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FACTORS AFFECTING THE CROSS-SECTION OF COMMON STOCK RETURNS: AN APPLIED ANALYSIS AT ISE*

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Özet
Gelişmiş sermaye piyasalarında gerçekleştirilmiş olan çalışmalar, firma büyüklüğü anomalisinin menkul kıymet piyasalarında var olduğu yönünde ciddi kanıtlar sunmuştur. İstanbul Menkul Kıymetler Borsasına ilişkin kanıtlar ise çelişkilidir. Bu durum kısmen, yürütülen çalışmalarda incelenen dönemler ve uygulanan metotlar ile ilişkilendirilebilir. Bu çalışmada, çeşitli yöntemler uygulanarak, firma büyüklüğünün, hisse senedi getirilerindeki değişkenliği açıklayıp açıklamadığı ve eğer açıklıyor ise; firma büyüklüğü ile hisse senedi getirileri arasındaki ilişkiye dayalı olarak normal-üstü getiriler elde edilip edilemeyeceği, Temmuz 1993-Haziran 2004 dönemi için araştırılmıştır. Firma büyüklüğünün yanı sıra, beta, öz kaynak defter değeri-piyasa değeri oranı ve hisse senedi fiyatının, hisse senedi getirileri üzerindeki açıklayıcı gücü de araştırılmıştır.

Anahtar Kelimeler: Firma Büyüklüğü Anomalisi, Sermaye Varlıkları Fiyatlama Modeli, Fiyat Anomalisi, Beta, Özkaynak Defter Değeri-Piyasa Değeri Oranı Anomalisi

Abstract
Studies, executed at many developed capital markets, has represented considerable evidence concerning the existence of firm size anomaly at stock exchanges. However, the evidence regarding Istanbul Stock Exchange were conflicting. This might partly be attributed to the differences in the periods examined and the methods applied, in the previous studies. This study, by applying different methods, examined whether firm size captures the variation in average common stock returns. And also it is examined whether abnormal returns can be gained by using the relationship between firm size and common stock returns, at ISE, over July 1993 to June 2004 period. Along the firm size; the explanatory power of beta, book-to-market value ratio of equity and price of the common stock, over common stock returns has been investigated.

Key Words: Firm Size Anomaly, Capital Assets Pricing Model, Price Anomaly, Beta, Book-to Market Value Ratio of Equity Anomaly

Giriş

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The Capital Asset Pricing Model (CAPM), has been the most widely used model in explaining the common stock returns (Fabozzi and Modigliani, 1992, p. 251). CAPM predicts that only systematic risk captures the variation in average common stock returns and beta has been used as the measure of systematic risk. To examine whether the Model is misspecified, the comparison of the expected common stock returns estimated using CAPM and realized returns, has been intensively studied in finance literature. If the expected common stock returns and realized returns differ; then beta, is not sufficient to capture the variation in average common stock returns. This situation would be interpreted as an anomaly at the market.

To control whether CAPM is misspecified, factors other than beta, have been added to the Model as explanatory variables, in the previous studies. Among these are; size (ME), earnings/price ratio (E/P), book-to-market value ratio of equity (BE/ME), leverage ratios, growth ratios and the price of the common stock (P). The emprical studies have presented evidence emphasizing that variables, other than beta, have explanatory power over the variation in average common stock returns. In other words, CAPM would capture the variation in average common stock returns, only when other factors are added to the Model as explanatory variables. This can be interpreted as; the investors can gain abnormal returns and there are anomalies existing at the market.

Reinganum (Reinganum, 1982), Basu (Basu, 1983, p. 129-156), Moore (Moore, 2000), Connor and Sehgal (Connor and Sehgal, 2001) and Ellouz (Ellouz, 2004) has presented evidence regarding E/P anomaly. Blume and Husic (1973), Edmister and Greene (1980), Dubofsky and French (1988), Goodman and Peavy (1986), Branch and Chang (1990) has presented evidence regarding price anomaly (Waelkens and Ward, 1997, p. 35-48). Fama and French (Fama and French, 1992, p. 427-465), Haris and Marston (Haris and Marston, 1994, p. 18-24), Davis (Davis, 1994, p. 1579-1593), Ajili (Ajili, 2002), Charitou and Constantinidis (Charitou and Constantinidis, 2004) and Chung et al. (Chung et al., 2004) has presented evidence regarding BE/ME anomaly.

