

## **Chapter 24**

# **THE 345 RULE: BUILD A CONFIDENCE INTERVAL IN OUTLIVING YOUR RETIREMENT FUND**

# 24 THE 345 RULE: BUILD A CONFIDENCE INTERVAL IN OUTLIVING YOUR RETIREMENT FUND

## The 345 Rule

| Age | Year | nth year | Inflation Rate | Opening Investment Asset Balance | Retirement Expenses | % of expenses over asset | Investment Asset After Withdrawal | Investment Asset (Gain/Loss) | Investment Asset Expensed | Investment Asset Balance | Average Return Rate | Return Sum | Return Sum Reinvested | Additional Asset | Income | Closing Balance |
|-----|------|----------|----------------|----------------------------------|---------------------|--------------------------|-----------------------------------|------------------------------|---------------------------|--------------------------|---------------------|------------|-----------------------|------------------|--------|-----------------|
| 55  | 2013 | 0        |                | 7,63,792                         | 29,900              | 3.91%                    | 7,33,892                          |                              |                           | 7,33,892                 | 6.00%               | 44,034     | 44,034                |                  |        | 7,77,926        |
| 56  | 2014 | 1        | 3.20%          | 7,77,926                         | 30,850              | 3.97%                    | 7,47,076                          |                              |                           | 7,47,076                 | 6.00%               | 44,825     | 44,825                |                  |        | 7,91,900        |
| 57  | 2015 | 2        | 3.20%          | 7,91,900                         | 31,000              | 3.91%                    | 7,60,900                          |                              |                           | 7,60,900                 | 6.00%               | 45,654     | 45,654                |                  |        | 8,06,554        |
| 58  | 2016 | 3        | 3.20%          | 8,06,554                         | 31,500              | 3.91%                    | 7,75,054                          |                              |                           | 7,75,054                 | 6.00%               | 46,503     | 46,503                |                  |        | 8,21,558        |
| 59  | 2017 | 4        | 3.20%          | 8,21,558                         | 32,000              | 3.90%                    | 7,89,558                          |                              |                           | 7,89,558                 | 6.00%               | 47,373     | 47,373                |                  |        | 8,36,931        |
| 60  | 2018 | 5        | 3.20%          | 8,36,931                         | 33,000              | 3.94%                    | 8,03,931                          |                              |                           | 8,03,931                 | 6.00%               | 48,236     | 48,236                |                  |        | 8,52,167        |
| 61  | 2019 | 6        | 3.20%          | 8,52,167                         | 34,000              | 3.99%                    | 8,18,167                          |                              |                           | 8,18,167                 | 6.00%               | 49,090     | 49,090                |                  |        | 8,67,257        |
| 62  | 2020 | 7        | 3.20%          | 8,67,257                         | 34,000              | 3.92%                    | 8,33,257                          |                              |                           | 8,33,257                 | 6.00%               | 49,995     | 49,995                |                  |        | 8,83,252        |
| 63  | 2021 | 8        | 3.20%          | 8,83,252                         | 34,500              | 3.91%                    | 8,48,752                          |                              |                           | 8,48,752                 | 6.00%               | 50,925     | 50,925                |                  |        | 8,99,677        |
| 64  | 2022 | 9        | 3.20%          | 8,99,677                         | 35,500              | 3.95%                    | 8,64,177                          |                              |                           | 8,64,177                 | 6.00%               | 51,851     | 51,851                |                  |        | 9,16,028        |
| 65  | 2023 | 10       | 3.20%          | 9,16,028                         | 36,000              | 3.93%                    | 8,80,028                          |                              |                           | 8,80,028                 | 6.00%               | 52,802     | 52,802                |                  |        | 9,32,830        |
| 66  | 2024 | 11       | 3.20%          | 9,32,830                         | 36,500              | 3.91%                    | 8,96,330                          |                              |                           | 8,96,330                 | 6.00%               | 53,780     | 53,780                |                  |        | 9,50,109        |
| 67  | 2025 | 12       | 3.20%          | 9,50,109                         | 37,500              | 3.95%                    | 9,12,609                          |                              |                           | 9,12,609                 | 6.00%               | 54,757     | 54,757                |                  |        | 9,67,366        |
| 68  | 2026 | 13       | 3.20%          | 9,67,366                         | 38,000              | 3.93%                    | 9,29,366                          |                              |                           | 9,29,366                 | 6.00%               | 55,762     | 55,762                |                  |        | 9,85,128        |
| 69  | 2027 | 14       | 3.20%          | 9,85,128                         | 38,500              | 3.91%                    | 9,46,628                          |                              |                           | 9,46,628                 | 6.00%               | 56,798     | 56,798                |                  |        | 10,03,426       |
| 70  | 2028 | 15       | 3.20%          | 10,03,426                        | 39,000              | 3.89%                    | 9,64,426                          |                              |                           | 9,64,426                 | 6.00%               | 57,866     | 57,866                |                  |        | 10,22,291       |
| 71  | 2029 | 16       | 3.20%          | 10,22,291                        | 40,000              | 3.91%                    | 9,82,291                          |                              |                           | 9,82,291                 | 6.00%               | 58,937     | 58,937                |                  |        | 10,41,229       |
| 72  | 2030 | 17       | 3.20%          | 10,41,229                        | 41,000              | 3.94%                    | 10,00,229                         |                              |                           | 10,00,229                | 6.00%               | 60,014     | 60,014                |                  |        | 10,60,242       |
| 73  | 2031 | 18       | 3.20%          | 10,60,242                        | 42,000              | 3.96%                    | 10,18,242                         |                              |                           | 10,18,242                | 6.00%               | 61,095     | 61,095                |                  |        | 10,79,337       |
| 74  | 2032 | 19       | 3.20%          | 10,79,337                        | 43,000              | 3.98%                    | 10,36,337                         |                              |                           | 10,36,337                | 6.00%               | 62,180     | 62,180                |                  |        | 10,98,517       |
| 75  | 2033 | 20       | 3.20%          | 10,98,517                        | 43,800              | 3.99%                    | 10,54,717                         |                              |                           | 10,54,717                | 6.00%               | 63,283     | 63,283                |                  |        | 11,18,000       |
| 76  | 2034 | 21       | 3.20%          | 11,18,000                        | 44,600              | 3.99%                    | 10,73,400                         |                              |                           | 10,73,400                | 6.00%               | 64,404     | 64,404                |                  |        | 11,37,804       |
| 77  | 2035 | 22       | 3.20%          | 11,37,804                        | 45,000              | 3.95%                    | 10,92,804                         |                              |                           | 10,92,804                | 6.00%               | 65,568     | 65,568                |                  |        | 11,58,372       |
| 78  | 2036 | 23       | 3.20%          | 11,58,372                        | 46,000              | 3.97%                    | 11,12,372                         |                              |                           | 11,12,372                | 6.00%               | 66,742     | 66,742                |                  |        | 11,79,115       |
| 79  | 2037 | 24       | 3.20%          | 11,79,115                        | 47,000              | 3.99%                    | 11,32,115                         |                              |                           | 11,32,115                | 6.00%               | 67,927     | 67,927                |                  |        | 12,00,042       |
| 80  | 2038 | 25       | 3.20%          | 12,00,042                        | 47,800              | 3.98%                    | 11,52,242                         |                              |                           | 11,52,242                | 6.00%               | 69,135     | 69,135                |                  |        | 12,21,376       |
| 81  | 2039 | 26       | 3.20%          | 12,21,376                        | 48,700              | 3.99%                    | 11,72,676                         |                              |                           | 11,72,676                | 6.00%               | 70,361     | 70,361                |                  |        | 12,43,037       |
| 82  | 2040 | 27       | 3.20%          | 12,43,037                        | 49,500              | 3.98%                    | 11,93,537                         |                              |                           | 11,93,537                | 6.00%               | 71,612     | 71,612                |                  |        | 12,65,149       |
| 83  | 2041 | 28       | 3.20%          | 12,65,149                        | 50,500              | 3.99%                    | 12,14,649                         |                              |                           | 12,14,649                | 6.00%               | 72,879     | 72,879                |                  |        | 12,87,528       |
| 84  | 2042 | 29       | 3.20%          | 12,87,528                        | 51,200              | 3.98%                    | 12,36,328                         |                              |                           | 12,36,328                | 6.00%               | 74,180     | 74,180                |                  |        | 13,10,508       |
| 85  | 2043 | 30       | 3.20%          | 13,10,508                        | 52,200              | 3.98%                    | 12,58,308                         |                              |                           | 12,58,308                | 6.00%               | 75,498     | 75,498                |                  |        | 13,33,806       |
| 86  | 2044 | 31       | 3.20%          | 13,33,806                        | 53,200              | 3.99%                    | 12,80,606                         |                              |                           | 12,80,606                | 6.00%               | 76,836     | 76,836                |                  |        | 13,57,442       |
| 87  | 2045 | 32       | 3.20%          | 13,57,442                        | 54,000              | 3.98%                    | 13,03,442                         |                              |                           | 13,03,442                | 6.00%               | 78,207     | 78,207                |                  |        | 13,81,649       |
| 88  | 2046 | 33       | 3.20%          | 13,81,649                        | 54,200              | 3.92%                    | 13,27,449                         |                              |                           | 13,27,449                | 6.00%               | 79,647     | 79,647                |                  |        | 14,07,096       |
| 89  | 2047 | 34       | 3.20%          | 14,07,096                        | 56,000              | 3.98%                    | 13,51,096                         |                              |                           | 13,51,096                | 6.00%               | 81,066     | 81,066                |                  |        | 14,32,162       |
| 90  | 2048 | 35       | 3.20%          | 14,32,162                        | 57,000              | 3.98%                    | 13,75,162                         |                              |                           | 13,75,162                | 6.00%               | 82,510     | 82,510                |                  |        | 14,57,871       |
| 91  | 2049 | 36       | 3.20%          | 14,57,871                        | 58,000              | 3.98%                    | 13,99,871                         |                              |                           | 13,99,871                | 6.00%               | 83,980     | 83,980                |                  |        | 14,83,652       |
| 92  | 2050 | 37       | 3.20%          | 14,83,652                        | 59,000              | 3.98%                    | 14,24,652                         |                              |                           | 14,24,652                | 6.00%               | 85,479     | 85,479                |                  |        | 15,10,131       |
| 93  | 2051 | 38       | 3.20%          | 15,10,131                        | 60,000              | 3.97%                    | 14,50,131                         |                              |                           | 14,50,131                | 6.00%               | 87,008     | 87,008                |                  |        | 15,37,139       |
| 94  | 2052 | 39       | 3.20%          | 15,37,139                        | 61,000              | 3.97%                    | 14,76,139                         |                              |                           | 14,76,139                | 6.00%               | 88,568     | 88,568                |                  |        | 15,64,707       |
| 95  | 2053 | 40       | 3.20%          | 15,64,707                        | 61,800              | 3.95%                    | 15,02,907                         |                              |                           | 15,02,907                | 6.00%               | 90,174     | 90,174                |                  |        | 15,93,081       |
| 96  | 2054 | 41       | 3.20%          | 15,93,081                        | 62,000              | 3.89%                    | 15,31,081                         |                              |                           | 15,31,081                | 6.00%               | 91,865     | 91,865                |                  |        | 16,22,946       |
| 97  | 2055 | 42       | 3.20%          | 16,22,946                        | 64,000              | 3.94%                    | 15,58,946                         |                              |                           | 15,58,946                | 6.00%               | 93,537     | 93,537                |                  |        | 16,52,483       |
| 98  | 2056 | 43       | 3.20%          | 16,52,483                        | 65,000              | 3.93%                    | 15,87,483                         |                              |                           | 15,87,483                | 6.00%               | 95,249     | 95,249                |                  |        | 16,82,732       |
| 99  | 2057 | 44       | 3.20%          | 16,82,732                        | 66,500              | 3.95%                    | 16,16,232                         |                              |                           | 16,16,232                | 6.00%               | 96,974     | 96,974                |                  |        | 17,13,206       |
| 100 | 2058 | 45       | 3.20%          | 17,13,206                        | 68,000              | 3.97%                    | 16,45,206                         |                              |                           | 16,45,206                | 6.00%               | 98,712     | 98,712                |                  |        | 17,43,918       |

