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## Empirical studies in building the risk averse portfolio model

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### Abstract

The present research article aims at exploring the possibilities of building a portfolio with minimum risk. There are numerous articles and book written on portfolio models which could bring greater returns with minimum risk. The risk and return go hand in hand but as an investor one wants more return and less risk.

Almost all portfolio theories are against single stock investing. They suggest a portfolio stocks from unrelated sectors or industries to mitigate risk. There is no way to secure oneself from systematic risk in the field of investment, but a right portfolio could bring down unsystematic risk considerably. However, such portfolio building requires a lot of financial acumen and experience in using mathematical techniques a model. By keeping such difficulties in mind, a constant index portfolio model is proposed and empirically tested for a period of ten years to validate the model. In this model, stock selection for the portfolio is done by the index itself and even a novice in the field of investment could understand the model without much of difficulty.

**Keywords:** Risk Averse Portfolio Model, Portfolio Building, Portfolio Risk, portfolio return, systematic risk, unsystematic risk.

### Introduction

By definition disposal income is shared between consumption and savings. Financialising the savings is the best way to preserve the value of money against the odds of inflation. Risk free returns are always less Most of the time, the real rate of return is zero, if not, negative. Moreover, zero interest rate regimes and negative interest rate regimes are potential threat to fall back on fixed returns with risk free approach for investing.

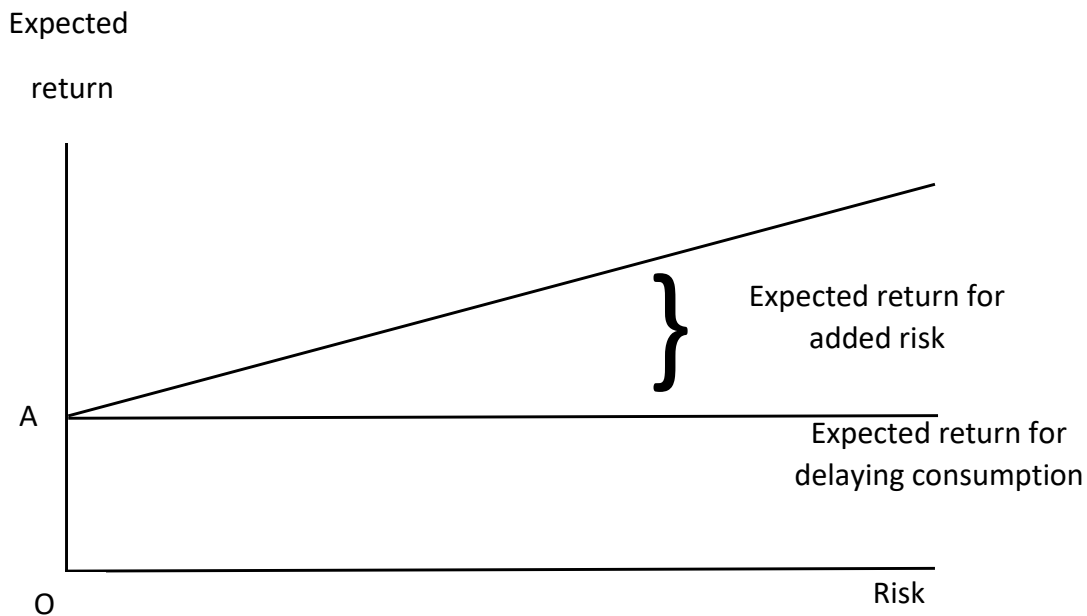
Market oriented investments are considered to be the best insurance for preserving the value of money with positive bias. The issue here is, such investments come with risk. Risk and returns go hand in hand. This Discourages risk averters to invest in any market-based investments.

Harry Max Markowitz, the 1990 Nobel Prize winners explains the risk-return trade off in a simpler way.

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Normally, Investors demand a return for delaying their consumption. To convince them to take on added risk, they demand a higher expected return.

**Investment Alternatives**

Among the plethora of investment avenues, an investor can choose the right one based on risk-return dynamics, liquidity, tax saving, marketability, etc. Non-marketable financial asset like bank deposits, Post office deposits, Fixed deposits, Public provident fund, National savings certificate, Kisan vikas patra, among others ensure a fixed return and mostly risk-free. Individual Investors hardly participate in money market instruments like treasury bills, commercial papers etc. Fixed Income securities like Bonds and Debentures are slowly making inroads with High-Net-worth Individuals (HNIs). Real Estate, Gold, Silver, Commodities, Art Objects and Antiques are there for people who are ready for lumpsum payments.

Equity shares and financial derivatives are there for direct investment. Mutual Funds, ULIPs and other insurance products (Unit Linked Insurance Product) are known as indirect investments. Financial Derivatives have short expiry period and highly leveraged by nature. Derivatives markets are for risk lovers and anybody can participate by paying the margin money. Risk averters do a lot of analysis before putting their money in equities, mutual funds and ULIPs. Unless they see a high probability of return over risk, their participation is doubtful.

**Portfolio Building: A Mathematical Conundrum.**

Direct participation in the stock market is exciting but involves the risk of losing the capital invested. Like a double-edged knife, either the market can reward the investors or punish him. Not everyone is well versed with the technical and fundamental analysis. Fear and greed disarm anybody from going for a rational approach and most of the time people succumb to their emotions. That results in wrong entry and wrong exit leading to huge losses.

Ample study materials are available for mastering oneself for doing stock market analysis. Ben Graham's value investing, Joel Greenblatt's Magic formula, Warren Buffet to coffee can portfolio by Saurabh mukherjea to hundreds

of books on portfolio management available for learning and understanding. But there is guarantees for success in the market by following any of them.

The main objective of every investor is to maximize returns, subject to constraints, primarily risk. Dividend returns and capital gains/loss constitute the total return. Some people calculate the return relative in their analysis. Risk is a mixture of danger and opportunity. Total risk involves systematic risk and unsystematic (unique) risk.

Measuring expected (ex Ante) return and risk is easy by calculating the probable outcomes.

$$\text{Expected Return} = \sum_{i=1}^{n1} PiRi$$

$$\text{Risk (Standard Deviation)} = \sum_{i=1}^{n1} [Pi(Ri - Ri)^2]^{1/2}$$

Where Pi is the probability of occurrence,

Ri is the rate of return.

This is simple to compute, but portfolios which are combination of securities do not take the aggregate characteristics of risk and return in the same direction as compared to their individual parts. Smart investors do not put their money in a single stock - 'all the eggs into a single basket'. An article by Markowitz in the journal of finance 1952, was the first scientific approach to determine the risk, return, covariance of the securities and developed a methodology for determining the optimum portfolio.

Though systematic risk cannot be solved by building portfolio of securities, the unsystematic risk could be minimised by doing so.

From the portfolio theories, it is given that

$$\text{Risk of a portfolio (two Securities model)} = \sigma_p^2 = \sigma_A^2 W_A^2 + \sigma_B^2 W_B^2 + 2r \sigma_A \sigma_B W_A W_B$$

Where W<sub>A</sub> – is the portfolio of amount invested in security A and

W<sub>B</sub> – is the portfolio of amount invested in security B.

Customarily, portfolio risk is measured by the help of Covariance or Coefficient of correlation. With the help of either any one of these, an investor can reduce his risk sustainability. Covariance is the relationship or responsiveness of returns between two securities – how they change with each other.

For historical (ex-post) data, we use the formula:  $\frac{1}{N} +$

$$\sum (R_A - R_A) (R_B - R_B)$$

Where  $R_A$  denotes return from security A and

$R_B$  denotes return from security B.

$N$  – is number of terms.

For the future (ex-ante) returns

$$\sum_{i=0}^n P_i (R_{iA} - R_A) (R_{iB} - R_B) \quad \text{---}$$

Where  $P_i$  denotes the probable outcomes under various situations; and

$R_{iA}$  and  $R_{iB}$  are the return on Security A and B

under various situations.

After Assuming state of economy in the future, assign probability value for each occurrence. The return of securities and their associated probabilities need to be considered for calculation return and risk.

