PRESENCE OF SIZE AND VALUE PREMIUM EFFECT IN INDIAN STOCK MARKET

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Abstract: The presence of different anomalies has always been observed by different studies. The value and size are considered one of those factors that affect the stock returns. The current paper examines the presence of value effect in the Indian stock market during the last decade. It also examines that whether asset pricing models (CAPM and three factor models) really explains the returns in the Indian stock market. Fama-French three factor model explains the presence of value and size effect in the Indian stock market.

Index Terms: **CAPM, Fama-French, Returns, Size, Value**

INTRODUCTION:

It has been evidenced that asset-pricing examines that stock returns are affected by several factors that include market beta, size, value and momentum (Fama & French, 1996). Some new factors such as liquidity, accruals, asset growth that can also explain stock returns has also been documented by many researchers (Cooper, Gulen, & Schill, 2008; Fama & French, 2008). Banz (1981) is first to document a new factor which is popularly called as size effect. Keim (1983) empirically tested that stock returns are negatively related with firm size as big size stocks perform better than small size stocks by providing extra risk-adjusted returns. Basu (1977) finds that portfolios with low price-to-earning (PE) ratios yield higher risk-adjusted returns than portfolios of high PE ratios. Basu's empirical results do not support the efficient market hypotheses as stock returns are inversely related with PE ratios. Bhandari (1988) makes revelation that stock returns are positively related with leverage (debt ratio of firms). Further, the study shows the evidence for a positive relation of stock returns with leverage once beta, size and January factors are controlled. Stattman's (1980) study exposes positive relation of book equity to market equity ratio (BE/ME) with stock returns. Rosenberg, Reid, and Lanstein (1985) experiment two investment strategies based on BE/ME and specific stock return reversal. Their study suggests to buy stocks with high BE/ME ratios and sell stocks with low BE/ME ratios while specific stock return reversal is again an investment strategy which calculates return on stocks for previous month and its relation with stock market factors. They find the strategies to be profitable and viable. Chan, Hamao, and Lakonishok (1991) found out the existence of positive relation between stock returns and financial variables for Japanese market.

Recent researches that are undertaken in the matured markets (e.g., Fama & French, 2008, 2014) show the size effect by detailing the size groups into micro, small and big. Similarly, momentum effect is tested by forming portfolios with cumulative stock returns (lagged returns on stock) rather than stocks past returns. In the backdrop of global evidences Sehgal and Balakrishnan (2013) re-examine and uphold the presence of size and value effects in Indian stock market. Their empirical findings suggest that average returns on stocks are substantially explained by Fama–French three-factor model (1993) vis-à-vis one-factor CAPM.

This study examines value effects in stock returns for Indian stock market during the last decade. This study also evaluates the competing asset pricing models' efficiency to capture stock returns. Most of the previous studies in Indian context experiment the size effect for only small stocks while value effect is tested with a

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different breakpoints for classifying the stocks. None of the previous studies carried out for Indian market verifies micro-size (tiny stocks) effect with stocks' cumulative returns for constructing portfolios as documented by Fama and French (2008, 2012).

Hence, this study fills the above gap. The study is presented as follows. The second section presents the data and their sources. The third section describes the methodological procedures being used to form portfolios. The next section shows the performance of size–value sorted portfolios in terms of mean excess returns and same section also discusses the empirical results of asset pricing models. The last section offers concluding remarks.

Data Collection:

The study analyses the data of 300 companies from National Stock Exchange. Monthly returns are calculated for each security. Market capitalisation is considered as the size of the securities and price to book ratio is considered as the value measure of the stocks. The data are collected from www.finance.yahoo.com and the size and value measures are collected from www.moneycontrol.com. Monthly returns of last 10 years are collected for the analysis.

Methodology:

Fama and French (1993) sort the sample stocks on market capitalization and book equity to market equity (BE/ME) by using the same breakpoints being used by NYSE to allocate portfolio. This enables them to avoid sorts that are dominated by micro (tiny) stocks of AMEX and NASDAQ. Generally, in US market, tiny stocks are considered to be less important. Fama and French (2008) sort the sample stocks on market capitalization into three size groups namely micro, small and big. Breakpoints for size classification being used in the study, 20th, 30th and 50th percentiles.

