

## **The Bull and Bear market beta – Evidence from the Indian stock Market**

**H.V. Jhamb,<sup>8</sup> K.L.Dhaiya<sup>9</sup>, Shikha Menani<sup>\*10</sup>**

---

**Abstract:** Capital Asset pricing model is one of the oldest models that present a relationship between expected return and market risk. The model states that market risk as measured by beta is able to explain the returns thereby giving it the most important determinant status in asset pricing. Recent empirical studies however present a doubt on the validity of a single beta model and various explanations have been given to justify that a single beta is not significant in explaining the returns of risky securities and/or portfolio as beta itself is not stable over different time periods. The present paper is thus an attempt to find out whether a single beta CAPM as proposed by Sharpe Lintner and Mossin is helpful in explaining the risk return relationship of the stock returns in India using 271 securities listed on BSE 500 for the period Jan 2000 – Dec 2016 or dual beta CAPM taking account of upside and downside risk is more successful in explaining the returns of the securities. Fabozzi and Francis supported the single beta CAPM by suggesting that it is insignificant to use two independent betas one for the bull market and other for the bear market. Apart from descriptive statistics the study uses Unit root test, OLS regression, Dummy analysis to empirical test the validity of single beta and Dual beta CAPM. Results revealed that a single beta CAPM is successful in explaining the stock returns and no significant improvement is found by taking up and down market betas.

**Key Words:** Dual Beta, Unit root, OLS regression, Dummy Analysis, Capital Asset Pricing Model, Bull and Bear Market

**JEL Classification:** G11, G12, G31, J11

### **INRODUCTION**

Capital market plays an important role in bridging the gap between capital scarce and capital abundant sectors/players. To enhance liquidity in the capital market and specifically stock market by bringing in more investors an efficient mechanism is needed where investors are compensated for bearing risk. Risk-return trade off or relationship plays an important role as to

---

<sup>8</sup> Associate Professor (Retired), Department of Commerce, Sri Guru Tegh Bahadur Khalsa College, University of Delhi, email:[Jhamb.harsh.v@gmail.com](mailto:Jhamb.harsh.v@gmail.com)

<sup>9</sup> Associate Professor, School of Open Learning, Department of Commerce, email: [Kldaiya@gmail.com](mailto:Kldaiya@gmail.com)

<sup>10</sup> Assistant Professor ,P.G.D.A.V College, University of Delhi, email:[Shikha75b@gmail.com](mailto:Shikha75b@gmail.com)

how investors make their investment. Researchers have been searching for various risk return mechanisms that can provide whether the returns being generated by a security and/or portfolio justifies the risk being taken. One such model that has been thoroughly researched is the Capital Asset Pricing Model given by Sharpe Lintner and Mossin which states that risk can be divided into two types – systematic and unsystematic and it is only the systematic risk that investor is compensated for as the unsystematic risk can be easily diversified away by holding an optimum portfolio. Systematic risk is measured by using beta that measures the volatility of a stock's return in comparison to the market return. However time and again empirical validity of the model has been questioned and advanced or reformed versions of the model have been presented that have been claimed to provide better explanation to the risk return relationship like the Fama French three factor model, consumption CAPM, Intertemporal CAPM, and Ross Arbitrage Pricing Theory. However one similarity between all the models is that they use the concept of Beta. Almost all the traditional models use a single beta for all the market conditions and does not differentiate between an up market beta and a down market beta as was done by Fabozzi and Francis (1977) in their seminal paper where they included a dummy variable to test for dual beta and found that there is no significant difference between the two separate market betas. Since then various studies have been conducted to find out the stability of beta and different results have been obtained.

### **Objectives of the study**

- To find if there is significant difference in the excess returns or alpha of the individual securities in bull and bear market
- To find if there is significant difference in the beta of the stock returns in bull and bear market
- To empirically test if bear market beta is higher as compared to bull market beta.

