Statistics Project

"Statistical Analysis of ICICI Prudential Bluechip Mutual Fund"

Submitted to

"Savitribai Phule Pune University"

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<u>Acknowledgement</u>

I feel immensely grateful on successful completion of my project on "Statistical Analysis of Bluechip Mutual Fund."

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Data Source:

The Data Required for the project is extracted from the monthly factsheets of performance of the mutual fund published on the website of ICICI Prudential Mutual Fund ("The Company" or "AMC") which is the disclosure required under the guidelines of Securities & Exchange Board Of India (SEBI).

Statistical tools Used:

1) R- Software
2) MINITAB

Motivation For Selecting The Topic:

A mutual fund is the most suitable investment for the investor who has relatively lower risk appetite than the investor who invests money directly into the capital market. Hence it is necessary to understand the interrelation between the technical terms related to the mutual fund to make the proper investment decision.

<u>Methodology</u>

The analysis of the collected data is done by the method of multiple linear regression models.

A situation involving response variable Y & p repressors or explanatory variables denoted by $X_1, X_2, \ldots\ldots X_p$. A multiple linear regression model relating p repressors to response variable Y can be expressed as :

$$Y = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 X3 + \ldots\ldots\ldots\ldots\ldots\ldots + \beta_P X_P + \varepsilon$$

Where, $\beta_0, \beta_1, \beta_2 \ldots\ldots\ldots \beta_p$ are the constants known as regression coefficients and ε is the random error.

Assumptions for the above model are:

(1) Errors are independent & normally distributed with $E(\varepsilon) = 0$ & $var(\varepsilon) = \sigma^2$

(2) Measurements on repressors are without error or with negligible error.

(3) The parameters β_i, $i = 1:p$ represents the expected change in the the response Y per unit change in X_i when all the remaining repressors X_j (j =! i) are held constant.

Hence, the parameters β_i i=1:p are also called partial regression coefficients.

Test Of Significance of Regression:

The test of significance of regression is a test to determine if there is a linear relationship between the response variable Y & any of the repressors $X_1, X_2, X_3 \ldots \ldots X_p$. The procedure is treated as overall or global test for checking whether the model is adequate. Mathematically we test $H_0 : \beta_0 = \beta_1 = \ldots \ldots = \beta_p = 0$ v/s H1 : $\beta_i = !0$ for at least one i.

The test is the generalization of analysis of variance procedure. The total sum of squares (SST) is partitioned into sum of squares due to regression (SSR) & sum of squares due to residual(SS_{res}). We can show that under H0, (SSR/σ^2) follows chisquare distribution with p degree of freedom (d.f.). further (SS_{res}/σ^2) follows chisquare distribution with n-p-1 d.f., SSR & SS_{res} are independent. Hence under H0, the statistic F is given by:

$$F = (SSR/p)/((SS_{res})/(n-p-1) = (MSSR/MS_{res}) \sim F_{(p,n-p-1)} \text{distribution.}$$

We reject null hypothesis h0 at 100α % l.o.s. if calculated value of F exceeds $F_{(p,n-p-1,\alpha)}$. Note that rejection of the null hypothesis implies that at least one of the regressors $X_1, X_2, \ldots X_p$ contributes significantly to the model.

ANOVA Table :

Sources Of Variation	d.f.	Sum Of Squares(SS)	Mean Sum Of Squares(MSS)	F – Ratio
Regression	P	SSR	MSSR	F = MSSR/ MSRes
Error	n-p-1	SSRes	MSres	
Total	n-1	SST		

Coefficient Of Determination:

It is a way to assess the overall adequacy of regression model is coefficient of determination. The coefficient of determination (R^2) is given by :

$$R^2 = 1-[SS_{res}/SST]$$

If the value of R^2 is close to 1 then it implies that most of variation in Y is explained by the repressors.

One Drawback of it is that it increases as we go on adding terms to the model. Hence if we take decision about the adequacy of the model based on R^2, it may mislead us. To avoid this the statistic "adjusted R^2" is used. It is given by :

$$R^2_{adj} = 1 - (1-R^2)*[(n-1)/(n-p-1)]$$

It also lies between 0 & 1. If unnecessary terms are added to the model, the value of R^2_{adj} often decrease. Hence it is very useful in assessing the model adequacy.

INTRODUCTION

Mutual Fund is a trust that pools together the resources of investors to make a foray into investments in the capital market thereby making the investor to be a part owner of the assets of the mutual fund. The fund is managed by a professional money manager who invests the money collected from different investors in various stocks, bonds or other securities according to specific investment objectives as established by the fund. If the value of the mutual fund investments goes up, the return on them increases and vice versa. The net income earned on the funds, along with capital appreciation of the investment, is shared amongst the unit holders in proportion to the units owned by them. Mutual Fund is therefore an indirect vehicle for the investor investing in capital markets. In return for administering the fund and managing its investment portfolio, the fund manager charges fees based on the value of the fund's assets.

Passed back to   Investors   Pool their money with

Returns   Fund
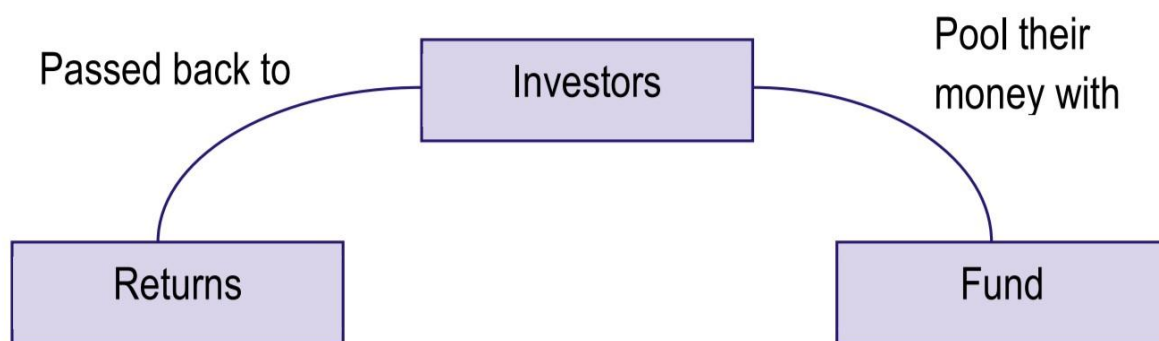
How does a mutual fund work?

- ***<u>Mutual Benefits</u>***

Investing in mutual funds is an expert's job in the present market scenario. A systematic investment in this instrument is bound to give rich dividends in the long-term. That is why over 2 crore investors have faith in mutual funds.

