

“Who Should Buy Long-Term Bonds?”

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Academic finance experts often boast about the impact of modern finance theory on the practice of investing. In many areas, from mutual funds to derivatives, my academic colleagues and I have much to celebrate. But we also have a well kept secret: Until now we have offered very little useful advice to investors planning asset allocations for the long term, or to institutions acting on their behalf.

The standard academic paradigm for asset allocation is the mean-variance analysis, first developed almost 50 years ago by Harry Markowitz and now embodied in mean-variance optimizers used by countless asset managers around the world. But optimizers are no better than their assumptions and their inputs. The mean-variance analysis assumes that investors care only about risks to their wealth in the short run; accordingly, optimizers are fed returns and risks measured over relatively short time intervals. This is not appropriate for the many investors who take the long view and care about risks to the standard of living that their wealth can support in the long run.

The mismatch between the mean-variance analysis and reality became clear to me when I started to think about the problem of allocating a portfolio among three broad asset classes: stocks, bonds, and money market funds (“cash”). One of the most famous results in mean-variance analysis is the mutual fund theorem of portfolio choice, according to which all investors should combine cash with a single portfolio or “mutual fund” of risky assets. Although the mutual fund theorem won its discoverer James Tobin a Nobel Prize, it is apparent that investors do not take it seriously.

The mutual fund theorem directs all investors, conservative or aggressive, to hold the *same* portfolio of stocks and bonds, mixing the portfolio with more or less cash depending on the investor’s aversion to risk. Thus if an aggressive investor holds 80% stocks and 20% bonds, a conservative investor should maintain the same 4:1 ratio of stocks to bonds at a lower scale, perhaps 40% equities and 10% bonds, with 50% of the portfolio in cash. This is quite different from the way conservative investors actually behave, and are advised to behave by financial planners. In practice, conservative investors favor bonds relative to equities so that a conservative portfolio might consist of 40% equities, 40% bonds, and 20% cash.

Using mean-variance analysis, it is hard to explain why any investors hold large positions in bonds. The mean-variance analysis treats cash as the riskless asset, and treats bonds merely as another risky asset like stocks. Bonds are valued only for their potential contribution to the short-run excess return, relative to risk, of a diversified risky portfolio. This view tends to relegate bonds to a minor supporting role in the recommended portfolio, since excess bond returns have historically been fairly low and bond returns have been highly variable in the short run. Over the period 1970-1996, for example, the average excess return on long-term US Treasury bonds over 3-month Treasury bills was less than 2% while the standard deviation of this return was almost 11%. Dividing average excess return by standard deviation gives a Sharpe ratio for bonds of 0.18. Over the same period the US equity market had an average excess return of almost 6% and a standard deviation of 17%, implying a Sharpe ratio almost twice as high at 0.34. The comparison looks even less favorable for bonds if one studies the early postwar period of slowly rising inflation or the very recent period of spectacular stock returns.

A long-horizon analysis treats bonds very differently, and assigns them a much more important role in the optimal portfolio. For long-term investors, money market investments are *not* riskless because they must be rolled over at uncertain future interest rates. Just as borrowers have come to appreciate that short-term debt carries a risk of having to refinance at high rates during a financial crisis, so long-term investors must appreciate that short-term investments carry the risk of having to reinvest at low real rates in the future. For long-term investors, an inflation-indexed long-term bond is actually less risky than cash. A long-term bond does not have a stable market value in the short term, but it delivers a predictable stream of real income and thus supports a stable standard of living in the long term.

I have recently completed an empirical analysis of optimal portfolio choice for long-term investors. Using a statistical model of nominal interest rates, real interest rates, inflation, and stock prices, I have calculated optimal portfolios for long-lived investors with varying attitudes towards risk. My analysis provides qualified support for the commonsense advice of financial planners. It directs conservative long-term investors to hold more bonds and fewer equities than aggressive long-term investors. The figure illustrates this pattern. The horizontal axis shows risk aversion, with aggressive investors to the left and conservative investors at the right. The vertical axis shows the division of the optimal portfolio among stocks, nominal bonds, and cash. Aggressive investors should hold almost 100% equity portfolios, but more conservative investors should shift largely into bonds along with a very modest allocation to cash. (A larger cash position can be justified as a contingency reserve to meet unexpected consumption needs, but I do not attempt to model this sort of cash demand.)

The conventional wisdom of financial planners comes out well from this analysis: Buyers of long-term bonds should be conservative long-term investors, or institutions such as pension funds acting on their behalf. There is however one important qualification. The analysis looks at recent historical data from the period 1983-96, during which monetary policy has successfully contained inflation. If I consider historical data from the whole postwar period 1952-96, I estimate a much larger risk of inflation that could erode the real value of long-term nominal bonds. When there is a significant risk of inflation, nominal bonds are far less appealing because they are not good substitutes for inflation-indexed bonds and are not in any sense riskless for long-term investors. Conservative long-term investors who are concerned about the possible return of inflation should instead hold US Treasury inflation-indexed bonds, which currently offer extraordinarily attractive real yields of about 4%.

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Optimal Asset Allocation for Long-Term Investors

