

## SEQUENCE OF RETURNS

Investing community often debate about expected returns from investments, using equity and other instruments. Many investors and advisors give reference of Sensex or Nifty 50 returns of average 12% over several years; hence achievable in future.

As a general guideline, historical average returns cannot be considered as guaranteed returns in the future. Large stocks, as the constituents of major Index, are observed to behave in a particular way over longer time span, hence 12% average returns are not wrong in totality.

However, a major pit-fall in such assumption is "sequence of returns". More losses in initial period will lead to shortfall in corpus for use at later stage of life and vice versa. In-order to understand this, data over 35 years from Sensex is considered. This data reflects uncertainty in returns from the market at large.

For **illustration purpose** three variations have been considered with varied pa returns and withdrawal rates. This can be referred as follows:-

(A) Entire corpus invested in Index fund and withdrawal of 8% for first year. Thereafter expenses considered to grow at the rate of 6% due to inflation on annual basis.

(B) Retirement corpus is invested mainly in Index fund and approx. 20-30% in debt instruments. The mix will give returns lower than Option-A. Expenses considered as 4.5% of corpus for first year and there after expenses will grow at the rate of 6% annually due to inflation.

(C) The retirement corpus is considered as a mix of Index fund approx. 50% and debt instruments approx. 50%. First year withdrawal considered with 3.3% of corpus and thereafter increase with the rate of 6% annually due to inflation.

Individual investor or retiree may have different annual expenses as per living standards and family situations and other conditions. Individuals may have to consider different data which might be more relevant to them, if they wish to explore further.

**Another interesting fact is observed that max three years negative returns were given by Sensex in successive years. However, any 10 years span has always given positive returns.**

Annexure -1 can be referred for tabulated results

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INDEX RETURN		ANNEXURE - 1		
EXAMPLE OF SEQUENCE OF RETURN				
Year	Sensex Open Price	Sensex Close Price at the End of Year	Gain/ Fall	10YR AVG RETURN
1986	₹ 549.43	₹ 524.45	-4.55%	
1987	₹ 542.06	₹ 442.17	-18.43%	
1988	₹ 439.17	₹ 666.26	51.71%	
1989	₹ 659.11	₹ 778.64	18.14%	
1990	₹ 780.01	₹ 1,048.29	34.39%	
1991	₹ 999.26	₹ 1,946.28	94.77%	
1992	₹ 1,957.33	₹ 2,615.37	33.62%	
1993	₹ 2,539.67	₹ 3,346.06	31.75%	
1994	₹ 3,465.86	₹ 3,926.90	13.30%	
1995	₹ 3,932.09	₹ 3,110.49	-20.89%	23.38%
1996	₹ 3,127.94	₹ 3,085.20	-1.37%	23.70%
1997	₹ 3,260.56	₹ 3,658.98	12.22%	26.76%
1998	₹ 3,694.62	₹ 3,055.41	-17.30%	19.86%
1999	₹ 3,060.34	₹ 5,005.82	63.57%	24.41%
2000	₹ 5,375.11	₹ 3,972.12	-26.10%	18.36%
2001	₹ 3,955.08	₹ 3,262.33	-17.52%	7.13%
2002	₹ 3,246.15	₹ 3,377.28	4.04%	4.17%
2003	₹ 3,390.12	₹ 5,838.96	72.23%	8.22%
2004	₹ 5,915.47	₹ 6,602.69	11.62%	8.05%
2005	₹ 6,679.20	₹ 9,397.93	40.70%	14.21%
2006	₹ 9,390.14	₹ 13,786.90	46.82%	19.03%
2007	₹ 13,942.20	₹ 20,286.99	45.51%	22.36%
2008	₹ 20,300.71	₹ 9,647.31	-52.48%	18.84%
2009	₹ 9,903.46	₹ 17,464.81	76.35%	20.12%
2010	₹ 17,558.73	₹ 20,509.09	16.80%	24.41%
2011	₹ 20,561.05	₹ 15,454.92	-24.83%	23.68%
2012	₹ 15,517.92	₹ 19,426.71	25.19%	25.79%
2013	₹ 19,580.81	₹ 21,170.68	8.12%	19.38%
2014	₹ 21,140.48	₹ 27,499.42	30.08%	21.23%
2015	₹ 27,507.54	₹ 26,117.54	-5.05%	16.65%
2016	₹ 26,160.90	₹ 26,626.46	1.78%	12.15%
2017	₹ 26,595.45	₹ 34,056.83	28.06%	10.40%
2018	₹ 33,812.75	₹ 36,068.33	6.67%	16.32%
2019	₹ 36,254.57	₹ 41,253.74	13.79%	10.06%
2020	₹ 41,306.02	₹ 47,751.33	15.60%	9.94%
2021	₹ 47,868.98	₹ 58,253.82	21.69%	14.59%
2022	₹ 59,183.22	₹ 60,840.74	2.80%	12.35%
2023	₹ 61,167.79	₹ 72,271.94	18.15%	11.50%
			-20.89%	9.74%
			-1.37%	9.39%
		<b>Average</b>		<b>15.72%</b>
Last two years negative returns considered purposely.				
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## CORPUS \_\_ FULLY INVESTED IN INDEX

