Beta Estimation Practice And Its Reliability Biasness Towards Aggressive Stocks: An Empirical Evidence From NSE

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INTRODUCTION

While investing in a capital market, investors always have concern about the market movements or changes in the value of capital market index. **This tendency of investors' behavior is related to a psychological factor that reveals that market movements and prices of stocks are closely related to each other. Upward / downward movement in market index gives trigger to the expectation of investors that the value of their holding would move accordingly. This is, more formally, known as systematic risk arising on account of economic wide uncertainties and explains the tendency of stock's price movement together with changes in market index. Systematic risk, also known as market risk, cannot be reduced through diversification of stocks' portfolio.** Investors are exposed to market risk even when they hold well diversified portfolio of securities. In finance literature, beta coefficient is a measurement statistic of systematic risk; it refers to the slope in a linear relationship fitted to data on the rate of return on a stock and the rate of return of the market (or market index). This usage stems from Sharpe's 1963 paper in Management Science. Beta is the stock's sensitivity to the market index: it is the degree (in percentage) by which the stock's return tends to increase or decrease for every 1% increase or decrease in the return of the index. Beta, according to textbooks, is supposed to quantify relative volatility: *"Beta measures the volatility of a given asset relative to the volatility of the market"* **(Levy, 2002)**; *"Beta measures how volatile a fund has been compared with a relevant benchmark"* **(Hirschey, 2001)**. **Sharpe** (the originator of this financial statistic) et al (1999, page 183), makes the same interpretation: ***"Stocks with betas greater than one are more volatile than the market and are known as aggressive stocks. In contrast, stocks with betas less than one are less volatile than the market index and are known as defensive stocks."*** In practice, market or index model is very common for beta estimation. Because the index model is linear, we estimate beta (sensitivity) coefficient of a stock through Simple (single-variable) Linear Regression Model (SLRM) equation. We regress returns of a stock against returns of the market index. The relationship is usually stated by following SLRM equation:

$$R_i = \alpha_i + \beta_i R_m + e_i \qquad (1)$$

Where R_i and R_m are return on the stock i and the return on the market m respectively. α_i is intercept, β_i is slope of linear regression. The intercept of this equation (denoted by the Greek letter alpha, or α) indicates return on stock when market return is zero. The slope coefficient, β_i, is the beta of stock i. e_i is error term (with a zero mean and constant standard deviation), commonly known as residual, represents unexplained component of R_i. It has expected value of zero ($E(e_i) = 0$) and is uncorrelated with R_m, the explanatory variable. e_i is also called noise variable as it contributes to the variance but not to the predicted value of *Ri* (dependent variable). The portion $R_i = \alpha_i + \beta_i R_m$ of SLRM in equation (1) is a straight line. Because $E(e_i) = 0$, if we take value of $E(R_i)$ in equation (1) we obtain following Simple Linear Regression Equation:

$$E(R_i) = \alpha_i + \beta_i E(R_m) \qquad (2)$$

This straight line is often referred to as the *prediction line*. Prediction line indicates that the predicted value of R_i equals α_i (intercept) plus β_i (slope) times the expected or known value of R_m. Equation (2) requires the determination of two

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regression coefficients α_i (intercept) and β_i (slope). The most common approach to determine α_i and β_i is the method of least-squares. The resulting slope of equation (2) can be expressed as:

$$\beta_i = \frac{Covr_{i,m}}{\sigma_m^2} \quad (3)$$

$$= \frac{\sigma_i \sigma_m r_{i,m}}{\sigma_m^2} \quad (4)$$

$$= r_{i,m} \frac{\sigma_i}{\sigma_m} \quad (5)$$

Where $Covr_{i,m}$ is covariance of stock i and market returns, σ_i is standard deviation of stock i returns, σ_m is standard deviation of market returns and $r_{i,m}$ is correlation coefficient between stock i and market returns.

