the percentage drop or rise in the Dow Jones Industrial Index using the previous day closing price. They estimate regression models for Asian crisis of September 1st, 1998, and the terrorist attack of September 11th, 2001, where dependent variable is the percentage change, from the previous day, in the price of each stock in the index and the independent variable is corresponding beta. In order to come to a sound conclusion they also estimate regression models for additional seven days on which the index fell or increased at least by 4 percent. They find that

regression coefficients of the models for Asian crisis and terrorist attack are significant. They also find significant regression coefficients for five of the seven additional models.

Another study about the effect of an unexpected political event on the pricing behaviour of the stock market is based on the Turkish experience. On March 1, 2003 the Turkish Parliament rejected the bill that was supposed to allow the deployment of US troops in Turkey. The rejection had come as a shock in domestic and international settings. Aktas and Oncu (2006) examine the pricing behaviour of the Turkish Stock Market after the rejection of the bill and find out that on the first trading day after the bill rejection, historically estimated betas were highly significant as explanatory variables.

Since beta coefficient continues to be the focus of attention in the finance world, despite various conflicting research results in the literature, it is worth investigating the relationship between beta and stock returns in Istanbul Stock Exchange.

3. Data

The data for the study were obtained from Istanbul Stock Exchange itself. All the data on daily stock prices and ISE National-All Shares Index were obtained through special request filling out the data request form and sending it to ISE. Data on extreme single day drops and rises and ten additional extreme single day data are used for the analysis. The number of stocks used in the regression analyses for each event day differs due to some stock delistings, enlistings, stock splits etc. Daily returns for individual stocks and ISE National-All Shares Index are calculated using the following equation:

$$R_t = \frac{P_t}{P_{t-1}} - 1, \tag{1}$$

where R_t = the daily return for day t either of an individual stock in the ISE National-All Shares Index or of ISE National-All Shares Index itself, P_{t-1} = the price or index value for day t-1, P_t = the price or index value for day t.

Contrary to Feinberg and Tokic (2002) which use readily calculated beta coefficients by major research firms, this study uses self-calculated beta coefficients. Beta coefficients, for each stock in the ISE National-All Shares Index, on the previous day before the huge rise or drop occurred are estimated using both thirty day and fifty day backward windows. Thirty day and fifty day windows are chosen in order for beta coefficients to reflect relevant information. Using a backward event window of more than fifty days might have caused irrelevant information to be included in betas, while less than thirty days might have caused losing some information. Beta coefficients are estimated for each event date using the following equation:

$$\beta_i = \frac{\sigma_{im}}{\sigma_m^2}, \tag{2}$$

where β_i = the beta coefficient of the ith stock, σ_{im} = the covariance between th i[th] stock and the market represented by ISE National-All Shares Index, σ_m^2 = the variance of market return.

As far as the ten additional extreme single day data are concerned, five extreme drops and five extreme rises during the relatively short history of ISE (from 1986 untill the end of 2005) were determined on the basis of largest percentage changes in the ISE 100 Index in both ways (up and down markets). The largest five rises and largest five drops contained only one event day each, in the pre-February 1997 period. Since, the calculation of ISE National-All Shares Index started in January 1997, it is impossible to go back thirty or fifty days to obtain daily index data for the sake of beta coefficient estimations. Therefore, five event days for largest rises and largest drops had to be started with the second available largest rise and largest drop. Beta coefficients of the last trading day before the day of extreme single day are estimated in the regression analyses.