### **Review of literature**

CAPM has been time and again tested by various researchers and various studies have empirically proved that CAPM is not a good fit for explaining the stock and/or portfolio returns as the very premise on which the model is based that is market risk (Beta) is questionable. The work that started the empirical validation of stable beta in all types of market (up and down) was by Fabozzi and Francis(1977). After this many studies have been conducted to find if there a single beta that explains the returns or a model requiring dual beta is needed. Few such studies have been presented :

**Fabozzi and Francis (1977)** used 70 stocks listed on New York Stock Exchange to find if there is significant difference between bull and bear market variables. For this they used dummy variables for testing alpha and beta differentials and at significance level of 1% found that only 1% of the securities have significant difference in alpha and beta coefficients. For the testing they used simple regression one with stable beta and other with dummy for the period Jan 1966 to Dec 1971 and found similar results throughout. Using incremental F test the study proved that

beta has been stable over the time period. To strengthen the results they have used three definitions of bull and bear – one using market information that is mentioned in publications, second classifying bull as the month having positive return and bear as the month having negative return and third excluding minimal transition month by including only those months where movement in either direction has been more than 5% the average return. All the three definitions provided similar results thus confirming the presence of stable beta.

**Stefanescu, Nistor and Dumitriu (2009)** investigated the Beta responses on ten stocks listed on Bucharest stock exchange to find whether the impact of good news and bad news on these stocks' return is similar or different. They used univariate kernel density to divide the total time period of Jan 2009 to July 2009 into up, low and tranquil markets. They used daily data to run two separate regressions one and that had dummy variables to construct a multifactor equation for finding beta for bull, bear and tranquil markets and other a single beta model to find beta as given by traditional CAPM. Results revealed that the mean beta of bear market outperformed single beta, tranquil beta and bull beta thereby supporting that a single beta model is not sufficient to explain excess return on stocks.

**Javid and Ahmad (2011)** The study made use of daily data of 50 firms listed on Karachi stock exchange for the period 1993-2007 to find that the betas differ significantly in the up and down markets such that betas increased when the market go up and decrease during down market. The study used market model for testing CAPM with stable beta and OLS regression with dummy for slope to test differential effect of bull and bear beta on the securities return. To compensate for measurement error they used Shanken t statistic to find that individual betas of securities are not stable throughout the time period and hence different testing is required for the up and down markets.

**Choi D and Fu (2012)** tested CAPM on 82 firms listed on New Zealand stock exchange for the period 1991-2003 to test using dummy analysis if there is significant difference in OLS estimation of CAPM model based on market conditions that is up and down market. Because of less trading in the New Zealand stock market they have included total risk along with beta instead of standard deviation of residuals to test for CAPM equation. Results revealed presence of significant negative relation between beta and returns in down market while no such positive or negative significant results are seen in the up market.

**Alagidede, Koutounidis and Panagiotidis(2017)** The study is based on the objective of testing the impact of financial crisis on traditional CAPM and basically beta using OLS and M estimation with fixed and random effect on the Johannesburg securities exchange. Monthly data for the period Jan 2000 to Dec 2014 has been used for the study wherein Fama and Macbeth two step procedure has been used for testing the validity of CAPM. Study revealed that Beta has been stable before the crisis but the same cannot be said for the period after the crisis thereby suggesting that investors need to be careful while using CAPM as any variation in normal market condition can severely impact the performance of beta and therefore CAPM.

**Suntraruk (2018)** The study used monthly data for the period 2000 to 2006 to test CAPM under different market conditions of bull and bear. Using dummy analysis as suggested by Fabozzi and

Francis for Thailand market they tested whether bull and bear market alpha and beta are significantly different or there is a single beta that is sufficient to provide explanation of excess security returns. The study tested beta stability on market value based portfolios rather than on individual securities. It also found that in bear period smallest portfolio outperformed the largest portfolio and in bull period the reverse holds true. It also revealed that single beta CAPM holds in all the market situations and bull or bear market does not have any impact on the performance of CAPM thereby supporting Fabozzi and Francis.

