Damage control

Dealing with the effects of time value of fluctuations

Routine losses over a few years can ruin a retirement plan for good, due to the Time Value of Fluctuations, writes JIM OTAR

Many of our clients spend between 20 and 30 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 per cent, you must eventually gain 25 per cent to break even. The following table shows how much you need to gain required for various losses:

% 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 you need to recover the market losses, but 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 – undeservedly – blaming the markets for that because they do not understand the concept of 'Time Value of Fluctuations'.

The Time Value of Fluctuations is calculated using the following set of equations developed by this writer:

1. $FA = PI \times (1 + GI)^{N+M} - WA \times [(1 + GI)^{N+M} - 1] / GI$
2. $FA = PC \times (1 + GR)^{M} - WA \times [(1 + GR)^{M} - 1] / GR$
3. $TG = (1 + GR)^{M} - 1$

where:

PI is the original portfolio value

PC is the current portfolio value

FA is the projected future value of the portfolio based on the original retirement plan

GI is the original assumed annual growth rate

GR is the future annual growth rate required to breakeven

N is the number of years since the original plan

M is the number of years required to breakeven

WA is the annual withdrawal amount from the portfolio

TG is the total gain in percentage required to meet the original retirement plan portfolio value

Firstly, calculate the future value (FA) of the portfolio based on your original assumptions at the beginning of retirement using equation 1.

Next, go to equation 2. This is a trial and error calculation: Enter an assumed value for GR (future annual growth rate required to break even), calculate the right hand side of equation 2 and see if it is equal to the value of FA calculated in equation 1. Vary the value of GR as needed and repeat this calculation until the right hand side of the equation 2 equals to the value of FA calculated in equation 1.

Once you figure out the value of GR, you can then calculate the total gain in percentage required to catch up with the original plan projection using equation 3.

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:

These formulae and 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.

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%

A real-life example

Bob retired at the end of 1999 at age 60. At that time, he had $1 million in his portfolio. He invested all this money in an S&P500 index fund with an annual management fee of 0.25 per cent.

The annualised growth rate of the S&P500 between 1975 and 1999 was 17.2 per cent. However, Bob used a more conservative growth rate of 10 per cent when he prepared his retirement plan four 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 per cent.

Using a retirement calculator, Bob's original retirement plan projected the following asset value over time: **See Figure 1**

In distribution portfolios, you need significantly higher gains to break even.

It is now five years later, January 2005. Bob's portfolio is down. He wants to know by how much 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 five years: **See Figure 2**

Going forward, Bob assumes a 3 per cent inflation rate, 1.6 per cent dividend yield and 0.25 per cent 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: S&P500 must go up by 32.8 per cent per year for each of the next five years to catch up with the original retirement

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FIGURE 1: BOB'S ORGINAL RETIREMENT PLAN

