

Construction of Portfolio Using Sharpe Index Model with Special Reference to Shipping Industry in India

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Abstract

Today avenues for investment are abundant like bank deposits, insurance, property and shares etc. But taking investment decision is much tougher task. Analysis of the risk associated with each investment option and evaluates the return out of investment becomes very crucial. The confidence of primary and secondary market investors also increased several fold, this change in scenario is encouraging people to invest in Stocks and Bonds who earlier park their savings like fixed deposits and other types of investments like gold, property. By using sharp index model we have constructed a portfolio for shipping industry. The stock prices were taken from the S&P CNX Nifty. The main objectives is to calculate the risk and return factors to help investors to arrive at decision of interest to invest money in return more and risk less companies and also gain knowledge of stock market. Findings and suggestions would help investor to choose the company to invest.

Keywords: Sharpe index, risk and return, shipping industry, investors, risk less, portfolio management, securities, market return, unsystematic risk, diversification and share value.

Background of the study

The topic of risk and analysis in the shipping sector had been selected because it is the very first global industry and interest to know about that sector, there are investors who invest in shipping companies. So the investors have to be aware of risk involved in making the investment. The investors have to calculate the variance and beta value to know the present condition of the company to know whether there is risk in investing in the particular company and does the company offers good return. The shipping industry is transporting 90% of the world's trade. Most ships move from country to country as part of their normal trading pattern.

Shipping plays an important role in the transport sector of India's economy. Approximately, 90 per cent of the country's trade by volume (70 per cent in terms of value) is moved by sea. India has the largest merchant shipping fleet among the developing countries and ranks 20th amongst the countries with the largest cargo carrying fleet with 8.83 million GT as on 01.06.2008 and the average of the fleet being 18 years. Indian maritime sector facilitates not only transportation of national and international cargo but also provides a variety of other services such as cargo handling services, shipbuilding and ship repairing, freight forwarding,

lighthouse facilities and training of marine personnel, etc. Therefore, there is a need to conduct a research in this area.

Statement of the problem

India's shipping sector has attracted considerable international interest in recent years. The shipping corporation of India plans to acquire 37 vessels over next two years and is expected to spend 2 billion US dollars on the purchases. This move illustrates the rapid growth of India's shipping industry. But many investors are not having interest to invest in the shipping industries in India due to the lack of awareness. So in order to create awareness and to bring more investments in the shipping industries in India, we are doing research paper in this sector. The main aim of this research is to find the opportunities in this sector and to find out the financial benefits associated with the shipping industries.

Objectives

The main objectives of these studies are :

- To analyse the Risk and Return of the companies.
- To maximize the return by creating a balance of risk.
- To measure actual return and expected return

with the help of standard deviation and beta.

- To study the volatility of companies in comparison with the market.
- To guide the investors of various investing opportunities and guiding company about investing money in business for expansion.
- To find risk less and return more companies to invest.

Theoretical Framework

F.J.A. Broeze, (1788), this article tells about the shippers transport cost of the Australian economy. The success of exports depends upon the resource, commodity price, transport cost and relationship with the trading system. Shipping industry not allows exporters to establish and maintain relations with the customers and also plan for long-term for e.g. through investment. B.B.Damachi and Yang Zhaosheng, (2005), in this article the author tells about problems in the Nigerian shipping companies. Lack of vessels is one of the major problems. The reason for this problem is giving opportunity to foreign carriers to lift a greater proportion. The Nigerian ship owners are owned 6th and 7th generation containership. No one's owns 3rd generation. To address this problem private shipping companies should pull resources together by merging. Capital formation for vessel is so high through merging. Most of the companies are merge and they are yet to pay back the loan they collected from ship acquisition and ship building fund (SASBF) to buy ship. The 2nd problem was lack of effective management. In the year 1966 the management style of the company led to its liquidation. The main problem is lack of skills to manage the modern shipping companies. This is because of lack of basic training and failure to update knowledge. So far, many companies have failed to realize that good management. To address this problem refresher should attend international conference and management staff should be continuously engaged. Another problem is lack of maintenance culture. The function of ship should be regularly maintained. The vessels were sold out for scraps due to lack of maintenance. Nigerian ship did not bother about general problems. To address this problem the

negative trend must be reversed and maintenance culture should be cultivated.

