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Tests of the Fama and French Three Factor Model in Iran

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Abstract

Fama and French (1992) found that beta has little or no ability in explaining cross-sectional variation in stock returns, but those variables such as size and the book-to-market ratio do. Since the time of the original publication of the Fama and French findings, Controversy and intense debate has emerged in the academic literature over the empirical performance of beta and the CAPM. This paper compare CAPM versus Fama and French three factors model and investigates the explanatory power of market beta, firm size, and book-to-market ratio, regarding the cross-sectional expected stock returns in Tehran stock exchange. The results indicate that Fama and French three factor model has strong explanatory power than CAPM and the explanatory power of market beta is significantly improved and successfully captures the cross-sectional variation in expected stock returns for the full sample period.

Keywords: CAPM; size value; book-to-market value; 3FM; SMB; HML

1- Introduction

The way investors act upon a set of estimates in determining the best investment decisions facing different probabilities can determine how aggregate investors behave and how prices are set. By constructing general equilibrium models the relevant measure of risk can be uncovered and the relationship between expected return and risk for any asset can be

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determined. The main issues in asset pricing theory are the measurement of expected return and the calculation of risk that is embedded in the return.

For years, the typical way to model the risk/return relationship and to evaluate risk has been to apply the Capital Asset Pricing Model (CAPM). Miller (1999) states that CAPM not only expressed new and powerful insights into the nature of risk but also through its empirical investigation contributed to the development of finance and to major innovations in the field of econometrics. The CAPM is based on an assumed efficient market in which there are many investors, each having the same information and expectations with respect to stock. They are also risk averse, preferring higher returns and lower risk. [1]

Weaknesses in CAPM's predictions were documented during the 1980s, when researchers started to look at other factors than the beta of a stock, which is the systematic risk of CAPM that influenced stock prices1. Fama and French (1992) show that stock risks are multidimensional. They state that one dimension is proxy by size and the other by book-to-market equity. [2] Fama and French (1993) find that besides beta two additional factors - firm size and book-to-market ratio(BE/ME) play an important role in explaining the cross section of expected stock returns and overcoming the inability of the CAPM in explaining size effect, value effect, and other apparent anomalies. [3]

Fama and French (1995) analyze the common variation in returns by including government and corporate bonds in the time series regression, their findings have ever since been challenged as the subject of a series of papers. [4] Gutierrez (2001) fined that book-to-market equity and size effects exist in the cross section of bond returns and are correlated with risks. He found that book-to-market and size each measure at least two risks (one is related to credit risk). One risk is priced in stocks and is correlated more with book-to-market, and the other risk is priced in bonds and is correlated more with size. Further evidence of the segmentation of the stock and bond markets is found in the sub period results for the book-to-market and size effects. [5] Larson (2005) defines Growth and Value Stocks based on Fama and French three

1- See Banz (1981), Basu (1983), Rosenberg, Lakonishok, Shleifer and Vishny (1994), Davis, Fama and French (2000), Pastor and Stambaugh (2000), Liew and Vassalou (2000) and Daniel, Titman and Wei (2001)... [12,13,..,19].

factor model. He stated that it is difficult to determine why stocks react a certain way and how they are likely to react. It is for this reason that identifying the primary risk factor(s) causing values' superior performance is critical. It would simply give investors one more tool to use while attempting to reap greater returns with less overall uncertainty. [6] Chung , Herb, Schill (2004) show that adding a set of systematic comments (but not standard moments) of order 3 through 10 reduces the explanatory power of the Fama-French factors to insignificance in almost every case. Their results suggest that the Fama-French factors proxy for higherorder co-moments, as the F-F loadings generally become insignificant when higher-order systematic co-moments are included in cross-sectional regressions for portfolio returns. Thus, they find evidence for a model of the sort given in Rubinstein (1973), i.e., measuring risk requires more than just measuring covariance. [7].

