COMPARATIVE PERFORMANCE EVALUATION OF EQUITY SHARES OF INDIAN CEMENT INDUSTRY

Dr. Aparna Mishra,
Associate Professor, BCIPS, Dwarka

Abstract

The present paper investigates the performance of top 5 Indian Cement Industry Equity Shares for the period from April 2005 to March 2015 (ten years) of transition economy. Daily Closing Price of the shareshave been used to calculate the returns. BSE-sensex has been used for market benchmarking. The historical performance of the selected shares were evaluated on the basis of Sharpe, Treynor, and Jensen's measure whose results will be useful for investors for taking better investment decisions. Under the analysis, he risk and return of the five companies were considered using the tools mentioned above. The study revealed that the investors can invest in JK Laxmi and Shree Cement because they are yielding maximum returns. Although the risk is very high in these securities but these securities are performing well and the investors can receive high returns after adjusting the risk.
Keywords: Jensen measure, Mutual funds, performance evaluation, Sharpe measure, Treynor measure.

I.   INTRODUCTION

Investment is very important to park the surplus fund of an individual for the purpose of earning additional income or capital appreciation or both. The study portfolio management and investment is increasing in today's world , because the investor has to consider various factors while making an investment decision such as; risk associated with the investment, tax benefits, liquidity, and marketability etc. Before 1960, investors evaluated portfolio performance almost entirely on the rate of return, although they knew that risk was a very important variable in determining investment success. Studies of portfolio performance evaluation began in the 1960's along with the development of modern asset pricing theory. Treynor (1965), Treynor and Mazuy (1966), and Jensen (1968, 1969) for instance used the CAPM to introduce portfolio performance measures. As finance theory developed so did performance measurement. The demand for research on managed portfolio performance increased as mutual funds and related investment vehicles became more important to investors in the 1980s and 1990s. During this period, equity investment became widely popular,

Portfolio Analysis:

Portfolio performance evaluation is a tool used to judge how a portfolio performs during a given period. The main evaluation methods include traditional (classical) portfolio performance evaluation and modern portfolio performance evaluation.

- Conventional Methods:

a. Benchmark Comparison- The most straightforward conventional method involves comparison of the performance of an investment portfolio against a broader market index. The most widely used market index in the India is the S & P BSE Sensex. If the return on the portfolio exceeds that of the benchmark index, measured during identical time periods, then the portfolio is said to have beaten thebenchmark index. While this type of comparison with a passive index is very common in the investment world. This creates a particular problem. The level of risk of the investment portfolio may not be the same as that of the benchmark index portfolio. Higher risk should leads to commensurately higher returns, in the long-term.

b. Style Comparison:A second conventional method of performance evaluation called 'style-comparison' involves comparison of return of a portfolio with that having a similar investment style. In order to evaluate the performance of a value-oriented portfolio, one would compare the return on such a portfolio with that of a benchmark portfolio that has value-style. Similarly a growth-style portfolio is compared with a growth-style benchmark index. This method also suffers from the fact that while the style of the two portfolios that are compared may look similar, the risks of the two portfolios may be different. Also the benchmarks chosen may not be truly comparable in terms of the style since there can be many important ways in which two similar style-oriented funds vary.

- Modern Risk-Adjusted Method

The risk-adjusted methods make adjustments to returns in order to take account of the differences in risk levels between the managed portfolio and the benchmark portfolio. While there are many such methods, the most notables are the Sharpe ratio, Treynor ratio and Jensen's alpha (α).

a. **Sharpe Ratio:** The Sharpe ratio (Sharpe, 1966) computes the risk premium of the investment portfolio per unit of total risk of the portfolio. The risk premium, also known as excess return, is the return of the portfolio less the risk-free rate of interest as measured by the yield of a Treasury security. The Sharpe measure is also called the "reward-to-variability" ratio. Sharpe ratio is calculated as:

