

► Retirement Education

Retirement Planning and Long-Term Risk

**by Wei-Yin Hu and
Jason Scott**

► Many defined contribution plan participants have available to them various measures of short-term risk. However, some of these participants don't understand that reducing short-term risk comes at the cost of increasing the risk of not reaching their retirement income goal. This article looks at the relationship between short- and long-term risk and their impact on retirement savings. ◀

The shift toward defined contribution pension plans in the U.S. workplace has meant increased opportunities for workers to determine their own financial future. In particular, workers' abilities to direct their own investment allocations allow them to choose their own balance between higher investment returns and higher risks. Indeed, for many workers, their retirement accounts are the primary reason they own any equities or equity mutual funds. While it is fast becoming conventional wisdom that investing in the stock market is expected to yield higher long-term returns, it is not clear whether individuals have access to reliable and understandable information regarding the risk to which they expose themselves by investing their retirement assets in equity markets.

Short-term measures of risk are widely available in newspapers and on freely accessible Web sites. However, risks related to long-term goals are harder to measure. Both types of risk are important for any given individual. Even if an employee is dedicated to saving for retirement, it is natural for him or her to follow a defined contribution account on an annual, quarterly or more frequent basis. Frequent monitoring might tempt long-term investors to react to short-term market fluctuations that have reduced consequences for their long-term goals. While individuals may be tempted to reduce their short-term volatility in order to sleep better at night, it is frequently the case that reducing short-term risk comes at the cost of *increasing* the risk of not meeting a retirement goal. This article elaborates on the relationship between short-term risk and long-term risk and demonstrates some examples of the pitfalls of using only short-term measures of risk in planning for retirement.

WHAT DO WE MEAN BY RISK?

Risk, variability, volatility and downside are terms that are often used interchangeably to mean the same thing. Yet they may have different degrees of salience in individuals' minds. One of the most common measures of risk presented in mutual fund prospectuses is standard deviation. The widespread use of this measure *might* suggest that the average worker understands what it means and can base sound finan-

cial decisions on it. However, it might be argued that a more salient measure of investment risk is “short-term potential loss”—the potential decrease in wealth that an investor faces in a given year. This measure might have a greater effect on an investor’s choices than standard deviation does for the simple reason that when an individual looks at his or her account balances, changes in the overall balance are obvious and more easily translated into changes in how much money an individual might have available for later spending.

This is not to argue that short-term loss is the only measure of risk that is useful. In particular, think of a 35-year-old employee saving for retirement in a 401(k) account. A typical, balanced portfolio might mean a short-term loss potential of about 5-10% of the account value in a given year. But is this important for a retirement goal?

One way to conceptualize a retirement goal is to specify a desired annual spending target. A successful retirement investment plan is then a plan in which the level of wealth at the date of retirement is likely to be large enough to support that spending target, either through a systematic withdrawal plan or through an annuity. Of course, when a worker starts the process of retirement planning, which may be decades before the retirement date, uncertainty abounds regarding the level of wealth at retirement. In order to negotiate this uncertainty, one can use software to forecast the likelihood that an individual’s retirement savings portfolio will yield enough wealth to support a specified postretirement spending target. In this way, a 401(k) account balance representing many years of contributions and accumulated earnings can be translated into an annual spending level, which may have more meaning to those saving for retirement. (Future 401(k) contributions can also be included. The annual spending level can easily be added to a projected Social Security benefit and other income sources to yield a total spending capability.)

LONG-TERM RISK FOR RETIREMENT SAVERS

General Principles

The main point of this article is to dispel the notion that all risk is the same and inter-

changeable. In particular, the view that greater short-term risk necessarily means greater long-term risk needs to be adjusted to recognize what the long-term goal of investing is—in this case, being able to afford a comfortable retirement.

Before getting into concrete examples, it is useful to discuss why short-term risk is different from long-term risk. The distinction is fundamentally due to what is commonly referred to as the *risk-return trade-off* (where the *risk* in that phrase refers to the familiar concept of short-term risk). Simply put, the risk-return trade-off means that choosing investments with higher expected returns generally requires taking on more short-term risk.

Applied to the case of an individual trying to meet a retirement income goal, the risk-return trade-off means that choosing a portfolio with too low a short-term risk might reduce expected returns so much as to increase the chance of missing the long-term goal. As an extreme example, a 30-year-old individual who invests his retirement assets only in money market mutual funds will experience very little variability but will also have very modest investment performance that may be inadequate to achieve the retirement goal. Thus, lower short-term risk can mean *higher* long-term risk.

Illustrative Examples

In order to demonstrate the magnitude of the long-term risk versus short-term risk trade-off, we compare two hypothetical savers: Alan (a 60-year-old) and Bob (a 35-year-old). Suppose that both currently earn \$50,000 per year and save for retirement through an employer-sponsored 401(k) plan. Also assume that they

The Authors

Wei-Yin Hu, Ph.D., is a senior research associate at Financial Engines. Prior to joining Financial Engines, he was a professor of economics at UCLA. He holds a Ph.D. in economics from Stanford University.

