

# A Comprehensive Analysis of Preferred Portfolios by Young Investors

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## Abstract

Every individual aims at maximizing the flow of income from whatever source possible. The most interesting activity undertaken by an individual to fulfill this objective is to make investments. The main criteria for investment are the expected return, risk involved, and liquidity of investment and safety of the fund invested. Investor tries trial and error method for identifying the optimal portfolio for their needs. Hybrid portfolios taps into the advantages of different asset categories by using a combination of risk premium and risk free securities. The project tries to understand the importance of hybrid portfolios over other portfolios by studying different hybrid portfolio combinations used among young investors and compare them with other categories. The major aim of study is to forecast the optimal hybrid portfolio for investors in 2019 by analyzing the trends of individual securities as well as markets associated with them. It also considers the portfolio valuation indices such as Sharpe, Treynor index for evaluating consistency and check whether they will perform according to investor's perception about them.

**Keywords:** Hybrid Portfolios; Risk and Return; Portfolio analysis; Portfolio evaluation; Investors perception; Ranking.

## Introduction

Investment is the employment of funds with the aim of achieving additional income or growth in value. Investment is the sacrifice of certain present value for the uncertain future reward. It entails arriving at numerous decisions such as type, mix, amount, timing, grade etc. of investment and disinvestments. Further, such decision-making has not only to be continuous but rational too. An investment decision is a tradeoff between risk and return. All investment choices are made at points of time in accordance with the personal investment ends and in contemplation of an uncertain future. All investments are risky, as the investor parts with the money. An efficient investor with proper training can reduce the risk and maximize returns. Companies and Government sell securities, either

for equity capital or debt capital. These securities may be in the form of shares, Debentures, Bonds etc. which are marketable. They have different degrees of risk and return, varying with the Instrument. The management of risk and return requires expertise. Portfolio investments can span a wide range of asset classes such as stocks, government bonds, corporate bonds, Treasury bills, real estate investment trusts (REITs), exchange-traded funds (ETFs), mutual funds and certificates of deposit. Portfolio investments can also include options, derivatives such as warrants and futures, and physical investments such as commodities, real estate, land, and timber. Depending on the contents and weightages to assets, portfolios can be classified as aggressive, defensive, income, speculative and hybrid. An aggressive portfolio or basket of stocks includes those stocks with high risk/high reward proposition. Stocks in this category typically have a high beta, or sensitivity to the overall market. Higher beta stocks experience larger fluctuations relative to the overall market on a consistent basis. Defensive portfolio do not usually carry a high beta, and usually are fairly isolated from broad market movements. Cyclical stocks, on the other hand, are those that are most sensitive to the underlying economic "business cycle". An income portfolio focuses on making money through dividends

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or other types of distributions to stakeholders, hence it generates positive cash flow. Real estate investment trusts (REITs) and master limited partnerships (MLP) are excellent sources of income producing investments. These companies return a great majority of their profits back to shareholders in exchange for favorable tax status. REITs are an easy way to invest in real estate without the hassles of owning real property, however these stocks are also subject to the economic climate. A speculative portfolio is the closest to a pure gamble & involves maximum risk. To mitigate risk & increase return a Hybrid portfolio can be selected. Hybrid Portfolio means venturing into other investments, such as bonds, commodities, real estate and even art. The composition of investments in a portfolio depends on a number of factors. Some of the most important include the investor's risk tolerance, investment horizon and amount invested.

### Statement of Problem

The management of an investment portfolio requires knowledge, experience, constant research, appraisal and reappraisal of securities market, sectors within the market and individual securities. The level at which an investor wants to take risk segregates the investors investment channels. The role of hybrid portfolio comes where there is an interest existing between risk loving and risk averse. Thus there is a requirement to find the optimum combination of asset allocation (Different weightages) in order to get maximum return with minimal risk. This study intends to find out the optimum combination of asset allocation from the different combinations used by young investors below 35 years.

### Objectives of the study

- ❖ To know more about hybrid portfolios among young investors aged below 35.
- ❖ To identify the different portfolio combinations from prospective investors.
- ❖ Return, Systematic risk and Unsystematic risk calculation and analysis of the representatives.
- ❖ To calculate the future values of risk and return of the representatives for the next years.

- ❖ Analyzing its optimality by using ratios such as Sharpe Treynor and Jensen.
- ❖ Ranking the portfolio combinations by risk and return characteristics and compare them with the choices of investors.

### Research Methodology

- For the analysis in order to find out most commonly using hybrid portfolio combinations, the study used a questionnaire containing twenty different asset allocation combinations in five categories such as Very Aggressive, Aggressive, Moderately Aggressive, Moderately Conservative and Conservative.
- The primary data is only used for identifying the top ten portfolio combinations for the detailed analysis. The study selected young investors (includes prospective investors) in Ernakulum district for the data collection.
- The total number of questionnaires given are 180 and received respondents were 156. Out of 156 response, there are only 112 responds were acceptable.
- Secondary data comprises of Historical share prices from stock market & Detailed research reports about stock performance.
- Trend analysis, Linear regression, Extrapolation, Treynor Index, Sharpe Ratio, Jensen's measure are the various tools employed for analysis. In order to analyze the different combination the study has to select securities to represent asset categories.
- The following companies are selected for the representation of these classifications Equity-Eicher Motors, Bonds-Indian Railway Finance Corporation Debentures-ECL Finance Ltd, Mutual Fund - Birla Sun Life Top 100 Commodity-Goldman Sachs Gold Bees

### Most Preferred Investment among Youth Based on Primary Data

After the voting, portfolios were ranked according to the number of votes received and Top ten ranks were selected for further analysis.

Classification of Portfolio	Portfolio No.	Equity (%)	Bond(%)	Debentures (%)	Mutual Funds (%)	Commodities (%)	Votes	Rank
Aggressive	7	65	20	20		5	42	1
Very Aggressive	2	80		20			35	2
Conservative	18	30	50	20			35	2
Very Aggressive	3	75	25				34	3
Very Aggressive	4	75			20	5	34	3
Moderately Aggressive	10	55	20	20		5	34	3
Very Aggressive	5	80	10	10			31	4
Aggressive	6	70	20	10			30	5
Moderately Aggressive	11	70	20	10	10		30	5
Moderately Aggressive	15	40	30	20	10		30	5

For proper identification for analysis, these portfolios were named from A to J

Portfolio Classification		Number of portfolios from Top 10					
Very Aggressive		4					
Aggressive		2					
Moderately Aggressive		2					
Moderately Conservative		1					
Conservative		1					

Portfolio No	Equity (%)	Bond (%)	Debentures (%)	Mutual Funds (%)	Commodities (%)	Rank	Portfolio Name
7	65	20	10		5	1	A
2	80		20			2	B
18	30	50	20			2	C
3	75	25				3	D
4	75			20	5	3	E
10	55	20	20		5	3	
5	80	10	10			4	G
6	70	20	10			5	H
11	50	20	20	10		5	I
15	40	30	20	10		5	J

### Inference

The Top Ten portfolios includes portfolios from all classifications. Out of 10, 4 portfolios belongs to the Very aggressive category (40 percent), 2 portfolios belongs to aggressive (20 percentage) and 2 portfolios belongs to moderately aggressive category (20 percentage). The remaining two portfolios belongs to moderately conservative and conservative category (10 percentage each). If we consider only the main classifications such as aggressive and conservative 80 percentage (8 out of 10) portfolios belongs to aggressive category.

