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## Research Article

### PORTFOLIO SELECTION THROUGH SINGLE INDEX MODEL-WITH SPECIAL REFERENCE TO TRUST LINE SECURITIES

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#### ABSTRACT

The major objectives sought by the investors' are security for investment, consistency of returns, growth of the capital, marketability, liquidity, diversification of portfolio etc., Securities and assets that have return and risk characteristics investing in financial securities is considered to be more risky now a days. Modern portfolio theory states that by diversification risk can be minimized. The main objective of the study is finding the best portfolio by applying single index model. The companies must be in a position to provide the clarity regarding the above requirements for an investor. In this study we have selected the companies from different sectors like FMCG, Cement sector, telecommunications sector. The companies under the FMCG are ITC, HUL, Britannia, Dabur India, and Nestle India. The companies under cement sector are JK cements, Ambhuja cements, ACC cements, India cements and Ultratech cements. The companies from telecommunications sector are Bharti Airtel, Vodafone, Idea, Reliance and Tata Docomo. The study reveals that the telecommunication industry has high returns at a given risk. Cement industry stocks are advisable for the conservative investors who are not in position to take high risk.

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#### INTRODUCTION

In order to invest in the equities, the investor must have sufficient knowledge, time and continuous monitoring of the market. The investors who need to manage efficiently their investments; the best supporting factor for them is Portfolio management services. The Portfolio management is selection of securities and continuously monitoring them in order to hold maximum returns to the investor by minimizing the risk. These services are the merchant banking activities recognized by SEBI and provided by the SEBI authorized managers. When coming to the point of wealth creation time is more valuable than that of money. This paper deals with investment decisions to maximize the return at minimum possible risk.

**Portfolio Management:** Portfolio indicates the set of investment tools such as stocks, shares, mutual funds, bonds, and cash etc, based up on the investors' income, budget and suitable time frame. There are two types of portfolios:

1. Market portfolio
2. Zero investment portfolio

Portfolio management is defined as the art of choosing the best investment policy for the investor at maximum returns with minimum risk.

**Types of Portfolio management:** There are 4 types:

1. Active Portfolio management: the portfolio managers actively take part in buying and selling of securities to attain the maximum profits to investors.
2. Passive portfolio management: the portfolio managers deals with the fixed portfolio which is designed to suit to the present market scenario.
3. Discretionary portfolio management services: the individual gives authority to the portfolio manager to take decisions on behalf of the individual.
4. Non discretionary portfolio management: the portfolio manager can only give suggestions to the investor and the investor retains all the rights in taking decisions.

**Need of Portfolio management**

- Best investment plan
- Risk minimization
- Customized investment solution

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## Industry Profile

**Fast moving consumer goods industry (FMCG):** Fast Moving Consumer Goods (FMCG) goods are all consumable items (other than groceries/pulses) that one needs to buy at regular intervals. These are items which are used daily, and so have a quick rate of consumption, and a high return. FMCG can broadly be categorized into three segments which are: Household items as soaps, detergents, household accessories, etc., Personal care items as shampoos, toothpaste, shaving products, etc and finally Food and Beverages as snacks, processed foods, tea, coffee, edible oils, soft drinks etc. Global leaders in the FMCG segment are Nestlé, ITC, Hindustan Unilever Limited, Reckitt Benckiser, Unilever, Procter & Gamble, Coca-Cola, Carlsberg, Kleenex, General Mills, Pepsi, Gillette etc. The burgeoning middle class Indian population, as well as the rural sector, presents a huge potential for this sector. The FMCG sector in India is at present, the fourth largest sector with a total market size in excess of USD 13 billion as of 2012. This sector is expected to grow to a USD 33 billion industry by 2015 and to a whopping USD 100 billion by the year 2025. This sector is characterized by strong MNC presence and a well established distribution network. Investment in stock markets of FMCG companies is constant. Some of the challenges this sector is likely to face are: Increasing rate of inflation, which is likely to lead to higher cost of raw materials.

