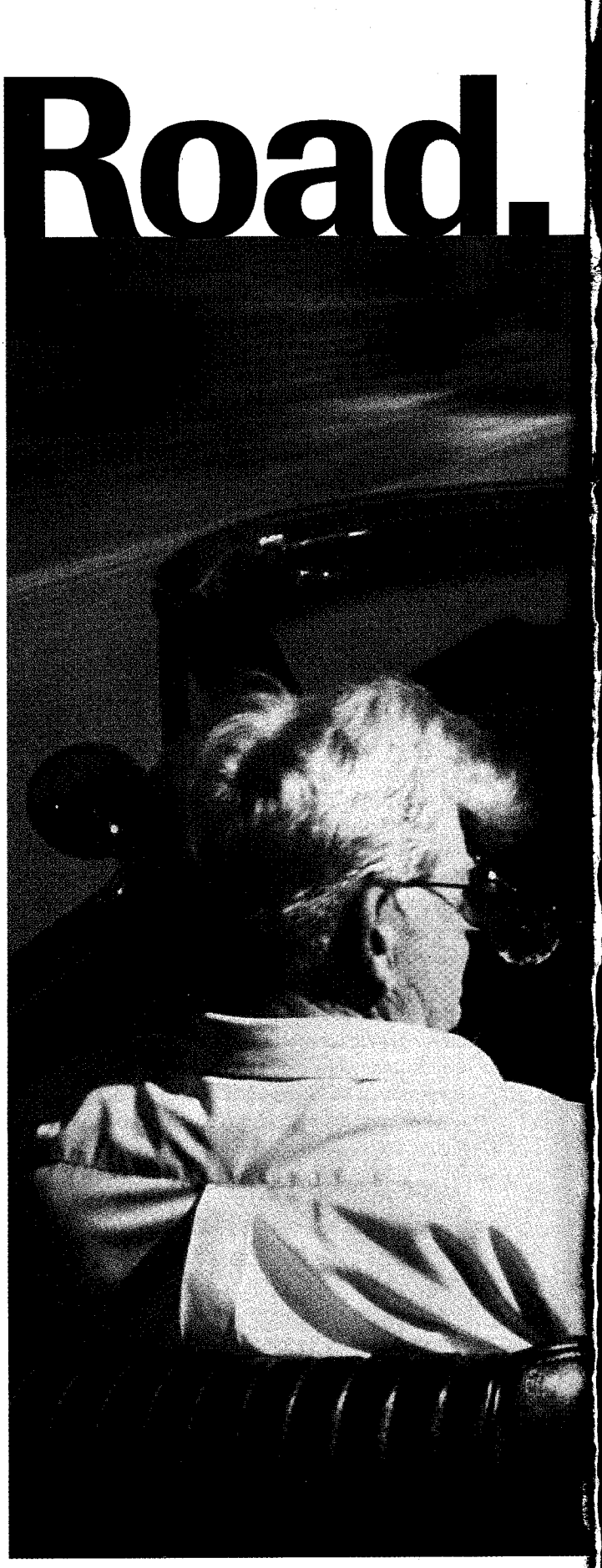
# Right Road.



## The vast majority of retirement plan projections are overly optimistic because they're based on incorrect or outdated assumptions. By Jim Otar

**As financial planners,** our goal is to provide clients with realistic retirement projections. However, my research shows that current models with straight-line growth do not achieve this goal. Adding some randomness to the model, such as the Monte Carlo simulation, is a step in the right direction, but it's still far short of what historic evidence suggests.

Retirement planning software helps us to prepare a projection of asset values into future years. In doing so, we input several assumptions, such as investing a certain amount periodically, retiring at a certain age, withdrawing a certain amount of income from this portfolio after retirement, and so on. Similar retirement calculators are available from financial institutions. For the do-it-yourselfers, there are plenty of Web sites that offer such calculators as well.