### Analysis

The main objective of the study is to compare and rank different portfolio combinations in terms of different indices and find the optimum combination of portfolio for 2018, 2019, 2020. In order to compare combinations the study has to select representatives for each category (for finding related values and compare them). Since there are millions of securities and constraints of the study, It is restricted to select more than one

representatives for each asset category. So according to current market performance and expert's choice, study selected five securities to represent five asset categories (Equity, Bonds, Debenture, Mutual funds and Commodity).

Equity	Eicher Motors
Bond	Indian Railway Finance Corporation
Debenture	ECL Finance
Mutual Fund	Birla Sun Life Top 100
Commodity	Goldman Sachs Gold Bees (ETF)

Analysis part of the study consists of two sections. The first section analyses the representatives in terms of Return, Beta, and Standard Deviation followed by trend analysis and linear regression to forecast the patterns and values of these terms in 2018, 2019, 2020. For the accurate trend measurement study considered closing monthly price of securities for seven years (2010-2017).

The second section deals with the portfolio analysis and evaluation techniques. Analysis of portfolios were done by indices such as return, beta, Standard deviation, and Expected return, Sharpe, Treynor and Jensen ratios.

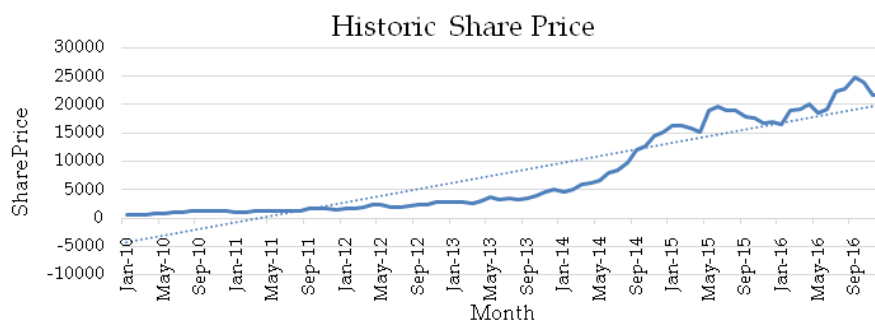
**Section-1***Analysis of Representatives***Table 1:** Equity

<b>Market Cap (RS CR)</b>	<b>73368.76</b>	<b>EPS</b>	<b>612.67</b>
P/E	44.01	P/C	40.29
Book Value (RS)	1885.84	Price/Book	14.3
DIV (%)	1000.00%	DIV Yield. (%)	0.370%

**Table 2:** Eicher Motors

<b>Year</b>	<b>Annual return</b>	<b>Beta</b>	<b>SD</b>
2010	88.545%	0.443466037	0.109247
2011	20.461%	1.283560917	0.114646
2012	95.336%	0.113861938	0.083628
2013	71.191%	1.213713633	0.111862
2014	202.963%	1.120330383	0.076909
2015	11.811%	1.172180076	0.079594
2016	29.352%	-0.042988036	0.076975
2017	23.485%	-0.483969182	0.067693

Long term Beta (2010-2016, monthly): 0.801733 [1]

**Graph 1:** Historic share price and Trend line of Eicher motors for eight years*Trend Analysis***Table 3:** Annual Return

<b>Year</b>	<b>Years from 2010</b>	<b>Average monthly return</b>	<b>Annual return</b>
2010	0	5.984%	88.545%
2011	1	2.187%	20.461%
2012	2	6.081%	95.336%
2013	3	5.177%	71.191%
2014	4	9.952%	202.963%
2015	5	1.221%	11.811%
2016	6	2.454%	29.352%
2017	7	2.003%	23.485%

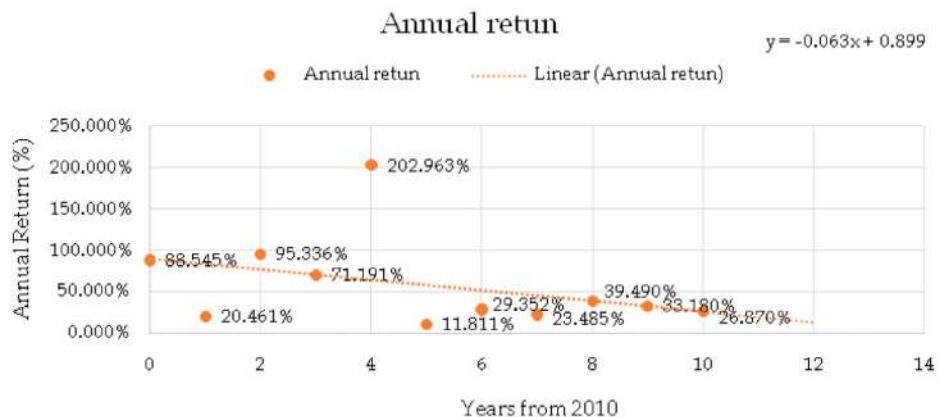
Regression Equation [2]:  $y = -0.0631x + 0.8997$

Correlation Co-efficient [3]: 0.815232213

Regression Equation [1]:  $y = -0.0241x + 0.8301$

Forecasted Annual Beta

2018: 0.6373

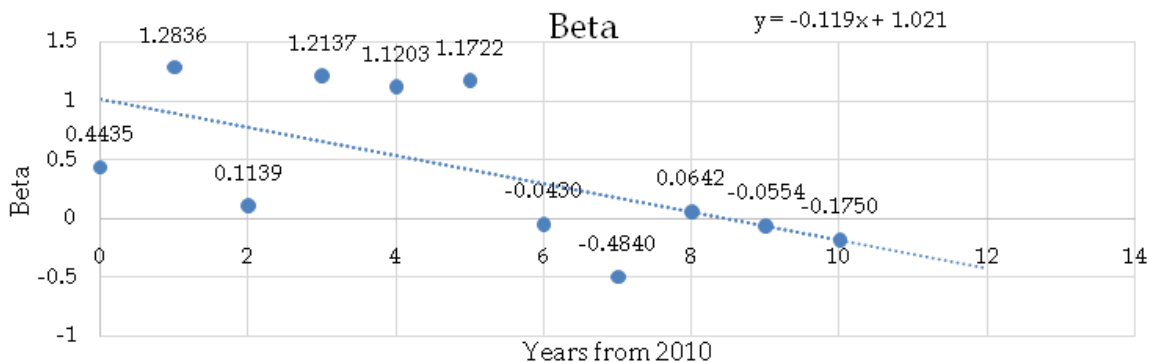


Graph 2: Annual Return trend line using linear regression

2019: -0.0554  
 2020: -0.175  
 Forecasted Annual Beta  
 2018: 0.6373  
 2019: -0.0554  
 2020: -0.175  
 Forecasted Annual Return  
 2018: 39.490%  
 2019: 33.180%  
 2020: 26.870%