**Cement industry:** Indian cement industry is the second largest cement producer in the world after china with a total capacity of 151.2 million tones. In the coming years more growth in the Indian cement industry is expected to come. It is predicted that the production in India would rise to 236.16 MT in FY 2015 and expected to rise to 262.61 MT in FY 16 in the cement industry. The Indian cement industry is dominated by 20 companies, which account for almost 70% of the total cement production in India. The companies all over India have produced 31 MT cement during April-September 2015. The Indian cement Industry plays a major role in the growth of the nation for that case in any country.

**Telecommunications industry:** India is currently the world's second-largest telecommunications market and has registered strong growth in the past decade and half. The Indian mobile economy is growing rapidly and is expected to contribute substantially to India's Gross Domestic Product. The Indian Telecommunications services market will likely grow by 10.3 percent year-on-year to reach US\$ 103.9 billion by 2020. Driven by strong adoption of data consumption on handheld devices, the total mobile services market revenue in India is expected to touch US\$ 37 billion in 2017. Smartphone subscription in India is expected to increase four-fold to 810 million users by 2021, while the total Smartphone traffic is expected to grow 15-fold to 4.5 Exa-bytes per month by 2021. India has the second largest mobile subscriber base in the world. According to telecom Regulatory Authority of India (TRAI), the total telecom subscriber base in December 2015 stood at 1.04 billion, out of which 1.01 billion were mobile subscribers and 25.52 million were wire line subscribers. According to study by GSMA, Smart phones are expected to account for two out of every three mobile connections globally by 2020 making India the fourth largest Smartphone Market. Total number of fourth-Generation (4G) enabled Smartphone

shipments in India stood at 13.9 million units in the quarter ending December 2015, which was more than 50 percent of total shipments, thereby surpassing number of Third-Generation (3G) enabled Smart phones shipments for the first time. The broadband services user base in India is expected to grow to 250 million connections by 2017, according to GSMA.

**Company Profile:** Trust line securities limited "is a stock brokerised company. It is one of the fastest growing financial services organizations, established in the year 1989. The code of this organization "ISO 9001:2008". Trust line has effective membership in several sectors like (equity & F and O, NSE, NSEF, BSE, BSEF, DSE) equity shares and preference shares, commodities (MCX, NCDEX, NMCEIL), currency (NSE, MCX-SX currency), depository (CDSL, NSDL). The grate personalities Dr. Mukesh Kansal and Mrs. Sarika Kansal are the promoters of the trust line and Dr. Mukesh Kansal is the chairman and managing director of the trust line. And another personality Mrs. Sarika Kansal is the director of the trust line. Trust line head office is located in Noida, New Delhi. Trust Line Securities Ltd. Is the Company registered under the Companies Act, 1956 is a Member of the National Stock Exchange (NSE) & Bombay Stock Exchange (BSE) of Cash and F&O Segment, Central Depository Services (I) Ltd. (CDSL), National Securities Depository Ltd. (NSDL) and also a Trading and Clearing member. Trust Line is professionally managed group headed by the directors, having vast experience in the stock market. Besides the core promoters, the group is having its full fledged teams headed by young and dynamic professionals like chartered accountants, company secretaries, MBAs, IT professionals etc. to handle the various divisions of the company.

## REVIEW OF LITERATURE

Sarker (2013) developed an optional portfolio of equity of IT industry with the help of Sharpe's single index model. For this study six top performing IT optimal portfolio was constructed with 5 companies.

Andrade (2012) constructed on optimum portfolio by using Sharpe's single Index model on the basis of monthly returns of 164 Stocks of DSE for the period of July 20087 to June 2012.

Nageswari, Selvam & Bhuvanewari (Nov 2013) highlighted the optimal portfolio selection units of Sharpe's single index model, through which a significant reduction in the riskiness (or) variability of the return of seriates can be obtained.

J. Francis Mary and G. Rathika have studied The Single Index Model And The Construction of Optimal Portfolio With Cnxpharma Scrip, Sharpe's single-index model was applied by using the monthly closing prices of 10 companies listed in NSE and CNX PHARMA price index for the period from September 2010 to September 2014. From the empirical analysis it can be concluded that out of 10 companies only one company is selected for investment purpose on the basis of Cut-off point which is -0.11182.