**Illustration**

State of the Economy	Probability	Return Security X (%)	Return Security Y (%)	Deviation of Return of Sec X from the Mean	Deviation of Return of Sec Y from the Mean	Product of Deviation * Probability
1	0.10	15	17	6	7	4.2
2	0.20	12	16	3	6	3.6
3	0.25	11	14	2	4	2.0
4	0.15	-7	9	-16	-1	-2.4
5	0.30	14	-6	5	-16	-9.0

The expected return on Security X:

$$E(R_x) = (.10*15) + (.20*12) + (.25*11) + (.15*-7) + (0.30*14) = 1.5+2.4+2.75-1.05+4.2 = 9.8\%$$

The expected Return on Security Y:

$$E(R_y) = (.10*17) + (.20*16) + (.25*14) + (.15*-9) + (0.30*-6) = .7 + 3.2 + 3.5 + 4.5 - 1.8 = 10.6\%$$

Covariance between X and Y = 1.6

Standard Deviation

$$\sigma_x = (0.1(6)^2 + 0.2(3)^2 + 0.25(2)^2 + 0.15(-16)^2 + 0.3(5)^2) = 3.6 + 1.8 + 1.0 + 38.4 + 7.5 = 52.5$$

$$\sigma_x = 7.23 \%$$

$$\sigma_y = (0.1(7)^2 + 0.2(6)^2 + 0.25(4)^2 + 0.15(-1)^2 + 0.3(-6)^2) = 4.9 + 7.2 + 2.0 + 0.15 + 10.8 = 25.05$$

$$\sigma_y = 5 \%$$

Now, the correlation Coefficient  $r = \frac{Cov(X,Y)}{\sigma_x \sigma_y} = \frac{1.6}{7.23*5} = \frac{1.6}{36.15} = 0.04$

It is obvious from the statistical theory that when the ‘r’ value is negative, the portfolio risk could be reduced. When the ‘r’ value is zero, the returns are independent and still the risk could be brought down. There is no risk could be brought down and no risk reduction possible, when the ‘r’ value is positive and close to 1. In the present case, by assuming that the total amount invested is exactly divided into 2, then the portfolio return is

$$= (0.5 * 9.8) + (0.5 * 10.1) = 4.9 + 5.05 = 9.95\%$$

Portfolio Risk =  $\sigma_p^2 = W_x^2 \sigma_x^2 + W_y^2 \sigma_y^2 + 2r W_x W_y \sigma_x \sigma_y$

$$= (0.5)^2 (7.23)^2 + (0.5)^2 (5)^2 + 2(0.4) (0.5) (7.23) (5) = (0.25*52.27) + (0.25*25) + 0.723 = (13.0675 + 6.25 + 0.723) = 20.04 \text{ and } \sigma_p = 4.48 \%$$

**Minimum Variance Portfolio**

The general formula for estimating optimum weight of two securities x and y is used here. W is the weight of X and the weight of Y will be (1-W).

Weight of X,

$$W_x = W_x = \frac{\sigma_y^2 - Cov_{xy}}{\sigma_x^2 + \sigma_y^2 - 2 Cov_{xy}}$$

By using the data from the example

$$W_x = \frac{25.05 - 0.04}{52.3 + 25.05 - 2(0.04)}$$

$$W_x = \frac{25.05}{77.27} = 0.3238$$

i.e.  $W_y = (1 - W_x) = 1 - 0.3238 = 0.6763$

Based on the above weight, the risk of the portfolio will be

$$\sigma_p^2 = [ (W_x)^2 * (\sigma_x^2) ] + [ (W_y)^2 * (\sigma_y^2) ] + 2 Cov_{xy} W_x W_y$$

$$= [ (0.3238)^2 (52.3) ] + [(0.6763)^2 (25.05)] + 2(0.04) (0.3238 * 0.6763) = (0.1048 * 52.3) + (0.4573 * 25.05) + 0.0175 = 5.4810 + 11.4553 + 0.0175 = 16.9540$$

i.e.  $\sigma_p = \sqrt{16.9540} = 4.1175 \%$

The above illustration clearly proves the point that, instead of going for equal allocation of funds arbitrarily, by allocating 32.38 % of funds for security x and 67.63% for security Y would bring down the portfolio risk from 4.48% to 4.1175%. This kind of mathematical exercise is beyond the reach of common investor who needs a single solution to build the wealth.

**Need for the study**

Every other day, a new tool is added on doing portfolio analysis. Business making continuous losses but based on ‘blitz sensing’ models are listed in the stock exchanges after mega IPOs. Almost all the conventional tools available in the text books have become redundant. External developments like pandemics, war, natural calamities, etc happen on regular basis reduce any type of analysis just an academic exercise. Therefore, an unconventional method is required to survive and make money in the market. The present study is an attempt to find a fool-proof model for investing in the stock-market.

It was identified that the market index itself has a self-cleaning system over a period of time. For example, non-performing stocks were replaced from the index (NIFTY) by a performing stock. When market itself is doing such an

exercise, a real time investor can replicate the addition and deletion of the stocks in the portfolio.

### **Research Method and Data**

The Study is based on secondary data. 10-year data on Nifty – 50 Index stocks were collected from National Stock Exchange database. The study period is between March 2012 – Feb 2022. The annual data were been analysed to know the trend, annual returns and overall returns in comparison with the NIFTY – 50 as benchmark.

The companies exiting the index were removed and the new ones' come in as replacement were added for analysis. Many companies declared bonus shares during the study period. The share price of such companies was standardised for the purpose of analysis. Dividend payments were not considered for the purpose of the study. Obviously, dividend payment payments are not going to changes results negatively.

### **Limitations**

The purpose of the study is to find a method for people to invest without doing complicated mathematical calculations. The results and findings were specific to the particular period of study. Any generalisation drawn from the study should be used with caution. This method is basically aimed at long term investors and not for day traders.

### **Constant weight Index – An Alternative model for Long- Term Investment:**

In an attempt to find a model for long term investment, NIFTY 50 index stocks were considered NIFTY has self-cleansing mechanism of dropping the non-performers and induct performers in that place. During the study period of 10 years, between 2012 – 2022, about 30 stocks moved out and the same number of new stocks moved in. Therefore, stock selection is done by the market itself. Now, the only concern is to know about the net results of such stocks churning.

The main problem with NIFTY is its biased towards few stocks. Some stocks like Reliance Industries Ltd (RIL), HDFC Twins, TCS, Infosys, etc have more weightage in the index. When the prices of these few stocks go up, Nifty also goes up. A handful of stocks dominate the Nifty 50 index and that nullifies the price movement in other 30-40 blue chip stocks.

To get rid of this issue, unlike the composition of stocks with differential weightage, all the stocks present in Nifty 50 were given equal weightage (Presumably 2% each), for the purpose of analysis. Therefore, stock selection is done by the market and the appropriate weight (2% each) is assigned by the investor/researchers.

Year-wise for 10 years starting from march 2012 to march 2022 data analysis was done and tabulated. Stock-splits and bonus issues were taken into consideration. The stock prices were normalised for the stock-split and bonus shares, if any, reflect in the total number of shares in the respective scrips. Dividend payments were not taken into consideration and that may not affect the findings adversely. Every year, the new stocks were brought in with the money generated from selling the out-going stocks. That was the only change done in the portfolio on annual basis. A total sum of Rs. 1 Cr was divided equally among the Nifty-50 stocks, for the purpose of analysis.

**Table 1:** Table Showing the returns between 2012 and 2013.

Sl.NO	List of companies	Share Price as on march 1st 2012	No of Shares	Initial Investment	Share Price as on march 1st 2013	Bonus Issue	No of Shares	Portfolio Value as on 1st march 2013	% Change
1	Reliance Power *	122.60	1631	199961	72.7		1631	118574	-41%
2	Jindal Steel & Power	574.80	347	199456	358.90		347	124538	-38%
3	Reliance Communication *	95.30	2098	199939	61.65		2098	129342	-35%
4	Hindalco Industries Ltd.	150.35	1330	199966	98.90		1330	131537	-34%
5	BHEL	199.80	1001	200000	133.97		1001	134101	-33%
6	SAIL *	101.50	1970	199955	71.599998		1970	141052	-29%
7	Reliance Infrastructure	610.20	327	199535	433.25		327	141673	-29%
8	Vedanta Limited	212.75	940	199985	153.95		940	144713	-28%
9	Tata Steel Ltd.	440.93	453	199740	325.36		453	147388	-26%
10	Calm India	376.90	530	199757	293.00		530	155290	-22%
11	Punjab National Bank	189.73	1054	199975	157.73		1054	166247	-17%
12	Tata Power	112.13	1783	199937	93.94		1783	167503	-16%
13	NTPC Ltd.	147.04	1360	199977	125.75		1360	171020	-14%
14	Hero MotoCorp Ltd.	1937.55	103	199568	1667.45		103	171747	-14%
15	GAIL	105.12	1902	199933	93.53		1902	177894	-11%
16	Bharti Airtel Ltd.	317.97	628	199682	285.65		628	179385	-10%
17	Ranbaxy Laboratories	425.25	470	199868	384.80		470	180856	-10%
18	Coal India Ltd.	334.50	597	199697	309.80		597	184951	-7%
19	Power Grid Corporation of India Ltd.	84.38	2370	199969	78.23		2370	185393	-7%
20	State Bank of India	221.88	901	199909	208.09		901	187489	-6%
21	ACC Ltd	1322.05	151	199630	1267.40		151	191377	-4%
22	JP Associates	74.80	2673	199940	72.25		2673	193124	-3%
23	Wipro Ltd.	159.32	1255	199945	156.15		1255	195968	-2%
24	Reliance Industries Ltd.	401.67	497	199629	403.10		497	200343	0%
25	Infosys Ltd.	357.08	560	199965	363.38		560	203490	2%
26	Maruti Suzuki India Ltd.	1315.05	152	199888	1354.35		152	205861	3%
27	Siemens	50.26	3979	199965	51.83		3979	206251	3%
28	Dr. Reddy's Laboratories Ltd.	1667.70	119	198456	1755.45		119	208899	5%
29	IDFC	66.80	2993	199940	71.30		2993	213386	7%
30	Larsen & Toubro Ltd.	567.96	352	199920	607.91		352	213985	7%
31	Grasim Industries Ltd.	425.73	469	199666	457.92		469	214764	8%
32	Tata Motors Ltd.	264.36	756	199860	284.50		756	215081	8%
33	Oil & Natural Gas Corporation Ltd.	192.13	1040	199819	208.97		1040	217325	9%
34	Bajaj Auto Ltd.	1774.20	112	198710	1973.00		112	220976	11%
35	Housing Development Finance Corporation Ltd	669.40	298	199481	757.65		298	225780	13%
36	Cipla Ltd.	315.15	634	199805	359.85		634	228145	14%
37	Hindustan Unilever Ltd.	380.35	525	199684	443.05		525	232601	16%
38	AxIs Bank Ltd.	230.58	867	199913	268.83		867	233076	17%
39	Ambuja Cements	164.35	1216	199850	192.55		1216	234141	17%
40	Kotak Mahindra Bank Ltd.	277.40	720	199728	329.80		720	237456	19%
41	ICICI Bank Ltd.	160.64	1245	199992	192.06		1245	239119	20%
42	HDFC Bank Ltd.	257.00	778	199946	311.25		778	242153	21%
43	DFL	214.05	934	199923	259.35		934	242233	21%
44	Tata Consultancy Services Ltd.	609.80	327	199405	758.50		327	248030	24%
45	Mahindra & Mahindra Ltd.	340.88	586	199753	436.85		586	255994	28%
46	UltraTech Cement Ltd.	1416.85	141	199776	1868.05		141	263395	32%
47	ITC Ltd.	137.90	1450	199955	194.17		1450	281542	41%
48	Sun Pharmaceutical Industries Ltd.	275.17	726	199777	401.08		726	291180	46%
49	HCL Technologies Ltd.	120.50	1659	199910	180.61		1659	299636	50%
50	Bharat Petroleum Corporation Ltd.	109.81	1821	199961	123.98	1:1	3642	451547	126%
<b>Total Initial Investment</b>				<b>9988996</b>	<b>Total Value as on 3rd March 2014</b>			<b>10247550</b>	<b>3%</b>