Thus, beta depends on **(i)** the variability of individual stock's return(σ_i), **(ii)** the variability of market return(σ_m) and **(iii)** correlation coefficient between market and stock returns($r_{i,m}$). The ratio of standard deviations measures how variable the stock's return is relative to the variability of the market return. The more variable a stock's return relative to the variability of market return, the greater the risk associated with the individual stock. The correlation coefficient indicates whether this relative variability is important. Beta would have a little meaning if the mutual relationship between the stock's return and market return is weak (i.e, the correlation coefficient is not a big number). Normally, in SLRM, the strength of the relationship is estimated by the coefficient of determination *(R^2)*. The correlation coefficient is often converted into coefficient of determination, which is the correlation coefficient squired and is referred to as R^2. Since R^2 gives the proportion of variation in dependent variable (stock's return), that is explained by the independent variable (market return) in SLRM, it is an important statistic for the purpose of this study. R^2 is a direct measure of the explanatory power (goodness of fit) of simple linear regression equation. Thus, degree of reliability of prediction line (and of course beta) is determined through R^2 statistic. Beta with low coefficient of determination suggest that the beta is of little use in explaining the movements in stock's return, because some factors other than the market return are causing the variation in stock's return. We, therefore, conclude that R^2 statistic may be used as a proxy to degree of reliability of beta coefficient in prediction line.

BETA ESTIMATION PRACTICE OF STOCK EXCHANGES

The two leading stock exchanges of India - National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) mention beta values of prominent stocks on their respective web sites. Where BSE presents beta values of only those stocks which constitute Sensex, NSE presents beta values of all those stocks which are constituents of S&P CNX Nifty and CNX Nifty Junior. S&P CNX Nifty and CNX Nifty Junior represent hundred most liquid stocks in India. Both the stock exchanges revise this data on monthly bases. Standard beta estimation practice needs daily paired observations of return on market index (R_{Nifty} or R_{Sensex}) and stock's return (R_i) over a period of one year. Stock exchanges use Index Model for beta estimation and since this model is linear, both series of observations are summarized through SLRM. As mentioned above, a straight line is framed by using Least Squires Method (LSM) and beta is estimated as per equation (3) to (5). Historical values of daily paired observations of the two data series, R_{Nifty} and R_i, are estimated as follows:

$$R_{Nifty}(t) = \{CV_{Nifty}(t) - CV_{Nifty}(t-1)\}/ CV_{Nifty}(t-1) \qquad (6)$$

and

$$R_i(t) = \{CV_i(t) - CV_i(t-1)\}/ CV_i(t-1) \qquad (7)$$

Where $R_{Nifty}(t)$ is return on market index, Nifty, of $(t)^{th}$ day, $CV_{Nifty}(t)$ is closing value of Nifty of $(t)^{th}$ day and $CV_{Nifty}(t-1)$ is closing value of Nifty of $(t-1)^{th}$ day. Similarly, $R_i(t)$ is stock i return of $(t)^{th}$ day, $CV_i(t)$ is closing value of stock i of $(t)^{th}$ day and $CV_i(t-1)$ closing value of stock i of $(t-1)^{th}$ day.

HYPOTHESIS

Objective of the study is to examine whether degree of reliability of beta coefficients (in prediction lines) for aggressive stocks is significantly higher than to that for defensive stocks. Since Index Model adopted by leading stock exchanges in India for the purpose of beta estimation is a replica of SLRM, R-squired (R^2) is an appropriate statistic to represent degree of reliability of beta coefficient in prediction line. Initially, in this context, we test following hypothesis:

HYPOTHESIS 1

Null hypothesis (Ho):

$\mu (R^2_{\text{Aggresiv Stocks}}) = \mu (R^2_{\text{Defensive Stocks}})$

Alternate hypothesis (H_1):

$\mu (R^2_{\text{Aggresiv Stocks}}) \neq \mu (R^2_{\text{Defensive Stocks}})$

Where $\mu (R^2_{\text{Aggresiv Stocks}})$ is population mean of R-squired values of aggressive stocks and $\mu (R^2_{\text{Defensive Stocks}})$ is population mean of R-squired values of defensive stocks. Test of this hypothesis examines whether $\mu (R^2_{\text{Aggresiv Stocks}})$ is significantly different to $\mu (R^2_{\text{Defensive Stocks}})$. If H_1 proves to be correct, we test another hypothesis:

HYPOTHESIS 2

We test this hypothesis to ascertain whether $\mu (R^2_{\text{Aggresiv Stocks}})$ is significantly higher than to $\mu (R^2_{\text{Defensive Stocks}})$.