Table 4: Beta

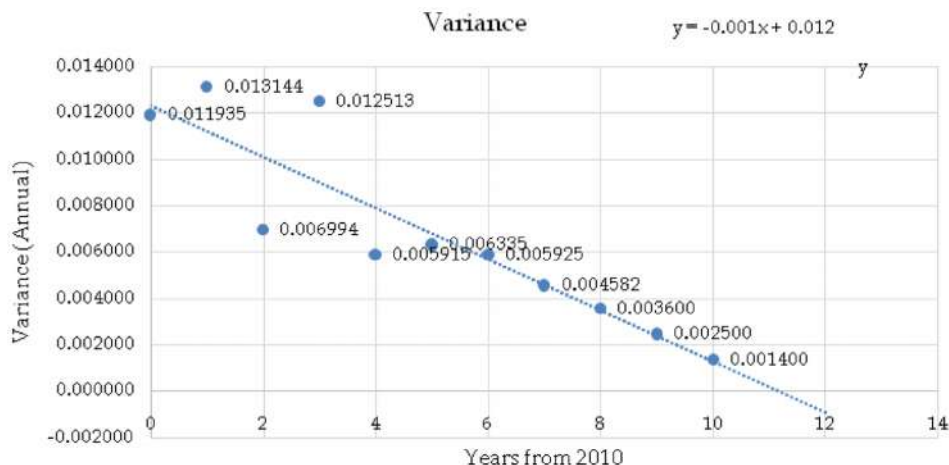
Year	Years from 2010	Beta	SD
2010	0	0.443466037	0.109247
2011	1	1.283560917	0.114646
2012	2	0.113861938	0.083628
2013	3	1.213713633	0.111862
2014	4	1.120330383	0.076909
2015	5	1.172180076	0.079594
2016	6	-0.042988036	0.076975
2017	7	-0.483969182	0.067693



Graph 3:

Table 5: Variance

Year	Years from 2010	Variance	SD
2010	0	0.011935	10.925%
2011	1	0.013144	11.465%
2012	2	0.006994	8.363%
2013	3	0.012513	11.186%
2014	4	0.005915	7.691%
2015	5	0.006335	7.959%
2016	6	0.005925	7.697%
2017	7	0.004582	6.769%



Graph 4: Annual Variance trend line using linear regression

Regression Equation [4]:  $y = -0.0011x + 0.0124$

*Forecasted Annual Variance*

- 2018: 0.003110 (SD: 5.577%)
- 2019: 0.002500 (SD: 5.000%)
- 2020: 0.001400 (SD:3.742%)

*Inference*

According to trend analysis and linear regression, we can say that Eicher Motors has a downward trend of Annual Return, Beta and Variance though it has an upward trend of share price over seven years. With the help of linear regression and extrapolation we can forecast the upcoming values of the corresponding security. The study intends to take these values for the representation of the asset classification Equity.

**Bond**

Table 6: Indian Railway Finance Corporation

Series	N2	Coupon Rate	8.1
Face Value	1000	Credit Rate	AAA
Issue Date	2012	Maturity	2027

Year	Annual Return	Annual Beta	Standard Deviation
2015	11.85%	0	0.00%
2016	11.85%	0	0.00%
2017	11.85%	0	0.00%
2018	11.85%	0	0.00%
2019	11.85%	0	0.00%
2020	11.85%	0	0.00%

Historical Return, Beta and Standard Deviation of IRFC

*Trend Analysis*

Table 7: Return

Year	Years from 2012	Annual Return
2012	0	8.1%
2013	1	8.1%
2014	2	8.1%
2015	3	8.1%
2016	4	8.1%
2017	5	8.1%

Annual Return trend line using linear regression

Regression Equation:  $y = 0.00000x + 0.08100$

*Forecasted Annual Return*

- 2017: 8.10%
- 2018: 8.10%
- 2019: 8.10%
- 2020: 8.10%

*Inference*

Government bonds also called fixed income securities so it has a fixed annual income which doesn't have any risks. That is the reason why bond's beta and standard deviation always remains zero. The only risk they have is the sovereign risk which can't be measured and depends on government policies. Study intends to take these values for the representation of the asset category bonds.

Table 8: Bond

Year	Annual Return	Beta	Standard Deviation
2017	8.10%	0	0
2018 (Forecasted)	8.10%	0	0
2019 (Forecasted)	8.10%	0	0
2019 (Forecasted)	8.10%	0	0

**Debenture**

**Table 9:** ECL Finance Limited

Series	N3	Coupon Rate	11.85
Face Value	1000	Credit Rate	AA
Issue Date	2014	Maturity	2019

Year	Annual Return	Beta	Standard Deviation
2014	11.85%	0	0
2015	11.85%	0	0
2016	11.85%	0	0

Annual Return trend line using linear regression

Regression Equation [5]:  $y = 0.00000x + 0.11850$

Forecasted Annual Return

2018: 11.85%

2019: 11.85%

2020: 11.85%

*Inference*

Debentures also called fixed income securities so it has a fixed annual income which doesn't have any risks when it is secured. That is the reason why debenture's beta and standard deviation always remains zero. The only risk they have is the risk of the company's goodwill and performance also it lacks the guarantee of government which induces some additional risk to the holder of debentures thus higher return than bonds. Study intends to take these values for the representation of the asset category debentures.

**Table 10:** Debenture

Year	Annual Return	Beta	Standard Deviation
2017	11.85%	0	0
2018 (Forecasted)	11.85%	0	0
2019 (Forecasted)	11.85%	0	0

**Table 11:** Mutual Funds

Bench Mark	Nifty 50	Type of scheme	Open ended
Credit Rank	2	Type of shares	Large cap

**Birla Sun Life Top 100(G)**

**Table 12:** Long term Beta (2010-2017, monthly):0.897604429

Year	Annual Return	Beta	Standard Deviation
2010	18.04%	0.730326444	0.036842531
2011	-21.60%	0.793784643	0.048194479
2012	36.36%	0.95017613	0.048191292
2013	9.15%	0.939361593	0.041724702
2014	48.91%	1.156271195	0.043602255
2015	-0.05%	0.871499544	0.03218015
2016	6.69%	0.846221474	0.041322189
2017	17.000%	0.9993	3.862%

Historical Return, Beta and Standard Deviation of Birla SL Top 10

Historic NAV and Trend line of Birla SL Top 100for seven years

*Trend Analysis*

**Table 13:** Annual Return

Year	Years from 2010	Annual Return
2010	0	18.041%
2011	1	-21.601%
2012	2	36.364%
2013	3	9.149%
2014	4	48.910%
2015	5	-0.045%
2016	6	6.692%
2017	7	17.000%

