Time Value of Fluctuations

By Jim Otar

Many of our clients spend between twenty and thirty years in retirement. In our current retirement planning practice, we assume an "average" portfolio growth rate for the entire time horizon. The reality is, all asset values fluctuate daily. Many in the financial planning industry naively think that if they use historic averages then everything will be fine in the long run.

Unfortunately, this is not the case. There is always a permanent loss due to the fluctuations in a distribution portfolio. In many cases, this loss can cut the portfolio life by half of what a standard retirement calculator predicts using an "average" growth rate.

If there are no cash flows in or out of a portfolio and if you lose 20%, you must eventually gain 25% to break even. The following table shows how much you need to gain to breakeven after a loss:

% Loss	% Gain required to break even
5%	5.3%
10%	11.1%
20%	25.0%
30%	42.9%
50%	100.0%
80%	400.0%

Can we use the same table if there is a periodic withdrawal from the portfolio? The answer is "No". In distribution portfolios, you need significantly higher gains to break even. That is because not only do you need to recover the market losses, but you also need to recover the differential losses between the original plan and the actual portfolio value. That is why more and more pension funds are going into an irrecoverable downward spiral. They are blaming the markets for that whereas the real reason is their lack of understanding of the concept of "Time Value of Fluctuations".

We skip the formulae for the time value of fluctuations to keep things simple. For the curious, they are available on my website.

The following table shows how much you need to gain over a *three-year time period* for various loss and withdrawal rates, assuming a steady increase of the portfolio value after the initial loss and no indexation of withdrawals over time:

	Initial Withdrawal Rate			
	0%	4%	6%	8%
Percent Loss	Percent Gain Required over 3 years			
10%	11%	26%	33%	41%
20%	25%	42%	51%	60%
30%	43%	63%	74%	86%
50%	100%	132%	150%	169%
80%	400%	525%	597%	676%

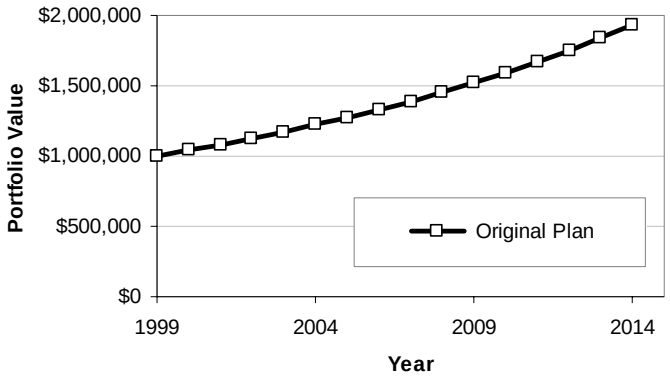
For example, if your initial withdrawal rate is 4% and your portfolio loses 20%, then it has to grow a total of 42% over the next three years just to break-even.

The figures tabled above do not consider inflation, dividends and management costs. In real life, they are important. The following example shows the effect of real-life time value of fluctuations for someone retired at the end of 1999.

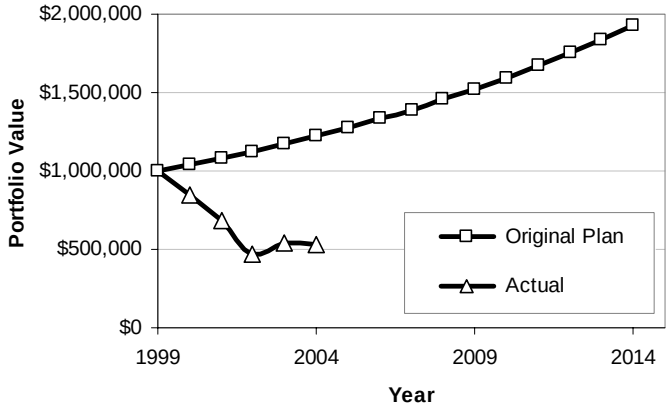
A Real-Life Example:

Bob retired at the end of 1999 at age 60. At that time, he had $1,000,000 in his portfolio. He invested all his money in an S&P500 index fund with an annual management fee of 0.25%. The annualized growth rate of the S&P500 between 1975 and 1999 was 17.2%. However, Bob used a more conservative growth rate of 10% when he prepared his retirement plan five years ago. He withdraws $60,000 from his portfolio each year indexed to CPI. He assumed an annual average long-term inflation rate of 3% for his calculations.