Expected return (rp) – risk free return (rf)/ Standard deviation (p)

b. **TreynorRatio** :The Treynor ratio (Treynor, 1965) computes the risk premium per unit of systematic risk. The risk premium is defined as in the Sharpe measure. The difference in this method is that it uses the systematic risk(B) of the portfolio as the risk parameter. The systematic risk is that part of the total risk of an asset which cannot be eliminated through diversification. It is calculated as:

(Average Return of the Portfolio - Average Return of the Risk-Free Rate)
Beta of the Portfolio

c.Jensen's Alpha: A risk-adjusted performance measure that represents the average return on a portfolio over and above that predicted by the capital asset pricing model (CAPM), given the portfolio's beta and the average market return. T.

$$αp = Rp – [Rf+Bp(Rm – Rf)]$$

Where,**Rp**is the Expected total Portfolio return, **Rf** is the risk free rate, **Bp** is the beta of the portfolio , and**Rm** is the expected market return.

When the portfolio is well diversified all three methods, Sharpe, Treynor, and Jensen will give the same ranking of performance. But when it is not or when it represents the total wealth of the investor, the appropriate measure of risk is the standard deviation of returns of the portfolio, then the Sharpe ratio is the most suitable. When the portfolio is well diversified, however, a part of the total risk has been diversified away and the systematic risk is the most appropriate risk metric, both Treynor ratio and Jensen's alpha can be used to assess the performance of securities.

Industry Snapshot:

The cement industry is the building block of the nation's construction industry. India is the second largest producer of cement in the world. India's cement industry is a vital part of its economy, providing employment to more than a million people, directly or indirectly. Ever since it was deregulated in 1982, the Indian cement industry has attracted huge investments, both from Indian as well as foreign investors.

India has a lot of potential for development in the infrastructure and construction sector and the cement sector is expected to largely benefit from it. Some of the recent major government initiatives such as development of 100 smart cities are expected to provide a major boost to the sector.

Expecting such developments in the country and aided by suitable government foreign policies, several foreign players such as Lafarge-Holcim, Heidelberg Cement, and Vicat have invested in the country in the recent past. A significant factor which aids the growth of this sector is the ready availability of the raw materials for making cement, such as limestone and coal.

Cement demand in India is expected to increase due to government's push for large infrastructure projects, leading to 45 million tones of cement needed in the next three to four years.India's cement demand is expected to reach 550-600 million tones per annum by 2025. The housing sector is the biggest demand driver of cement, accounting for about 67 per cent of the total consumption in India. The other major consumers of cement include infrastructure at 13 per cent, commercial construction at 11 per cent and industrial construction at nine per cent.

To meet the rise in demand, cement companies are expected to add 56 million tones capacity over the next three years. The cement capacity in India may register a growth of eight per cent by next year end to 395 million tones from the current level of 366 million tones. It may increase further to 421 MT by the end of 2017. The country's per capita consumption stands at around 190 kg.

The Indian cement industry is dominated by a few companies. The top 20 cement companies account for almost 70 per cent of the total cement production of the country. A total of 188 large cement plants together account for 97 per cent of the total installed capacity in the country, with 365 small plants account for the rest. Of these large cement plants, 77 are located in the states of Andhra Pradesh, Rajasthan and Tamil Nadu.

II.   LITERATURE REVIEW

Hussein AbediShamsabadi, Mohammad NouraniDargiri and DevinagaRasiah, (2012): The study reviewed the risk-return relationship and pricing methods, theories and empiricalstudies to develop a performance measures comparing different industry sectors. The theories and pioneerliterature related to Capital Asset Pricing Model (CAPM) was explored to show the relationshipbetween expected return and systematic risk. Treynor Index, Sharpe Index, and Jansen Index asperformance measures were extracted from CAPM model and the correlation were discussed betweenthem. As of outcome, the study proposed a risk-return construct regards to develop better performancemeasures for industry sectors.