The evidence of Iranian capital market shows that beta size and BE/ME factors have significant relationship to the expected return. Rahmani and Ahmadpour (2005) find the relationship between expected stock returns and conditional beta, firm size, and BE/ME for Tehran Stock Exchange (TSE) (2002-2005).they show that Three Factors Model (3FM) explain the expected return better than CAPM (single model). Taromi (2005) present relationships between expected stock returns and conditional beta, firm size, and BE/ME. [8] Taromi (2005) also finds an inverse relationship between returns and BE/ME ratio. [9] Karimi (2006) show that in short-term 3FM explain the expected return better than CAPM in the TSE (2001-2005). [10] Bagher zadeh (2002) states that bate and size can explain the expected return, he also fined inverse relationship between returns and BE/ME ratio. [11]

We have little knowledge about the role of market beta, firm size and book-to-market ratio on the cross-section stock returns in Iran. Previous studies presented diverse empirical results in the short period of time while 3FM needs more time and further empirical verification before it can be accepted as a credible (and ideally) theory-based model to replace the CAPM. So the author decides to use more period of time and sample of firms.

The main purpose of this paper is to investigate the explanatory power of market beta, firm size, and book-to-market ratio (the comparison of the CAPM versus 3FM) on the cross-section of expected stock returns by using sample of firms listed on TSE (Tehran Stock Exchange, 1999-2009). This

study also attempts to take into account whether 3FM is applicable in TSE with not only the beta factor but also the factors such as BE/ME, size and minimize the gap between theoretical and empirical studies in Iran.

3- Data and Methodology:

3-1-Hypothesis:

hree major propositions are tested:

First, whether the CAPM model explains the cross section of TSE expected stock returns for the period 1999-2009.

Second, the 3FM explains the variation of expected stock returns in the TSE better than the CAPM pricing model during the period 1999-2009.

Third, the explanatory power of size1 is stronger than BE/ME2 factor.

3-2- Data description:

3-2-1) Sample size:

The sample covers all industrial firms listed on TSX over the period 1999-2009. The empirical analysis of this paper uses monthly market information and annual accounting data (such as market capitalization and also used book value of stock). Thus, the dataset used consists of monthly stock returns and month Treasury bill rates of returns as a proxy for risk-free rates of returns. Monthly stock returns and the accounting data are obtained from the Pars Portfolio Software. The final sample consists of 111 observations for each portfolio.

3-2-1-Sample period:

Ten years period (1999-2009) is considered for this study, however, the sample size is not same for every year but rather the sample size increases every year.

1- Our purpose of size equals' market capitalization.

2- Book-to-Market define as shareholder equity divided by market capitalization both as March of each year.

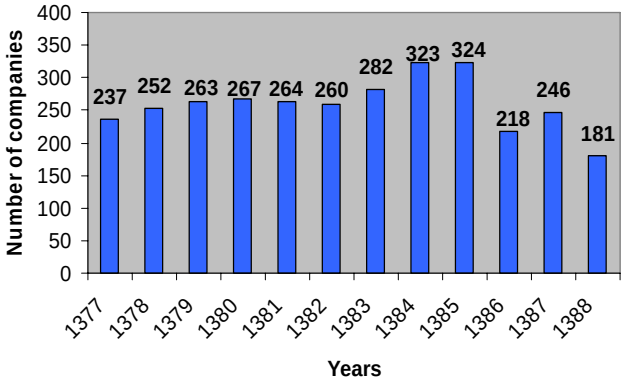

Figure 1: Number of companies

3-3- Fama and French three factor model:

Fama and French form size and BE/ME portfolios to capture the cross sectional variation in average stock returns. To present the appropriate of each factor in this Model, it was used Standard Multivariate Regression Framework and Eviews statistical software. [3] So because of using this model we must form six portfolios.

3-3-1- Portfolio formation:

At the end of calendar year from 1999 to 2009, companies are selected to be included in the study. To be included, the company must have a price recorded at the end of the year publically available accounting data as of march of the same year. The selected companies are ranked by size (market capitalization as of march) and sorted into two groups with median size of the market. So All companies were divided into 2 groups; companies have market value more than cutting point are big company (B) while companies have market value less than cutting point are small company (S).

The companies are also ranked by BE/ME than the stocks are divided to 3 groups according to BE/ME ratio. First group, 30 percentage of whole stock has BE/ME highest (called High: H group) second group, 40 percentage of whole stock has BE/ME in medium (Medium: M group) and

the last group, 30 percentage of whole stock has BE/ME lowest (called Low: L group). According to the BE/ME ranking. Group 1 is made up of companies with the highest Book-to-Market while group 3 is made of companies with the lowest Book-to-Market.