Theo Nottemboom and Filip Merckx, (2006), this article tells about the freight integration in liner shipping. In a logistics environment dominated by concepts such as global logistics and one-stop shopping and freight integration. The shipping lines are well aware about the growing importance of integration along the logistics chain to include landside and logistics operations. This paper focus the development of an overall freight integration score for a large set of container shipping lines. The freight integration serves as a business model in the liner shipping industry. Liner shipping industry follows different strategies to reach higher levels of integration. The customer is perceived as a key indicator needs by relevant knowledge of the intermodal transport sector and of the supply chain. Each carrier leverages its service portfolio to develop the freight integration. The freight integration capabilities in liner shipping are important in view of serving global production networks. Global productions are based upon production, distribution and consumption. Elements of the international distribution, maritime shipping companies are well placed to provide a range of services. Because the level of integration they provide cannot easily be matched by other transport providers. Global production networks appear to be a powerful force in shaping the nature. Helen B. Bendall and Alan F. Stent, this paper explains an application of real option analysis applied to the shipping industry. It explains about valued an investment decision of ship owners faced many uncertainties in the competitive market environment. These uncertainties may resolve progressively in time but managers should change strategies according to the conditions. Management had an option on the maximum of two operating strategies, trading or chartering out. Two flexible strategies resulted in three main conclusions. First, the greater volatility of the underlying base projects, generally more value the strategies will have. Second, more alternative strategies present, the more value, in general will be added. Standard ships with low asset specificity provide with greater flexibility to alter strategy in

management. Thus, there is more option value in building ship with low specificity such as standard containership. Third, the more correlated are underlying projects the less net value will be added.

Theodore Syriopoulos and Efthimios Roumpis, (2009), in this study the author carefully selected the sample of companies publicly listed in US stock exchange. It investigated the market risk of the shipping companies. The market capitalization values and their equities are widely traded in the stock market. This helps the investors who invest in the stock market. This paper explains about the risk and return of the shipping companies. The author can use two volatility models to identify the best shipping volatility dynamics. The models are EGARCH & APGARCH. In the EGARCH model presence of a leverage factor and asymmetric effects were found stronger. In APGARCH model these effects were not statistically robust. This leverage effect found negative shock for some shipping stocks. Negative shock is anticipated to potentially cause volatility to raise more than a positive shock. The volatility on shipping stock returns has not been uniform across all shipping companies. The company specific fundamentals are important to investment decision making on shipping stock selection. The shipping stock portfolios yield higher potential loss compared with capital market portfolio. The GARCH model found more accurate estimation of value at risk. Value at risk estimates were seen to be closely related to the future volatility of shipping stock. Michael B. Grelck, Stefan Prigge, Lars Tegtmeier and Michael Topalov, (2009), this article contributes to closing this gap in the literature and investigates the returns and diversification properties of investment in shipping. The sample period from Jan 1999 to Dec 2007, the shipping earned attractive risk-return. From overall perspective they find the investment in shipping stocks to the base portfolio worsened diversification. In more cases sharp ratios were considerable. First, the diversification of equally-weightage shipping stocks portfolio of the research was partially even statistically significant for this kind of test. Second, diversifications were not stable. Later

are statistically more reliable. The overall view of the diversification properties of shipping stock based on single stock market. It resulted in the open question and requires further research. Victor Ricciardi, (2008), the previous narrative risk perception review by Ricciardi (2004) demonstrated that scholars in financial psychology (behavioural finance), behavioural economics, and behavioural accounting have investigated and tested over 150 unique accounting, financial, and investment proxy risk factors (e.g., beta, current ratio) and more than 100 behavioural risk characteristics (e.g., overconfidence, familiarity bias). This presentation is a preliminary discussion that builds on the research work of Ricciardi (2004, 2006) and Ricciardi (2008). Edward I. Altman, (2008), this paper presents a detailed review of the way credit risk models, developed during the last thirty years, treat the recovery rate and, more specifically, its relationship with the probability of default of an obligor. It also reviews the efforts by rating agencies to formally incorporate recovery ratings into their assessment of corporate loan and bond credit risk and the recent efforts by the Basel Committee on Banking Supervision.