REFERENCE YR	STARTING CORPUS	RETURN IN A YR	WITHDRAWAL 8% 1ST YR 6% INFLATION THERE AFTER	CORPUS AT END OF YR
1	4,00,00,000	-18,20,000	32,00,000	3,49,80,000
2	3,49,80,000	-64,46,814	33,92,000	2,51,41,186
3	2,51,41,186	1,30,00,507	35,95,520	3,45,46,173
4	3,45,46,173	62,66,676	38,11,251	3,70,01,598
5	3,70,01,598	1,27,24,850	40,39,926	4,56,86,521
6	4,56,86,521	4,32,97,116	42,82,322	8,47,01,315
7	8,47,01,315	2,84,76,582	45,39,261	10,86,38,637
8	10,86,38,637	3,44,92,767	48,11,617	13,83,19,787
9	13,83,19,787	1,83,96,532	51,00,314	15,16,16,005
10	15,16,16,005	-3,16,72,583	54,06,333	11,45,37,089
11	11,45,37,089	-15,69,158	57,30,713	10,72,37,218
12	10,72,37,218	1,31,04,388	60,74,555	11,42,67,050
13	11,42,67,050	-1,97,68,200	64,39,029	8,80,59,822
14	8,80,59,822	5,59,79,629	68,25,370	13,72,14,080
15	13,72,14,080	-3,58,12,875	72,34,893	9,41,66,313
16	9,41,66,313	-1,64,97,938	76,68,986	6,99,99,389
17	6,99,99,389	28,27,975	81,29,125	6,46,98,238
18	6,46,98,238	4,67,31,538	86,16,873	10,28,12,903
19	10,28,12,903	1,19,46,859	91,33,885	10,56,25,877
20	10,56,25,877	4,29,89,732	96,81,918	13,89,33,691
21	13,89,33,691	6,50,48,754	1,02,62,834	19,37,19,611
22	19,37,19,611	8,81,61,795	1,08,78,604	27,10,02,803
23	27,10,02,803	-14,22,22,271	1,15,31,320	11,72,49,212
24	11,72,49,212	8,95,19,774	1,22,23,199	19,45,45,787
25	19,45,45,787	3,26,83,692	1,29,56,591	21,42,72,888
26	21,42,72,888	-5,32,03,958	1,37,33,986	14,73,34,944
27	14,73,34,944	3,71,13,672	1,45,58,025	16,98,90,591
28	16,98,90,591	1,37,95,116	1,54,31,507	16,82,54,200
29	16,82,54,200	5,06,10,863	1,63,57,397	20,25,07,666
30	20,25,07,666	-1,02,26,637	1,73,38,841	17,49,42,187
31	17,49,42,187	31,13,971	1,83,79,172	15,96,76,986
32	15,96,76,986	4,48,05,362	1,94,81,922	18,50,00,427
33	18,50,00,427	1,23,39,528	2,06,50,837	17,66,89,118
34	17,66,89,118	2,43,65,429	2,18,89,888	17,91,64,659
35	17,91,64,659	2,79,49,687	2,32,03,281	18,39,11,065
36	18,39,11,065	3,98,90,310	2,45,95,478	19,92,05,898
37	19,92,05,898	55,77,765	2,60,71,206	17,87,12,456
38	17,87,12,456	3,24,36,311	2,76,35,479	18,35,13,288
39	18,35,13,288	-3,83,35,926	2,92,93,608	11,58,83,755
40	11,58,83,755	-15,87,607	3,10,51,224	8,32,44,924