These calculators produce a report outlining a financial plan, including a graph showing projected asset growth over time. Typically, it may look similar to the graph shown in Figure 1. Note: For this article, I made the following assumptions: 1) the initial withdrawal rate is 6% during the first year of retirement; 2) the withdrawal amount is adjusted each year for inflation. The average inflation between 1900 and 1999 was 3.5%, and that is what I used in this projection; and 3) the portfolio grows at 8% each year. I am assuming a conservative asset mix of 60% fixed-income and 40% equities. The portfolio is rebalanced each year.

*First in a Three-Part Series*

# Wrong Map

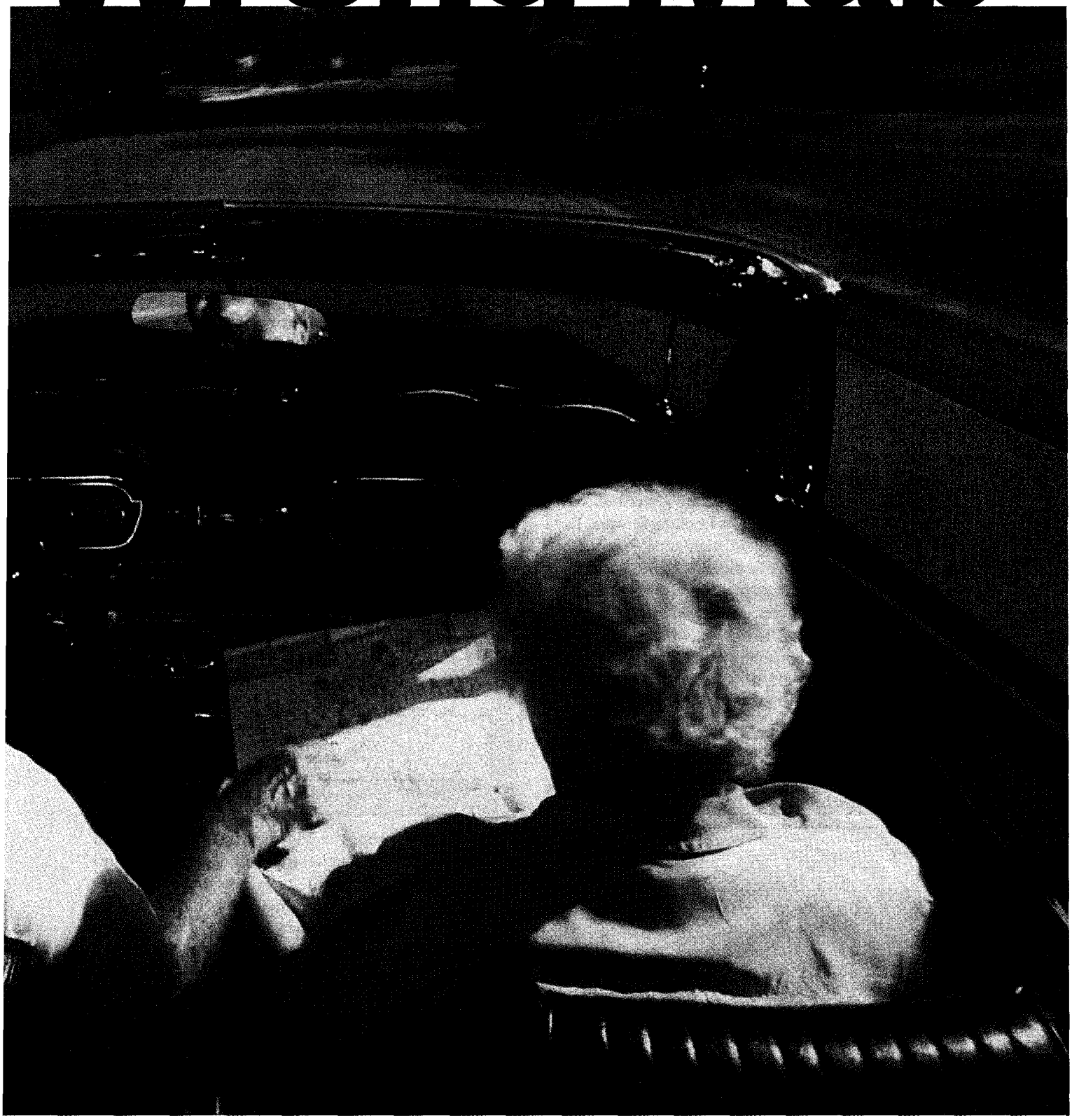
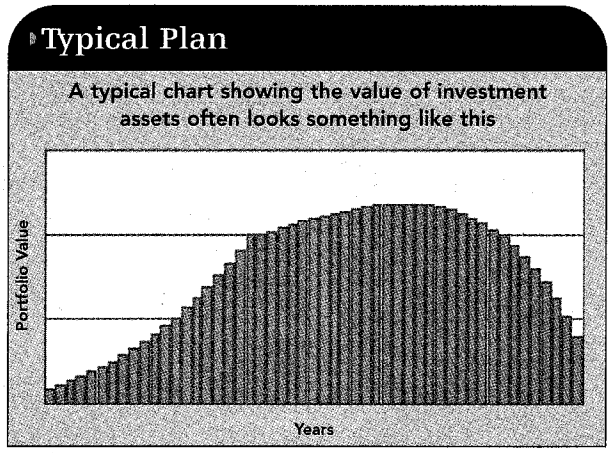