Between march 2012 and 2013, nine stocks lose their value by more than 25 % and 17 stocks by more than 10 % and six stock recorded marginal losses in single digit. But at the same time, prices of 9 stocks moved up marginally. 5 stocks gained by more than 25 % and 1 stock went up by 125%.

During this period, three stocks were replaced in the index. Reliance Power, Reliance Communication and Sail were dropped and Bank of Baroda, Asian Paints Ltd and Lupin Ltd were brought in. The winners in the portfolio were able to more than off-set the losers, and the portfolio went up by 3% in 2013.

**Table 2:** Table Showing the returns between 2013 and 2014.

Sl.NO	List of companies	Share Price as on march 1st 2013	Bonus Issue	No of Shares	Value on the date 1st march 2013	Share Price as on march 3rd 2014	Bonus Issue	No of Shares	Value on the date 3rd march 2014	% Change
1	DFL	259.35		934	242233	139.15		934	129966	-46%
2	JP Associates	72.25		2673	193124	40.50		2673	108257	-44%
3	IDFC	71.30		2993	213386	46.46		2993	139066	-35%
4	Jindal Steel & Power	358.90		347	124538	242.40		347	84113	-32%
5	State Bank of India	208.09		901	187489	153.32		901	138146	-26%
6	NTPC Ltd.	125.75		1360	171020	93.67		1360	127387	-26%
7	Bank of Baroda	141.75		836	118508	109.19		836	91283	-23%
8	Coal India Ltd.	309.80		597	184951	244.00		597	145668	-21%
9	Tata Power	93.94		1783	167508	75.51		1783	134639	-20%
10	BHEL	133.97		1001	134101	108.47		1001	108575	-19%
11	Reliance Infrastructure *	433.25		327	141673	354.549988		327	115938	-18%
12	Grasim Industries Ltd.	457.92		469	214764	393.61		469	184604	-14%
13	ACC Ltd	1267.40		151	191377	1099.50		151	166025	-13%
14	Ambuja Cements	192.55		1216	234141	167.90		1216	204166	-13%
15	Power Grid Corporation of India Ltd.	78.23		2370	185393	70.88		2370	167974	-9%
16	Bharti Airtel Ltd.	285.65		628	179385	263.20		628	165287	-8%
17	Oil & Natural Gas Corporation Ltd.	208.97		1040	217325	194.23		1040	202003	-7%
18	AxIs Bank Ltd.	268.83		867	233076	253.41		867	219706	-6%
19	Ranbaxy Laboratories	384.80		470	180856	365.85		470	171950	-5%
20	ICICI Bank Ltd.	192.06		1245	239119	187.24		1245	233109	-3%
21	Reliance Industries Ltd.	403.10		497	200343	396.22		497	196921	-2%
22	UltraTech Cement Ltd.	1868.05		141	263395	1839.20		141	259327	-2%
23	Bajaj Auto Ltd.	1973.00		112	220976	1946.35		112	217991	-1%
24	Tata Steel Ltd.	325.36		453	147388	327.55		453	148381	1%
25	Bharat Petroleum Corporation Ltd.	123.98	1:1	3642	451547	126.00		3642	458892	2%
26	Kotak Mahindra Bank Ltd.	329.80		720	237456	342.25		720	246420	4%
27	Hindalco Industries Ltd.	98.90		1330	131537	105.35		1330	140115	7%
28	Cipla Ltd.	359.85		634	228145	384.30		634	243646	7%
29	HDFC Bank Ltd.	311.25		778	242153	333.10		778	259152	7%
30	Housing Development Finance Corp	757.65		298	225780	818.20		298	243824	8%
31	Asian Paints Ltd.	435.91		296	129029	472.95		296	139993	8%
32	GAIL	93.53		1902	177894	104.27		1902	198328	11%
33	Calson India	293.00		530	155290	326.80		530	173204	12%
34	Mahindra & Mahindra Ltd.	436.85		586	255994	487.25		586	285529	12%
35	ITC Ltd.	194.17		1450	281542	219.47		1450	318227	13%
36	Vedanta Limited	153.95		940	144713	174.45		940	163983	13%
37	Maruti Suzuki India Ltd.	1354.35		152	205861	1589.00		152	241528	17%
38	Hero MotoCorp Ltd.	1667.45		103	171747	1967.15		103	202616	18%
39	Larsen & Toubro Ltd.	607.91		352	213985	739.77		352	260398	22%
40	Siemens *	51.83		3979	206251	63.994999		3979	254636	23%
41	Hindustan Unilever Ltd.	443.05		525	232601	549.25		525	288356	24%
42	Infosys Ltd.	363.38		560	203490	478.11		560	267740	32%
43	Punjab National Bank	157.73		1054	166247	107.96	1:1	2108	227580	37%
44	Wipro Ltd.	156.15		1255	195968	223.97		1255	281081	43%
45	Tata Motors Ltd.	284.50		756	215081	412.53		756	311869	45%
46	Tata Consultancy Services Ltd.	758.50		327	248030	1137.88		327	372085	50%
47	Dr. Reddy's Laboratories Ltd.	1755.45		119	208899	2895.50		119	344565	65%
48	Lupin Limited	595.10		237	141039	982.75		237	232912	65%
49	HCL Technologies Ltd.	180.61		1659	299636	376.16		1659	624054	108%
50	Sun Pharmaceutical Industries Ltd.	401.08		726	291180	644.70	1:1	1452	936104	221%
Total Value as on 1st March 2013 after Revision					10247154	Total Value as on 3rd March 2014			11577317	13%

About 23 stocks registered negative price change and 27 stocks showed upward movement in price. Around 9 stocks were up by more than 25%, especially HCL technologies Ltd and Sun Pharma went up by 108% and 221% respectively. Overall, the whole year showed a 13%

increase in value in the model portfolio.

During this period, siemens went out of the portfolio and gave room for IndusInd Bank. The other change is NMDC replaced Reliance Infrastructure.