Panagiotis Xidonas and John Psarras, (2007), the current study provides a categorized application of the techniques of multiple criteria decision making (MCDM) to the problems and issues of portfolio management. A large number of studies in the field of portfolio management have been compiled and classified according to the different methodological approaches that have been used. Except the in-depth presentation of the MCDM contributions in the area of portfolio management, the outmost aim of this paper is to stress the inarguable multiple criterion nature of the majority of the problems that modern financial management faces. Selwyn Ruby, (2009), Alok Industries is among the performance driven companies beating all odds and regaining a strong position in the industry today. The three major factors that make Alok Industries a good buy are (a) the stock has discounted all the negatives in the market and is available at an attractive price, (b) the company has diversified into new business and ventures-

infrastructure and realty development- thereby derricking its business and, (c) the company is ramping up its business by adding new machineries. Jeroen Derwall, Tilburg University, Joop Huij Rotterdam School of Management, (2009), concentrated funds with higher levels of tracking error display better performance than their more broadly diversified counterparts. We show that the observed relation between portfolio concentration and performance is mostly driven by the breadth of the underlying fund strategies; not just by fund managers' willingness to take big bets. Our results indicate that when investors strive to select the best performing funds, they should not only consider fund managers' tracking error levels. It is of greater importance that they take into account the extent to which fund managers carefully allocate their risk budget across multiple investment strategies and have concentrated holdings in multiple market segments simultaneously.

Anna Morrell, (2010), rather too many of us, I suspect, have portfolios that are just collections of haphazardly acquired shares. As with asset allocation, so with portfolio construction, you need to sit down first and do some thinking. What is your preferred level of risk? It has to be moderately high for you to consider getting involved in equity investment, but are you willing to take larger risks - for instance, investing in AIM companies - for greater gains, or do you take a more conservative approach? That's a balance between how many stocks you can research and keep on top of, and how many stocks you need to achieve the benefit of diversification reducing your overall risk. That will differ from person to person, and it will also be different depending on whether you use funds and ETFs to gain broader exposure, or whether your portfolio is entirely equity focused. Karen Benson, Philip Gray, Egon Kalotay, Judy Qiu, (March 2008), the foundation of popular approaches to portfolio construction and performance measurement lies in the mean-variance framework of Markowitz (1952, 1959). However, the suitability of such approaches in practice is questionable in light of considerable evidence of non-normalities in returns. This

explores the potential usefulness of a non-parametric approach to portfolio construction and performance measurement recently proposed by Stutzer (2000). The Portfolio Performance Index (PPI) is based on the notion that investors associate risk with the failure to achieve a target return. Stutzer proposes that portfolio construction and performance measurement be approached by calculating the decay rate in the probability that a given portfolio will underperform its designated benchmark. By comparing the PPI and Sharpe ratio metrics, this paper presents preliminary evidence of the economic significance of non-normalities in Australian equity returns, and documents the impact of such on portfolio construction and performance evaluation practice.

Research Methodology

The nature of study is descriptive, as the study describes the characteristics of the shipping industry. Sampling technique used here is purposive sampling.

Sharpe's Model of Portfolio Optimization

Using Sharpe model, the return for each security can be represented by the equation

$$R_i = \alpha_i + \beta_i + e_i$$

Where,

R_i : expected return on security i

α_i : intercept giving return on security when index return is zero

β_i : slope which measures the change in the security return with respect to change in the market return

e_i : error term with mean zero and a standard deviation which is constant

The desirability of any security is directly related to its excess return-to-beta ratio given by

$$(R_i - R_f) / \beta_i$$

Where,

R_i = expected return of stock i

R_f = risk-free rate of return

β_i = beta of stock i

The number of stocks selected in the optimum portfolio depends on a unique cutoff rate C^* such

that all stocks with excess return-to-beta ratios greater than this unique cutoff C^* are included and all stocks with lower ratios excluded.

$$C_i = \frac{\sigma_m^2 \sum (R_i - R_f) \beta_i}{1 + \sigma_m^2 \sum \beta_i^2 / \sigma_{ei}^2}$$

Where,

R_f - Treasury bill rate

R_m - Rate of return on market index

R_i - Return on the i th stock

σ_m^2 - Variance in the market index

σ_{ei}^2 - Variance of a stock's movement that is not associated with the movement of the market index. This is the stock's unsystematic risk.