The % of expenses over asset has been under 4%. The balance has not turned negative yet.

- Observations**
1. The 4 percent withdrawal rule states that if you never spend more than 4% of the investment asset balance each year, then you have a lower risk of running out of money. Observe that the balance will not turn negative even after the year 2058. So, if you follow the 4% rule, then you have a lower risk of running out of your money.
  2. In this particular sheet, annual retirement expenses have been assumed in such a way that it remains under 4% of the investment asset balance each year. In sheet 3 and sheet 4, we have assumed that our retirement expenses increases with the rate of inflation of 3.2% each year.
  3. It is advisable to go through each cells and all the four sheets to understand the

The 4 percent withdrawal rule states that if you never spend more than 4 percent of the investment asset balance or your retirement asset balance every year then you increase the art of living your retirement life with a lower risk of running out of money. This is just a guideline and not exactly a rule although it says a 4 percent golden rule. In the 4 percent withdrawal rule, first thing is to show you the difference of how this makes. Now before going through this excel sheet, this is the exact computation we have by following the inflation rule where it will increase our retirement asset balance by 3.2 percent. So this is what we have demonstrated that increases things exponentially. And the thing is if you add in one more column over here you can see exactly how many percents of the retirement expenses over your opening investment asset balance. If you retire at age 55 and age of 65, 10 years

after your retirement according to what we have already is about thirty-nine thousand a month which you divide by 12 because it is annual. So at the age of 65 because of increases in inflation that are already like 4.3 percent of your retirement asset balance and as the years go by to the age of hundred, at the late years of your retirement you'll be withdrawing so much money as up to 5 percent of your retirement asset balance. If you compare you have the same opening balance. But the difference is now instead of increasing this amount with inflation. You adjust the expenses without following the 3.2 percent inflation. If you haven't realized that already that may mean you are gradually reducing your lifestyle. And manifest that every time it is. Your entire retirement asset affects just by your one financial decision and the ultimate decision-maker is you whether which rule you want to follow.