**Table 3:** Table Showing the returns between 2014 and 2015.

SI.NO	List of companies	Share Price as on march 3rd 2014	Bonus Issue	No of Shares	Value on the date 3rd march 2014	Share Price as on march 3rd 2015	Bonus Issue	No of Shares	Value on the date 3rd march 2015	% Change
1	JP Associates *	40.50		2673	108257	26		2673	69498	-36%
2	Jindal Steel & Power	242.40		347	84113	188.70		347	65479	-22%
3	Caim India	326.80		530	173204	254.50		530	134885	-22%
4	Housing Development Finance Corporation	818.20		298	243824	818.20		298	243824	0%
5	Tata Steel Ltd.	327.55		453	148381	335.89		453	152157	3%
6	ITC Ltd.	219.47		1450	318227	228.83		1450	331808	4%
7	Bajaj Auto Ltd.	1946.35		112	217991	2074.25		112	232316	7%
8	NMDC	129.00		898	115842	138.20		898	124104	7%
9	Reliance Industries Ltd.	396.22		497	196921	428.07		497	212749	8%
10	Oil & Natural Gas Corporation Ltd.	194.23		1040	202003	213.37		1040	221901	10%
11	GAIL	104.27		1902	198328	115.00		1902	218736	10%
12	DFL	139.15		934	129966	154.55		934	144350	11%
13	Wipro Ltd.	223.97		1255	281081	249.19		1255	312730	11%
14	Tata Power	75.51		1783	134639	86.25		1783	153784	14%
15	Dr. Reddy's Laboratories Ltd.	2895.50		119	344565	3386.65		119	403011	17%
16	Tata Consultancy Services Ltd.	1137.88		327	372085	1334.70		327	436447	17%
17	Bharti Airtel Ltd.	263.20		628	165287	320.49		628	201268	22%
18	Vedanta Limited	174.45		940	163983	218.20		940	205108	25%
19	Mahindra & Mahindra Ltd.	487.25		586	285529	639.08		586	374498	31%
20	Hero MotoCorp Ltd.	1967.15		103	202616	2624.55		103	270329	33%
21	HCL Technologies Ltd.	376.16		1659	624054	506.21		1659	839807	35%
22	Tata Motors Ltd.	412.53		756	311869	578.79		756	437567	40%
23	NTPC Ltd.	93.67		1360	127387	132.92		1360	180767	42%
24	Sun Pharmaceutical Industries Ltd.	644.70	1:1	1452	936104	925.20		1452	1343390	44%
25	Hindalco Industries Ltd.	105.35		1330	140115	156.55		1330	208212	49%
26	Punjab National Bank	107.96	1:1	2108	227580	165.75		2108	349401	54%
27	Grasim Industries Ltd.	393.61		469	184604	617.70		469	289701	57%
28	ACC Ltd	1099.50		151	166025	1762.80		151	266183	60%
29	Coal India Ltd.	244.00		597	145668	394.75		597	235666	62%
30	HDFC Bank Ltd.	333.10		778	259152	541.28		778	421112	62%
31	Power Grid Corporation of India Ltd.	70.88		2370	167974	117.53		2370	278534	66%
32	Larsen & Toubro Ltd.	739.77		352	260398	1230.73		352	433218	66%
33	Bank of Baroda	109.19		836	91283	182.40		836	152486	67%
34	BHEL	108.47		1001	108575	182.50		1001	182683	68%
35	ICICI Bank Ltd.	187.24		1245	233109	317.32		1245	395061	69%
36	Ambuja Cements	167.90		1216	204166	285.45		1216	347107	70%
37	Hindustan Unilever Ltd.	549.25		525	288356	935.65		525	491216	70%
38	Asian Paints Ltd.	472.95		296	139993	838.30		296	248137	77%
39	Lupin Limited	982.75		237	232912	1796.95		237	425877	83%
40	UltraTech Cement Ltd.	1839.20		141	259327	3369.80		141	475142	83%
41	Cipla Ltd.	384.30		634	243646	716.95		634	454546	87%
42	IDFC	46.46		2993	139066	88.95		2993	266221	91%
43	State Bank of India	153.32		901	138146	302.00		901	272102	97%
44	Kotak Mahindra Bank Ltd.	342.25		720	246420	702.35		720	505692	105%
45	Bharat Petroleum Corporation Ltd.	126.00		3642	458892	259.83		3642	946313	106%
46	Ranbaxy Laboratories*	365.85		470	171950	805.5		470	378585	120%
47	Maruti Suzuki India Ltd.	1589.00		152	241528	3711.45		152	564140	134%
48	IndusInd Bank Ltd.	397.50		640	254400	944.50		640	604480	138%
49	Infosys Ltd.	478.11		560	267740	572.92	1:1	1120	641676	140%
50	Axis Bank Ltd.	253.41		867	219706	647.55		867	561426	156%
Total Value as on 3rd March 2014 after Revision					11576985	Total Value as on 3rd March 2015			17705429	53%

The table above shows a phenomenal year for the portfolio. 8 stocks went up more than 25%, 18 stocks galloped up more than 50% and 7 stocks appreciated by more than

100%. Overall appreciation of the portfolio worked out to be at 53%



**Table 4:** Table Showing the returns between 2015 and 2016.

Sl.NO	List of companies	Share Price as on march 3rd 2015	Bonus Issue	No of Shares	Value on the date 3rd march 2015	Share Price as on march 1st 2016	Bonus Issue	No of Shares	Value on the date 1st march 2016	% Change
1	Jindal Steel & Power *	188.70		347	65479	55.849998		345	19280	-71%
2	BHEL	182.50		1001	182683	61.87		1001	61929	-66%
3	Vedanta Limited	218.20		940	205108	74.95		940	70453	-66%
4	IDFC*	88.95		2993	266221	38.400002		2993	114931	-57%
5	Hindalco Industries Ltd.	156.55		1330	208212	68.75		1330	91438	-56%
6	Punjab National Bank	165.75		2108	349401	73.65		2108	155254	-56%
7	Cairn India	254.50		530	134885	122.95		530	65164	-52%
8	Tata Motors Ltd.	578.79		756	437567	299.70		756	226573	-48%
9	State Bank of India	302.00		901	272102	158.75		901	143034	-47%
10	ICICI Bank Ltd.	317.32		1245	395061	177.50		1245	220988	-44%
11	Axis Bank Ltd.	647.55		867	561426	375.75		867	325775	-42%
12	Larsen & Toubro Ltd.	1230.73		352	433218	717.33		352	252501	-42%
13	NMDC*	138.20		898	124104	82.400002		898	73959	-40%
14	Oil & Natural Gas Corporation Ltd.	213.37		1040	221901	129.40		1040	134576	-39%
15	DFL*	154.55		934	144350	98.099998		933	91556	-37%
16	Ambuja Cements	285.45		1216	347107	190.40		1216	231526	-33%
17	Tata Power	86.25		1783	153784	58.40		1783	104127	-32%
18	ACC Ltd	1762.80		151	266183	1232.90		151	186168	-30%
19	Tata Steel Ltd.	335.89		453	152157	237.33		453	107509	-29%
20	Cipla Ltd.	716.95		634	454546	514.15		634	325971	-28%
21	Bank of Baroda	182.40		836	152486	136.05		836	113738	-25%
22	GAIL	115.00		1902	218736	85.82		1902	163236	-25%
23	NTPC Ltd.	132.92		1360	180767	99.58		1360	135433	-25%
24	Wipro Ltd.	249.19		1255	312730	195.09		1255	244843	-22%
25	Coal India Ltd.	394.75		597	235666	311.00		597	185667	-21%
26	Tata Consultancy Services Ltd.	1334.70		327	436447	1088.40		327	355907	-18%
27	UltraTech Cement Ltd.	3369.80		141	475142	2768.60		141	390373	-18%
28	Power Grid Corporation of India Ltd.	117.53		2370	278534	97.54		2370	231164	-17%
29	Grasim Industries Ltd.	617.70		469	289701	515.51		469	241773	-17%
30	Maruti Suzuki India Ltd.	3711.45		152	564140	3236.50		152	491948	-13%
31	IndusInd Bank Ltd.	944.50		640	604480	830.00		640	531200	-12%
32	Hindustan Unilever Ltd.	935.65		525	491216	830.40		525	435960	-11%
33	Dr. Reddy's Laboratories Ltd.	3386.65		119	403011	3036.25		119	361314	-10%
34	HDFC Bank Ltd.	541.28		778	421112	492.08		778	382834	-9%
35	Bharti Airtel Ltd.	320.49		628	201268	294.46		628	184921	-8%
36	Sun Pharmaceutical Industries Ltd.	925.20		1452	1343390	853.90		1452	1239863	-8%
37	ITC Ltd.	228.83		1450	331808	216.90		1450	314505	-5%
38	Hero MotoCorp Ltd.	2624.55		103	270329	2499.90		103	257490	-5%
39	Mahindra & Mahindra Ltd.	639.08		586	374498	614.05		586	359833	-4%
40	Lupin Limited	1796.95		237	425877	1761.50		237	417476	-2%
41	Bharat Petroleum Corporation Ltd.	259.83		3642	946313	256.42		3642	933869	-1%
42	Asian Paints Ltd.	838.30		296	248137	871.95		296	258097	4%
43	Bajaj Auto Ltd.	2074.25		112	232316	2201.20		112	246534	6%
44	Zee Entertainment	340.50		1111	378296	374.15		1111	415681	10%
45	Reliance Industries Ltd.	428.07		497	212749	478.79		497	237957	12%
46	Tech Mahindra Ltd.	715.01		97	69356	415.55		194	80617	16%
47	Housing Development Finance Corporation Ltd.	818.20		298	243824	1060.30		298	315969	30%
48	HCL Technologies Ltd.	506.21		1659	839807	416.08	1:1	3318	1380537	64%
49	Kotak Mahindra Bank Ltd.	702.35		720	505692	630.40	1:1	1440	907776	80%
50	Infosys Ltd.	572.92	1:1	1120	641676	542.03	1:1	2240	1214136	89%
Total Value as on 3rd March 2015 after Revision					17704998	Total Value as on 1st March 2016			16033362	-9%

The above table indicates that 2015-2016 was the only year in which the model portfolio registered a 9% negative growth on against the 21% fall of Nifty. It was a bad year

for Nifty. Fortunately, the model portfolio witnessed a moderate fall only in comparison.



