
Maximum Withdrawal Rate: A Historical Perspective

By Craig L. Israelsen, Ph.D. Fri, Sep 11, 2015

We obsess about safe withdrawal rates. But the developer of the "7Twelve Portfolio" shows that anyone retiring from 1970 to 1990 would have vastly underspent by using the '4% rule.' He suggests that excess caution can be as much a hazard as excess spending.

Few topics are more important to retirees than determining (or estimating) the “safe withdrawal rate” from their investment portfolios. As human longevity increases, the demands placed on the retirement nest egg continue to escalate. This study takes a historical perspective on this issue of retirement portfolio withdrawal rate, as opposed to a Monte Carlo perspective.

Rather than estimate the safe withdrawal rate for a retirement portfolio based on hundreds or thousands of simulations, this analysis evaluated the maximum initial withdrawal rate for two different retirement portfolios using actual historical returns over rolling 25-year periods.

The time frame of this study is the 45-year period from 1970-2014. Over this 45-year period there were 21 rolling 25-year periods. A 25-year period simulates the experiences of those who retire at age 65 and draw upon retirement portfolio through the age of 90—assuming they live that long. The maximum initial withdrawal rate that was calculated for each 25-year period led to a 100% success rate in meeting the stipulated ending outcome.

Two investment portfolios were evaluated in this study using well-known market indexes: A 60/40 portfolio consisting of 60% large cap US stock and 40% US bonds and a diversified 7-asset portfolio consisting of large cap US stock, small cap US stock, non-US stock, real estate, commodities, US bonds, and cash. Each asset class in the 7-asset portfolio was equally weighted at 14.28% each. Both portfolios were rebalanced annually.

Taxes and fees (advisor fees and/or investment product fees) were not taken into account. In actual practice, taxes will differ by type of retirement account and individual circumstances. Investment product fees can be held very low by using an ETF-based investment model (30-40 bps). Inflation was accounted for by use of a COLA (explained later) in the analysis.

Portfolio survival

The survivability of a retirement portfolio depends on the *initial withdrawal rate* in the first

year of retirement. Unless changed in subsequent years, the initial withdrawal rate sets the pace of the portfolio depletion. This analysis assumes that a retiree's pattern of annual withdrawals from their retirement portfolio is established by their initial withdrawal rate and then annually adjusted by the COLA (cost-of-living adjustment) they select.

Let's assume an investor with a retirement portfolio of \$500,000 by the time she is ready to retire. A 4% initial withdrawal rate the first year produces a cash withdrawal of \$20,000. If that is not enough money, she may be inclined to withdraw 5%, or \$25,000 the first year. In either case, she plans to increase the amount of cash withdrawn each year by a COLA of 3%.

As much as we would like to believe that retirees govern their portfolio withdrawals based on research on the topic of sustainable withdrawal rates and Monte Carlo analysis, many don't. Rather, they withdraw the amount of money needed to fund their first year of retirement. As a result of the cart-driving-the-horse (allowing the needed amount of first year retirement income to determine the initial withdrawal rate percentage) the initial withdrawal rate could be 6%, 8%, or even 12% of the account balance.

Once the initial withdrawal amount (and therefore the initial withdrawal rate) has been established, the die has been cast. It's unlikely that retirees will withdraw less money in the second or third year, and so on. In fact, they will likely add a COLA (cost of living adjustment) to their annual withdrawal so that they can keep pace with actual or perceived inflation. Thus, choosing the initial withdrawal amount/withdrawal percentage of account balance is a crucially important decision. It sets into motion a pattern that will dramatically impact how long the portfolio will last.

Maximum initial withdrawal rate

This analysis takes a novel approach in the evaluation of retirement portfolio survival. Rather than impose a pre-determined withdrawal rate, this analysis determined the *maximum* initial withdrawal rate that could have been sustained by the portfolio over a 25-year period assuming a 3% annual COLA in the cash being withdrawn. The performances of the portfolios in the study were not estimated through a Monte Carlo simulation but reflected the historical returns of actual indexes.

Three ending outcomes for the retirement portfolios were imposed in this analysis:



(1) An ending account balance of zero dollars in the retirement portfolio after each rolling 25-year period.

(2) An ending balance equal to the starting balance at the end of each 25-year period.

(3) An ending balance twice (2x) as large as the starting balance after each 25-year period.