The formulae of the elements used in the spread

sheet are as follows:

1. Sum of Individual Stock returns - R_i and Market return - R_m
2. Stock return $\rightarrow Y$ and Market return $\rightarrow X$:
= ((Today's price - Yesterday's price) / Yesterday's price) * 100
3. Mean of stock return - \bar{Y} , Mean of market return - \bar{X}
 \bar{Y} = (sum of Y) / total number of days
 \bar{X} = (sum of X) / total number of days
4. Standard deviation of Stock return - σ_y , Standard deviation of market return - σ_x
5. Correlation = Covariance / ($\sigma_y * \sigma_x$)
6. Risk factor β = Covariance * (σ_y / σ_x)
7. Return indicator $\alpha = \bar{Y} - \beta(\bar{X})$
8. Unsystematic risk - σ_{ei}^2

Analysis and Interpretations

Mean, Standard Deviation, Beta, Alpha, Covariance and Correlation of Seamec Shipping, The Great Eastern Shipping, Varun Shipping, Shreyas Shipping and Sci Shipping.

Table 1: Seamec Shipping

	2004	2005	2006	2007	2008	2009	2010	Average
Mean(X)	0.07	0.13	0.15	0.11	-0.25	0.26	-0.11	0.05
Mean(Y)	0.46	0.06	0.42	0.54	-0.67	0.76	-0.18	0.19
Sigma x	1.69	1.11	1.64	1.67	2.79	2.19	1.06	1.74
Sigma y	4.74	3.74	3.72	4.93	4.33	4.04	2.32	3.98
BETA	-0.003	0.43	0.30	0.07	0.32	0.16	0.32	0.23
Alfa	0.46	0.009	0.37	0.53	-0.59	0.72	-0.15	0.19
Covariance	-0.01	0.54	0.82	0.21	2.53	0.81	0.36	0.75
Correlation	-0.001	0.12	0.13	0.02	0.20	0.09	0.14	0.10

Table 2: Great Eastern Shipping

	2004	2005	2006	2007	2008	2009	2010	Average
Mean(X)	0.07	0.13	0.16	0.19	-0.25	0.25	-0.13	0.06
Mean(Y)	0.12	0.14	0.03	0.41	-0.25	0.17	-0.19	0.06
Sigma X	1.69	1.11	1.70	1.60	2.79	2.18	1.10	1.74
Sigma y	2.99	2.22	3.64	2.49	4.82	3.70	2.19	3.15
BETA	0.12	0.08	0.25	0.27	0.38	0.12	0.15	0.19
Alfa	0.11	0.13	-0.004	0.36	-0.16	0.14	-0.17	0.05
Covariance	0.36	0.10	0.75	0.70	2.97	0.59	0.18	0.81
Correlation	0.07	0.41	0.12	0.17	0.22	0.07	0.07	0.16

The table 1 shows the Average Stock Return (Mean(Y) is highest in 2009 (i.e. appr 0.76) and is negative and lowest in 2008 (i.e., appr -0.18). Average Market Return (Mean(X) is also highest in 2009 (i.e., appr 0.76) and is negative and lowest in 2008 (i.e. appr -0.25). Risk Factor BETA is more in 2005, 2006, and 2008 and growing in 2010 and

average Beta is 0.233015857. Standard Deviation is less in only in 2005. The table 2 shows the highest average stock return is in 2007 and shows negative values in both 2008 and 2010. Highest deviation is seen in 2008 and least SD is in 2005. Risk Factor Beta is below 1 for all 7 years and average is also less than 1.

Table 3: Varun Shipping

	2004	2005	2006	2007	2008	2009	2010	Average
Mean (X)	0.07	0.13	0.15	0.19	-0.25	0.25	0.25	0.11
Mean (Y)	0.16	0.31	0.03	0.18	-0.26	0.11	0.88	0.20
Sigma x	1.69	1.11	1.64	1.60	2.79	2.18	1.10	1.73
Sigma y	3.24	2.79	2.69	2.33	3.14	2.51	1.55	2.61
BETA	0.17	-0.08	0.08	0.23	0.18	0.05	-0.02	0.08
Alfa	0.15	0.32	0.02	0.14	-0.21	0.10	0.09	0.09
Covariance	0.49	-0.10	0.22	0.60	1.44	0.24	-0.02	0.41
Correlation	0.08	-0.03	0.04	0.16	0.16	0.04	-0.01	0.06