The most studied phenomenen in finance literature about anomalies is size anomaly. Its is also referred as "firm size effect". The first time size anomaly was mentioned in the literature was Banz's pioneering study (Banz, 1981, p. 3-18). Size anomaly states that; small firms (firms with low market value of equity) yield more average common stock returns than big firms (firms with hig market value of equity).

In the studies following Banz's study, Reinganum (Reinganum, 1981, p. 19-46), Roll (Roll, 1981, p. 879-888), Keim (Keim, 1983, p. 13-32), Basu (Basu, 1983, p. 129-156), Cook and Rozeff (Cook and Rozeff, 1984, p. 449-464), Tseng (Tseng, 1988, p. 333-343), Keim, Jaffe and Westerfield (Keim et al., 1989, p. 135-148), Lamoureux and Sanger (Lamoureux and Sanger, 1989, p. 1219-1245), Wong (Wong, 1989, p. 61-65), Chan and Chen (Chan and Chen, 1991, p. 1467-1484), Chan, Hamao and Lakonishok (Chan et at., 1991, p. 1739-1764), Fama and French (Fama and French, 1992, p. 427-465), Jegadeesh (Jegadeesh, 1992, p. 337-351), Herrera and Lockwood (Herrera and Lockwood, 1994, p. 621-632), Barber and Lyon (Barber and Lyon, 1997, p. 875-883), Allen and Cleary (Allen and Cleary, 1998, p. 253-275), Chui and Wei (Chui and Wei, 1998, p. 275-293), Heston, Rouwenhorst and Wessels (Heston et al., 1999, p. 9-27), Schwert (Schwert, 2000), Moore (Moore, 2000, p. 1-13), Barry, Goldreyer, Lockwood, and Rodriguez (Barry et al., 2001), Connor and Sehgal (Connor

and Sehgal, 2001, p. 1-23), Lam (Lam, 2002, p. 163-179), Chou, Lin and Hsu (Chou et al., 2002, p. 1-24), Charitou and Constantinidis (Charitou and Constantinidis, 2004) and Ellouz (Ellouz, 2004) have provided evidence supporting the existence of size anomaly at the developed and emerging markets.

The studies conducted, examining size anomaly at ISE, have provided evidence supporting the existence of the anomaly. These studies are; Demir, Küçükkiremitçi, Pekkaya and Üreten (Demir et al., 1997), Topsever (Topsever, 1998), Baştürk (Baştürk, 2002), Pınar (Pınar, 2002), Özcan and Yücel (Özcan and Yücel, 2003) and Karan (Karan, 2003).

Contradictory to the findings of these studies, there are studies which emphasize that size anomaly does not exist at ISE. These studies are; Bora (Bora, 1995), Taner and Kayalıdere (Taner and Kayalıdere, 2002). These conflicting findings might partly be attributed to the differences in the periods examined and the methods applied, in the previous studies. Examining the existence of size anomaly at ISE and the explanatory power of firm size, along with other variables, over the variation in average common stock returns, by applying different methods, for a longer time period would be beneficial.

The aim of this study is to examine the existence of size anomaly at ISE and the explanatory power of firm size, along with other factors, over the variation in common stock returns, by applying different methods, over July 1993 to June 2004 period and over July 1993 to June 1999 period and over July 1999 to June 2004 sub periods.

Methodology

The sample includes firms, quoted to ISE over July 1993 to June 2004 period. For a firm to be included in the sample in July of year k (k: 1993, 1994,...,2003, 2004); the monthly returns of the common stock for the 24 months preceding July of year k; the price and number of the common stock and market value of equity for December of year k-1; the price and number of the common stock for December of year k; monthly returns and price of the common stock for the 12 months between July of year k and June of year k+1 must be available.

In addition; firms with missing information, firms that were removed from ISE quotation for various reasons, firms with fiscal yearends different than December and firms with more than one share class (A,B,C) were excluded from the sample.

