

## Forum Education Previews

# Time Value of Fluctuations

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Bob is your client. He is just about to retire. During your last meeting, he asked: "I have \$1 million in my retirement portfolio. I want my money to last 25 years. I expect an inflation rate of

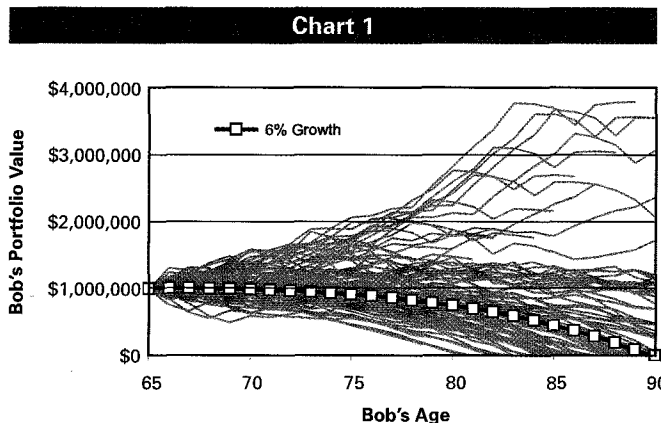
3% throughout my retirement. How much can I safely take out each year?" You promised to give him an answer the next day.

You look at the market history. Since 1900, the median portfolio with an asset mix of 40% equities and 60% conventional bonds grew by about 6% annually. You plug 6% for the "assumed" growth rate and 3% for the average inflation into your retirement calculator. Great! The calculator tells you that Bob can take out \$59,000 annually, indexed at 3% for the next 25 years.

This result would have been accurate if Bob were buying a 25-year term annuity with 6% interest rate indexed by 3% each year. But an investment portfolio is not an annuity; it fluctuates each day. Because of that, this Annuitized Withdrawal Rate (AWR) calculated with a standard retirement calculator is of no use. The fluctuations deplete the portfolio a lot sooner, as indicated in Chart 1:

Each thin line shows the portfolio value if Bob were to start his retirement in any one of the years since 1900. By plotting each of these lines on the same chart as the original retirement plan, we can compare them to the red line – our projection using a steady growth rate and inflation. There is a 54% chance that Bob's portfolio will run out of money before 25 years!

Now, I introduce the Time Value of Fluctuations (TVF). It is a new concept that



quantifies the combined losses in a distribution portfolio due to factors beyond our control such as the luck factor, reverse-dollar cost averaging, and fluctuations of inflation.

Firstly, we need to figure out Bob's Sustainable Withdrawal Rate (SWR). SWR is defined as the maximum amount of indexed, periodic, lifelong income from a portfolio. SWR is calculated as the AWR less the TVF:

$$\text{SWR} = \text{AWR} - \text{TVF}$$

We obtain the AWR from the standard retirement calculator. How do we calculate the TVF?

TVF is mainly a function of the time horizon. If you hold the optimum asset mix of equities and conventional bonds, you can calculate TVF empirically using this formula developed by this author:

$$\text{TVF} = 20 / ( N^{0.735} )$$

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

$$\text{TVF} = 20 / ( 25^{0.735} ) = 1.9\%$$

We calculate Bob's SWR, remembering that his AWR was 5.9% (\$59,000 divided by \$1 million) and his TVF is 1.9%:

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# Time Value

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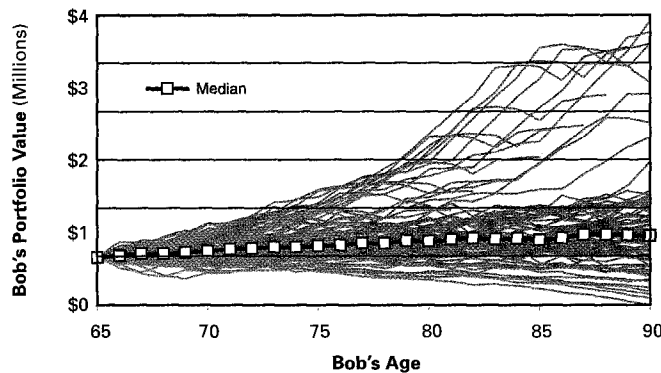
$$\text{SWR} = 5.9\% - 1.9\% = 4.0\%$$

Bob's SWR is 4% 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%. The difference of 2% between the long-term growth rate and

SWR is the cost of self-insuring his life-long retirement cash flow. Chart 2 shows the potential outcomes of Bob's portfolio if he were to retire in any year since 1900.

The TVF is the missing link between the SWR and the standard retirement calculator. Now you have it. For more groundbreaking ideas in advanced retirement planning, visit my workshop at the FSP Forum in Palm Springs on the afternoon of October 17th. ●

Chart 2



*Jim Otar, CFP, is a financial planner, professional engineer, market technician, financial writer, and founder of [www.retirementoptimizer.com](http://www.retirementoptimizer.com). His past articles on retirement planning won the CFP Board Article Awards in 2001 and 2002. He is the author of High Expectations and False Dreams. This article is excerpted from his upcoming book, Mathematics of Retirement. Jim can be reached at [jimotar@rogers.com](mailto:jimotar@rogers.com).*