Retirement Daily

Your Money

Use Bond Duration to Build a Risk Management Strategy

By Retirement Daily Guest Contributor | Mar 17, 2020 9:43 AM EDT

By Massi De Santis

There is an old Wall Street saying that goes, "The best way to make money is not to lose it in the first place." As investors, we are often so focused on growing our assets that we may overlook the fact that the key to a well-designed asset allocation is having the right risk management strategy. And this begins with realizing that the risk that matters is falling short of your goals.

For example, the volatility of a portfolio is meaningless if we think a goal can be reached with a 100% probability. In contrast, falling short of a retirement goal by 20% is very meaningful. This post shows you how to build a bond allocation tailored to your goals, by using a key

characteristic of bonds called duration. As we discuss, this risk management approach can help you increase potential portfolio returns for the level of risk taken for the goals.

Goals as Bonds

Besides defining what risk means for you, your goals help you determine the least risky way to achieve them, which is the starting point of an efficient risk management strategy. From a financial perspective, goals are simply dollar expenses at some time in the future.

Imagine having a bond making payments of the same amount and timing of your goals. You could lock in part or all of your goals without any risk, assuming the bond makes the payment. The bond or bond portfolio that matches your goals is your risk management strategy.

Given the variety of bonds and bond funds available, in principle you can mix bonds and bond funds to match just about any goal. The only problem is that building a bond portfolio that exactly matches each one of your goals is not very practical and can be very costly. Luckily, there is a cost-effective technique that we can use to approximate the value of any bond called duration matching.

Use Duration to Match Bond Portfolio to Goals

Duration is a concept related to the maturity of a payment or a series of payments. Say my goal is to take my family on a European vacation in five years to celebrate my 50th birthday. The duration of my goal is five years.

If a goal has multiple payments, like a college goal, duration is a weighted average of the maturities of each payment, where the earlier payments are given greater weight. We can use interest rates from the U.S. Treasury website and standard textbook formulas to compute duration.

Duration is also a characteristic of bonds. It is related to the maturity of a bond but considers the fact that bonds make regular interest payments besides the principal repayment at the end. For example, a 10-year government bond makes semiannual interest payments until the end of the 10 years when the principal is also repaid. Thus, the duration of the 10-year government bond is less than 10 years.

Because duration considers the timing of the cash flows (of both bonds and goals), you can build an efficient risk management strategy by matching the duration of your bond portfolio to the duration of your goals.

Bonds that Match Goals Can Eliminate Unnecessary Risks

Let's continue with my goal of a European vacation in five years.

If I buy a bond that matures exactly in five years, with the face value equal to the amount I will need to meet my goal, I can lock-in the goal today. Assuming the bond is repaid and my estimate for the goal is accurate, I basically bear no risk, because the bond and the goal have the same payment schedule. The price of this bond today (and the amount I need for the goal) depends on today's interest rates, so I can know today how much capital I need to achieve my goal with no risk. The higher the rate, the less I will need to set aside for the goal today.

In contrast, say I invest the same amount in 6-month CDs and decide to roll over the amount for the next four and a half years. This strategy has some risk. I don't know exactly how much I will get at the end of the five years, because at each rollover date the interest rate will likely change. The amount I get at the end of the five years can be higher if interest rates rise or lower if they decline. Not only is this strategy risky for the stated goal, there is no compensation for this risk in terms of higher expected returns. This strategy is not an efficient use of my savings.

Now consider a different goal. Say I plan to renovate my kitchen in six months. Buying a 5-year bond would be risky in this case, because the 5-year bond can change in value and even generate a loss within a six-month period. In contrast, locking in a six-month rate with a CD would have virtually no risk.

Asset Allocation

We are not saying you should not take any risks for your goals. Investors may want to take risk if that risk is compensated with higher expected returns, like investing in stocks. What we are saying is that investors should manage their risk as efficiently as possible and avoid unnecessary risks. Unnecessary risks are risks you are not compensated for as an investor, like interest rate risk from rolling over short term bonds when you have a long-term goal. By eliminating unnecessary risks, you can use your risk tolerance and risk capacity to hold assets with higher returns, like stocks, and achieve higher potential returns for the level of risk taken.

