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EVIDENCE AGAINST EXISTENCE OF SIZE EFFECT IN THE INDIAN CONTEXT

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ABSTRACT

This paper presents evidence against the size effect in the Indian context. The size effect is the phenomenon of small cap stocks generating higher returns than large cap stocks. The size effect can also be stated as the phenomenon of small cap stocks generating returns more than is predicted by their beta (beta of Capital Asset Pricing Model). The study considers the BSE SmallCap index to represent the small cap segment in India. The Jensen's alpha (Jensen, 1968) is found to be statistically insignificant for the BSE SmallCap index. This confirms that the BSE SmallCap index generates returns in conformity with that estimated by the CAPM and is an evidence against the size effect in the Indian context. The Jensen's alpha for the BSE MidCap index (a representative index of the midcap segment in India) is also computed to compare the results with that obtained for BSE SmallCap. The results are same as that for the BSE SmallCap, that is, the Jensen's alpha for the BSE MidCap index too is statistically insignificant. The betas of both these indices, that is, the BSE SmallCap and the BSE MidCap are statistically significant and greater than one implying that their systematic risk is greater than that of the market. And of the small cap and the midcap indices, the beta of the former is greater than that of the latter. The period of the study is April 2003 till March 2015.

KEYWORDS

size effect, BSE SmallCap, BSE MidCap.

INTRODUCTION

The size effect is the phenomenon of small cap stocks generating higher returns than large cap stocks. The size effect can also be stated as the phenomenon of small cap stocks generating returns more than is predicted by their CAPM beta. Since the phenomenon of size effect is unexplained by the Capital Asset Pricing Model (CAPM) the phenomenon is considered an anomaly. Since its documentation by Banz (1981), the size effect has received lot of attention in the Finance research literature all over the world. Many authors have presented evidence in support of the size effect in the Indian context too.

In order to test the size effect, it would suffice to test if the returns to the small cap stocks in India are in conformity with that predicted by the CAPM. If the returns to the small cap stocks are in excess to that estimated by the CAPM it can be inferred that the size effect exists in India.

The study considers the BSE SmallCap index of the Mumbai Stock Exchange (BSE) to represent the small cap segment in the Indian context. The BSE MidCap index, the midcap index of the BSE has also been included in the study just to see if size effect is observed in the midcap stocks as midcap stocks are of lower market capitalization than the large cap stocks. Two proxies for the market are considered, one, the BSE Sensex and two, the BSE 500 index. The period of the study is April 2003 till March 2015.

Surprisingly enough, the study finds that for both the market proxies considered the BSE MidCap and the BSE SmallCap do not earn returns in excess of that predicted by the CAPM and that their returns are in conformity with that predicted by the CAPM. This is evidence against the existence of size effect in India. It is found that the betas of both these indices, that is, the BSE SmallCap and the BSE MidCap are statistically significant and above one implying that their systematic risk is greater than that of the market. And of the small cap and the midcap indices, the beta of the former is greater than that of the latter.

REVIEW OF LITERATURE

Blume and Friend (1974) study common stocks on the New York Stock Exchange (NYSE) for the period 1928-68 and come to the conclusion that the beta performs relatively better for large capitalization stocks as compared to small capitalization stocks. Levy (1978) after a study of a sample of 101 stocks listed on the New York Stock Exchange (NYSE) comes to a conclusion consistent with that of Blume and Friend (1974) by stating that for widely held stocks beta seems to provide a better explanation for price behaviour while for stocks that are not held by many investors, variance seems to provide a better explanation for price behaviour. Levy (1978) claims consistency by stating that we could possibly assume large capitalization stocks to be widely held stocks. The time period of the Levy (1978) study is 1948-68.

Banz (1981) and Reinganum (1981 a) document the size effect – that size (measured by market capitalization) and average stock returns were inversely related. They observe that small-capitalization firms generated higher average returns than estimated by the Sharpe-Lintner capital asset-pricing model (CAPM). Banz studies the monthly returns for the period 1931-75 for New York Stock Exchange (NYSE) listed stocks. For this period, the fifty smallest stocks perform better than the fifty largest by an average of one percentage point per month when risk adjusted returns are considered.