Here,

Null hypothesis (Ho):

$\mu (R^2_{\text{Aggresiv Stocks}}) \leq \mu (R^2_{\text{Defensive Stocks}})$

Alternate hypothesis (H_1):

$\mu (R^2_{\text{Aggresiv Stocks}}) > \mu (R^2_{\text{Defensive Stocks}})$

DATA SOURCE AND METHODOLOGY

A sample of hundred stocks of listed companies on NSE has been taken for this study. The sample of stocks has been selected from CNX 100 index of NSE. CNX 100 is a diversified hundred stocks index accounting for thirtyfive sectors of the economy and comprises of the stocks which are constituents of S&P CNX Nifty and CNX Nifty Junior. This sample is prominent enough just because of following counts:

1. CNX 100 represents about 73% of the free float market capitalization of stocks listed on NSE.

2. The traded value of all CNX100 stocks is approximately 70% of the traded value of all stocks on the NSE.

Datasets of daily closing values of S&P CNX Nifty and selected hundred stocks in the period 31st march 2009 to 31st march 2010 have been obtained from the web site of NSE. Since beta estimation practice of NSE requires daily paired observations of R_{Nifty} and R_i over a period of one year, we convert the obtained datasets into series of R_{Nifty} and R_i (for each stock) through equations (6) and (7) respectively for the financial year 2009-10. We apply Index Model for beta estimation and Simple Linear Regression Equation (Prediction Line) for each stock is framed using LSM. In our study, Microsoft Excel Regression - a data analysis tool is used to perform the computations involved in LSM.

Sample of hundred stocks is divided into two subsets i.e,

(i) Aggressive stocks with beta coefficient > one and

(ii) Defensive stocks with beta coefficient ≤ one. Initially, we need to compare the variability of R- squired values of aggressive and defensive stocks. *F* test statistic is used for testing the equality of two variances. One important reason to test for the difference between the variances of two populations i.e, R-squired values of aggressive and defensive stocks is to determine whether to use pooled-variance *t* test (equal variance case) or separate-variance *t* test (unequal variance case) for testing both the hypothesis mentioned above.

STATISTICAL ANALYSIS & RESULTS

The researchers have used Microsoft Excel Regression to obtain SLRM statistics of hundred sample stocks which are summarized in Table1.The Table 1 indicates that first 39 stocks are aggressive stocks (with a beta coefficient > one) and remaining 61 are defensive stocks. Microsoft Excel Descriptive Statistics for R-squired values of aggressive and defensive groups of stocks are mentioned in table 2.

Table 2 indicates that sample means of $R^2_{\text{Aggresiv Stocks}}$ and $R^2_{\text{Defensive Stocks}}$ are 0.5084 and 0.2898 with sample variances of