### **Data and methodology**

Secondary data from BSE and PROWESS has been used. BSE S&P 500 index has been used as proxy for market return as it covers 93% of total market capitalization. Out of 500 companies listed on it only those that have been continuously traded for all the 17 years has been selected. Hence monthly data of 272 companies from the period January 2000 to December 2016 has been used to do dummy regression analysis to find out the stability of beta. As the time series data involves problem of non stationarity and regression with non stationary data is spurious so the first step in the time series data is to test for stationarity that has been done using Augmented dickey Fuller test (ADF) and Phillips Perron test (PP). Both the stock prices and market index being non stationary at level have been converted to natural log returns to make them stationary.  $R_i = \text{Log}(P_t) - \text{Log}(P_{t-1})$  where  $R_i$  = return on security for time period t and  $P_t$  = Closing price of security for time period t and  $P_{t-1}$  is closing price of security for the previous month. Thus while the closing prices were non stationary, log differentials that gives returns are stationary and would be used in the regression.

$R_m = \text{Log}(P_m) - \text{Log}(P_{m-1})$  where  $R_m$  = return on BSE S&P500 for time period t and  $P_m$  = Closing value of index for time period t and  $P_{m-1}$  is closing value of index for the previous month. Thus while the closing index values were non stationary, log differentials that gives returns are stationary and would be used in the regression.

### **Ols regression model**

After obtaining stationary data set for the empirical investigation of stability of beta in the Indian stock market three different OLS regression equation have been tested where the first equation involves excess stock returns as dependent variable and excess market return as the independent variable and along with that a dummy is used to find intercept differential in case of bull and bear markets. Second equation involves dummy variable both for intercept and slope differential and last equation is simple CAPM equation to find best model fit out of the three for determining expected return. To validate the regression model residual diagnostics has been done to find out whether the error term is white noise or contains some additional information. For this Breusch Godfray Serial Correlation Lagrange Multiplier test, Breusch Pegan-Godfray test and Jarque bera statistics have been computed to test for autocorrelation, heteroscedasticity and normality of the residuals.

Equation for Bull and Bear market beta

$$R_i - R_f = \alpha_{\text{Bear}} + (\alpha_{\text{Bull}} - \alpha_{\text{Bear}})D_t + \beta_{\text{Bear}}(R_m - R_f) + (\beta_{\text{Bull}} - \beta_{\text{Bear}})D_t(R_m - R_f) + e$$

For Bear as  $D = 0$  So

$$R_i - R_f = \alpha_{\text{Bear}} + \beta_{\text{Bear}}(R_m - R_f) + e$$

For Bull as  $D = 1$  So

$$R_i - R_f = \alpha_{\text{Bear}} + (\alpha_{\text{Bull}} - \alpha_{\text{Bear}}) + \beta_{\text{Bear}}(R_m - R_f) + (\beta_{\text{Bull}} - \beta_{\text{Bear}})(R_m - R_f) + e$$

Thus it provides for differential alpha and beta in case of bull and bear market and if the differential effect is significantly different in both the markets then it shows that beta are not stable in up and down market and Sharpe Lintner and Mossin CAPM does not hold in the Indian stock market.

To determine what is an up market and what is a down market a comparison is done between the current month return and past month return such that when the market return of the current month is positive that is the index is higher than the previous month that is  $R_{mt}$  is positive then market is taken to be up market and when the market return of the current month is negative that is  $R_{mt}$  is negative such that index is lower than the previous month then market is said to be down.

