

Empirical Evidence for Naïve Investment Strategy in Indian Financial Markets

(Study of BSE select indices: Sensex, BSE200 and BSE 500)

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Abstract: Modern portfolio analysis show that how diversification benefits are derived to search and invest in the assets/ portfolios which are on the efficient frontier of the investment space. In the present study we start with a very simple alignment of understanding and finding the benefit in investing in the various indices like sensex, BSE200, BSE 500.

Literature Review

The need of simple yet powerful method of investment has been made popular by investors like Benjamin Graham, Warren Buffet. The methods advocated by Benjamin Graham in his book "Intelligent Investor and Security Analysis" has been as old as 1934. In article "How to Assess Real World Portfolio Diversification" by John Dowdⁱ has considered volatility and the return relation for different investment assets based on NASDAQ. A similar and simple analysis has been done by Ryan Hypke "Evaluating a diversified portfolio using different benchmarks". He has taken US Indices for his evaluation. In the working paper by Gianni Pola "Is your portfolio effectively diversified?" Balanced Quantitative Research – Amundi, Gianni uses the concept of "available diversification and diversification curve"ⁱⁱ.

What is missing in the lot of analysis is the use of simple yet powerful techniques of diversification

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	13320664200.46	2.00	6660332100.23	279.63	0.00	3.01
Within Groups	14505222843	609	23818099.91			
Total	27825887044	611				

As the F critical is less than F value hence the null hypothesis is rejected. There exists significant difference in the three indices.

Further it was tested that if the data are correlated or not.

The overall correlation matrix for these indices is as given under

which can be used by a naïve investor. In the present study the endeavour is to find such simple technique.

Research Methodology and Analysis

We take the data from the Bombay stock exchange portal from February 1999 to January 2016 on monthly basis. ANOVA is used through the excel sheet to know statistically know that if the two data are related or not. The hypothesis is

Null hypothesis $\mu = \mu = \mu$

Alternate hypothesis $\mu = \mu \neq \mu$ where the μ is the mean of the two data.

Analysis

The result of the ANOVA for the series is as under

SUMMARY

Groups	Count	Sum	Average	Variance
Sensex	204	25879	12686.05	609207
BSE200	204	31774	1557.586	962386
BSE500	204	99378	4871.516	957114

	Sensex	BSE200	BSE500
Sensex	1		
BSE200	0.998528	1	
BSE500	0.997739	0.999758	1

The returns are highly correlated. For diversification benefit it is important that we take such assets in the portfolio which are not correlated. In fact the Markowitz theory shows that negative correlation is best to minimize the volatility of the portfolio.

The next step is to find if the movement of SENSEX can be explained by the movement of the other two (viz, BSE200 and BSE500) indices. To find the impact of the BSE 200 & 500 multiple regressions was done with the following output.

ANOVA

	df	SS	MS	F	Significance F
Regression	2	12338207973.10	6169103986.55	43192.23	0.00
Residual	201	28708632.52	142829.02		
Total	203	12366916605.62			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	199.5401664	52.04234639	3.834188506	0.000169	96.92117
BSE200	16.94627571	1.228853742	13.79031136	6.96E-31	14.52318
BSE500	(2.855122318)	0.389666505	-7.327091958	5.6E-12	-3.62348

We find that the r square is 0.99 which hence is able to explain 99% of the movements in the Sensex. (While the rest 1% is exogenous)

The regression equation hence can be formed which can explain the interrelation impact of the BSE sensex on BSE 200 & 500 indices. The equation is :-

$$\text{BSE sensex} = 199.54 + 16.94(\text{BSE200}) + (-2.86)(\text{BSE 500})$$

Once we know that nothing much can be done in terms of diversification here as the three indices are very much positively correlated. Hence the investment strategy can be to select the assets (portfolios BSE sensex, 200 & 500) in a manner to give superior returns. One way to select is to understand that what the return for each percentage of risk taken is.

For this objective risk and return were calculated for the tree indices based on the data collected. The table of returns and volatility (standard deviation) are given below.

The returns and risk (standard deviation) of the three indices are

Regression Statistics	
Multiple R	0.998838623
R Square	0.997678594
Adjusted R Square	0.997655496
Standard Error	377.9272649
Observations	204

	Average		Standard Deviation	
	Monthly	Annual	Monthly	Annual
Sensex	1.26%	15%	7.0%	24.3%
BSE200	1.42%	17%	7.8%	26.9%
BSE500	1.48%	18%	7.9%	27.3%

Here we see that for every 1% increase in return of the three portfolios, the additional volatility added is 0.37% for BSE200 and 0.29% for BSE500 for every 1% increase in portfolio over and above market index which is BSE sensex.

Next is the relation of the volatility of the three portfolios and the risk premium, which is summarised her under:-

Portfolio	Volatility	Risk Premium
Sensex	24.3%	7.32%
BSE200	26.9%	9.31%
BSE500	27.3%	10.00%

(risk free taken is 7.75%ⁱⁱⁱ)

The observation here^{iv} is that the extra risk premium earned by the BSE 200 and 500 over the sensex is 0.76% and 1.11% for every 1% volatility respectively. Here it seems pertinent that the BSE 500 does a better job as the risk premium earned is over and above the BSE 200. It demonstrates that