Table 1 : SLRM Statistics Of Sample Stocks

Sr. No	Name of Stock	α	β	R^2	Reg. Sig. F
1	Housing Development and Infrastructure Ltd.	0.0019	1.8268	0.5140	**
2	Unitech Ltd.	0.0000	1.7086	0.4896	**
3	Indiabulls Real Estate Ltd.	-0.0013	1.6668	0.4954	**
4	DLF Ltd.	-0.0006	1.6474	0.5637	**
5	Reliance Capital Ltd.	-0.0001	1.6087	0.6144	**
6	Jaiprakash Associates Ltd.	0.0009	1.5642	0.6181	**
7	Punj Lloyd Ltd.	-0.0003	1.5576	0.5436	**
8	Suzlon Energy Ltd.	-0.0006	1.5432	0.4187	**
9	IFCI Ltd.	0.0011	1.5047	0.4566	**
10	JSW Steel Ltd.	0.0041	1.4820	0.4446	**
11	Reliance Infrastructure Ltd.	-0.0002	1.4303	0.6045	**
12	Infrastructure Development Finance Co. Ltd.	0.0017	1.4161	0.5425	**
13	ICICI Bank Ltd.	0.0014	1.4124	0.6622	**
14	Tata Steel Ltd.	0.0019	1.3989	0.5060	**
15	Reliance Communications Ltd.	-0.0029	1.3932	0.5581	**
16	Kotak Mahindra Bank Ltd.	0.0012	1.3845	0.5806	**
17	Sterlite Industries (India) Ltd.	0.0009	1.3679	0.5275	**
18	Steel Authority of India Ltd.	0.0013	1.2939	0.6103	**
19	Hindalco Industries Ltd.	0.0026	1.2916	0.4621	**
20	IDBI Bank Ltd.	0.0013	1.2741	0.4556	**
21	Mahindra & Mahindra Ltd.	0.0017	1.2694	0.5481	**
22	Larsen & Toubro Ltd.	0.0010	1.2673	0.6927	**
23	Tata Motors Ltd.	0.0037	1.2248	0.3614	**
24	Reliance Natural Resources Ltd.	-0.0009	1.1990	0.3896	**
25	Axis Bank Ltd.	0.0018	1.1811	0.5554	**
26	Housing Development Finance Corporation Ltd.	0.0002	1.1671	0.5843	**
27	GMR Infrastructure Ltd.	-0.0012	1.1671	0.4754	**
28	State Bank of India	0.0003	1.1567	0.6316	**
29	Siemens Ltd.	0.0018	1.1409	0.5623	**
30	Bharat Forge Ltd.	0.0018	1.1346	0.3347	**
31	Ashok Leyland Ltd.	0.0025	1.1251	0.3846	**
32	Jindal Steel & Power Ltd.	0.0029	1.1178	0.4822	**
33	Reliance Industries Ltd.	-0.0010	1.1144	0.6820	**
34	HCL Technologies Ltd.	0.0031	1.1090	0.3693	**
35	Sesa Goa Ltd.	0.0043	1.0995	0.3504	**
36	Indian Overseas Bank	0.0007	1.0958	0.4281	**
37	Idea Cellular Ltd.	-0.0011	1.0777	0.4425	**
38	Aditya Birla Nuvo Ltd.	0.0009	1.0439	0.3943	**
39	Reliance Power Ltd.	-0.0005	1.0115	0.4921	**
40	Indian Hotels Co. Ltd.	0.0020	0.9980	0.3346	**
41	Mangalore Refinery & Petrochemicals Ltd.	0.0008	0.9631	0.2549	**
42	Syndicate Bank	0.0004	0.9619	0.4737	**
43	Bharti Airtel Ltd.	-0.0019	0.9554	0.3492	**
44	LIC Housing Finance Ltd.	0.0038	0.9431	0.2958	**
45	Tech Mahindra Ltd.	0.0033	0.9345	0.2086	**

46	Cairn India Ltd.	0.0001	0.9334	0.4604	**
47	Bharat Heavy Electricals Ltd.	-0.0001	0.9251	0.5658	**
48	Bank of India	0.0000	0.9241	0.3440	**
49	Crompton Greaves Ltd.	0.0036	0.9225	0.3200	**
50	Canara Bank	0.0019	0.9100	0.3953	**
51	Tata Teleservices (Maharashtra) Ltd.	-0.0016	0.9018	0.3213	**
52	United Phosphorus Ltd.	0.0000	0.8896	0.2978	**
53	United Spirits Ltd.	0.0012	0.8861	0.2918	**
54	Punjab National Bank	0.0019	0.8511	0.4733	**
55	Adani Enterprises Ltd.	0.0036	0.8454	0.2727	**
56	Andhra Bank	0.0019	0.8447	0.3709	**
57	Glenmark Pharmaceuticals Ltd.	0.0007	0.8399	0.2221	**
58	Torrent Power Ltd.	0.0042	0.8319	0.1847	**
59	Oil & Natural Gas Corporation Ltd.	-0.0003	0.8312	0.4483	**
60	Tata Consultancy Services Ltd.	0.0027	0.8285	0.3844	**
61	Ranbaxy Laboratories Ltd.	0.0028	0.8283	0.2573	**
62	Power Finance Corporation Ltd.	0.0008	0.8061	0.3236	**
63	ACC Ltd.	0.0004	0.8056	0.3802	**
64	ABB Ltd.	0.0011	0.8053	0.3783	**
65	Bank of Baroda	0.0025	0.7984	0.3502	**
66	Power Grid Corporation of India Ltd.	-0.0013	0.7964	0.5234	**
67	Patni Computer Systems Ltd.	0.0046	0.7930	0.1661	**
68	Federal Bank Ltd.	0.0011	0.7870	0.3297	**
69	HDFC Bank Ltd.	0.0011	0.7858	0.5491	**
70	Hero Honda Motors Ltd.	0.0009	0.7796	0.3437	**
71	Biocon Ltd.	0.0014	0.7685	0.2418	**
72	Tata Power Co. Ltd.	0.0008	0.7643	0.4305	**
73	Wipro Ltd.	0.0028	0.7607	0.3469	**
74	Ambuja Cements Ltd.	0.0006	0.7565	0.3229	**
75	Mundra Port and Special Economic Zone Ltd.	0.0022	0.7490	0.2646	**
76	Oracle Financial Services Software Ltd.	0.0033	0.7202	0.2475	**
77	Maruti Suzuki India Ltd.	0.0010	0.7115	0.3236	**
78	Zee Entertainment Enterprises Ltd.	0.0026	0.7101	0.1781	**
79	Union Bank of India	0.0014	0.7054	0.3014	**
80	Cummins India Ltd.	0.0028	0.6923	0.2666	**
81	Infosys Technologies Ltd.	0.0014	0.6849	0.3593	**
82	Corporation Bank	0.0026	0.6827	0.2988	**
83	GAIL (India) Ltd.	0.0007	0.6650	0.3127	**
84	Mphasis Ltd.	0.0034	0.6593	0.1745	**
85	Sun Pharmaceutical Industries Ltd.	0.0007	0.6451	0.2123	**
86	UltraTech Cement Ltd.	0.0017	0.6448	0.2693	**
87	NTPC Ltd.	-0.0007	0.6096	0.4275	**
88	I T C Ltd.	0.0002	0.6050	0.2764	**
89	Bharat Electronics Ltd.	0.0026	0.5889	0.2305	**
90	Bajaj Auto Ltd.	0.0038	0.5696	0.1862	**
91	Hindustan Petroleum Corporation Ltd.	-0.0003	0.5442	0.1459	**