Saurabh and gowutham (2014) studied the single index model & the construction of optimal portfolio: A case of Banks Listed in NSE India. In this study 10 companies listed at National Stock Exchange (NSE) and CNX Bank Price Index was selected taking Jan 2009 to Dec 2013 as period of study. The

monthly closing prices of the selected securities were used for the above mentioned period. Application of Single Index Model for the empirical analysis identified a portfolio of two companies based on the cut-off point.

Niranjan Mandal (2013), studied Sharpe’s Single Index Model And Its Application to Construct Optimal Portfolio: An Empirical Study. Taking BSE SENSEX as market performance index and considering daily indices along with the daily prices of sampled securities for the period of April 2001 to March 2011, the proposed method formulates a unique cut-off rate and selects those securities to construct an optimal portfolio whose excess return to beta ratio is greater than the cut-off rate. Then, proportion of investment in each of the selected securities is computed on the basis of beta value, unsystematic risk, and excess return to beta ratio and cut-off rate of each of the securities concerned.

Kapil Sen and Disha studied Sharpe’s Single Index Model and its Application Portfolio Construction: An Empirical Study. In their study the main objectives of the study are to get an insight into the idea embedded in Sharpe’s Single Index Model, to construct an optimal portfolio empirically using the Sharpe’s Single Index Model, to determine return and risk of the optimal portfolio constructed by using Sharpe’s Single Index Model. The method is formulated a unique cut off rate and select those securities whose excess return to beta ratio is greater than a cut off rate. Then proportion of investment in each selected securities should decide on the basis of the beta value, unsystematic risk, excess return to beta ratio and cut off rate of each security is concerned.

Dr. R. Nalini, has done research on Optimal Portfolio Construction Using Sharpe’s Single Index Model - A Study of Selected Stocks From Bse. Fifteen companies from the S&P BSE Sensex index were selected for the study. Among the fifteen sample companies, only four were selected for optimal portfolio using SIM. The results of the present study and such micro level studies have more utility value to the fund managers.

Dr. S Poornima and Aruna, investigated on Construction of Optimal Portfolio using Sharpe’s Single Index Model: A Study with Reference to Automobiles and Pharmaceutical Sector. Their study includes ten stocks from automobile sector and ten stocks from pharmaceutical sector. Data for a period of five years (2010-2015) had been taken for the study. After analysing the collected data a “cut-off rate “can calculate. This cut-off rate is considered in the construction of optimal portfolio. Every investor prefers maximum return with a minimum risk. This study found out that Ashok Leyland having highest return and Hyundai having lowest return. This paper identifies an optimal portfolio from the selected companies which serves as a guide to function in maximising return.

**Need for study:** This study helps in knowing how the investment in different securities helps to minimize the risk and maximize the returns. This also helps in identifying how the companies are managing portfolio and how they are investing in different sectors. The study also helps to attain the knowledge in investment decision and asset allocation.

**Objectives of the study**

- To find out risk and return of diversified sector specific portfolios in the study.
- To understand the role of diversification and its impact on risk and return.
- To find out best portfolio by applying single index model

**Sources of data:** The Data was collected from secondary source. Also from the official websites of Kotak Securities, National Stock Exchange and from the published books and journals.

**Sample size:** 15 companies from three sectors namely FMCG, CEMENT and TELECOMMUNICATIONS were taken for the study. The details are given in the table I:

**Table I**

FMCG	CEMENT	Telecommunications
ITC	ACC	Bharati Airtel
HUL	Ambuja	Vodafone
Britannia	India Cements	Idea
Nestle India	Ultratech	Reliance
Dabur India	JK Cemenets	Tata Docomo

**Period of the study**

One financial year has been taken for study (from 1-4-2015 to 31-03-2016).

