Predicting Asset Class Returns: Recommendations for Financial Planners
By Joe Tomlinson
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Developing reasonable estimates for stock and bond returns requires more than just historical data or the assumptions provided in financial software packages. Inappropriate assumptions can doom retirees to outliving their savings or forgoing a life style they could otherwise afford. There are better ways to forecast, and in this article I’ll suggest a few of them.

Larry Siegel addressed the issue of assumptions in a February 2012 article, "Jeremy Siegel, Rob Arnott and Other Experts Forecast Equity Returns." He reported on a 2011 gathering of experts, whose consensus was that equity returns over the next decade would be significantly lower than historical returns. In an August 2012 article, "The Profession's Faulty Assumptions: A Top Ten List," Bob Veres ranked "assumed U.S. equity returns" as the number one among "garbage-in" assumptions being used in financial planning.

I also looked into the assumptions used by a couple of the most popular financial planning packages. Both stock and bond returns were well above what I consider reasonable.

Historical view

Beginning in the 1970s, Roger Ibbotson and colleagues began publishing data on historical returns (going back to 1926) for various asset classes, research that evolved into the annual "Stocks, Bonds, Bills and Inflation Yearbook." Using historical returns from the Ibbotson Associates data became the most popular approach for estimating future returns. But, as time has passed, Roger Ibbotson and other researchers increasingly recognized that history provides only a partial guide to the future.

This chart shows compound annual returns for the 1926-2012 period:

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Return (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large company stocks</td>
<td>9.8%</td>
</tr>
<tr>
<td>Intermediate-term government bonds</td>
<td>5.4%</td>
</tr>
<tr>
<td>Historical Equity Risk Premium (ERP)</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

Source: 1926-2011 Ibbotson® Yearbook, 2012 Author's estimate

The historical difference between stock returns and government bond returns of 4.4% is slightly higher than the forward-looking estimates from the panel of experts cited by Larry Siegel, which mostly fell in the 3% to 4% range. The big difference, however, between
history and the forward-looking outlook is in the bond category. The return one can expect from investing in bonds today is heavily influenced by current yields, and the yield on 10-year Treasury bonds as of year-end 2012 was 1.74%, a full 3.7% below the Ibbotson historical average.

This gap between historical and current bond returns raises questions. When predicting bond returns, how much weight should be given to historical returns as opposed to current yields? To estimate future stock returns, should the estimated ERP be added to the current government bond yield or to a future estimate of yields? I'll deal with these questions, among others, by looking at bonds and stocks separately.

**Predicting bond returns**

When it comes to bonds, one-size-fits-all forecasting is a common error. Instead, the choice of a bond return assumption needs to reflect client characteristics. For a retired client who is drawing down savings, future returns will be closely tied to the current yield to maturity on the bond investments in the portfolio. For younger workers, whose investing for retirement lies mostly in the future, estimated returns need to reflect future bond yields, which are harder to forecast.

Estimating future bond yields requires an underlying assumption about the future vibrancy of the economy. Historical real returns (net of inflation) for intermediate-term government bonds have averaged 2.4%, according to the Ibbotson data (5.4% average nominal return minus 3.0% average inflation). Current real returns, as measured by yields on Treasury Inflation Protected Securities (TIPS), are negative – -0.73% for 10-year TIPS – partly because of the Fed’s zero-interest rate policy and partly because of economic weakness. The prediction for future bond yields needs to rest on the outlook going forward – will we get back to the "good times" that produced an average 2.4% real return, and, if so, how fast?

Bond duration is also a consideration. One can lock in higher yields by investing longer. (The year-end 2012 yield for 30-year Treasuries was 2.89%, versus 1.74% for the 10-year bond.) But higher duration means more market risk from future interest rate movements. For retirement portfolios, there is the additional consideration of whether to ladder bond investments in order to match projected portfolio outflows. Laddering locks in rates and effectively reduces volatility to near zero.

Finally, the target bond quality needs to be factored into the estimate, and this will depend on basic investment policy. Some investment managers, like David Swensen who runs the Yale Endowment, argue that individual investors should limit their bond investments to Treasuries and TIPS and only take economic risk in stock investing. Others argue that those who invest only in government bonds miss out on the attractive spreads that can be earned on corporate bonds.
Hedge fund manager Anti Ilmanen offered a more nuanced view in his 2011 book, "Investor Returns." Ilmanen noted that returns from the active management of corporate bond funds tend to fall well short of what one might expect *ex ante* based on estimated spreads and default losses. He cites 120-basis-point *ex ante* spreads net of estimated defaults on investment-grade corporate bonds that turn into *ex post* realized spreads of only 30 to 60 basis points. He blames additional factors beyond simple credit default losses – "embedded options, downgrading bias, agency problems, lower liquidity, and bad timing of losses" -- for harming corporate bond performance.