Regression Equation:  $y = 0.0077x + 0.1162$

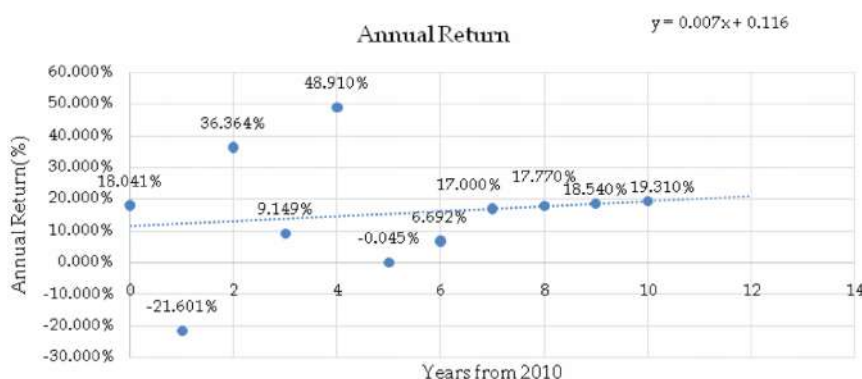
Correlation Co-efficient [6]: 0.976529913

Forecasted Annual Return

2018: 17.77%

2019: 18.540%

2020: 19.310%



**Graph 5:** Annual Return trend line using linear regression

**Table 14:** Beta

Year	Years from 2010	Beta
2010	0	0.730326444
2011	1	0.793784643
2012	2	0.95017613
2013	3	0.939361593
2014	4	1.156271195
2015	5	0.871499544
2016	6	0.846221474
2017	7	0.9993

Forecasted Annual Return

Regression Equation [7]:  $y = 0.0253x + 0.8223$

Forecasted Annual Beta

2018: 1.0246

2019: 1.0499

2020: 1.0752

**Table 15:** Variance

Year	Years from 2010	Variance	SD
2010	0	0.00135737	3.684%
2011	1	0.00232271	4.819%
2012	2	0.0023224	4.819%
2013	3	0.00174095	4.172%
2014	4	0.00190116	4.360%
2015	5	0.00103556	3.218%
2016	6	0.00170752	4.132%
2017	7	0.0014916	3.862%

Regression Equation:  $y = -0.0000695x + 0.0019781$

Forecasted Annual Variance

2018: 0.0014221 (SD: 3.771%)

2019: 0.0013526 (SD: 3.678%)

2020: 0.0012831 (SD: 3.582%)

*Inference*

According to trend analysis and linear regression, we can say that Birla sunlife top 100 mutual fund has a downward trend for Variance though it has an upward trend of NAV, Return and Beta over seven years. With the help of linear regression and extrapolation we can forecast the upcoming values

of the corresponding security. The study intends to take these values for the representation of the asset classification Mutual Fund.

**Table 16:** Mutual Fund

Year	Annual Return	Beta	Standard Deviation
2017	17.000%	0.9993	3.862%
2018 (Forecasted)	17.770%	1.0246	3.771%
2019 (Forecasted)	18.540%	1.0499	3.678%
2020 (Forecasted)	19.310%	1.0752	3.582%

*Commodity*

According to current scenario, there are no direct investment in commodities (here Gold, Like Buying ornaments, coins, bars etc.). For the convenience of transaction they convert gold into Gold ETF (Exchange Trade Fund). There like mutual funds but treated like stocks and not actively managed like mutual funds.

**Table 17:** Goldman Sachs

Year	Beta	Annual Return	SD
2010	-0.172555236	0.179759069	0.036958869
2011	-0.584172689	0.383530149	0.053667612
2012	0	-0.0059485	0
2013	-0.24831889	0.091827225	0.057297071
2014	0.362454855	-0.067510378	0.042572452
2015	-0.774979917	-0.060279955	0.042117737
2016	0.133766377	0.085563309	0.04034832
2017	-0.0551	-0.08925	0.043309352

**Table 18:** Trend Analysis

Year	Years from 2010	Annual Return
2010	0	17.976%
2011	1	38.353%
2012	2	-0.595%
2013	3	9.183%
2014	4	-6.751%
2015	5	-6.028%
2016	6	8.556%
2017	7	-8.925%

*Annual Return*

Regression Equation:  $y = -0.04399x + 0.21868$



**Graph 6:** Historic share price and Trend line of Goldman Sachs Gold Bees (ETF) for seven years



Correlation Co-efficient 0.826953498

2018-0.023

Forecasted Annual Return

2019 0.0091

2020-22.122%

2020 0.0412

2019: -17.723%

2018: -13.324%

Table 20: Variance

Table 19: Beta

Year	Years from 2010	Beta
2010	0	-0.172555236
2011	1	-0.584172689
2012	2	0
2013	3	-0.24831889
2014	4	0.362454855
2015	5	-0.774979917
2016	6	0.133766377
2017	7	-0.0551

Year	Years from 2010	Variance	SD
2010	0	0.001365958	3.696%
2011	1	0.002880213	5.367%
2012	2	0	0.000%
2013	3	0.003282954	5.730%
2014	4	0.001812414	4.257%
2015	5	0.001773904	4.212%
2016	6	0.001627987	4.035%
2017	7	0.0018757	4.331%