**Scope of the study:** The Study uses the Sharpe’s single index model to find out best portfolio. The study covers the calculations of risk and return of individual securities. It also covers return and risk of 3 sectors specific portfolio.

**Data Analysis and Discussions:** The standard deviation, variance and the Beta values are shown in the following table II:

**Table II**

Company	Standard deviation	Variance	Beta
ITC	3.9758	15.807	0.6593
HUL	4.272	18.257	0.42019
Britannia	7.996	63.941	0.5987
Nestle India	15.9808	255.387	1.29715
Dabur India	5.149	26.52	0.90772
ACC	7.258	52.692	1.18038
Ambuja	7.258	52.692	1.59440
India Cements	18.803	353.559	2.84625
Ultratech	7.3460	53.964	1.27510
JK Cemenets	13.327	177.61	2.17613
Bharati Airtel	8.334	69.46	1.0334
Vodafone	5.616	31.55	0.3734
Idea	8.337	69.52	0.92450
Reliance	7.004	49.06	0.92528
Tata Docomo	6.278	39.424	1.14418

**Calculation of Portfolio Alpha**

**FMCG SECTOR:**  $\alpha_p = W_i \times a_i + W_j \times a_j + W_k \times a_k + \dots$   
 $= (0.2 \times 0.6195) + (0.2 \times 2.4764) + (0.2 \times 15.2515) + (0.2 \times 0.4265) + (0.2 \times 0.0458)$   
 $= 0.1239 + 0.49528 + 3.0503 + 0.0853 + 0.00916$   
 $= -2.33666$

**Cement industry**

$\alpha_p = W_i \times a_i + W_j \times a_j + W_k \times a_k + \dots$

$$\begin{aligned}
 &= (0.2 \times 0.0322) + (0.2 \times 0.48395) + (0.2 \times 2.6467) + (0.2 \times 2.0622) + (0.2 \times 2.6931) \\
 &= 0.00644 + 0.09679 + 0.52934 + 0.41244 + 0.53862 \\
 &= 0.52485
 \end{aligned}$$

**Telecommunications industry**

$$\begin{aligned}
 \alpha_n &= W_i \times a_i + W_j \times a_j + W_k \times a_k + \dots \\
 &= (0.2 \times 0.3576) + (0.2 \times 0.57075) + (0.2 \times 3.0298) + (0.2 \times 2.8407) + (0.2 \times 1.65154) \\
 &= 0.07152 + 0.11415 + 0.60596 + 0.56814 + 0.130308 \\
 &= 0.278158
 \end{aligned}$$

The study reveals that the alpha of the CEMENT industry is very high when compared to other two sector specific portfolios. Irrespective of market risk FMCG sector having less alpha value with -2.33666 whereas CEMENT industry has highest portfolio alpha of 0.52485. Telecommunication Industry have moderate portfolio alpha of 0.278158.

**Calculation of Portfolio Beta**

**FMCG Industry:**

$$\begin{aligned}
 \beta_n &= W_i \times b_i + W_j \times b_j + W_k \times b_k + \dots \\
 &= (0.2 \times 0.6593) + (0.2 \times 0.5987) + (0.2 \times 1.29715) + (0.2 \times 0.42019) + (0.2 \times 0.90772) \\
 &= 0.13186 + 0.11974 + 0.25943 + 0.084038 + 0.181544 \\
 &= 0.776612
 \end{aligned}$$

**Cement Industry**

$$\begin{aligned}
 \beta_p &= W_i \times b_i + W_j \times b_j + W_k \times b_k + \dots \\
 &= (0.2 \times 1.18038) + (0.2 \times 1.59440) + (0.2 \times 2.84625) + (0.2 \times 1.27510) + (0.2 \times 2.17613) \\
 &= 0.236076 + 0.31888 + 0.56925 + 0.25502 + 0.435226 \\
 &= 1.814452
 \end{aligned}$$

**Telecommunication Industry**

$$\begin{aligned}
 \beta_n &= W_i \times b_i + W_j \times b_j + W_k \times b_k + \dots \\
 &= (0.2 \times 1.0334) + (0.2 \times 0.37314) + (0.2 \times 0.92450) + (0.2 \times 0.92528) + (0.2 \times 1.14418) \\
 &= 0.20668 + 0.074628 + 0.1849 + 0.185056 + 0.228836 \\
 &= 0.8801
 \end{aligned}$$

The study reveals that Cement industry as the beta value of 1.8144 which is more the one and aggressive in nature. Beta value of FMCG industry is 0.776612 which is lowest when compared to other two sectors in the study. Telecommunication Industry has beta value of 0.8801 which is less than one and defensive in nature.