Third step organize stock to be 6 groups according to cross of stock group that invent in first and second step is S/L, S/M, S/H, B/L, B/M, B/H for example group S/L consist of the stock that exist in small group has BE/ME at the lowest or B/H group consist of stock that exist in large (Big) stock group has BE/ME highest, etc (Table 1).

Fama and French (1993) construct a three-factor asset pricing model for stocks that includes the conventional market (beta) factor and two additional risk factors related to size (SMB) and book to market equity (HML). They extend the study by using a time-series regression approach. So we use the following regression model: [3]

$$RP(t)-Rf(t)=a+b\,[Rm(t)-Rf(t)]+sSMB(t)+hHML(t)+e(t) \qquad (1)$$

Where RP (t) is the monthly return at period t, Rm (t) is the monthly market Return at period t, Rf (t) is the monthly Treasury bill rate; e (t) is an error Term.

SMB (Small minus Big) represent the risk factor diverge of rate return which involve with size effect, SMB will different in each month among average return rate of small sample group (S/L, S/M and S/H) with the average return rate of 3 large groups (B/L, B/M, B/H).

SMB = Small minus Big = Average Returns of Small Size minus Average Returns of Big Size

$$= 1/3\,(S/H + S/M + S/L) - 1/3\,(B/H + B/M + B/L) \qquad (2)$$

HML (High minus Low) represent the risk factor of return rate that involve with ratio Book to Market Value Effect. HML each month had differ between average return rate of 2 portfolios that has BE/ME high (S/H and B/H) with average return rate of 2 portfolios has BE/ME low (S/L and B/L)

HML = High minus Low = Average Returns of High BE/ME Ratio minus Average Returns of Low BE/ME ratio

$$= 1/2\,(S/H + B/H) - 1/2\,(S/L + B/L) \qquad (3)$$

Time-series regression approach of Fama and French (I) can be used to estimate and test the CAPM pricing model by imposing the restriction s=h=0. The case when the model contains only the market factor as an explanatory variable. So we can test CAPM versus 3FM. [5]

4- Empirical studies:

4-1- Summary Descriptive Statistics

Descriptive statistics of the test variables are presented in Table 1. Table 1 shows mean, median, max, min standard deviation of the test variables.

Results show that the mean and median of the S/L, S/M, S/H and B/L portfolio are positive and higher that 3.26 but the mean and median of the B/M and B/H portfolio are negative. The evidence also shows that risk premium of the size, BE/ME and market factor are positive and higher than 0.96. Furthermore table 1 present that size factor has higher premium and market factor has lowest than the others.

4-2- CAPM vs. Fama and French

First, we check whether the CAPM model explains the cross section of TSE stock returns for the period 1999-2009. In order to test of CAPM model we estimate the regression model (1) for the six portfolios by imposing h= s =0. Table 3 presents the results of the six portfolios regressions using all the stocks. The t-tests show that the coefficients of the risk factors (Beta) are statistically significant at the 5% level of significance in the portfolios of S/M, S/H, S/L, B/M and B/L. Only for B/H portfolio the Beta factor is significant at the 10% level of significance, this result suggests that the difference in returns between six portfolios is attributed to changes in risk as measured by the CAPM betas. The value of the intercept coefficient all of six portfolios indicate that there is direct relationship between stock return and beta. The above result is consistent with previous studies (Rahmani, Ahmadpour, 2005), in which they find that positive risk-return relationship. Table 3 presents that risk-return relationship of B/H, B/L, B/M, and B/H portfolios are weaker than the result of previous studies. [8] However, we should note that the sample period of the previous studies was short (2002-2005). Table 3 also shows that CAPM model produces an adjusted R2 ranging between 41% and 57%. So the results confirm our first propositions

(whether the CAPM model explains the cross section of TSE expected stock returns for the period 1999-2009).

Second we test whether the Fama and French (1993) three-factor model can explains the cross section of TSE expected stock returns for the period 1999-2009 better than CAPM.

