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February 2017

In-depth analysis and insights  
to inform your decision-making.



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## Retirement Investing **RETIRING IN A BEAR MARKET**

### EXECUTIVE SUMMARY

- While the stock market has experienced positive gains for eight years, investors nearing retirement or those newly retired are concerned about the timing of a potential bear market and the effect on their nest egg.
- By analyzing two time periods with significant bear markets at the onset of retirement, we found that an initial 4% withdrawal amount, increased to maintain purchasing power, produced good results in each scenario.
- Inflation is an important factor to consider when planning for retirement spending. While inflation has not been a large factor in recent years, it can have a significant impact on spending needs and the portfolio.

With the last bear market ending in March 2009, investors near retirement have been anxiously watching the market—and their portfolio balances—and wondering when the other shoe is going to drop. This extended bull market has been bittersweet. Investors have enjoyed growing account balances, but they also know it doesn't last forever. A top concern is that the market may turn right when they decide to retire.

When it comes to spending from your hard-earned money, the sequence of returns, meaning the order markets are rising and falling, is very important. Experiencing a bear market within the first five years of drawing down retirement assets can significantly increase the chance of the nest egg running out of money, especially if you are planning for a retirement horizon that could last decades.

As a result, retirees are hit with a double whammy: Their portfolio value is down and withdrawing money from a depressed portfolio locks in losses.

Therefore, there is less potential to benefit from future earnings over the rest of their retirement horizon.

This is every retiree's worst nightmare.

So, how dire might this be? And is there any good news for retirees who find themselves in this situation?

We wanted to examine historical bear markets and see the impact they have on retirees when markets drop early in the retirement period.

We analyzed retirees from two different time periods:

- Someone who retired Jan. 1, 1973, the most recent 30-year period that started with a bear market.
- Someone who retired Jan. 1, 2000, who has already lived through two recent bear markets and is more than halfway into their retirement years.

## THE 1973 RETIREE SCENARIO

In 1973, there was the onset of the oil embargo and energy crisis that sparked a recession. I remember gas shortages and rationing causing lines of cars circling the block and energy conservation attempts like year-round daylight savings time and a national speed limit.

Adding fuel to the fire (pardon the pun), the early 1970s were one of the highest inflationary periods in history seeing prices more than double in 10 years.

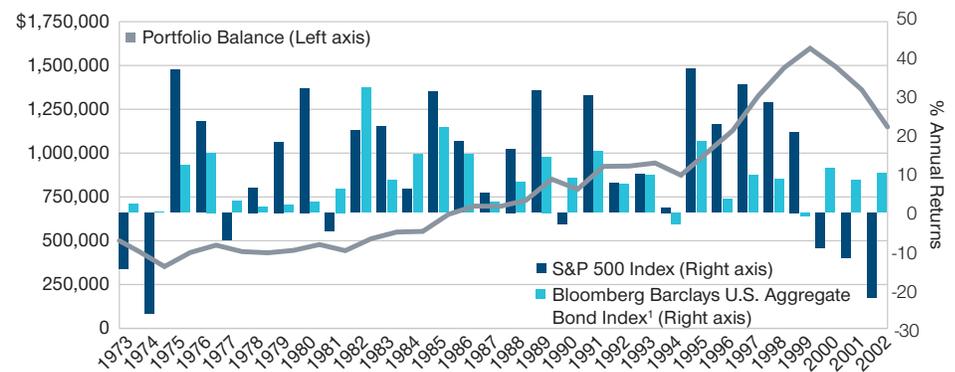
We assumed a starting portfolio of \$500,000 with an asset allocation of 60% stocks and 40% bonds throughout the entire horizon using the S&P 500 Index and the Bloomberg Barclays U.S. Aggregate Bond Index.<sup>1</sup>

We tested the “4% rule” assuming the investor started with an initial withdrawal amount that was 4% of the starting portfolio balance (\$20,000 the first year). This amount was adjusted each year based on actual inflation<sup>2</sup> in order to maintain purchasing power over the 30-year spending horizon. Many experts consider the “4% rule” a safe starting point that helps investors navigate an uncertain market environment, especially at the onset of retirement.

The beginning monthly withdrawal for the investor who retired in 1973 was \$1,667. But retirement would get off to a rocky start. This investor entered a bear market that would see the S&P 500 Index decline 48% within the next two years.