## CORPUS MAJORLY INVESTED IN INDEX AND PARTIALLY ( 20% TO 30%)IN DEBT

REFERENCE age	STARTING CORPUS	RETURN IN A YR ( REF YR RETUN - 4%)	WITHDRAWAL 4.50% 1ST YR 6% INFLATION THERE AFTER	CORPUS AT END OF YR
58	4,00,00,000	-34,20,000	18,00,000	3,47,80,000
59	3,47,80,000	-78,01,154	19,08,000	2,50,70,846
60	2,50,70,846	1,19,61,301	20,22,480	3,50,09,667
61	3,50,09,667	49,50,367	21,43,829	3,78,16,205
62	3,78,16,205	1,14,92,345	22,72,459	4,70,36,091
63	4,70,36,091	4,26,94,660	24,08,806	8,73,21,944
64	8,73,21,944	2,58,64,760	25,53,334	11,06,33,370
65	11,06,33,370	3,07,00,760	27,06,534	13,86,27,595
66	13,86,27,595	1,28,92,366	28,68,927	14,86,51,035
67	14,86,51,035	-3,69,99,243	30,41,062	10,86,10,730
68	10,86,10,730	-58,32,396	32,23,526	9,95,54,808
69	9,95,54,808	81,83,405	34,16,937	10,43,21,276
70	10,43,21,276	-2,22,20,432	36,21,954	7,84,78,891
71	7,84,78,891	4,67,49,875	38,39,271	12,13,89,495
72	12,13,89,495	-3,65,38,238	40,69,627	8,07,81,630
73	8,07,81,630	-1,73,84,207	43,13,805	5,90,83,618
74	5,90,83,618	23,633	45,72,633	5,45,34,619
75	5,45,34,619	3,72,08,970	48,46,991	8,68,96,598
76	8,68,96,598	66,21,521	51,37,810	8,83,80,309
77	8,83,80,309	3,24,35,573	54,46,079	11,53,69,803
78	11,53,69,803	4,94,01,350	57,72,844	15,89,98,309
79	15,89,98,309	6,60,00,198	61,19,214	21,88,79,292
80	21,88,79,292	-12,36,23,024	64,86,367	8,87,69,900
81	8,87,69,900	6,42,25,023	68,75,549	14,61,19,374
82	14,61,19,374	1,87,03,280	72,88,082	15,75,34,572
83	15,75,34,572	-4,54,17,217	77,25,367	10,43,91,987
84	10,43,91,987	2,21,20,662	81,88,889	11,83,23,760
85	11,83,23,760	48,74,939	86,80,223	11,45,18,476
86	11,45,18,476	2,98,66,419	92,01,036	13,51,83,859
87	13,51,83,859	-1,22,34,139	97,53,098	11,31,96,621
88	11,31,96,621	-25,12,965	1,03,38,284	10,03,45,372
89	10,03,45,372	2,41,43,097	1,09,58,581	11,35,29,888
90	11,35,29,888	30,31,248	1,16,16,096	10,49,45,040
91	10,49,45,040	1,02,74,119	1,23,13,062	10,29,06,097
92	10,29,06,097	1,19,37,107	1,30,51,845	10,17,91,359
93	10,17,91,359	1,80,06,891	1,38,34,956	10,59,63,294
94	10,59,63,294	-12,71,560	1,46,65,054	9,00,26,681
95	9,00,26,681	1,27,38,775	1,55,44,957	8,72,20,500
96	8,72,20,500	-2,17,09,182	1,64,77,654	4,90,33,663
97	4,90,33,663	-26,33,108	1,74,66,313	2,89,34,242