Figure 1



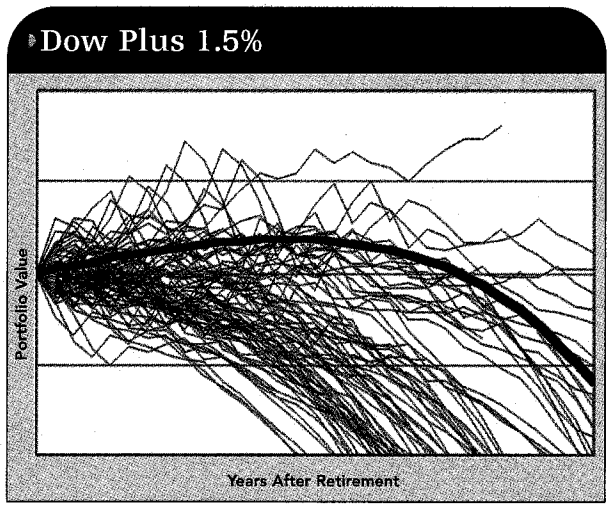

After reviewing Figure 1, you would be relieved to see that your client's portfolio will likely outlast her. Thanks to you, her planner, she is confident about her finances after retirement. Right?

Wrong!

Let's make two small changes to my previous assumptions and see what happens. Instead of the "average" growth rate for the equity markets, I use the actual growth rate. In this case, I use the Dow Jones Industrials Average between 1900 and 1999. Looking forward, I add the prevailing average dividend yield of 1.5% to the historic Dow returns to arrive at the total return for equities in my portfolio. Also, instead of using "average" inflation, I use the actual inflation between 1900 and 1999.

Now look at Figure 2. Each one of the black lines on the graph shows the portfolio value if one retired at the beginning of 1900, 1901, 1902 and so on until 1979. They cover all retirement years with at least 20 years of history, all years between 1900 and 1999.