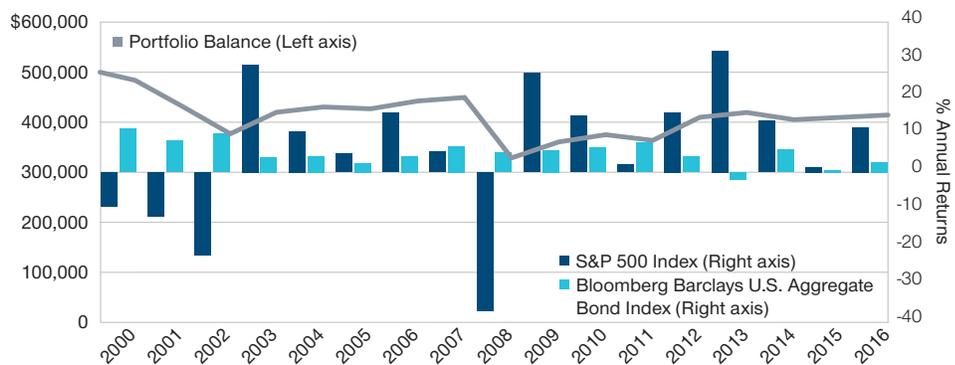
Not only did the investor have to cope with watching his portfolio shrink down to about \$328,500 by September 1974 (Figure 1), but inflation was also a huge factor. At the end of 1972, inflation was at 3.4% but it had soared to over 12% by the end of 1974.<sup>2</sup> Money at that time wasn't going as far as it used to when it came to paying for everyday expenses like gas and food.

**FIGURE 1: MARKET RETURNS AND PORTFOLIO BALANCE BEGINNING IN 1973**



Past performance cannot guarantee future results.

**FIGURE 2: MARKET RETURNS AND PORTFOLIO BALANCE BEGINNING IN 2000**



Past performance cannot guarantee future results.

But recovery was around the corner and the balance began to grow again with the help of two subsequent bull markets. The account balance recovered to over \$500,000 about 10 years into retirement in December of 1982 and actually hit \$1,000,000 by year's end of 1995.

When we saw a significant bear market in March 2000, those gains from the bull years helped the investor weather market swings.

At the end of 30 years, the portfolio balance for the investor who retired in 1973 was well above \$1 million despite all the market volatility incurred during those decades.

Of course, this investor didn't know after seeing the portfolio decline to \$328,500

just two years into retirement that the account would have more than doubled after 30 years.

## THE 2000 RETIREE SCENARIO

Let's fast forward to a more recent bear market scenario. Using the same assumptions from our first scenario, the investor who retired in 2000 is now just over halfway through a 30-year retirement period. And, again, consider the “4% rule,” spending \$20,000 the first year of retirement and adjusting each year based on actual inflation to maintain purchasing power.

The investor who retired in 2000 encountered a bear market that started in March 2000 and also weathered the great financial crisis of 2008.

<sup>1</sup>Benchmark reflects the Bloomberg Barclays Government/Credit US Bond Index for the period 1973–1975 and the Bloomberg Barclays US Aggregate Bond Index from 1975 to the present.

<sup>2</sup>Consumer Price Index, seasonally adjusted.

The S&P 500 lost 49% between March 2000 and October 2002 and a bit over 56% between October 2007 and March 2009.

This investor, however, had a couple things working in her favor, like a benign inflationary environment. Inflation between 2000 and 2009 topped out at 4.1% in 2007 and was at 0% in 2008.<sup>2</sup> A strong bond market during this time also helped buoy returns.

Since this investor's retirement on Jan. 1, 2000:

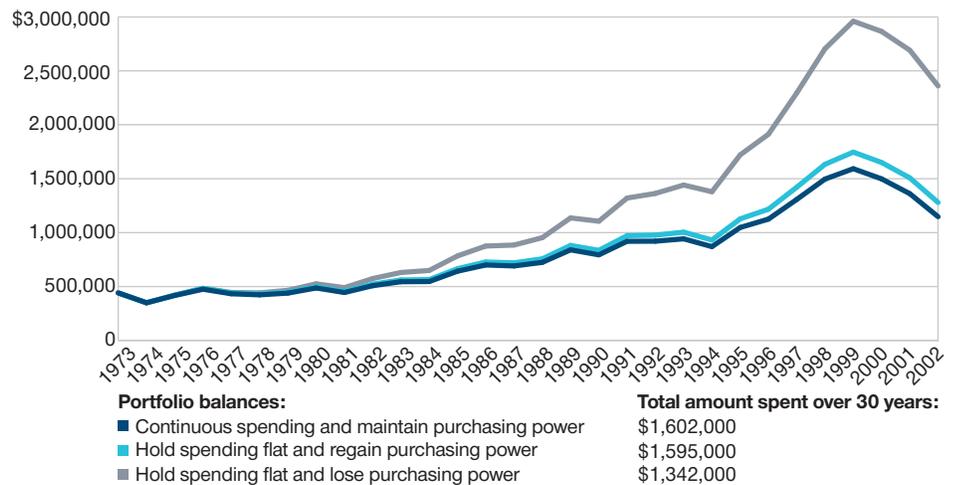
- The portfolio balance dropped to under \$365,000 in February of 2003, just three years into retirement.
- The account rebounded to a high of almost \$463,000 in October 2007, before the next bear market would start in 2008.

