



Develop Business/Financial Planning

5 Warning Signs That a Retirement Portfolio Won't Last

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Price-to-earnings ratios are one way to gauge whether a distribution portfolio has staying power. Withdrawal rate as a percentage of portfolio value or compared with annuity payments are two more. Following are five indicators that will give you eight to 30 years' advance notice of when a portfolio will be depleted.

When it comes to retirement income, there are three significant risk factors for the retiree:

- **Longevity risk.** Longevity risk comes into the play when a retiree outlives his or her savings. Mortality tables indicate the percentage of survivability for each age. When you enter an age of death in a retirement plan, make sure that its probability of survivability does not exceed 15%. Entering 95 as the age of death in most retirement plans is usually a safe bet.
- **Market risk.** Market risk is the probability of portfolio depletion by the age of death. Make sure market risk does not exceed 10%; otherwise, you're courting the possibility of irreversible damage. If the market risk is over 10%—even just marginally—an exponentially higher level of genius or luck is required to recover from even a routine correction.
- **Inflation risk.** Inflation risk refers to the ability to maintain purchasing power. A good limit to set is 10%—purchasing power must stay above 90% of the requested amount. This becomes important when discussing variable annuities, variable pay annuities, and index-linked annuities.

A retirement plan must meet all three of the above criteria to be considered well designed. Are there any warning signals for a pending depletion of retirement savings? Yes, the following five scenarios should alert you to a problem with a distribution portfolio.

Warning signal 1: current price-to-earnings ratio

The [price-to-earnings ratio](#) (P/E) is one way of measuring the fair value of the stock market. If the average P/E of all the stocks that make up an index is high, the markets are assumed to be overvalued. If the average P/E is low, we assume the markets are undervalued. There are also studies that relate the prevailing P/E ratio to subsequent market performance.

What about distribution portfolios? The industry expects more than 80 million boomers to retire over the next 10 years. Is there a correlation between current P/E ratios and subsequent portfolio longevity? Yes—the prevailing P/E has a great influence on portfolio

life.

Using actual market history, I calculated the portfolio life for each year of retirement since 1900. In this example, the retirement portfolio starts with \$1 million, invested 40% in the S&P 500 and 60% in fixed income. The withdrawal in the first year is \$60,000; it is indexed to inflation in subsequent years. Thus, the [initial withdrawal rate](#) (IWR) is 6%, calculated as \$60,000 as a percentage of \$1 million.

On the equity side, I used the prevailing dividend rate of 2%. As for the management costs, I assumed 1.5% for the equity holdings and 1.0% for the fixed-income holdings. To smooth the fluctuations of the portfolio life within the average market cycle, I took the four-year moving average of the portfolio life.

