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Application of Fama and French Three Factor Model and Its Variants : An Empirical Study on Indian Stock Market

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ABSTRACT

Fama and French (1993) elaborated the use of firm specific characteristics in explaining the return behavior of different types of portfolios. He extended the CAPM model and described that only market factor cannot describe the return behavior of the stocks in a significant manner but a blend of market factor with the size and book to market ratio jointly have more power to explain the behavior of stock returns. It can be ascertained from the findings of the study that in Indian capital market, instead of considering the market risk and firm specific characteristics (SMB and HML) individually to explain the return behavior of the stock prices, a combination of all these three factors have more predictability power to express the stock return behavior.

Keywords : *CAPM, Fama and French Three Factor Model,, SMB, HML, R^2.*

INTRODUCTION

Fama and French (1993) elaborated the use of firm specific characteristics in explaining the return behavior of different types of portfolios. He extended the CAPM model and described that only market factor cannot describe the return behavior of the stocks in a significant manner but a blend of market factor with the size and book to market ratio jointly have more power to explain the behavior of stock returns. The Fama-French Three Factor Model is used to predict the risk and returns of equity portfolios. It is a model that compares a portfolio to three distinctive types of risk found in the equity market to assist in categorizing returns. Prior to the three-factor model, the Capital Asset Pricing Model (CAPM) was used as a "Single Factor" way to explain portfolio returns. However, several shortcomings of the CAPM model exist and incorrectly predicting results compared to realize returns and the effect of other risk factors have put this model under criticism. The assumption of a single risk factor limits the usefulness of this model.

In June 1992, Eugene F. Fama and Kenneth R. French published a paper that found that on average, a portfolio's beta only explains about 70% of its actual returns and other 30% is explained by other factors not related to beta. Beta, the measure of market exposure of a given stock or portfolio, which was previously thought to be the end-all measurement of stock risk/return, is of only limited use. Fama-French showed that this parameter did not predict the returns of all equity portfolios, although it is still useful in predicting the return of stock/bond and stock/cash mixes. The return of any stock portfolio can be explained almost entirely by two factors: Market cap ("size") and book/market ratio ("value"). The smaller and the median market cap of your portfolio, the higher its expected return.

The present study is destined to empirically test the three factor model suggested by Fama and French on Indian stock market and to document the evidences that how firm characteristics are used as a better explanation of stock return behavior.

Review of Literature

Fama and French (1992) provided a strong support to the relationship between size and B/M ratio and stock returns. In their univariate and multivariate tests they found a significant positive relationship between B/M value and stock returns and a negative relation between size and stock returns. They studied the joint effect of beta, size, E/P ratio, and leverage and B/M ratio on the cross-sectional stock returns. Their results showed that both size and B/M ratios were significant when included together, and they dominated other variables. In their study leverage and P/E ratio were significant by themselves or when considered with size, but they became insignificant when both size and B/M ratio were considered. The strong size effect has also been documented in the succeeding works of Fama and French. Lakonishok, Schleifer and Vishny (1994) defined value strategies as buying shares with low prices compared to some indicator of fundamental values such as earnings, book value, dividend and cash flow. Glamour stocks grew faster for the first couple of years but after that the growth rates of the two groups were essentially the same. Value strategies using both past low growth and low current multiplies outperformed glamour strategies by an impressive 10-11% per year. Among the various measures of fundamental values, P/E did not produce as large an effect as price-to-book value or price-to-cash flow, possibly because stocks with temporarily depressed earnings were lumped together with well performing glamour stocks in the high expected growth/low E/P category. They found little support

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to the view that value strategies were fundamentally riskier. Value stocks outperformed glamour stocks quite consistently and did particularly well in 'bad' state of the world.

Fama and French (1995) studied the behavior of stock prices, in relation to the size and book-to-market-equity (BE/ME) of companies listed New York Stock Exchange, American stock exchange and NASDEQ for the period from 1963 to 1992. They found, consistent with rational pricing, high BE/ME (a low stock price relative to book value) indicated persistent poor earnings and low BE/ME (a high stock price relative to book value) indicated strong earnings. Within book-to-market groups, small stocks tended to be less profitable than big stocks. Berk (1995) argued that the market value of a firm was inherently negatively related with its common stock return and Berk (1996) reported that size effect disappeared when some non market based size measure was used. He used five different measures of firm size viz market capitalization (MC), book value of total assets (BVA), book value of un-depreciated properly, plant and equipment (PPE), annual sales value (sales) and number of employees in order to check the existence of size effect.