Fama and French (2012) sort the sample securities on market capitalization using breakpoints of bottom 10th percentile of stocks as small while top 90th percentile of stocks as big stocks. In the case of BE/ME, stocks are sorted using the breakpoints of bottom 30th percentile of the stocks are growth (G), median 40th percentile of the stocks are neutral (N) and top 30th percentile of the stocks are value (V). From the above size classifications, it is noted that micro (tiny) stocks are brought to the mainstream.

We group the stocks based on size into two groups small and big bottom 30 percentile are considered as small and top 70 percentile are considered as big stock (Market capitalisation being the size of the socks). Then, stocks are grouped into three categories based on Price to Book (P/B) ratio which is the measure of company value. The value groups are namely low (L), Medium (M) and growth (G). The following breakpoints have been used for the above classification. 30 per cent of the stocks from bottom fall in the low (L) group, next 40 per cent of stocks are in the bracket of Medium (*M*) group and above 70 per cent of the stocks are put in the growth (G) group.

Then from the intersection of two size and three value groups, six portfolios consisting of S/L, S/M, S/G, B/L, B/M and B/G are formed. Portfolio S/L represents small size and low value stocks, S/M is composed of small size and medium value stocks, S/G is formed by combining small size and high value stock, B/L is composed of big size and low value stocks, B/M is big size and medium value stocks and B/G represents the portfolio consisting of big size and hive value stocks. Next equally weighted monthly excess return of each portfolio is calculated for a period of 2007 to 2007.

Then we form SMB and LMH portfolios. SMB represents small minus big, a portfolio which presents the portfolio returns in relation to company size and mimics the risk factor related to company size. It is calculated by subtracting the B/L, B/M and B/G portfolio returns from S/L, S/M and S/G portfolios.

SMB = [(S/L+S/M+S/G)/3] – [(B/L+B/M+B/G)/3] ---------- (1)

The other portfolio LMH represents low minus high. In this case only low value and high value stocks are considered. It i calculated by subtracting S/G and B/G portfolios from S/L and B/L portfolios.

LMH = [(SL+BL)/2] – [(SG+BG)/2] ---------- (2)

Next we regress monthly average returns on portfolios for monthly average returns on market portfolio for the whole sample period. We use prominent market model to run CAPM regression. The specification of the market model is stated below.

$R_p - R_f = a + b(R_m-R_f) + e$ ----------(3)

$R_p - R_f$ = Excess returns on portfolio (portfolio returns are reduced by risk-free rate),

R_m-R_f = Excess returns on market portfolio (market returns are reduced by risk-free rate),

a = Abnormal returns (portfolio returns in excess of returns on market portfolio),

b = Portfolio's responsiveness to market factor (beta coefficient).

Above Equation (3) takes a hypothesis that CAPM can absorb all variations in stock returns so that intercepts of the time-series regression are zero. Further the monthly average returns on portfolios are regressed on Fama and French three-factor model. The three-factor model is stated as below.

$R_p - R_f = a + b(R_m-R_f) + sSMB + lLMH + e$ ----------(4)

$R_p - R_f$ = Excess returns on portfolio (portfolio returns are reduced by risk-free rate),

R_m-R_f = Excess returns on market portfolio (market returns are reduced by risk-free rate),

a = Abnormal returns (portfolio returns in excess of returns on market portfolio),

b = Portfolio's responsiveness to market factor (beta coefficient).

SMB mimics the risk factor in returns relating to size,

LMH mimics the risk factor in returns relating to value,

's' and 'l' are the portfolio's sensitivity coefficients of SMB and LMH factors, respectively.

Data Analysis:

Table 1 represents the mean return, standard deviation and t-statistics of the different portfolios along with the explanatory variables (Rm, SMB and LMH). The mean return of B/G portfolio is highest (i.e. 1.3%) and which means that the portfolio which is composed on big size and high value stocks gives higher return. Whereas the standard deviation of S/L portfolio is highest representing the riskiest portfolio even though the return from that portfolio is also very low. Among the differential returns i.e. the SMB and LMH, the LMH portfolio shows a higher difference of -0.615%. It can be interpreted here that there may existence of value effect in the Indian stock market during the last decade. The t-statistic in case of SG and BG portfolio is significant. This also reflects the presence of value effect in the Indian stock market during the decade.

