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Vanguard's economic and investment outlook

Vanguard research

January 2012

Executive summary. In this annual economic and market outlook, Vanguard presents our perspectives on the future of growth, inflation, interest rates, and the returns on stocks, bonds, and other asset classes. We discuss important themes and risks in this outlook, as well as the consideration of these factors in any potential investment strategy. We first summarize the salient points of Vanguard's global market perspective.

The asset-return distributions shown here represent Vanguard's view on the potential *range* of risk premiums that may occur over the next ten years; such long-term projections are *not* intended to be extrapolated into a short-term view of the next 12 months. These potential outcomes for long-term investment returns are generated by the Vanguard Capital Markets Model[®] (VCMM—see the description in the Appendix) and reflect the collective perspective of our Investment Strategy Group, overseen by George U. Sauter, Vanguard's chief investment officer. The expected risk premiums—and the uncertainty surrounding those expectations—are among a number of important qualitative and quantitative inputs used in Vanguard's investment methodology and portfolio-construction process.

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Note: The authors would like to thank members of Vanguard's investment research groups for helpful comments.

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Vanguard's distinct approach to forecasting

To treat the future with the deference it deserves, Vanguard believes that market forecasts are best viewed in a probabilistic framework. This publication's primary objectives are to describe the projected long-term return *distributions* that contribute to strategic asset allocation decisions and to discuss the rationale for the ranges and probabilities of potential outcomes. This analysis discusses our global outlook from the perspective of a U.S. investor with a dollar-denominated portfolio.

Global market outlook summary

U.S. growth. The U.S. economic recovery is likely to persist at a reduced 2.0%–3.0% trend real GDP growth rate, given the continuing headwinds involving housing, consumer balance-sheet repair, and the transition toward fiscal austerity in Europe and, eventually, the United States. Future U.S. economic growth should prove more uneven than expected, given the downside risks of a full-blown European sovereign debt/banking crisis, a housing-related Chinese slowdown, and the (unresolved) process for addressing U.S. fiscal imbalances. These and other (unanticipated) risks are likely to lead to periodic bouts of risk aversion and economic slowdowns in 2012 and beyond, followed by economic rebounds.

U.S. inflation. Trend inflationary pressures are currently modest, with the risk of returning to the high inflationary regime of the 1970s and early 1980s over the next several years estimated to be less than 10%. Over the next ten years, our simulations project a median inflation rate averaging about 2.0%–2.5% per year for the U.S. Consumer Price Index (CPI).

Monetary policy. The target federal funds rate is likely to remain near 0% through at least mid-2013, with a bias toward the Federal Reserve's remaining on hold into 2014. The return on cash will likely average less than 2.0% over the next ten years through 2021, with real (inflation-adjusted) short-term interest rates remaining negative for some time.

U.S. Treasury yields. Consistent with the current steepness of the Treasury yield curve, our ten-year projections generally exhibit a gradual rising-rate bias, although dispersion around this median path remains considerable. Based in part on our inflation outlook, the yield on the 10-year Treasury bond is expected to eventually move from its current range of 1.5%–2.5% toward the 3.5%–4.5% range over the next decade, a central tendency near its historical long-run average.

Bond market returns. The expected long-run median return of the broad taxable U.S. fixed income market is near current benchmark yields and thus most closely resembles the historical bond returns of the 1950s and 1960s. Despite the modest secular bias toward rising U.S. interest rates, we caution investors against maintaining a secular short-duration

bias in their fixed income portfolios. In our simulations, shorter-maturity Treasury yields tend to rise more than the yields on longer-maturity Treasury bonds. This so-called bear-flattening bias produces expected median returns that are similar for *all* Treasury bond portfolios, regardless of their maturity or duration. It is important to note that the diversification benefits of fixed income in a balanced portfolio remain under most scenarios; the bottom decile of expected U.S. bond returns through 2021 is positive, and is higher than the bottom-decile expected returns on equities.

Stock market returns. Centered in the 6%–9% return range, the long-term median nominal return for global equity markets is modestly below the historical averages. But after adjusting for potential future inflation, we estimate an approximately 50% likelihood that global equities over the next decade will realize their post-1926 *real* return average. This generally formative outlook for the global equity risk premium may surprise some readers, given the economic outlook and low-rate environment. However, our long-held view is that market valuations generally correlate with future stock returns, and that consensus economic growth expectations and initial dividend yields do not. As a result, the expected long-run return on emerging-market equities is statistically identical to that on developed-market equities, and in fact tends to be lower when adjusted for emerging markets' higher expected volatility. The expected distribution of correlations among major equity markets continues to underscore the strategic benefits of international diversification.