Fama and French (1996) studied the value and growth stocks in markets around world for the period 1975-1995. During the study period the difference between average returns on global portfolios of high and low book-to-market stocks was 7.60% per year and value stocks outperformed growth stocks in 12 of 13 major markets. There were similar value premiums when stocks were sorted on earnings/price, cash flow/price, and dividend/price and found a value premium in emerging markets. Since these results were out-of-sample relative to earlier tests on U.S. data, they suggested that the return premium for value stocks was real. An international CAPM was not able to explain the value premium, but a two factor model that included a risk. Kim (1997) examined the explanatory power of beta, firm size, book-to-market equity and the earning price ratio during the period July 1958 to December 1993. The study found stronger support for the betas pricing theory and concluded market betas had economically and statistically significant force regardless of the presence and absence of the firm size, book-to-market equity and earning-price ratio. But unlike the firm size and earning price, book to market had significant explanatory power to average stock returns. In particular, firm size was barely significant using monthly returns, but no longer significant using quarterly returns. However, book-to-market equity still had significant explanatory power for average stock returns. Daniel and Titman (1997) confronted that firm characteristics rather than factor loadings on the SMB and HML portfolios determine expected returns. Within portfolios formed on size, there was basically no relation between returns and loadings on the SMB factor. This suggested that expected stock returns were related to their characteristics for reasons that might have nothing to do with the covariance structure of returns and constituted evidence against a financial distress interpretation of the SMB factor.

Connor and Sehgal (2001) examined the Fama-French three-factor model of stock returns for India using a sample of 364 companies from June 1989 to March 1999. They analyzed whether the market, size and value factors were pervasive in the cross-section of random stock returns and investigated whether there were market, size and value factors in corporate earnings similar to those in returns, and whether the common risk factors in earnings translated in to common risk factor in returns. They found evidence for pervasive market; size and book-to-market factors in Indian stock returns and found cross-sectional mean returns were explained by exposure to these three factors and not by the market factor alone. They found mixed evidences for parallel market, size and book-to-market factors in earnings and did not find any reliable link between the common risk factors in earnings and those in stock returns. As a whole the empirical results were reasonably consistent with the Fama-French Three-Factor model. Pandey (2001) studied panel data set of 1729 observations to identify variables that could explain expected returns of Malaysian stocks. The study was based on the fixed effects regression model as it performed better than the random effect model and OLS models without the firm effects. Results of the fixed-effect univariate regression indicated that beta, size, book-to-market value (B/M) ratio, earning-price (E/P) ratio and dividend yield individually played significant role in explaining stock returns and payout and leverage had no effect. The explanatory power of size (natural log of market capitalization) was the highest. Beta was found to have consistently a positive relation with stock returns by itself and other variables. But this explanatory power was less than size and other variables. Contrary to the results of Fama and French (1992) B/M ratio was not persistently a significant variable; it's significant disappeared when they incorporated size and E/P ratio in regression.

Drew, Naughton and Veeraraghavan (2003) studied firm size, book-to-market equity and security returns on Shanghai Stock Exchange (China) and tested multifactor approach to asset pricing in one of the most challenging international market, the Shanghai Stock Exchange, China for the period December, 1993 to December, 2000 by making various type portfolios. The study concluded that mean-variance efficient investors in china was able to select some combinations of small and low book-to-market equity firms in addition to the market portfolio to generate superior risk-adjusted returns. Moreover they found no evidence to support the view that seasonal effects could explain the findings of the multifactor model. In summary, the study found the market factors alone was not sufficient to describe the cross-section of average stock returns in China. Gaunt (2004) studied the evidences of size effect, BE/ME effect and the application of the Fama and French factor model in the Australian market. He found that beta was less than one which was contrary to Fama and French who found beta to be close to one. Risk inclined to be greater for smaller size firms and low BE/ME ratios like the findings of Fama and French. There were evidences that there was a monotonic increase in the HML factor loading from low to high BE/ME portfolios implying that the HML factor played a significant role in asset pricing. The author found an inconsequential small firm effect and no large firm effect. He found an improvement in the explanatory power of the three factor model over and above the one factor CAPM when compared