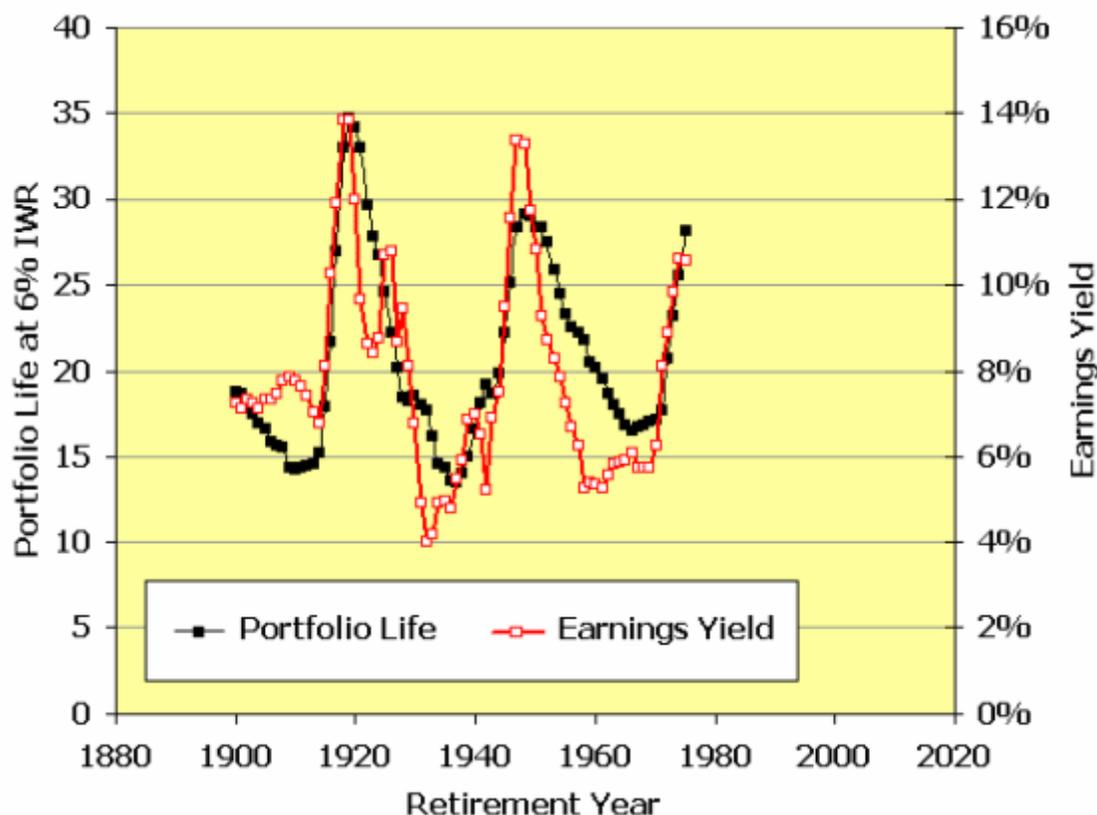
Next, I calculated the earnings yield (EY) since 1900. The EY is calculated as earnings divided by the stock price, the exact opposite of the P/E. I used the historic earnings data available in Robert Shiller's book [Market Volatility](#), between the years 1900 and 1935. For the years after 1935, the historic P/Es were available at the [Standard & Poor's](#) database. I calculated the EY for each year since 1900 and used the four-year moving average of the EY to smooth fluctuations.

Subsequently, I observed that the EY needed two modifications. The first one accounts for survivor bias after the market crash of 1929. Many companies went under during and immediately after the Great Depression. The earnings yield during this period included only the surviving companies. Therefore, I reduced the earnings yield by one-third between 1935 and 1945.

The second adjustment was for the years between 1900 and 1934. Before 1934, companies were not required to disclose detailed financial information. I allowed a three-year time lapse in the dissemination of real company information for all years before 1935. Besides these two modifications, I made no other adjustments for any years after 1945.

Next, I plotted the four-year moving average of the portfolio life over time. On the same chart (Figure 1), I also plotted the modified four-year moving average of the earnings yield. Can you spot the similarity of the two curves?

Figure 1: Portfolio Life and Earnings Yield Since 1900



Source: Otar & Associates

In the final analysis, you can estimate the average expected life for a well-diversified portfolio using the following formulas (PE4 is the average P/E ratio of the most recent four years):

- Portfolio life for a 6% initial withdrawal rate = $4 + (250/PE4)$
- Portfolio life for a 5% initial withdrawal rate = $4 + (360/PE4)$

Example: The P/E ratio for the S&P 500 was 28.31, 20.32, 18.83, and 17.05 at the end of June 2003, 2004, 2005, and 2006, respectively. The average of these four years is 21.13. The expected approximate life of a well-diversified portfolio at 5% initial withdrawal rate, fully indexed to inflation, retiring at the end of June 2006 is calculated like this:

$$\text{Portfolio life for 5\% IWR} = 4 + (360/21.13) = 21 \text{ years}$$

In this analysis the P/E tells us that the portfolio will run out in about 21 years. This warning signal will give you 12 to 30 years of advance notice.

Warning signal 2: the fourth-year check-up

Looking at all portfolios four years after retirement since 1900, some had a higher market value and some had lower when compared with the starting amount. Then reviewing each portfolio after 20 years, those that had a higher value after four years had a much higher survival rate than those with a lower value after four years.

The following table shows the numbers for U.S. investors. The asset mix is 40% DJIA and 60% fixed income.