Table 4: Shreyas Shipping

	2004	2005	2006	2007	2008	2009	2010	Average
Mean (X)	0.07	0.13	0.15	0.19	-0.25	0.26	-0.11	0.06
Mean (Y)	0.57	0.74	-0.11	0.12	-0.55	0.22	-0.19	0.11
Sigma x	1.69	1.11	1.64	1.60	2.79	2.21	1.06	1.73
Sigma y	4.32	4.63	4.70	3.30	4.79	4.05	1.99	3.97
BETA	0.005	0.01	0.07	0.35	0.14	0.13	0.23	0.13
Alfa	0.57	0.74	-0.12	0.12	-0.52	0.18	-0.16	0.11
Covariance	0.10	0.26	1.60	0.38	3.23	2.26	0.92	1.25
Correlation	0.013	0.05	0.20	0.07	0.24	0.25	0.43	0.18

The table 3 shows the Average Stock Return is greater than Average Market Return in 2004, 2005 and in 2010. In other Financial years it is not the case. The Average Beta value is 0.088787871 which is lesser than 1 which again shows that Market price less than Stock Price. High deviation is in 2008 and low in 2005 and

seems growing in 2010. The table 4 shows the Average stock return is always higher than the Average Market Return in all the years except 2008, 2007 and 2006. The Average Beta value is 0.136307429 and is lesser than 1 where shares are defensive. Highest deviations are seen in 2008 and least in 2005.

Table 5: SCI Shipping

	2004	2005	2006	2007	2008	2009	2010	Average
Mean(X)	0.07	0.13	0.15	0.19	-0.25	0.26	-0.09	0.06
Mean(Y)	0.12	0.44	0.02	0.32	-0.43	0.27	-0.01	0.103
Sigma x	2.88	1.24	2.7	2.55	7.79	4.83	1.12	3.3
Sigma y	12.7	3.44	4.4	11	19.05	8.71	6.18	9.40
BETA	0.09	0.14	0.02	0.15	0.007	0.03	0.15	0.08
Alfa	0.11	-0.01	0.01	0.29	-0.43	0.26	-0.01	0.033
Covariance	0.75	0.23	0.18	0.98	0.44	0.75	0.19	0.51
Correlation	0.02	0.05	0.01	0.03	0.003	0.018	0.02	0.02

Table 6: Individual Returns Vs. Stock Return

	SHREYAS	VARUN	SEAMEC	SCI	GE
Stock Return	221.7022115	122.5011	279.198	70.20806	147.4213
Market Return	133.3112017	133.2644858	133.2644858	133.2644858	133.3312294

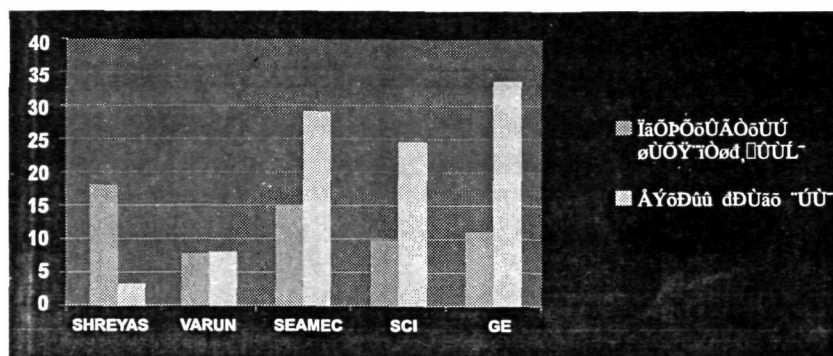
The table 5 shows the Average Stock return is higher than Average Market Returns in the financial years 2005, 2007 and others are opposite to this. But Average of 7 years stock return is higher than Market Return. The Beta value is 0.0867648286 and is lesser than 1. The Correlation is 0.02 where it is positive one. Highest deviations are seen in 2008. The table 6 shows the Stock

Return is very high for Seamec Shipping than Market Return. The SCI shows least Stock Return among all. So here Seamec Shipping has invested more in stock investment and SCI has less Stock Return so they have to invest more in stocks. If all companies go for Diversification they can reduce Unsystematic Risk.

Table 7: Cut-off Points Vs. Unsystematic Risk

	SHREYAS	VARUN	SEAMEC	SCI	GE
Unsystematic risk($V_{arp} - \rho e_i^2$)	18.52673	7.694649	15.43213	9.76816	11.57802
Cutoff point (ci)	3.180377	8.592306	23.09134	25.04787	33.6133

Figure 1: Cut-off Points Vs. Unsystematic Risk



The above graph shows the Cut-off Point is high for GE Shipping and Seamec Shipping and so the revenue generation time is more for Seamec Shipping and GE Shipping. The Cutoff Point is low for Shreyas Shipping and very soon they will turn out the revenue in which they have invested other than rest of the companies. The Diversification has to be done in Seamec Shipping and GE Shipping in order to reduce the Unsystematic risk or Internal Risk to compete in market and give much more profit.