Table 4 shows the results of Fama and French three factor model (the six portfolios regressions using all the stocks). According to the table 4, the coefficients of the Beta are statistically significant at the 5% level of significance in all portfolios. But for the B/L and S/M portfolios the HML and for the B/L and B/M portfolios the SMB are not statistically significant. The intercept coefficient of the SMB factor is positive and significant for the S/H, S/L and S/M portfolios. Furthermore, Fama and French three factor model produce an adjusted R2 ranging between 52% and 76%.

The results show in spite of beta power in explaining the variation of stock returns, the added variable promotes the R2 and the adjusted ted R2 of the three-factor model is higher than those of the CAPM. Table 5 and figure 2 show that the adjusted R2 of two model (CAPM and three factor model). For the hedge portfolio(S/H) the adjusted R2 increases from 0.54 to 0.76 (Table 5). The above results suggest that the three-factor model captures the common variation in stock returns better than CAPM model. So, consistent with our second proposition, the Fama and French model clearly outperforms the CAPM model.

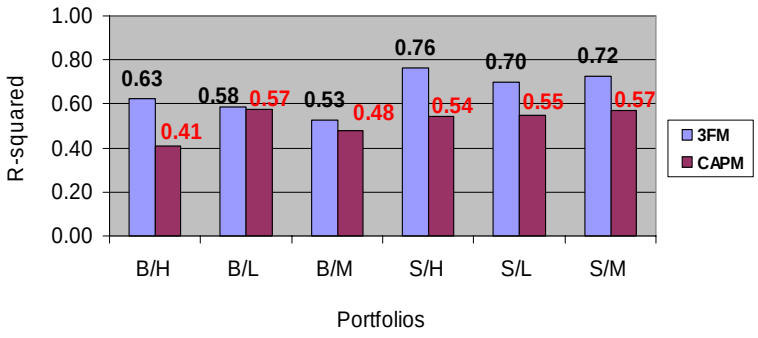

Figure 2: CAMP vs Fama and French Model: R- Squared

4-3- SMB (size) and HML (BE/ME)

Tables 6 and 7 present the result of testing explanatory power of two variables SMB (size) and HML (BE/ME). In order to test which of the above two variables is more powerful in explaining the variation of expected returns we use the regression model (1) for all of the six portfolios (S/L, S/M, S/H, B/L, B/M, and B/H) first by imposing h=0 and then by imposing s=0.

Results in Tables 6 and 7 indicate that the R2 increases more by adding the factor SMB when the testing observation consist of B/L , S/H , S/L, S/M portfolio (figure 3). On the other hand, the R2 increases with the addition of HML when the testing portfolios consist of B/H and B/M. However, we should note that the coefficients of the HML for the B/L, S/L and the coefficients of the SMB for the B/L, B/M are not statistically significant. Furthermore ,The intercept coefficient of the SMB factor (for the B/H,B/M) and The intercept coefficient of the HML factor(for the S/L,B/M) is negative .

Figure 3: HML vs MSB: R- Squared

In summary, results show that the market factor clearly has the most explanatory power in explaining the variation of stock returns. Moreover, the explanatory power of the size factor (SMB) dominates the explanatory power of the BE/ME factor (HML) when the testing portfolios consist of B/L, S/H, S/L, S/M portfolios. The opposite occurs when the testing portfolios consist of big stock (B/H and B/M).

5- Conclusion

Recent studies suggest that the size and book-to-market effects can explain expected return. The objective of this paper was to investigate the effect of book-to-market and size in explaining variation in stock returns. Furthermore, this paper investigates the Whether the three factor model explains the variation of stock return better than CAPM and to tests which of the above two variables(SMB &HML) is more powerful in explaining the variation of expected returns of Iranian expected stock returns for the period 1999-2009.

In general, our results confirmed the first proposition and the second but the third proposition was partially supported. Using the Fama and French three factor regression model capture much of the cross section of average stock returns in the Iranian expected stock returns during the period 1999-2009 better than CAPM. The market factor clearly has the most explanatory power in explaining the variation of stock returns than the two others factors (SMB & HML).

The explanatory power of the size factor (SMB) dominates the explanatory power of the BE/ME factor (HML) when the testing portfolios consist of B/L, S/H, S/L, S/M portfolio. The opposite occurs when the testing portfolios consist of B/H and B/M. However, the market factor cannot be replaced by either size or BE/ME factor. The best model that explains the variation of stock returns is the three factors model.