- ***<u>What is a Mutual Fund</u>***

A mutual fund is a trust that pools the savings of a number of investors who share a common financial goal. A mutual fund is the most suitable investment for the cautious investor as it offers an opportunity to invest in a diversified professionally managed basket of securities at a relatively low cost. So, we can say that Mutual Funds are trusts which pool resources from large number of investors through issue of units for investments in capital market instruments such as shares, debentures and bonds and money-market instruments such as commercial papers, certificate of deposits and treasury bonds.

- ***<u>Who can invest in Mutual Funds</u>***

Anybody with an investible surplus of as little as a few thousand rupees can invest in mutual funds by buying units of a particular mutual fund scheme that has a defined investment objective and strategy.

- ### *How Mutual Funds work for you*

The money collected from the investors is invested by a fund manager in different types of securities. These could range from shares and debentures to money market instruments depending upon the scheme's stated objectives. The income earned through these investments and capital appreciation realized by the scheme is shared by its unit holders in proportion to the units owned by them. (please refer the diagram above)

- ### *Should we invest in Stocks or Mutual Funds?*

As soon as, you have set your goals and decided to invest in equity the question arises should you invest in stocks or mutual funds? Well, you need to decide what kind of an investor you are. First, consider if you have the kind of disposable income to invest in 15-20 stocks. That is how many stocks you will have to invest in if you want to create a well-diversified portfolio. Remember the familiar adage: Do not put all your eggs in one basket? If ` 5,000 were all you have to spare, it would be impractical to invest it across many stocks.

Many beginners tend to focus on stocks that have a market price of less than ` 100 or ` 50; that should never be a criterion for choosing a stock. Also, brokerage could eat into your returns if you purchase small quantities of a stock.On the other hand, you would be able to gain access to a wide basket of stocks for ` 5,000 if you buy into a fund. Investing in funds would also be an easy way to build your equity portfolio over time.

Let's say you can afford to put away only ` 1,000 a month in the market. You can simply invest in a fund every month through

a Systematic Investment Plan (SIP) as a matter of financial discipline. You can save yourself the trouble of scouting for a stock every month.

That brings us to the next point. Do you have the time to pick stocks? You need to invest a considerable amount of time reading newspapers, magazines, annual reports, quarterly updates, industry reports and talking to people who are familiar with industry practices. Else, you certainly won't catch a trend or pick a stock ahead of the market. How many great investors have you heard of who have not made investing their full-time job?Plus, you may have the time, but not the inclination. You have to be an active investor, which means continuously monitor the stocks you pick and make changes – buy more, cut exposures – depending upon the turn of events. These actions have costs as well. As you churn your portfolio, you bear expenses such as capital gains tax. Funds do not pay capital gains tax when they sell a stock. All this assumes you know what you are doing and have the skill to pick the right stocks. You are likely to be better at investing in an industry you understand. Only, too bad if that industry appears to be out of favour in the market. If you love the thrill of the ups and downs in the stock market; if you find yourself turning to business channels and business newspapers hoping that you can pick the next Infosys; if you have an instinct for spotting stocks and, importantly, the discipline to act on it; if you have the emotional maturity to cut your losses when you are ahead, then you can trust yourself to invest in stocks. Otherwise, hand over your money to the professional. Mutual funds could be the best avenue for the risk-averse Investors.

- ***EVOLUTION OF THE INDIAN MUTUAL FUND INDUSTRY***

The mutual fund industry in India started in 1963 with the formation of Unit Trust of India, at the initiative of the Government of India and Reserve Bank of India. The history of mutual funds in India can be broadly divided into four distinct phases.

1. *First Phase – 1964-87*

Unit Trust of India (UTI) was established in 1963 by an Act of Parliament. It was set up by the Reserve Bank of India and functioned under the regulatory and administrative control of the Reserve Bank of India. In 1978, UTI was de-linked from the RBI and the Industrial Development Bank of India (IDBI) took over the regulatory and administrative control in place of RBI. The first scheme launched by UTI was Unit Scheme 1964. At the end of 1988, UTI had ` 6,700 crores of assets under management.

2. *Second Phase – 1987-1993 (Entry of Public Sector Funds)*

1987 marked the entry of non- UTI, public sector mutual funds set up by public sector banks, Life Insurance Corporation of India (LIC) and General Insurance Corporation of India (GIC). SBI Mutual Fund was the first non- UTI Mutual Fund established in June 1987 followed by Canbank Mutual Fund (Dec 87), Punjab National Bank Mutual Fund (Aug 89), Indian Bank Mutual Fund (Nov 89), Bank of India (Jun 90), Bank of Baroda Mutual Fund (Oct 92). LIC established its mutual fund in June 1989 while GIC

had set up its mutual fund in December 1990. At the end of 1993, the mutual fund industry had assets under management of ` 47,004 crores.

3. _Third Phase – 1993-2003 (Entry of Private Sector Funds)_

With the entry of private sector funds in 1993, a new era started in the Indian mutual fund industry, giving the Indian investors a wider choice of fund families. Also, 1993 was the year in which the first Mutual Fund Regulations came into being, under which all mutual funds except UTI were to be registered and governed. The erstwhile Kothari Pioneer (now merged with Franklin Templeton) was the first private sector mutual fund registered in July 1993. The 1993 SEBI (Mutual Fund) Regulations were substituted by a more comprehensive and revised Mutual Fund Regulations in 1996. The industry now functions under the SEBI (Mutual Fund) Regulations 1996. The number of mutual fund houses went on increasing, with many foreign mutual funds setting up funds in India. The industry has also witnessed several mergers and acquisitions. As at the end of January 2003, there were 33 mutual funds with total assets of `1,21,805 crores. The Unit Trust of India with `44,541 crores of assets under management was way ahead of other mutual funds.

4. _Fourth Phase – since February 2003- April 2014_

In February 2003, following the repeal of the Unit Trust of India Act 1963, UTI was bifurcated into two separate entities. One is the Specified Undertaking of the Unit Trust of India (SUUTI) with

assets under management of ` 29,835 crores as at the end of January 2003, representing broadly, the assets of US 64 scheme, assured return and certain other schemes. The Specified Undertaking of Unit Trust of India, functioning under an administrator and under the rules framed by Government of India does not come under the purview of the Mutual Fund Regulations. The second is the UTI Mutual Fund, sponsored by SBI, PNB, BOB and LIC. It is registered with SEBI and functions under the Mutual Fund Regulations. With the bifurcation of the erstwhile UTI which had in March 2000 more than ` 76,000 crores of assets under management and with the setting up of a UTI Mutual Fund, conforming to the SEBI Mutual Fund Regulations, and with recent mergers taking place among different private sector funds, the mutual fund industry has entered its current phase of consolidation and growth. Moreover, in its effort to increase investor awareness, the industry and the Securities and Exchange Board of India (SEBI) have launched several initiatives. These include literature and campaigns to propagate financial education to various investor segments (including potential investors), such as school and collegestudents, homemakers, executives, etc.