4. Methodology

In investigating the relationship between beta and extreme single day stock returns for Istanbul Stock Exchange, Feinberg and Tokic's (2002) approach is used with the addition of examining the relationship on the basis of decile portfolios. In order to see if the relationship between beta and return differs between high beta stocks and low beta stocks, beta deciles are employed in this study. In order to test the hypothesis that there is a relationship between beta and corresponding stock returns, simple linear cross-sectional regression models are estimated for all extreme single day returns. In order to estimate future returns, historical betas are used by authors like Harvey (1989) and Ferson and Korajczyk (1995). Also, Wiggins (1992) finds that high historical beta stocks tend to have higher systematic risk in up markets than in down markets and low historical beta stocks have the opposite characteristic. In this respect, in this paper beta on the last trading day before the day of extreme single day return is used, for each corresponding regression model, under the assumption that betas vary systematically. From the results of regression models we examine the validity of beta coefficients, as predictors of returns on those specific days, by looking at the statistical significance of the regression coefficients. Regression models are estimated for all the available stocks in the ISE National-All Shares Index for each event day as well as for decile portfolios formed by ascending order beta coefficients of each trading day prior to the event day. First portfolio in the decile for each of the fifteen event day is the one that lies in the lowest 10% in terms of beta coefficients of that specific last trading day prior to the event day.

In all the regression models estimated, the dependent variables are the percentage changes in the stock prices from the last trading day, while the independent variables are the beta coefficients on the last trading day before the day of extreme event. The first regression is estimasted using betas on August 16, 1999 and returns on August 26, 1999 for 186 stocks. The second regression is estimated using betas on February 16, 2001 and returns on February 19, 2001 for 257 stocks. The third regression is estimated using betas on February 21, 2001 and returns on February 22, 2001 for 257 stocks. The fourth regression is estimated using betas on November 19, 2003 and returns on November 20, 2003 for 254 stocks. The fifth regression is estimated using betas on November 20, 2003 and returns on December 01, 2003 for 254 stocks. In addition to regression models estimated for extreme single day returns resulting from a natural disaster, a political crisis, and a terrorist attack, regression models are estimated for the five largest ups and five largest downs in the index during the history of Istanbul Stock Exchange (till the end of 2005). Ten additional regression models are estimated in order to reach a sound conclusion about the relationship between beta and return within the framework of extreme single day returns.

5. Empirical Results

In Tables 1, 3, and 5, descriptive statistics for betas and returns for each specific date are presented. In Tables 2, 4 and 6, regression results for each specific date are summarized. In Tables 1, 3, and 5, mean and standard deviation data for different numbers of stocks' beta coefficients and returns are depicted. Note that in Tables 1, 3, and 5, descrpitive statistics for beta coefficients estimated using both thirty day and fifty day windows take place. Note also that in Tables 2, 4 and 6, regression results for all stocks in ISE National-All Shares Index are included. As far as the decile portfolios are concerned, only a very few individual portfolios for some dates have significant coefficients which does not support a systematic pattern between the size of beta and beta-return relationship. Since the regression coefficients of the models for decile portfolios turn out to be statistically insignificant in most of the cases and the number of stocks in each decile is around 20 (which is relatively small), the regression results for decile portfolios are not presented in the tables. Tables 1 and 2 are given below.

Table 1

Descriptive statistics for beta coefficients and subsequent returns

Beta Coefficients and Stock Returns (%)		N	Mean	Standard Deviation
Betas on August 16, 1999	30 Day Beta	186	0.513445	0.400484
	50 Day Beta	186	0.667149	0.334787
August 26, 1999 Return		186	-0.1244	0.086007
Betas on February 16, 2001	30 Day Beta	257	0.822014	0.34817
	50 Day Beta	257	0.932743	0.198921
February 19, 2001 Return		257	-0.14005	0.035183
Betas on February 21, 2001	30 Day Beta	257	0.84991	0.258582
	50 Day Beta	257	0.914045	0.190748
February 22, 2001 Return		257	0.046473	0.079542
Betas on November 19, 2003	30 Day Beta	254	0.571646	0.335368
	50 Day Beta	254	0.614171	0.310925
November 20, 2003 Return		254	-0.03887	0.043717
Betas on November 20, 2003	30 Day Beta	254	0.514297	0.413397
	50 Day Beta	254	0.613349	0.311437
December 01, 2003 Return		254	0.043329	0.044219