Findings

- We compared Beta values of all 5 companies; the value of Beta is always lies below 1. Where risk associated with these stocks are pretty low and also price of the shares are highly fluctuating because the reason may be inflationary trends in economy.
- So shipping sector exhibits low risk in terms of Beta.
- As shipping sector is international one, it is bound to international risk. Here if there is any downturn in foreign economy, it will affect the shares of these companies. but longterm investment is promising one in this sector.
- When come to SCI shipping, it is the Government sector where there is very less Risk. But that is not the case in the private sector.
- When there is downturn in the oil industry, unavailability of crude oil and upward and downward trend in crude oil will reflect Shipping sector mainly.
- People can invest in Seamec Shipping because it has low Risk and highest Market Return. Its till 2009.

Seamec Shipping

- The Average Beta value is approximately 0.233 which is less than 1, so it means this stock is less volatile than the market and shares in this range is called Defensive shares.
- When we compare the Market return with the stock return where Market Return shows a tendency.
- Correlation value is 0.105491 where 0.15% changes in Market Return changes 0.15% in individual return.

- The Alpha value is 0.19% and there is assurance of 0.19% return if there is no risk also.

Great Eastern Shipping

- The Beta value less than 1 that means it is low volatility of the price of the stock in comparison with the SD of the Market returns.
- The positive correlation 0.164592143 shows that 0.16% change in the market return will change the 0.16% in company's stock return.
- There is only 0.05% return when there is no risk according to the Alpha value.

Varun Shipping

- Here Beta is less than 1, so we can say its defensive shares.
- The correlation value is 0.06% and it will affect stock return when 0.06% change happens in Market return.
- The Alpha value is 0.09% such that there is assurance of only 0.09% of return of investment if there is no risk also.

Shreyas Shipping

- The Correlation value is seems to be 0.18% and 0.18% change in market return will affect same in stock return.
- The stocks are less volatile and because the SD Market returns are always less than Stock returns.
- The Alpha is 0.11% so there is surety of 0.11% return of investment if there is no risk.

SCI Shipping

- The Correlation value is 0.02% and it will change Stock return when 0.02% change happens in Market Return.
- The Beta Value is less than 1 where again it is defensive shares.
- The Alpha value is 0.03% that 0.33% is return of investment assurance if there is zero risk.

Suggestion

- Diversification should not be done before analysing the market.
- The stocks of shipping sector are subjected to less risk since the beta is less than 1. Stock price of Shipping sector are growing mainly because of strong bottom line and reputation of these

companies, so still they should maintain the Reputation.

➤ In the point of view of Cutoff point, the Shreyas has less cutoff point, so they will generate the revenue in particular period of time. For other companies they can go for Diversification for earlier revenue generation.

➤ In GE Shipping the Risk factor is more than the Stock Return and also has high cutoff point, so the company has to be careful in investing further more investment and the decision taken by the Manager should be clear for investment and Revenue: is rate per unit times volume of units. Carriers will need to raise rates.

➤ Seamec Shipping in 2010 showing the slightly high risk and showing negative in Stock Return. So Seamec should take appropriate decisions to stop this and to increase the Stock Return.

➤ Shreyas Shipping has least market capitalization and still Stock Return is more for it and least cutoff, so revenue will be generated in considerable time and Risk factor is also less. So the people can invest in Shreyas and to increase the profit, the company can go for diversification and reduce the unsystematic risk still more.

Conclusion

From this research we conclude that the shipping sector exhibits low risk in terms of beta. Investors should not only look on the beta "when making decisions on ship Investments. The company and shareholders both must go for diversification as to reduce their risk. As the stock market is high volatile, it depends on investor to invest their money in order to put in the market. The investor has to be in such a position to analyze the various markets and thus minimize the Risk and maximize the Returns. The investor has to analyze the market in continuous basis so that investor can pick right company. The company should also analyze the market continuously so that it can reduce the internal risk, for Reinvestment and competing with the competitors for potential growth.

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