The portfolio flirted with a \$300,000 balance in February 2009. However, the last eight years of market growth and strong rebound helped the balance grow to over \$414,000 as of year-end 2016. (Figure 2 on page 2)

While this investor is more than halfway into a 30-year retirement horizon, we wanted to analyze how well these assets would hold up over the next 13 years. We used the T. Rowe Price Retirement Income Calculator and assumed the following:

- An 82-year-old living with no spouse/partner in retirement.
- An ending balance of \$414,399 as of year-end 2016.
- A hypothetical portfolio composed of 60% stocks and 40% bonds.
- Continuing monthly withdrawals from the portfolio growing by a 3% annual rate of inflation. We started year 2017 with a monthly withdrawal of \$2,421. This resulted in 92% Simulation

**FIGURE 3: PORTFOLIO BALANCES OVER THREE SPENDING SCENARIOS FOR A RETIREE BEGINNING IN 1973**



**Past performance cannot guarantee future results.**

- Success Rate (i.e., the investor has at least \$1 remaining in the portfolio at the end of retirement) for the investor based on 1,000 market scenarios.
- No Social Security or other income was considered as we were only assessing the impact of withdrawals on personal savings. (See page 5 for a detailed description of Monte Carlo assumptions).

need to make some kind of adjustment when seeing this precipitous drop in their nest eggs. As a matter of fact, in our recent study that asked about investor behavior,<sup>3</sup> we learned this about retirees:

- 89% found they can adjust their lifestyle to their income
- 60% prefer to adjust spending (either up or down) depending on the market to maintain the value of their portfolio
- 78% reduce spending immediately if spending exceeds their income

**MAKING SPENDING ADJUSTMENTS**

Hindsight is 20/20, and our analysis shows that in each scenario, retirees starting with a conservative withdrawal amount were able to maintain their purchasing power over each period and not run out of money.

But, it doesn't mean the investors didn't have heartburn along the way. Imagine retiring in early 1973 to see your portfolio, just two years into retirement, drop by more than one-third.

Or the investor in 2000 who saw her portfolio balance decline about 40% nine years into retirement.

It's human nature to adapt and adjust. Most likely, both retirees would feel the

So, if an investor in the throes of a bear market wanted to try to preserve their account balance by spending less, how would that affect his or her circumstances over time? What would be a trigger point for that response?

We looked at the same two retired investors again and assumed once their original portfolio value of \$500,000 dropped by 30%—or below \$350,000—they would temporarily adjust their spending to help offset the steep loss.

We assumed the investor who retired in 1973 would make spending adjustments at the end of 1974 for just

<sup>3</sup>T. Rowe Price, "First Look: Assessing the New Retiree Experience" (2014).

**FIGURE 4: SPENDING SCENARIOS FOR SOMEONE WHO RETIRED IN 2000**

	Portfolio Balance		Total amount spent over 17 years
	Beginning 2000	Ending 2016	
Continuous spending and maintain purchasing power	\$500,000	\$414,399	\$417,000
Hold spending flat and regain purchasing power	\$500,000	\$420,159	\$414,000
Hold spending flat and lose purchasing power	\$500,000	\$429,090	\$406,600

**Past performance cannot guarantee future results.**

two years. Instead of having a monthly withdrawal of \$2,035 starting in 1975, the monthly withdrawal would remain at \$1,816 and stay at that amount until the end of 1976. Though forgoing inflation adjustments sounds tame, this actually would have translated into a cut in spending because of the higher inflationary environment at that time.

This retiree would never have to take another cut in income for the remainder of the 30-year retirement period and by the end 2002, the portfolio had grown to over \$2 million. Sounds great, right? But consider that when this investor resumed taking inflation adjustments in 1977, those adjustments were based on a lower withdrawal amount than if he had never made any reductions in spending. This resulted in a permanent loss of purchasing power. While the investor spent considerably less money over time, he would have likely felt the pinch during high inflationary times. At the same time, he would have had considerably more breathing room and the ability to increase spending later in retirement.

But what if the same investor decided after two years of flat spending to increase annual withdrawals to the same level they would have been if no cuts were made? In that case, the investor would have more to spend each year while regaining full purchasing power.