**Table 1` : Bear and Bull beta for the period Jan 2000-Dec 2016**

Company Name	Bear Beta	Bull Beta	Company Name	Bear Beta	Bull Beta	Company Name	Bear Beta	Bull Beta
3M India Ltd.	1.0552	0.4709	F D C Ltd.	0.8119	0.6225	N C C Ltd.	1.3163	1.5116
A B B India Ltd.	1.1523	1.0465	Federal Bank Ltd.	1.0785	1.0956	N I I T Ltd.	1.0297	1.0782
A C C Ltd.	0.8266	0.7925	Finolex Cables Ltd.	0.9967	0.9260	N L C India Ltd.	1.5267	1.3487
Aarti Industries Ltd.	0.5949	0.6398	Finolex Industries Ltd.	0.9571	0.9424	Natco Pharma Ltd.	1.1297	0.6857
Aban Offshore Ltd.	1.4262	1.2355	G A I L (India) Ltd.	0.8250	0.9146	National Aluminium Co. Ltd.	1.4052	1.1078
Abbott India Ltd.	0.5428	0.1452	G E Power India Ltd.	1.4677	1.1904	Nava Bharat Ventures Ltd.	0.8723	1.4456
Adani Enterprises Ltd.	0.6917	1.8916	G E T & D India Ltd.	1.1703	1.1439	Navneet Education Ltd.	0.9471	0.7519
Aditya Birla Nuvo Ltd.	0.8818	1.0544	G H C L Ltd.	1.3363	0.5300	Nestle India Ltd.	0.3750	0.2904

Aegis Logistics Ltd.	1.4779	1.5239	G I C Housing Finance Ltd.	0.8622	1.4960	Nilkamal Ltd.	1.0897	0.9107
Ajanta Pharma Ltd.	0.9551	0.7018	Geometric Ltd.	1.7169	0.7532	Novartis India Ltd.	0.5609	0.3581
Akzo Nobel India Ltd.	0.5373	0.0498	Gillette India Ltd.	0.8683	0.2913	Oil & Natural Gas Corpn. Ltd.	0.8097	0.9718
Amara Raja Batteries Ltd.	1.6623	0.8717	Glaxosmithkline Consumer Healthcare Ltd.	0.4630	0.1453	Oriental Bank Of Commerce	0.7570	1.1145
Ambuja Cements Ltd.	0.8683	0.6923	Glaxosmithkline Pharmaceuticals Ltd.	0.5137	0.2438	Pfizer Ltd.	0.5613	0.3863
Amtek Auto Ltd.	1.1509	1.0095	Glenmark Pharmaceuticals Ltd.	0.7967	0.9245	Phoenix Mills Ltd.	1.4144	0.5964
Apollo Hospitals Enterprise Ltd.	0.4705	0.3953	Godfrey Phillips India Ltd.	0.7891	0.7433	Pidilite Industries Ltd.	0.8208	0.7388
Apollo Tyres Ltd.	1.3263	0.9284	Godrej Industries Ltd.	1.1099	1.7077	Piramal Enterprises Ltd.	0.8538	0.5785
Arvind Ltd.	1.6565	1.2999	Grasim Industries Ltd.	1.0595	0.7778	Polaris Consulting & Services Ltd.	1.7073	1.1353
Asahi India Glass Ltd.	0.6843	0.5674	Great Eastern Shipping Co. Ltd.	1.0098	0.9863	Praj Industries Ltd.	1.4404	0.8707
Ashok Leyland Ltd.	1.1485	1.1260	Greaves Cotton Ltd.	0.7869	0.8914	Prism Cement Ltd.	1.3106	1.2172

Asian Paints Ltd.	0.3427	0.4735	Gruh Finance Ltd.	0.8838	0.7188	Procter & Gamble Hygiene & Health Care Ltd.	0.4374	0.2186
Astrazeneca Pharma India Ltd.	0.5354	0.5863	Gujarat Fluorochemicals Ltd.	1.2854	1.2409	Rain Industries Ltd.	1.2847	1.5455
Atul Ltd.	1.0215	0.6914	Gujarat Mineral Devp. Corpn. Ltd.	1.1559	1.6479	Rajesh Exports Ltd.	1.1251	0.9786
Aurobindo Pharma Ltd.	1.6504	1.2311	Gujarat Narmada Valley Fertilizers & Chemicals Ltd.	1.1891	0.8006	Rallis India Ltd.	0.6464	0.8836
Avanti Feeds Ltd.	0.4286	0.1467	Gujarat State Fertilizers & Chemicals Ltd.	1.1964	0.9393	Ramco Cements Ltd.	0.8277	0.7925
Axis Bank Ltd.	0.9006	1.1372	H C L Infosystems Ltd.	1.7105	0.8578	Rashtriya Chemicals & Fertilizers Ltd.	1.7235	1.5197
B A S F India Ltd.	0.6313	0.5988	H C L Technologies Ltd.	1.0890	0.7267	Raymond Ltd.	0.9289	1.2152
B E M L Ltd.	1.3522	1.1173	H D F C Bank Ltd.	0.6163	0.8233	Relaxo Footwears Ltd.	0.4742	0.6764
Bajaj Electricals Ltd.	0.6867	1.1855	H S I L Ltd.	1.1869	1.3909	Reliance Capital Ltd.	1.5150	1.7608
Bajaj Finance Ltd.	1.2144	0.6895	Havells India Ltd.	0.7518	1.2107	Reliance Industries Ltd.	0.6118	0.9854

