

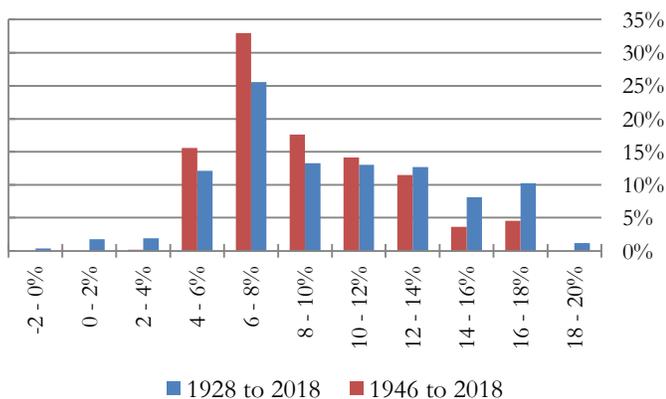
Stock Returns & Financial Planning

Last quarter we cautioned that a traditional 60/40 portfolio of stocks and bonds is likely to underperform expectations formed from history because of today's low starting bond yields. We developed a few potential solutions to this portfolio problem in the same piece (click [here](#) to learn more). While we believe those portfolio adjustments are up to the task of improving future results given the market risk they take, we nonetheless think you should model lower returns when developing your financial plan. Lower bond returns are a component of that conclusion but we believe lower stock returns should be contemplated as well. What follows is how we think through such a modeling exercise. We consider how to select a stock return assumption and the importance of weighing volatility around that figure and its interaction with anticipated portfolio spending.

Stock returns are the wild card in financial planning. Depending on the day you read the financial press we are either poised to continue setting new highs in stock markets or dangling over the first drop of the market rollercoaster. While the point of planning isn't to predict the immediate path of returns, we do need to assume something about the long-term trajectory. To get to an assumption that makes us comfortable, we first consider the full distribution of annualized stock returns over a long period (see Figure 1). We selected twenty years here because we will later simulate hypothetical twenty-year financial plans.

Figure 1: 20 Year Stock Market Return Distribution

Source: Bloomberg, KP calculations



The median twenty-year return within the longer 1928 to 2018 sample (blue bars) was 9.0% annualized. The single best period posted 19.3%; the worst was a negative -0.5%, a period that starts at a high immediately preceding the Great Depression. We also show a post-World War II distribution (red bars) to help you think about the numbers excluding the Great Depression. The median result from this

smaller sample was 8.1%, the best was 17.4%, and the worst a 3.6% annualized result.

For planning purposes, we think it is useful to think about the 25th percentile return. There is both art and science behind this rule of thumb: it reflects 1) a desire to err on the side of conservative assumptions when planning and 2) a view that current valuations are more likely to depress rather than augment future returns. The 25th percentile figure for the 1928 to 2018 period is 6.8% annualized (6.7% for post-WWII). That number sits right in the middle of the tallest, or most frequent, bar on Figure 1.

Introducing Volatility

With a stock growth trajectory set, we now need to consider how volatility impacts the financial plan. Figure 1 may give a false sense of security; it depicts returns as positively skewed, meaning the curve pushes further to the higher returns at the right than you would expect under a symmetrical bell curve. This is why financial planners recommend equity heavy portfolios for those who don't need the money for a long time – the odds are in your favor. A picture of one-year stock returns, on the other hand, would skew left, posing challenges for those who need the money year to year. We need to consider the likelihood and magnitude of bad years when we model.

We can assess how those years impact the probability of plan success two ways: first using actual results to get a better understanding of the concept before moving to more robust Monte Carlo analysis. Consider a hypothetical 60/40 portfolio that earned the stock market's return in every twenty-year period starting in 1928 on the 60% side of the portfolio but earned today's bond yield (2.3%) on the 40% side. This corrects for the reality that most historical analyses of 60/40 portfolios cover time periods that enjoyed bond yields far higher than those available today. Figure 2 shows that analysis with an added important element – it assumes that you need some of your money each year. Specifically, we withdraw 4% of your initial portfolio value for living expenses every year growing at a 2% inflation rate.

The graph shows how real, or 2% per year inflation-adjusted, wealth moves through time, assuming you begin with a \$100 investment and withdraw as described above. The lines, from the 95th percentile ending at \$382 in real wealth to the 5th percentile ending at \$45, are selected to show the distribution of paths. The downside extreme results (not shown) are important to consider as well – 1.6% of all paths end with you running out of money though all occurred in the period before World War II. Clients are also interested to understand the likelihood that they will dip into principal (here, inflation-adjusted

principal, a slightly different concept): 45% of twenty-year periods end with less than the original \$100 of real wealth.

