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Asset allocation in a low-yield and volatile environment

Outlook for stocks and bonds underscores the classic risk/return trade-off

Vanguard research

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Executive summary. Against the current backdrop of low U.S. interest rates and elevated economic volatility, what are reasonable expectations for U.S. bond and stock returns going forward, how do they compare with historical returns, and what are the potential implications for strategic asset allocation?

Using the Vanguard Capital Markets Model[®], we simulated distributions of future stock and bond returns (both nominal and inflation-adjusted, or *real*) based on market conditions as of September 30, 2011, under various scenarios for future interest rates, inflation, and other risk factors.

Our simulations show that the average annual returns on a 50% equity/50% bond portfolio are expected to center in the 4.5%–6.5% range in nominal terms and in the 3.5%–4.5% range in real terms over the next decade. This central tendency is modestly below the average for a 50%/50% portfolio since 1926 (8.2% nominal, 5.1% real), but it is above that of the past decade in either the United States or Japan, an economy to which the U.S. has been compared recently owing to Japan's decades-long period of slow growth following a recession.

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Put another way, the likelihood that the average returns on a 50% equity/50% bond portfolio over the next ten years will exceed those of the past ten years is approximately 70%—odds that may seem surprisingly high to some readers, considering the current economic and interest rate environment. We discuss other stock/bond allocations as well.

Overall, we find that the expected risk/return trade-offs among stocks and bonds do not warrant abandoning the basic principles of portfolio construction—balance, diversification, and a strategic allocation based on long-term goals. We believe that modestly recalibrating one’s return expectations for a balanced portfolio based on prevailing market conditions is more prudent than radically shifting the asset allocation in an attempt to either defend against market volatility or pursue higher returns in hopes of a (risk-)free lunch.

Indexes used in our calculations

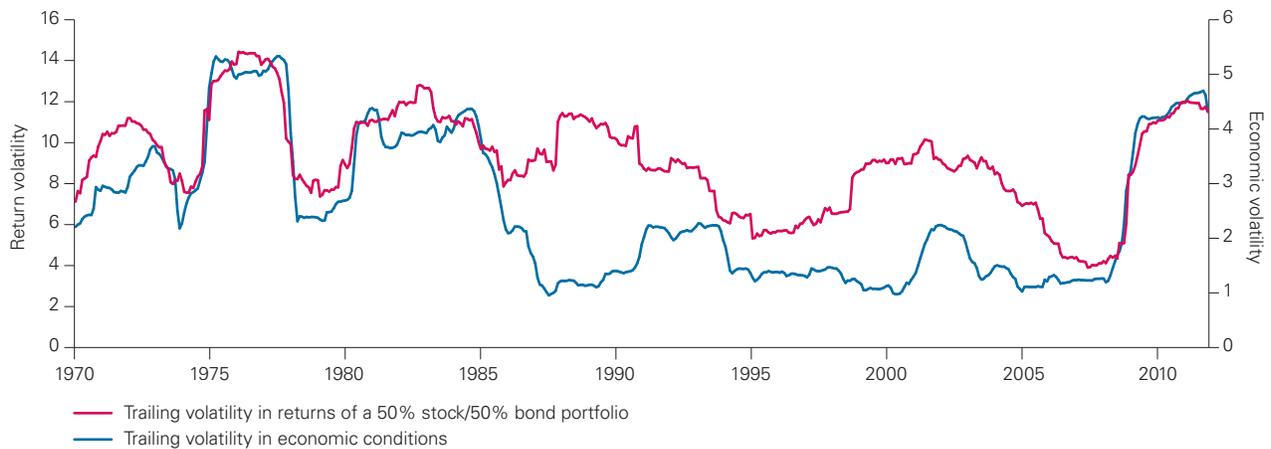
The long-term returns for our hypothetical portfolios are based on data for appropriate market indexes. For U.S. bond market returns, we use the Standard & Poor’s High Grade Corporate Index from 1926 to 1968, the Citigroup High Grade Index from 1969 to 1972, the Lehman Brothers U.S. Long Credit AA Index from 1973 to 1975, and the Barclays Capital U.S. Aggregate Bond Index thereafter. For U.S. stock market returns, we use the S&P 90 from 1926 to March 3, 1957; the S&P 500 Index from March 4, 1957, to 1974; the Dow Jones Wilshire 5000 Index from 1975 to April 22, 2005; and the MSCI US Broad Market Index thereafter. For international stock market returns, we use the MSCI EAFE Index from 1970 through 1988, and a blend of 75% MSCI EAFE Index and 25% MSCI Emerging Markets Index thereafter.