to prior studies in the Australian setting. Vassalou and Xing (2004) investigated the relation between the size and book-to-market effects and default risk, defined as the risk that a firm failed to service its debt obligations. The authors estimated the default likelihood for up to 4,200 U.S. firms over the period 1971-1999 on the basis of contingent claims theory. The study showed that while the SMB and HML factors contain some default-related information, default risk could not account for the explanatory power of the Fama-French three-factor model. Nartea and Djajadikerta (2005) found a significant size effect and a weak BE/ME effect in the case of New Zealand. According to them, the three factor model's explanatory power was not as big an improvement over the CAPM as was for the Australian case. Sehgal and Triphati (2005) examined the size effect in the Indian stock market using data of top 482 Indian companies for the period of 1990-2003. They found a strong size premium using six alternative measures of company viz. - Market capitalization, Enterprise value, Net Fixed Assets, Net Annual Sales, Total assets and net working capital. Further the size based investment strategy seemed to be economically feasible as it provided extra normal returns on risk adjusted basis. Frequent rebalancing of size based portfolio was however fount to be undesirable. The size effect did not seem to be owing to any seasonality or business cycle factors. The presence of a strong size premium also raised doubts the informational efficiency of Indian Stock market. The authors found strong size effect over the study period which had become more pronounced during recent time period.

Bhel (2006) studied the Fama and French three-factor model of stock returns along with its variants, including the one-factor CAPM for 79 stocks listed on the BSE-100 stock market index for India from July 2001 to June 2006. These sample stocks were split in to six portfolios sorted on size and book-to-market equity ratio. The factor portfolios that explained the returns were the market factor, size factor (SMB) and value factor (HML). The author found strong evidences for the market factor in all the portfolios, it being regarded with had the highest explanatory power. The SMB and HML factors could not be clearly ranked in this regard. On the basis of the adjusted R^2 it was confirmed that the three-factor model captured better the common variations in the stock returns than the CAPM. It was found that the three-factor model of Fama-French fairs better in explaining the cross-section of returns in the portfolios than its variants and the CAPM.

Data Inputs and Research Methodology

The present study has considered companies listed under the BSE-500 index series for all the empirical tests to study the impact of firm specific characteristics in explaining the cross-sectional stock return behavior. The Monthly observations have been considered for the individual stock prices as well as various parameters related to company specific. As the base year of BSE-500 index was February 1999, so the study under consideration has taken data from Feb 1999 to December 2007. Further, the companies were first shortlisted in consideration with the availability of the data for a regular period of the sampled duration. The companies listed under the head 'Finance Related' was excluded as these companies may differ from the other companies in terms of their market cap and other financial parameters. A few companies were further eliminated due to non availability of data related to one or more parameters (BM or Size). So the final sample consisted of a total of 219 companies having consistent availability of monthly data for their prices, BP ratio, & size factors.

All the portfolios are constructed and revised on first trading day of July. All the data required for the study under consideration have been obtained from *PROWESS* database provided by CMIE, Mumbai.

The three-factor model:

To represent the market cap ("size") and book/market ratio ("value") returns, Fama and French modified the original CAPM with two additional risk factors: Size risk and Value risk.

The original CAPM equation:

$$E(R_i) = R_f + \beta_i (E(R_m) - R_f))$$

Where R_f is the risk free rate and $E(R_m)$ is the expected excess return of the market portfolio beyond the risk-free rate, often called the equity risk premium. The Fama and French equation:

$$E(R_i) = R_f + \beta_i (E(R_m) - R_f) + s_i\, SMB + h_i\, HML$$

Where SMB is the "Small Minus Big" market capitalization risk factor and HML is the "High Minus Low" value premium risk factor.

SMB, Small Minus Big, measures the additional return investors have historically received by investing in stocks of companies with relatively small market capitalization. This additional return is often referred to as the "size premium". HML, which is short for High Minus Low, has been constructed to measure the "value premium" provided to investor for investing in companies with high book-to-market values (essentially the value placed on the company by accountants as a ratio relative to the value the public markets placed on the company, commonly expressed as B/M).The key point of the model is that it allows investors to weight their portfolios so that they have greater or lesser exposure to each of the specific risk factors, and therefore can target more precisely different levels of expected return.

So in order to test the explanatory power of different variants of Fama and French three factor model, the study under consideration constructed the six size and value sorted portfolios. Every year the portfolios were revised in the month of July. Fama used these two factors to construct value and growth portfolios and used excess returns of market proxy to model the stock return behavior. He found that the three factors, market, size, and book to market ratio as the three main factors to determine the insidious risk in the returns. The following section has discussed the findings of the Fama and French three factor model in detail.