Jason Scott, Ph.D., is the director of financial research at Financial Engines. Prior to joining Financial Engines, he was an economics consultant at Cornerstone Research. He holds a Ph.D. in economics from Stanford University.

TABLE

**Short-Term Investment Risk
and Long-Term Retirement Risk**

60-year-old "Alan"

Salary	\$ 50,000
Retirement Income Goal	40,000
401(k) Balance	335,000
Annual Contribution	5,000

Short-Term Loss Potential	Retirement Forecast Success
2%	84%
5	83
10	80
20	76

35-year-old "Bob"

Salary	\$50,000
Retirement Income Goal	40,000
401(k) Balance	70,000
Annual Contribution	5,000

Short-Term Loss Potential	Retirement Forecast Success
2%	64%
5	74
10	80
20	81

Note: Retirement Forecast Success indicates the likelihood of meeting the retirement income goal. Initial 401(k) balance is chosen so as to yield an 80% success rate at short-term loss potential of 10%. Investment choices include a popular (anonymous) family of mutual funds. All dollar amounts are adjusted for inflation. Retirement income goal and forecast include projected Social Security benefits, assuming both are unmarried.

both want to retire at age 65 and be able to support annual retirement spending of \$40,000.¹ The key task of this section is to illustrate how various levels of short-term risk translate into long-term risk of not meeting a retirement goal.

As a basis for forecasting investment performance, we use the Financial Engines Investment AdvisorSM Service, applied to the situations of Alan and Bob. (See the box for a description of the forecast methodology.) As

investment alternatives, we assume both have access to any fund within a popular (anonymous) mutual fund company's family of funds, which includes money market, bond, balanced equity, aggressive growth and international funds. As the measure of short-term risk, we calculate the "short-term loss potential," which is represented by the one-year decrease in portfolio value that might occur with, at most, a 5% probability. The 5% likelihood benchmark is chosen so that the risk measure captures the wealth decrease that might occur in a bad year (roughly, the worst year out of any randomly chosen 20 years). For portfolios with higher values of the familiar standard deviation, the short-term loss potential is also larger. In order to choose somewhat comparable examples, we set annual contributions to \$5,000 (with no employer match) and choose initial account balances so that the retirement success probability is 80% when the short-term loss potential is 10% of wealth.²

The table shows the relationship between retirement success and short-term loss potential for both Alan and Bob. For each individual, moving down the rows is equivalent to increasing the portfolio risk by choosing a different mix of mutual funds. At each risk level, mutual fund allocations are chosen to maximize the portfolio's expected return; this portfolio optimization process also takes into account the benefits of diversification across types of assets (e.g., money market, bonds, domestic stocks and international stocks). For Alan, note that increasing the amount of potential short-term loss leads to a lower likelihood of successfully meeting the retirement goal. This means that, over this range of risk and for a short time horizon, the risk-return trade-off favors investments that have less short-term risk, if "success" is measured in terms of the likelihood of meeting the retirement goal. For a person nearing retirement with a comfortable level of wealth, preserving that wealth can be more important than maximizing expected returns.

For 35-year-old Bob, the trade-off between short-term and long-term risk is quite different. Choosing a portfolio with more short-term risk now uniformly increases the likelihood of a successful retirement. As a practical matter,

of course, individuals are free to choose a different level of risk that does not necessarily maximize their retirement goal; an individual can decide that he or she just does not feel comfortable sticking to a retirement plan that involves more than, say, 10% downside in a given year. Note that the magnitudes of the retirement forecast changes might be considered small relative to the increases in short-term risk. For example, moving from 10% downside to 20% downside only increases Bob's retirement forecast from 80% to 81%. Thus, taking on maximum short-term risk (in an effort to maximize expected returns) may not be advisable if an individual wishes to maximize the chance of long-term success.

The difference between Alan and Bob's decisions is fundamentally due to the risk-return trade-off and how that trade-off changes with the investment horizon (the number of years until retirement). This example is another way of demonstrating the conventional financial planning wisdom that a short horizon investor should have less risky investments than a long horizon investor. However, the retirement forecast allows an individual to explicitly see the trade-off, instead of relying on rules of thumb that may not take into account his or her particular circumstances.³

In summary, these examples show the danger of using only short-term measures of risk to choose portfolios. While it is not wise to *ignore* short-term risk altogether, having a more comprehensive picture of risk is essential to developing a prudent retirement investment plan.