Figure 2: Paths Using Historical Equity & Today's Bond Yields

Source: Bloomberg, KP calculations

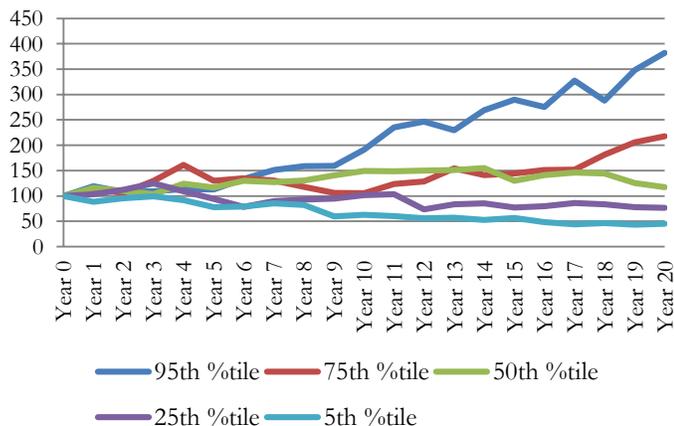
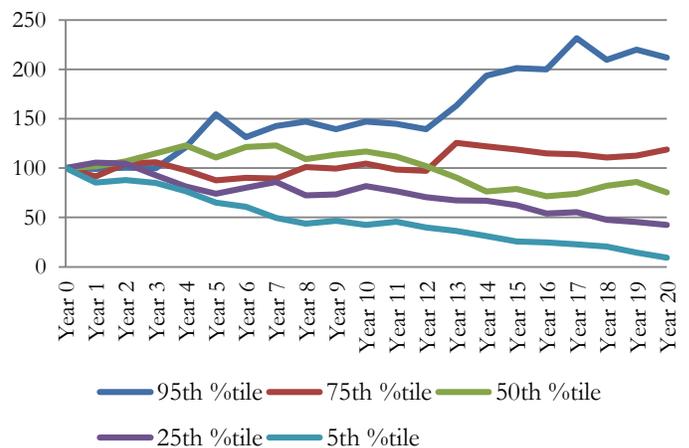


Figure 3: Paths Using 60/40 Simulations

Source: KP calculations



Takeaways

- 1) **Financial plans should consider lower equity and fixed income returns to assess adequacy of portfolio positioning relative to strategic objectives.** The great fortune of catching a 12%+ per year stock market covers a lot of warts, whereas the misfortune of a 4% per year market stresses financial plans, especially given the likelihood of low bond returns.
- 2) **Historical paths and simulations can provide a framework for assessing plan adequacy.** This is because volatility and return sequences interacting with spending and time creates a wide dispersion of results. Take an oversimplified example regarding sequence. A \$100 portfolio that earns 10% annualized by losing 20% one year and then gaining 51% the next ends with \$111 in capital after distributions of \$4 each year. If you reverse the order, with the gains coming first and the losses second, that same 10% portfolio grows to \$114.
- 3) **The best way to deal with potentially lower returns and inherent volatility is to make conservative assumptions and simulate outcomes.** This *Investment Bulletin* demonstrated the basic concepts that underlie such an approach. Please speak to your Keel Point representative to apply these principles to your specific situation. □

While the 1928 to 2018 period (containing 853 overlapping twenty-year periods starting each month along the way) considered in Figure 2 seems like an incredibly robust sample size, we think there is value in considering even more paths. Monte Carlo analysis allows us to drop our reliance on those specific 853 data points, instead creating thousands via simulation, and take a view that forward equity returns will be less than historical returns. Figure 3 depicts a path distribution of 10,000 twenty-year periods for a 60/40 portfolio based on the following assumptions:

- Bonds earn today's yield (2.3%)
- Equities earn their 25th percentile return (6.8%) – note the effective assumption in Figure 2 analysis is 9.0%
- 10% annual volatility around the portfolio's return (the actual volatility of a 60/40 portfolio since 1976, when our bonds data start, is 9.4%; we've rounded up)
- Same spending and inflation assumption

The results show a few key changes. Ending real wealth is lower at each percentile level because we are assuming lower equity returns. Second, 66% of paths end with less than \$100 (real principal) in wealth and 2.2% paths run out of money before we reach year twenty. Whereas Figure 2 analysis benefits from a median 60/40 return (about 6.3%) better than the sum of your 4% withdrawal rate plus 2% inflation, Figure 3 has an uphill battle with its roughly 5% return.

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