Keim (1983) studies the month to month stability of the size effect for the time period 1963-1979 for a sample of NYSE and AMEX stocks. The study gives evidence in support of the size effect and also documents that about fifty percent of the average magnitude of the size effect could be attributed to the January effect - the phenomenon of high abnormal returns in January relative to the rest eleven months.

Schultz (1983) does a decile ranking of NYSE and American Exchange (AMEX) stocks taken together on the basis of market capitalization for the time period 1963 till 1979.The study finds that for holding periods of one year the smallest decile of stocks earn average risk adjusted returns of about 31 percent per year net of transaction costs. So the study concludes that higher transaction costs of small cap stocks cannot explain the size effect.

Fama and French (1993) study all the NYSE Stocks on the CRSP database for the time period 1963 till 1991 to demonstrate that a three factor model (which is popularly called the Fama-French Three Factor Model) with market, size (measured by market capitalization) and value (measured by ratio of book equity to market equity) factors is able to describe stock returns better than the CAPM thus providing additional support for the size effect and also highlighting the inability of the CAPM and beta in describing small capitalization stock returns.

There have been many studies supporting the view that the Fama-French model is a good descriptor of stock returns in the Indian market and other emerging economies. Connor and Sehgal (2001) and Mohanty (2001) state that the Fama-French three factor model well describes the stock returns in the Indian context. Drew (2003) gives evidence supporting the applicability of the Fama-French model in Hong Kong, Korea, Malaysia and the Philippines. Bundoo (2008) states that the Fama-French three factor model is a good descriptor of returns for stocks listed on the Stock Exchange of Mauritius. Tripathi (2008), Bahl (2006) and Taneja (2010) are among the other authors who have given evidence in support of the Fama-French three factor model in the Indian context.

The fact that the Fama-French three factor model has found support in the context of India and other countries implies support for the size effect in these countries.

DATA AND METHODOLOGY

The well-known Sharpe (1964) and Lintner (1965) Capital Asset Pricing Model (CAPM) is given by

$R_i = R_f + \beta_i (R_m – R_f)$, (1)

where, R_i is the return of the ith stock, R_f is the risk free rate of return, β_i is the beta of the ith stock and R_m is the return of the market.

The excess return earned by a stock, index or a portfolio over and above the return estimated for it by the CAPM can be determined by computing the Jensen's alpha given by Jensen (1968). It is the alpha given in the below equation.

$R_i - R_f = \alpha_i + \beta_i (R_m - R_f)$ (2),

where α_i is the alpha of the ith asset.

Two proxies for the market have been considered, one the BSE Sensex and two, the BSE 500 index. The data for these two market proxies as well as for the BSE SmallCap and BSE MidCap indices have been obtained for the time period April 2003 till March 2015 from the official website of the Mumbai Stock Exchange (BSE), www.bseindia.com. It is to be noted that the BSE website does not have any data for the indices BSE SmallCap and BSE MidCap before April 2003. The interest rates data on Central Government Dated Securities for the time period April 2003 till March 2015 obtained from the official website of the Reserve Bank of India, www.rbi.org.in, have been considered as the proxy for the risk free rate.The monthly percentage returns for the two market proxies, the BSE Sensex and BSE 500 index as well as for the BSE SmallCap and BSE MidCap indices were computed for the time period May 2003 till March 2015 using the monthly closing values of the indices. The annual interest rates obtained from the Reserve Bank of India website were converted to monthly rates.

RESULTS & DISCUSSION

The regression for the Jensen's alpha equation stated earlier is run for the BSE SmallCap and BSE MidCap were run using the EasyReg econometric software (Bierens, 2015) and the Jensen's alpha is obtained for the indices BSE SmallCap and BSE MidCap using both BSE Sensex and BSE 500 as market proxies. Surprisingly, the Jensen's alpha for both the indices BSE SmallCap and BSE MidCap are statistically insignificant for both the market proxies, BSE Sensex and BSE 500. The EasyReg software reports heteroscedasticity consistent t-values, standard errors and p-values (observed significance levels) based on White's heteroscedasticity consistent variance matrix (White, 1980). The EasyReg outputs for the Jensen's alpha equation regression for the indices BSE SmallCap and BSE MidCap for both the market proxies follow.