Following Fama and French, firms with negative BE/ME for December of k-1, were excluded from the sample for the period between July of year k and June of year k+1. As BE/ME turned positive in the following years, the firms were included in the sample (Fama and French, 1993, p. 3-56).

To ensure that accounting variables are known before the returns they are used to explain, firms with fiscal yearends other than December were excluded from the sample.

Firms are required to file their accounting reports to ISE within 3 months of their fiscal year ends. However, Alford, Jones and Zmijewski has shown that in USA, almost 19,8 % of the firms do not comply (Alford et al., 1994, p. 229-254). Again, to ignore the consequences of such a case, which might be valid for ISE too, and to ensure that accounting variables are known before the returns they are used to explain,

the accounting data for all fiscal yearends in calendar year k-1 are matched with the returns for July of year k to June of year k+1 both for the portfolios and cross-sectional regressions, leaving a 6 month gap between fiscal yearend and return tests.

The accounting data of the firms in the sample were gathered from ISE Training and Publications Department. The monthly return and monthly price data of the firms in the sample were gathered from the ISE web page (www.ise.org). As the risk free rate; monthly interest rates derived from the annual interest rates of Government Discounted Bond auctions are used (www.hazine.gov.tr). ISE National-100 indices, a value-weighted indices, was used as the market proxy.

ME for a firm at month t is; number of the firm's common stock at month t times the monthly closing price of the firm's common stock traded at ISE. BE/ME for a firm at month t is; the firm's book value of equity divided by the firm's market value of equity. Common stock price (P) at month t is; closing price of the firm's common stock traded at ISE at month t. Monthly common stock return for a firm at month t is; the monthly return gained by holding the common stock for monrth t.

The beta coefficients in this study were estimated by 3 different methods. The rationale for this was to avoid the consequences of the autocorrelation between the market returns following Fama and French (Fama and French, 1992, p. 427-465) and Dimson (Dimson, 1979, p. 197-226).

The first beta coefficient (BETA) was estimated as the slope in the regression of a common stock's monthly excess return on the current month's excess market return. BETA was estimated on the preceding 24 monthly returns. Ordinary least squares regression method was applied.

The second beta coefficient (BETAF), was estimated as the sum of the slopes in the regression of a common stock's monthly excess return on the current and prior month's excess market return. The sum of the betas are meant to adjust for nonsynchronous trading, to avoid the the autocorrelation between the market returns (Fama and French, 1992, p. 427-465).

The third beta coefficient (BETAD), was estimated as the sum of the slopes in the regression of a common stock's monthly excess return on the current, two preceding and two following month's excess market return, following Dimson's rationale. However, in Dimson's study, beta was estimated as the sum of the slopes in the regression of a common stock's monthly excess return on the current, twenty preceding and five following month's excess market return (Dimson, 1979, p. 197-226). The reason that less number of observations were used as explanatory variables in the beta estimation regression in this study is due to the shortness of time period, for which data is available at ISE.

Size anomaly was, first, explored by making use of portfolios, constructed by two different methods as below:

In the first portfolio formation method, the size of the firms in the sample were ranked according to firm size in June of year k. Then firms were located in 10 portfolios based on size. The first portfolio (Portfolio1) included the biggest firms and the last portfolio (Portfolio10) included the smallest firms. The firms included in each of the 10 portfolio remain the same over July of year k to June of year k+1 period. Then in June of year k+1, firms were located to portfolios according to firm size of June of year k+1.

Fama and French provided evidence that the average beta coefficients of these portfolios had, almost, perfect correlation with average firm size. Added that, it would be difficult to seperate the effects of firm size and beta coefficient over average common stock returns, by examining the average monthly returns of these 10 portfolios. For this reason, Fama and French has first ranked firms based on size and located the firms in 10 portfolios. Then ranked the firms, in each of the 10 portfolios, this time, based on the estimated beta coefficients and located the firms into 10 sub portfolios, totalling a sum of 100 portfolios (Fama and French, 1992, p. 427-465).