Shown in Table 1 are the results for the maximum initial withdrawal rate analysis assuming a zero account balance at the end of each 25-year period. The first 25-year period was from 1970 to 1994. If the initial withdrawal rate was set at 9.70% (meaning that 9.70% of the account balance was withdrawn at the end of the first year) the diversified 7-asset retirement portfolio was exhausted at the end of year 25. The 60/40 portfolio was exhausted after 25 years assuming a maximum initial withdraw rate of 7.76%.

**Table 1. Retirement Portfolio Survival Analysis:
Zero Ending Balance**



Retirement Portfolio Survival Analysis <i>Diversified Asset Allocation</i>		Diversified 7-Asset Portfolio* with Equal Allocations (14.28% each)	Traditional 60% Stock/40% Bond Portfolio
Rolling 25-Year Periods Zero Account Balance After 25 Years			
Starting Year	Ending Year	Maximum Initial Withdrawal Rate with 3% COLA (zero account balance after 25 years)	Maximum Initial Withdrawal Rate with 3% COLA (zero account balance after 25 years)
1970	1994	9.70%	7.76%
1971	1995	10.75%	7.80%
1972	1996	10.45%	7.63%
1973	1997	10.00%	7.36%
1974	1998	11.10%	8.77%
1975	1999	13.55%	11.54%
1976	2000	12.95%	10.33%
1977	2001	12.30%	9.54%
1978	2002	12.60%	11.09%
1979	2003	12.31%	12.07%
1980	2004	11.30%	12.28%
1981	2005	10.35%	11.50%
1982	2006	11.53%	13.25%
1983	2007	11.05%	11.91%
1984	2008	10.15%	11.41%
1985	2009	10.50%	11.67%
1986	2010	9.30%	10.12%
1987	2011	8.51%	9.50%
1988	2012	8.72%	10.09%
1989	2013	8.00%	9.87%
1990	2014	7.34%	8.66%
Average Maximum Initial Withdrawal Rate with Zero Ending Balance		10.59%	10.20%

The next 25-year period was 1971-1995. In this period, the maximum initial withdrawal rate was 10.75% for the 7-asset portfolio and 7.80% for the 60/40 portfolio. Over all 21 rolling 25-year periods the maximum initial withdrawal rate for the 7-asset portfolio averaged 10.59% and 10.20% for the 60/40 portfolio—under the assumption that the portfolio was exhausted at the end of each 25-year period. It is worth noting that the maximum initial

withdrawal rates for both portfolios have been smaller in recent years.

Table 2 summarizes the maximum initial withdrawal rate under the assumption that the ending balance in the account at the end of each 25-year period was equal to the starting balance in year 1. Understandably, the maximum withdrawal rate is lower in every case. The average maximum initial withdrawal rate for the 7-asset portfolio was 9.79% vs. 9.44% for the 60/40 portfolio. Thus, if imposing a requirement that the retirement portfolio finish each 25-year period with an ending balance equal to the starting balance, the maximum initial withdrawal rate was reduced by 80 bps in the 7-asset portfolio and by 76 bps in the 60/40 portfolio.



**Table 2. Retirement Portfolio Survival Analysis:
Ending Balance Equal to Starting Balance**

Retirement Portfolio Survival Analysis <i>Diversified Asset Allocation</i>		Diversified 7-Asset Portfolio* with Equal Allocations (14.28% each)	Traditional 60% Stock/40% Bond Portfolio
Rolling 25-Year Periods Ending Account Balance Equal to Starting Balance After 25 Years			
Starting Year	Ending Year	Maximum Initial Withdrawal Rate with 3% COLA <small>(Ending account balance equal to starting balance after 25 years)</small>	Maximum Initial Withdrawal Rate with 3% COLA <small>(Ending account balance equal to starting balance after 25 years)</small>
1970	1994	9.14%	7.13%
1971	1995	10.25%	7.27%
1972	1996	9.97%	7.12%
1973	1997	9.51%	6.91%
1974	1998	10.57%	8.36%
1975	1999	13.03%	11.12%
1976	2000	12.38%	9.86%
1977	2001	11.59%	8.99%
1978	2002	11.79%	10.42%
1979	2003	11.59%	11.43%
1980	2004	10.57%	11.60%
1981	2005	9.63%	10.76%
1982	2006	10.79%	12.48%
1983	2007	10.27%	11.08%
1984	2008	8.97%	10.27%
1985	2009	9.37%	10.59%
1986	2010	8.25%	9.04%
1987	2011	7.33%	8.36%
1988	2012	7.54%	8.96%
1989	2013	6.86%	8.81%
1990	2014	6.14%	7.61%
Average Maximum Initial Withdrawal Rate With Ending Balance Equal to Starting Balance		9.79%	9.44%