There is no formula to say that my expenses will increase in tandem with inflation compared to the previous year. So now I get the values over here is that I randomly check in those values many of the time, it is just a simulation case. In this excel sheet, I put in all the expenses figures so that at any given year my retirement expenses are no more than 4 percent of the remaining asset balance of the opening investment asset balance. If you see this column K over here and see this goes from it ranges from 3.9 percent to about slightly more than 4 percent. So now see what happens when you live up to 100 years you still have a balance of about 1.7 million. This all is investment returns and everything is assumed constant. Last time increase the expenses as per the inflation rate which has been constant for the next 30-40 years at 3.2 percent. At the age of a hundred, your investment closing balance is dwindling. Look at this closing balance column. It looks much better. At the age of seventy, it never drops even below 1 million.

| Age | Year | nth year | Inflation Rate | Opening Investment Asset | Retirement Expenses | % of expenses over asset | Investment Asset After Withdrawal | Investment Asset (Gain/Loss) | Investment Asset Expensed | Investment Asset Balance | Average Return Rate | Return Sum | Return Sum Reinvested | Additional Asset | Income | Closing Balance |
|-----|------|----------|----------------|--------------------------|---------------------|--------------------------|-----------------------------------|------------------------------|---------------------------|--------------------------|---------------------|------------|-----------------------|------------------|--------|-----------------|
| 55  | 2013 | 0        |                | 7,63,792                 | 29,900              | 3.91%                    | 7,33,892                          |                              |                           | 7,33,892                 | 6.00%               | 44,034     | 44,034                |                  |        | 7,77,926        |
| 56  | 2014 | 1        | 3.20%          | 7,77,926                 | 30,850              | 3.97%                    | 7,47,076                          |                              |                           | 7,47,076                 | 6.00%               | 44,825     | 44,825                |                  |        | 7,91,900        |
| 57  | 2015 | 2        | 3.20%          | 7,91,900                 | 31,000              | 3.91%                    | 7,60,900                          |                              |                           | 7,60,900                 | 6.00%               | 45,654     | 45,654                |                  |        | 8,06,554        |
| 58  | 2016 | 3        | 3.20%          | 8,06,554                 | 31,500              | 3.91%                    | 7,75,054                          |                              |                           | 7,75,054                 | 6.00%               | 46,503     | 46,503                |                  |        | 8,21,558        |
| 59  | 2017 | 4        | 3.20%          | 8,21,558                 | 32,000              | 3.90%                    | 7,89,558                          |                              |                           | 7,89,558                 | 6.00%               | 47,373     | 47,373                |                  |        | 8,36,931        |
| 60  | 2018 | 5        | 3.20%          | 8,36,931                 | 33,000              | 3.94%                    | 8,03,931                          | -2,00,000                    |                           | 6,03,931                 | 6.00%               | 36,236     | 36,236                |                  |        | 6,40,167        |
| 61  | 2019 | 6        | 3.20%          | 6,40,167                 | 34,000              | 5.31%                    | 6,06,167                          |                              |                           | 6,06,167                 | 6.00%               | 36,370     | 36,370                |                  |        | 6,42,537        |
| 62  | 2020 | 7        | 3.20%          | 6,42,537                 | 34,000              | 5.29%                    | 6,08,537                          |                              |                           | 6,08,537                 | 6.00%               | 36,512     | 36,512                |                  |        | 6,45,049        |
| 63  | 2021 | 8        | 3.20%          | 6,45,049                 | 34,500              | 5.35%                    | 6,10,549                          |                              |                           | 6,10,549                 | 6.00%               | 36,633     | 36,633                |                  |        | 6,47,182        |
| 64  | 2022 | 9        | 3.20%          | 6,47,182                 | 35,500              | 5.49%                    | 6,11,682                          |                              |                           | 6,11,682                 | 6.00%               | 36,701     | 36,701                |                  |        | 6,48,383        |
| 65  | 2023 | 10       | 3.20%          | 6,48,383                 | 36,000              | 5.55%                    | 6,12,383                          |                              |                           | 6,12,383                 | 6.00%               | 36,743     | 36,743                |                  |        | 6,49,126        |
| 66  | 2024 | 11       | 3.20%          | 6,49,126                 | 36,500              | 5.62%                    | 6,12,626                          |                              |                           | 6,12,626                 | 6.00%               | 36,758     | 36,758                |                  |        | 6,49,383        |
| 67  | 2025 | 12       | 3.20%          | 6,49,383                 | 37,500              | 5.77%                    | 6,11,883                          |                              |                           | 6,11,883                 | 6.00%               | 36,713     | 36,713                |                  |        | 6,48,596        |
| 68  | 2026 | 13       | 3.20%          | 6,48,596                 | 38,000              | 5.86%                    | 6,10,596                          |                              |                           | 6,10,596                 | 6.00%               | 36,636     | 36,636                |                  |        | 6,47,232        |
| 69  | 2027 | 14       | 3.20%          | 6,47,232                 | 38,500              | 5.95%                    | 6,08,732                          |                              |                           | 6,08,732                 | 6.00%               | 36,524     | 36,524                |                  |        | 6,45,256        |
| 70  | 2028 | 15       | 3.20%          | 6,45,256                 | 39,000              | 6.04%                    | 6,06,256                          |                              |                           | 6,06,256                 | 6.00%               | 36,375     | 36,375                |                  |        | 6,42,632        |
| 71  | 2029 | 16       | 3.20%          | 6,42,632                 | 40,000              | 6.22%                    | 6,02,632                          |                              |                           | 6,02,632                 | 6.00%               | 36,158     | 36,158                |                  |        | 6,38,789        |
| 72  | 2030 | 17       | 3.20%          | 6,38,789                 | 41,000              | 6.42%                    | 5,97,789                          |                              |                           | 5,97,789                 | 6.00%               | 35,867     | 35,867                |                  |        | 6,33,657        |
| 73  | 2031 | 18       | 3.20%          | 6,33,657                 | 42,000              | 6.63%                    | 5,91,657                          |                              |                           | 5,91,657                 | 6.00%               | 35,499     | 35,499                |                  |        | 6,27,156        |
| 74  | 2032 | 19       | 3.20%          | 6,27,156                 | 43,000              | 6.86%                    | 5,84,156                          |                              |                           | 5,84,156                 | 6.00%               | 35,049     | 35,049                |                  |        | 6,19,206        |
| 75  | 2033 | 20       | 3.20%          | 6,19,206                 | 44,000              | 7.11%                    | 5,75,206                          |                              |                           | 5,75,206                 | 6.00%               | 34,512     | 34,512                |                  |        | 6,09,718        |
| 76  | 2034 | 21       | 3.20%          | 6,09,718                 | 45,000              | 7.38%                    | 5,64,718                          |                              |                           | 5,64,718                 | 6.00%               | 33,883     | 33,883                |                  |        | 5,98,601        |
| 77  | 2035 | 22       | 3.20%          | 5,98,601                 | 45,000              | 7.52%                    | 5,53,601                          |                              |                           | 5,53,601                 | 6.00%               | 33,216     | 33,216                |                  |        | 5,86,817        |
| 78  | 2036 | 23       | 3.20%          | 5,86,817                 | 46,000              | 7.84%                    | 5,40,817                          |                              |                           | 5,40,817                 | 6.00%               | 32,449     | 32,449                |                  |        | 5,73,266        |
| 79  | 2037 | 24       | 3.20%          | 5,73,266                 | 47,000              | 8.20%                    | 5,26,266                          |                              |                           | 5,26,266                 | 6.00%               | 31,576     | 31,576                |                  |        | 5,57,842        |
| 80  | 2038 | 25       | 3.20%          | 5,57,842                 | 48,000              | 8.60%                    | 5,09,842                          |                              |                           | 5,09,842                 | 6.00%               | 30,591     | 30,591                |                  |        | 5,40,433        |
| 81  | 2039 | 26       | 3.20%          | 5,40,433                 | 49,000              | 9.07%                    | 4,91,433                          |                              |                           | 4,91,433                 | 6.00%               | 29,486     | 29,486                |                  |        | 5,20,918        |
| 82  | 2040 | 27       | 3.20%          | 5,20,918                 | 50,000              | 9.60%                    | 4,70,918                          |                              |                           | 4,70,918                 | 6.00%               | 28,255     | 28,255                |                  |        | 4,99,174        |
| 83  | 2041 | 28       | 3.20%          | 4,99,174                 | 51,000              | 10.22%                   | 4,48,174                          |                              |                           | 4,48,174                 | 6.00%               | 26,890     | 26,890                |                  |        | 4,75,064        |
| 84  | 2042 | 29       | 3.20%          | 4,75,064                 | 52,000              | 10.95%                   | 4,23,064                          |                              |                           | 4,23,064                 | 6.00%               | 25,384     | 25,384                |                  |        | 4,48,448        |
| 85  | 2043 | 30       | 3.20%          | 4,48,448                 | 53,000              | 11.82%                   | 3,95,448                          |                              |                           | 3,95,448                 | 6.00%               | 23,727     | 23,727                |                  |        | 4,19,175        |
| 86  | 2044 | 31       | 3.20%          | 4,19,175                 | 54,000              | 12.88%                   | 3,65,175                          |                              |                           | 3,65,175                 | 6.00%               | 21,910     | 21,910                |                  |        | 3,87,085        |
| 87  | 2045 | 32       | 3.20%          | 3,87,085                 | 55,000              | 14.21%                   | 3,32,085                          |                              |                           | 3,32,085                 | 6.00%               | 19,925     | 19,925                |                  |        | 3,52,010        |
| 88  | 2046 | 33       | 3.20%          | 3,52,010                 | 56,000              | 15.91%                   | 2,96,010                          |                              |                           | 2,96,010                 | 6.00%               | 17,761     | 17,761                |                  |        | 3,13,771        |
| 89  | 2047 | 34       | 3.20%          | 3,13,771                 | 57,000              | 18.17%                   | 2,56,771                          |                              |                           | 2,56,771                 | 6.00%               | 15,406     | 15,406                |                  |        | 2,72,177        |
| 90  | 2048 | 35       | 3.20%          | 2,72,177                 | 57,000              | 20.94%                   | 2,15,177                          |                              |                           | 2,15,177                 | 6.00%               | 12,911     | 12,911                |                  |        | 2,28,088        |
| 91  | 2049 | 36       | 3.20%          | 2,28,088                 | 58,000              | 25.43%                   | 1,70,088                          |                              |                           | 1,70,088                 | 6.00%               | 10,205     | 10,205                |                  |        | 1,80,293        |
| 92  | 2050 | 37       | 3.20%          | 1,80,293                 | 59,000              | 32.72%                   | 1,21,293                          |                              |                           | 1,21,293                 | 6.00%               | 7,278      | 7,278                 |                  |        | 1,28,571        |
| 93  | 2051 | 38       | 3.20%          | 1,28,571                 | 60,000              | 46.67%                   | 68,571                            |                              |                           | 68,571                   | 6.00%               | 4,114      | 4,114                 |                  |        | 72,685          |
| 94  | 2052 | 39       | 3.20%          | 72,685                   | 61,000              | 83.92%                   | 11,685                            |                              |                           | 11,685                   | 6.00%               | 0,701      | 0,701                 |                  |        | 12,386          |
| 95  | 2053 | 40       | 3.20%          | 12,386                   | 61,000              | 492.49%                  | -48,614                           |                              |                           | -48,614                  | 6.00%               | -2,917     | -2,917                |                  |        | -31,533         |
| 96  | 2054 | 41       | 3.20%          | -51,531                  | 62,000              | -120.32%                 | -1,13,531                         |                              |                           | -1,13,531                | 6.00%               | -6,812     | -6,812                |                  |        | -1,20,343       |
| 97  | 2055 | 42       | 3.20%          | -1,20,343                | 63,000              | -52.35%                  | -1,83,343                         |                              |                           | -1,83,343                | 6.00%               | -11,001    | -11,001               |                  |        | -1,94,343       |
| 98  | 2056 | 43       | 3.20%          | -1,94,343                | 64,000              | -32.93%                  | -2,58,343                         |                              |                           | -2,58,343                | 6.00%               | -15,501    | -15,501               |                  |        | -2,73,844       |
| 99  | 2057 | 44       | 3.20%          | -2,73,844                | 65,000              | -23.74%                  | -3,38,844                         |                              |                           | -3,38,844                | 6.00%               | -20,331    | -20,331               |                  |        | -3,59,174       |
| 100 | 2058 | 45       | 3.20%          | -3,59,174                | 66,000              | -18.38%                  | -4,25,174                         |                              |                           | -4,25,174                | 6.00%               | -25,510    | -25,510               |                  |        | -4,50,684       |