Figure 2

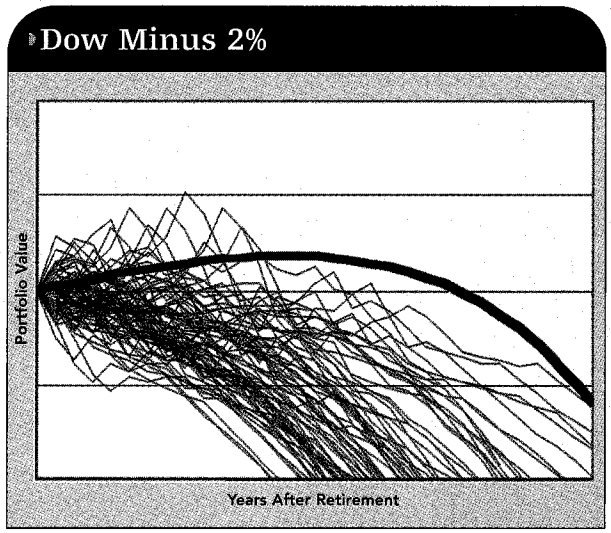



For comparison purposes, the red line shows the projection of the "standard" retirement plan as shown in Figure 1. Since I am only interested in what happens to the portfolio value after retirement, I used the portion of the projection that relates to after retirement in Figure 1.

There are seventy 30-year time periods in 100 years. It is interesting to note that after 30 years, in only seven times out of 70 did the real-life portfolio beat the standard retirement plan projection. In 63 times out of 70, the standard retirement plan was too optimistic.

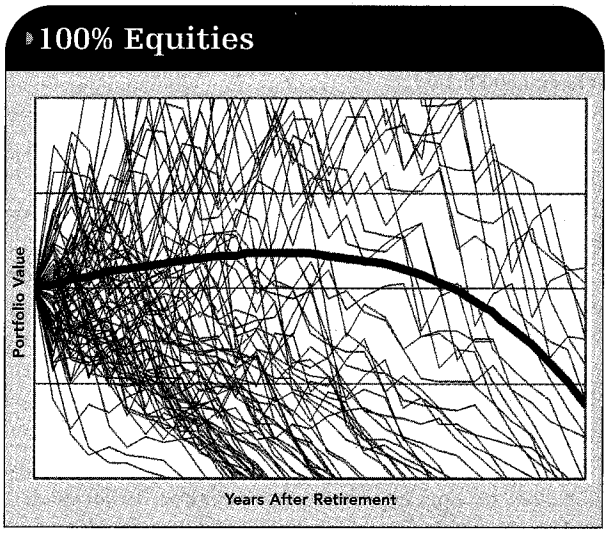
Some clients may be holding "average" equity funds in their portfolio. Over the long term, research shows that actively managed "average" mutual funds underperform the index by about 2% a year. Based on this, Figure 3 shows the retirement projections for 1900-99. If you were holding "average" equity funds, after about 15 years your portfolio never outperformed the standard retirement plan. In all cases, your standard retirement plan was too optimistic.

Figure 3



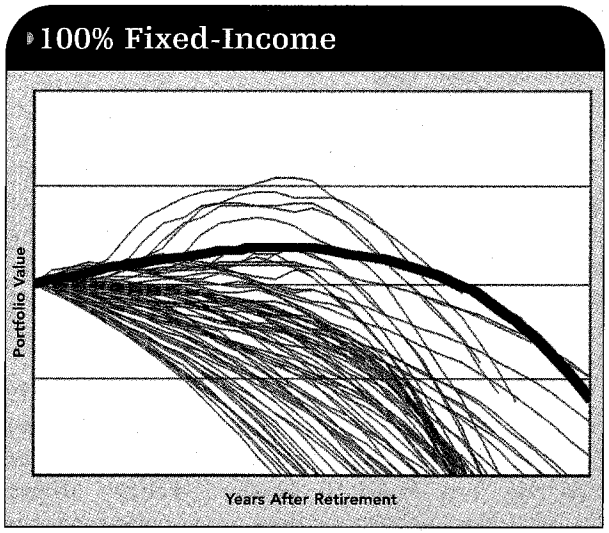

Is this scary enough? You may think that some of your clients can take higher risk for higher potential return. Instead of a balanced portfolio as we had in these two examples, they may decide to hold an all-equities portfolio. Unfortunately, that does not improve your client's projections by too much (Figure 4). If you were holding an all-equities portfolio, it would have outperformed the standard retirement plan projections in only seven times out of 70 after 30 years. In 90% of the cases, the standard financial plan was too optimistic. In the worst case, your client would be broke after only six years. It is certainly a high price to pay for this degree of volatility.

