Managing the Riskless Portfolio

An investor can limit risk by reducing the portion of her wealth exposed to the risky market portfolio and increasing her holdings in the riskless portfolio.

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The first five parts of this series on Modern Portfolio Theory (MPT) have focused on the importance of diversification and on the concept of the "market portfolio" of risky assets. These are the assets that, over time, give us powerful financial rewards—even though from one year to the next, they may decline in value.

Now we shift gears. MPT prescribes that this fully diversified market portfolio should be paired with a "riskless portfolio" containing extremely safe and very short-term fixed-income investments.

The purpose of having both the market portfolio and the riskless portfolio is to allow investors to tailor their total risk exposure to their circumstances and preferences. A young and bold professional with a solid career might only place a minor fraction of her wealth in the riskless portfolio, while a conservative and retired person of modest financial means might invest in nothing other than the riskless portfolio.

MPT demonstrates that using a combination of a market portfolio and a riskless portfolio allows for full risk-management in pursuit of any given target rate of return.

So far, so good. But what sorts of specific investment opportunities are appropriate for inclusion in the riskless portfolio? And how should the portfolio's funds be allocated amongst the riskless opportunities?

To address these concrete, operational problems, we can zero in on five key issues. One is whether any investments can be entirely risk-free. A similar question can be asked about a portfolio with only dollar-denominated assets. The third issue is interest-rate timing—and in particular the futility of trying to predict future interest rates. The fourth concerns the "yield curve," which compares short- and long-term interest rates at any given time. The fifth and most practical topic is how to pursue a strategy of "laddering" the riskless portfolio by using CDs of varying maturities.

"Riskless" investments include FDIC-insured CDs and money-market funds, Treasury bills, savings bonds, and TIPS.

Is Anything Truly "Riskless"? To begin with, what are some standard investments to include in the riskless portfolio? For U.S. investors a riskless portfolio would typically contain one or more of the following types of securities: FDIC-insured certificates of deposit (CDs), U.S. Treasury bills, U.S. Savings Bonds, Treasury Inflation Protected Securities (TIPS), and FDIC-insured money-market accounts. Also, the portfolio can include investment vehicles that *contain* these securities such as money-market funds and short-term bond funds.

You may notice that bonds (including short-term Treasury bills) play a prominent part in this market basket of safe investments. The fact is, bonds can be risky. But short-term bonds are likely to be much less risky than long-term bonds. Let's see why.

Bonds entail three major kinds of risk: default, price inflation, and interest rates.

Defaults happen, whether by governments or companies. But bond mutual funds reduce default risk by diversifying across a spectrum of bond issues. That is why short-term bond mutual funds are good candidates to include in the riskless portfolio.

As for inflation, short-term bonds can be traded in financial markets without much worry over the long-term decrease in the purchasing power of the bond's face value—simply because the price level is not likely to rise by much over, say, one year.

Similarly, when market interest rates rise, any bonds you hold will be worth less than before. If you need to sell your bonds before they mature, you will take a capital loss.

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But holders of short-term bonds need only wait until the bond matures, in a few weeks or months. They are much less likely to have to sell the bond at a reduced price.

That said, we should acknowledge that no investment is truly riskless. Even an insured cash holding is subject to the risk of loss due to inflation or a catastrophe (global nuclear war). There is nothing we can do with our money to be 100 percent sure that it will provide us with a guaranteed economic benefit in the future.

In short, the riskless portfolio can be viewed as a collection of fixed-income assets that contains very little risk from credit failures or stock-market fluctuations. A U.S. Treasury bill (or T-bill) with only a few weeks or months to maturity is often used to represent the concept of a riskless security. Further, the portfolio should be invested with times to maturity that reflect the investor's anticipated cash needs.

Foreign Bonds and the Riskless Portfolio. But now we come to a caveat. Keeping all of one's fixed income securities in a particular currency may overexpose the investor to losses in the purchasing power (i.e., real value) of that currency. An unexpected decline in the value of that currency can cause large losses in true value.

Should a U.S. investor only invest in assets denominated in U.S. dollars? One of the most important but difficult and neglected areas of investments is international investing in general and investing in foreign-denominated assets in particular. Should a U.S. investor's riskless bond portfolio include only the bonds of the U.S. or should it be internationally diversified with resulting exposures to a variety of foreign currencies?

The issue boils down to whether wealth should be measured in a particular currency. In general, if an investor places funds in short term bonds denominated in a variety of currencies, the investor is diversified against currency fluctuations. Moreover, the longer-term an investor's time horizon, the more the investor should strive to hold her fixed income assets in a portfolio diversified into a variety of currencies.

In a practical sense, diversification across currencies can be accomplished through mutual-fund holdings of short-term, low-credit-risk, international bond portfolios. While the portfolios may appear risky when their values are reported in U.S. dollars, the true effect may be to reduce the real risk of a person's total wealth.

From Consols to Junk Bonds

In the time of the Napoleonic Wars (1814) the British government issued debt instruments called consols that paid interest in perpetuity—but never arrived at maturity. In other words, buyers of the consols received their annual or periodic interest payments, but that's all. There was no redemption value to factor into the rate of return.