Bajaj Hindusthan Sugar Ltd.	1.8288	2.3835	Heidelberg Cement India Ltd.	1.0700	1.5504	Reliance Infrastructure Ltd.	1.0075	1.7003
Bajaj Holdings & Invst. Ltd.	1.0455	0.3544	Hero Motocorp Ltd.	0.3913	0.6062	Rolta India Ltd.	1.5242	1.2897
Balkrishna Industries Ltd.	1.2857	1.1245	Hexaware Technologies Ltd.	1.3910	1.1457	S K F India Ltd.	0.7259	0.7137
Balmer Lawrie & Co. Ltd.	0.9267	0.8903	Himachal Futuristic Communications Ltd.	2.3140	1.9216	S M L Isuzu Ltd.	0.6258	0.6011
Balrampur Chini Mills Ltd.	1.3427	1.1763	Himatsingka Seide Ltd.	0.8318	0.9478	S R E I Infrastructure Finance Ltd.	0.9992	1.4244
Bank Of Baroda	0.6709	1.1456	Hindalco Industries Ltd.	0.9177	1.1516	S R F Ltd.	0.9428	0.8131
Bank Of India	0.8380	1.4097	Hindustan Construction Co. Ltd.	1.2073	1.8256	Sanofi India Ltd.	0.6245	0.3755
Bata India Ltd.	1.3013	0.8958	Hindustan Petroleum Corpn. Ltd.	0.8655	0.7792	Shipping Corpn. Of India Ltd.	1.0885	1.4779
Bayer Cropscience Ltd.	0.9064	0.7323	Hindustan Unilever Ltd.	0.5016	0.3950	Shree Cement Ltd.	1.3673	0.9331
Berger Paints India Ltd.	0.5143	0.3816	Hindustan Zinc Ltd.	1.1163	1.0474	Shriram Transport Finance Co. Ltd.	0.6470	0.9332
Bharat Electronics Ltd.	1.1247	0.8654	Honeywell Automation India Ltd.	0.8115	1.1109	Siemens Ltd.	0.9729	1.3170