Empirical Results

Table 1 has reported the results of descriptive statistics or six size and value portfolio returns. As depicted in the table, the small sized portfolios performed better than large sized portfolios in terms of mean returns. The small sized portfolios also showed higher level of volatility in comparison to large sized portfolios. But the sixth portfolio showed an increased level of volatility despite having large size in terms of market cap. In general, majority of the portfolios reported negatively skewed distribution of return except for SH portfolio and all the portfolios reported higher peakedness in their distribution curve in comparison to normal curve. Except, SL & BL portfolios, the rest four portfolios had higher magnitude of probability of their Jarque-Bera statistic indicating normally distributed return series of these portfolios throughout the study period. Added to this, out of the three factor portfolios, the market portfolio reported the negative mean returns. It also reported the highest level of volatility amongst the three factor portfolios and also negatively skewed return series. The Jarque-Bera statistic further confirmed the less than normally distributed return series of the market portfolio. The other two factor portfolios, SMB & HML reported normally distributed return series as per the Jarque-Bera statistic. Table, has reported the correlation between the market portfolios and the pattern of mean returns for six size and value portfolios has also been depicted through the Figure.

Explanation of Common Variation in Returns with the Factor Portfolios

Table 2, has reported the results of Fama and French Model through all its variants. As depicted in the table, the R^2 reported of CAPM (excess return on market portfolio) alone ranged from 57.36% (BH) to 82.91% (BL). It explained the variations in low and medium book to market ratio portfolios returns with both small and big sized stocks. But the explanatory power of other two factors was found less than market factor. The SMB factor alone showed highest explanatory power in case of SL portfolio with a value of 47.77% and for BH portfolio, it explained less than 5% variation in the monthly return series. The HML factor alone showed even poorer parameter to explain the variation in the returns of all the six portfolios. For SL and SM portfolios, it explained less than 5% variation, for BL portfolio it explained less than 1% variation and for BM portfolio, it explained less than 10% in the returns during the overall study period of the present study. But when SMB and HML factors taken together to explain the risk factor in the return generation by various portfolios, still it produced no significant explanation regarding this. It was only in the case of SH portfolio that it explained approximately 62% variability in its monthly returns, for rest of the portfolios the value of R^2 was found very less. So during the overall study period, the SMB and HML factors jointly did not explained the variability the returns of portfolios in a strong way.

But when EXRET was added with other factors, there was an increase in the explanatory power of the model. With the inclusion of SMB factor with the EXRET, the R^2 coefficient increased for all the six portfolios indicating that both these factors were in a better position to explain the variation in returns in comparison to simple CAPM mode which was based on EXRET only. The explanatory power ranged from 59.36% to 89.05% which was better than depicted by market factor alone. Further, when HML factor was added with the market factor, an added improvement could be seen in the coefficient of determination obtained through the regression equation. The range of R^2 was 79.19% to 87.79%, which could given a good explanation to the causes of variability in the returns of the all the portfolios. It was better for the big sized portfolios where the explanatory power of these two factors was more than 80% for all the three portfolios. But the results obtained by using all the three factors in determining the behavior of returns of all the six portfolios were more useful. As indicated in the Table, around 88% of variability in the returns of small sized portfolios and around 83% variability in the returns of three big sized portfolios could be explained by using the EXRET, SMB, & HML factors together. So the investors can use these three important factors to determine the return behavior of their portfolios. So the overall findings indicated that the three factor model given by Fama and French is more powerful, than its other variants of taking one or two factors, in explaining the variability in the returns of all six portfolios. The following paragraphs have discussed the suitability of the Fama and French three factor model during the alternate phases of the market.

Conclusion

It can be ascertained from the above analysis that instead of considering the market risk alone and firm specific characteristics (SMB and HML) individually to explain the return behavior of the stock prices, a combination of all these three factors have more predictability power to express the stock return behavior over a period of time. The return behavior of all the six types of portfolios was significantly explained (as shown by R^2) by adding growth and value factors with the market risk. No other combination of different parameters was found strong enough to explain the return behavior of all the six portfolios. The Fama and French three factor model was found most appropriate model to explain the stock return behavior of all six types (based on growth and value strategies of the fund managers) of portfolios in comparison to other variants of their model in India.