92	Cipla Ltd.	0.0008	0.5062	0.1970	**
93	Bharat Petroleum Corporation Ltd.	0.0005	0.4473	0.1221	**
94	Dr. Reddy's Laboratories Ltd.	0.0032	0.4123	0.1297	**
95	Hindustan Unilever Ltd.	-0.0007	0.3795	0.1428	**
96	Container Corporation of India Ltd.	0.0018	0.3431	0.1372	**
97	Colgate Palmolive (India) Ltd.	0.0008	0.3235	0.1332	**
98	Asian Paints Ltd.	0.0034	0.2659	0.0735	**
99	Lupin Ltd.	0.0032	0.2322	0.0400	**
100	Glaxosmithkline Pharmaceuticals Ltd.	0.0019	0.0779	0.0126	

Note: ** and * indicates significance of regression at 1% and 5% levels respectively.

Table 2 : Descriptive Statistics

	R^2 *Aggresiv Stocks*	R^2 *Defensive Stocks*
Mean	0.5084	0.2898
Standard Error	0.015223456	0.015350723
Median	0.506	0.2978
Mode	#N/A	0.3236
Standard Deviation	0.095070452	0.119892976
Sample Variance	0.009038	0.014374
Kurtosis	-0.780282455	-0.058060315
Skewness	0.018892242	0.044966696
Range	0.358	0.5532
Minimum	0.3347	0.0126
Maximum	0.6927	0.5658
Sum	19.8291	17.6766
Count	39	61

0.009038 and 0.014374 respectively. Now, we use *F* test to determine whether two independent populations, $R^2_{\text{Aggresiv Stocks}}$ and $R^2_{\text{Defensive Stocks}}$, have same variability.

i.e, Ho: $\sigma^2(R^2_{\text{Aggresiv Stocks}}) = \sigma^2(R^2_{\text{Defensive Stocks}})$

Table 3: *F* test results for the difference between $\sigma^2(R^2_{\text{Aggresiv Stocks}})$ and $\sigma^2(R^2_{\text{Defensive Stocks}})$

F Test for Differences in Two Variances	
Data	
Level of Significance	0.05
Sample 1 : R^2 *Aggresiv Stocks*	
Sample Size	39
Sample Standard Deviation	0.095070452
Sample 2 : R^2 *Defensive Stocks*	
Sample Size	61
Sample Standard Deviation	0.119892976
Intermediate Calculations	
***F* Test Statistic**	**0.6288**
Population 1 Sample Degrees of Freedom	38
Population 2 Sample Degrees of Freedom	60

Two-Tail Test	
Lower Critical Value	0.5482
Upper Critical Value	1.7556
p-Value	0.1287
Do not reject the null hypothesis	
Lower-Tail Test	
Lower Critical Value	0.6048
p-Value	0.0644
Do not reject the null hypothesis	
Upper-Tail Test	
Upper Critical Value	1.6032
p-Value	0.9356
Do not reject the null hypothesis	

and H_1: $\sigma^2(R^2_{\text{Aggresiv Stocks}}) \neq \sigma^2(R^2_{\text{Defensive Stocks}})$.