Table 2

Regression model summary for 30 day and 50 day-preceding betas

Regression Model		30 Day Preceding Betas	50 Day Preceding Betas
August 26, 1999	Number of Observations	186	186
	R^2	0.005	0.006
	Adjusted R^2	-0.001	0.001
	Standardized Regression Coefficient	-0.015	-0.020
	Significance of the Regression Coefficient	0.349	0.302
February 19, 2001	Number of Observations	257	257
	R^2	0.047	0.124
	Adjusted R^2	0.043	0.121
	Standardized Regression Coefficient	-0.022	-0.062
	Significance of the Regression Coefficient	0.0005[1]	0.0000[1]
February 22, 2001	R^2	0.027	0.042
	Adjusted R^2	0.023	0.039
	Standardized Regression Coefficient	0.050	0.086

Table 2 (continued)

Regression Model		30 Day Preceding Betas	50 Day Preceding Betas
February 22, 2001	Significance of the Regression Coefficient	0.009**	0.0009*
	Number of Observations	257	257
November 20, 2003	Number of Observations	254	254
	R^2	0.090	0.116
	Adjusted R^2	0.086	0.113
	Standardized Regression Coefficient	-0.039	-0.048
	Significance of the Regression Coefficient	0.0000*	0.0000*
December 01, 2003	Number of Observations	254	254
	R^2	0.104	0.109
	Adjusted R^2	0.100	0.106
	Standardized Regression Coefficient	0.034	0.047
	Significance of the Regression Coefficient	0.0000*	0.0000*

Notes: * Significant at 0.1 percent, ** significant at 1 percent.

As can be seen above, in Table 2 results of five regression models representing five extraordinary events are presented both for thirty day-preceding beta coefficients and fifty day-preceding beta coefficients. The concern in this study is the significance of betas in explaining extreme stock returns. Therefore, while acknowledging the existence of various other factors that affect stock returns, R^2 numbers are evaluated taking only beta into consideration. In other words R^2 numbers in the tables show the percentage variation in stock returns resulting from the variation in betas. Bearing this in mind, the R^2 numbers don't seem low at all. Indeed, they are relatively high for regression models where regression coefficients are statistically significant. The column titled "30 Day-Preceding Betas" gives regression summary, for the stocks in ISE National-All Shares Index, obtained using 30 Day backward window for the estimation of beta coefficients. Looking at significance of the regression coefficient (0.349), Table 2 indicates that the regression coefficient for August 26, 1999 (first trading day after the earthquake) is not significant. However regression coefficients of 30 Day-Preceding Beta models of February 19, 2001 (political crisis), February 22, 2001 (recovery date after the turmoil caused by the political crisis), market dip on November 20, 2003 (terrorist attack) and market recovery on December 01, 2003 are highly significant at significance levels of 0.1%, 1%, 0.1%, 0.1% respectively. The regression coefficient of -0.022 for February 19, 2001 which is significant at 0.1 percent refers to a significant negative relationship between beta and return. In other words, the negative regression coefficient indicates that stocks with higher betas decreased more on the 19th of February, 2001 than stocks with lower betas. The regression coefficient of 0,050 for February 22, 2001, which is significant at 1 percent refers to a positive relationship between beta and return. This means that stocks with higher betas increased more on the recovery date of 22nd of February, 2001 than stocks with lower betas. It is noteworthy that the signs of significant regression coefficients are in corformance with the direction of the market. The sign is negative for February 19, 2001 when the index fell by 14.62%, and positive for February 22, 2001 when the index rose by 9.88%. The regression coefficient of -0.039 for November 20, 2003 which is significant at 0.1 percent refers to a significant negative relationship between beta and return. In other words, the negative regression coefficient indicates that stocks with higher betas decreased more on the 20th of November, 2003 than stocks with lower betas. The regression coefficient of 0,034 for December 01, 2003, which is significant at 0.1 percent refers to a positive relationship between beta and return. This means that stocks with higher betas increased more on the 1st of December, 2003 than stocks with lower betas. Again, it is noteworthy that the signs of significant regression coefficients are in corformance with the direction of the market. The sign is negative for November 20, 2003 when the index fell by 7.37%, and positive for December 01, 2003 when the index rose by 9.51%.