Observe that the balance has turned negative in year 2053.

#### Observations

1. In this sheet, we have assumed a one-time expense of \$2,00,000 in year 2018. This one-time expense reduces our investment balance (shown in row H) for further years and our % of expenses over asset goes above 4%. Because of this one-time expense, our investment balance has turned negative in year 2053.

See the highlights over here, before you're 65 years old from the age of 55 until let's say 65 for the first 10 years of your retirement which are critical, in this 4 percent safe withdrawal rule will apply and that's about like a maximum of about 35 thousand per year. Compare this to what happened there like 64 - 65 years old if you were to increase your retirement expenses as per the inflation rate. At 64 years of age, you withdraw like 38,000 a year. So about thirty-eight thousand a year compared to about 35,000 a year. So in a year in terms of per annum that is just a difference of about slightly more than 3000. When it is an annual difference of about 3000, divide it by 12 that is only about like 250 a month. So just by using 200 less a month for the first 10 years of your retirement makes quite a lot different although in the early years you would compare apples to apples, it is not that much but you have to use this retirement expenses increase with the inflation rate. At the age of 70, retirement balloons up and that is up to like 4.8 percent of your retirement asset balance at 46000. Compare that to the second 4 percent safe withdrawal method. At the age of 70, you are just withdrawing probably around 39000 or what about even if it is 40000, still above 4 percent. So at the age of 70, if you withdraw 40,000 compare to this you withdraw forty-six thousand, that's a six thousand difference a year. And that transacts about 500 more a month makes a whole lot of difference. There is a myth that the retiree needs to spend more in the later years of their retirement.