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Table-1

Descriptive Statistics for All Portfolios under Fama and French Model (1999-2007)

Portfolios	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera (prob.)
SL	0.0253	0.0451	0.1085	-0.8107	3.9684	15.159* (.0005)
SM	0.0332	0.0453	0.0954	-0.3555	3.1273	2.2174 (0.33)
SH	0.0356	0.0328	0.1093	0.0633	3.2157	0.2659 (0.8755)
BL	0.0129	0.0271	0.0716	-0.9459	4.7284	27.905* (1.00E-06)
BM	0.0174	0.0234	0.0834	-0.2512	3.0357	1.0777 (0.5834)
BH	0.0195	0.0262	0.1023	-0.3306	3.2198	2.0634 (0.3564)
EXRET	-0.0466	-0.0254	0.0836	-0.9109	3.9988	18.344* (0.0001)
SMB	0.0147	0.0147	0.0368	0.0901	2.8577	0.2247 (0.8941)
HML	0.0084	0.0045	0.0642	-0.1408	3.9966	4.5586 (0.1023)

●*Significant at 1% and **Significant at 5% level of Significance.

Figure 1

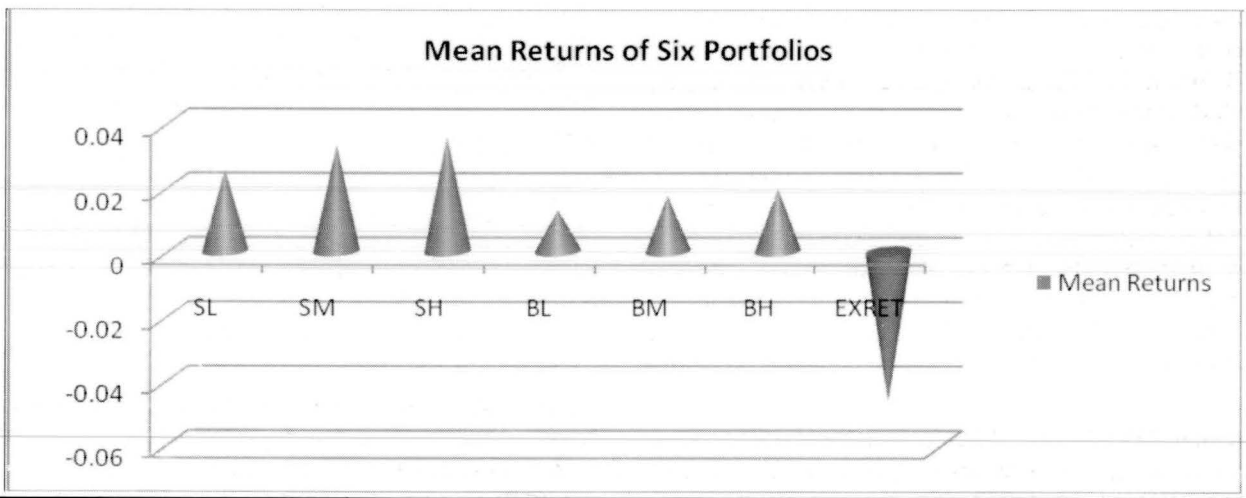

Table 2 Fama and French Three Factor Model

Explanatory	Dependent Variable	a Variable	b	SMB	HML
EXRET	S/L	2.3689	18.4523	-	-
	Prob.	0.0198	0		
	S/M	2.6506	17.0626	-	-
	Prob.	0.0094	0		
	S/H	2.1966	11.9737	-	-
	Prob.	0.0304	0		
	B/L	-3.9296	22.0244	-	-
	Prob.	0.0002	0		
	B/M	-1.3102	16.367	-	-
	Prob.	0.1932	0		
	B/H	-0.2405	11.5991	-	-
	Prob.	0.8104	0		
SMB	S/L	-8.2292	-	9.5643	-
	Prob.	0		0	
	S/M	-6.1708	-	6.6824	-
	Prob.	0		0	
	S/H	-5.1778	-	6.0706	-
	Prob.	0		0	
	B/L	-8.9587	-	4.8079	-
	Prob.	0		0	
	B/M	-6.6636	-	3.2993	-
	Prob.	0		0.0013	
	B/H	-4.9587	-	2.0668	-
	Prob.	0		0.0413	
HML	S/L	-3.4262	-	-	-1.6658
	Prob.	0.0009			0.0989
	S/M	-3.6179	-	-	2.1205
	Prob.	0.0005			0.0364
	S/H	-3.6437	-	-	5.0435
	Prob.	0.0004			0
	B/L	-6.8808	-	-	-0.1375
	Prob.	0			0.8909
	B/M	-6.0965	-	-	2.8125
	Prob.	0			0.0059
	B/H	-6.0661	-	-	6.4524
	Prob.	0			0

Table 2 contd.....