The last column of Table 2 indicates five regression models for fifty day-preceding beta coefficients. Using fifty day-preceding betas in the regression analyses does not cause a noteworthy difference in the significance of the coefficients. The coefficient of August 26, 1999 remains insignificant. The significance of February 22, 2001 changes from 1% to 0.1%, while the significance of the other three dates remains the same.

As a result, when Table 2 is examined as a whole, there seem to be four significant regression models and this suggests a strong relationship between beta and return. However, in order to come to a sound conclusion as to whether beta is a useful tool in explaining stock returns, additional regression models should have been estimated. Ten additional regression models are estimated for the five largest ups and five largest downs in the index during the history of Istanbul Stock Exchange. Descriptive statistics on betas and returns for five extreme single day rises in the index are presented below in Table 3, and regression results for those specific dates are summarized in Table 4.

As can be seen below, Table 4 indicates that the regression coefficients of models for September 18, 1998, January 04, 2000, December 05, 2000, December 06, 2000 and April 27, 2001 are all highly significant. The 5th row of each block in the column titled "30 Day-Preceding Betas" indicates significance levels of 0.1% for all the dates. Therefore, we can conclude that there are positive linear relationships between betas and returns for those five specific dates. Positive signs of regression coefficients are in conformance with the direction of the market (rising market). Five positive linear relationships found, for those specific dates, between betas and returns tell us that stocks with higher betas increased more on those dates than stocks with lower betas. As far as the decile potrfolios are concerned, only a few portfolios for some dates have significant coefficients which does not support a systematic pattern between the size of beta and beta-return relationship. Therefeore, as mentioned earlier those results are not presented in the paper.

The last column of Table 4 indicates five additional regression models of extreme single day rise in returns for fifty day-preceding beta coefficients. Using fifty day-preceding betas in the regression analyses does not cause a noteworthy difference in the significance of the coefficients. When "50 Day-Preceding Betas" are used in the regression estimations, the significance of all regression coefficients remains the same as that of the regression coefficients in the column titled "30 Day-Preceding Betas".

Table 3

Descriptive statistics for additional extreme single day rise in returns

Beta Coefficients and Stock Returns (%)		N	Mean	Standard Deviation
Betas on September 17, 1998	30 Day Beta	222	0.88098	0.308777
	50 Day Beta	222	0.886007	0.280019
September 18, 1998 Return		222	0.159101	0.052665
Betas on December 28, 1999	30 Day Beta	217	0.528183	0.357418
	50 Day Beta	217	0.510925	0.341469
January 04, 2000 Return		217	0.108519	0.054616
Betas on December 04, 2000	30 Day Beta	265	0.875795	0.274102
	50 Day Beta	265	0.823476	0.248062
December 05, 2000 Return		265	0.187785	0.049447
Betas on December 05, 2000	30 Day Beta	265	0.944379	0.268268
	50 Day Beta	265	0.883379	0.236168
December 06, 2000 Return		265	0.169377	0.058413
Betas on April 26, 2001	30 Day Beta	245	0.815802	0.284907
	50 Day Beta	245	0.847137	0.206247
April 27, 2001 Return		245	0.061588	0.055199

Table 4

Regression model summary for additional extreme single day rise in returns
(30 day and 50 day-preceding betas)