At 70 years you may have much less energy. It's realistic and not surprising. I mean if you spent less than the early years of retirement instead of spending more. That is why if you were to ask me this 4 percent safe withdrawal rule makes sense. You do spend more even if you were to use this 4 percent rule, compare to 65 or 70 years you spend more but not significantly more. At age of 70 years, 46000 a year of spending is equivalent to about 3.8 thousand a year of spending. And if you see about 40000 years of spending per month it's about 3.5 thousand years of spending and they have a difference of about 500. So I don't think at the age of 70 you are equally healthy or spending less than five hundred a month is something a person can live with. So this the difference between the methods used and the other point is that one can go to 3 and 5 percent golden rule. How about a 3 percent golden rule is the fact that let's say at the age of 60 years old assuming that you lose an amount of money in a bad investment in a stock market crash, invest it in a bad stock and go bankrupt. Assuming that in retirement asset you lose like 200000, i.e., (200000) over here and how does this compute.



| Age | Year | nth year | Inflation Rate | Opening Investment Asset | Retirement Expenses | % of expenses over asset | Investment Asset After Withdrawal | Investment Asset (Gain/Loss) | Investment Asset Expensed | Investment Asset Balance | Average Return Rate | Return Sum | Return Sum Reinvested | Additional Asset | Income | Closing Balance |
|-----|------|----------|----------------|--------------------------|---------------------|--------------------------|-----------------------------------|------------------------------|---------------------------|--------------------------|---------------------|------------|-----------------------|------------------|--------|-----------------|
| 55  | 2013 | 0        |                | 7,63,792                 | 29,900              | 3.91%                    | 7,33,892                          |                              |                           | 7,33,892                 | 6.00%               | 44,034     | 44,034                |                  |        | 7,77,926        |
| 56  | 2014 | 1        | 3.20%          | 7,77,926                 | 30,857              | 3.97%                    | 7,47,069                          |                              |                           | 7,47,069                 | 6.00%               | 44,824     | 44,824                |                  |        | 7,91,893        |
| 57  | 2015 | 2        | 3.20%          | 7,91,893                 | 31,844              | 4.02%                    | 7,60,049                          |                              |                           | 7,60,049                 | 6.00%               | 45,603     | 45,603                |                  |        | 8,05,652        |
| 58  | 2016 | 3        | 3.20%          | 8,05,652                 | 32,863              | 4.08%                    | 7,72,789                          |                              |                           | 7,72,789                 | 6.00%               | 46,367     | 46,367                |                  |        | 8,19,156        |
| 59  | 2017 | 4        | 3.20%          | 8,19,156                 | 33,915              | 4.14%                    | 7,85,241                          |                              |                           | 7,85,241                 | 6.00%               | 47,114     | 47,114                |                  |        | 8,32,355        |
| 60  | 2018 | 5        | 3.20%          | 8,32,355                 | 35,000              | 4.20%                    | 7,97,355                          |                              |                           | 7,97,355                 | 6.00%               | 47,841     | 47,841                |                  |        | 8,45,197        |
| 61  | 2019 | 6        | 3.20%          | 8,45,197                 | 36,120              | 4.27%                    | 8,09,076                          |                              |                           | 8,09,076                 | 6.00%               | 48,545     | 48,545                |                  |        | 8,57,621        |
| 62  | 2020 | 7        | 3.20%          | 8,57,621                 | 37,276              | 4.35%                    | 8,20,345                          |                              |                           | 8,20,345                 | 6.00%               | 49,221     | 49,221                |                  |        | 8,69,566        |
| 63  | 2021 | 8        | 3.20%          | 8,69,566                 | 38,469              | 4.42%                    | 8,31,097                          |                              |                           | 8,31,097                 | 6.00%               | 49,866     | 49,866                |                  |        | 8,80,983        |
| 64  | 2022 | 9        | 3.20%          | 8,80,983                 | 39,700              | 4.51%                    | 8,41,263                          |                              |                           | 8,41,263                 | 6.00%               | 50,476     | 50,476                |                  |        | 8,91,739        |
| 65  | 2023 | 10       | 3.20%          | 8,91,739                 | 40,970              | 4.59%                    | 8,50,769                          |                              |                           | 8,50,769                 | 6.00%               | 51,046     | 51,046                |                  |        | 9,01,815        |
| 66  | 2024 | 11       | 3.20%          | 9,01,815                 | 42,281              | 4.69%                    | 8,59,533                          |                              |                           | 8,59,533                 | 6.00%               | 51,572     | 51,572                |                  |        | 9,11,105        |
| 67  | 2025 | 12       | 3.20%          | 9,11,105                 | 43,634              | 4.79%                    | 8,67,471                          |                              |                           | 8,67,471                 | 6.00%               | 52,048     | 52,048                |                  |        | 9,19,519        |
| 68  | 2026 | 13       | 3.20%          | 9,19,519                 | 45,031              | 4.90%                    | 8,74,489                          |                              |                           | 8,74,489                 | 6.00%               | 52,469     | 52,469                |                  |        | 9,26,958        |
| 69  | 2027 | 14       | 3.20%          | 9,26,958                 | 46,472              | 5.01%                    | 8,80,487                          |                              |                           | 8,80,487                 | 6.00%               | 52,829     | 52,829                |                  |        | 9,33,316        |
| 70  | 2028 | 15       | 3.20%          | 9,33,316                 | 47,959              | 5.14%                    | 8,85,357                          |                              |                           | 8,85,357                 | 6.00%               | 53,121     | 53,121                |                  |        | 9,38,479        |
| 71  | 2029 | 16       | 3.20%          | 9,38,479                 | 49,493              | 5.27%                    | 8,88,985                          |                              |                           | 8,88,985                 | 6.00%               | 53,339     | 53,339                |                  |        | 9,42,325        |
| 72  | 2030 | 17       | 3.20%          | 9,42,325                 | 51,077              | 5.42%                    | 8,91,247                          |                              |                           | 8,91,247                 | 6.00%               | 53,475     | 53,475                |                  |        | 9,44,722        |
| 73  | 2031 | 18       | 3.20%          | 9,44,722                 | 52,712              | 5.58%                    | 8,92,011                          |                              |                           | 8,92,011                 | 6.00%               | 53,521     | 53,521                |                  |        | 9,45,531        |
| 74  | 2032 | 19       | 3.20%          | 9,45,531                 | 54,398              | 5.75%                    | 8,91,133                          |                              |                           | 8,91,133                 | 6.00%               | 53,468     | 53,468                |                  |        | 9,44,601        |
| 75  | 2033 | 20       | 3.20%          | 9,44,601                 | 56,139              | 5.94%                    | 8,88,462                          |                              |                           | 8,88,462                 | 6.00%               | 53,308     | 53,308                |                  |        | 9,41,770        |