The consol (aka a "perpetuity") offers a classic illustration of the inverse link between interest rates and the prices of existing bonds. With no redemption value, how much would a bond buyer pay for a consol paying 1,000 pounds every year forever? It depends on the current market rate of interest.

For a consol paying 1,000 pounds a year (the coupon rate), if the market rate of interest is 5 percent, how much would an investor pay? The relevant equation:

1,000/.05 = 20,000 because 1,000/20,000 = .05 or 5 percent.

But if the market rate of interest rises to 10 percent, then to get someone to buy the consol, the price of the consol has to come down accordingly:

1,000/.10 = 10,000 because 1,000/10,000 = .10 or 10 percent.

In other words, when market interest rates double, the price of the bond must fall by half if it is to attract lenders.

In financial markets today, calculations are messier because the redemption value at maturity factors into the rate of return. But the same logic applies: When the market rate of interest rises, existing bond issues can only be sold at lower prices.

The closest parallel to a consol today may be a high-yield or junk bond, so termed because it has a high probability of defaulting before it reaches maturity. In that case, the price that will be paid for the bond is largely determined by the size of the annual payments.

Using the "law of 72," a junk bond paying 12 percent only has to survive six years to pay off the price paid for it. (The law says that $1 will double in value over a time-span obtained by dividing 72 by the rate of compound interest—in this case 12.) After that, any further returns are gravy.

Interest-Rate Timing. Perhaps the two most fundamental rules of bond investing are the following. (1) Fixed-income investments such as traditional bonds fall in value when interest rates rise. (The box "From Consols to Junk Bonds" explains why.) (2) The prices of long-term bonds fluctuate more than the prices of short-term bonds.

Indeed, there have been times when long-term bond prices fluctuated even more than stock prices. In the early 1970s investors in long-term U.S. Treasury securities saw their bond values decline by almost 40 percent when interest rates skyrocketed.

The conventional wisdom in bond investing is that one should study interest rates closely. Then when interest rates are "high" (i.e., expected to fall) the thing to do is to invest longer term, so as to lock in the higher rates. By the same token, when interest rates are "low" (i.e., expected to rise), invest shorter term, increasing your liquidity.

But what if bond markets are efficiently priced—meaning that on any given day, bond prices already reflect all available information about future interest rates? Then trying to follow your own instincts about future interest rates can actually be harmful. To that extent, investors are not just wasting their time trying to forecast interest rates, they are allowing their forecasts to interfere with maintaining a proper level of risk.

If bond markets are efficient, investors should simply focus on risk management and liquidity (cash-flow) management rather than attempting to beat the market by speculating on interest-rate directions.

The Yield Curve. Much of our discussion of the riskless portfolio concerns the pro's and con's of short-term vs. longer-term bonds. Bonds with longer maturities normally tend to offer higher yields than short-term bonds, in part because they are viewed as more risky.

This relationship between current interest rates and their times to maturity can be seen in a graphic called the yield curve (also known somewhat awkwardly as "the term structure of interest rates"). A familiar example of it is the pattern that investors see at a bank when they observe that CDs with different maturities offer different yields. As to the actual yield curve, at the time of this writing it was steep. Two-year Treasury issues fetched about one percent, vs. about four percent for ten-year Treasury bonds.

Because lenders are typically risk-averse, the normal yield curve has a positive slope, meaning the longer the maturity the higher the interest rate. *Lenders* prefer short-term bonds viewing them as less risky. By contrast, *borrowers* generally would prefer to lock in the cost of their capital by issuing longer-term bonds. To induce lenders to buy longer-term bonds, borrowers must offer a higher expected return. Accordingly, long-term bonds normally tend to offer higher yields and higher expected returns than short-term bonds.

The position or "height" of the yield curve depends on the general level of interest rates.

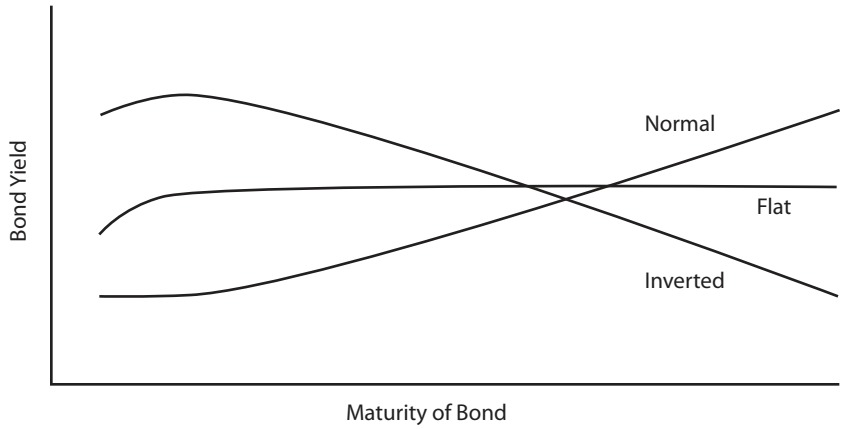
But the slope (the steepness) of the yield curve can change when expectations change. For example, the prospect of high inflation in an over-heated economy will tend to generate expectations of rising interest rates. Lenders will prefer to stay liquid and to buy short-term bonds, driving up their prices and reducing their yields. This in turn will lead to a steeper positive slope, reflecting a larger spread between long- and short-term bond rates.