SaritaBahl and Meenakshi Rani, (2012): The study was based on the performance of 29 open-ended, growth-oriented equity schemes for the period from April 2005 to March 2011 (six years) of transition economy. The historical performance of the selected schemes were evaluated on the basis of Sharpe, Treynor, and Jensen's measure whose results will be useful for investors for taking better investment decisions. The study revealed that 14 out of 29 (48.28 percent) sample mutual fund schemes had outperformed the benchmark return. In the study, the Sharpe ratio was positive for all schemes, which showed that funds were providing returns greater than risk free rate. Results of Jensen measure revealed that 19 out of 29 (65.52 percent) schemes were showed positive alpha which indicated superior performance of the schemes.

John Lee Murphy,(2015) focuses on four typical measures of traditional (classical) portfolio performance evaluation, including Jensen's alpha, Sharpe ratio, generalized Sharpe ratio and Treynor ratio. These four measures were applied to three financial models: single index model, constant correlation model and multigroup model and be compared to test which measure evaluates more accurately in different situations.

George O. Aragon and Wayne E. Ferson, (2006) provided a review of the methods for measuring portfolio performance and the evidence on the performance of professionally managed investment portfolios. Traditional performance measures, strongly influenced by the Capital Asset Pricing Model of Sharpe (1964), were developed prior to 1990. They discuss some of the properties and important problems associated with these measures. They then review the more recent Conditional Performance Evaluation techniques, designed to allow for expected returns and risks that may vary over time, and thus addressing one major shortcoming of the traditional measures. They also discuss weight-based performance measures and the stochastic

discount factor approach. They review the evidence that these newer measures have produced on selectivity and market timing ability for professional managed investment funds.

Steen Koekebakker and ValeriZakamouline, (2007) using the expected utility theory and the approximation analysis, they derive a formula for the most natural extension of the Sharpe ratio which takes into account the skewness of distribution. The ranking statistic based on the adjusted for skewness Sharpe ratio preserves the standard Sharpe ratio for normal distribution, decreases ranking of distributions with left-tail risk, and improves ranking of distributions with right-tail potential. They illustrate the use of the adjusted skewness Sharpe ratio by comparing the performances of portfolios with manipulated Sharpe ratios and the performances of hedge funds.

Noulas, John and John (2005) evaluated the risk-adjusted performance of Greek equity funds during the period1997-2000. This study is based on weekly data for equity mutual funds and includes 23 equity funds that existed for the whole period under consideration. Mutual funds were ranked on the techniques used by Treynor (1965), Sharpe (1966) and Jensen. Results showed positive returns of the stock market for the first three years and negative returns for the fourth year. The results also indicated that the beta of all funds is smaller than 1 for four-year period.

III.   OBJECTIVES

- To calculate return and risks associated with different securities of cement industry.
- To analyze the performance of the securities using modern measures like Sharpe ratio, Treynor ratio and Jenson's alpha.
- To do a comparative analysis of securities with the market index on the basis of the above mentioned three performance measures

IV.   RESEARCH METHODOLOGY

The data collected to achieve the respective objectives is through secondary research. A comprehensive use has been made of the various books, journals, Internet, financial reports etc. The data taken for this research is for 10 years from 2006 to 2015 NSE website of top 5 Indian Cement Companies.

Tools and techniques of analysis:

- **Beta-**The beta coefficient is the relative measure of sensitivity of an asset's return to change in return on the market portfolio**.** It can be viewed as an index of the degree of responsiveness of the securities returns with the market return.
- **Standard Deviation-** Standard deviation is used as a tool for measuring the risk, which is a measure of the variables around its mean. The following formula is used to calculate standard deviation:

- **Sharpe Ratio-** The Sharpe Ratio is a measure for calculating risk-adjusted return, and this ratio has become the industry standard for such calculations. The Sharpe ratio is the average return earned in excess of the risk-free rate per unit of volatility or total risk.
- **Treynor Ratio-** The Treynor ratio (sometimes called the reward-to-volatility ratio or Treynor measureis a measurement of the returns earned in excess of that which could have been earned on an <u>investment</u> that has no diversifiable risk.
- **Jenson Alpha-** Jensen's Alpha, or just "Alpha", is used to measure the risk-adjusted performance of a security or portfolio in relation to the expected market return (which is based on the capital asset pricing model (CAPM). The higher the alpha, the more a security has earned above the level predicted.