**Calculation of Portfolio Return**

**FMCG Industry**

$$\begin{aligned}
 \text{Portfolio Return (Rp)} &= \alpha_n + \beta_n \cdot R_m \\
 &= (-2.33666) + 0.776612 \cdot (-8.871) \\
 &= -2.33666 + (-6.8893) \\
 &= -9.22596
 \end{aligned}$$

**Cement Industry**

$$\begin{aligned}
 \text{Portfolio Return (Rp)} &= \alpha_n + \beta_n \cdot R_m \\
 &= 0.52485 + 1.81445 \cdot (-8.871) \\
 &= 0.52485 + (-16.095) \\
 &= -15.57015
 \end{aligned}$$

**Telecommunication Industry**

$$\begin{aligned}
 \text{Portfolio Return (Rp)} &= \alpha_n + \beta_n \cdot R_m \\
 &= 0.278158 + 0.8801 \cdot (-8.871) \\
 &= 0.278158 + (-7.5292) \\
 &= -7.5292
 \end{aligned}$$

The study reveals that three specific portfolios taken for the study are having negative returns.

**Calculation of Portfolio Risk**

**FMCG:**

$$\begin{aligned}
 \text{Portfolio variance } \sigma_n^2 &= \beta_n^2 \cdot \sigma_m^2 + \sum_{i=1}^n w_i^2 \cdot \sigma_{ei}^2 \\
 &= (0.7766)^2 \times 20.171 + 15.1964 \\
 &= 0.6031 \times 20.171 + 15.1964 \\
 \sigma_n &= \sqrt{27.3615} \\
 &= 5.2308
 \end{aligned}$$

**Cement**

$$\begin{aligned}
 \text{Portfolio variance } \sigma_n^2 &= \beta_n^2 \cdot \sigma_m^2 + \sum_{i=1}^n w_i^2 \cdot \sigma_{ei}^2 \\
 &= (1.81445)^2 \times 20.171 + 27.1144 \\
 &= 3.2922 \times 20.171 + 27.1144 \\
 \sigma_n &= \sqrt{93.5204} \\
 &= 9.6705
 \end{aligned}$$

**Telecommunication**

$$\begin{aligned}
 \text{Portfolio variance } \sigma_n^2 &= \beta_n^2 \cdot \sigma_m^2 + \sum_{i=1}^n w_i^2 \cdot \sigma_{ei}^2 \\
 &= (0.8801)^2 \times 20.171 + 10.36056 \\
 &= 0.7745 \times 20.171 + 10.36056 \\
 \sigma_n &= \sqrt{25.98296} \\
 &= 5.09734
 \end{aligned}$$

The study observes that three specific portfolios are associated with portfolio risks. CEMENT Industry has risk with 9.6705 which is very high when compared to two other portfolios taken in the study. Telecommunication Industry associated with risk of 5.09734 which is less when compared to other two portfolios includes in the study. FMCG Industry as associated with moderate risk of 5.2308

**Evaluation of portfolio risk and return through single index model**

**Table III**

Portfolio	Return	Risk
FMCG sector	-9.22596	5.2308
Cement sector	-15.57015	9.6705
Telecommunication sector	-7.5292	5.09734

The study reveals that all the stocks under the study having alpha values less than one and more than one. Some stocks under the study having alpha values more than one which means those securities will yield return in excess of the reward for the assumed risk. Reliance has the highest alpha value which more than one whereas Nestle India has lowest alpha value which is less than one. It indicates Nestle associated with too risky to earn the return.