In this scenario, the investor's portfolio value would have been almost \$1.3 million after 30 years, and the investor would have been able to keep pace with inflation. (Figure 3—see previous page)

If we were to apply the same spending scenario to the investor who retired in 2000, she would not have experienced

as severe a loss in purchasing power because inflation was relatively mild in the 2000s compared with the 1970s.

This retiree would not have to forgo annual inflation adjustments until 2009 after the second bear market in this time period. We assumed the annual withdrawals remained flat for four years until 2013 when the portfolio value finally got back above \$400,000.

There isn't as much different between the end portfolio balances in this scenario, however, as inflation during this time remained well below 3%.

If the investor resumed taking inflation adjustments in 2013, the portfolio value at the end of 2016 would have been just over \$429,000 compared with \$414,000 if no adjustments in annual income had been made at all and \$420,000 if adjusting to regain purchasing power. The narrow difference reflects the impact that very modest inflation can have on spending rates in general. (Figure 4)

**APPROACHING RETIREMENT AND THE UNKNOWN**

We can't predict future markets. While past returns do not guarantee future performance, our analysis in applying an initial 4% withdrawal amount—and accounting for inflation adjustments—seems to be able to sustain multiple bear markets, even when the bear market happens early in retirement.

History has shown that bear markets have typically been followed by a healthy market recovery. But while investors are in the thick of market downturns, it may

be difficult to stay the course and believe things will turn around.

When starting a drawdown strategy from a retirement nest egg, it's a good idea to start out with a conservative withdrawal amount. The first five years into retirement may be the most critical time period, especially if markets fall. Try to resist the urge to make drastic changes in portfolio strategy when markets become more volatile, especially early in your retirement horizon.

If you do feel the need to make changes, temporary adjustments to spending can help sustain portfolio balances throughout retirement and they seem like actions most retirees expect to make. But it's also important to be aware of the inflationary environment. Over time, inflation can eat into your portfolio and impact your spending.

A conservative starting point allows much more flexibility later in retirement after weathering a bear market or if there isn't a bear market early on. As we saw in the 1973 scenario, balances doubled and the investor could have spent more. The investor who retired in 2000 now has a success rate of 92% and may be able to potentially spend more going forward.

The idea of retirement itself may cause anxiety for many investors. When someone finally makes that decision to retire, it can be unsettling to see the market tumble. By following a conservative withdrawal approach early in retirement and planning for temporary adjustments along the way (if needed) retirees can weather the markets and truly have a fulfilling and enjoyable next phase of life.

**ASSUMPTIONS**

The hypothetical examples above are based on the performance of the S&P 500 Index, which tracks the performance of 500 large-company stocks, and the Bloomberg Barclays Aggregate Bond Index, which tracks domestic investment-grade bonds, including corporate, government, and

mortgage-backed securities, for the time periods represented. Indexes are unmanaged and it is not possible to invest directly in an index. These hypothetical examples are meant for illustrative purposes only and do not reflect an actual investment, nor does it account for the effects of taxes or any investment expenses. Investment returns are not guaranteed, cannot be predicted and will fluctuate. All investments are subject to risk, including the possible loss of the money invested.

#### **MONTE CARLO DISCLOSURE FOR THE RETIREMENT INCOME CALCULATOR (RIC)**

The retirement income results are presented as a snapshot of the first month in retirement. These estimates are displayed in today's dollars and do not take any taxes into account that may be due upon withdrawal. The dollar amounts are assumed to increase by 3% each year throughout the retirement horizon.

Any Social Security estimates are based on your current annual salary, current age, and age at retirement. The accuracy of the estimate depends on the pattern of your actual past and future earnings. The estimate may not be representative of your situation. Estimates for retirement ages prior to age 62 and some spousal estimates may also be included for illustrative purposes only. Visit [socialsecurity.gov](http://socialsecurity.gov) for more information.

#### **MONTE CARLO SIMULATION**

Monte Carlo simulations model future uncertainty. In contrast to tools generating average outcomes, Monte Carlo analyses produce outcome ranges based on probability, thus incorporating future uncertainty.

#### **MATERIAL ASSUMPTIONS INCLUDE:**

- Underlying long-term expected annual returns for the asset classes are not based on historical returns. Rather, they represent assumptions that take into account, among other things, historical returns. They also include

our estimates for reinvested dividends and capital gains.

