



Ignore Time Value of Fluctuations and you can cause irreparable damage to retirement plans and pension funds, warns JIM OTAR

Time Value of Fluctuations (TVF) has the same effect on a retirement portfolio as friction losses have to driving a truck in the sand; they both use up a lot more 'fuel' than anticipated.

The Time Value of Fluctuations quantifies the combined losses in a distribution portfolio due to factors beyond our control; the luck factor, reverse-dollar cost averaging, and fluctuations in the inflation rate. In many cases, the real culprit for failing retirement plans and pension funds is the ignorance of Time Value of Fluctuations.

Let's look at an example: Bob, your client, asks: "I have \$1 million in my retirement portfolio. I want my money to last 25 years. I expect an inflation of 3 per cent throughout my retirement. How much can I safely take out each year?"

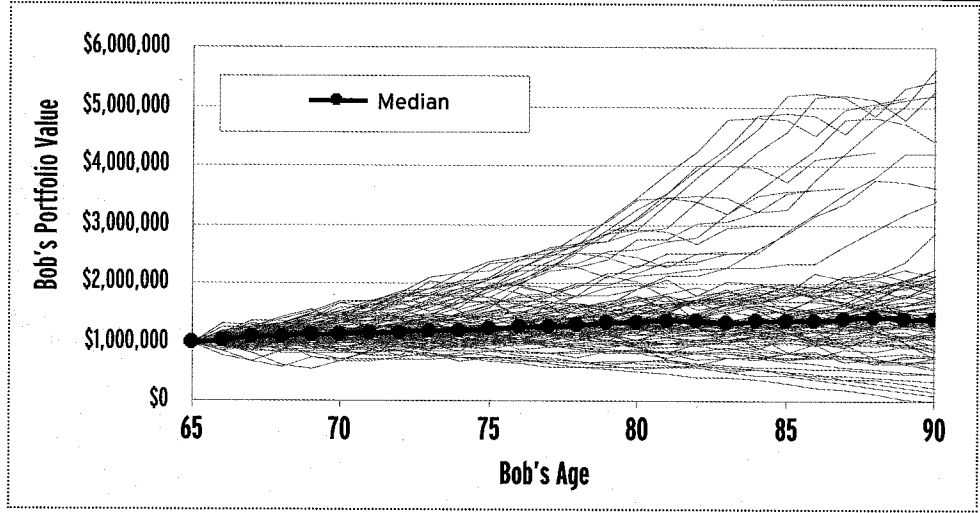
When we look at all portfolios since 1900, the median portfolio with an asset mix of 40 per cent equities and 60 per cent conventional bonds, returned from 6.4 per cent (10-year time horizon) to 5.6 per cent (40-year time horizon). To keep things simple, we will stick with 6 per cent annual growth rate.

Plug in 6 per cent for the 'average' growth and 3 per cent for the 'average' inflation to a standard retirement calculator. Voila! It tells you that Bob could take out \$59,000 annually, indexed at 3 per cent for the next 25 years.

This result would have been accurate if Bob was buying a 25-year term annuity with 6 per cent interest rate indexed by 3 per cent each year. But an investment portfolio is not an annuity; its value fluctuates each day. Because of that, this 'Annuitised Withdrawal Rate' (AWR) calculated with a standard retirement calculator is of no use. The fluctuations deplete the portfolio a lot sooner. There is a 70 per cent to 80 per cent chance (based on market history) that Bob's portfolio would run out of money before 25 years.

We need to calculate the Sustainable

GRAPH 1: POTENTIAL PORTFOLIO OUTCOMES



Withdrawal Rate (SWR). It is defined as the maximum amount of indexed, periodic, life-long income from a portfolio. It is equal to the Annuitised Withdrawal Rate less Time Value of Fluctuations:

$$SWR = AWR - TVF$$

How do we calculate the TVF? It is mainly a function of the time horizon. The shorter the time horizon, the higher is the TVF. Other factors that affect the TVF are: the asset mix, asset selection, portfolio management costs, and asset allocation strategies. If you hold the optimum asset mix of equities and conventional bonds, you can calculate TVF empirically using this formula developed by this writer:

$$TVF = 20 / (N 0.735)$$

→ where N is the time horizon, number of years between 10 and 40. For example, for Bob's time horizon, 25 years, the TVF is:

$$TVF = 20 / (25 0.735) = 1.9\%$$

Thus, the Time Value of Fluctuations removes 1.9 per cent from Bob's portfolio annually.

We calculate Bob's Sustainable Withdrawal Rate, remembering that his AWR was 5.9 per cent (\$59,000 divided by \$1 million) and his TVF is 1.9 per cent:

$$SWR = 5.9\% - 1.9\% = 4.0\%$$

Bob's Sustainable Withdrawal Rate is 4 per cent or \$40,000 during the first year of his retirement. This amount is indexed fully to actual inflation for the rest of his life. Keep in mind that his long-term median portfolio growth is still 6 per cent. The difference of 2

TABLE 1: WRs OVER TIME

TIME HORIZON	AWR	SWR
10 years	12.0%	8.3%
15 years	8.6%	5.9%
20 years	6.9%	4.6%
25 years	5.9%	4.0%
30 years	5.2%	3.6%
35 years	4.7%	3.3%
40 years	4.4%	3.0%

per cent between the long-term growth rate and SWR is the price Bob must pay for self-insuring his life-long retirement income. Graph 1 shows the potential outcomes of Bob's portfolio if he were to retire in any year since 1900.

For other time horizons, use this table 1.

Remember, in all these cases, the median portfolio growth rate is still 6 per cent. Please, no more: "This portfolio will grow on the average by 6 per cent annually over the long-term. Therefore, I can take out 6 per cent from my portfolio." ♣

Jim Otar CFP is the author of *High Expectations and False Dreams - One Hundred Years of Stock Market History Applied to Retirement Planning*. This article is excerpted from his upcoming book *Mathematics of Retirement*. Your comments are welcome: jimotar@rogers.com