Mutual Fund Industry also could not be saved itself from the financial turmoil of 2009 as securities market tanked. In addition to that the absolution of Entry Load by SEBI also worsen the situation for MF industry who was already struggling to maintain its economic viability during 2010-2013.

5. *Fifth Phase – since May 2014*

To 're-energies' the Indian Mutual Fund industry and increase in its penetration, SEBI introduced several measures. With formation of new Government and success measures taken in reversion of negative trend, the situation improved significantly. Hence, since May 2014, the industry has witnessed steady inflow and increase in number of investors as well as of AUM. MF Distributors connected themselves to small towns and also enabled investors to invest in appropriate schemes and retain investor in during the course of volatility and experiencing them benefit of investing in Mutual Fund .With 'hand holding' of investors and MF Distributors, who convinced them to stay invested and encouraging them to invest in MF and when NAV in financial year 2015-16 witnessed steady positive net inflow though same year was not good for Indian securities markets.

5. *ADVANTAGES OF MUTUAL FUND*

(a) Professional Management: The funds are managed by skilled and professionally experienced managers with a back up of a Research team.

(b) Diversification: Mutual Funds offer diversification in portfolio which reduces the risk.

(c) Convenient Administration: There are no administrative risks of share transfer, as many of the Mutual Funds offer services in a demat form which save investor's time and delay.

(d) Higher Returns: Over a medium to long-term investment, investors always get higher returns in Mutual Funds as compared to other avenues of investment. This is already seen from excellent returns, Mutual Funds have provided in the last few years. However, investors are cautioned that such high returns riding on the IT boom should not be taken as regular returns and therefore one should look at the average returns provided by the Mutual Funds particularly in the equity schemes during the last couple of years.

(e) Low Cost of Management: No Mutual Fund can increase the cost beyond prescribed limits of 2.5% maximum and any extra cost of management is to be borne by the AMC.

(f) Liquidity: In all the open ended funds, liquidity is provided by direct sales / repurchase by the Mutual Fund and in case of close ended funds, the liquidity is provided by listing the units on the Stock Exchange.

(g) Transparency: The SEBI Regulations now compel all the Mutual Funds to disclose their portfolios on a half-yearly basis. However, many Mutual Funds disclose this on a quarterly or monthly basis to their investors. The NAVs are calculated on a daily basis in case of open ended funds and are now published through AMFI in the newspapers.

(h) Other Benefits: Mutual Funds provide regular withdrawal and systematic investment plans according to the need of the

investors. The investors can also switch from one scheme to another without any load.

(i) Highly Regulated: Mutual Funds all over the world are highly regulated and in India all Mutual Funds are registered with SEBI and are strictly regulated as per the Mutual Fund Regulations which provide excellent investor protection.

(j) Economies of scale: The way mutual funds are structured gives it a natural advantage. The "pooled" money from a number of investors ensures that mutual funds enjoy economies of scale; it is cheaper compared to investing directly in the capital markets which involves higher charges. This also allows retail investors access to high entry level markets like real estate, and also there is a greater control over costs.

(k) Flexibility: There are a lot of features in a regular mutual fund scheme, which imparts flexibility to the scheme. An investor can opt for Systematic Investment Plan (SIP), Systematic Withdrawal Plan etc. to plan his cash flow requirements as per his convenience. The wide range of schemes being launched in India by different mutual funds also provides an added flexibility to the investor to plan his portfolio accordingly.

6. DRAWBACKS OF MUTUAL FUND

(a) No guarantee of Return – There are three issues involved:
(i) All Mutual Funds cannot be winners. There may be some who may underperform the benchmark index i.e. it may not even

perform well as a novice who invests in the stocks constituting the index.

(ii) A mutual fund may perform better than the stock market but this does not necessarily lead to a gain for the investor. The market may have risen and the mutual fund scheme increased in value but the investor would have got the same increase had he invested in risk free investments than in mutual fund.

(iii) Investors may forgive if the return is not adequate. But they will not do so if the principal is eroded. Mutual Fund investment may depreciate in value.

(b) Diversification – A mutual fund helps to create a diversified portfolio. Though diversification minimizes risk, it does not ensure maximizing returns. The returns that mutual funds offer are less than what an investor can achieve. For example, if a single security held by a mutual fund doubles in value, the mutual fund itself would not double in value because that security is only one small part of the fund's holdings. By holding a large number of different investments, mutual funds tend to do neither exceptionally well nor exceptionally poor.

(c) Selection of Proper Fund – It may be easier to select the right share rather than the right fund. For stocks, one can base his selection on the parameters of economic, industry and company analysis. In case of mutual funds, past performance is the only criteria to fall back upon but past cannot predict the future.

(d) Cost Factor – Mutual Funds carry a price tag. Fund Managers are the highest paid executives. While investing, one has to pay for entry load and when leaving he has to pay for exit load. Such costs reduce the return from mutual fund. The fees paid to the Asset Management Company is in no way related to performance.

(e) Unethical Practices – Mutual Funds may not play a fair game. Each scheme may sell some of the holdings to its sister concerns for substantive notional gains and posting NAVs in a formalized manner.

(f) Taxes – When making decisions about your money, fund managers do not consider your personal tax situations. For example when a fund manager sells a security, a capital gain tax is triggered, which affects how profitable the individual is from sale. It might have been more profitable for the individual to defer the capital gain liability.

(g) Transfer Difficulties – Complications arise with mutual funds when a managed portfolio is switched to a different financial firm. Sometimes the mutual fund positions have to be closed out before a transfer can happen. This can be a major problem for investors. Liquidating a mutual fund portfolio may increase risk, increase fees and commissions, and create capital gains taxes.

7. TERMS ASSOCIATED WITH MUTUAL FUNDS

7.1 Net Asset Value (NAV)

It is the amount which a unit holder would receive if the mutual fund were wound up. An investor in mutual fund is a part owner of all its assets and liabilities. Returns to the investor are determined by the interplay of two elements, Net Asset Value and Costs of Mutual Fund.Net Asset Value is the mutual fund's calling card. It is the basis for assessing the return that an investor has earned.

There are three aspects which need to be highlighted:

(i) It is the net value of all assets less liabilities. NAV represents the market value of total assets of the Fund less total liabilities attributable to those assets.

(ii) NAV changes daily. The value of assets and liabilities changes daily. NAV today will not be NAV tomorrow or day later.

(iii) NAV is computed on per unit basis i.e. dividing the Net Asset Value by number of \Outstanding Units.