Regression Equation:  $y = 0.0321x - 0.2797$

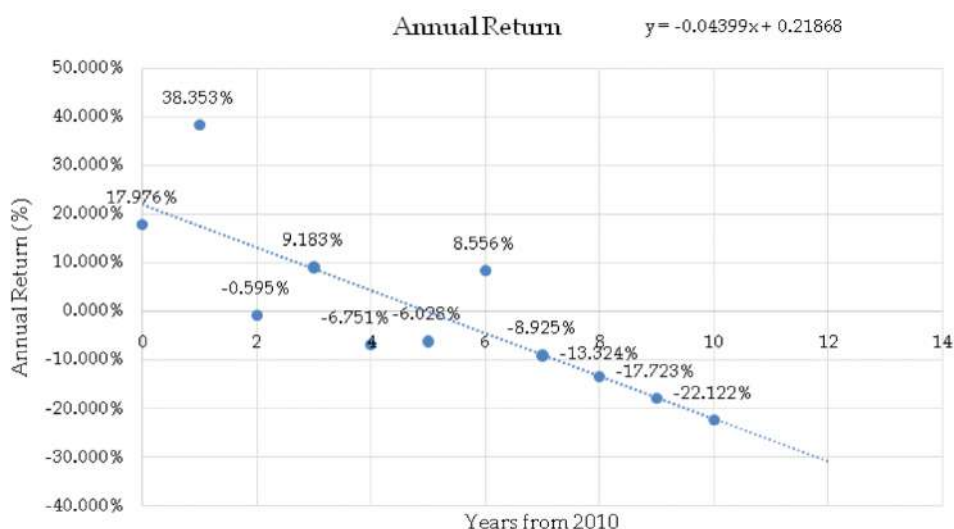
Forecasted Annual Beta

Annual Variance trend line using linear regression

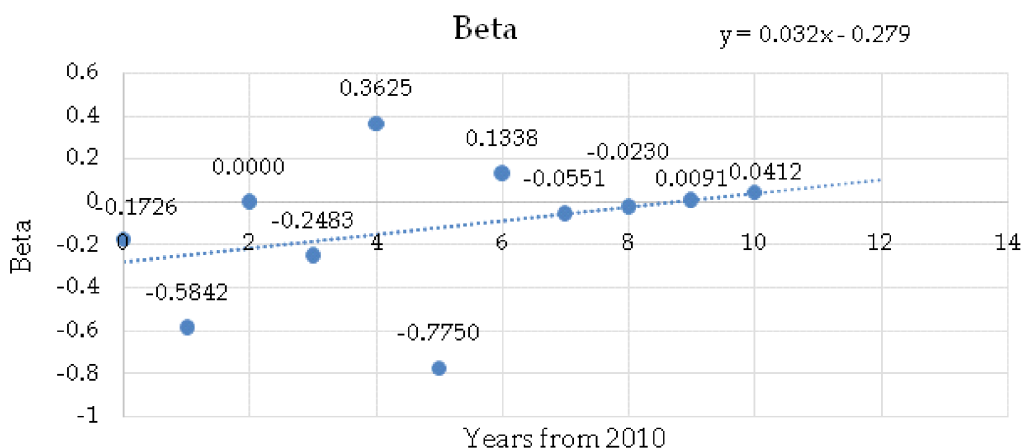
Regression Equation:  $y = 0.0000138x + 0.0017791$

Forecasted Annual Variance

2018 0.0018895 SD: 4.347%



Graph 7: Annual Return trend line using linear regression



Graph 8: Beta trend line using linear regression

2019	0.0019033	SD: 4.363%
2020	0.0019171	SD: 4.378%

2011	-24.618%	0.00345269	5.876%
2012	27.697%	0.00250371	5.004%
2013	6.755%	0.0017566	4.191%
2014	31.388%	0.00121714	3.489%
2015	-4.061%	0.00114345	3.381%
2016	3.013%	0.00218546	4.675%
2017	28.64595%	0.00070221	2.650%

*Inference*

According to trend analysis and linear regression, Gold ETF has a downward trend of annual returns while Beta and Variance maintains an upward trend. Gold ETF return has a high positive correlation with the domestic gold prices which causes the fluctuations because domestic gold price depends on many factors such as inflation rate, Export-import policies, Demands, Business cycles etc. The study intends to take these values for the representation of the asset classification commodity.

**Table 21:** Commodity

Year	Annual Return	Beta	Standard Deviation
2017	-8.93%	-0.0551	4.331%
2018 (Forecasted)	-13.32%	-0.023	4.347%
2019 (Forecasted)	-17.72%	0.0091	0.000%
2020 (Forecasted)	-22.12%	0.0412	5.730%

*Market*

**Table 22:** NSE Nifty 50

Stock Exchange	NSE	No. of Companies	50
Year	Annual Return	Variance	Standard Deviation
2010	17.947%	0.00211402	4.598%

*Trend Analysis*

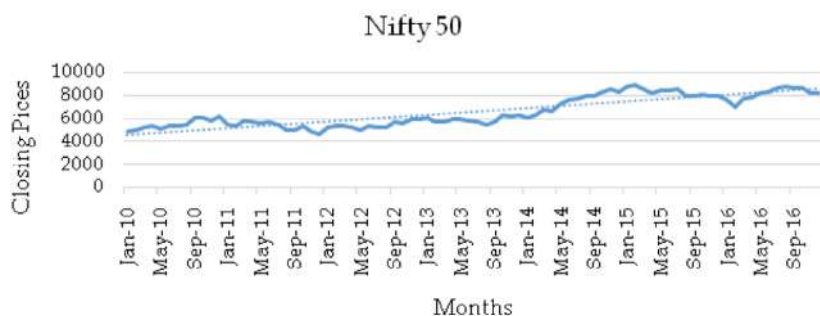
**Table 23:** Annual Return

Year	Year from 2010	Average monthly return	Annual Return
2010	0	1.488%	17.947%
2011	1	-2.154%	-24.618%
2012	2	2.179%	27.697%
2013	3	0.632%	6.755%
2014	4	2.361%	31.388%
2015	5	-0.287%	-4.061%
2016	6	0.356%	3.013%
2017	7	1.935%	28.64595%

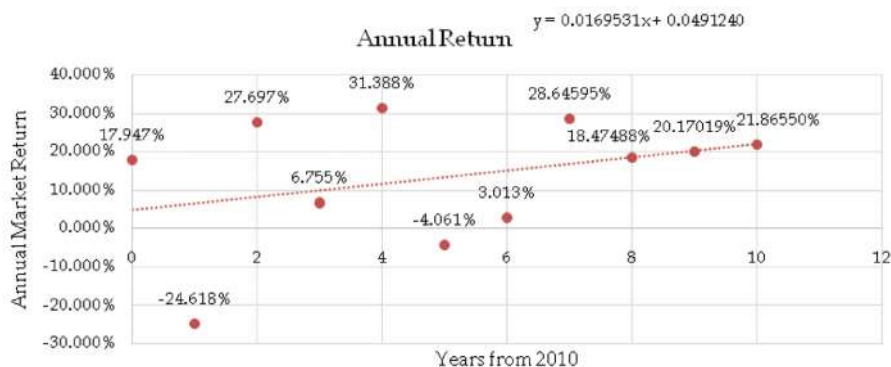
Regression Equation:  $y = 0.0169531x + 0.0491240$

Forecasted Annual Return

2018	18.47488%
2019	20.17019%
2020	21.86550%



**Graph 9:** Historical Return and Standard Deviation of Nifty 50



**Graph 10:** Annual Return trend line using linear regression

**Table 24:** Variance

Year	Year from 2010	Variance	Standard Deviation
2010	0	0.002114024	4.598%
2011	1	0.003452691	5.876%
2012	2	0.00250371	5.004%
2013	3	0.001756596	4.191%
2014	4	0.001217145	3.489%
2015	5	0.001143447	3.381%
2016	6	0.002185457	4.675%
2017	7	0.000702215	2.650%

Annual Variance trend line using linear regression

$$\text{Regression Equation: } y = -0.000216x + 0.002667$$

Forecasted Annual Variance

2018	0.00093	SD: 3.050%
2019	0.000836	SD: 2.891%
2020	0.000633	SD: 2.516%

### *Inference*

By the trend analysis the annual return seems a constant with a slight upwardness but the change is negligible where the variance shows a downward trend. The changes in these values have a positive correlation with equity as well as mutual funds so the study intends to take these values for the representation of market. The rate of fixed deposits of SBI for 3-10 years is taken as risk free rate (For compensating large cap fund, its better to take longterm rates)