Analysis - I

1. Risk- Return Analysis

Company	Returns	Risk	Analysis
UltraTech	35.81	67.57	Moderate
JK Laxmi	77.62	166.44	Risky
ACC Ltd.	17.62	46.31	Moderate
Ambuja Cement	15.11	36.04	Moderate
Shree Cement	68.57	113.52	Risky

Table 1: Top 5 Cement Company's Risk –Return Analysis

It is found that the JK Laxmi and Shree cement involves the maximum risk while UltraTechcement; ACC limited and Ambuja cement involves moderate level of risk.

2. Market Variance and Market Returns: S&P BSE SENSEX

Year	Open Price	Close Price	Returns	Average Return	R-Average (d)	d^2
2006	9422.49	13786.91	46.32	17.06	29.26	855.92
2007	13827.77	20286.99	46.71	17.06	29.65	879.06
2008	20325.27	9647.31	-52.54	17.06	-69.60	4843.94
2009	9720.55	17464.81	79.67	17.06	62.61	3919.50
2010	17473.45	20509.09	17.37	17.06	0.31	0.10
2011	20621.61	15454.92	-25.05	17.06	-42.12	1773.90
2012	15534.67	19426.71	25.05	17.06	7.99	63.85
2013	19513.45	21170.68	8.49	17.06	-8.57	73.45
2014	21222.19	27499.42	29.58	17.06	12.52	156.64
2015	27485.77	26117.54	-4.98	17.06	-22.04	485.80
		Total	**170.63**			**13052.17**

Table 2: Market Risk-Return Analysis

Market Return = **170.6**
Variance of market= d^2/(n-1) = 13052.17/9 = **1450**

Analysis –II (Performance measurement)

1. Sharpe Performance Index

$$S = R\text{-}Rf/SD$$

Where,S= Sharpe Ratio; R= Average rate of return of security; Rf= Rate of return of risk free security (i.e. T-bills); SD= Standard deviation of security

Sharpe Performance Index						
Company	R	Rf	R-Rf	S.D	Sharpe Ratio	Rank
UltraTech	35.81	8.00	27.81	67.57	0.41	3
JK Laxmi	77.62	8.00	69.62	166.44	0.42	2
ACC Ltd.	17.62	8.00	9.62	46.31	0.21	4
Ambuja Cement	15.11	8.00	7.11	36.04	0.20	5
Shree Cement	68.57	8.00	60.57	113.52	0.53	1
S&P BSE Sensex	17.06	8	9.06	38.08	0.24	

*Assuming risk free rate is 8%.

Table 3: Performance Analysis through Sharpe Ratio

This ratio shows how much additional return one is receiving for the additional volatility of holding the risky asset over a risk-free asset. The higher the ratio, better it is.

  − **UltraTech Cement:** The risk premium of UltraTech cement is 27.81% while its Sharpe ratio is equal to 0.41. The market index's (S&P BSE Sensex) excess return is 9.06% while its Sharpe ratio is 0.24. That means for each unit of standard deviation, the stocks of UltraTech Cement earned a risk premium of 0.41% suggesting that the security has outperformed the market after adjusting for total risk.

  − **JK Laxmi:** The risk premium of JK Laxmi cement is 69.62% while its Sharpe ratio is equal to 0.42. The market index's (S&P BSE Sensex) excess return is 9.06% while its Sharpe ratio is 0.24. That means for each unit of standard deviation, the stocks of JK Laxmi Cement earned a risk premium of 0.42% suggesting that the security has outperformed the market after adjusting for total risk.

  − **ACC Limited:** The risk premium of ACC Ltd. cement is 9.62% while its Sharpe ratio is equal to 0.21. The market index's (S&P BSE Sensex) excess return is 9.06% while its Sharpe ratio is 0.24. That means for each unit of standard deviation, the stocks of ACC Ltd. Cement earned a risk premium of 0.21% suggesting that the company's returns are under the market expectations after adjusting for total risk.