**Table 5:** Table Showing the returns between 2016 and 2017.

Sl.NO	List of companies	Share Price as on march 1st 2016	Bonus Issue	No of Shares	Value on the date 1st march 2016	Share Price as on march 1st 2017	Bonus Issue	No of Shares	Value on the date 1st march 2017	% Change
1	Sun Pharmaceutical Industries Ltd.	853.90		1452	1239863	679.00		1452	985908	-20%
2	Lupin Limited	1761.50		237	417476	1469.80		237	348343	-17%
3	Infosys Ltd.	542.03	1:1	2240	1214136	506.20		2240	1133888	-7%
4	Dr. Reddy's Laboratories Ltd.	3036.25		119	361314	2849.95		119	339144	-6%
5	Wipro Ltd.	195.09		1255	244843	183.30		1255	230042	-6%
6	HCL Technologies Ltd.	416.08	1:1	3318	1380537	424.55		3318	1408657	2%
7	Coal India Ltd.	311.00		597	185667	321.90		597	192174	4%
8	Hindustan Unilever Ltd.	830.40		525	435960	865.90		525	454598	4%
9	Idea Cellular	108.35		845	91556	113.25		845	95696	5%
10	Mahindra & Mahindra Ltd.	614.05		586	359833	656.08		586	384460	7%
11	Bharti Airtel Ltd.	294.46		628	184921	333.07		628	209167	13%
12	Tata Consultancy Services Ltd.	1088.40		327	355907	1233.13		327	403232	13%
13	Cipla Ltd.	514.15		634	325971	583.70		634	370066	14%
14	ACC Ltd	1232.90		151	186168	1411.50		151	213137	14%
15	Asian Paints Ltd.	871.95		296	258097	1032.75		296	305694	18%
16	Tech Mahindra Ltd.	415.55		194	80617	499.40		194	96884	20%
17	Ambuja Cements	190.40		1216	231526	228.85		1216	278282	20%
18	Bank of Baroda	136.05		836	113738	165.35		836	138233	22%
19	Bosch India	17188.40		6	103130	21514.60		6	129088	25%
20	Bajaj Auto Ltd.	2201.20		112	246534	2755.90		112	308661	25%
21	Hero MotoCorp Ltd.	2499.90		103	257490	3138.10		103	323224	26%
22	Kotak Mahindra Bank Ltd.	630.40	1:1	1440	907776	802.10		1440	1155024	27%
23	Reliance Industries Ltd.	478.79		497	237957	613.21		497	304767	28%
24	Housing Development Finance Corporation Ltd.	1060.30		298	315969	1370.05		298	408275	29%
25	Axis Bank Ltd.	375.75		867	325775	506.65		867	439266	35%
26	Zee Entertainment	374.15		1111	415681	504.50		1111	560500	35%
27	UltraTech Cement Ltd.	2768.60		141	390373	3774.55		141	532212	36%
28	NTPC Ltd.	99.58		1360	135433	135.79		1360	184677	36%
29	Larsen & Toubro Ltd.	717.33		352	252501	979.47		352	344772	37%
30	Tata Power	58.40		1783	104127	81.95		1783	146117	40%
31	HDFC Bank Ltd.	492.08		778	382834	695.83		778	541352	41%
32	ICICI Bank Ltd.	177.50		1245	220988	252.05		1245	313797	42%
33	Power Grid Corporation of India Ltd.	97.54		2370	231164	144.11		2370	341547	48%
34	Grasim Industries Ltd.	515.51		469	241773	766.99		469	359719	49%
35	Tata Motors Ltd.	299.70		756	226573	456.75		756	345303	52%
36	Adani Ports and Special Economic Zone Ltd.	196.70		376	73959	301.75		376	113458	53%
37	IndusInd Bank Ltd.	830.00		640	531200	1312.60		640	840064	58%
38	GAIL	85.82		1902	163236	145.38		1902	276509	69%
39	State Bank of India	158.75		901	143034	269.20		901	242549	70%
40	BHEL	61.87		1001	61929	106.83		1001	106940	73%
41	Maruti Suzuki India Ltd.	3236.50		152	491948	5922.50		152	900220	83%
42	Punjab National Bank *	73.65		2108	155254	142.65		2108	300675	94%
43	Tata Steel Ltd.	237.33		453	107509	459.89		453	208328	94%
44	Yes Bank	143.88		134	19280	290.93		134	38985	102%
45	Cairn India *	122.95		530	65164	284.1		530	150572	131%
46	Hindalco Industries Ltd.	68.75		1330	91438	184.35		1330	245186	168%
47	Bharat Petroleum Corporation Ltd.	256.42		3642	933869	446.70	1:1	7284	3253763	248%
48	Vedanta Limited*	74.95		940	70453	265.5		940	249570	254%
49	ITC Ltd.	216.90		1450	314505	268.50	1:2	4350	1167975	271%
50	Oil & Natural Gas Corporation Ltd.	129.40		1040	134576	193.55	1:2	3120	603876	349%
Total Value as on 1st March 2016 after Revision					16021561	Total Value as on 1st March 2017			23024570	44%

During the 2016-17 period, the model portfolio went up by 44% in value. Only 5 stocks went down in value. 45 stocks in the portfolio recorded positive growth, especially the new comers into the index, viz yes bank, cairn India and

Vedanta Ltd were very impressive with more than 100% appreciation. By march 2017, the initial investment more than doubled in record.

**Table 6:** Table Showing the returns between 2017 and 2018.

Sl.NO	List of companies	Share Price as on march 1st 2017	Bonus Issue	No of Shares	Value on the date 1st march 2017	Share Price as on march 1st 2018	Bonus Issue	No of Shares	Value on the date 1st march 2018	% Change
1	Lupin Limited	1469.80		237	348343	803.90		237	190524	-45%
2	Idea Cellular *	113.25		845	95696	83.05		845	70170	-27%
3	Dr. Reddy's Laboratories Ltd.	2849.95		119	339144	2237.25		119	266233	-21%
4	Sun Pharmaceutical Industries Ltd.	679.00		1452	985908	535.35		1452	777328	-21%
5	Tata Motors Ltd.	456.75		756	345303	369.90		756	279644	-19%
6	Bank of Baroda*	165.35		836	138233	138.3		836	115619	-16%
7	Bosch India	21514.60		6	129088	18707.50		6	112245	-13%
8	Aurobindo Pharma	678.25		222	150572	624.10		222	138550	-8%
9	Coal India Ltd.	321.90		597	192174	309.15		597	184563	-4%
10	Oil & Natural Gas Corporation Ltd.	193.55	1:2	3120	603876	188.30		3120	587496	-3%
11	ITC Ltd.	268.50	1:2	4350	1167975	264.00		4350	1148400	-2%
12	State Bank of India	269.20		901	242549	268.00		901	241468	0%
13	NTPC Ltd.	135.79		1360	184677	136.04		1360	185017	0%
14	Cipla Ltd.	583.70		634	370066	589.65		634	373838	1%
15	Tata Power*	81.95		1783	146117	84.3		1783	150307	3%
16	Power Grid Corporation of India Ltd.	144.11		2370	341547	148.28		2370	351412	3%
17	AxIs Bank Ltd.	506.65		867	439266	528.75		867	458426	4%
18	Asian Paints Ltd.	1032.75		296	305694	1118.90		296	331194	8%
19	Zee Entertainment	504.50		1111	560500	551.60		1111	612828	9%
20	Bajaj Auto Ltd.	2755.90		112	308661	3020.60		112	338307	10%
21	UltraTech Cement Ltd.	3774.55		141	532212	4155.60		141	585940	10%
22	Yes Bank	290.93		134	38985	321.05		134	43021	10%
23	Ambuja Cements	228.85		1216	278282	253.15		1216	307830	11%
24	HCL Technologies Ltd.	424.55		3318	1408657	471.40		3318	1564105	11%
25	Eicher Motors Ltd.	2413.01		103	248540	2743.77		103	282609	14%
26	Hero MotoCorp Ltd.	3138.10		103	323224	3596.70		103	370460	15%
27	ACC Ltd*	1411.50		151	213137	1633.8		151	246704	16%
28	Infosys Ltd.	506.20		2240	1133888	586.30		2240	1313312	16%
29	Bharti Airtel Ltd.	333.07		628	209167	392.75		628	246647	18%
30	GAIL	145.38		1902	276509	171.56		1902	326312	18%
31	Wipro Ltd.	183.30		1255	230042	219.60		1255	275598	20%
32	Bharti Infratel	285.00		1055	300675	342.25		1055	361074	20%
33	Tech Mahindra Ltd.	499.40		194	96884	612.65		194	118854	23%
34	Tata Consultancy Services Ltd.	1233.13		327	403232	1517.53		327	496231	23%
35	IndusInd Bank Ltd.	1312.60		640	840064	1680.75		640	1075680	28%
36	Housing Development Finance Corporation Ltd.	1370.05		298	408275	1808.70		298	538993	32%
37	Hindalco Industries Ltd.	184.35		1330	245186	245.40		1330	326382	33%
38	HDFC Bank Ltd.	695.83		778	541352	937.17		778	729122	35%
39	Adani Ports and Special Economic Zone Ltd.	301.75		376	113458	408.35		376	153540	35%
40	Kotak Mahindra Bank Ltd.	802.10		1440	1155024	1090.55		1440	1570392	36%
41	Tata Steel Ltd.	459.89		453	208328	671.60		453	304235	46%
42	Maruti Suzuki India Ltd.	5922.50		152	900220	8850.95		152	1345344	49%
43	Grasim Industries Ltd.*	766.99		469	359719	1152.7		469	540616	50%
44	Hindustan Unilever Ltd.	865.90		525	454598	1317.75		525	691819	52%
45	Mahindra & Mahindra Ltd.	656.08		586	384460	728.35	1:1	1172	853626	122%
46	BHEL*	106.83		1001	106940	90.7		3003	272372	155%
47	Bharat Petroleum Corporation Ltd.	446.70	1:1	7284	3253763	429.55	1:2	21852	9386526	188%
48	Reliance Industries Ltd.	613.21		497	304767	945.59	1:1	994	939913	208%
49	Larsen & Toubro Ltd.	979.47		352	344772	1318.15	1:2	1056	1391966	304%
50	ICICI Bank Ltd.	252.05		1245	313797	304.25	1:10	12450	3787913	1107%
Total Value as on 1st March 2017 after Revision					23023540	Total Value as on 1st March 2018			37360706	62%

The above table shows the second consecutive trial blazing year for the model portfolio which recorded 62 % of growth. Indeed, it was a great year for the portfolio, since 6 stocks from the list brought more than 100% returns, especially, ICICI Bank was the winner at the top with 1107% returns.