Finally, in Table 3 we find the results of the analysis under the assumption that the ending account balance needed to be twice (2x) as large as the starting balance. The average maximum initial withdrawal rate for the 7-asset portfolio was 8.96% and 8.67% for a 60/40 portfolio. The smallest maximum initial withdrawal rate for the 7-asset portfolio over all 21 rolling 25-year periods was 4.94%—which was in the most recent 25-year period, from

1990-2014.

**Table 3. Retirement Portfolio Survival Analysis:
Ending Balance 2x Larger Than Starting Balance**

Retirement Portfolio Survival Analysis Diversified Asset Allocation		Diversified 7-Asset Portfolio* with Equal Allocations (14.28% each)	Traditional 60% Stock/40% Bond Portfolio
Rolling 25-Year Periods Ending Account Balance 2x Larger than Starting Balance After 25 Years			
Starting Year	Ending Year	Maximum Initial Withdrawal Rate with 3% COLA (Ending account balance 2x larger than starting balance after 25 years)	Maximum Initial Withdrawal Rate with 3% COLA (Ending account balance 2x larger than starting balance after 25 years)
1970	1994	8.57%	6.49%
1971	1995	9.72%	6.73%
1972	1996	9.46%	6.61%
1973	1997	8.99%	6.46%
1974	1998	10.01%	7.94%
1975	1999	12.45%	10.70%
1976	2000	11.79%	9.38%
1977	2001	10.87%	8.45%
1978	2002	10.96%	9.74%
1979	2003	10.84%	10.76%
1980	2004	9.83%	10.91%
1981	2005	8.87%	10.02%
1982	2006	10.04%	11.72%
1983	2007	9.47%	10.27%
1984	2008	7.75%	9.12%
1985	2009	8.23%	9.49%
1986	2010	7.14%	7.95%
1987	2011	6.13%	7.21%
1988	2012	6.35%	7.82%
1989	2013	5.71%	7.75%
1990	2014	4.94%	6.56%
Average Maximum Initial Withdrawal Rate With Ending Balance 2x Larger Than Starting Balance		8.96%	8.67%

In summary, these results demonstrate that diversified retirement portfolios can sustain unusually high initial withdrawal rates—far higher than the typical “4% withdrawal rate” guideline. Understandably, it is impossible to know at the start of any 25-year period what the maximum withdrawal rate can be set at. This analysis does not suggest that an initial

withdrawal rate of 8% or 10% be employed, but it also suggests that imposing a very low initial withdrawal rate of 2% or 3% may be too conservative in light of actual index-based historical results.

Finally, this analysis is based on the last 45 years of actual performance, from 1970 to 2014. Are the last 4.5 decades an anomaly? It is what it is. Or, rather—it was what it was.

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The 45-year historical performance of large-cap US stock was represented by the S&P 500 Index, while the performance of small-cap US stock was measured using the Ibbotson Small Companies Index from 1970-1978 and the Russell 2000 Index from 1979-2014. The performance of non-US stock was represented by the Morgan Stanley Capital International EAFE Index Index. U.S. bonds were represented by the Ibbotson Intermediate Term Bond Index from 1970-75 and the Barclays Capital Aggregate Bond Index from 1976-2014. As of late 2008, Lehman Brothers indexes became “Barclays Capital” indexes. The historical performance of cash was represented by three-month Treasury bills. The performance of real estate was measured by using the annual returns of the NAREIT Index (National Association of Real Estate Investment Trusts) from 1970-1977 (annual returns for 1970 and 1971 were regression-based estimates inasmuch as the NAREIT Index did not provide annual returns until 1972). From 1978-2014 the annual returns of the Dow Jones US Select REIT Index were used (prior to April 2009 it was the Dow Jones Wilshire REIT Index). Finally, the historical performance of commodities was measured by the Goldman Sachs Commodities Index (GSCI). As of February 6, 2007, the GSCI became S&P GSCI.