Initial withdrawal rate	Is the portfolio value higher on the fourth anniversary of retirement? (Probability of depletion)	
	Yes	No
5%	0%	7%
6%	2%	38%
8%	6%	72%

Source: Otar & Associates

Table 2 shows the numbers for Canadian investors. The asset mix is 40% TSX and 60% fixed income.

Initial withdrawal rate	Is the portfolio value higher on the 4th anniversary of retirement? (Probability of depletion)	
	Yes	No
5%	0%	5%
6%	0%	30%
8%	10%	75%

Source: Otar & Associates

Here is how the fourth-year check-up works: On the fourth anniversary of retirement, look at the value of your client's total retirement savings. Does he have more money or less money than four years ago? If he has more money, don't worry; be happy. If he has [less money](#), the chances are—within the next 20 years—his portfolio will run out of money if his current withdrawals exceed 6% of the total portfolio value.

This warning signal will give you up to 20 years of advance notice.

Warning signal 3: withdrawals exceed the sustainable withdrawal rate

If the current withdrawal rate exceeds the sustainable withdrawal rate, the retirement assets will likely expire before their owner. You want at least a 90% probability that the portfolio will survive—a realistic number for retirement planning, as Tables 3 and 4 illustrate.

Time horizon (years)	Asset mix S&P500/fixed income	Sustainable withdrawal rate for 90% survival
10	15/85	9.3%

15	30/70	6.4%
20	30/70	5.1%
25	40/60	4.4%
30	40/60	3.8%
35	40/60	3.5%
40	40/60	3.2%

Source: Otar & Associates

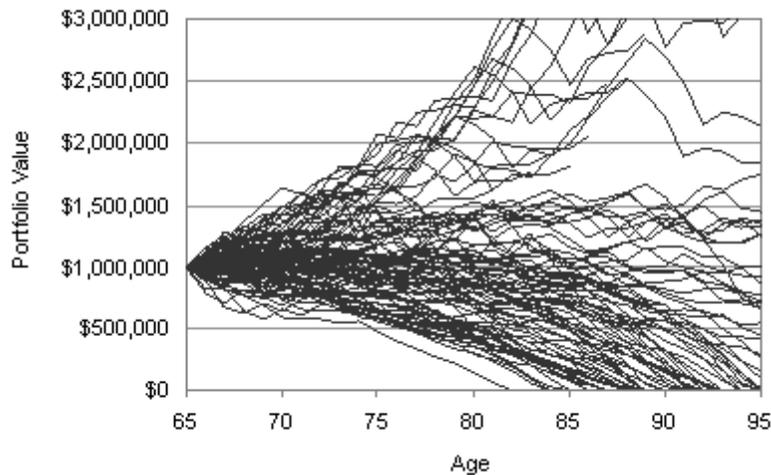
Table 4: Sustainable Withdrawal Rates With 90% Chance of Portfolio Survival (U.S.)		
Time horizon (years)	Asset mix TSX/fixed income	Sustainable withdrawal rate for 90% survival
10	30/70	9.8%
15	30/70	6.7%
20	40/60	5.3%
25	50/50	4.4%
30	50/50	3.9%
35	50/50	3.6%
40	50/50	3.3%

Source: Otar & Associates

Example: Bob has just retired at 65 years old. He has \$1 million in his portfolio, and he needs \$48,000 each year, indexed to actual inflation. His asset mix is 40% S&P 500 (index only) and 60% fixed income. He wants his money to last until age 95. What are the chances of going broke by age 95?

Answer: Bob's time horizon is 30 years. His sustainable withdrawal rate for 90% survival is 3.8%, which is less than his withdrawal rate of 4.8% (\$48,000 is 4.8% of \$1 million). Therefore, it is likely that he will be broke before age 95. Figure 2 shows the historic outcomes since 1900.

Figure 2: Probability of Portfolio Depletion



Source: Otar & Associates

The probability of portfolio depletion by age 95 is 64% in this example.

This warning signal will give you up to 15 to 25 years of advance notice.