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Ratio / Size	High(H)	Medium(M)	Low(L)
Big(B)	B/H	B/M	B/L
Small(S)	S/H	S/M	S/L

Table1: The six portfolios based on Fama and French three factors model(S/L, S/M, S/H, B/L, B/M, B/H for example group S/L consist of the stock that exist in small group has BE/ME at the lowest or B/H group consist of stock that exist in large (Big) stock group has BE/ME highest, etc)

	Rm-Rf	HML	SMB	B/H-Rf	B/M-Rf	B/L-Rf	S/H-Rf	S/M-Rf	S/L-Rf
MEAN	0.96	1.77	8.07	-2.23	-2.65	3.26	5.80	4.83	4.37
MEDIAN	1.24	2.37	7.58	-1.42	-1.42	1.12	4.76	3.38	4.01
MAX	11.93	24.41	25.75	29.81	24.49	40.79	28.89	24.97	20.92
MIN	-12.16	-19.12	-8.29	-29.72	-31.82	-23.81	-9.41	-10.42	-8.97
ST. DEV	4.46	6.76	6.15	6.46	5.92	8.71	8.09	7.23	6.61
Skewness	-0.34	-0.04	0.05	0.03	-1.32	0.36	0.60	0.62	0.17
Kurtosis	3.31	3.94	2.83	11.96	15.61	5.73	2.93	3.07	2.29
observations	111	111	111	111	111	111	111	111	111

Table2: Excess Returns on the Six Size-BE/ME Portfolios Regressed on Rm-Rf, SMB and HML. Descriptive Statistics for the Dependent and Explanatory Returns: April 1999 to May 2009, 111 Monthly Observations. The portfolios (S/L, S/M, S/H, B/L, B/M, and B/H) are formed according to Fama and French framework (table 1) and monthly returns are calculated from April to the following March.

The dependent variables are the returns on the size-BE/ME portfolios minus the Treasury bill rates (Rf) of Iranian market. SMB is the difference, each month, between the average of the returns on the three small-stock portfolios (S/L, S/M, and S/H) and the average of the returns on the three big-stock portfolios (B/L, B/M, and B/H). HML is the difference between the average of the returns on the two high-BE/ME portfolios (S/H and B/H) and the average of the returns on the two low-BE/ME portfolios (S/L and B/L).

Independent variable	**dependent variable**	**C** **t-Statistic** **Prob.**	**B** **t-Statistic** **Prob.**	**AR(1)** **t-Statistic** **Prob.**	**R-squared** **Adjusted R** **Durbin-Watson**
B	B/H-Rf	-2.945485 -3.290513 0.0013	0.181809 1.761776 0.0807	0.543446 8.256487 0.000	0.41106 0.401162 1.844767
B	B/L-Rf	1.358298 0.856998 0.3932	0.754478 5.146962 0.000	0.659918 9.529686 0.000	0.574878 0.567733 2.139922
B	B/M-Rf	-2.936508 -2.777709 0.0064	0.254553 2.353758 0.0202	0.629266 8.795087 0.000	0.479123 0.470369 1.737055
B	S/H-Rf	4.796425 4.338375 0.000	0.701345 5.965971 0.000	0.560509 7.522361 0.000	0.543653 0.535983 1.988654
B	S/L-Rf	3.80349 3.777977 0.0002	0.541066 5.138424 0.000	0.5951 7.906461 0.000	0.545791 0.538158 1.990039
B	S/M-Rf	4.174252 4.884665 0.000	0.900012 7.546195 0.000	0.487091 6.078552 0.000	0.568384 0.561129 2.030148

Table 3: Excess Returns on the Six Size-BE/ME Portfolios Regressed on Rm-Rf. Summary Statistics for the Dependent and Explanatory Returns: April 1999 to May 2009, 111 Monthly Observations. The portfolios (S/L, S/M, S/H, B/L, B/M, and B/H) are formed according to Fama and French framework (table 1) and monthly returns are calculated from April to the following March.

The dependent variables are the returns on the size-BE/ME portfolios minus the Treasury bill rates (Rf) of Iranian market.