- These assumptions, as well as an assumed degree of fluctuation of returns around these long-term rates, are used to generate random monthly returns for each asset class over specified time periods.
- The monthly returns are then used to generate 1,000 scenarios, representing a spectrum of possible performance for the modeled asset classes. Analysis results are directly based on these scenarios.
- Required minimum distributions (RMDs) are included. In the simulations, if the RMD is greater than the planned withdrawal, the excess amount is reinvested in a taxable account.

#### **MATERIAL LIMITATIONS INCLUDE:**

- The analysis relies on return assumptions, combined with a return model that generates a wide range of possible return scenarios from these assumptions. Despite our best efforts, there is no certainty that the assumptions and the model will accurately predict asset class return ranges going forward. As a consequence, the results of the analysis should be viewed as approximations, and users should allow a margin for error and not place too much reliance on the apparent precision of the results. Users should also keep in mind that seemingly small changes in input parameters (the information the user provides to the tool, such as age or contribution amounts) may have a significant impact on results, and this (as well as mere passage of time) may lead to considerable variation in results for repeat users.
- Extreme market movements may occur more often than in the model.
- Some asset classes have relatively short histories. Actual long-term results for each asset class going forward may differ from our assumptions, with

those for classes with limited histories potentially diverging more.

- Market crises can cause asset classes to perform similarly, lowering the accuracy of our projected return assumptions and diminishing the benefits of diversification (that is, of using many different asset classes) in ways not captured by the analysis. As a result, returns actually experienced by the investor may be more volatile than projected in our analysis.
- The model assumes no month-to-month correlations among asset class returns (correlation is a measure of the degree in which returns are related or dependent upon each other). It does not reflect the average duration of bull and bear markets, which can be longer than those in the modeled scenarios.
- Inflation is assumed to be constant, so variations are not reflected in our calculations.
- The analysis assumes a diversified portfolio, which is rebalanced monthly. Not all asset classes are represented, and other asset classes may be similar or superior to those used.
- Taxes on withdrawals are not taken into account, nor are early withdrawal penalties.
- The analysis models asset classes, not investment products. As a result, the actual experience of an investor in a given investment product (e.g., a mutual fund) may differ from the range of projections generated by the simulation, even if the broad asset allocation of the investment product is similar to the one being modeled. Possible reasons for divergence include, but are not limited to, active management by the manager of the investment product or the costs, fees, and other expenses associated with the investment product. Active management for any particular investment product—the selection of a portfolio of individual securities that differs from the broad asset classes

modeled in this analysis—can lead to the investment product having higher or lower returns than the range of projections in this analysis.

#### MODELING ASSUMPTIONS:

- The primary asset classes used for this analysis are stocks, bonds, and short-term bonds. An effectively diversified portfolio theoretically involves all investable asset classes, including stocks, bonds, real estate, foreign investments, commodities, precious metals, currencies, and others. Since it is unlikely that investors will own all of these assets, we selected the ones we believed to be the most appropriate for long-term investors.
- Results of the analysis are driven primarily by the assumed long-term, compound rates of return of each asset class in the scenarios. Our corresponding assumptions, all presented in excess of inflation, are as follows: for stocks, 4.90%; for bonds, 2.23%; and for short-term bonds, 1.38%.
- Investment expenses in the form of an expense ratio are subtracted from

the return assumption as follows: for stocks, 0.70%; for bonds, 0.60%; and for short-term bonds, 0.55%. These expenses represent what we believe to be a reasonable approximation of investing in these asset classes through a professionally managed mutual fund or other pooled investment product.

#### PORTFOLIO AND INITIAL WITHDRAWAL AMOUNT

- The portfolio is either determined by the user or based on preconstructed allocations that consider the user's current age and shift throughout the retirement horizon (as displayed in the graphic "Why should I consider this?" in the Asset Allocation section).
- The initial withdrawal amount is assumed to be distributed in 12 monthly payments at the beginning of each month for the year; in each subsequent year, the amount withdrawn is adjusted to reflect a 3% annual rate of inflation. The modeled asset class scenarios and withdrawal amounts may be calculated at, or result in, a Simulation Success Rate. Simulation Success Rate is a

probability measure and represents the number of times our outcomes succeed (i.e., has at least \$1 remaining in the portfolio at the end of retirement).

**IMPORTANT: The projections or other information generated by the T. Rowe Price Retirement Income Calculator regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. The projections are based on assumptions. There can be no assurance that the projected results will be achieved or sustained. The charts present only a range of possible outcomes. Actual results will vary with each use and over time, and such results may be better or worse than the projected scenarios. Clients should be aware that the potential for loss (or gain) may be greater than demonstrated in the projections.**

The results are not predictions, but they should be viewed as reasonable estimates. Source: T. Rowe Price Associates, Inc.

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