How Net Asset Value is calculated?

It is value of net assets of the funds. The investor's subscription is treated as the unit capital in the balance sheet of the fund and the investments on their behalf are treated as assets. The fund's net assets are defined as the assets less liabilities.

$$NAV = \frac{\text{Net asset of the scheme}}{\text{Number of units outstanding}}$$

Net Assets of the Scheme = Market value of investments + Receivables + Other accrued income + other assets - Accrued Expenses - Other Payables - Other Liabilities

7.2 Entry and Exit Load in Mutual Funds

Some Asset Management Companies (AMCs) have sales charges, or loads, on their funds (entry load and/or exit load) to compensate for distribution costs. Funds that can be purchased without a sales charge are called no-load funds. Entry load is charged at the time an investor purchases the units of a scheme. The entry load percentage is added to the prevailing NAV at the

time of allotment of units. Exit load is charged at the time of redeeming (or transferring an investment between schemes). The exit load percentage is deducted from the NAV at the time of redemption (or transfer between schemes). This amount goes to the Asset Management Company and not into the pool of funds of the scheme. In simple terms, therefore, Entry and Exit Load in Mutual Fund are the charges one pays while buying and selling the fund respectively.

7.3 Trail Commission

It is the amount that a mutual fund investor pays to his advisor each year. The purpose of charging this commission from the investor is to provide incentive to the advisor to review their customer's holdings and to give advice from time to time. Distributors usually charge a trail commission of 0.30-0.75% on the value of the investment for each year that the investor's money remains invested with the fund company. This is calculated on a daily basis as a percentage of the assets under management of the distributor and is paid monthly. This is separate from any upfront commission that is usually paid by the fund company to the distributor out of its own pocket.

7.4 Expense Ratio

It is the percentage of the assets that were spent to run a mutual fund. It includes things like management and advisory fees, travel costs and consultancy fees. The expense ratio does

not include brokerage costs for trading the portfolio. It is also referred to as the Management Expense Ratio (MER).Paying close attention to the expense ratio is necessary. The reason is it can sometimes be as high as 2-3% which can seriously undermine the performance of a mutual fund.

7.5 Side Pocketing

In simple words, a Side Pocketing in Mutual Funds leads to separation of risky assets from other investments and cash holdings. The purpose is to make sure that money invested in a mutual fund, which is linked to stressed assets, gets locked, until the fund recovers the money from the company or could avoid distress selling of illiquid securities. The modus operandi is simple. Whenever, the rating of a mutual fund decreases, the fund shifts the illiquid assets into a side pocket so that current shareholders can be benefitted from the liquid assets. Consequently, the Net Asset Value (NAV) of the fund will then reflect the actual value of the liquid assets.

Side Pocketing is beneficial for those investors who wish to hold on to the units of the main funds for long term. Therefore, the process of Side Pocketing ensures that liquidity is not the problem even in the circumstances of frequent allotments and redemptions. Side Pocketing is quite common internationally. However, Side Pocketing has also been resorted to bereft the investors of genuine returns. In India recent fiasco in the Infrastructure Leasing and Financial Services (IL&FS) has led to many discussions on the concept of side pocketing as IL&FS and

its subsidiaries have failed to fulfill its repayments obligations due to severe liquidity crisis. The Mutual Funds have given negative returns because they have completely written off their exposure to IL&FS instruments.

7.6 Tracking Error

Tracking error can be defined as the divergence or deviation of a fund's return from the benchmarks return it is following. The passive fund managers closely follow or track the benchmark index. Although they design their investment strategy on the same index but often it may not exactly replicate the index return. In such situation, there is possibility of deviation between the returns. The tracking error can be calculated on the basis of corresponding benchmark return vis a vis quarterly or monthly average NAVs. Higher the tracking error higher is the risk profile of the fund. Whether the funds outperform or underperform their benchmark indices; it clearly indicates that of fund managers are not following the benchmark indices properly. In addition to the same other reason for tracking error are as follows:

• Transaction cost
• Fees charged by AMCs
• Fund expenses
• Cash holdings
• Sampling biasness

Thus from above it can be said that to replicate the return to any benchmark index the tracking error should be near to zero.

The Tracking Error is calculated as follows:

$$TE = \sqrt{\dfrac{\sum\left(d - \bar{d}\right)^2}{n-1}}$$

d = Differential return
d(bar)= Average differential return
n = No. of observation

7.8: Sharpe Ratio:

The sharpe ratio is a measure for calculating risk adjusted returns. It is the average return earned in excess of the risk-free rate per unit of volatility or total risk.

7.9: Beta Ratio (Portfolio Beta):

Beta is a measure of the volatility or systematic risk of a security or a portfolio in comparison to the market as a whole. Beta of less than 1 means that the security will be less volatile than the market. A beta of greater than security's price will be more than the market.

7.10: AUM (Aseets Under Management):

AUM or assets under management refers to the recent / updated cumulative market value of investments managed by a mutual fund manager or any investment firm.

7.11: Standard Deviation:

Standard deviation is a measure of the dispersion of a set of data from its mean. More the spread apart the data, higher the deviation. It is applied to the annual rate of an investment to measure the investment's volatility.

7.12: Total Expense Ratio:

Total expense ratio is the percentage of net expenses that are charged by the fund. The net asset value of the fund is calculated after deducting total expense ratio.

7.13: Benchmark:

A group of securities, usually a market index, whose performance is used as a standard or benchmark to measure investment performance of mutual funds, among other investments.

# *In Brief about ICICI Prudential Bluechip Mutual Fund*

Scheme details as on 29/Feb/2024

1) Inception of fund : 23/May/2008

2) Closing AUM : Rs. 51554.28 Cr.

3) NAV :93.84

4) Application amount for fresh subscription : Rs. 100 (Plus in multiples of Re 1

5) Minimum required investment : Rs. 100 (plus in multiple of Re 1

6) Indicative investment horizon : 5 yrs & above

7) Fund Managers:
    i.   Mr.Anish Tawakley
    ii. Mr. Vaibhav Dusad

8) Total Expense Ratio : 1.45% p.a.