For the second portfolio formation method in this study, because of the few number of firms in the sample, firms were located into 4 portfolios based on size firstly. Firm size at June of year k-1 was taken as the ranking criteria. And then firms in each of the 4 groups were located into 4 sub portfolios based on estimated BETA coefficients, totalling a sum of 16 portfolios. BETA at July of year k was taken as the ranking criteria. Firms in each sub portfolio remained the same over July of year k to June of year k+1 period. The same methodology in portfolio formation based on size and BETA, was applied in forming 16 portfolios based on size and BETAF and in forming 16 portfolios based on size and BETAD.

Almost equal number of firms were located in each portfolios in both of the two portfolio formation methods. The ME, BE/ME, BETA, BETAF and BETAD values for the firms in each portfolio and sub portfolio were renewed annually. However, the common stock return figures were taken monthly.

The renewal of the beta coefficients annually was applied in Haris and Marston (Haris and Marston, 1994, p. 18-24) and Strong and Xu (Strong and Xu, 1997, p. 1-23).

The natural logarithm of the ME, BE/ME and P variables were employed in the study, following Brown et al. (Brown et al., 1983, p. 33-56) and Fama and French (Fama and French, 1992, p. 427-465). The reason for this is that a non-linear relationship between common stock returns and the variables was detected in the previous studies.

For both portfolio formation methods, the time series equal-weighted means of each variable were calculated for all the portfolios, of the 132 months over July 1993 to June 2004 period and of the sub-periods of the 72 months over July 1993 to June 1999 period and 60 months over July 1999 to June 2004. The time series mean values are represented in Table 1, Table 2, Table 3 and Table 4, as descriptive statistics.

In addition to examining the relationship between firm size and average common stock returns by utilizing portfolios; to determine the explanatory power of firm size over average common stock returns, cross-sectional regressions were run. For this purpose, some of the variables, that were emphasized to have explanatory power over average common stock returns in previous studies, were added to CAPM as explanatory power, besides beta and firm size. These variables were BE/ME and P. The cross sectional regression run was:

$$R_{i,t} - R_{f,t} = \alpha 0 + \alpha 1 * beta_{i,t} + \alpha 2 * \ln(ME)_{i,t} + \alpha 3 * \ln(BE/ME)_{i,t} + \alpha 4 * \ln(P)_{i,t} + e_{i,t}$$

(beta = BETA, BETAD, BETAF)

In this equation; $R_{j,t}$: the monthly return of the common stock of firm "i" at month t, $R_{f,t}$: monthly risk free rate at month t, $beta_{it}$: the estimated beta coefficient for firm "i" at month t, $(ME)_{it}$: size of firm "i" at month t, $(BE/ME)_{it}$: the book-to-market value of equity ratio for firm "i" at month t, $(P)_{it}$: the closing price of the common stock of firm "i" at the and of month t, αi: regression slopes (i = 1, 2, 3, 4), $\alpha 0$: intercept, e_{it}: error term.

In the regression, for the firms; ME at June of year k, BE/ME at December of year k-1, beta cefficients at July of year k, closing common stock prices at the end of months between July of year k and June of year k, were matched with the excess common stock returns of firms over July of year k to June of year k+1 period.

The ME, BE/ME, BETA, BETAF and BETAD values for the firms were renewed annually. However, the excess common stock return figures were taken monthly.

The cross-sectional regressions were run using the monthly common stock returns, instead of using the average monthly returns of portfolios, following Chad et al. (Chan et al., 1991, p. 1739-1764), Fama and French (Fama and French, 1992, p. 427-465), Davis (Davis, 1994, p. 1579-1593), Haris and Marston (Haris and Marston, 1994, p. 18-24). The regressions were also run for the sub-periods.

The coefficients gathered by running cross-sectional regressions and the corresponding t-statistics of the coeffcients were unitilized to determine the explanatory power of size and other factors on the variation of the average common stock returns.

Empirical Results

The descriptive statistics for the 10 portfolios, constructed based on firm size alone, over July 1993 to June 2004 period, are shown in Table 1. Portfolio 1 contains the biggest firms in the sample, and portfolio 10 contains the smallest firms.