FIGURE 1: EASYREG OUTPUT FOR BSE SMALLCAP USING BSE SENSEX AS THE MARKET PROXY

```
EasyReg International [May 27, 2015]
Session date: Sunday March 27, 2016
Session time: 13:05:08
----------------------------------------------
Dependent variable:
Y = BSE SmallCap - Rf

Characteristics:
BSE SmallCap - Rf
  First observation = 1
  Last observation  = 143
  Number of usable observations: 143
  Minimum value: -3.3113601E+001
  Maximum value:  5.1331634E+001
  Sample mean:    1.7019129E+000

X variables:
X(1) = Sensex - Rf
X(2) = 1

Model:
Y = b(1)X(1) + b(2)X(2)  + U,
where U is the error term, satisfying
E[U|X(1),X(2)] = 0.

OLS estimation results
Parameters    Estimate     t-value    H.C. t-value
                            (S.E.)     (H.C. S.E.)
                          [p-value]  [H.C. p-value]
b(1)         1.2422606      17.140          14.639
                          (0.07248)       (0.08486)
                          [0.00000]       [0.00000]
b(2)         0.1927963       0.371           0.392
                          (0.51927)       (0.49229)
                          [0.71043]       [0.69533]

Notes:
1: S.E. = Standard error
2: H.C. = Heteroskedasticity Consistent. These t-values and
   standard errors are based on White's heteroskedasticity
   consistent variance matrix.
3: The two-sided p-values are based on the normal approximation
```

FIGURE 2: EASYREG OUTPUT FOR BSE MIDCAP USING BSE SENSEX AS THE MARKET PROXY

```
EasyReg International [May 27, 2015]
Session date: Sunday March 27, 2016
Session time: 13:07:58
----------------------------------------------
Dependent variable:
Y = BSE MidCap - Rf

Characteristics:
BSE MidCap - Rf
  First observation = 1
  Last observation  = 143
  Number of usable observations: 143
  Minimum value: -3.3928456E+001
  Maximum value:  4.3324998E+001
  Sample mean:    1.4954530E+000

X variables:
X(1) = Sensex - Rf
X(2) = 1


Model:
Y = b(1)X(1) + b(2)X(2)  + U,
where U is the error term, satisfying
E[U|X(1),X(2)] = 0.


OLS estimation results
Parameters   Estimate     t-value    H.C. t-value
                           (S.E.)     (H.C. S.E.)
                         [p-value]  [H.C. p-value]
b(1)        1.1525525     23.763          18.934
                         (0.04850)       (0.06087)
                         [0.00000]       [0.00000]
b(2)        0.0953152      0.274           0.286
                         (0.34751)       (0.33274)
                         [0.78387]       [0.77453]

Notes:
1: S.E. = Standard error
2: H.C. = Heteroskedasticity Consistent. These t-values and
   standard errors are based on White's heteroskedasticity
   consistent variance matrix.
3: The two-sided p-values are based on the normal approximation.
```

FIGURE 3: EASYREG OUTPUT FOR BSE SMALLCAP USING BSE 500 AS THE MARKET PROXY

```
EasyReg International [May 27, 2015]
Session date: Sunday March 27, 2016
Session time: 12:45:11
---------------------------------------------
Dependent variable:
Y = BSE SmallCap - Rf

Characteristics:
BSE SmallCap - Rf
  First observation = 1
  Last observation  = 143
  Number of usable observations: 143
  Minimum value: -3.3113601E+001
  Maximum value:  5.1331634E+001
  Sample mean:    1.7019129E+000

X variables:
X(1) = BSE 500 - Rf
X(2) = 1


Model:
Y = b(1)X(1) + b(2)X(2)  + U,
where U is the error term, satisfying
E[U|X(1),X(2)] = 0.


OLS estimation results
Parameters   Estimate    t-value    H.C. t-value
                          (S.E.)    (H.C. S.E.)
                        [p-value]  [H.C. p-value]
b(1)         1.2328445    24.081         19.537
                        (0.05120)       (0.06310)
                        [0.00000]       [0.00000]
b(2)         0.0597305     0.148          0.156
                        (0.40324)       (0.38273)
                        [0.88224]       [0.87598]

Notes:
1: S.E. = Standard error
2: H.C. = Heteroskedasticity Consistent. These t-values and
   standard errors are based on White's heteroskedasticity
   consistent variance matrix.
3: The two-sided p-values are based on the normal approximation.
```