Independent variable	dependent variable	C t-Statistic Prob.	B t-Statistic Prob.	HML t-Statistic Prob.	SMB t-Statistic Prob.	AR(1) t-Statistic Prob.	AR(2) t-Statistic Prob.	R-squared Adjusted R Durbin-Watson
B- HML-SMB	B/H-Rf	-1.3272 -1.6965 0.0925	0.513281 5.869086 0.000	0.586593 8.521178 0.000	-0.31033 -5.40371 0.000	0.682697 -1.88609 0.0618	-0.16822 7.368964 0.000	0.625486 0.609203 1.914303
B- HML-SMB	B/L-Rf	-0.57371 -0.30278 0.7626	0.763044 2.029501 0.0447	-0.08865 -0.3842 0.7015	0.236619 1.249607 0.2139	0.63287 8.72793 0.000	0 0 0	0.58387 0.569643 2.088684
B- HML-SMB	B/M-Rf	-2.40455 -2.50335 0.0137	0.26706 2.580912 0.0111	-0.16018 -2.1669 0.0323	-0.03972 -0.62034 0.5363	0.744839 8.108955 0	-0.20005 -2.19085 0.0305	0.528865 0.508381 1.921109
B- HML-SMB	S/H-Rf	-0.17943 -0.21172 0.8327	0.845923 9.286168 0.000	0.2137 3.246447 0.0015	0.569087 7.60083 0.000	0.441148 5.242101 0.000	0 0 0	0.764522 0.756471 2.060367
B- HML-SMB	S/L-Rf	-0.3592 -0.47542 0.6354	0.476288 5.196307 0.000	-0.35468 -5.57323 0.000	0.584414 8.162104 0.000	0.382422 4.530762 0.000	0 0 0	0.699838 0.689576 1.958733
B- HML-SMB	S/M-Rf	-0.14297 -0.18696 0.852	0.853627 8.184882 0.000	-0.0151 -0.22216 0.8246	0.531931 7.316818 0.000	0.351196 3.915656 0.0002	0 0 0	0.72495 0.715547 2.054857

Table 4: Excess Returns on the Six Size-BE/ME Portfolios Regressed on Rm-Rf, SMB and HML. Summary Statistics for the Dependent and Explanatory Returns: April 1999 to May 2009, 111 Monthly Observations. The portfolios (S/L, S/M, S/H, B/L, B/M, and B/H) are formed according to Fama and French framework (table 1) and monthly returns are calculated from April to the following March.

The dependent variables are the returns on the size-BE/ME portfolios minus the Treasury bill rates (Rf) of Iranian market. SMB is the difference, each month, between the average of the returns on the three small-stock portfolios (S/L, S/M, and S/H) and the average of the returns on the three big-stock portfolios (B/L, B/M, and B/H). HML is the difference between the average of the returns on the two high-BE/ME portfolios (S/H and B/H) and the average of the returns on the two low-BE/ME portfolios (S/L and B/L).

Table 5: Adjusted R-squared of the CAPN and 3FM

Dependent variable	R-squared Adjusted R-squared		
	3FM	**CAPM**	**3FM minus CAPM**
B/H-Rf	0.63 0.61	0.41 0.40	0.21 0.21
B/L-Rf	0.58 0.57	0.57 0.57	0.01 0.00
B/M-Rf	0.53 0.51	0.48 0.47	0.05 0.04
S/H-Rf	0.76 0.76	0.54 0.54	0.22 0.22
S/L-Rf	0.70 0.69	0.55 0.54	0.15 0.15
S/M-Rf	0.72 0.72	0.57 0.56	0.16 0.15