Table 1 – The Descriptive Statistics For The 10 Portfolios, Constructed Based On Firm Size Alone, Over July 1993 To June 2004 Period (Figures for the variables are mean monthly values)

Portfolio	Ln(ME)	Return	BETA	BETAF	BETAD	Ln(B/M)	Firm #
Portfolio 1	32,92	0,0641	1,02	0,98	0,94	-1,37	17,27
Portfolio 2	31,49	0,0626	0,97	1,06	1,10	-1,04	15,36
Portfolio 3	30,74	0,0615	0,90	1,01	1,00	-0,96	15,36
Portfolio 4	30,29	0,0574	0,91	1,06	1,07	-0,75	15,36
Portfolio 5	29,91	0,0642	0,93	1,03	1,07	-0,66	15,36
Portfolio 6	29,52	0,0599	0,90	1,03	0,98	-0,57	15,36
Portfolio 7	29,13	0,0663	0,91	1,00	0,92	-0,57	15,36
Portfolio 8	28,71	0,0620	0,93	1,03	1,07	-0,67	15,36
Portfolio 9	28,25	0,0754	0,84	0,98	1,01	-0,50	15,36
Portfolio 10	27,11	0,0980	0,87	1,15	1,17	-0,16	17,72

The average monthly return for portfolio 10 is obviously higher than the average monthly return of portfolio 1. However, the change in average monthly returns do not show a steady pattern with the decrease in the firm size. The difference in average monthly returns is most apparent for the portfolios containing the smallest and biggest portfolios. The average monthly return for portfolio 1 is 6.41 %, while it is 9.80 % for portfolio 2. The evidences for the sub-periods are similar. It can be concluded that; the mean monthly returns differ for the portfolios containing the smallest and the biggest firms, but due to the unsteady pattern of the mean monthly returns, the research should be taken one step further by running cross-sectional regressions.

As the average firm size of the portfolios decreases, the average BETA for the portfolios decreases. The average BETA for portfolio 1 is 1.02, while the average BETA for portfolio 10 is 0.87. The results are similar for the sub-periods. However, as in the case of average monthly returns, the change in BETA do not show a steady pattern with the decrease in the firm size. The difference between portfolio 1 and portfolio 10 is apparent. These findings are noteworthy because they are contradictory to Fama and French (Fama and French, 1992, p. 427-465) study, in which it was emphasized that; as the average firm size of the portfolios decreased, the average beta for the portfolios increased. This contradiction against the developed Exchanges reveals that, at ISE, small firms have less systematic risk than big firms.

It can be seen in Table 1 that; the average BETAF and BETAD coefficients of the portfolios increase, as the average firm size decreases. The average BETAF coefficients for portfolio 1 and portfolio 10 are is 0.98 and 1.15 consecutively, while the average BETAD coefficients for portfolio 1 and portfolio 10 are is 0.94 and 1.17 consecutively. The findings are similar for the sub-periods. The results for the BETAF and BETAD coefficients are different than the results for the BETA coefficient. This difference might be attributed to the correlation problem, mentioned earlier. Also, the unsteady pattern between the firm size and BETA, is valid between BETAF and BETAD, and size.

For the portfolio construction based on firm size and BETA method, the biggest firms in the sample were located in Ln(Me)-1 portfolio and the smallest firms in Ln(Me)-4 portfolio. Then, out of each portfolio, the firms with the highest BETA are located in sub-portfloio Beta-1 and firms with the smallest BETA are located in sub-portfolio Beta-4. The same methodology was applied for the portfolio construction based on firm size and, BETAF and BETAD. The descriptive statistics for the portfolios constructed based on firm size and BETA, firm size and BETAF, firm size and BETAD are represented in Table 2, Table 3 and Table 4, consecutively.