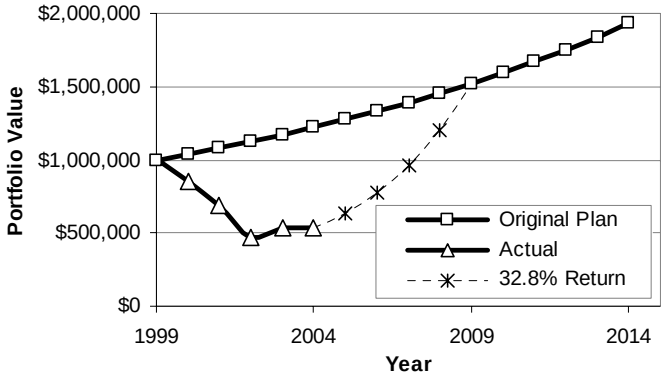
Using a retirement calculator, Bob's original retirement plan projected the following asset value over time, reaching $2 million at age 75:



It is now five years later, January 2005. Bob's portfolio is down to about $530,000. He wants to know by how much the S&P500 has to go up over the next five years (by the end of 2009) so that his portfolio can catch up with his original retirement plan projection. The following chart shows the actual performance of his portfolio over the last 5 years:

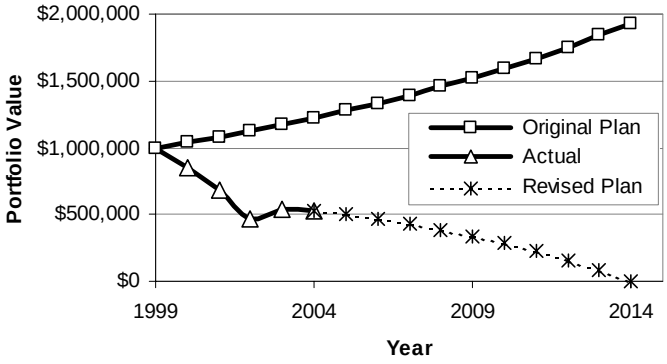


Going forward, Bob assumes a 3% inflation rate, 1.6% dividend yield and 0.25% annual management fees. He calculates how much the S&P500 index needs to go up between 2005 and 2009 to catch up with his original projection: the S&P500 must go up by 32.8% per year for each of the next five years to catch up with the original retirement plan (not including exchange rate losses). In other words, the index must nearly quadruple from where it is now until the end of 2009. Is this a reasonable expectation? Definitely not.



Bob now understands the time value of fluctuations. At this point, he decides, "what is lost is lost" and he wants to make a fresh start. He decides to be more conservative, hold a balanced portfolio, and he assumes an average annual growth rate of 7%. Everything else being equal, what kind of longevity can Bob expect from his portfolio?

According to his revised retirement plan, Bob's portfolio will now run out of money in ten years -at age 75-, instead of being worth nearly $2 million as he originally forecasted just five years ago. That is the price Bob has to pay for not considering the time value of fluctuations when he prepared his original retirement plan. For Bob, it is game over; he should definitely look into life annuities at this point in his life.



The Root Causes of Time Value of Fluctuations

For time value of fluctuations to exist, there must be periodic withdrawals. If there are no withdrawals, then there is no time value of fluctuations, just fluctuations.

There are two types of contributors to the time value of fluctuations: The first one is the fluctuations in the asset values. The growth of portfolio assets deviates from the assumed long-term "average" growth rate. An analogy can be made to gas mileage when driving a bus: If you drive a bus along a straight road with no hills, you will use less gas than if you were to drive an identical distance with many curves, hills and valleys. Similarly, the more a portfolio fluctuates, the more money is exhausted going up and down the fluctuations, for the lack of a better term, "friction losses".

The second contributing factor to time value of fluctuations is caused by fluctuations of cash flow, particularly the inflation. Continuing with our bus analogy: If no one gets on the bus along the way, you will use less gas than if the bus makes many stops and picks up new passengers. Similarly, the further the inflation deviates from the original assumed "average", the more money is exhausted; for the lack of a better term, "kinetic losses".