Independent variable	dependent Variable	C t-Statistic Prob.	B t-Statistic Prob.	HML t-Statistic Prob.	SMB t-Statistic Prob.	AR(1) t-Statistic Prob.	AR(2) t-Statistic Prob.	R-squared Adjusted R Durbin-Watson
B-SMB	B/H-Rf	-1.52576 -1.71855 0.0883	0.3709 3.615888 0.0004	0 0 0	-0.13194 -1.98764 0.0491	0.628487 9.151036 0.000	0 0 0	0.445853 0.431883 1.842271
B-SMB	B/L-Rf	-0.40039 -0.22088 0.8256	0.894786 5.346111 0.000	0 0 0	0.179713 1.592747 0.1139	0.630426 8.737312 0.000	0 0 0	0.583345 0.572752 2.078425
B-SMB	B/M-Rf	-2.16767 -1.91633 0.0577	0.304467 2.730605 0.0073	0 0 0	-0.09788 -1.46755 0.1449	0.609976 8.294891 0.000	0 0 0	0.488235 0.475224 1.743654
B-SMB	S/H-Rf	-0.5949 -0.66825 0.5053	0.749475 8.354206 0.000	0 0 0	0.664951 9.416006 0.000	0.466751 5.934609 0.000	0 0 0	0.743538 0.737018 2.117985
B-SMB	S/L-Rf	0.983533 1.047029 0.2972	0.589583 6.076565 0.000	0 0 0	0.342321 5.064553 0.000	0.509869 6.215885 0.000	0 0 0	0.62556 0.616041 1.976387
B-SMB	S/M-Rf	-0.10331 -0.13832 0.8902	0.862026 9.049576 0.000	0 0 0	0.5235 8.293318 0.000	0.352549 3.976216 0.0001	0 0 0	0.724834 0.717838 2.058408

Table 6: Excess Returns on the Six Size-BE/ME Portfolios Regressed on Rm-Rf and SMB. Summary Statistics for the Dependent and Explanatory Returns: April 1999 to May 2009, 111 Monthly Observations. The portfolios (S/L, S/M, S/H, B/L, B/M, and B/H) are formed according to Fama and French framework (table 1) and monthly returns are calculated from April to the following March.

The dependent variables are the returns on the size-BE/ME portfolios minus the Treasury bill rates (Rf) of Iranian market. SMB is the difference, each month, between the average of the returns on the three small-stock portfolios (S/L, S/M, and S/H) and the average of the returns on the three big-stock portfolios (B/L, B/M, and B/H).

Independent variable	dependent variable	C t-Statistic Prob.	B t-Statistic Prob.	HML t-Statistic Prob.	SMB t-Statistic Prob.	AR(1) t-Statistic Prob.	AR(2) t-Statistic Prob.	R-squared Adjusted R Durbin-Watson
B-HML	B/H-Rf	-3.61914 -4.28542 0.000	0.345162 3.647586 0.0004	0.40227 5.985707 0.000	0 0 0	0.571522 8.214614 0.000	0 0 0	0.548111 0.536622 1.826537
B-HML	B/L-Rf	0.749921 0.465872 0.6422	1.032775 3.380912 0.001	0.139588 1.007352 0.3158	0 0 0	0.640353 9.000635 0.000	0 0 0	0.578248 0.567525 2.091496
B-HML	B/M-Rf	-2.69515 -2.61763 0.010	0.240735 2.287051 0.024	-0.19566 -2.69878 0.008	0 0 0	0.627477 8.780173 0.000	0 0 0	0.509649 0.497182 1.755012
B-HML	S/H-Rf	4.10535 4.620714 0.000	0.904862 8.145187 0.000	0.417059 5.713796 0.000	0 0 0	0.509061 6.277633 0.000	0 0 0	0.642585 0.633498 1.978967
B-HML	S/L-Rf	3.896488 3.89152 0.0002	0.516304 4.70569 0.000	-0.05636 -0.91231 0.3635	0 0 0	0.590382 7.77859 0.000	0 0 0	0.54896 0.537493 1.999405
B-HML	S/M-Rf	3.74333 4.551279 0.000	1.028861 8.536226 0.000	0.232423 3.359039 0.0011	0 0 0	0.481351 6.229274 0.000	0 0 0	0.606663 0.596663 2.019841

Table 7: Excess Returns on the Six Size-BE/ME Portfolios Regressed on Rm-Rf and HML. Summary Statistics for the Dependent and Explanatory Returns: April 1999 to May 2009, 111 Monthly Observations. The portfolios (S/L, S/M, S/H, B/L, B/M, and B/H) are formed according to Fama and French framework (table 1) and monthly returns are calculated from April to the following March.

The dependent variables are the returns on the size-BE/ME portfolios minus the Treasury bill rates (Rf) of Iranian market. HML is the difference between the average of the returns on the two high-BE/ME portfolios (S/H and B/H) and the average of the returns on the two low-BE/ME portfolios (S/L and B/L).