Regression Model		30 Day Pre-ceding Betas	50 Day Pre-ceding Betas
September 18, 1998	Number of Observations	222	222
	R^2	0.143	0.151
	Adjusted R^2	0.140	0.147
	Standardized Regression Coefficient	0.065	0.073
	Significance of the Regression Coefficient	0.0000*	0.0000*
January 04, 2000	Number of Observations	217	217
	R^2	0.055	0.068
	Adjusted R^2	0.051	0.064
	Standardized Regression Coefficient	0.036	0.042
	Significance of the Regression Coefficient	0.0005*	0.0000*
December 05, 2000	Number of Observations	265	265
	R^2	0.124	0.115
	Adjusted R^2	0.121	0.112
	Standardized Regression Coefficient	0.064	0.068
	Significance of the Regression Coefficient	0.0000*	0.0000*
December 06, 2000	Number of Observations	265	265
	R^2	0.196	0.194
	Adjusted R^2	0.193	0.191
	Standardized Regression Coefficient	0.096	0.109
	Significance of the Regression Coefficient	0.0004*	0.0000*
April 27, 2001	Number of Observations	245	245
	R^2	0.051	0.066
	Adjusted R^2	0.048	0.062
	Standardized Regression Coefficient	0.044	0.069
	Significance of the Regression Coefficient	0.0003*	0.0000*

Note: * Significant at 0.1 percent.

Descriptive statistics on betas and returns for five extreme single day drops in the index are presented below in Table 5 and regression results for those specific dates are summarized in Table 6 below.

As can be seen from the column titled "30 Day Preceding Betas" in Table 6, regression coefficients of models for all dates of falling market are significant. The regression coefficients of the models for August 27, 1998, September 25, 1998, November 11, 1998, February 21, 2001 and March 03, 2003 are all significant at 0.1 percent. Five significant negative coefficients indicate that stocks with higher betas dropped more on those five specific dates than stocks with lower betas. Negative signs of the coefficients are in conformance with the direction of the market (declining market). The regression results of the decile portfolios do not support a systematic pattern between the size of beta and beta-return relationship during periods of falling market, and are not presented for this reason.

The last column of Table 6 indicates five additional regression models of extreme single day rise in returns for fifty day-preceding beta coefficients. Using fifty day-preceding betas in the regression analyses does not cause a noteworthy difference in the significance of the coefficients. The significance of all regression coefficients in the last column remains the same except for the

coefficient of the model for March 03, 2003. The significance level of the model for March 03, 2003 changes from 0.1% to 5%. Therefore, we can conclude that there are negative linear relationships between betas and returns for those five specific dates

Four of the five regression models estimated for dates of extreme shocks (earthquake, political crisis, terrorist attack) result in the expected relationship between beta and return, while ten of the ten additional models have significant regression coefficients pointing out the expected relationships between beta and return. If beta coefficient is related to return, excess gains might be generated by holding a long position in high beta stocks when a rise in the market is expected and by holding a short position in them when a fall in the market is expected. Therefore, an investor in the ISE might have utilized the above mentioned relationships to hedge risk when the index was declining and to increase capital gains when the index was increasing, especially on recovery dates. On the other hand a risk averse investor who had invested in low beta stocks might have sold them on the same day as the market dip occured in order to avoid further losses or to buy them back at a lower price.

Table 5

Descriptive statistics for additional extreme single day fall in returns

Beta Coefficients and Stock Returns (%)		N	Mean	Standard Deviation
Betas on August 26, 1998	30 Day Beta	209	0.845863	0.362498
	50 Day Beta	209	0.7721	0.314023
August 27, 1998 Return		209	-0.12593	0.057019
Betas on September 24, 1998	30 Day Beta	216	0.919925	0.25283
	50 Day Beta	216	0.930161	0.247973
September 25, 1998 Return		216	-0.10228	0.042753
Betas on November 10, 1998	30 Day Beta	231	0.76775	0.259306
	50 Day Beta	231	0.861322	0.228677
November 11, 1998 Return		231	-0.13567	0.045913
Betas on February 20, 2001	30 Day Beta	252	0.860786	0.254789
	50 Day Beta	252	0.936076	0.188592
February 21, 2001 Return		252	-0.16249	0.041354
Betas on February 28, 2003	30 Day Beta	233	0.828183	0.441151
	50 Day Beta	233	0.970774	0.347134
March 03, 2003 Return		233	-0.1134	0.038113