**Table 25:** Market

Year	Annual Return	Variance	Standard Deviation
2016	3.01%	0.002185457	4.68%
2017	8.30%	0.001242	3.52%
2018 (Forecasted)	18.47%	0.00093	3.05%
2019 (Forecasted)	20.17%	0.000836	2.89%
2020 (Forecasted)	21.87%	0.000633	2.52%

## Section 2

### *Portfolio Analysis*

**Table 26:** Portfolio A

Rank [1]	Portfolio No. [2]	Equity	Bond	Debenture	Mutual fund	Commodity
1	7	65%	20%	10%	0%	5%

Year	Rp	Bp	Variance	$\Sigma p$	E(RP)	Sharpe	Treynor	Jenson
2017	46.0432%	0.427155	0.2040%	4.5162%	7.2704%	8.755851	0.925734	38.7728%
2018	43.6785%	0.413095	0.1496%	3.8678%	7.2451%	9.612272	0.9	36.4334%
2019	22.7687%	-0.03556	0.001062065	3.2589%	6.0140%	4.992031	-4.57564	16.755%
2020	16.7222%	-0.11169	0.000604189	2.4580%	4.7838%	4.15872	-0.91523	11.938%

**Table 27:** Portfolio B

Rank	Portfolio No.	Equity	Bond	Debenture	Mutual fund	Commodity
2	2	80%	0%	20%	0%	0%

**Table 28:** Portfolio C

Rank	Portfolio No.	Equity	Bond	Debenture	Mutual fund	Commodity
2	18	30%	50%	20%	0%	0%

Year	Rp	Bp	Variance	op	E(RP)	Sharpe	Treynor	Jenson
2017	26.5926%	0.19842	0.0434%	2.0835%	6.8579%	9.643668	1.01263	19.7347%
2018	25.5966%	0.19119	0.0318%	1.7829%	6.8449%	10.71087	0.998828	18.7517%
2019	16.0388%	-0.01662	0.02252%	1.50077%	6.27280%	6.35592	-5.73933	0.09766
2020	13.3331%	-0.0525	0.01277%	1.13024%	5.69331%	6.045662	-1.30154	0.076398

Table 29: Portfolio D

Rank	Portfolio No.	Equity	Bond	Debenture	Mutual fund	Commodity
3	3	75%	25%	0%	0%	0%

Table 30: Portfolio E

Rank	Portfolio No.	Equity	Bond	Debenture	Mutual fund	Commodity
3	4	75%	0%	0%	20%	5%

YEAR	Rp	Bp	Variance	$\Sigma p$	E(RP)	Sharpe	Treynor	Jenson
2017	55.0219%	0.693155	0.3069%	5.5395%	7.7502%	8.759264	0.700016	47.2718%
2018	52.5213%	0.681745	0.2294%	4.7894%	7.7297%	9.608899	0.675052	44.7916%
2019	31.113%	0.168885	0.1489%	3.8587%	8.8087%	6.378648	1.4574	0.223046
2020	24.786%	0.08585	0.0848%	2.9125%	7.8191%	6.278241	2.129942	0.169664

Table 31: Portfolio F

Rank	Portfolio No.	Equity	Bond	Debenture	Mutual fund	Commodity
3	10	55%	20%	20%	0%	5%

Year	Rp	Bp	Variance	Op	E(RP)	Sharpe	Treynor	Jenson
2017	40.5040%	0.361015	0.1461%	3.8226%	7.1511%	8.895405	0.941899	33.3528%
2018	38.4713%	0.349365	0.1072%	3.2746%	7.1302%	9.763362	0.915127	31.3412%
2019	0.207474	-0.03002	0.000761761	0.027600025	0.060896892	5.162112	-4.74677	0.146578
2020	0.156029	-0.09419	0.000433909	0.020830472	0.050227236	4.369987	-0.96644	0.105502

Table 32: Portfolio G

Rank	Portfolio No.	Equity	Bond	Debenture	Mutual fund	Commodity
4	5	80%	10%	10%	0%	0%

Year	Rp	Bp	Variance	$\Sigma p$	E(RP)	Sharpe	Treynor	Jenson
2017	55.7886%	0.52912	0.3087%	5.5560%	7.4543%	8.871231	0.93152	48.3343
2018	53.1326%	0.50984	0.2260%	4.7544%	7.4196%	9.808207	0.914651	45.7130%
2019	0.276451	-0.04432	0.001601642	0.040020521	0.058941372	5.283554	-4.771	0.217509
2020	0.204298	-0.14	0.000908407	0.030139788	0.0434883	4.621741	-0.99499	0.16081

Table 33: Portfolio H

Rank	Portfolio No.	Equity	Bond	Debenture	Mutual fund	Commodity
5	6	70%	20%	10%	0%	0%

Year	Rp	Bp	Variance	$\Sigma p$	E(Rp)	Sharpe	Treynor	Jenson
2017	49.8744%	0.46298	0.2363%	4.8615%	7.3350%	8.922012	0.936853	42.5394%
2018	47.5504%	0.44611	0.1731%	4.1601%	7.3047%	9.86755	0.920185	40.2457%
2019	25.249%	-0.03878	0.1226%	3.5018%	5.9699%	5.354053	-4.83466	19.2789%
2020	18.9355%	-0.1225	0.0695%	2.6372%	4.6177%	4.715353	-1.01514	14.3178%

Table 34: Portfolio I

Rank	Portfolio No.	Equity	Bond	Debenture	Mutual fund	Commodity
5	11	50%	20%	20%	10%	0%

Year	Rp	Bp	Variance	$\Sigma p$	E(Rp)	Sharpe	Treynor	Jenson
2017	40.1408%	0.43063	0.1315%	3.6266%	7.2767%	9.276065	0.781199	32.8641%
2018	38.5788%	0.42111	0.0976%	3.1241%	7.2596%	10.26833	0.761767	31.3192%
2019	23.993%	0.07729	0.0644%	2.5368%	7.5566%	6.89576	2.263288	16.4364%
2020	19.7937%	0.02002	0.036308%	1.905478%	6.807617%	6.976594	6.640233	12.9861%

**Table 35:** Portfolio J

Rank	Portfolio No.	Equity	Bond	Debenture	Mutual fund	Commodity
5	15	40%	30%	20%	10%	0%

Year	Rp	Bp	Variance	$\Sigma p$	E(RP)	Sharpe	Treynor	Jenson
2017	34.2266%	0.36449	0.0865%	2.9406%	7.1574%	9.42883	0.760695	27.0692%
2018	32.9966%	0.35738	0.0645%	2.5387%	7.1446%	10.43689	0.741412	25.8520%
2019	21.597%	0.08283	0.0419%	2.0476%	7.6323%	7.372917	1.822612	13.9644%
2020	18.2994%	0.03752	0.023772%	1.541824%	7.076514%	7.65288	3.144828	11.2229%