Bond Funds Report Duration

You don't really have to work that hard to estimate bond duration. Fund managers do it for you. If you look at any bond mutual fund or ETF fact sheet, you will see that it reports the duration of the portfolio of bonds that the fund holds.

Consider some ICE Treasury bond indices, which are tracked by a number of funds and ETFs, for example. The ICE Treasury 10-20 years has a duration of 12 years, while the ICE Treasury 3-7 has a duration of about four and a half years, and the Treasury Short Index has a duration of 0.4 years.

When you look at fixed income funds and ETFs, take note of the duration of these funds. By mixing funds with different durations, you can build a portfolio of the duration that matches your goal, as we explain below. For example, a portfolio that mixes 50% of the ICE 10-20 Years

Index and 50% of the ICE Treasury Short Index would have a duration of 6.2 years (0.5x12 + 0.5x0.4 = 6.2). Take a look at your bond fund holdings and check your portfolio duration.

Your Goals have Duration

Goals are defined by a time horizon in addition to a dollar value. If you have already worked on your goals, now you can add durations to each goal. In most cases, the duration of a goal will correspond to the horizon of that goal, or will be close to the average maturity of the goal, e.g., in the case of a 2-year college goal. For other goals, duration needs to be computed using interest rates.

Say you turn 65 and retire this year, and you plan for a steady level of income until age 90. The goal is a monthly paycheck for 25 years. Using current real Treasury rates, the duration of this goal is 11 years, similar to the ICE Treasury 10-20, which has a duration of 12 years. So, an investment that tracks this index would be a good approximation to the cash flows of your goal. To make it 11 years, you can combine the 10-20 index with an index with shorter duration, like the Treasury 3-7 years.

What if you are 60 years old and five years away from retirement? It turns out that duration increases by one year for every year prior to retirement. So, at age 60, and planning to retire at age 65, your duration is 16 (11 + 5). In retirement, duration goes down by half a year for each year you are in retirement. So, if you are 67, and still planning until age 90, your duration is 10 (11 - 2*0.5). At age 70 the duration of the 20-year cash flow is 8.5, and so on. Every year, you compute your duration and change your bond allocation to match the desired duration. That's it.

Inflation and Other Risks

Our basic principle for building a bond portfolio is to match the duration of the portfolio with the time horizon of the goal it is designed for. Does this work if we consider inflation risk or other risks? The approach still works, but these risks need to be accounted for.

For example, suppose we are concerned about the effect of inflation on our retirement income. We can use our duration matching approach with inflation protected securities to protect our income from inflation. If we have some flexibility about our goal, e.g., a discretionary income goal, we can consider adding investment grade corporate bonds in the portfolio using our duration matching approach. The added default risk is compensated for in the higher potential returns from corporate bonds over Treasuries. In a taxable account, municipal bonds can be used as part of a duration matched portfolio.

Simple rules about risk management suggest that you should use long-term bonds to manage income risk, intermediate bonds to manage mid- or longer-term goals in equity heavy portfolios, and short-to-intermediate bonds for goals that have a short-to-intermediate horizon.

With a goals-based approach to retirement planning, you can make risk management much more effective by simply matching the duration of each goal with the duration of the dedicated risk management portfolio for each goal, with little or no effort.

This approach leads to more efficient portfolios, in terms of higher potential returns for the level of risk taken, and to increased clarity.

About the author: Massimiliano ("Massi") De Santis is an Austin, Texas-based fee-only financial planner and founder of Desmo Wealth Advisors. Desmo Wealth Advisors provides objective financial planning and investment management to help clients organize, grow and protect their resources throughout their life. Before founding DESMO Wealth, Massi was a senior researcher at Dimensional Fund Advisors in Austin and an assistant professor at Dartmouth College, where he taught finance and macroeconomics. Massi's accomplishments include the development of award-winning retirement strategies at Dimensional Fund Advisors and, with S&P Dow Jones, the development of the first set of indices that track retirement readiness.

TheStreet

About/Privacy/Terms of Use

Need Help? Contact Us.

©1996-2020 TheStreet, Inc. All rights reserved. Retirement Daily is a registered trademark of TheStreet, Inc.