Furthermore, having *ongoing* access to a richer picture of short-term risk and long-term goals is crucial, for two reasons. First, more comprehensive information helps individual employees *stick with* their retirement plans through market fluctuations. It is easy to imagine Bob starting out with the intention of investing his 401(k) assets in a portfolio with a 10% potential short-term loss. However, if a bad year does arrive that yields a 10% loss, Bob might choose to abandon that plan if he loses sight of the long-term retirement goal. Thus, employees who can monitor their progress toward their long-term goals on a continuing basis stand a better chance of success than those who have high-quality informa-

BOX

Forecast Methodology

Using a basic set of user inputs (age, retirement age, current assets, etc.), the Financial Engines Investment Advisor creates a forecast of the user's wealth at the time of retirement. The forecast methodology involves using an economic model of inflation, interest rates and dividend growth rates to simulate thousands of scenarios for the evolution of mutual fund returns. The forecast shows the median, upside (95th percentile), and downside (5th percentile) rather than just a single average forecast value. This simulation methodology (Monte Carlo simulation) has been widely used to forecast investment performance in a variety of settings, including defined benefit pension plans. A one-year simulation is used to calculate the short-term loss potential; for the retirement forecast, simulations over the number of years remaining until retirement are performed.

Once the forecast scenarios of wealth are created, the wealth measure in each scenario is translated into a postretirement income by assuming that the user purchases an inflation-indexed annuity that guarantees a certain income for the rest of his or her life. Applicable taxes on withdrawals from tax-deferred accounts are deducted. Combined with Social Security benefits and other (optional) user-defined income sources, such as defined benefit pensions, a total inflation-indexed income figure is calculated for each of the thousands of scenarios that are simulated. These income scenarios are then used to calculate the likelihood that a given individual will have retirement income above a specified target. The Retirement Forecast Success is the percentage of these scenarios in which the predicted income is above the retirement income goal.

Further assumptions not detailed in the text include the following, which apply to both Alan and Bob. Salary is assumed to grow at an annual nominal growth rate of 5% per year, which in turn affects the Social Security forecast. Alan and Bob both reside in California and face the applicable state taxes.

tion only at the starting point of their retirement planning. Second, imagine Bob starting out with a retirement plan at age 35; as he grows older, his trade-off between short-term risk and long-term risk will change and become similar to Alan's situation. Without a periodic review of his progress toward his long-term goals, it would be easy for Bob to passively stay with a portfolio strategy that, at older ages, exposes him to a lot of short-term risk *and* also jeopardizes his retirement income.

"In order to make good, prudent decisions about their financial futures, employees need information that helps them see the relevant long-term consequences of alternative choices."

IMPLICATIONS FOR EMPLOYERS

As demonstrated above, employees can benefit greatly from investment education and advice that accurately portrays the long-term risks associated with alternative investment strategies. Furthermore, providing retirement planning assistance on an *ongoing* basis is critically important if employees stay with the firm for more than a few years. It is hard to overstate the extent to which individual workers' circumstances (family, medical, etc.) or goals may change over time, and their retirement plans should reflect these changes. From the employers' point of view, making such information available to their workforces adds a tangible benefit to the compensation package. The benefit can take different forms. First, better advice can help employees achieve a successful retirement. Second, focusing on long-term goals can give employees more confidence in their retirement plans during extreme market swings.

CONCLUSION

This article has briefly described the danger of using only short-term measures of risk in designing a retirement saving plan. While short-

term risk is an important factor that affects individuals' comfort with portfolio allocation strategies, it should not be used to the exclusion of long-term forecasts that are more directly related to their retirement goals.

In order to make good, prudent decisions about their financial futures, employees need information that helps them see the relevant *long-term* consequences of alternative choices. Furthermore, the value of this information is enhanced if it is provided on an ongoing basis. Mutual fund prospectuses are but one component of this information. More complete information is available through services that are targeted specifically at retirement planning needs. One example, used in this article for illustrative purposes, is the Financial Engines Investment AdvisorSM Service.⁴ ◀

Endnotes

1. The fact that this spending goal is lower than salary reflects lower work-related expenses after retirement.
2. This 10% downside benchmark is slightly more risky than a hypothetical "market" portfolio that could be constructed from the set of assets held by all U.S. investors combined and less risky than the S&P 500 stock market index.
3. An example of how particular circumstances can matter in a 401(k) context is that the particular set of mutual funds available to an employee should affect the recommended asset allocation at a given level of risk. For instance, a 401(k) plan that offers a high-expense bond fund should yield a different recommended allocation (lower bond exposure) than the equivalent plan with a low-expense bond fund. Thus, rules of thumb such as "invest x percent in bonds if you are ten years away from retirement" may not be the best advice when investment choices are limited.
4. This service provides, via a free retirement forecast, both the short-term and the long-term view of risk and helps employees focus on their long-term retirement objectives. The Advisor also has a paid subscription service that provides advice on specific mutual funds that will improve employees' retirement outlooks. It is available either as a service through plan sponsors that provide it for their employees or as a service for which individuals can enroll themselves.

Copyright 2000, Financial Engines, Inc. All rights reserved. Reprinted with permission.