**Table 36:** Ranking of Portfolios based on annual return

Rank	Portfolio Name	2017	Portfolio Name	2018	Portfolio Name	2019	Portfolio Name	2020
1	B	56.16%	B	53.51%	E	31.11%	E	24.79%
2	G	55.79%	G	53.13%	B	28.02%	B	20.80%
3	E	55.02%	E	52.52%	G	27.65%	G	20.43%
4	D	52.46%	D	49.97%	D	26.07%	I	19.79%
5	H	49.87%	H	47.55%	H	25.25%	D	19.31%
6	A	46.04%	A	43.68%	I	23.99%	H	18.94%
7	F	40.50%	I	38.58%	A	22.77%	J	18.30%
8	I	40.14%	F	38.47%	J	21.60%	A	16.72%
9	J	34.23%	J	33.00%	F	20.75%	F	15.60%
10	C	26.59%	C	25.60%	C	16.04%	C	13.33%

### *Inference*

According to the ranking of portfolios based of Annual return, Portfolio B has the highest return in all three years. Second ranked Portfolio G has slight variation from the first. Investors from the table it's clear that most used combination (Portfolio A) is not good according to Sharpe index even though A has high preference among investors, it has a Sharpe index rank of 5 in 2016, last position in 2017 and will be second last in 2018. It's not consistent according to Sharpe index. Portfolio B has slight good position comparing to A, It comes back into 4<sup>th</sup> rank in 2017 from 6<sup>th</sup> and maintains its position to 2018. On the

other hand second most favorite combination (along with B, 2<sup>nd</sup> rank) maintaining its 1<sup>st</sup> rank in all three years. According to Sharpe index Portfolio C will have maximum investment attractiveness in 2017 and 2018. Investors use shape index for portfolio evaluation should reconsider their current choice (A or B) and try to change for future benefits (C or J) Considering only return regardless of risk can choose B or G for next years (2017, 2018) and investors already invested into these can keep their investments and others can opt for a portfolio evaluation and consider a change in the allocation of assets for better returns in future.

**Table 37:** Ranking of Portfolios Based on Sharpe Ratio

Portfolio Name	Rank By Votes [1]	2016	2017	2018
A	1	5	10	9
B	2	6	4	4
C	2	1	1	1
D	3	9	8	8
E	3	10	9	10
F	3	4	6	7
G	4	8	7	6
H	5	7	5	5
I	5	3	3	3
J	5	2	2	2

**Table 38:** Ranking based on Treynor Ratio

Rank	Portfolio Name	2017	Portfolio Name	2018	Portfolio Name	2019	Portfolio Name	2020
1	C	9.643668213	C	10.71087	J	7.372917	J	7.65288
2	J	9.42882999	J	10.43689	I	6.89576	I	6.976594
3	I	9.476065039	I	10.26866	E	6.378648	E	6.27841
4	B	8.938725365	B	9.887081	C	6.35592	C	6.045662
5	H	8.922012434	H	9.86755	B	5.377256	B	4.746162
6	F	8.895404562	G	9.808207	H	5.354053	H	4.715353
7	G	8.871230837	F	9.763362	G	5.283554	G	4.621741
8	D	8.822934752	D	9.751769	D	5.216505	D	4.532712
9	E	8.75926439	A	9.612272	F	5.162112	F	4.369987
10	A	8.75585115	E	9.608899	A	4.992031	A	4.15872

### Inference

Treynor ratio is also called return to volatility ratio, Higher the ratio higher will be the excess return. The trend analysis of Treynor ratio has a downward trend for the next years and some serious changes in ranks. The investors invested in first 3 ranks in 2018 should reconsider their asset allocation weightage and Portfolio I will have an attractive as well as consistent performance in next years.

### Optimal Portfolio (Markowitz Model)

Here the selection of optimal portfolio is based on the combination of risk (Standard Deviation) and return ( $R_p$ ) (Markowitz Model).

**Table 39:** Optimal Portfolio (Markowitz Model)

Portfolio Name	Risk	Return
A	5.008%	22.25%
B	6.160%	25.75%
C	2.310%	15.19%
D	5.775%	23.94%
E	5.874%	24.21%
F	4.239%	20.51%
G	6.160%	25.37%
H	5.390%	23.26%
I	3.882%	19.53%
J	3.123%	17.41%
Equity (100%)	7.700%	29.22%
Bond (100%)	0.000%	8.10%
Debenture (100%)	0.000%	11.85%
Commodity (100%)	4.083%	8.96%

### Inference

According to feasibility set of portfolios graph, the optimal portfolio combination in 2016 was portfolio A. Which is most favored portfolio combination by the investors. This means that

the most of the investors decision for an optimal portfolio was right in 2016.

The additional five points in the graph besides the top 10 portfolios are not actually portfolios, they are the risk and return if investor decides to invest only in a single asset category (e.g. 100% investment in equity) that means there no hybrid portfolio combination.

This gives a comparison between single asset investment and hybrid portfolio investment. From the graph we can see that no single asset investment included in the optimal combinations region. But even though single equity investment has high returns it also has the maximum risk.

Portfolios A, F, I, J and C are lying in the North West boundary of the shaded area which are more efficient than the others.

Portfolio C represents the Global Minimum Variance Portfolio

**Table 40:** Risk and Return of Portfolios 2018

Portfolio Name	Risk	Return
A	3.868%	43.68%
B	4.754%	53.51%
C	1.783%	25.60%
D	4.457%	49.97%
E	4.789%	52.52%
F	3.275%	38.47%
G	4.754%	53.13%
H	4.160%	47.55%
I	3.124%	38.58%
J	2.539%	33.00%
Equity	5.943%	63.92%
Bond	0.000%	8.10%
Debenture	0.000%	11.85%
Commodity	4.348%	-13.51%
Mutual Fund	5.013%	26.28%

*Inference*

Feasible set of portfolios of 2018 indicates that there will be a drastic change in the selection of optimal portfolio. According to the trend analysis, 2018 will be the year with less risk than previous years so the expected risk rate will also less that's why Portfolio F will be the optimal portfolio for 2018. The investors who desires slight higher return with slight higher risk can still opt for portfolio A.

**Table 41:** Risk and Return of Portfolios 2019

Portfolio Name	Risk	Return
A	3.26%	22.77%
B	4.00%	28.02%
C	1.50%	16.04%
D	3.75%	26.07%
E	3.86%	31.11%
F	2.76%	20.75%
G	4.00%	27.65%
H	3.50%	25.25%
I	2.54%	23.99%
J	2.05%	21.60%
Equity	5.00%	32.06%
Bond	0.00%	8.10%
Debenture	0.00%	11.85%
Commodity	4.36%	-17.54%
Mutual Fund	4.77%	39.72%

*Inference*

Feasible set of portfolios of 2019 indicates that there will be a drastic change in the selection of optimal portfolio. According to the trend analysis, 2019 will be the year with less risk than previous years so the expected risk rate will also less that's why Portfolio I will be the optimal portfolio for 2019.