IMPORTANT: The projections or other information generated by the Vanguard Capital Markets Model regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM results will vary with each use and over time.

The VCMM projections are based on a statistical analysis of historical data. Future returns may behave differently from the historical patterns captured in the VCMM. More important, the VCMM may be underestimating extreme negative scenarios unobserved in the historical period on which the model estimation is based.

All investing is subject to risk. Past performance is no guarantee of future returns. Investments in bond funds are subject to interest rate, credit, and inflation risk. Foreign investing involves additional risks, including currency fluctuations and political uncertainty. Diversification does not ensure a profit or protect against a loss in a declining market. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Figure 1. U.S. economic volatility and financial market volatility have been highly correlated: January 1970–September 2011



Notes: Volatility in economic conditions is defined here as the rolling standard deviation over the past 36 months in the Federal Reserve Bank of Philadelphia’s Aruoba-Diebold-Scotti Business Conditions Index, which is designed to track real business conditions at high frequency. Its underlying (seasonally adjusted) economic indicators—weekly initial jobless claims, monthly payroll employment, industrial production, personal income less transfer payments, manufacturing and trade sales, and quarterly inflation-adjusted gross domestic product—blend high- and low-frequency information and stock and flow data. Financial market volatility is defined here as the rolling standard deviation over the past 36 months in the total returns of a hypothetical 50% U.S. stock/50% U.S. bond portfolio. See the box on page 2 for a list of the U.S. indexes used for the portfolio returns. Data shown are through September 30, 2011.

Sources: Barclays Capital, Thomson Reuters Datastream, and Vanguard calculations using data from the Federal Reserve Bank of Philadelphia and index returns.

Note that the performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Current market conditions

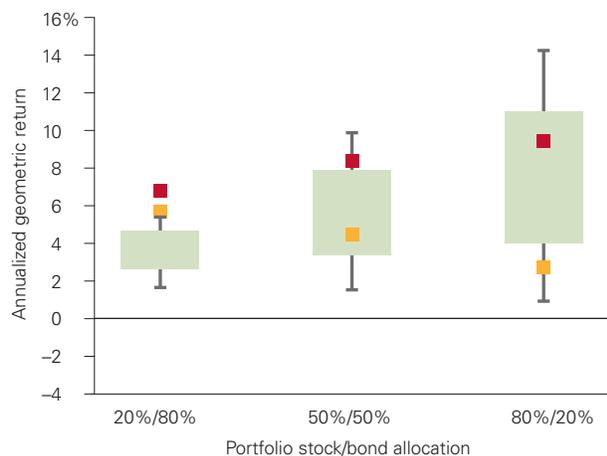
Economic uncertainties and disappointments—ranging from stubbornly high unemployment and elevated double-dip recession fears to unresolved government debt concerns and unconventional monetary policy actions—have long moved in tandem with financial market volatility (see **Figure 1**). Today, long-term U.S. interest rates remain near their lowest levels in decades, and the real yield on the 10-year Treasury inflation-protected bond has turned briefly negative over the past few months.

With 10-year U.S. Treasury yields near 2.0%, financial markets currently anticipate that a low-yield, low-growth environment may persist in the United States for years. The Federal Reserve recently announced its intention to leave short-term interest rates near 0% through the middle of 2013, and the possibility exists that near-0% rates will last far longer, should the U.S. economy languish in a Japanese-like low-growth environment. Investors also are concerned with the prospect for higher future inflation that could result from some combination of too-accommodative-for-too-long monetary policy and the temptation to “inflate away” high and growing U.S. government debt.

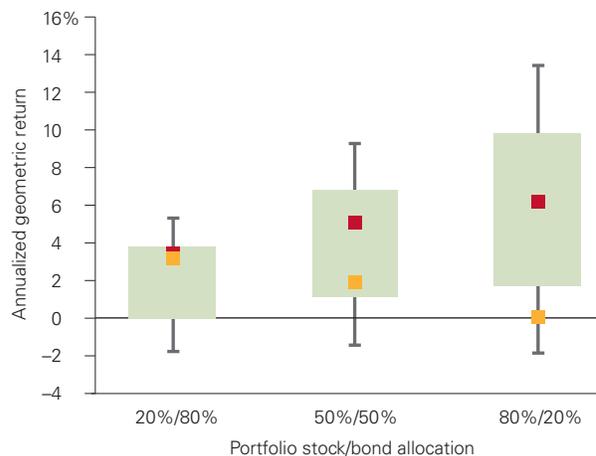
Figure 2. Return outlook for balanced portfolios