- **Ambuja Cement:** The risk premium of Ambuja cement is 7.11% while its Sharpe ratio is equal to 0.20. The market index's (S&P BSE Sensex) excess return is 9.06% while its Sharpe ratio is 0.24. That means for each unit of standard deviation, the stocks of Ambuja Cement earned a risk premium of 0.20% suggesting that the company's returns are under the market expectations after adjusting for total risk.
- **Shree Cement:** The risk premium of Shree cement is 60.57% while its Sharpe ratio is equal to 0.53. The market index's (S&P BSE Sensex) excess return is 9.06% while its Sharpe ratio is 0.24. That means for each unit of standard deviation, the stocks of Shree Cement earned a risk premium of 0.53% suggesting that the security has outperformed the market after adjusting for total risk.

2. TreynorPerformance Index

$$T = R\text{-}Rf/B$$

Where,T= Treynor Ratio; R= Return on the security; Rf= Risk-free rate; B= Beta of the security

Treynor Performance Index						
Company	**R**	**Rf**	**R-Rf**	**Beta**	**Treynor Ratio**	**Rank**
UltraTech	35.81	8	27.81	1.24	22.43	3
JK Laxmi	77.62	8	69.62	1.81	38.46	1
ACC Ltd.	17.62	8	9.62	0.84	11.45	5
Ambuja Cement	15.11	8	7.11	0.65	10.94	4
Shree Cement	68.57	8	60.57	2.13	28.44	2
S&P BSE Sensex	17.06	8	1	9.06	9.06	

Table 4: Performance analysis through Treynor Ratio

Treynor uses betain the denominator instead of standard deviation. The beta measures only the security's sensitivity to the market movement. The higher the ratio, better is the performance.
*Assuming market index (S&P BSE Sensex) beta is 1

- **UltraTech Cement:** The Treynor ratio for UltraTech cement is 22.43, while for the market it is 9.06. Thus, after adjusting for systematic risk, the company earned an excess return of 22.43% for each unit of beta while the market index earned an excess return of 9.06% for each unit of beta. Thus, the company's stocks outperformed the market after adjusting for systematic risk.
- **JK Laxmi Cement:** The Treynor ratio for JK Laxmi cement is 38.46, while for the market it is 9.06. Thus, after adjusting for systematic risk, the company earned an excess return of 38.46% for each unit of beta while the market index earned an excess return of 9.06% for each unit of beta. Thus, the company's stocks outperformed the market after adjusting for systematic risk.
- **ACC Limited:** The Treynor ratio for ACC Limited is 11.45, while for the market it is 9.06. Thus, after adjusting for systematic risk, the company earned an excess return of 11.45% for

each unit of beta while the market index earned an excess return of 9.06% for each unit of beta. Thus, the company's stocks outperformed the market after adjusting for systematic risk.

- **AmbujaCement :**The Treynor ratio for Ambuja Cement is 10.94, while for the market it is 9.06. Thus, after adjusting for systematic risk, the company earned an excess return of 10.94% for each unit of beta while the market index earned an excess return of 9.06% for each unit of beta. Thus, the company's stocks outperformed the market after adjusting for systematic risk.

- **Shree Cement:** The Treynor ratio for Shree Cement is 28.44, while for the market it is 9.06. Thus, after adjusting for systematic risk, the company earned an excess return of 28.44% for each unit of beta while the market index earned an excess return of 9.06% for each unit of beta. Thus, the company's stocks outperformed the market after adjusting for systematic risk.

3. Jenson's Alpha

$$\alpha p = Rp – [Rf + \beta p (Rm – Rf)]$$

Company	Rp	Rm	Rf	Beta	B*(Rm-Rf)	Rf+[B*(Rm-Rf)]	Rp-[Rf+(Rm-Rf)*B]
UltraTech	35.81	17.06	8	1.24	11.23	19.23	16.58
JK Laxmi	77.62	17.06	8	1.81	16.40	24.40	53.22
ACC Ltd.	17.62	17.06	8	0.84	7.61	15.61	2.01
Ambuja Cement	15.11	17.06	8	0.65	5.89	13.89	1.22
Shree Cement	68.57	17.06	8	2.13	19.30	27.30	41.27

Table 5: Performance Evaluation through Jenesen Ratio

The Jenson's alpha indicator can be used as a basis for a trading strategy. If the security has trending behaviors, positive alpha would generate a bullish signal, whereas negative alpha would generate a bearish signal. Investors are constantly seeking for investments that have higher alpha.