**Table 42:** Risk and Return of Portfolios 2020

Portfolio Name	Risk	Return
A	2.46%	16.72%
B	3.01%	20.80%
C	1.13%	13.33%
D	2.83%	19.31%
E	2.91%	24.79%
F	2.08%	15.60%
G	3.01%	20.43%
H	2.64%	18.94%
I	1.91%	19.79%
J	1.54%	18.30%
Equity	3.77%	23.04%
Bond	0.00%	8.10%
Debenture	0.00%	11.85%
Commodity	4.38%	-21.22%
Mutual Fund	4.49%	42.82%

*Inference*

Feasible set of portfolios of 2020 indicates that there will be a drastic change in the selection of optimal portfolio. According to the trend analysis, 2020 will be the year with less risk than previous years so the expected risk rate will also less that's why Portfolio I will be the optimal portfolio for 2020.

**Table 43:** Portfolio ranks for Sharpe ratio- Horizontal Analysis of portfolio ranks based on Sharpe Ratio

Portfolio Name	Rank by Votes	2016	2017	2018	2019	2020
A	1	5	10	9	10	10
B	2	6	4	4	5	5
C	2	1	1	1	4	4
D	3	9	8	8	8	8
E	3	10	9	10	3	3
F	3	4	6	7	9	9
G	4	8	7	6	7	7
H	5	7	5	5	6	6
I	5	3	3	3	2	2
J	5	2	2	2	1	1

*Inference*

From the table it's clear that most used combination (Portfolio A) is not good according to Sharpe index even though A has high preference among investors, it has a Sharpe index rank of 5 in 2016, last position in upcoming years. Its not consistent according to Sharpe index. Portfolio B has slight good position comparing to A, it comes back into 4<sup>th</sup> rank in 2017 from 6<sup>th</sup> and maintains its position to 2020.

According to Sharpe index Portfolio J will have maximum investment attractiveness in 2019 and 2020. Investors use shape index for portfolio evaluation should reconsider their current choice (A or B) and try to change for future benefits (J or I).

**Major findings**

- ❖ According to the primary data, 67% of the investors opted for Aggressive portfolio while the remaining investors considers conservative portfolios are the best option.
- ❖ Most used hybrid portfolio combination according to the primary data is portfolio 7, which is the combination of 65% equity, 20% bond, 10% Debentures and 5% commodity.
- ❖ Top 10 portfolios are selected with respected to the votes gained by them and eight of them belongs to aggressive category.

- ❖ Samples selected for analysis of portfolio combinations by their current performance and investor preferences.
- ❖ After the analysis of samples, it's concluded that the sample representing equity indicates a downward trend for return, beta and Variance though it has an upward trend for share prices for the past seven years. So the study assumes the asset category equity also shows these trends and values.
- ❖ The samples representing bond and debenture categories have a fixed income thus a parallel return trend and zero market risk. Therefore, study assumes Bonds and debentures category have the same trends and values.
- ❖ Sample selected for mutual fund category has a downward risk trend but an upward NAV, return and Beta trend. Assumes mutual fund category shows same trends.
- ❖ For the commodity category study selected gold ETF which benchmarks against domestic gold prices, shows a downward trend for return and upward trends for beta and variance.
- ❖ The NSE nifty 50 has high positive correlations with equity and mutual fund samples so it represents the market and has an almost parallel trend line and downward trend for variance.
- ❖ The top 10 portfolios were analyzed based on risks, return as well as Sharpe, Treynor and Jensen ratios and they were ranked in basis of their indices.
- ❖ Portfolio E has highest return in 2019 and 2020 and C has the lowest return based on ranking method.
- ❖ Based on ranking, Portfolio C had the lowest beta in 2018, B will have the lowest beta in 2019 and 2020. C had the lowest standard deviation in 2018 and will continue its position till 2020.
- ❖ According to the ranking based on Sharpe ratios and J will be the most attractive portfolio combinations in 2019 and 2020. Portfolio I has also maintains its first rank in Treynor ratio in 2019 and 2020.
- ❖ Portfolio B has been maintaining its first rank in Jensen ratio since 2017 and will be till the end of 2020.
- ❖ When we use Markowitz model for finding the optimal portfolios, the results are
  - Portfolio F-2018
  - Portfolio I-2019
  - Portfolio I-2020
- ❖ According to Markowitz model, the shaded region contains all possible portfolio combinations from the asset categories which also includes categories such as equity (100%), Bond (100%), Debenture (100%), Mutual Fund (100%) and commodity (100%) which are not portfolios.
- ❖ Portfolio C represents the global minimum variance portfolio.
- ❖ These non-hybrid categories values shows the advantages of Hybrid portfolios over them.
- ❖ The Equity (100%) has the highest return among all portfolios and non-hybrid categories but it also possess the highest risk among them. It shows why the investment in hybrid portfolios is important.
- ❖ The hybrid portfolios contains the advantages of all categories and promises a guarantee income by using combinations of risk and risk free securities.
- ❖ If we use the trend of portfolio ranks for portfolio evaluation and the selection of next year portfolio combinations, we can see whether these ranks stay faithful to their investor's choices.

### Conclusion

- ❖ The project represents the analysis of different combination of portfolios based on same asset categories (Equity, Bond, Debenture, Mutual funds and Commodity) and finding out the optimum asset combinations for the next years. For the benchmarking of different portfolios, the study uses portfolio evaluation characteristics such as Risk, Return, Sharpe, and Treynor .
- ❖ In order to achieve a direct comparison between different combinations we have to use real values of securities in these combinations. For that the project chose samples from the market which represents each asset category.



- ❖ For the future value calculation of portfolios, the study had to analyze and calculate future values of assets by using trend analysis and linear regression method. After that these values were used to calculate the future values of portfolios.
- ❖ The values were calculated with the help of CAPM model and Markowitz model. The top 10 portfolios selected by the investors were ranked according to different characteristics such as risk, return and indices (Sharpe and Treynor) and calculated the feasible set of portfolios (optimal portfolios) by using Markowitz model.
- ❖ According to Markowitz model, Portfolio A became the optimal portfolio in 2017 and 2018 which also the most favorite portfolio combination among investors. Following years (2019 & 2020) A will have a change in risk and return move to the right side (Move away from the efficient set of portfolios).
- ❖ Portfolio I will be the optimal portfolios in 2019 and 2020.
- ❖ Portfolio management is incomplete without portfolio evaluation. Here the method used for portfolio evaluation is the trend in portfolio ranking based on indices. (Because there is no significant changes in Risk and return characteristics of the portfolio combinations). According to these evaluation the most consistent portfolio among these years is Portfolio J in year 2019 and continue its performance to 2020. Investor considering differential income as a basis of portfolio selection should consider B for their next year investment because they will be attractive as well as have higher returns than other combination.
- ❖ The study mainly focuses on combinations of asset classification among hybrid portfolios and its advantage over other type of portfolios. The results may vary if study chooses another set of samples for the asset category or different analysis methodology. Still it can be considered a frame work for future selection, analysis and evaluation of different portfolio combination according to their characteristics. Even though the future is uncertain, we can still forecast the market movement to an extent considering some assumptions thus the movement of our securities.

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