

Average Versus Worst Case Projections of Retirement Portfolios

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The asset allocation decision for retirement is one of the most important financial decisions of a household. This decision has become more important due to the increase in the prevalence of 401(k) plans and related retirement saving programs, and the decrease in the use of defined-benefit plans since the 1980s. Typically, financial planners use average rates of return and risk measures in recommending asset allocations for their clients. However, investors often invest for particular time periods and these time periods may have unusually high or low rates of return on assets. Therefore, both a pessimistic return and an average return from an investment should be considered, especially for long term financial planning goals such as retirement. This study focuses on average versus worst case projections of current financial assets and investigates factors associated with the difference between the two. This analysis contributes information relevant to public policy discussions related to pension plans, and to specific investment strategies for future retirees. This study uses household data from the 1995 Survey of Consumer Finances and data for the historical rate of return from Stock, Bonds, Bills and Inflation Yearbook (1995) published by Ibbotson Associates. Historical rate of returns for different assets over a 69-year period (1926-1994) are used to project financial assets in this research, assuming that the historical behavior of returns during the past 69 years accurately represents the behavior of rates in the future. All financial assets have a range of possible real accumulations. For instance, during the 1926-1994 period, an investment in a large stock index fund of \$1 per year (in constant dollars) for a 20 year period would have grown to \$50.24 on the average, but in the worst 20 year period, that investment would have only grown to \$18.42. Therefore, the worst case accumulation is 37% of the average accumulation. In this study, 1, 660 households with a non-retired householder age 35 to 70 years, positive non-investment income and positive current financial assets were analyzed. The ratio of the worst case total accumulation to the average case total accumulation is 0.54 at the median (for more detail, see the full paper at the web page www.hec.ohio-state.edu/hanna/sh/yuh.htm). Thus, financial assets projected using the minimum historical real rate of returns are about half the size of financial assets projected using the average historical real rate of returns. The ratio for the individual households in the sample ranges from 0.32 to 0.84. A regression analysis of the ratio on household characteristics was run. Independent variables used in the regression analysis include the log of non-investment income, household types, race/ethnicity, risk tolerance, defined-benefit ownership, and the number of years until retirement as a proxy for the investment horizon. Since a non-linear relationship was expected between the ratio and the investment horizon, six dummy variables are used to capture the effect of the number of years until retirement. Non-investment income, risk tolerance, and being more than 5 years from retirement had negative effects on the ratio. Households with high non-investment income were more likely to choose more aggressive financial instruments such as stocks, which will produce larger differences between the worst case and average case projections. For the same portfolio, a relatively longer investment horizon should result in a higher ratio, as variability is reduced. However, if those who are closer to retirement have more conservative portfolios, then there may be a non-uniform relationship between the ratio and the number of years until retirement.

Even though stocks have a higher variability than bonds, workers should include stocks in their retirement portfolios. Hanna and Chen (1996) showed that workers more than 20 years from retirement should invest in mutual funds that are 100% small stocks. However, care should be taken in projecting accumulations based on average rates of return. A worker saving enough for retirement based on average rates of return will be running a risk of doing much worse than projected. Consideration should be given to use of the ratio of the average to the worst case projection in the retirement planning process. This paper demonstrates the possible danger of assuming mean rates of return in projecting retirement savings. For a young worker, it may be adequate to assume the average rate of return on a portfolio, if the situation is reviewed every 5 years. If the portfolio has done worse than the historical average, then standard financial calculations will result in an increase in contributions to the retirement fund.

Endnotes

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