Figure 4




Of course, you can go to the other extreme and stick everything into the safety of fixed-income (Figure 5). That undoubtedly would reduce the volatility, but it would also increase the certainty of going broke. The cost of lower risk can come at a high price.

Figure 5




There are no tricks on these charts. Don't expect the standard retirement plan to do a better job at different withdrawal rates. I experimented with different initial withdrawal rates between 2% and 10%. During the years 1900 to 1999, the standard retirement plan was realistic only 10% to 15% of the time.

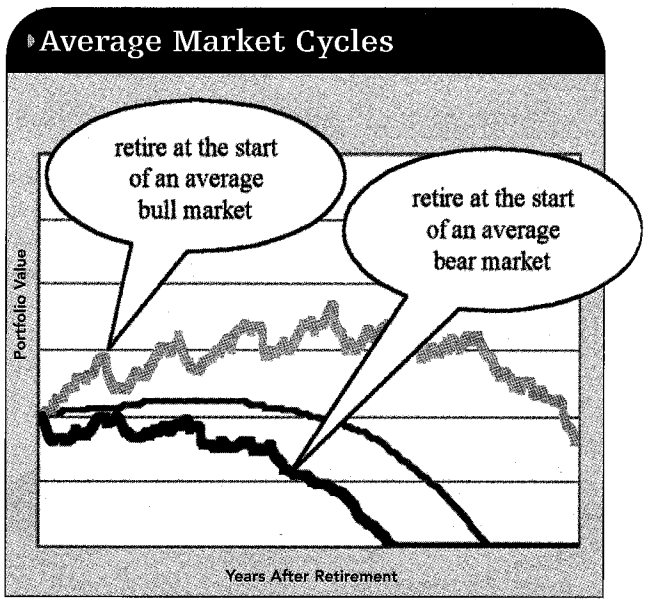
Why are the standard retirement plans so poor in their projections? The reason is simple: The underlying model is wrong.

There are four important reasons for the apparent failure of the standard retirement plan models: 1) market cycles, 2) reverse dollar-cost averaging, 3) inflation and 4) random fluctuations. Let's look at each of these points.

**Market cycles.** All financial plans assume a steady-state growth rate of the equity markets. However, there is a problem with this assumption: Stock markets do not grow steadily, they fluctuate. I don't mean the daily, weekly or monthly fluctuations. I mean the business cycles. Since 1854, the average business cycle lasted 53 months, the average bull market was 35 months and the average bear market was 18 months in duration.

Between 1945 and 1991, the average bull market was 50 months, and the average bear market was 11 months. The business cycles should be incorporated in every retirement plan. It makes a big difference whether a client starts his retirement at the start of a bear market or a bull market. Withdrawals during bear markets can deplete a portfolio much sooner than anticipated with a steady growth equity model. Figure 6 shows the difference between the steady state growth rate and the typical growth rate that incorporates idealized "average" market cycles. (The spreadsheet model is available for free downloading from my Web site: www.cotar.org.)

Figure 6




Extended bull or bear markets that are unusual in their severity or longevity are called megatrends. During the last century, we had three mega-bull markets. Two of them started after the end of the first and second world wars, and the third, which started after the Cold War, showed early signs of ending in 1982. A mega-bear market followed each of the first two mega-bull markets. We have yet to see if the bear market that developed after 1999 develops into a full-scale mega-bear market.

Mega-bear markets can have a devastating effect on retirement portfolios, because 1) periodic asset rebalancing will speed up depletion of the portfolio; 2) the retiree won't have the means to replenish the losses; and 3) the time horizon (i.e., the remaining life expectancy of the retiree) for recovery may be short.