9) No. of investors in the scheme:20,22,363

Style

	Value	Blend	Growth	Size
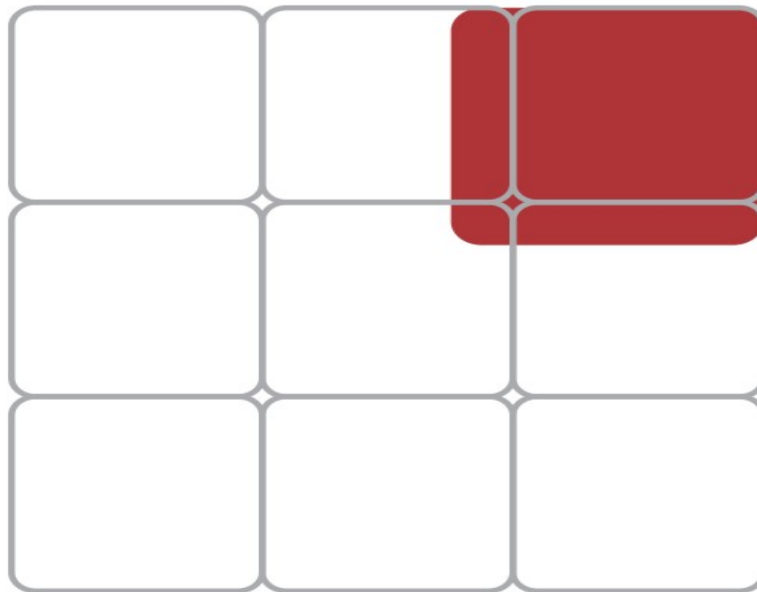
Diversified

Portfolio as on February 29, 2024

Company/Issuer	Rating	% to NAV	% to NAV Derivatives
Equity Shares		**91.02%**	0.15%
Auto Components		**0.79%**	
Motherson Sumi Systems Ltd.		0.79%	
Automobiles		**8.39%**	
• Maruti Suzuki India Ltd.		4.61%	
Hero Motocorp Ltd.		1.85%	
Tata Motors Ltd. - DVR		1.16%	
TVS Motor Company Ltd.		0.78%	
Banks		**16.88%**	
• ICICI Bank Ltd.		8.27%	
• Axis Bank Ltd.		4.66%	
• HDFC Bank Ltd.		2.87%	
Kotak Mahindra Bank Ltd.		1.07%	
Beverages		**1.66%**	
United Breweries Ltd.		0.86%	
United Spirits Ltd.		0.80%	
Capital Markets		**1.06%**	
HDFC Asset Management Company Ltd.		1.06%	
Cement & Cement Products		**4.01%**	
• Ultratech Cement Ltd.		4.01%	
Construction		**6.76%**	
• Larsen & Toubro Ltd.		6.76%	
Consumable Fuels		**1.21%**	
Coal India Ltd.		1.21%	
Diversified Fmcg		**1.53%**	
ITC Ltd.		1.53%	
Insurance		**2.92%**	
ICICI Prudential Life Insurance Company Ltd.		1.53%	
SBI Life Insurance Company Ltd.		1.39%	
It - Software		**8.66%**	
• Infosys Ltd.		5.46%	
HCL Technologies Ltd.		1.66%	
Tech Mahindra Ltd.		1.54%	
Non - Ferrous Metals		**1.03%**	
Hindalco Industries Ltd.		1.03%	
Oil		**1.50%**	
Oil & Natural Gas Corporation Ltd.		1.50%	
Personal Products		**1.00%**	
Procter & Gamble Hygiene and Health Care Ltd.		1.00%	
Petroleum Products		**9.63%**	
• Reliance Industries Ltd.		8.10%	
Bharat Petroleum Corporation Ltd.		1.52%	
Pharmaceuticals & Biotechnology		**4.02%**	
• Sun Pharmaceutical Industries Ltd.		2.71%	
Lupin Ltd.		1.30%	
Power		**3.12%**	
NTPC Ltd.		2.03%	
Power Grid Corporation Of India Ltd.		1.09%	
Realty		**1.45%**	
DLF Ltd.		1.45%	
Retailing		**0.90%**	
Avenue Supermarts Ltd.		0.90%	
Telecom - Services		**3.78%**	
• Bharti Airtel Ltd.		3.78%	
Transport Services		**0.95%**	
Interglobe Aviation Ltd.		0.95%	
Index Futures/Options			0.15%
Nifty 50 Index - Futures			0.15%
Treasury Bills		**0.37%**	
91 Days Treasury Bill 2024	SOV	0.19%	
364 Days Treasury Bill 2024	SOV	0.10%	
182 Days Treasury Bill 2024	SOV	0.08%	
Equity less than 1% of corpus		**9.80%**	
Short Term Debt and net current assets		**8.45%**	
Total Net Assets		**100.00%**	

• Top Ten Holdings

Securities and the corresponding derivative exposure with less than 1% to NAV, have been clubbed together with a consolidated limit of 10%. Derivatives are considered at exposure value.

Top 5 Stock Holdings

ICICI Bank Ltd.	8.27%
Reliance Industries Ltd.	8.10%
Larsen & Toubro Ltd.	6.76%
Infosys Ltd.	5.46%
Axis Bank Ltd.	4.66%

Top 5 Sector Holdings

Financial Services	22.11%
Oil, Gas & Consumable Fuels	12.92%
Automobile And Auto Components	10.23%
Information Technology	8.99%
Construction	6.76%

Statistical Analysis:

In this section we are going to find the interrelationship between the terms related to the mutual fund like –NAV,AUM, Expense Ratio, SD,Avg PE, Avg PB, Sharpe, Beta using multiple linear regression model.

Let;

Y = NAV

X1 = AUM

X2 =Expense Ratio

X3 = SD

X4 = Avg PE

X5 = Avg PB

X6 = Sharpe

X7 = Beta

- *Analysis Using R – Software :*

1) Importing Data :

➢ setwd("C:/Users/Dell/Desktop/OMKAR")

➢ data=read.csv("Project data final.csv")
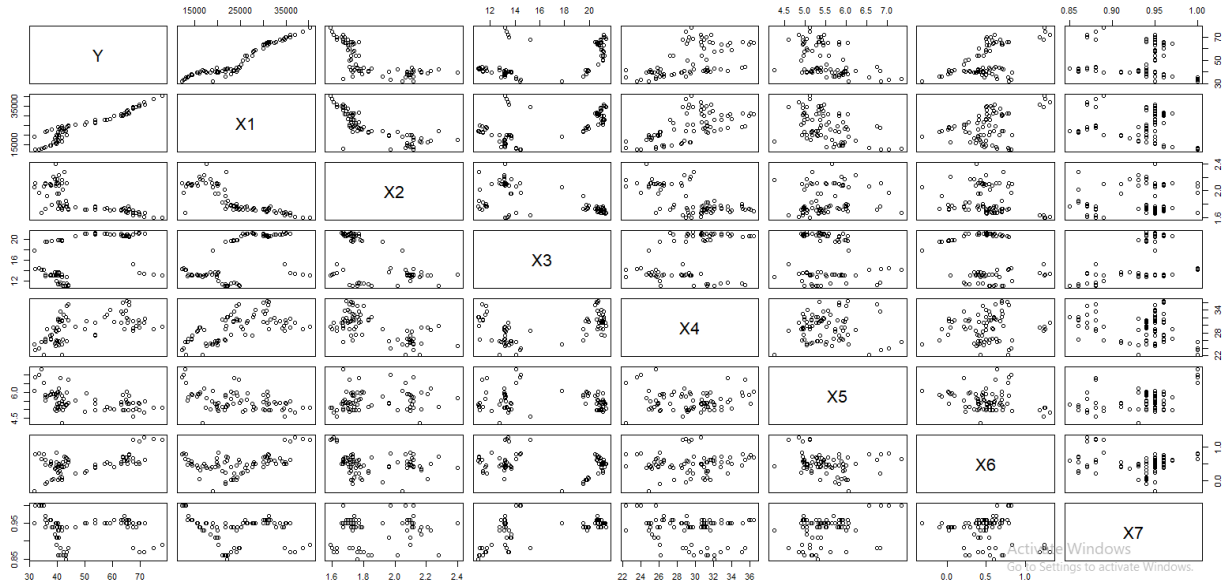➢ data