VCOMM simulated distribution of expected annualized ten-year returns

2a. Nominal returns



2b. Real (inflation-adjusted) returns



■ U.S. historical returns: 1926–2010 ■ U.S. historical returns: 2000–2010 ■ 25th–75th percentiles ┆ 10–90th percentiles

Notes: Percentile distributions are determined based on results from the Vanguard Capital Markets Model (described in the Appendix). For each portfolio allocation, 10,000 simulation paths for U.S. equities and bonds are combined, and the 10th, 90th, 25th, and 75th percentiles of return results are shown in the box and whisker diagrams. The dots indicating U.S. historical returns for 1926–2010 and 2000–2010 represent equity and bond market annualized returns over these periods. The equity returns represent a blend of 70% U.S. equities and 30% international equities; bond returns represent U.S. bonds only. Returns are based on the broad-market indexes listed in the box on page 2.

Sources: Barclays Capital, Thomson Reuters Datastream, and Vanguard calculations, including VCOMM simulations (see Appendix), and index returns.

Three simple but crucial questions based on the current environment

Given this macroeconomic backdrop, we sought to address three simple yet fundamentally important questions for strategic asset allocation:

1. What is a reasonable range of expected returns (both nominal and real) for a balanced portfolio of stocks and bonds based on present market conditions?
2. How does this range of returns compare with both long-run historical averages and the more recent past in the United States, as well as with the last decade in Japan?¹
3. Should this range of expected returns alter an investor’s approach to asset allocation in light of the prevailing concerns over future U.S. growth, inflation, and interest rates?

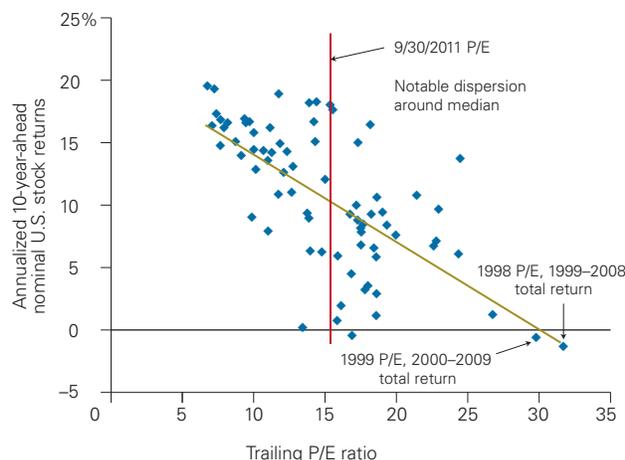
Uncertain times, probabilistic insight

As we discussed in detail in last year’s launch of our annual publication, *Vanguard’s Economic and Capital Markets Outlook* (Davis, Wallick, and Aliaga-Díaz, 2010c), Vanguard strongly believes that investors should consider market forecasts only in a probabilistic framework. The stock and bond distributions shown in this paper represent Vanguard’s current views on the potential distribution of risk premiums that may occur over the next ten years, and are among a number of important qualitative and quantitative inputs used in the company’s portfolio-construction process.

¹ For an examination of factors influencing the U.S. and Japanese economies, see the Vanguard paper *Which Path Will the U.S. Economy Follow? Lessons From the 1990s Financial Crises of Japan and Sweden* (Davis et al., 2009b).

Figure 3. Initial conditions and future returns in the U.S. stock and bond markets: 1926 through September 30, 2011

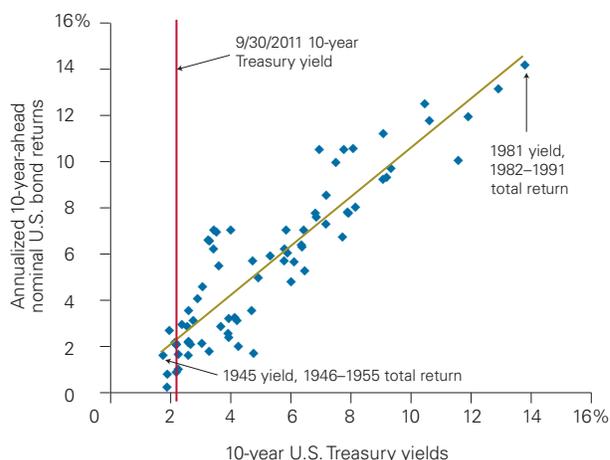
3a. Stocks: Price/earnings ratios and subsequent average annualized returns



Note: The trailing P/E ratio reflects the 12-month moving average P/E. Returns are S&P 500 Index total returns calculated on the basis of data from economist Robert Shiller.