**Reverse dollar-cost averaging.** To understand reverse dollar-cost averaging, first look at dollar-cost averaging (DCA), which is defined as adding a set dollar amount to an investment on a periodic basis. Say you hold an investment that goes through a bear market cycle. The share price first goes down and then goes back up. Figure 7 shows what happens with an initial investment of $500, to which $60 is added periodically. Initially, the share price is $10. During the bear market the share price goes down. From there, it gradually recovers back to $10.

Figure 7

**Dollar-Cost Averaging**

| Share price $ | Invested $ | Total cost $ | Number of shares bought | Share balance | Total market value $ |
|---|---|---|---|---|---|
| 10 | 500 | 500 | 50.0 | 50.0 | 500 |
| 7 | 60 | 560 | 8.6 | 58.6 | 410 |
| 8 | 60 | 620 | 7.5 | 66.1 | 529 |
| 9 | 60 | 680 | 6.7 | 72.7 | 655 |
| 10 | 60 | 740 | 6.0 | 78.7 | 787 |

Since both the starting and final share price are the same (i.e., $10), all of the profit is attributable only to the mathematics of DCA. How much is the profit? At the end of the cycle, the total cost is $740 and the total market value is $787. Therefore, the net profit due to DCA is 6.4%.

Reverse DCA is exactly the opposite: Start with $500 initially and withdraw $60 at each period (Figure 8).

Figure 8

**Reverse Dollar-Cost Averaging**

| Share price $ | Invested $ | Total cost $ | Number of shares bought | Share balance | Total market value $ |
|---|---|---|---|---|---|
| 10 | 500 | 500 | 50.0 | 50.0 | 500 |
| 7 | -60 | 440 | -8.6 | 41.8 | 290 |
| 8 | -60 | 380 | -7.5 | 33.9 | 271 |
| 9 | -60 | 320 | -6.7 | 27.3 | 245 |
| 10 | -60 | 260 | -6.0 | 21.3 | 213 |

How much is the profit? Because we had to sell more shares when the price was low for the same $60 periodic withdrawal, when the price went back up to $10, we had less shares to participate in the rise. At the end of the cycle, our total cost is $260, the total market value is $213, and therefore net loss due to reverse DCA is a whopping 18.1%!

This example may be somewhat extreme to prove my point. However, you can see that a good portion of a portfolio can be depleted during retirement because, in all likelihood, most retirees will endure three or four bear markets during that time.

**Inflation.** Clients may have some control over when they retire (with respect to market cycles), or they may work part time for a few years after retirement. But several years later, they may not have these choices. This is when inflation hits, when clients are most vulnerable.

On a year-to-year basis, the effects of inflation may not even be noticed. However over time, inflation is a real portfolio-buster in two ways: Initially, retirees withdraw more and more from their investments to meet their increasing living expenses. Then, to fight inflation, central banks occasionally increase short-term interest rates. This invariably pushes down the share prices, which in turn reduces the value of investments (at least temporarily). In the final analysis, your clients end up not only withdrawing increasingly larger amounts from their investments, but also doing so from a shrunken asset base.

**Random fluctuations.** In addition to cyclical megatrends and market cycles, share prices fluctuate randomly. When I added random fluctuations to my market-cycle model, it showed clearly their effect on the portfolio life. After several hundred simulations, the portfolio life increased at best by 9.4%. At worst it decreased by 7.5%. So, random fluctuations, although not a large contributor to the longevity of a portfolio, do make a difference.

Some newer financial planning models include Monte Carlo simulation. The Monte Carlo model picks up on this type of fluctuation randomness, but that may provide a false sense of security. Monte Carlo's main flaw is that it does not account for cyclical events. **FP**

**Next month:** Optimizing the asset mix and rebalancing frequency, based on 100 years of historic data, with the objective of maximizing portfolio life.

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