Here all the securities are having positive alpha or abnormal returns i.e. asset's return is even higher than the risk adjusted return.

Conclusion:

Investors can invest that matches their investment objectives and analyze stock based on various criteria such as risk prevailing in the market, variation on return and deviation occur in return etc. Risk appetite of an investor plays an important role in selection of stocks. The study reveals that the investors who need regular income can invest in JK Laxmi and Shree Cement as these have maximum returns. Sharpe and Treynor ratios concluded that the investment in Shree Cement and JK Laxmi Cement better compensates the investor in terms of returns generated

per unit of risk as compared to ACC Limited, Ambuja Cement and UtraTech Cement. Shree Cement and JK Laxmi Cement are offering higher returns after adjusting the total risk when compared to the other three companies.If the portfolio represents the entire investment for an individual, Sharpe ratio compared to the Sharpe ratio for the market is appropriate.If many alternatives are possible then Jensen's Alpha or Treynor measure is appropriate.Government's plan of 100 smart cities will need solid infrastructure development including housing, roads, highways etc. So the cement industry will be the early beneficiaries.

REFERENCES

1. Bombay stock exchange."Historical Data" (2015). Accessed on 20 Apr 2016 at http://www.bseindia.com/

2. Chandra, Prasanna. *Investment Analysis and Portfolio Management*. Tata Mcgraw-Hill, 2008.

3. George O. Aragon and Wayne E. Ferson. (2006). "Portfolio Performance Evaluation," *Foundations and Trends in Finance,* Vol. 2, No. 2.

4. India Brand Equity Foundation. "Overview of Cement Industry," (2016). Accessed on 21 Apr. 2016 at http://www.ibef.org/industry/cement-india.aspx

5. Jensen Michael C. (1968). "The Performance of Mutual Funds in the period 1945-1964," *The Journal of Finance*, Vol. 23, No. 2. Available at http://www.seligson.fi/resource/jensen.pdf

6. SamarakoonLalith P. et al., (2005). "Portfolio Performance Evaluation," In Cheng-Few Lee and Alice C. Lee (eds). *Encyclopedia of Finance*. Springer. pp. 471-475.

7. ShansabadAbedi Hussein et al., (2012). "A Review Study of Risk-Return Relationship and Performance Measures Comparing Different Industry Sectors," *Australian Journal of Basic and Applied Sciences*, Vol. 6, No. 12. Available at http://ajbasweb.com/old/ajbas/2012/Nov%202012/14-22.pdf

8. Sharpe W.F. (1992). "Asset allocation: Management style and Performance measurement: an asset class factor model can help make order out of chaos," *Journal of Portfolio Management, Winter*, Vol. 18, No. 2.Available at http://down.cenet.org.cn/upfile/36/2005215213440140.pdf

9. Vasantha S. (2013). "Evaluating the Performance of some selected open ended equity diversified Mutual Fund in Indian mutual fund Industry," *International Journal of Innovative Research in Science, Engineering and Technology* Vol. 2, No. 9. Available at http://www.ijirset.com/upload/september/69_Evaluating.pdf

10. Yahoo India Finance. ''Historical Prices'' (2016). Accessed on 19 Apr 2016 at https://in.finance.yahoo.com/

11. Zakamouline, Valeri and Steen Koekebakker. "Portfolio Performance Evaluation With Generalized Sharpe Ratios: Beyond the Mean And Variance". *SSRN Electronic Journal*.

12. Zikmund, William G. *Business Research Methods*. Mason, OH: Thomson/South-Western, 2003. Print.