2) Extraction Of Variables :

➢ Y=data$NAV
➢ X1=data$AUM
➢ X2=data$Expense_Ratio
➢ X3=data$SD
➢ X4=data$Avg_PE
➢ X5=data$Avg_PB
➢ X6=data$Sharpe
➢ X7=data$Beta

3) Scatter Diagram & Correlation Matrix :

➢ m=cbind(Y,X1,X2,X3,X4,X5,X6,X7)
➢ pairs(m)
➢ cor(m)

Output:

Scatter Diagram:

Correlation Matrix :

	Y	X 1	X 2	X 3	X 4	X 5	X 6	X 7
Y	1	0.9440664	-0.7029532	0.5544181	0.519097456	-0.464611325	0.55152895	-0.009224866
X 1	0.944066353	1	-0.8068169	0.5594699	0.588647135	-0.462307272	0.40175731	-0.186443796
X 2	-0.702953209	-0.8068169	1	-0.5671061	-0.635543309	0.144244392	-0.21610488	0.103741548
X 3	0.554418132	0.5594699	-0.5671061	1	0.347824595	-0.148601688	-0.18313515	0.553928526
X 4	0.519097456	0.5886471	-0.6355433	0.3478246	1	-0.009539025	0.08284625	-0.252007236
X 5	-0.464611325	-0.4623073	0.1442444	-0.1486017	-0.009539025	1	-0.21457504	0.316983037
X 6	0.551528952	0.4017573	-0.2161049	-0.1831351	0.082846251	-0.214575044	1	-0.167627164
X 7	-0.009224866	-0.1864438	0.1037415	0.5539285	-0.252007236	0.316983037	-0.16762716	1

From Scatter Diagram & Correlation Matrix we can conclude that :

    i.   Corr(Y,X1) = 0.944066353

                = corr(NAV,AUM)

    There is high positive correlation between NAV and AUM.

    ii.   Corr(Y,X2) = -0.702953209

                = corr(NAV. Expense Ratio)

    Therefore NAV & expense ratio have negative correlation between them.

    iii.   Corr(Y,X3) = 0.554418132

                = corr(NAV,SD)

    Therefore NAV & SD have positive correlation in between.

    iv.   Corr(Y,X4) = 0.519097456

                = corr(NAV,Avg PE)

    Therefore NAV & Avg PE have positive correlation in between them.

    v.   Corr(Y,X5) = -0.464611325

                = Corr(NAV,Avg PB)

    Therefore NAV & Avg PB have negative correlation in between them.

vi. Corr(Y,X6) = 0.551528952

                = Corr(NAV,Sharpe)

Therefore NAV & Sharpe have positive correlation between them.

vii. Corr(Y,X7) = -0.009224866

                = corr(NAV, Beta)

There is very low correlation between NAV & Beta.

viii. Corr(X1,X2) = -0.8068169

                = Corr(AUM, Expense Ratio)

There is high negative correlation between AUM & Expense Ratio.

ix. Corr(X1,X3) = 0.5594699

                = Corr(AUM,SD)

Therefore AUM & SD have positive correlation between them.

x. Corr(X1,X4) = 0.5886471

                = Corr(AUM,Avg PE)

Therefore AUM & Avg PE Have positive correlation between them.

xi.   Corr(X1,X5) = -0.4623073

$$= Corr(AUM, Avg\ PB)$$

Therefore AUM & Avg PB have negative correlation in between.

xii.   Corr(X1,X6) = 0.4017573

$$= Corr(AUM, Sharpe)$$

Therefore AUM & Sharpe have positive correlation in between.

xiii.   Corr(X1,X7) = -0.1864438

$$= Corr(AUM, Beta)$$

Therefore AUM & Beta have negative correlation in between.

xiv.   Corr(X2,X3) = -0.5671061

$$= Corr(Expense\ Ratio, SD)$$

Hence expense ratio & SD have negative correlation between them.

xv.   Corr(X2,X4) = -0.6355433

$$= Corr(Expense\ Ratio, Avg\ PE)$$

Hence expense ratio & Avg PE have negative correlation in between.

xvi.   = Corr(X2,X5) = 0.1442444

= Corr(Expense Ratio, Avg PB)

Hence expense ratio & Avg PB have positive correlation in between.

xvii.   Corr(X2,X6) = -0.2161049

= Corr(Expense Ratio, Sharpe)

Hence expense ratio & sharpe have negative correlation between them.

xviii.   Corr(X2,X7) = 0.1037415

= Corr(Expense Ratio,Beta)

Hence expense ratio & beta have positive correlation between them.

xix.   Corr(X3,X4) = 0.3478246

= Corr(SD, Avg PB)

Hence SD & Avg PB have positive correlation between them.

xx.   Corr(X3,X5) = -0.1486017

= Corr(SD, Avg PB)

Hence SD & Avg PB have negative correlation in between.

xxi.   Corr(X3,X6) = -0.1831351

                     = Corr(SD, Sharpe)

Hence SD & Sharpe have negative correlation between them.

xxii.   Corr(X3,X7) = 0.5539285

                     = Corr(SD, Beta)

Therefore SD & Beta have positive correlation between them.

xxiii.   Corr(X4,X5) = -0.009539025

                     = Corr(Avg PE, Avg PB)

There is very low correlation between Avg PE & Avg PB.

xxiv.   Corr(X4,X6) = 0.082846251

                     = Corr(Avg PE,Sharpe)

Hence Avg PE & Sharpe have positive correlation between them.

xxv.   Corr(X4,X7) = -0.252007236

                     = Corr(Avg PE,Beta)

Therefore Avg PE & Beta Have negative correlation between them.

xxvi.   Corr(X5,X6) = -0.214575044

= Corr(Avg PB, Sharpe)

Hence Avg PB & Sharpe have negative correlation between them.

xxvii.   Corr(X5,X7) = 0.316983037
                    = Corr(Avg PB,Beta)

Therefore Avg PB & Beta have positive correlation between them.

xxviii.   Corr(X6,X7) = -0.16762716

   = Corr(Sharpe, Beta)

Hence Sharpe & Beta have negative correlation between them.