| 76  | 2034 | 21       | 3.20%          | 9,41,770                 | 57,936              | 6.15%                    | 8,83,834                          |                              |                           | 8,83,834                 | 6.00%               | 53,030     | 53,030                |                  |        | 9,36,864        |
| 77  | 2035 | 22       | 3.20%          | 9,36,864                 | 59,789              | 6.38%                    | 8,77,075                          |                              |                           | 8,77,075                 | 6.00%               | 52,624     | 52,624                |                  |        | 9,29,899        |
| 78  | 2036 | 23       | 3.20%          | 9,29,899                 | 61,703              | 6.64%                    | 8,67,997                          |                              |                           | 8,67,997                 | 6.00%               | 52,080     | 52,080                |                  |        | 9,20,076        |
| 79  | 2037 | 24       | 3.20%          | 9,20,076                 | 63,677              | 6.92%                    | 8,56,399                          |                              |                           | 8,56,399                 | 6.00%               | 51,384     | 51,384                |                  |        | 9,07,783        |
| 80  | 2038 | 25       | 3.20%          | 9,07,783                 | 65,715              | 7.24%                    | 8,42,068                          |                              |                           | 8,42,068                 | 6.00%               | 50,524     | 50,524                |                  |        | 8,92,592        |
| 81  | 2039 | 26       | 3.20%          | 8,92,592                 | 67,818              | 7.60%                    | 8,24,775                          |                              |                           | 8,24,775                 | 6.00%               | 49,486     | 49,486                |                  |        | 8,74,261        |
| 82  | 2040 | 27       | 3.20%          | 8,74,261                 | 69,988              | 8.01%                    | 8,04,273                          |                              |                           | 8,04,273                 | 6.00%               | 48,256     | 48,256                |                  |        | 8,52,530        |
| 83  | 2041 | 28       | 3.20%          | 8,52,530                 | 72,228              | 8.47%                    | 7,80,302                          |                              |                           | 7,80,302                 | 6.00%               | 46,818     | 46,818                |                  |        | 8,27,120        |
| 84  | 2042 | 29       | 3.20%          | 8,27,120                 | 74,539              | 9.01%                    | 7,52,581                          |                              |                           | 7,52,581                 | 6.00%               | 45,155     | 45,155                |                  |        | 7,97,736        |
| 85  | 2043 | 30       | 3.20%          | 7,97,736                 | 76,924              | 9.64%                    | 7,20,812                          |                              |                           | 7,20,812                 | 6.00%               | 43,249     | 43,249                |                  |        | 7,64,061        |
| 86  | 2044 | 31       | 3.20%          | 7,64,061                 | 79,366              | 10.39%                   | 6,84,675                          |                              |                           | 6,84,675                 | 6.00%               | 41,081     | 41,081                |                  |        | 7,25,756        |
| 87  | 2045 | 32       | 3.20%          | 7,25,756                 | 81,926              | 11.29%                   | 6,43,830                          |                              |                           | 6,43,830                 | 6.00%               | 38,630     | 38,630                |                  |        | 6,82,460        |
| 88  | 2046 | 33       | 3.20%          | 6,82,460                 | 84,548              | 12.39%                   | 5,97,912                          |                              |                           | 5,97,912                 | 6.00%               | 35,875     | 35,875                |                  |        | 6,33,787        |
| 89  | 2047 | 34       | 3.20%          | 6,33,787                 | 87,253              | 13.77%                   | 5,46,534                          |                              |                           | 5,46,534                 | 6.00%               | 32,792     | 32,792                |                  |        | 5,79,326        |
| 90  | 2048 | 35       | 3.20%          | 5,79,326                 | 90,045              | 15.54%                   | 4,89,281                          |                              |                           | 4,89,281                 | 6.00%               | 29,357     | 29,357                |                  |        | 5,18,638        |
| 91  | 2049 | 36       | 3.20%          | 5,18,638                 | 92,927              | 17.92%                   | 4,25,711                          |                              |                           | 4,25,711                 | 6.00%               | 25,543     | 25,543                |                  |        | 4,51,254        |
| 92  | 2050 | 37       | 3.20%          | 4,51,254                 | 95,900              | 21.25%                   | 3,55,353                          |                              |                           | 3,55,353                 | 6.00%               | 21,321     | 21,321                |                  |        | 3,76,674        |
| 93  | 2051 | 38       | 3.20%          | 3,76,674                 | 98,969              | 26.27%                   | 2,77,705                          |                              |                           | 2,77,705                 | 6.00%               | 16,662     | 16,662                |                  |        | 2,94,368        |
| 94  | 2052 | 39       | 3.20%          | 2,94,368                 | 1,02,136            | 34.70%                   | 1,92,231                          |                              |                           | 1,92,231                 | 6.00%               | 11,534     | 11,534                |                  |        | 2,03,765        |
| 95  | 2053 | 40       | 3.20%          | 2,03,765                 | 1,05,404            | 51.73%                   | 98,361                            |                              |                           | 98,361                   | 6.00%               | 5,902      | 5,902                 |                  |        | 1,04,263        |
| 96  | 2054 | 41       | 3.20%          | 1,04,263                 | 1,08,777            | 104.33%                  | -8,515                            |                              |                           | -8,515                   | 6.00%               | -0,271     | -0,271                |                  |        | -7,243          |
| 97  | 2055 | 42       | 3.20%          | -4,786                   | 1,12,258            | -2345.66%                | -1,17,044                         |                              |                           | -1,17,044                | 6.00%               | -7,023     | -7,023                |                  |        | -1,24,067       |
| 98  | 2056 | 43       | 3.20%          | -1,24,067                | 1,15,851            | -93.38%                  | -3,39,917                         |                              |                           | -3,39,917                | 6.00%               | -14,395    | -14,395               |                  |        | -3,54,312       |
| 99  | 2057 | 44       | 3.20%          | -2,54,312                | 1,19,558            | -47.01%                  | -3,73,870                         |                              |                           | -3,73,870                | 6.00%               | -22,432    | -22,432               |                  |        | -3,96,302       |
| 100 | 2058 | 45       | 3.20%          | -3,96,302                | 1,23,384            | -31.13%                  | -5,19,686                         |                              |                           | -5,19,686                | 6.00%               | -31,181    | -31,181               |                  |        | -5,50,867       |

Observe that the balance has turned negative in year 2054.

#### Observations

- In this sheet, we have assumed that our retirement expenses increases with the rate of inflation of 3.2% each year and we have no one-time expenses or gains.
- Observe that the % of expenses over asset has gone above 4% in year 2015 and the investment balance has turned negative (there has been a shortfall in retirement corpus) in year 2054. This is because of the consistent rise in our retirement expenses.