Table 6

Regression model summary for additional extreme single day fall in returns
(30 day-preceding betas)

Regression Model		30 Day Preceding Betas	50 Day Preceding Betas
	Number of Observations	209	209
	R^2	0.133	0.126
August 27, 1998	Adjusted R^2	0.129	0.122
	Standardized Regression Coefficient	-0.057	-0.064
	Significance of the Regression Coefficient	0.0000[1]	0.0000[1]

Table 6 (continued)

Regression Model		30 Day Pre-ceding Betas	50 Day Pre-ceding Betas
September 25, 1998	Number of Observations	216	216
	R^2	0.176	0.178
	Adjusted R^2	0.173	0.174
	Standardized Regression Coefficient	-0.071	-0.073
	Significance of the Regression Coefficient	0.0000[1]	0.0000[1]
November 11, 1998	Number of Observations	231	231
	R^2	0.193	0.207
	Adjusted R^2	0.189	0.204
	Standardized Regression Coefficient	-0.078	-0.091
	Significance of the Regression Coefficient	0.0000[1]	0.0000[1]
February 21, 2001	Number of Observations	252	252
	R^2	0.093	0.131
	Adjusted R^2	0.090	0.127
	Standardized Regression Coefficient	-0.050	-0.079
	Significance of the Regression Coefficient	0.0000[1]	0.0000[1]
March 03, 2003	Number of Observations	233	233
	R^2	0.055	0.025
	Adjusted R^2	0.051	0.020
	Standardized Regression Coefficient	-0.020	-0.017
	Significance of the Regression Coefficient	0.0003[1]	0.016[3]

Notes: [1] significant at 0.1 percent, [2] significant at 1 percent, [3] significant at 5 percent.

6. Conclusion

While there are arguments to discard beta as a measure of systematic risk, many studies on ther other hand suggest that there exist relationships between beta and return under different conditions. In this paper we conclude that there are remarkable relationships between beta and extreme single day returns in Istanbul Stock Exchange. As far as the single day effect of beta coefficient is concerned our findings bear resemblance to the findings of Harris and Spivey (1990) and Aktas and Oncu (2006). In our study, four out of the five regression models estimated for extreme single day returns resulting from shocks to the market and ten of the additional ten regression models have significant regression coefficients. On the other hand, regression models for decile portfolios based on the size of beta coefficients (ranging from the lowest beta portfolio to the highest beta portfolio) do not support a systematic pattern between the size of beta and beta-return relationship. The number of observations in each beta decile ranged from 18 to 27. Therefore, regression models for beta decile portfolios are estimated using number of observations within this range. The small number of observations in each beta decile may have led to insignificant regression coefficients. Therefore, decile portfolio regression results are not presented. Due to the small number of observations in each beta decile, it is not feasible to subdivide the deciles into further deciles based on size. For this reason, the major limitation of the study is the lack of examination of the effects of both the magnitude of beta coefficient and size on stock returns.

Consequently, four out of the five regression models estimated for extreme single day returns resulting from shocks to the market and ten of the additional ten regression models point out relationships between beta and return as CAPM asserts. Choosing low beta stocks, investors might be able to sell their stocks following the day of extreme fall, in order not to sustain further losses. A long position in high beta stocks when the market is expected to rise and a short position in them when the market is expected to fall provide the rational investor with excess capital gains.

Utilizing these opportunities, the investor might hedge systematic risk or generate excess returns. As a result, beta is remarkably valid, within the framework of extreme single day retuns, in reflecting the systematic risk of stocks in ISE.

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