- *Fitting Of Multiple Linear Regression Model Using MINITAB:*

The regression equation is:

NAV = - 119 + 0.00176*(AUM) + 4.90*(Expense_Ratio) - 0.685*(SD) + 0.564*(Avg_PE)- 3.31*(Avg_PB) + 6.82*(Sharpe) + 136*(Beta)

Predictor	Coef	SE Coef	T	P
Constant	-119.25	12.96	-9.2	0
AUM	0.00176095	0.0000917	19.2	0
Expense Ratio	4.899	2.163	2.27	0.027
SD	-0.6852	0.193	-3.55	0.001
Avg PE	0.56398	0.09402	6	0
Avg PB	-3.3096	0.5741	-5.76	0
Sharpe	6.815	1.255	5.43	0
Beta	135.51	15.7	8.63	0

S =	1.85267
R-Sq =	98.10%
R-Sq(adj)=	98.00%

Analysis Of Variance

Source	DF	SS	MS	F - Ratio
Regression	7	12716.9	1816.7	529.28
Residual Error	70	240.3	3.4	
Total	77	12957.1		

Source	DF	Seq.SS
AUM	1	11548.2
Expense Ratio	1	128.1
SD	1	41.7
Avg PE	1	1.1
Avg PB	1	2.1
Sharpe	1	739.8
Beta	1	255.8

Plots Using R – Software :

➢ fit=lm(Y~X1+X2+X3+X4+X5+X6+X7)
➢ plot(fit)

Output :

1)

Residuals vs Fitted

2)

Q-Q Residuals

3)

.

Scale-Location
Im(Y ~ X1 + X2 + X3 + X4 + X5 + X6 + X7)

4)