Table 2 - The Descriptive Statistics For The 16 Portfolios, Constructed Based On Firm Size and BETA Coefficients, Over July 1993 To June 2004 Period

Mean Monthly Returns					
		Beta-1 (High)	**Beta-2**	**Beta-3**	**Beta-4 (Low)**
Ln(Me)-1 (Big)		0,0654	0,0650	0,0600	0,0577
Ln (Me)-2		0,0622	0,0552	0,0647	0,0655
Ln (Me)-3		0,0551	0,0738	0,0656	0,0558
Ln (Me)-4 (Small)		0,0794	0,0809	0,0901	0,0828

In Table 2, when the coloumns are considered, it can be observed that the portfolios including the smallest firms yield higher average monthly returns than the portfolios including the biggest firms. Out of the portfolios with the highest BETA ranking, the mean monthly returns for Ln(Me)-1 portfolio and Ln(Me)-4 portfolio are 6.54 % and 7.94 % consecutively. An analogous situation is valid for the other sub-portfolios. And similar figures were obtained for the sub-periods.

Considering the rows in Table 2, it is not possible to emphasize a steady relationship between mean monthly returns and BETA coefficients. This can be interpreted as; when there is a variation in BETA independent of firm size, there is not sufficient evidence of a relationship between mean monthly returns and BETA.

The descriptive statistics are simlar when the portfolio construction method based on firm size and BETAF, and firm size and BETAD is applied. The descriptive statistics are presented in Table 3 and Table 4, consecutively.

Table 3 - The Descriptive Statistics For The 16 Portfolios, Constructed Based On Firm Size and BETAF Coefficients, Over July 1993 To June 2004 Period

Mean Monthly Returns					
		Betaf-1 (High)	**Betaf-2**	**Betaf-3**	**Betaf-4 (Low)**
Ln(Me)-1 (Big)		0,0654	0,0637	0,0692	0,0511
Ln (Me)-2		0,0621	0,0632	0,0570	0,0655
Ln (Me)-3		0,0582	0,0698	0,0688	0,0530
Ln (Me)-4 (Small)		0,0883	0,0829	0,0839	0,0779

Table 4 - The Descriptive Statistics For The 16 Portfolios, Constructed Dependent On Firm Size and BETAF Coefficients, Over July 1993 To June 2004 Period

Mean Monthly Returns					
		Betad-1 (High)	**Betad-2**	**Betad-3**	**Betad-4 (Low)**
Ln(Me)-1 (Big)		0,0596	0,0593	0,0660	0,0634
Ln (Me)-2		0,0635	0,0610	0,0563	0,0644
Ln (Me)-3		0,0568	0,0647	0,0676	0,0601
Ln (Me)-4 (Small)		0,0824	0,0850	0,0957	0,0722

Cross-sectional regressions were applied to determine the explanatory power of firm size and other factors, over average common stock returns. The regression coefficients and the corresponding t-statistics for the regression, where BETA, Ln(Me), Ln(Be/Me) and Ln(P) are independent variables, are represented in Tabel 5. The regression coefficients for both the time period between July 1993 and June 2004 and subperiods are represented in Table 5.

The regression coefficients for Ln(Me) in all periods are negative, representing a negative relationship between firm size and average monthly returns of the common stocks. The corresponding t-statistics are statistically significant,

indicating that firm size has explanatory power over average monthly common stock returns. The t-statistics are 3.95, 2.64, and 3.33 for the July 1993-June 2004, July 1993-June 1998 and July 1998-June 2004 periods consecutively. These findings can be interpreted as; there is strong evidence supporting that firm size anomaly exists at ISE over the period between July 1993 and June 2004. These evidences are similar to those of Karan (Karan, 2003).

Table 5 – The Time Series Mean Values of the Regression Coefficients and Corresponding t-statistics (t-statistics represented in paranthesis)

	July 1993-June 2004	**July 1993-June 1998**	**July 1998-June 2004**
BETA	0,01659 *(2,46)*	0,01973 *(2,34)*	0,01282 *(1,17)*
Ln(Me)	-0,00839 *(-3,95)*	-0,00901 *(-2,64)*	-0,00766 *(-3,33)*
Ln(Be/Me)	0,01711 *(4,98)*	0,02155 *(3,90*)	0,01178 *(3,31)*
Ln(P)	0,02602 *(8,31)*	0,03250 *(6,36)*	0,01825 *(6,35)*

The t-statistics for BETA in Table 5 might be interpreted as BETA having less explanatory power over the mean monthly common stock returns, compared to other independent variables. For the sub-period between July 1998 and June 2004, the t-statistic is insignificant. At this point, it would be more useful to study the situation, where BETAF and BETAD are employed in the regression, instead of BETA.