So if you were to blindly increase expenses using this 4 percent rule, your retirement asset balance will change and you would have a deficit over here already (closing balance is in red cells over here). And the fact is if you suffer some monetary loss like this you could reduce your expenses probably for a few years just to recover what you have already lost so that you can still increase your odds of not running out of money. To continue with this 4 percent rule because you lose the amount of your retirement nest egg. So you're opening retirement balance shrinks, so many retirees think how much it reduces. So my retirement landscape is still intact. So here is how you reduce. If you lose it to 2-3 percent, it's fine but you'll go aggressive if it will be more than 3 percent of investment assets. We're going to do some trial and error over here, let's say in the following year after you lose that amount of money, for say the twenty-five thousand a year, it is equal to about 2000 a month. If you want to go aggressive by using the 4 percent rule what if, it will go even more aggressive. So we stick to about like using a 3 percent rule. So if you were to resume just these few short years, you reduce spending. Even I want to reduce my retirement expense, my lifestyle at age of 67 before I lose this amount of money. But it just goes up to about 5 percent of retirement fund. It would still be sufficient to last you until the age of 100 years or about three hundred thousand. The 3 - 4 percent rule can reduce it when you suffer monetary losses. Similarly when you want to use the 5 percent rule and have an investment in the stock market maybe you gain 200000. Now with this probably here you could increase your spending by five percent. After gain, you get to increase you're spending over here and you probably allocate

the additional spending that is allowable here enables you to do some major traveling or other things. Increasing your spending based on this 5 percent safe withdrawal rule while still having peace of mind knowing that if you were to live until the age of 100, you still have about 2.9 million left as a legacy for your children. So that is the certainty and the sense of empowerment, the knowledge that it's so valuable once you know how to make use of the retirement system and knowing some of these rules and some of these guidelines that you can use to apply in post-retirement management.