Sources: Robert Shiller, Standard & Poor's, and Vanguard. For more details, see the Vanguard paper *What Does the Crisis of 2008 Imply for 2009 and Beyond?* (Davis, Aliaga-Diaz, and Ren, 2009a).

3b. Bonds: 10-year U.S. Treasury yields and subsequent average annualized returns



Note: Yield data is from Global Financial Data and the Federal Reserve Board. Returns are based on the bond indexes listed in the box on page 2.

Sources: Global Financial Data, Federal Reserve Board, Barclays Capital, Thomson Reuters Datastream, and Vanguard calculations based on index return data.

Simulating future portfolio returns

To examine potential implications for asset allocation, we used the Vanguard Capital Markets Model to generate 10,000 simulations of potential ten-year stock and bond return paths based on market conditions as of September 30, 2011, and various scenarios for future interest rates, inflation, and other risk factors.

Figure 2 presents the results. It shows the simulated return distributions for three hypothetical portfolios ranging from more conservative to more aggressive:²

- 20% equities/80% bonds.
- 50% equities/50% bonds.
- 80% equities/20% bonds.

Figure 2a shows the distributions for nominal returns; Figure 2b displays the distributions of returns adjusted for the rate of expected Consumer Price Index inflation. For reference, both figures also show how the hypothetical portfolios would have performed over two past periods: 1926–2010 and 2000–2010.

Implications for strategic allocation

Three key take-aways

Figure 2 has at least three key implications for strategic asset allocation. The first is that balanced portfolio returns over the next decade are likely to be moderately below long-run historical averages (indicated by the red dots). Put another way, the “mean-variance” frontier of expected returns may

² In each portfolio, the equity portion is 70% U.S. stocks and 30% international stocks, and the fixed income portion is 100% U.S. bonds.

now be somewhat lower for all but the most aggressive portfolios than what has been realized, on average, over the past 85 years.

As an example, our VCMM simulations indicate that the average annualized returns on a 50% equity/50% bond portfolio are expected to center in the 4.5%–6.5% range in nominal terms and in the 3.5%–4.5% range in real terms over the next decade. This central tendency is below the actual average returns for such a portfolio from 1926 through 2010: 8.2% in nominal terms and 5.1% in real terms.

Viewed from another angle, the likelihood that our 50%/50% portfolio would achieve the 1926–2010 average nominal return is estimated at somewhat less than 25%; in terms of real return, the odds are higher but still below 50%.

A second implication of Figure 2 is that balanced portfolio returns over the next decade are likely to be moderately *higher* than those for 2000–2010 in both the United States (4.5%, yellow dots) and Japan (1.6%), at least for portfolios with higher equity allocations. A primary reason is the outlook for the equity risk premium.

Specifically, our simulations suggest that the average return on a broad stock portfolio is likely to be higher than that for a broad bond portfolio given current equity valuations and as compensation for investors bearing greater equity-market risk. This may surprise some readers, considering the anticipated headwinds to long-run economic growth.

However, as discussed in previous Vanguard research papers (including *Vanguard's Economic and Capital Markets Outlook*), it is market valuations—not consensus growth forecasts—that generally correlate with future stock returns. As shown in **Figure 3a**, on page 5, recent stock valuation

Total returns, income, and the search for yield

Vanguard believes it is important for investors to view their portfolios from a total return perspective, rather than simply in terms of potential income (i.e., the yield to maturity on a bond fund, or the dividend yield on an equity fund). An investor looking at total return will be concerned with capital gains and losses as well as with the income derived from bond interest and stock dividends. Past Vanguard research has highlighted the importance of understanding total return and the risks that can accompany a narrow focus on income.³

Investors who increase their allocation to higher-yielding bonds or dividend-paying stocks in an attempt to meet spending needs based on income alone should be aware that their portfolio volatility will likely increase as a result. (Such a change in strategic asset allocation is a “move to the right” along the expected-return frontiers in Figure 2.) Figures 2, 3, and 4 all can serve as reminders that, while an allocation to bonds may provide below-average total returns in the next decade, the volatility-dampening properties of bonds should be carefully taken into consideration when developing a sound investment strategy.

³ See Jaconetti (2007).