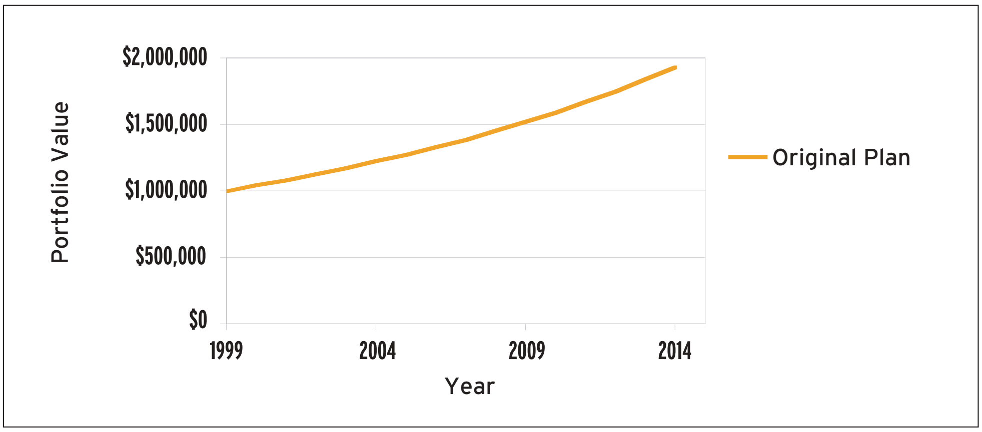


FIGURE 2: BOB'S ACTUAL PORTOFOLIO PERFORMANCE

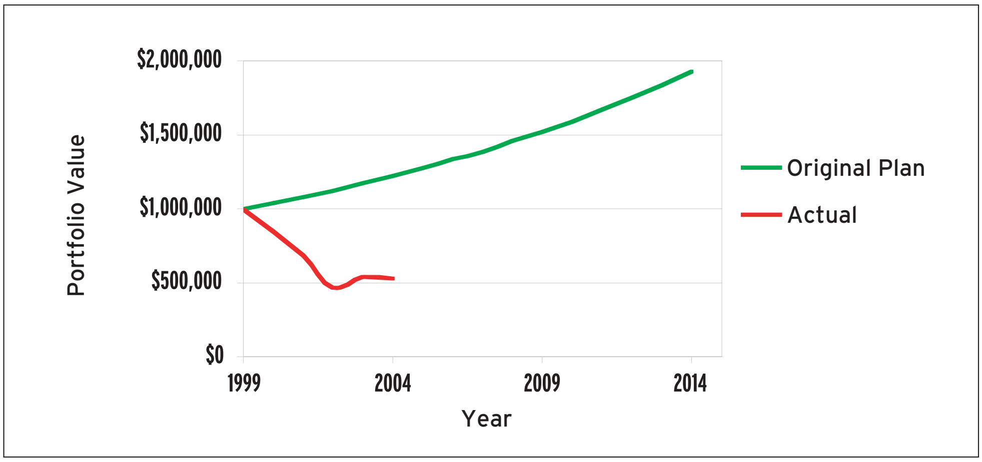


FIGURE 3: BOB'S PLAN TO CATCH UP WITH ORIGINAL PROJECTION

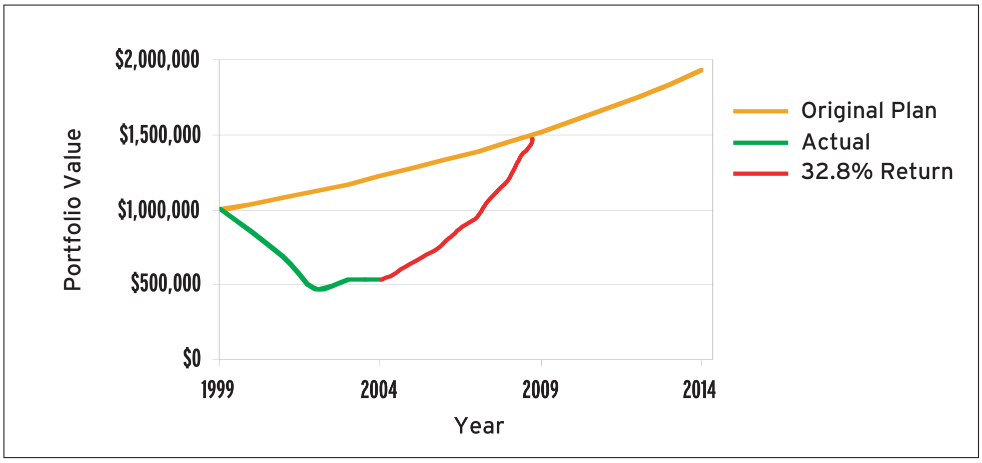
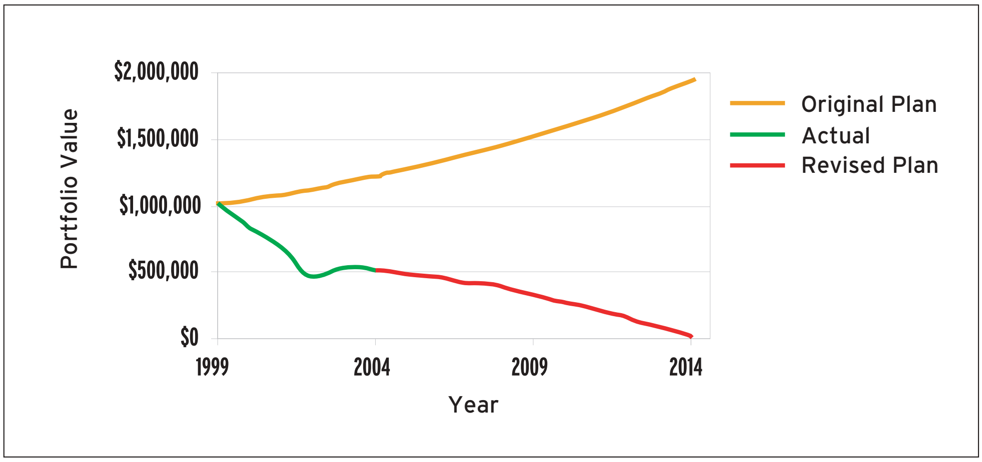


FIGURE 4: BOB'S POTENTIAL INCOME LOSS



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plan (not including exchange rate losses). In other words, it must nearly quadruple from where it is now until the end of 2009. Is this a reasonable expectation? Definitely not. **See Figure 3**

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 per cent. Everything else being equal, what kind of longevity can Bob expect from his portfolio?

According to his revised retirement plan, Bob's portfolio will run out of money in 10 years – at age 75 – instead of being worth nearly $2 million as he originally forecasted. That is the price Bob has to pay for not considering the Time Value of Fluctuations when he prepared his original retirement plan. **See Figure 4**

Conclusion

Routine losses over a few years can ruin a retirement plan for good 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 just for one market cycle (typically four to five 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 it follows the same logic. ✤

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