The BE/ME ratio has positive and had a statistically significant relationship with average common stock returns, for all the periods analysed. The t-statistics are 4.98, 3.90, and 3.31 for the July 1993-June 2004, July 1993-June 1998 and July 1998-June 2004 periods consecutively. The t-statistics indicate that the explanatory power of BE/ME over common average common stock returns is stronger than the explanatory power of ME, which is consistent with the results of Fama and French (Fama and French, 1992, p. 427-465).

The P variable has a positive, strong relationship with the average common stock returns. P has the strongest explanatory power over the average common stock returns with t-statistics of 8.31, 6.36 and 6.35 for the July 1993-June 2004, July 1993-June 1998 and July 1998-June 2004 periods consecutively. These evidences are consistent with the findings of Karan (Karan, 2003), which indicate a high price anomaly at ISE. However Blume and Husic (1973), Edmister and Greene (1980), Dubofsky and French (1988), Goodman and Peavy (1986), Branch and Chang (1990) has presented evidence regarding a low price anomaly (Waelkens and Ward, 1997, p. 35-48).

To investigate the relationship between beta coefficients and average common stock returns further and to analyse the effect of employing beta coefficients, adjusted for autocorrelation, in the regressions along other independent variables; BETAF and

BETAD variables were employed in the regressions as independent variables separately, instead of BETA.

The regression results, exhibited in Table 6 and 7, are similar for the ME, BE/ME and P independent variables when BETAF and BETAD are employed in the regressions separately. All the variables have significant explanatory power over average monthly common stock returns. When BETAF is employed in the cross-sectional regression, the explanatory power of BETAF diminishes significantly. As in the regressions run, using BETA, the explanatory power of BETAF is insignificant for the July 1998-June 2004 sub-period. BETAF has significant explanatory power only for the whole period.

Table 6 – The Time Series Mean Values of the Regression Coefficients and Corresponding t-statistics (t-statistics represented in paranthesis)

	July 1993-June 2004	**July 1993-June 1998**	**July 1998-June 2004**
BETAF	0,01578 *(2,66)*	0,01775 *(1,96)*	0,01342 *(1,83)*
Ln(Me)	-0,00749 *(-3,57)*	-0,00748 *(-2,25)*	-0,00752 *(-3,16)*
Ln(Be/Me)	0,01902 *(5,31)*	0,02552 *(4,42)*	0,01123 (3,14)
Ln(P)	0,02769 *(8,49)*	0,03537 *(6,63)*	0,01847 *(6,45)*

When BETAD is employed in the cross-sectional regressions, the explanatory power of the coefficient is insignificant for the whole period and the sub-periods. This is important since BETAD paysg more attention to the autocorrelation problem, compared to BETA and BETAF. Recalling the descriptive statistics gathered from the portfolios, constructed earlier too, these results might be implying that, when the autocorrelation is taken into account, beta coefficient loses its explanatory power over the average monthly common stock returns, which is contradictory to the Capital Asset Pricing Model.

Table 7 – The Time Series Mean Values of the Regression Coefficients and Corresponding t-statistics (t-statistics represented in paranthesis)

	July 1993-June 2004	**July 1993-June 1998**	**July 1998-June 2004**
BETAD	0,00419 *(0,94)*	0,00366 *(0,56)*	0,00483 *(0,80)*
Ln(Me)	-0,00725 *(-3,39)*	-0,00757 *(-2,21)*	-0,00688 *(-2,97)*
Ln(Be/Me)	0,02142 *(5,59)*	0,02907 *(4,62)*	0,01223 *(3,53)*
Ln(P)	0,02679 *(8,47)*	0,03412 *(6,66)*	0,01800 *(6,15)*

Conclusion

In this study, the existence of size anomaly at ISE and the explanatory power of firm size, along with other factors, over the variation in common stock returns was studied by applying different methods, over July 1993 to June 2004 period.