Asset-allocation strategies. Our VCMM simulations indicate that balanced-portfolio returns over the next decade are likely to be below long-run historical averages in nominal terms, but are much more likely to approach those averages when adjusted for future inflation. In short, *the distribution of real returns on a balanced portfolio looks more normal than abnormal*. Contrary to suggestions that the next decade warrants some radically new investment strategy, Vanguard still firmly believes that the principles of portfolio construction remain unchanged, given the expected risk–return trade-off among stocks and bonds. Specifically, our simulated mean-variance frontier of expected portfolio returns is upward sloping—that is, anticipating higher expected returns for more aggressive portfolios, accompanied by greater downside risk.

Investor behavior. We remain concerned that the currently low nominal yield environment will lead some to aggressively pursue higher nominal returns based on the thematic allure of either *higher dividend yields* (potentially comprising total return), *higher economic growth* (without considering market valuations), *inflation protection* (regardless of price), or *alternative investments* (without regard to cost or risk exposure). We believe that a balanced and diversified low-cost portfolio can remain an extremely high-value proposition in the decade ahead.

Secular growth outlook

Over the decade ending 2021, global expansion should occur at varied speeds, with emerging markets and Australia generally expanding fastest; the United States growing more modestly; and Europe, the United Kingdom, and Japan generally posting more sluggish growth. Since the uneven recovery scenario is broadly priced in by the financial markets, it should have little impact on the projected stock returns in these regions.

The U.S. economic recovery is likely to persist at a reduced trend pace of 2.0%–3.0% real GDP growth, compared with the historical trend growth rate of 3.5%–4.0% (Figure 1). As we discussed in our 2010

economic and investment outlook,¹ this somewhat U-shaped recovery for both real GDP (Figure 2a, on page 6) and employment (Figure 2b) is typical of economic recoveries following financial crises and home-price busts as overcapacity engenders consolidation, “creative destruction” reshapes broad industries, bank lending remains tepid for a time, and consumers pay down debt.

Despite its below-average trend growth rate, our secular U.S. economic outlook remains cautiously optimistic. It is important to note that U.S. profit margins and corporate balance sheets are strong and productivity is high, thereby providing a level of shock-resistance to the U.S. private sector going

¹ See *Vanguard’s Economic and Capital Markets Outlook* (Davis, Wallick, and Aliaga-Díaz, 2010a).

Indexes used in our calculations

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

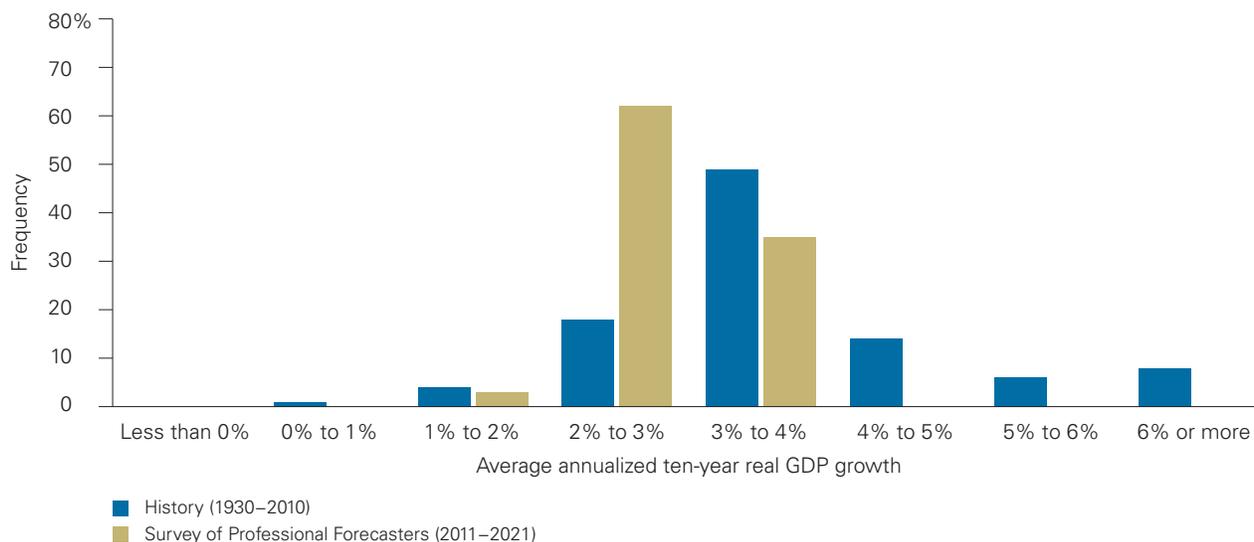
IMPORTANT: The projections or other information generated by the Vanguard Capital Markets Model regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM results will vary with each use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

Investments in bonds are subject to interest rate, credit, and inflation risk. Stocks of companies in emerging markets are generally more risky than stocks of companies in developed countries. U.S. government backing of Treasury or agency securities applies only to the underlying securities and does not prevent share-price fluctuations. Investments that concentrate on a relatively narrow market sector face the risk of higher share-price volatility.