Warning signal 4: withdrawals exceed the SPIA rate

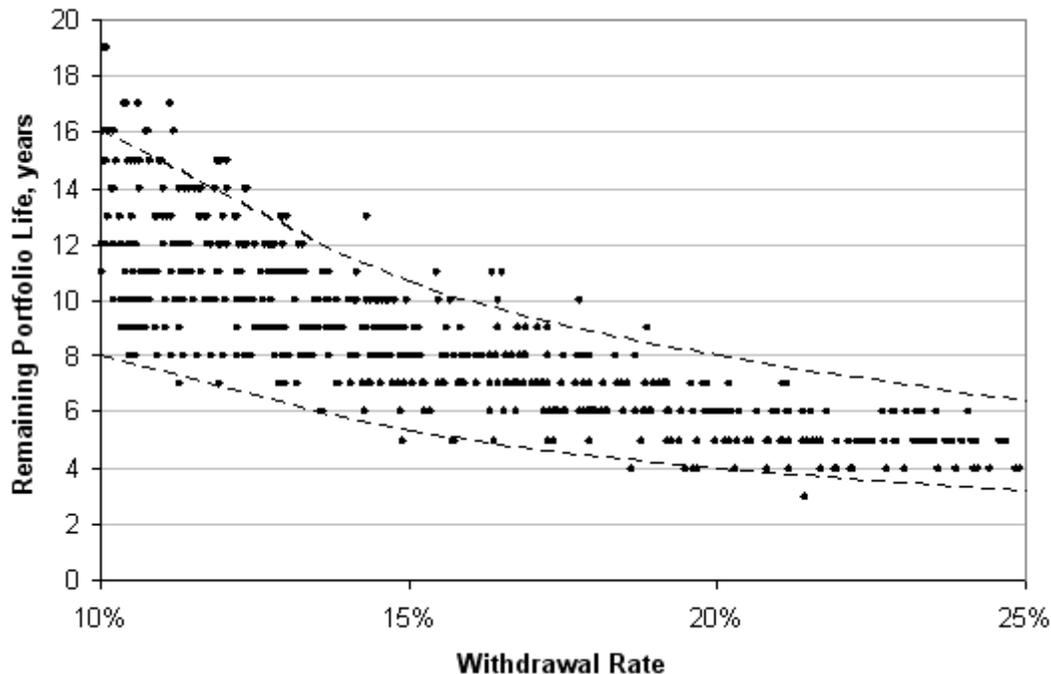
If the current withdrawal rate is larger than the payments that would be generated if one were to buy an immediate, single-premium life annuity (SPIA) using the entire retirement savings balance, the portfolio will likely run out of money during the retiree's lifetime.

This warning signal will give you up to 15 years of advance notice.

Warning signal 5: the final warning signal

Looking at all retirement years since 1900, I plotted the current withdrawal rate against the remaining portfolio life. Figure 3 depicts the results.

Figure 3: Remaining Portfolio Life vs. Current Withdrawal Rate



Source: Otar & Associates

Once the withdrawal rate exceeds 10% of the portfolio value, never in history has a balanced retirement portfolio lasted more than 19 years.

The following formulas will give you a rough estimate of the range of the remaining portfolio life:

- Maximum remaining portfolio life = $160/\text{withdrawal rate}$
- Minimum remaining portfolio life = $80/\text{withdrawal rate}$

This warning signal will give you eight to 16 years of advance notice.

A note of caution: Please don't try to re-create or verify these outcomes using a [Monte Carlo \(MC\) simulation model](#)—it won't work. There are many academic articles on retirement published in recent years, and their findings are generally flawed. This is because—either out of ignorance or competitive expediency—their research is based on man-made MC simulators. If you want to arrive at conclusions that resemble the reality, you definitely need to take the longer road in this type of research and use actual market history.

Conclusion

These five different and independently functioning warning signals will give you eight to 30 years of advance notice. As an advisor, you can no longer claim innocence and say, "I did not know about it!" You may want to go over your client accounts and see if any of these warning signals apply. If so, make sure to discuss them with your client and see if other income classes such as a life annuity would be a safer way of generating lifelong income. Your supreme objective must be to prevent nightmares—not sell dreams.

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