Six Stocks were dropped from the list. Bajaj Finance Ltd was one of the stocks added in the list during this period.

**Table 7:** Table Showing the returns between 2018 and 2019.

Sl.NO	List of companies	Share Price as on march 1st 2018	Bonus Issue	No of Shares	Value on the date 1st march 2018	Share Price as on march 1st 2019	Bonus Issue	No of Shares	Value on the date 1st march 2019	% Change
1	Tata Motors Ltd.	369.90		756	279644	177.45		756	134152	-52%
2	Indiabulls Housing Finance	1256.30		216	271361	1256.30		216	145130	-47%
3	Vedanta Umlted	323.25		1672	540474	173.45		1672	290008	-46%
4	Hindustan Petroleum *	376.75		306	115286	232.7		306	71206.19908	-38%
5	Bharti Airtel Ltd.	392.75		628	246647	282.48		628	177396	-28%
6	Elcher Motors Ltd.	2743.77		103	282609	1986.91		103	204652	-28%
7	Hero MotoCorp Ltd.	3596.70		103	370460	2628.10		103	270694	-27%
8	Coal Indla Ltd.	309.15		597	184563	228.30		597	136295	-26%
9	Yes Bank	321.05		134	43021	237.60		134	31838	-26%
10	Tata Steel Ltd.	671.60		453	304235	500.45		453	226704	-25%
11	Maruti Suzuki India Ltd.	8850.95		152	1345344	6829.70		152	1038114	-23%
12	Bharat Petroleum Corporation Ltd.	429.55	1.2	21852	9386526	337.55		21852	7376142	-21%
13	Oll & Natural Gas Corporation Ltd.	188.30		3120	587496	148.65		3120	463788	-21%
14	Hindalco Industries Ltd.	245.40		1330	326382	195.75		1330	260348	-20%
15	Adani Ports and Special Economic Zone Ltd.	408.35		376	153540	325.85		376	122520	-20%
16	Sun Pharmaceutical Industries Ltd.	535.35		1452	777328	445.15		1452	646358	-17%
17	Zee Entertainment	551.60		1111	612828	466.35		1111	518115	-15%
18	Bharti Infratel	342.25		1055	361074	292.00		1055	308060	-15%
19	Ambuja Cements *	253.149994		1216	307830	217.45		1216	264419	-14%
20	NTPC Ltd.	136.04		1360	185017	117.71		1360	160083	-13%
21	Indusind Bank Ltd.	1680.75		640	1075680	1473.85		640	943264	-12%
22	Mahindra & Mahindra Ltd.	728.35	1.1	1172	853626	645.90		1172	756995	-11%
23	UltraTech Cement Ltd.	4155.60		141	585940	3826.50		141	539537	-8%
24	Power Grid Corporation of India Ltd.	148.28		2370	351412	137.14		2370	325016	-8%
25	Cipla Ltd.	589.65		634	373838	554.55		634	351585	-6%
26	Bajaj Auto Ltd.	3020.60		112	338307	2900.60		112	324867	-4%
27	Lupin Limited *	803.90		237	190524	786.6		237	186424	-2%
28	GAIL	171.56		1902	326312	171.00		1902	325242	0%
29	Bosch India *	18707.50		6	112245	18749.75		6	112499	0%
30	State Bank of India	268.00		901	241468	269.05		901	242414	0%
31	Housing Development Finance Corporation Ltd.	1808.70		298	538993	1841.20		298	548678	2%
32	ITC Ltd.	264.00		4350	1148400	278.20		4350	1210170	5%
33	HDFC Bank Ltd.	937.17		778	729122	1041.68		778	810423	11%
34	Kotak Mahindra Bank Ltd.	1090.55		1440	1570392	1213.10		1440	1746864	11%
35	HCL Technologies Ltd.	471.40		3318	1564105	526.30		3318	1746263	12%
36	Aurobindo Pharma*	624.10		222	138550	712.05		222	158075	14%
37	ICICI Bank Ltd.	304.25	1.10	12450	3787913	354.25		12450	4410413	16%
38	Dr. Reddy's Laboratories Ltd.	2237.25		119	266233	2631.65		119	313166	18%
39	UPL Ltd.	485.83		309	150123	585.07		309	180786	20%
40	Asian Paints Ltd.	1118.90		296	331194	1392.35		296	412136	24%
41	Wipro Ltd.	219.60		1255	275598	276.68		1255	347227	26%
42	Reliance Industries Ltd.	945.59	1.1	994	939913	1219.49		994	1212174	29%
43	Hindustan Unilever Ltd.	1317.75		525	691819	1732.65		525	909641	31%
44	AxIs Bank Ltd.	528.75		867	458426	709.55		867	615180	34%
45	Tech Mahindra Ltd.	612.65		194	118854	830.15		194	161049	36%
46	Indian Oil Corporation Ltd.	189.65		370	70170	144.60	1.1	740	107004	52%
47	Bajaj Finance Ltd.	1659.35		148	245584	2660.75		148	393791	60%
48	Infosys Ltd.	586.30		2240	1313312	734.30	1.1	4480	3289664	150%
49	Tata Consultancy Services Ltd.	1517.53		327	496231	1983.45	1.1	654	1297176	161%
50	Larsen & Toubro Ltd.	1318.15	1.2	1056	1391966	1292.95	1.2	3168	4096065	194%
Total Value as on 1st March 2018 after Revision					37357914	Total Value as on 1st March 2019			40919810	10%

There were only 10 % returns for the portfolio during this period between 2018 Mar-19 Mar. Only L&T, TCS and Infosys were able to show more than 100% returns. Very high base effect of the previous year could also be a reason for normal returns.

This year also witnessed major churning of stocks in the portfolio. Titan, Grasim Industries, Bajaj Finserv Ltd, JSW steel and Britannia Industries Ltd found their place for the first time in the Index.