Table 3 displays HP Stat2 results of *F* test. In table3, *F* test statistic is 0.6288. In testing for the equality of variances, as part of assessing the validity of the pooled-variance *t* test procedure, the *F* test is a two-tail test. Using 0.05 level of significance, the upper and lower critical values of *F* distribution with 38 and 60 degrees of freedom, are 1.7556 and 0.5482 respectively.

Because $F_L = 0.5482 < F = 0.6288 < F_U = 1.7556$ and p-value = 0.1287 > 0.05, we do not reject null hypothesis and conclude that there is no evidence of a significant difference in the variability of $R^2_{\text{Aggresiv Stocks}}$ and $R^2_{\text{Defensive Stocks.}}$ We, therefore, validate the use of pooled-variance *t* test for testing both the hypothesis mentioned above.

TESTING OF HYPOTHESIS 1:

As stated, Ho: $\mu(R^2_{\text{Aggresiv Stocks}}) = \mu(R^2_{\text{Defensive Stocks}})$

H_1: $\mu(R^2_{\text{Aggresiv Stocks}}) \neq \mu(R^2_{\text{Defensive Stocks}})$

Table 4 displays Microsoft Excel results of the pooled-variance *t* test for comparing the means of two independent populations i.e, $\mu(R^2_{\text{Aggresiv Stocks}})$ & $\mu(R^2_{\text{Defensive Stocks}})$.

Table 4

t-Test: Two-Sample Assuming Equal Variances		
	R^2 Aggresiv Stocks	***R^2 Defensive Stocks***
Mean	0.508438462	0.289780328
Variance	0.009038391	0.014374326
Observations	39	61
Pooled Variance	0.01230529	
Hypothesized Mean Difference	0	
df	98	
t Stat	9.6143	
P(T<=t) one-tail	4.16E-16	
t Critical one-tail	1.6606	
P(T<=t) two-tail	8.32E-16	
t Critical two-tail	1.9845	

t - Test Results For The Difference Between $\mu(R^2_{\text{Aggresiv Stocks}})$ and $\mu(R^2_{\text{Defensive Stocks}})$

To perform this two-tail hypothesis test, upper-tail and lower-tail critical values from *t* distribution with 98 degrees of freedom and 0.05 level of significance are 1.9845 and -1.9845 respectively. In table 4, *t* test statistic is 9.6143 and *p*-value is 8.32E-16 (approximately zero). Since $t = 9.6143 > t_{98} = 1.9845$ and p-value = 8.32E-16 < 0.05, we reject null hypothesis and conclude that $\mu(R^2_{Aggresiv\ Stocks})$ and $\mu(R^2_{Defensive\ Stocks})$ are significantly different. Result comes similar also at 0.01 level of significance as *p*-value is even lesser than to 0.01.

TESTING OF HYPOTHESIS 2

Here, Ho: $\mu(R^2_{Aggresiv\ Stocks}) \leq \mu(R^2_{Defensive\ Stocks})$

H_1: $\mu(R^2_{Aggresiv\ Stocks}) > \mu(R^2_{Defensive\ Stocks})$

Using 0.05 level of significance, for one-tail test in the upper tail, the critical value from *t* distribution is 1.6606 (Pl. refer table 4). Since $t = 9.6143 > t_{98} = 1.6606$ (one-tail) and *p*-value = 4.16E-16 < 0.05, there is sufficient evidence to reject null hypothesis. Ho is also rejected at 0.01 level of significance. We, therefore, conclude that $\mu(R^2_{Aggresiv\ Stocks})$ is significantly higher than to $\mu(R^2_{Defensive\ Stocks})$.

CONCLUSION

It becomes evident from above discussion that in practice, aggressive stocks not only carry big beta coefficients but also have significantly higher R-squired values in comparison to their counterparts. Since R-squired statistic is a direct measure of explanatory power (goodness of fit) of simple linear regression equation, we conclude that beta coefficients (estimated through Index Model) for aggressive stocks carry considerably higher degree of reliability over defensive stocks.

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