Explanatory Variable	Dependent Variable	a	b	SMB	HML
EXRET-SMB	S/L	-2.5933	19.3149	10.3055	-
	Prob.	0.0109	0	0	
	S/M	0.15748	14.7788	4.28849	-
	Prob.	0.8752	0	0	
	S/H	0.16906	9.85601	3.36612	-
	Prob.	0.8661	0	0.0011	
	B/L	-3.8594	19.3953	0.99671	-
	Prob.	0.0002	0	0.3213	
	B/M	-0.4559	15.3154	-1.2388	-
	Prob.	0.6495	0	0.2183	
	B/H	0.96211	11.602	-2.2042	-
	Prob.	0.3383	0	0.0298	
EXRET-HML	S/L	2.8456	19.3502	-	-3.3851
	Prob.	0.0054	0		0.001
	S/M	2.3846	18.8754	-	4.7577
	Prob.	0.019	0		0
	S/H	1.9965	17.21801	-	10.2419
	Prob.	0.0487	0		0
	B/L	-3.8793	21.91162	-	-0.0607
	Prob.	0.0002	0		0.9522
	B/M	-2.2374	19.428	-	6.3769
	Prob.	0.0275	0		0
	B/H	-2.1645	21.756	-	15.7047
	Prob.	0.0328	0		0
SMB-HML	S/L	-8.0016	-	9.2436	0.0183
	Prob.	0		0	0.9855
	S/M	-7.6071	-	8.2293	4.6301
	Prob.	0		0	0
	S/H	-9.0214	-	10.416	9.5491
	Prob.	0		0	0
	B/L	-8.9738	-	4.916	1.0297
	Prob.	0		0	0.3057
	B/M	-7.8488	-	4.4028	4.026
	Prob.	0		0	0.0001
	B/H	-7.8408	-	4.438	7.8884
	Prob.	0		0	0

Table 2 contd.....

Explanatory Variable	Dependent Variable	a	b	SMB	HML
EXRET-SMB-HML	S/L	-2.0875	19.7232	9.5778	-2.0337
	Prob.	0.0394	0	0	0.0447
	S/M	-1.5518	17.538	7.1076	7.4758
	Prob.	0.1239	0	0	0
	S/H	-3.8398	18.285	11.351	17.923
	Prob.	0.0002	0	0	0
	B/L	-3.7827	19.173	1.0111	0.205
	Prob.	0.0003	0	0.3145	0.838
	B/M	-1.9608	17.215	0.205	6.1808
	Prob.	0.0527	0	0.838	0
	B/H	-1.823	19.354	0.0667	15.105
	Prob.	0.0713	0	0.947	0

Table 3 Fama and French Three Factor Model (July 1999- December 2007)

Explanatory Variable	Dependent Variable	a	b	SMB	HML	Adj R^2
EXRET	S/L	0.0145	1.1837	-	-	0.773
	Std.Error	0.0061	0.0641			
	S/M	0.0153	1.0322	-	-	0.7443
	Std.Error	0.0058	0.0605			
	S/H	0.0183	1.0435	-	-	0.589
	Std.Error	0.0083	0.0872			
	B/L	-0.0142	0.8346	-	-	0.8291
	Std.Error	0.0036	0.0379			
	B/M	-0.0068	0.8948	-	-	0.7282
	Std.Error	0.0052	0.0547			
	B/H	-0.0019	0.9558	-	-	0.5736
	Std.Error	0.0079	0.0824			
SMB	S/L	-0.0719	-	2.1153	-	0.4777
	Std.Error	0.0087		0.2212		
	S/M	-0.0551	-	1.511	-	0.3087
	Std.Error	0.0089		0.2261		
	S/H	-0.054	-	1.6039	-	0.2693
	Std.Error	0.0104		0.2642		
	B/L	-0.0664	-	0.9028	-	0.1878
	Std.Error	0.0074		0.1878		
	B/M	-0.0596	-	0.7468	-	0.0982