Table – 1: Mean, Standard deviation and T-statistics of value and size sorted portfolios

	SL	SM	SG	BL	BM	BG	Rm	SMB	LMH
N	133	133	133	133	133	133	133	133	133
Mean	0.484%	0.923%	1.283%	0.923 %	1.147%	*1.3554 %*	0.6573 %	-0.242%	-0.615%
Std. Dev	8.515%	7.456%	5.788%	7.766 %	7.528%	6.235%	6.504%	2.205%	3.791%
T-statis	.656	1.429	2.557	1.372	1.758	2.507	1.165	-1.282	-1.872
P-value	.513	.155	.012	.172	.081	.013	.246	.202	.063

Table- 2, below represents the CAPM results of the Size-value sorted portfolios. In this case it can be observed that the Intercept of S/L portfolio is negative reflecting a weak performance and the beta co-efficient of this portfolio is also more than other portfolios. This reflects the higher volatility of the stock. The t-statistic of B/G portfolio's alpha is significant and for most of the portfolios it is high (more than zero). Apart from that the R^2 of B/G, SG and BM is also low. So here we can conclude that the CAPM mode fails to explain the variations size-value sorted portfolios so we have tested the three factor model in the next table. It also signals the presence of size and value effect in the Indian stock market.

Table – 2: CAPM Results for Size–value Sorted Portfolios

$R_p - R_f = a + b(R_m - R_f) + e$

Portfolios	a	b	t(a)	t(b)	R^2
SL	-.031	1.158	-.087	21.690	.782
SM	.240	.970	.687	18.185	.716
SG	.355	.700	1.132	14.593	.619
BL	.287	1.023	.815	19.005	.734
BM	.420	.921	1.048	15.055	.634
BG	.469	.746	1.365	14.206	.606

Table – 3 below shows the Fama-French three factor model for size-value sorted portfolios. Intercept (alpha) of every portfolio is positive and high. The beta co-efficient of all the portfolios are also less than one. The t-statistics of beta is highly significant. But in case of S/G portfolio the SMB coefficient is not significant but in all the cases it is significant reflecting a presence of value effect. The alphas of all the portfolios are not significant. Also it can be seen that the R^2 in this case is more than 0.70 other than S/G portfolio only. From these figures we can interpret that there is presence of value and size effect in the Indian stock market.

Table – 3: Fama—French Three-factor Model Results for Size–value Sorted Portfolios

$R_p - R_f = a + b(R_m - R_f) + sSMB + lLMH + e$

Portfolio	a	b	s	l	t(a)	t(b)	t(s)	t(l)	R^2
SL	.223	.887	.258	.706	.769	15.652	1.906	7.023	.855
SM	.237	.862	-.509	.357	.710	13.183	-3.254	3.076	.747
SG	.224	.886	.073	-.517	.772	15.637	.537	-5.135	.685
BL	.225	.883	-1.008	.506	.773	15.468	-7.381	4.993	.823
BM	.234	.869	-1.347	.312	.736	13.984	-9.071	2.830	.777
BG	.225	.884	-.823	-.271	.770	15.493	-6.029	-2.681	.725

Conclusion:

Returns calculated on the monthly basis from size-value sorted portfolios shows a strong presence of size and value effect in the Indian stock market during the last decade. If we observe the data carefully it can be seen that the presence of value effect is stronger than size effect. As in both the asset pricing model the SL and SG portfolios performed differently we can conclude that there exists a size and value effect in the Indian Stock market. The size premium is found in all the portfolios. The value premium is also spread over all the portfolios other than SG portfolio with a lower SMB coefficient. In case of BM and BG portfolios the SMB coefficient is highest, reflecting a strong presence of size effect in the Indian stock market. But in case of SL and BL portfolios the LMH coefficient is highest which reflects the presence of value effect in the Indian stock market. The R-square of both the portfolios is also highest among all the other portfolios reflecting a strong presence of value effect Indian stock market in the last decade. Value based portfolios can be designed to get better return from the stock market.

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