**Beta of Individual Security:** The study reveals that all fifteen securities included in the study are having positive beta values.

INDIA CEMENTS has the highest beta value of 2.84625 in all the securities taken for the study. VODAFONE is termed as defensive security which is associated with least positive beta value of 0.37314.

**Portfolio Alpha and Portfolio Beta:** The study observed that three specific portfolios taken for the study are having both positive portfolio alpha values and negative portfolio alpha values. Irrespective of the market risk, Cement industry has highest portfolio alpha of 0.52485 when compared to other two specific portfolios. The study reveals that Cement industry has the beta value of 1.814452 which is more the one and aggressive in nature. Beta value of FMCG sector is 0.776612 which is lowest when compared to other two sectors in the study. Telecommunication Industry have beta value of 0.8801 which is less than one and defensive in nature.

**Portfolio Return:** The study reveals that three specific portfolios taking for the study are having negative returns. FMCG sector has the negative return of -9.22596. Cement industry has the negative return of -15.57015. Telecommunication industry has also had the negative return of -7.5292.

**Portfolio Risk:** The study observes that three specific portfolios are associated with portfolio risks. Cement Industry has risk with 9.6075 which is very high when compared to two other portfolios taken in the study. Telecommunication Industry associated with risk of 5.09734 which is less when compared to other two portfolios includes in the study. FMCG Industry is associated with moderate risk of 5.2308.

**Overall Risk and Return:** The study reveals that CEMENT industry associated with highest return of -15.57015 with high risk of 9.6705. Telecommunication industry yields return of -7.5292 associated with risk of 5.09734. It indicates respective industry yields moderate returns. Portfolio of FMCG industry bearing more risk of 5.2308 with a return of -9.22596.

### Findings

#### Return and Risk

- Return of RELIANCE having more return 25.885 with 7.004 Risk it has given highest return when compared to other scrip's.
- Return of INDIA CEMENTS is -57.008 with 18.803 Risk. It has performed lower when compared other scrip's.

#### ALPHA

- Reliance Communication associated with alpha value greater than zero with 2.8407. It indicates the investing in Reliance Communication stock will yields a return in excess of the reward for the assumed risk.
- Nestle India has bearing alpha value less than 1 that is -15.2515. which indicates investing in the stocks alpha values less than 1 were too risky for the return.

#### BETA

- Cement Industry has beta value more than 1 that is 1.8144.
- FMCG and Telecommunications Industry associated with least portfolio beta values which are less than 1.

### Portfolio Return

- Among all three selected industries the returns are in negative form.
- Telecommunications industry is having moderate portfolio return -7.5292 when compared to FMCG industry with -9.225 and CEMENT industry with -15.57015

### Portfolio Risk

- The study reveals that CEMENT Industry has highest portfolio risk of 9.6705 comparatively with other two industries.
- FMCG Industry has moderate portfolio risk of 5.2308 which is less than Cement Industry and more than Telecommunications Industry.
- TELECOMMUNICATION Industry has least portfolio risk of 5.09734 comparatively with other two specific portfolios.

### Sector Specific Observation

The study observes that the stocks under TELECOMMUNICATION industry yield high rate of negative return of -7.5292 associated with high risk of 5.09734. The stocks under the FMCG Industry have moderate negative return of -9.225 with less risk of 5.2308 during the study period. The stocks under the CEMENT Industry yields negative return of -15.57015 at a risk of 9.6705 during the study period.

### Suggestions

Portfolio of Telecommunication industry is suggestible to the investor who expects high return at given risk. Moderate investors can invest in FMCG sector where return and risks are moderate. CEMENT stocks are suggestible to the conservative investors who are not willing to take high risk.

### CONCLUSION

Financial assets and real assets have risk and return. By diversifying investment, investor can reduce risk. Investing in group of securities rather than single security, investor can maximize return. So this study using Sharpe's Single Index Model constructed an optimum portfolio to yield higher return that minimizes risk to the investor.

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