Firstly, the descriptive statistics of the 10 portfolios, constructed based solely on firm size were analysed. The descriptive statistics showed that the average monthly return for the portfolio, containing the smallest firms is higher than the average monthly return of the portfolio, containing the biggest firms. However, it was observed that the change in average monthly returns do not show a steady pattern with the decrease in the firm size. The evidences for the sub-periods were similar, too. As a result it could be emphasized that; there is an obvious difference between the average monthly returns for the portfolios containing the smallest and the biggest firms. The research should be taken one step further by running cross-sectional regressions due to the unsteady pattern of the mean monthly returns.

The descriptive statistics also emphasized that the average BETA for the portfolio containing the biggest firms, is higher than the average monthly return of the portfolio, containing the smallest firms. The results were similar for the sub-periods. These findings are noteworthy because they were contradictory to Fama and French (Fama and French, 1992, p. 427-465) study, in which it was emphasized that; as the average firm size of the portfolios decreased, the average beta for the portfolios increased. A noteworthy point was that, as in the case of average monthly returns, the change in BETA do not show a steady pattern with the decrease in the firm size.

When the BETAF and BETAD coefficients were considered, an opposite pattern was observed for the relationship between firm size and beta coefficients. This situation might be attributed to the autocorrelation problem between the monthly market returns.

Secondly, to examine the relationship between firm size and average monthly returns independent of the effect of beta coefficient over average monthly common stock returns; 16 portfolios were constructed based on firm size and the 3 different beta coefficients, separately. When the corresponding descriptive statistics were considered, it could be observed that the portfolios including the smallest firms yield higher average monthly returns than the portfolios including the biggest firms. Also, it could be observed that is not possible to emphasize a steady relationship between mean monthly returns and BETA coefficients. This could be interpreted as; when there is a variation in BETA independent of firm size, there is not sufficient evidence of a relationship between mean monthly returns and BETA. Similar figures were obtained for the sub-periods.

The descriptive statistics showed a similar pattern when the portfolio construction method based on firm size and BETAF, and firm size and BETAD was applied.

Later, cross-sectional regressions were run to determine the explanatory power of firm size and other factors, over average common stock returns for both the time period between July 1993 and June 2004 and subperiods. Negative regression coefficients for Ln(Me) were observed in all periods, representing a negative relationship between firm size and average monthly returns of the common stocks. The corresponding t-statistics were statistically significant. These findings could be

interpreted as a strong evidence supporting that firm size anomaly exists at ISE over the period between July 1993 and June 2004.

The t-statistics for BETA were smaller compared to the t-statistics corresponding to the regression coefficients of the other independent variables. This could be indicating that BETA has less explanatory power over the mean monthly common stock returns, compared to other independent variables. For the sub-period between July 1998 and June 2004, the t-statistic was insignificant. As a result, it would be more useful to study the situation, where BETAF and BETAD are employed in the regression, instead of BETA.

The BE/ME ratio was positive and showed a statistically significant relationship with average common stock returns, for all the periods analysed. The explanatory power of BE/ME over common average common stock returns was stronger than the explanatory power of ME, which is consistent with the results of Fama and French (Fama and French, 1992, p. 427-465).

The P variable had a positive, strong relationship with the average common stock returns, too. P has the strongest explanatory power over the average common stock returns.

To investigate the relationship between beta coefficients and average common stock returns further and to analyse the effect of employing different beta coefficients in the regressions along other independent variables; BETAF and BETAD variables were employed as independent variables separately, instead of BETA.

The regression results were similar for the ME, BE/ME and P independent variables when BETAF and BETAD are employed in the regressions separately. All the variables had significant explanatory power over average monthly common stock returns. However, when BETAF was employed in the cross-sectional regression, the explanatory power of BETAF diminished significantly. BETAF had significant explanatory power only for the whole period.

When BETAD was employed in the cross-sectional regressions, the explanatory power of the coefficient was insignificant for the whole period and the sub-periods. Recalling the descriptive statistics gathered from the portfolios, constructed earlier, too; these results could be implying that, when the autocorrelation is taken into account, beta coefficient loses its explanatory power over the average monthly common stock returns, which is contradictory to the Capital Asset Pricing Model.

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