**Table 9:** Table Showing the returns between 2019 and 2020.

Sl.NO	List of companies	Share Price as on march 1st 2019	Bonus Issue	No of Shares	Value on the date 1st march 2019	Share Price as on march 1st 2020	Bonus Issue	No of Shares	Value on the date 1st march 2020	% Change
1	Yes Bank	237.60		134	31838	31.55		134	4228	-87%
2	Indiabulls Housing Finance	671.90		216	145130	284.399994		216	61430.3987	-58%
3	Zee Entertainment	466.35		1111	518115	229.90		1111	255419	-51%
4	GAIL	171.00		1902	325242	104.40		1902	198569	-39%
5	Oil & Natural Gas Corporation Ltd.	148.65		3120	463788	91.95		3120	286884	-38%
6	Vedanta Limited	173.45		1672	290008	110.95		1672	185508	-36%
7	Grasim Industries Ltd.	1166.60		135	157491	791.75		135	106886	-32%
8	ITC Ltd.	278.20		4350	1210170	195.30		4350	849555	-30%
9	Mahindra & Mahindra Ltd.	645.90		1172	756995	457.05		1172	535663	-29%
10	Bharti Infratel	292.00		1055	308060	210.20		1055	221761	-28%
11	Cipla Ltd.	554.55		634	351585	402.10		634	254931	-27%
12	Tata Motors Ltd.	177.45		756	134152	128.95		756	97486	-27%
13	Indian Oil Corporation Ltd.	144.60	1:1	740	107004	105.75		740	78255	-27%
14	Coal India Ltd.	228.30		597	136295	168.40		597	100535	-26%
15	Indusind Bank Ltd.	1473.85		640	943264	1104.05		640	706592	-25%
16	Tata Steel Ltd.	500.45		453	226704	381.75		453	172933	-24%
17	Hero MotoCorp Ltd.	2628.10		103	270694	2051.75		103	211330	-22%
18	Hindalco Industries Ltd.	195.75		1330	260348	155.90		1330	207347	-20%
19	Elcher Motors Ltd.	1986.91		103	204652	1660.23		103	171004	-16%
20	Sun Pharmaceutical Industries Ltd.	445.15		1452	646358	372.90		1452	541451	-16%
21	JSW Steel Ltd.	281.10		663	186369	235.70		663	156289	-16%
22	Larsen & Toubro Ltd.	1292.95	1:2	3168	4096065	1187.55		3168	3762159	-8%
23	Maruti Suzuki India Ltd.	6829.70		152	1038114	6283.10		152	955031	-8%
24	Britannia Industries Ltd.	3056.90		23	70309	2970.20		23	68315	-3%
25	Axis Bank Ltd.	709.55		867	615180	697.30		867	604559	-2%
26	Power Grid Corporation of India Ltd.	137.14		2370	325016	136.13		2370	322616	-1%
27	Bajaj Auto Ltd.	2900.60		112	324867	2890.00		112	323680	0%
28	Infosys Ltd.	734.30	1:1	4480	3289664	731.70		4480	3278016	0%
29	Tata Consultancy Services Ltd.	1983.45	1:1	654	1297176	2000.15		654	1308098	1%
30	Adani Ports and Special Economic Zone Ltd.	325.85		376	122520	342.20		376	128667	5%
31	Reliance Industries Ltd.	1219.49		994	1212174	1316.17		994	1308277	8%
32	UltraTech Cement Ltd.	3826.50		141	539537	4219.60		141	594964	10%
33	Dr. Reddy's Laboratories Ltd.	2631.65		119	313166	2927.10		119	348325	11%
34	State Bank of India	269.05		901	242414	308.00		901	273003	13%
35	HDFC Bank Ltd.	1041.68		778	810423	1179.60		778	917729	13%
36	Housing Development Finance Corporation Ltd.	1841.20		298	548678	2175.75		298	648374	18%
37	Titan Company Ltd.	1025.20		109	111747	1254.50		109	136741	22%
38	Hindustan Unilever Ltd.	1732.65		525	909641	2174.75		525	1141744	26%
39	Bharat Petroleum Corporation Ltd.	337.55		21852	7376142	426.35		21852	9316600	26%
40	Asian Paints Ltd.	1392.35		296	412136	1786.80		296	528893	28%
41	Kotak Mahindra Bank Ltd.	1213.10		1440	1746864	1620.35		1440	2333304	34%
42	Bajaj Finserv Ltd.	6440.60		41	264065	8914.50		41	365495	38%
43	ICICI Bank Ltd.	354.25		12450	4410413	506.10		12450	6300945	43%
44	Bajaj Finance Ltd.	2660.75		148	393791	4360.75		148	645391	64%
45	UPL Ltd.	585.07		309	180786	519.70	1:2	618	321175	78%
46	Bharti Airtel Ltd.	282.48		628	177396	518.35		628	325524	84%
47	HCL Technologies Ltd.	526.30		3318	1746263	549.70	1:1	6636	3647809	109%
48	Tech Mahindra Ltd.	830.15		194	161049	744.40		647	481762	199%
49	Wipro Ltd.	276.68		1255	347227	221.45	1:3	5020	1111679	220%
50	NTPC Ltd.	117.71		1360	160083	106.55	1:5	8160	869448	443%
Total Value as on 1st March 2019 after Revision					40917168	Total Value as on 1st March 2020			47772357	17%

Yes Bank, Indiabulls Housing finance and Zee entertainment were the worst performers during this period. On the other hand, HCL technologies, Tech Mahindra, Wipro and NTPC added strength to the portfolio to witness 17% returns overall. As expected, nestle replaced

Indiabulls Housing Finance. Yes Bank escaped from the axes for the first time being. Returns at high teens added a lot of positivity to the portfolio value to reach so close to 5 Cr mark. By march 2022 the initial investment of 1cr has increased almost by five-fold in 8 years.

**Table 9:** Table Showing the returns between 2020 and 2021.

SI.NO	List of companies	Share Price as on march 1st 2020	Bonus Issue	No of Shares	Value on the date 1st march 2020	Share Price as on march 1st 2021	Bonus Issue	No of Shares	Value on the date 1st march 2021	% Change
1	Tech Mahindra Ltd.	744.40		647	481762	918.85		194	178257	-63%
2	Yes Bank*	31.55		134	4228	16.3		134	2184	-48%
3	Grasim Industries Ltd.	791.75		135	106886	668.45		135	90241	-16%
4	Zee Entertainment *	229.90		1111	255419	202.4		1111	224866	-12%
5	Coal India Ltd.	168.40		597	100535	152.20		597	90863	-10%
6	Indian Oil Corporation Ltd.	105.75		740	78255	98.05		740	72557	-7%
7	IndusInd Bank Ltd.	1104.05		640	706592	1062.95		640	680288	-4%
8	Hindustan Unilever Ltd.	2174.75		525	1141744	2132.05		525	1119326	-2%
9	NTPC Ltd.	106.55	1:5	8160	869448	107.30		8160	875568	1%
10	Nestle India Ltd.	15778.85		3	47337	16101.60		3	48305	2%
11	Bharti Airtel Ltd.	518.35		628	325524	532.20		628	334222	3%
12	Axis Bank Ltd.	697.30		867	604559	724.80		867	628402	4%
13	Bharat Petroleum Corporation Ltd.	426.35		21852	9316600	449.85		21852	9830122	6%
14	ITC Ltd.	195.30		4350	849555	206.90		4350	900015	6%
15	Maruti Suzuki India Ltd.	6283.10		152	955031	6866.15		152	1043655	9%
16	Bajaj Finserv Ltd.	8914.50		41	365495	9774.05		41	400736	10%
17	Kotak Mahindra Bank Ltd.	1620.35		1440	2333304	1780.35		1440	2563704	10%
18	Titan Company Ltd.	1254.50		109	136741	1406.90		109	153352	12%
19	Britannia Industries Ltd.	2970.20		23	68315	3363.75		23	77366	13%
20	Housing Development Finance Corporation Ltd.	2175.75		298	648374	2539.40		298	756741	17%
21	Power Grid Corporation of India Ltd.	136.13		2370	322616	160.73		2370	380918	18%
22	Bharti Infratel*	210.20		1055	221761	252.25		1055	266124	20%
23	ICICI Bank Ltd.	506.10		12450	6300945	608.35		12450	7573957	20%
24	Oil & Natural Gas Corporation Ltd.	91.95		3120	286884	111.00		3120	346320	21%
25	Bajaj Finance Ltd.	4360.75		148	645391	5266.80		148	779486	21%
26	Larsen & Toubro Ltd.	1187.55		3168	3762159	1442.50		3168	4569840	21%
27	State Bank of India	308.00		901	273003	390.15		901	351525	29%
28	Bajaj Auto Ltd.	2890.00		112	323680	3798.70		112	425454	31%
29	HDFC Bank Ltd.	1179.60		778	917729	1558.90		778	1212824	32%
30	Asian Paints Ltd.	1786.80		296	528893	2362.30		296	699241	32%
31	GAIL	104.40		1902	198569	141.80		1902	269704	36%
32	Tata Consultancy Services Ltd.	2000.15		654	1308098	2894.30		654	1892872	45%
33	UltraTech Cement Ltd.	4219.60		141	594964	6115.00		141	862215	45%
34	Eicher Motors Ltd.	1660.23		103	171004	2498.60		103	257356	50%
35	Dr. Reddy's Laboratories Ltd.	2927.10		119	348325	4426.55		119	526759	51%
36	Hero MotoCorp Ltd.	2051.75		103	211330	3224.00		103	332072	57%
37	Reliance Industries Ltd.	1316.17		994	1308277	2085.80		994	2073285	58%
38	Sun Pharmaceutical Industries Ltd.	372.90		1452	541451	594.60		1452	863359	59%
39	UPL Ltd.	519.70	1:2	618	321175	561.55		927	520557	62%
40	JSW Steel Ltd.	235.70		663	156269	395.45		663	262183	68%
41	HCL Technologies Ltd.	549.70	1:1	6636	3647809	930.35		6636	6173802	69%
42	Infosys Ltd.	731.70		4480	3278016	1253.30		4480	5614784	71%
43	Mahindra & Mahindra Ltd.	457.05		1172	535663	806.40		1172	945101	76%
44	Wipro Ltd.	221.45	1:3	5020	1111679	410.30		5020	2059706	85%
45	Tata Steel Ltd.	381.75		453	172933	715.15		453	323963	87%
46	Vedanta Limited*	110.95		1672	185508	705.05		506	356755	92%
47	Cipla Ltd.	402.10		634	254931	787.05		634	498990	96%
48	Adani Ports and Special Economic Zone Ltd.	342.20		376	128667	675.90		376	254138	98%
49	Hindalco Industries Ltd.	155.90		1330	207347	340.25		1330	452533	118%
50	Tata Motors Ltd.	128.95		756	97486	322.95		756	244150	150%
Total Value as on 1st March 2020 after Revision					47758263	Total Value as on 1st March 2021			61460746	29%

This was the period covid-19 struck the market. Initially the market was hammered down and subsequently there was a tremendous recovery to record 29% returns for the period

between march 2020 – march 2021. Stocks like Adani Port, Hindalco and Tata Motors came for the rescue. Vedanta, Zee, Yes Bank and Bharati Infratel moved out of the Index.