Clearly, a lot of analysis is necessary to produce a well-thought-out bond return assumption. One needs to form an opinion on each of the factors that will combine to produce returns. It's not just a "look up a number" exercise; it involves a personal choice. For example, I currently prefer intermediate-term bonds over long-term bonds, and I like Swensen’s approach of concentrating fixed-income investments in Treasury bonds and TIPS. If I were preparing a fixed-income assumption for a new retiree, I would be using current 10-year Treasury and TIPS yields.

**Predicting stock returns**

Some researchers develop stock return assumptions by taking what they feel is the most plausible estimate of the ERP and adding that to the current government bond yield. I believe a more reliable approach is to estimate future stock returns directly.

The most popular predictive approaches in use today are known as "supply models," so named because they estimate what the economy and corporations will be able to supply to investors in the form of cash flow. This approach was used by three different researchers (or research teams) from the panel Larry Siegel’s article described, and those efforts came up with nominal compound annual return estimates for the stock market in the 6% to 7% range, considerably lower than the historical 9.8%.

These models all involved adding together a current dividend rate (typically adjusted to add in net stock buybacks) and a measure of growth in either corporate earnings or GDP. The average growth estimate for the three models was 1.8%.

In my own planning work, I incorporate a less optimistic growth forecast for the U.S. economy than 1.8%. My view is more in line with the predictions of Professor Robert Gordon of Northwestern University. In an August 2012 paper, he described the headwinds the U.S. economy faces ("demography, education, inequality, globalization, energy/environment, and the overhang of consumer and government debt") and on that basis, projected future growth to be less than 1%. For my return assumption, I knock 1% off the 6% to 7% range, and use 5.5%. (This stock return assumption is stated as a nominal rate and includes an inflation assumption of 2.5%, based on the current spread between TIPS and Treasury bonds.)
Geometric versus arithmetic returns

So far I have discussed only compound annual returns, also known as geometric returns. For Monte Carlo analysis, we also need to consider arithmetic returns. This example illustrates the difference:

If we have an investment that earns 30% in the first year and loses 10% in the second year, the compound annual return is 8.17% \( (1.3 \times .9)^{0.5} - 1 \).
The arithmetic average return is 10% \( (30\% - 10\%)/2 \).

The amount by which arithmetic returns exceed geometric returns is greater for higher-volatility asset classes, and the difference can be closely approximated as half the return variance (standard deviation squared). For bond returns with a standard deviation of 5%, the difference is only 13 basis points, but for stock returns with a 20% standard deviation, the difference is 200 basis points. My 5.5% return assumption for stocks turns into a 7.5% assumption when stated as an arithmetic average.

When working with financial planning software, it is important know whether the return inputs are geometric or arithmetic averages. For Monte Carlo simulations that I program myself, I input arithmetic averages and then set up the calculations so that the program generates month-by-month or year-by-year random returns that are log-normally distributed (in other words, skewed to the right). I check the results to be sure that the average of many simulations closely matches the arithmetic average I input to begin with.

When working with software packages, it is important to understand not only what the program expects for inputs, but also what it does with them.

Implications

The following chart demonstrates how much of a difference return assumptions can make in financial planning. The example is based on a 65-year-old female with a life expectancy of 22 years who takes annual inflation-adjusted withdrawals beginning at 4% of savings, i.e. following the classic 4% rule. I’ve assumed a 50/50 stock/bond mix and annual investment expenses of 0.5%. The figures labeled "software package" are from the particular financial planning package with which I am most familiar.

Outcomes under different investment return assumptions

*Returns shown are geometric averages after inflation*

<table>
<thead>
<tr>
<th>Return Assumptions</th>
<th>Stock returns</th>
<th>Bond returns</th>
<th>50/50 Combined</th>
<th>Probability of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical averages 1926-2012</td>
<td>6.80%</td>
<td>2.40%</td>
<td>4.60%</td>
<td>96%</td>
</tr>
</tbody>
</table>

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The "Probability of success" reflects the likelihood that the investor will not deplete her savings while she is still alive, and it is clear that the choice of assumptions makes a big difference in this measure.

These differences in outcomes are large enough to change fundamental retirement planning recommendations. A plan based on historical average returns might look just fine, whereas, with my assumptions, the recommendation would be to keep working and/or dramatically cut expenses.

Developing return estimates is by no means an exact science, and I am not suggesting that my assumptions are the ones everyone should use. Instead, give careful thought the considerations that go into your assumptions, and appreciate the importance of putting a lot of thought into this aspect of the planning process.

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