CORPUS INVESTED MAINLY IN INDEX AND PARTIALLY ( 40% TO 50%) IN DEBT

REFERENCE age	STARTING CORPUS	RETURN IN A YR ( REF YR RETUN - 6%)	WITHDRAWAL 3.30% 1ST YR 6% INFLATION THERE AFTER	CORPUS AT END OF YR
61	9,00,00,000	-94,95,000	29,70,000	7,75,35,000
62	7,75,35,000	-1,89,41,801	31,48,200	5,54,45,000
63	5,54,45,000	2,53,43,909	33,37,092	7,74,51,817
64	7,74,51,817	94,02,651	35,37,318	8,33,17,150
65	8,33,17,150	2,36,53,739	37,49,557	10,32,21,332
66	10,32,21,332	9,16,29,576	39,74,530	19,08,76,379
67	19,08,76,379	5,27,20,056	42,13,002	23,93,83,433
68	23,93,83,433	6,16,41,234	44,65,782	29,65,58,885
69	29,65,58,885	2,16,48,799	47,33,729	31,34,73,954
70	31,34,73,954	-8,42,93,146	50,17,753	22,41,63,056
71	22,41,63,056	-1,65,20,817	53,18,818	20,23,23,421
72	20,23,23,421	1,25,84,517	56,37,947	20,92,69,991
73	20,92,69,991	-4,87,59,908	59,76,224	15,45,33,859
74	15,45,33,859	8,89,65,143	63,34,797	23,71,64,205
75	23,71,64,205	-7,61,29,710	67,14,885	15,43,19,611
76	15,43,19,611	-3,62,95,972	71,17,778	11,09,05,860
77	11,09,05,860	-21,73,755	75,44,845	10,11,87,261
78	10,11,87,261	6,70,16,323	79,97,535	16,02,06,049
79	16,02,06,049	90,03,580	84,77,387	16,07,32,241
80	16,07,32,241	5,57,74,088	89,86,031	20,75,20,299
81	20,75,20,299	8,47,09,786	95,25,192	28,27,04,892
82	28,27,04,892	11,16,96,703	1,00,96,704	38,43,04,891
83	38,43,04,891	-22,47,41,501	1,07,02,506	14,88,60,885
84	14,88,60,885	10,47,23,632	1,13,44,656	24,22,39,861
85	24,22,39,861	2,61,61,905	1,20,25,336	25,63,76,430
86	25,63,76,430	-7,90,40,853	1,27,46,856	16,45,88,720
87	16,45,88,720	3,15,84,575	1,35,11,667	18,26,61,629
88	18,26,61,629	38,72,427	1,43,22,367	17,22,11,688
89	17,22,11,688	4,14,68,574	1,51,81,709	19,84,98,552
90	19,84,98,552	-2,19,34,090	1,60,92,612	16,04,71,850
91	16,04,71,850	-67,71,912	1,70,58,169	13,66,41,770
92	13,66,41,770	3,01,43,174	1,80,81,659	14,87,03,285
93	14,87,03,285	9,96,312	1,91,66,558	13,05,33,039
94	13,05,33,039	1,01,68,524	2,03,16,552	12,03,85,010
95	12,03,85,010	1,15,56,961	2,15,35,545	11,04,06,426
96	11,04,06,426	1,73,22,768	2,28,27,678	10,49,01,517
97	10,49,01,517	-33,56,849	2,41,97,338	7,73,47,330
98	7,73,47,330	93,97,701	2,56,49,179	6,10,95,852
99	6,10,95,852	-1,64,28,674	2,71,88,129	1,74,79,048
100	1,74,79,048	-12,88,206	2,88,19,417	-1,26,28,575