Yield curves can also have other shapes, as the chart above shows. When there is no consensus that interest rates are more likely to move in one direction or the other, the yield curve is likely to be flat beyond maturities of a year or so.

The third curve in the chart is called an inverted curve and is somewhat rare. Except for the first few months, it is downward sloping and occurs when there is a general consensus that interest rates are more likely to decline than to rise. For example, anticipation of a recession and correspondingly lower interest rates would lead investors to lock in higher rates by buying longer-term bonds, driving their prices up and their rates of return down. In that event short-term bonds could offer higher returns than longer issues. Accordingly, an inverted yield curve is often viewed as an indicator of an impending recession.

Three Classic Term Structures

To compensate lenders for higher risks, longer-term bond yields normally exceed yields for short-term issues.



The Sweet Spot: One to Five years. From what we have said so far, it would seem that investors should rely on very short-term bonds as the centerpiece of a riskless portfolio. Now we need to modify this view in light of the historical evidence.

Long-term bonds have consistently generated higher average returns than short-term bonds. Very short-term, riskless securities such as T-bills have generated average returns that have barely kept pace with inflation, and have generally fallen in real value (i.e., after inflation) when taxes are considered.

The record comes down in favor of holding fixed-income securities that have maturities of up to one year rather than those with extremely short maturities such as a few weeks. The evidence also indicates that there is relatively little added expected return (compared to the risk) of investing in longer term maturities such as in excess of five or ten years.

Here is the key: Bonds with longer maturities offer higher average returns than bonds with shorter-term maturities regardless of the slope of the yield curve. Even if long term yields are lower than short term yields, it is likely that the long term bonds will offer higher expected returns because interest rates are more likely to fall than to rise.

So, one strategy is to focus on buying bonds of one to five years to maturity. A variation is to buy bonds with maturities slightly longer than one's "horizon point." Thus, if I am investing for a tuition payment due in exactly two years, I might buy a bond with a maturity of closer to three years. The idea is to keep as much money as possible in the "sweet spot" of the maturity spectrum (one to five years) and to avoid having too much money that is long term or very short term. If history repeats itself, maturities of one to five years will offer a slightly better combination of risk and return.

A Laddered CD Strategy. The idea here is to hold CDs somewhat evenly across a spectrum of maturities. Suppose that Rob has $300,000 to invest in "the riskless asset." Rob starts by investing $50,000 in six CDs with maturities ranging evenly from six months to three years. As the CDs mature, Rob reinvests the money after searching for the best three-year rate.

Six months later the shortest-term CD has matured and Rob reinvests the $50,000 in another three-year CD. The previously purchased CDs all now have six months' less maturity than when originally purchased. The process continues so that Rob has a CD maturing every six months but is always obtaining three-year rates on his reinvestments. This strategy can make sense if banks set CD rates *inefficiently* such that three-year rates consistently exceed very short-term rates. Of course the strategy might be implemented with intervals other than every six months and with an initial maturity of more or less than three years.

The record comes down in favor of holding fixed-income securities of up to one year rather than a few weeks.

A laddered strategy makes cash available at regular intervals—reducing the need for keeping money in an ultra-short term account such as a money-market fund or money-market account.

For those who are financially disciplined, another source of liquidity can be a home equity line of credit that can provide low-rate, tax deductible funds for emergency needs. The key is to avoid maintaining large balances in accounts that offer immediate access but low interest rates.

CDs and Savings Bonds. Throughout this series the perspective has been that markets are efficiently priced such that investors are wasting time (and money) when they attempt to time markets or pick stocks. However, yields on CDs are set by institutions, not markets. It is often the case that higher CD yields can be found by searching for higher rates on insured CDs.

Also, U.S. savings bonds sometimes offer exceptional rates of return and tax benefits. Some of the most attractive savings bonds opportunities are limited in size or the tax benefits are limited to particular income levels. But time spent carefully studying the rates and terms of savings bonds can generate substantial benefits to a riskless portfolio strategy.

Implications. Putting MPT into practice is not a "one size fits all" exercise. Issues regarding different currencies and appropriate portfolio maturities can be complex. But it is important to keep the larger perspective in focus.

The primary message of MPT is that extreme diversification should be vigorously pursued. An investor should limit risk by reducing the portion of her wealth exposed to the market portfolio—not by trimming the components of the market portfolio that are high risk.

To close with an example, suppose that Jenny, a successful accountant, has decided to retire and wishes to substantially reduce the risk of her total portfolio. The point of MPT is that she should reduce her risk by evenly reallocating some of her wealth away from her diversified (market) portfolio and into her riskless portfolio. She should not analyze her diversified portfolio of risky assets and sell off only those investments that appear highly risky. To do so would be to lower the level of diversification that she is achieving—and according to MPT that would be a very expensive way to reduce her risk.