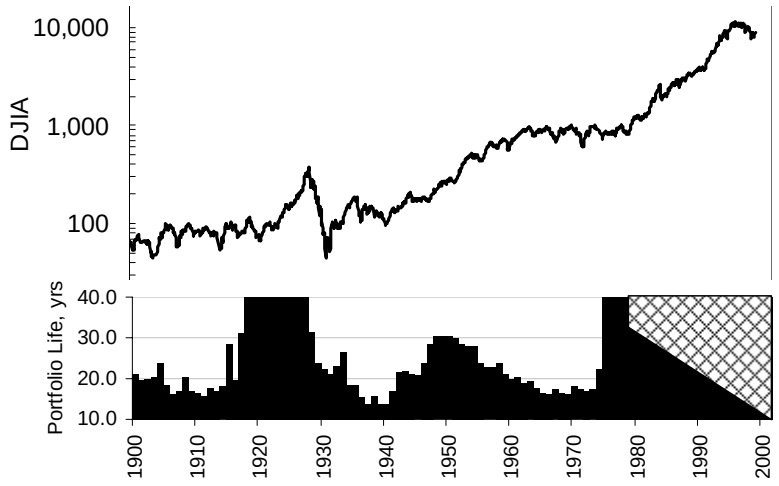
When we talk about the fluctuating asset values, mainly we consider equities because generally they have the highest volatility in a portfolio. Equity markets are made up of four sizes of fluctuations, or waves:

- Secular trends
- Cyclical trends
- Seasonality
- Random fluctuations

Secular trends are long-term market trends that can last as long as twenty years. They exert the strongest effect on market behavior. In sideways and bearish secular trends, portfolio life can easily be reduced by one half (or more) compared to a projection using average growth rates. We will call this the "Luck Factor". The term "luck" here refers to your timing of retirement relative to a secular trend: If your retirement starts at the beginning of a secular bull market, the chances are that you will not outlive your money after retiring. Otherwise, you will likely run out of money during retirement.

The chart below shows the variability of the portfolio life over the last century. For the same asset allocation, the same portfolio management costs and the same assets selection, some portfolios expired after only 12 years, others lasted over 40 years, even tough the withdrawal rates were identical and the asset allocation was conservative (60% fixed income and 40% equity).

The remedy for the luck factor is simple: Once you realize you are not lucky, seek other avenues of income such as life annuities.



The next size of waves is the cyclical trends. Generally, they have a period of four or five years. During wealth accumulation, you are adding money to your investments on a periodic basis. This is called Dollar-Cost Averaging (DCA) and it is good for your portfolio. Cyclical trends enhance the benefits of DCA; your average cost of shares will always be less than the average price of the shares, because you will be buying more shares during market troughs.

However, once you retire and start taking periodic income from your portfolio, this is called Reverse Dollar-Cost Averaging (RDCA). This can reduce the portfolio life by as much as 50% based on my research of the market history. There are two remedies to minimize the effects of RDCA: Firstly, take income only from non-fluctuating investments such as cash balance or money market funds in the portfolio. Secondly, do not rebalance your portfolio too often.

Seasonal cycles are recurring market movements with one-year period. They have no long-term influence on the portfolio longevity. However, the strongest three months of the year for stocks have historically been November, December and January. Accordingly, if you are withdrawing income annually, the best time to do so might be at the end of January, after their seasonal rise.

In addition to secular, cyclical and seasonality trends, markets fluctuate randomly. My analysis based on market history indicates that portfolio longevity varies no more than 9% as a result of random fluctuations. The advisory profession pays excessive attention to the randomness of markets. Secular or cyclical trends, investment strategies, risk management strategies and management costs each have far more influence on the longevity of a retirement portfolio than random fluctuations.

In a future article, we will look at how inflation affects the time value of fluctuations. At this point, suffice to say that equities provide a very poor inflation hedge in secular sideways trends. Inflation indexed bonds do a much better job than equities in such markets.

Conclusion:

Routine losses over a few years can ruin a retirement plan because of the time value of fluctuations. As a matter of fact, you don't need to have *any losses at all* in your portfolio. If a portfolio grows less than the original projection for just one market cycle (typically 4 to 5 years) at the beginning of retirement, the likelihood of ever catching up with the original retirement projection will diminish to near zero. Compounding works for you during accumulation years and against you during distribution years. This is how the time value of fluctuations works.

For individual retirement accounts, your mission must be to preserve the capital especially during the first four years of retirement. The longevity of the retirement portfolio is exponentially proportional to how successful you are in accomplishing this task. For pension funds, the problem is a bit more complex but when it comes to the time value of fluctuations, it follows the same logic.

Editor's Note: Feel free to download Otar's retirement calculator that is based on market history. It is a tool that can help find solutions to overcoming the effects of the time value of fluctuation.

Jim Otar, BASc, MEng, CMT, CFP, is a professional engineer, a market technician, a financial writer, and founder of www.retirementoptimizer.com. He 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