Bharat Forge Ltd.	1.0344	1.0116	Housing Development Finance Corpn. Ltd.	0.5358	0.9301	Sintex Industries Ltd.	1.0963	1.8700
Bharat Heavy Electricals Ltd.	0.8519	0.8839	I C I C I Bank Ltd.	0.8795	1.3948	Sonata Software Ltd.	1.0661	0.8016
Bharat Petroleum Corpn. Ltd.	0.9707	0.6667	I D B I Bank Ltd.	1.1447	1.5081	South Indian Bank Ltd.	0.9638	1.0565
Birla Corporation Ltd.	1.2737	1.0283	I F C I Ltd.	1.5136	1.7434	Spicejet Ltd.	1.2108	1.4558
Bliss G V S Pharma Ltd.	0.8367	0.8120	I T C Ltd.	0.7015	0.4829	State Bank Of Bikaner & Jaipur	0.5584	1.1624
Blue Dart Express Ltd.	0.9190	0.3351	I T D Cementation India Ltd.	1.1829	1.1336	State Bank Of India	0.7595	1.2242
Blue Star Ltd.	0.9525	0.9756	India Cements Ltd.	1.4102	1.2094	State Bank Of Travancore	0.5580	1.3552
Bombay Burmah Trdg. Corpn. Ltd.	0.7651	1.1447	Indian Hotels Co. Ltd.	0.8643	0.9728	Steel Authority Of India Ltd.	1.1721	1.8706
Bombay Dyeing & Mfg. Co. Ltd.	1.5212	1.7310	Indian Oil Corpn. Ltd.	0.9551	1.0463	Sun Pharmaceutic al Inds. Ltd.	0.6398	0.3611
Bosch Ltd.	0.4922	0.6401	Indo Count Inds. Ltd.	0.8377	0.5348	Sundram Fasteners Ltd.	0.8524	0.8097
Britannia Industries Ltd.	0.2599	0.0801	Indusind Bank Ltd.	1.1171	1.3189	Supreme Industries Ltd.	1.2907	0.6942
C C L Products (India) Ltd.	1.0376	0.9688	Infosys Ltd.	0.5972	0.4549	Suven Life Sciences Ltd.	0.9627	0.9507

C E S C Ltd.	0.8946	1.2516	Ingersoll-Rand (India) Ltd.	0.7804	0.4499	Symphony Ltd.	0.9781	0.6969
Cadila Healthcare Ltd.	0.5240	0.4983	Ipca Laboratories Ltd.	0.8983	0.9268	Syndicate Bank	0.9143	1.0496
Can Fin Homes Ltd.	0.6850	0.8892	J B Chemicals & Pharmaceuticals Ltd.	0.6269	0.3410	T T K Prestige Ltd.	0.8172	0.8062
Carborundum Universal Ltd.	0.4339	0.5908	J B F Industries Ltd.	1.0686	1.3647	T V S Motor Co. Ltd.	1.0430	0.9862
Castrol India Ltd.	0.6711	0.2557	J K Lakshmi Cement Ltd.	1.1789	1.1247	T V S Srichakra Ltd.	0.8623	0.6382
Ceat Ltd.	1.1951	1.5096	J K Tyre & Inds. Ltd.	1.1256	0.9822	Tamil Nadu Newsprint & Papers Ltd.	0.5564	0.5107
Century Textiles & Inds. Ltd.	1.7247	1.5668	J M Financial Ltd.	0.8520	1.4471	Tata Chemicals Ltd.	1.0759	0.8353
Chambal Fertilisers & Chemicals Ltd.	0.9046	0.8310	J S W Steel Ltd.	1.1423	1.7327	Tata Communications Ltd.	0.8029	0.7080
Chennai Petroleum Corpn. Ltd.	1.2635	1.2071	Jai Corp Ltd.	1.1292	2.0020	Tata Elxsi Ltd.	1.2196	0.7080
Cholamandalam Investment & Finance Co. Ltd.	1.1639	1.0263	Jain Irrigation Systems Ltd.	0.5552	0.7448	Tata Global Beverages Ltd.	0.8466	0.6800
Cipla Ltd.	0.5493	0.2885	Jammu & Kashmir Bank Ltd.	0.7978	1.0713	Tata Investment Corpn. Ltd.	0.7876	1.1850