| Age | Year | nth year | Inflation Rate | Opening Investment Asset | Retirement Expenses | % of expenses over asset | Investment Asset After Withdrawal | Investment Asset (Gain/Loss) | Investment Asset Expensed | Investment Asset Balance | Average Return Rate | Return Sum | Return Sum Reinvested | Additional Asset | Income | Closing Balance |
|-----|------|----------|----------------|--------------------------|---------------------|--------------------------|-----------------------------------|------------------------------|---------------------------|--------------------------|---------------------|------------|-----------------------|------------------|--------|-----------------|
| 55  | 2013 | 0        |                | 7,63,792                 | 29,900              | 3.91%                    | 7,33,892                          |                              |                           | 7,33,892                 | 6.00%               | 44,034     | 44,034                |                  |        | 7,77,926        |
| 56  | 2014 | 1        | 3.20%          | 7,77,926                 | 30,857              | 3.97%                    | 7,47,069                          |                              |                           | 7,47,069                 | 6.00%               | 44,824     | 44,824                |                  |        | 7,91,893        |
| 57  | 2015 | 2        | 3.20%          | 7,91,893                 | 31,844              | 4.02%                    | 7,60,049                          |                              |                           | 7,60,049                 | 6.00%               | 45,603     | 45,603                |                  |        | 8,05,652        |
| 58  | 2016 | 3        | 3.20%          | 8,05,652                 | 32,863              | 4.08%                    | 7,72,789                          |                              |                           | 7,72,789                 | 6.00%               | 46,367     | 46,367                |                  |        | 8,19,156        |
| 59  | 2017 | 4        | 3.20%          | 8,19,156                 | 33,915              | 4.14%                    | 7,85,241                          |                              |                           | 7,85,241                 | 6.00%               | 47,114     | 47,114                |                  |        | 8,32,355        |
| 60  | 2018 | 5        | 3.20%          | 8,32,355                 | 35,000              | 4.20%                    | 7,97,355                          | -2,00,000                    |                           | 5,97,355                 | 6.00%               | 35,841     | 35,841                |                  |        | 6,33,197        |
| 61  | 2019 | 6        | 3.20%          | 6,33,197                 | 36,120              | 5.70%                    | 5,97,076                          |                              |                           | 5,97,076                 | 6.00%               | 35,825     | 35,825                |                  |        | 6,32,901        |
| 62  | 2020 | 7        | 3.20%          | 6,32,901                 | 37,276              | 5.89%                    | 5,95,625                          |                              |                           | 5,95,625                 | 6.00%               | 35,738     | 35,738                |                  |        | 6,31,363        |
| 63  | 2021 | 8        | 3.20%          | 6,31,363                 | 38,469              | 6.09%                    | 5,92,894                          |                              |                           | 5,92,894                 | 6.00%               | 35,574     | 35,574                |                  |        | 6,28,467        |
| 64  | 2022 | 9        | 3.20%          | 6,28,467                 | 39,700              | 6.32%                    | 5,88,768                          |                              |                           | 5,88,768                 | 6.00%               | 35,326     | 35,326                |                  |        | 6,24,094        |
| 65  | 2023 | 10       | 3.20%          | 6,24,094                 | 40,970              | 6.56%                    | 5,83,123                          |                              |                           | 5,83,123                 | 6.00%               | 34,987     | 34,987                |                  |        | 6,18,111        |
| 66  | 2024 | 11       | 3.20%          | 6,18,111                 | 42,281              | 6.84%                    | 5,75,830                          |                              |                           | 5,75,830                 | 6.00%               | 34,550     | 34,550                |                  |        | 6,10,379        |
| 67  | 2025 | 12       | 3.20%          | 6,10,379                 | 43,634              | 7.15%                    | 5,66,745                          |                              |                           | 5,66,745                 | 6.00%               | 34,005     | 34,005                |                  |        | 6,00,750        |
| 68  | 2026 | 13       | 3.20%          | 6,00,750                 | 45,031              | 7.50%                    | 5,55,719                          |                              |                           | 5,55,719                 | 6.00%               | 33,343     | 33,343                |                  |        | 5,89,062        |
| 69  | 2027 | 14       | 3.20%          | 5,89,062                 | 46,472              | 7.89%                    | 5,42,591                          |                              |                           | 5,42,591                 | 6.00%               | 32,555     | 32,555                |                  |        | 5,75,146        |
| 70  | 2028 | 15       | 3.20%          | 5,75,146                 | 47,959              | 8.34%                    | 5,27,188                          |                              |                           | 5,27,188                 | 6.00%               | 31,631     | 31,631                |                  |        | 5,58,819        |
| 71  | 2029 | 16       | 3.20%          | 5,58,819                 | 49,493              | 8.86%                    | 5,09,326                          |                              |                           | 5,09,326                 | 6.00%               | 30,560     | 30,560                |                  |        | 5,39,885        |
| 72  | 2030 | 17       | 3.20%          | 5,39,885                 | 51,077              | 9.46%                    | 4,88,808                          |                              |                           | 4,88,808                 | 6.00%               | 29,328     | 29,328                |                  |        | 5,18,137        |
| 73  | 2031 | 18       | 3.20%          | 5,18,137                 | 52,712              | 10.17%                   | 4,65,425                          |                              |                           | 4,65,425                 | 6.00%               | 27,926     | 27,926                |                  |        | 4,93,351        |
| 74  | 2032 | 19       | 3.20%          | 4,93,351                 | 54,398              | 11.03%                   | 4,38,952                          |                              |                           | 4,38,952                 | 6.00%               | 26,337     | 26,337                |                  |        | 4,65,289        |
| 75  | 2033 | 20       | 3.20%          | 4,65,289                 | 56,139              | 12.07%                   | 4,09,150                          |                              |                           | 4,09,150                 | 6.00%               | 24,549     | 24,549                |                  |        | 4,33,699        |
| 76  | 2034 | 21       | 3.20%          | 4,33,699                 | 57,936              | 13.36%                   | 3,75,764                          |                              |                           | 3,75,764                 | 6.00%               | 22,546     | 22,546                |                  |        | 3,98,310        |
| 77  | 2035 | 22       | 3.20%          | 3,98,310                 | 59,789              | 15.01%                   | 3,38,520                          |                              |                           | 3,38,520                 | 6.00%               | 20,311     | 20,311                |                  |        | 3,58,832        |
| 78  | 2036 | 23       | 3.20%          | 3,58,832                 | 61,703              | 17.20%                   | 2,97,129                          |                              |                           | 2,97,129                 | 6.00%               | 17,828     | 17,828                |                  |        | 3,14,957        |
| 79  | 2037 | 24       | 3.20%          | 3,14,957                 | 63,677              | 20.22%                   | 2,51,279                          |                              |                           | 2,51,279                 | 6.00%               | 15,077     | 15,077                |                  |        | 2,66,356        |
| 80  | 2038 | 25       | 3.20%          | 2,66,356                 | 65,715              | 24.67%                   | 2,00,641                          |                              |                           | 2,00,641                 | 6.00%               | 12,038     | 12,038                |                  |        | 2,12,680        |
| 81  | 2039 | 26       | 3.20%          | 2,12,680                 | 67,818              | 31.89%                   | 1,44,862                          |                              |                           | 1,44,862                 | 6.00%               | 8,692      | 8,692                 |                  |        | 1,53,554        |
| 82  | 2040 | 27       | 3.20%          | 1,53,554                 | 69,988              | 45.58%                   | 83,566                            |                              |                           | 83,566                   | 6.00%               | 5,014      | 5,014                 |                  |        | 88,580          |
| 83  | 2041 | 28       | 3.20%          | 88,580                   | 72,228              | 81.54%                   | 16,352                            |                              |                           | 16,352                   | 6.00%               | 0,981      | 0,981                 |                  |        | 17,333          |
| 84  | 2042 | 29       | 3.20%          | 17,333                   | 74,539              | 430.03%                  | -67,208                           |                              |                           | -57,205                  | 6.00%               | -3,432     | -3,432                |                  |        | -69,238         |
| 85  | 2043 | 30       | 3.20%          | -60,838                  | 76,924              | -126.86%                 | -1,37,562                         |                              |                           | -1,37,562                | 6.00%               | -8,254     | -8,254                |                  |        | -1,45,816       |
| 86  | 2044 | 31       | 3.20%          | -1,45,816                | 79,386              | -54.44%                  | -2,25,201                         |                              |                           | -2,25,201                | 6.00%               | -13,512    | -13,512               |                  |        | -2,38,713       |
| 87  | 2045 | 32       | 3.20%          | -2,38,713                | 81,926              | -34.32%                  | -3,20,639                         |                              |                           | -3,20,639                | 6.00%               | -19,238    | -19,238               |                  |        | -3,39,871       |
| 88  | 2046 | 33       | 3.20%          | -3,39,871                | 84,548              | -24.88%                  | -4,24,425                         |                              |                           | -4,24,425                | 6.00%               | -25,466    | -25,466               |                  |        | -4,49,891       |
| 89  | 2047 | 34       | 3.20%          | -4,49,891                | 87,253              | -19.39%                  | -5,37,144                         |                              |                           | -5,37,144                | 6.00%               | -32,229    | -32,229               |                  |        | -5,69,372       |
| 90  | 2048 | 35       | 3.20%          | -5,69,372                | 90,045              | -15.81%                  | -6,59,418                         |                              |                           | -6,59,418                | 6.00%               | -39,565    | -39,565               |                  |        | -6,98,983       |
| 91  | 2049 | 36       | 3.20%          | -6,98,983                | 92,927              | -13.29%                  | -7,91,909                         |                              |                           | -7,91,909                | 6.00%               | -47,515    | -47,515               |                  |        | -8,39,424       |
| 92  | 2050 | 37       | 3.20%          | -8,39,424                | 95,900              | -11.42%                  | -9,35,324                         |                              |                           | -9,35,324                | 6.00%               | -56,119    | -56,119               |                  |        | -9,91,444       |
| 93  | 2051 | 38       | 3.20%          | -9,91,444                | 98,969              | -9.98%                   | -10,90,413                        |                              |                           | -10,90,413               | 6.00%               | -65,425    | -65,425               |                  |        | -1,15,847       |
| 94  | 2052 | 39       | 3.20%          | -11,55,837               | 1,02,136            | -8.84%                   | -12,57,974                        |                              |                           | -12,57,974               | 6.00%               | -75,478    | -75,478               |                  |        | -1,33,352       |
| 95  | 2053 | 40       | 3.20%          | -13,33,452               | 1,05,404            | -7.90%                   | -14,38,856                        |                              |                           | -14,38,856               | 6.00%               | -86,331    | -86,331               |                  |        | -1,52,188       |
| 96  | 2054 | 41       | 3.20%          | -15,25,188               | 1,08,777            | -7.13%                   | -16,33,965                        |                              |                           | -16,33,965               | 6.00%               | -98,038    | -98,038               |                  |        | -1,72,203       |
| 97  | 2055 | 42       | 3.20%          | -17,32,003               | 1,12,258            | -6.48%                   | -18,44,262                        |                              |                           | -18,44,262               | 6.00%               | #####      | -1,10,656             |                  |        | -1,93,917       |
| 98  | 2056 | 43       | 3.20%          | -19,54,917               | 1,15,851            | -5.93%                   | -20,70,768                        |                              |                           | -20,70,768               | 6.00%               | #####      | -1,24,246             |                  |        | -2,18,014       |
| 99  | 2057 | 44       | 3.20%          | -21,95,014               | 1,19,558            | -5.45%                   | -23,14,572                        |                              |                           | -23,14,572               | 6.00%               | #####      | -1,38,874             |                  |        | -2,47,448       |
| 100 | 2058 | 45       | 3.20%          | -24,53,446               | 1,23,384            | -5.03%                   | -25,76,830                        |                              |                           | -25,76,830               | 6.00%               | #####      | -1,54,610             |                  |        | -2,79,458       |

Observe that the balance has turned negative in year 2042.

**Observations**

- In this sheet, we have assumed that our retirement expenses increases with the rate of inflation of 3.2% each year and we have a large one-time expense in year 2018.
- Observe that the % of expenses over asset has gone above 4% in year 2015 and the investment balance has turned negative (there has been a shortfall in retirement corpus) in year 2042. This is because of the one-time expense we had in 2018 and the consistent increase in our retirement expenses. (inflation rate of 3.2%)