Residuals vs Leverage
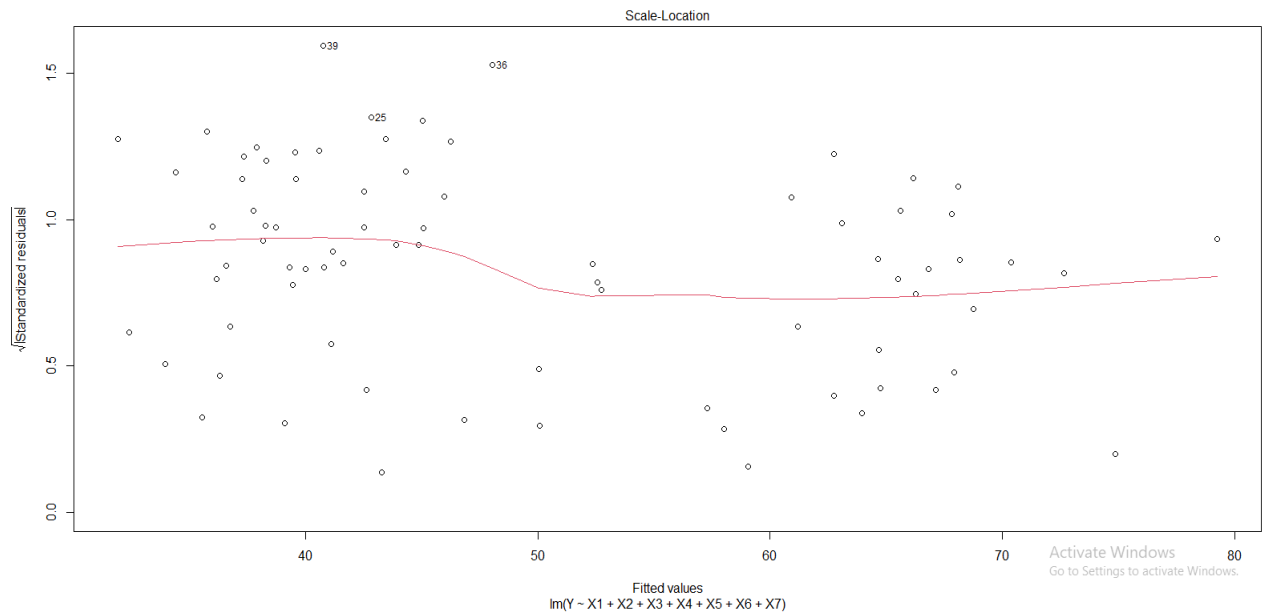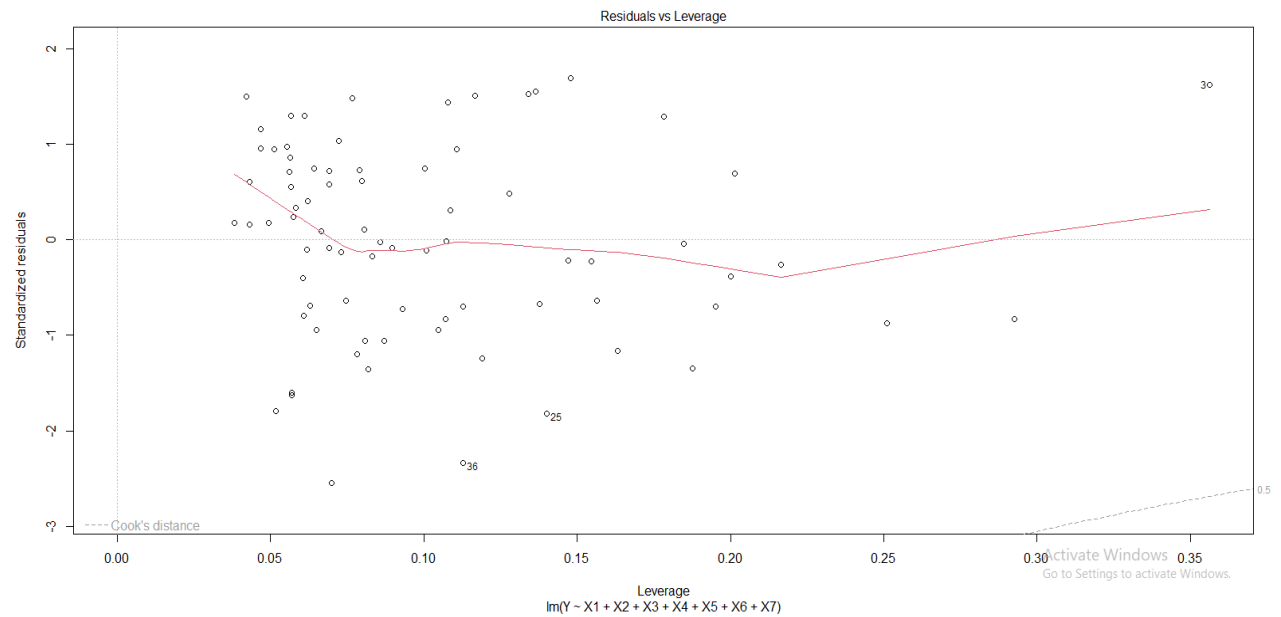Im(Y ~ X1 + X2 + X3 + X4 + X5 + X6 + X7)
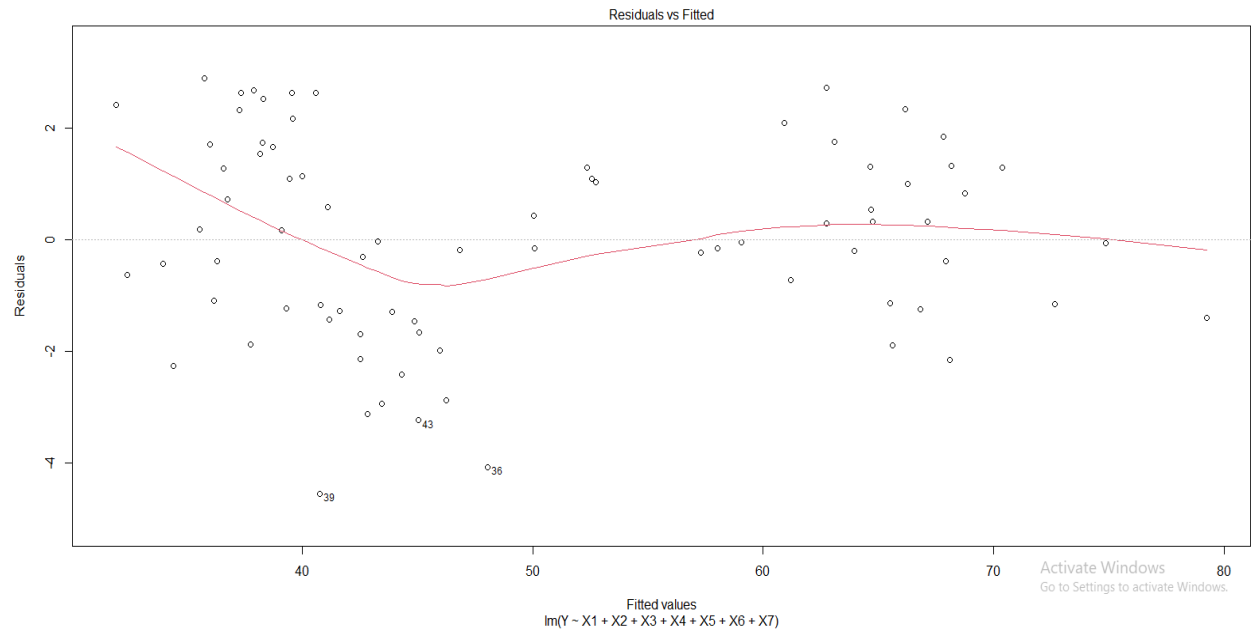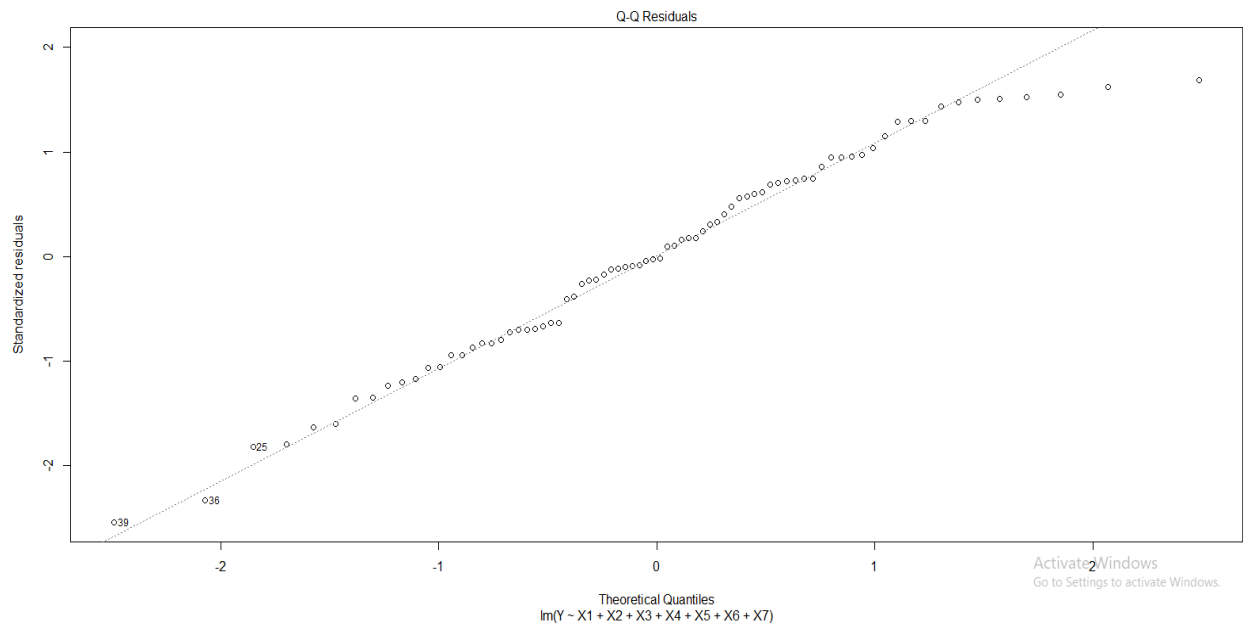
Interpretation :

i. First plot of residual (e_i) against fitted values while third plot considers square root of standardized residuals ($\sqrt{d_i}$).

ii. From the second QQ plot, one can verify normality assumption.

iii. The fourth plot considers standardized residuals & leverages.

Conclusion:

i. The regression equation for finding the value of NAV is:

NAV = - 119 + 0.00176*(AUM) + 4.90*(Expense_Ratio) - 0.685* (SD) + 0.564*(Avg_PE)- 3.31*(Avg_PB) + 6.82*(Sharpe) + 136* (Beta)

ii. There is high positive correlation between NAV and AUM.

iii. NAV & Beta have mathematically negative but have almost no correlation between them

iv. There is very low correlation between Avg PE & Avg PB.