City Union Bank Ltd.	0.7645	0.8237	Jindal Poly Films Ltd.	0.6805	0.3855	Tata Motors Ltd.	1.5198	1.0444
Colgate-Palmolive (India) Ltd.	0.4238	0.1228	Jindal Steel & Power Ltd.	1.4510	1.7465	Tata Power Co. Ltd.	1.3034	1.3877
Container Corp. Of India Ltd.	0.7705	0.6361	Johnson Controls-Hitachi Air Conditioning India Ltd.	1.0591	0.9076	Tata Sponge Iron Ltd.	0.5899	1.5141
Coromandel International Ltd.	0.4265	0.8612	Jubilant Life Sciences Ltd.	1.1833	0.9578	Tata Steel Ltd.	1.2871	1.7278
Corporation Bank	0.9608	1.2525	K R B L Ltd.	0.9805	0.6461	Thermax Ltd.	0.9603	1.2865
Crisil Ltd.	0.8020	0.1550	Kajaria Ceramics Ltd.	1.1035	0.6727	Thomas Cook (India) Ltd.	1.1186	0.8304
Crompton Greaves Ltd.	1.1180	1.0770	Kalpataru Power Transmission Ltd.	1.0888	1.0238	Timken India Ltd.	0.8560	0.6621
Cummins India Ltd.	1.0127	0.5095	Kansai Nerolac Paints Ltd.	0.5545	0.5736	Titan Company Ltd.	1.0185	0.7950
Cyient Ltd.	1.5482	0.7080	Kesoram Industries Ltd.	1.2185	1.5650	Torrent Pharmaceuticals Ltd.	1.0635	0.6401
D C M Shriram Ltd.	1.2415	0.9750	Kotak Mahindra Bank Ltd.	1.2412	0.8137	Trent Ltd.	0.8538	0.4910
Dabur India Ltd.	0.6262	0.3358	L I C Housing Finance Ltd.	1.1092	1.5122	Trident Ltd.	1.0046	1.1474
Deepak Fertilisers & Petrochemicals Corpn. Ltd.	0.9103	0.7861	La Opala R G Ltd.	0.9421	0.7490	Tube Investments Of India Ltd.	0.8154	0.8085

Dena Bank	0.9490	1.0939	Lakshmi Machine Works Ltd.	0.9943	1.5207	U P L Ltd.	0.7988	0.7976
Dewan Housing Finance Corpn. Ltd.	0.4482	1.2970	Larsen & Toubro Ltd.	1.2044	1.3781	Uflex Ltd.	1.6864	0.6354
Dhanuka Agritech Ltd.	0.3591	0.1830	Linde India Ltd.	0.6989	0.5123	Unichem Laboratories Ltd.	0.6522	0.7731
Dr. Reddy'S Laboratories Ltd.	0.4840	0.4534	Lupin Ltd.	0.8423	0.5531	Unitech Ltd.	0.9060	2.0022
Dynamatic Technologies Ltd.	0.9161	0.8852	M R F Ltd.	1.2852	1.3373	V I P Industries Ltd.	0.8000	1.1581
E I D-Parry (India) Ltd.	0.6001	0.9098	Mahanagar Telephone Nigam Ltd.	0.7985	1.1065	V S T Industries Ltd.	0.7768	0.6636
E I H Ltd.	0.6205	0.4692	Mahindra & Mahindra Ltd.	1.1567	0.7449	Vakrangee Ltd.	2.7816	1.7449
Eicher Motors Ltd.	0.9147	0.6421	Mahindra Lifespace Developers Ltd.	0.9387	1.2439	Vardhman Textiles Ltd.	0.8337	1.2470
Elgi Equipments Ltd.	0.7813	0.8255	Mangalore Refinery & Petrochemicals Ltd.	1.1915	1.7707	Vedanta Ltd.	1.1511	1.6384
Engineers India Ltd.	1.2002	1.0272	Marico Ltd.	0.4627	0.4228	Voltas Ltd.	0.8532	1.3338
Escorts Ltd.	1.6254	1.0701	Marksans Pharma Ltd.	1.6948	1.1500	Welspun India Ltd.	1.1394	1.4318
Essel Propack Ltd.	1.2777	1.1615	Max Financial Services Ltd.	0.8837	1.4047	Whirlpool Of India Ltd.	0.9375	1.1621

Eveready Industries (India) Ltd.	1.2970	0.5713	Monsanto India Ltd.	0.9489	0.3810	Wipro Ltd.	1.3001	0.9053
Exide Industries Ltd.	0.7006	0.9001	Motherson Sumi Systems Ltd.	0.8788	0.5426	Wockhardt Ltd.	1.4111	0.4861
F A G Bearings India Ltd.	0.6463	0.2230	Mphasis Ltd.	1.2320	1.0244	Zee Entertainment Enterprises Ltd.	1.0316	0.7581
Source: Author's own computation						Zensar Technologies Ltd.	1.5672	0.8800