	Std.Error	0.0089		0.2263		
	B/H	-0.055	-	0.5806	-	0.041
	Std.Error	0.0111		0.2809		
HML	S/L	-0.0382	-	-	-0.2891	0.027
	Std.Error	0.0112			0.1736	
	S/M	-0.0356	-	-	0.3243	0.043
	Std.Error	0.0098			0.153	
	S/H	-0.0372	-	-	0.8002	0.2028
	Std.Error	0.0102			0.1587	
	B/L	-0.053	-	-	-0.0165	0.0002
	Std.Error	0.0077			0.1198	
	B/M	-0.0517	-	-	0.371	0.0733
	Std.Error	0.0085			0.1319	
	B/H	-0.054	-	-	0.8942	0.294
	Std.Error	0.0089			0.1386	

Table-3 contd.....

Explanatory Variable	Dependent Variable	a	b	SMB	HML	Adj R^2
EXRET-SMB	S/L	-0.0131	0.9607	1.1651	-	0.8905
	Std.Error	0.005	0.0497	0.1131		
	S/M	0.001	0.9165	0.6045	-	0.7844
	Std.Error	0.0063	0.062	0.141		
	S/H	0.0016	0.9085	0.7053	-	0.6312
	Std.Error	0.0093	0.0922	0.2095		
	B/L	-0.0165	0.8163	0.0954	-	0.8308
	Std.Error	0.0043	0.0421	0.0957		
	B/M	-0.0028	0.9274	-0.1705	-	0.7323
	Std.Error	0.0061	0.0606	0.1376		
	B/H	0.0088	1.0419	-0.45	-	0.5936
	Std.Error	0.0091	0.0898	0.2041		
EXRET-HML	S/L	0.0167	1.1811	-	-0.27	0.7965
	Std.Error	0.0059	0.061		0.0798	
	S/M	0.0126	1.0354	-	0.3411	0.7919
	Std.Error	0.0053	0.0549		0.0717	
	S/H	0.0117	1.0513	-	0.8172	0.8004
	Std.Error	0.0059	0.0611		0.0798	
	B/L	-0.0142	0.8345	-	-0.003	0.8291
	Std.Error	0.0037	0.0381		0.0498	
	B/M	-0.0099	0.8984	-	0.3855	0.8073
	Std.Error	0.0044	0.0463		0.0605	

	B/H	-0.0092	0.9644	-	0.9098	0.8779
	Std.Error	0.0043	0.0443		0.0579	
SMB-HML	S/L	-0.0719	-	2.1163	0.0024	0.4777
	Std.Error	0.009		0.2289	0.1316	
	S/M	-0.0634	-	1.7464	0.5649	0.4318
	Std.Error	0.0083		0.2122	0.122	
	S/H	-0.0699	-	2.0554	1.0834	0.6196
	Std.Error	0.0077		0.1973	0.1135	
	B/L	-0.0681	-	0.9505	0.1145	0.1964
	Std.Error	0.0076		0.1933	0.1112	
	B/M	-0.0669	-	0.9563	0.5027	0.225
	Std.Error	0.0085		0.2172	0.1249	
	B/H	-0.0701	-	1.0113	1.0335	0.4111
	Std.Error	0.0089		0.2279	0.131	

Table-3 contd.....

Explanatory Variable	Dependent Variable	a	b	SMB	HML	Adj R^2
EXRET-SMB-HML	S/L	-0.0107	0.9712	1.1041	-0.1213	0.8949
	Std.Error	0.0051	0.0492	0.1153	0.0597	
	S/M	-0.008	0.8772	0.8322	0.4532	0.8627
	Std.Error	0.0052	0.05	0.1171	0.0606	
	S/H	-0.0179	0.8237	1.197	0.9784	0.9138
	Std.Error	0.0047	0.045	0.1055	0.0546	
	B/L	-0.0167	0.8154	0.1007	0.0106	0.8308
	Std.Error	0.0044	0.0425	0.0996	0.0515	
	B/M	-0.0106	0.8937	0.0249	0.3889	0.8074
	Std.Error	0.0054	0.0519	0.1215	0.0629	
	B/H	-0.0094	0.9629	0.0078	0.9108	0.8779
	Std.Error	0.0052	0.0498	0.1165	0.0603	

Reference # Envision - C -01

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