Figure 4. A balanced, diversified investor has fared relatively well

A comparison of performance since the start of the financial crisis



Note: Stock returns represent a blend of 70% U.S. equities and 30% international equities; bond returns represent U.S. bonds only. Returns are based on the broad-market indexes listed in the box on page 2. Data are from October 9, 2007, through September 30, 2011.

Sources: Barclays Capital, Thomson Reuters Datastream, and Vanguard calculations based on index return data.

metrics, such as those for the S&P 500 Index, do not appear at extreme historical levels, whereas bond yields signal the possibility of below-average nominal bond returns in the near future. In other words, the expected equity risk premium is high.

The third and most important implication of Figure 2 is that the simulated ranges of expected returns are upward-sloping. Simply put, higher risk accompanies higher (expected) return; more aggressive allocations have a higher—and wider—range of expected returns, with greater downside risk in the event that the equity risk premium is not realized over the next decade. Indeed, these expected risk-return trade-offs among stocks and bonds show why the principles of portfolio construction remain unchanged, in our view.

In fact, this upward-sloping and wider-tail pattern in Figure 2 reaffirms the beneficial role that bonds should be expected to play in a broadly diversified portfolio *despite their presently low yields and regardless of the future direction of interest rates*. Although our scenarios generate below-average nominal returns for a broad taxable bond index over the next decade—a central tendency of 2%–3% annually on average—bonds should be expected to moderate the volatility in equity portfolios in the years ahead.⁴

Figure 4 shows how an allocation to bonds can provide some downside protection even during a low-yield environment such as we have experienced since 2008. In addition to offering this diversification benefit, bonds would be expected to provide a higher nominal income stream in the event that interest rates rise.

⁴ The Appendix in *Vanguard's Economic and Capital Markets Outlook* provides a table showing an expected range of correlations between future stock and bond returns.

Conclusion

Timeless asset allocation principles continue to endure

Our VCMM simulations indicate that balanced portfolio returns over the next decade are likely to be moderately below long-run historical averages, especially for more conservative portfolios. Yet, while the mean-variance frontier of expected returns for such portfolios may now be modestly lower and steeper than the average over the past 75 years, we have shown that the basic principles of portfolio construction remain unchanged, given the expected risk-return trade-off among stocks and bonds.

In our view, all investors should appreciate that market conditions today are less favorable for the future than they were in, say, 1980, when high bond yields and depressed P/E ratios provided tailwinds toward higher-than-average stock and bond returns during the decades of the 1980s and 1990s.

But the future need not be dark, either. Indeed, the present levels of interest rates and stock market valuations are arguably closer to the levels of the 1950s and 1960s, environments that over time produced respectable balanced portfolio returns.

Overall, we believe that realistically recalibrating one's return expectations for a balanced portfolio is more prudent than making a drastic shift in allocation in an attempt either to defend against elevated market volatility or to pursue higher returns under the allure of higher yields, higher economic growth, or alternative investments. Investors who are unwilling or unable to lower their targeted rates of return or spending requirements may need to increase their savings rates—an approach that Vanguard research has shown can be quite effective in raising the odds of investment success.⁵

An alternative approach, for investors who feel locked to their return or spending targets, would be to adopt a somewhat more aggressive strategic asset allocation by increasing their holdings of equities. Of course, a direct result of this approach would be for the investor to bear higher portfolio volatility and greater downside risk.

⁵ See, for instance, Vanguard papers by Bruno and Zilbering (forthcoming in 2011) and Wallick, Shtekhman, and Schlanger (2011).

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Appendix

Vanguard Capital Markets Model

The Vanguard Capital Markets Model (VCMM) is a proprietary, state-of-the-art financial simulation tool developed and maintained by Vanguard's Investment Counseling & Research and Investment Strategy Groups. The VCMM uses a statistical analysis of historical data for interest rates, inflation, and other risk factors for global equities, fixed income, and commodity markets to generate forward-looking distributions of expected long-term returns. The asset return distributions shown in this paper are drawn from 10,000 VCMM simulations based on market data and other information available as of September 30, 2011.

The VCMM is grounded on the empirical view that the returns of various asset classes reflect the compensation investors receive for bearing different types of systematic risk (or beta). Using a long span of historical monthly data, the VCMM estimates a dynamic statistical relationship among global risk factors and asset returns. Based on these calculations, the model uses regression-based Monte Carlo simulation methods to project relationships in the future. By explicitly accounting for important initial market conditions when generating its return distributions, the VCMM framework departs fundamentally from more basic Monte Carlo simulation techniques found in certain financial software. The reader is directed to the research paper *Vanguard Capital Markets Model* (Wallick et al., 2009) for further details.



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