As seen from data above that 164 securities have higher bear beta as compared to bull beta and 107 securities have higher bull beta, thus laying the path for testing of stability of beta using dummy analysis whose results reveal that though the bear and bull betas differ but there is no significant differential impact on the regression alphas and betas of the market situation. As can be seen from table below that 7 percent of securities have a significant differential alpha where bull and bear excess return as measured by alpha is different according to market conditions. Similarly 10 percent securities have a significant differential beta where beta varies in bull and bear market.

**Table 2: Differential effect of Alpha and Beta using Dummy Regression Analysis**

	At 5%		At 10%	
	Alpha differential	Beta Differential	Alpha differential	Beta Differential
<b>Time Period</b>				
<b>Jan 2000- Dec 2016</b>	19 securities	28 Securities	30 securities	45 securities
<b>In Percent</b>	7.04%	10.37%	11.11%	16.67%

Source: Author's Own Computation

### Empirical results

The above regression analysis revealed that the bull and bear betas are different but the difference is not that significant to impact the SLM capital asset pricing model. Results also revealed that though no significant differences are found in different regression parameters but bear market betas are found to be higher than the bull market beta in majority of the stocks but the difference is not that high to impact the overall decision making and also average bear and bull betas for all the securities combined is also almost same. The results thus provide

confirmation to Fabozzi and Francis model and thus investors can make decision on the basis of beta irrespective of whether market is going up or down.

## Conclusion

The study has tried to empirically test stability of beta over different time periods that is bull and bear market using monthly data for the 17 year data from Jan 2000 to Dec 2016 and using OLS regression with Dummy variables for up and down market it was found that neither the excess security returns nor the betas differed significantly in different market conditions as only 7% and 10% of securities out of 271 has a significantly different alpha and beta respectively. Estimation of Beta being the first step in various asset pricing models required the testing of its stability and above results proves that there is no need for calculating two different betas for up and down market and testing of the models can be done as a whole. However the results do not provide any evidence for justification of CAPM in the Indian security market for which further investigation is required.

## Bibliography

1. Ahmad, A. Y. (2011). Asset Pricing Behaviour with Dual-Beta in Case of Pakistani Stock Market. *Pakistan Development Review* , 95-118.
2. Chen, Nai-fa (1982) An Examination of Risk Return Relationship in Bull and bear Markets Using Time-Varying Security Betas. *Journal of Financial and Quantitative Analysis*, 265–286.
3. Fabozzi, f. J. (1977). Stability tests for alphas and betas over Bull and bear market conditions. *Journal of finance, American finance association* , 1093-1099.
4. Hwang, C. P. (2003). Does downside beta matter in asset pricing. *Unpublished paper* .
5. Paul Alagidede, N. K. (2017). On the stability of the CAPM before and after the financial crisis : panel evidence from the Johannesburg Securities Exchange. *African Review of Economics and Finance* , 180 –189.
6. Pagan, A. and K. Sossounov (2000) A Simple Framework for Analysing Bull and Bear Markets. Australian National University.(Working Paper).
7. Pettengill, G., S. Sundaram and I. Muthar (1995)The Conditional Relation between Beta and Return, *Journal of Financial and Quantitative Analysis*, 101–116
8. Razvan Stefanescu, C. N. (2009). Asymmetric Responses of CAPM-Beta to the Bull and Bear Markets on the Bucharest Stock Exchange. *Annals of the University of Petrosani, Economics* , 257-262.
9. Sossounov, A. P. (2003). A simple framework for analyzing bull and bear markets. *Journal of Applied Econometrics* , 23-46.
10. Yaseer, D. L. (2012). Is capital asset pricing model relevant to Indian Stock Market. *journal of Business Management Studies* , 55-68.