FIGURE 4: EASYREG OUTPUT FOR BSE MIDCAP USING BSE 500 AS THE MARKET PROXY

```
EasyReg International [May 27, 2015]
Session date: Sunday March 27, 2016
Session time: 12:41:16
----------------------------------------------
Dependent variable:
Y = BSE MidCap - Rf

Characteristics:
BSE MidCap - Rf
  First observation = 1
  Last observation  = 143
  Number of usable observations: 143
  Minimum value: -3.3928456E+001
  Maximum value:  4.3324998E+001
  Sample mean:    1.4954530E+000

X variables:
X(1) = BSE 500 - Rf
X(2) = 1


Model:
Y = b(1)X(1) + b(2)X(2)  + U,
where U is the error term, satisfying
E[U|X(1),X(2)] = 0.


OLS estimation results
Parameters     Estimate     t-value    H.C. t-value
                             (S.E.)    (H.C. S.E.)
                           [p-value]  [H.C. p-value]
b(1)          1.1242200      40.334          30.027
                           (0.02787)      (0.03744)
                           [0.00000]      [0.00000]
b(2)         -0.0020385      -0.009          -0.009
                           (0.21954)      (0.21468)
                           [0.99259]      [0.99242]

Notes:
1: S.E. = Standard error
2: H.C. = Heteroskedasticity Consistent. These t-values and
   standard errors are based on White's heteroskedasticity
   consistent variance matrix.
3: The two-sided p-values are based on the normal approximation.
```

The results of the EasyReg outputs for the two indices for both the market proxies are summarized in the table below:

TABLE 1: SUMMARY OF THE EASYREG OUTPUTS FOR THE TWO INDICES

Index	Market Proxy	αi	αi H.C. t-value	αi H.C. p-value	βi	βi H.C. t-value	βi H.C. p-value
BSE SmallCap	BSE Sensex	0.1928	0.3920	0.6953	1.2423	14.6390	0.0000
BSE MidCap	BSE Sensex	0.0953	0.2860	0.7745	1.1526	18.9340	0.0000
BSE SmallCap	BSE 500	0.0597	0.1560	0.8760	1.2328	19.5370	0.0000
BSE MidCap	BSE 500	-0.0020	-0.0090	0.9924	1.1242	30.0270	0.0000

Note: H.C t-value and H.C p-value in the above table refer to heteroscedasticity consistent t-values and heteroscedasticity consistent p-values respectively.

It can be inferred from the above table that for the two indices BSE SmallCap and BSE MidCap, the Jensen's alphas are statistically insignificant even at 10% level of significance for both the market proxies considered.

The betas for both the indices BSE SmallCap and BSE MidCap are statistically significant at 1% level of significance for both the market proxies. It can also be seen that for both the market proxies the betas of both BSE SmallCap and BSE MidCap are greater than one implying that the small cap and the midcap indices have a greater systematic risk than the market. It could also be observed that the beta of the small cap index is greater than the beta of the midcap index.

CONCLUSIONS

It is seen that the Jensen's alpha for the BSE SmallCap index is statistically insignificant implying that the returns of the small cap index are in conformity with that predicted by the CAPM. This is serious evidence against the existence of the size effect in the Indian context. The Jensen's alpha for the BSE MidCap index too is statistically insignificant implying that the returns of the mid cap index too are in conformity with that predicted by the CAPM.

The study finds that the betas of the small cap and the midcap indices are greater than one implying that the small cap and midcap stocks have higher systematic (non-diversifiable) risk than the market. And among the small cap and midcap stocks the small cap stocks have a higher systematic risk (since the beta of the small cap index is greater than the beta of the midcap index).

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