**Table 10:** Table Showing the returns between 2021 and 2022.

Sl.NO	List of companies	Share Price as on march 1st 2021	No of Shares	Value on the date 1st march 2021	Share Price as on march 2nd 2022	Bonus Issue	No of Shares	Value on the date 2nd march 2022	% Change
1	Bharat Petroleum Corporation Ltd.	449.85	21852	9830122	349.80		21852	7643829	-22%
2	Hero MotoCorp Ltd.	3224.00	103	332072	2535.45		103	261151	-21%
3	HDFC Life Insurance Company Ltd.	705.05	506	356755	560.90		506	283815	-20%
4	IndusInd Bank Ltd.	1062.95	640	680288	920.70		640	589248	-13%
5	HDFC Bank Ltd.	1558.90	778	1212824	1374.25		778	1069167	-12%
6	Dr. Reddy's Laboratories Ltd.	4426.55	119	526759	4063.40		119	483545	-8%
7	Shree Cement Ltd.	26501.70	2	53003	24414.70		2	48829	-8%
8	Bajaj Auto Ltd.	3798.70	112	425454	3530.35		112	395399	-7%
9	Housing Development Finance Corporation Ltd.	2539.40	298	756741	2364.50		298	704621	-7%
10	Mahindra & Mahindra Ltd.	806.40	1172	945101	790.85		1172	926876	-2%
11	Hindustan Unilever Ltd.	2132.05	525	1119326	2172.10		525	1140353	2%
12	Britannia Industries Ltd.	3363.75	23	77366	3427.45		23	78831	2%
13	GAIL	141.80	1902	269704	144.85		1902	275505	2%
14	Axis Bank Ltd.	724.80	867	628402	742.40		867	643661	2%
15	Kotak Mahindra Bank Ltd.	1780.35	1440	2563704	1842.75		1440	2653560	4%
16	Elcher Motors Ltd.	2498.60	103	257356	2589.80		103	266749	4%
17	ITC Ltd.	206.90	4350	900015	215.30		4350	936555	4%
18	Adani Ports and Special Economic Zone Ltd.	675.90	376	254138	707.50		376	266020	5%
19	UltraTch Cement Ltd.	6115.00	141	862215	6567.90		141	926074	7%
20	Nestle India Ltd.	16101.60	3	48305	17639.15		3	52917	10%
21	Coal India Ltd.	152.20	597	90863	169.55		597	101221	11%
22	Reliance Industries Ltd.	2085.80	994	2073285	2359.55		994	2345393	13%
23	Indian Oil Corporation Ltd.	98.05	740	72557	115.00		740	85100	17%
24	ICICI Bank Ltd.	608.35	12450	7573957	714.85		12450	8899882	18%
25	Cipla Ltd.	787.05	634	498990	925.05		634	586482	18%
26	UPL Ltd.	561.55	927	520557	665.45		927	616872	19%
27	HCL Technologies Ltd.	990.35	6636	6173802	1115.55		6636	7402790	20%
28	Maruti Suzuki India Ltd.	6866.15	152	1048655	8314.15		152	1263751	21%
29	Tata Consultancy Services Ltd.	2894.30	654	1892872	3554.20		654	2324447	23%
30	State Bank of India	390.15	901	351525	483.20		901	435363	24%
31	NTPC Ltd.	107.30	8160	875568	133.50		8160	1089360	24%
32	Larsen & Toubro Ltd.	1442.50	3168	4569840	1816.75		3168	5755464	26%
33	Bharti Airtel Ltd.	532.20	628	334222	674.25		628	423429	27%
34	DIVI's Laboratories Ltd.	3363.10	79	265685	4265.00		79	336935	27%
35	SBI Life Insurance Company Ltd.	876.40	256	224358	1121.15		256	287014	28%
36	Asian Paints Ltd.	2362.30	296	699241	3028.95		296	896569	28%
37	Bajaj Finance Ltd.	5266.80	148	779486	6831.55		148	1011069	30%
38	Wipro Ltd.	410.30	5020	2059706	555.80		5020	2790116	35%
39	Infosys Ltd.	1253.30	4480	5614784	1715.60		4480	7685888	37%
40	Tata Motors Ltd.	322.95	756	244150	454.05		756	343262	41%
41	Sun Pharmaceutical Industries Ltd.	594.60	1452	863359	843.90		1452	1225343	42%
42	OIL & Natural Gas Corporation Ltd.	111.00	3120	346320	160.65		3120	501228	45%
43	Tech Mahindra Ltd.	918.85	194	178257	9410.00		194	273540	53%
44	JSW Steel Ltd.	395.45	663	262183	627.45		663	415999	59%
45	Bajaj Finserv Ltd.	9774.05	41	400736	16053.00		41	658173	64%
46	Hindalco Industries Ltd.	340.25	1330	452533	573.75		1330	763088	69%
47	Tata Steel Ltd.	715.15	453	323963	1220.75		453	553000	71%
48	Titan Company Ltd.	1406.90	109	153352	2546.55		109	277574	81%
49	Grasim Industries Ltd.	668.45	135	90241	1548.50		135	209048	132%
50	Power Grid Corporation of India Ltd.	160.73	2370	380918	209.15	1.3	9480	1982742	421%
Total Value as on 1st March 2021 after Revision				61510618	Total Value as on 2nd March 2022		71186848	16%	

During the last year of analysis, (2021-22) the model portfolio registered 16% growth in value. The overall market was resilient during this period in spite of successive covid waves. About 19 stocks showed an impressive growth rate in excess of 25% Grasim Industries

Ltd (132%) and Power Grid (421%) were the top-ranking performers during this period. As on 2<sup>nd</sup> March 2022, the portfolio value stood at Rs. 7,11,86,848, an impressive more than seven folds rise in value in ten years.

**Table 11:** Table Showing the Performance of Portfolio Vs Nifty 50.

Sl.NO	Year	Investment Value	Portfolio Growth y-o-y in %	NSE	NSE NIFTY Growth	y-o-y in %
1	2012	9988996		5278.8		
2	2013	10247154	3	5679.9	8	
3	2014	11576985	13	6212.25	9	
4	2015	17704998	53	8885.45	43	
5	2016	16021561	-10	7035.1	-21	
6	2017	23023540	44	8898.6	26	
7	2018	37357914	62	10447.15	17	
8	2019	40917168	10	10823.1	4	
9	2020	47758263	17	11036.25	2	
10	2021	61510618	29	14638.55	33	
11	2022	71186848	16	16478.65	13	
CAGR		22%		12%		

The performance of the portfolio was compared with Nifty-50 as the benchmark. Only two years, viz 2012-13 and 2020-21, the Nifty was able to outpace the model portfolio. During all other periods, the model portfolio outshone Nifty with a huge margin of difference. Year-on-year growth rate comparison of the portfolio and Nifty confirms the superiority of the performance of the model portfolio over Nifty.

CAGR of Nifty for the entire period was 12%, whereas, the model portfolio CAGR was 22%, almost double. Therefore, it is easy to infer that the constant index-based investing brings better results than investing in Nifty- ETFs / Index Funds.

#### Summary of Findings

1. A long-term investor need not do the stock selection. All the stocks in the index are eligible for investment.
2. The Investible amount to be divided into equal portions towards investments in each stock.
3. It is a passive approach towards investing and the investor needs to sell the stocks which are going out of the index. The sales proceeds need to be invested in the new stocks comes into the index on replacement.
4. Stock splits and bonus shares call for no action from the investors.
5. Dividend amount received should be invested back into the same stocks to pinch the growth of portfolio values.
6. Only heavy weight stocks can influence the Nifty in a big way. In constant index method, any performing stocks can lift the performance of the portfolio. Since all the stocks were invested with equal amounts.
7. Time mitigates risk. One can reap better returns by giving time to the portfolio with appropriate adjustment as indicated by the Index itself.
8. The portfolio value doubled once in three and half years to four years. Table 11, shows the evidence for the statement.
9. All the Ups and Downs in the market during the intervening periods have no effect on the overall performance of the portfolio over a period of time.
10. There is no tax payment involved since the investor sells only the loss-making stocks for replacement.
11. The investor follows the Markowitz hypothesis of the portfolio diversification. Nifty stocks belong to different sector and not all sector is linearly correlated with very high positive correlation with one another.
12. Though the portfolio is diversified too much, it is easy to monitor and manage. Investors need to follow the changes in the composition of stocks in the Index.
13. There is no need for individual stock analysis, since the portfolio is the replica of the Index.
14. Equal weight assumption removes the pain of doing complicated mathematical analysis for appropriating the capital invested towards various stocks.
15. This approach ensures positive returns for the people remain invested for three or more than three years in the market.
16. CAGR of 22% for a relatively longer period of ten years gives hope for people without formal education and knowledge about building portfolio could also make money in the market by investing based in constant index.
17. A long-term investor need not worry about the short-term fluctuations. Governance issues in big companies like ICICI Bank, Yes Bank etc.. or Covid like pandemic which made people to remain indoor have not dampened the spirit of market in the long run. They are all just short-term noises.
18. There is no need for profit booking unlike a short-term trade, once the investor has long-term perspective.
19. Roughly more than 15% real rate of return (Inflation adjusted) is possible even for a novice investor.
20. Index is the ultimate indicator in the market. Just follow the index, the unerring source of navigation is wealth creation.

#### References

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