Figure 1. Distributions of annualized ten-year U.S. real GDP growth rates—future versus historical record



Notes: Blue bars represent historical distribution of rolling ten-year annualized growth rates in U.S. real GDP (overlapping). Tan bars represent distribution of actual survey responses for predicted average real GDP growth over 2012–2021 in the March 2011 *Survey of Professional Forecasters* (by Federal Reserve Bank of Philadelphia, available at <http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/>).

Sources: Vanguard, based on data from Federal Reserve Bank of Philadelphia and U.S. Bureau of Economic Analysis.

forward.² Modest progress has also been made to date in reducing consumer debt (Figure 3a, on page 7) and housing imbalances (Figure 3b).

That said, we anticipate there will be some time before consumer debt levels and U.S. housing prices reach their longer-term equilibrium levels, a critical condition for sustained above-average economic growth. Based on our calculations, U.S. consumer debt (as a percentage of household disposable income) may not reach more sustainable levels until 2015 or so, although lower interest rates have substantially reduced the costs of “passive deleveraging” by bringing household debt service burdens down to those last seen in the early 1990s.

U.S. home prices are more closely aligned with home-price fundamentals than at any time since the late 1990s, with housing affordability at all-time recorded

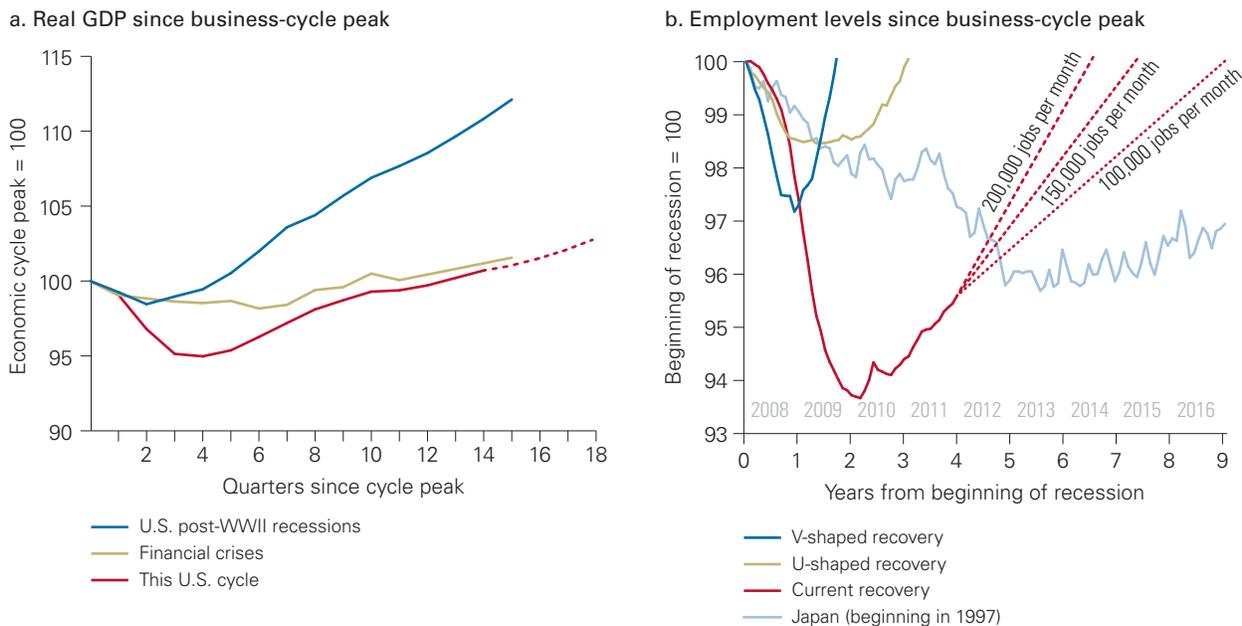
highs. However, it may take until 2014 before home prices bottom. Future home-price appreciation is likely to be modest, at best, for the foreseeable future, based on still-high foreclosure rates and unsold home inventories, still-tight credit standards, and the historical tendency for home prices to undershoot fundamentals following a housing bubble.

On balance, Vanguard views the risk to this secular outlook as more even-keeled than the distribution of consensus forecasts shown in Figure 1. Over the next several years, risk factors that would contribute to lower-than-expected growth would include a failure for home prices to stabilize by year-end 2014, a significant shift in long-term inflation expectations, and failure by the U.S. government to propose and enact a credible plan to address the nation’s long-term fiscal imbalances.³

2 As further evidence of this, the ratio of the level of real GDP in Figure 2a to the level of U.S. employment in Figure 2b is near an all-time high. Indeed, the level of real GDP (which includes corporate profits) at the end of 2011 exceeded that of the 2007 pre-crisis peak.

3 As we stressed in our 2010 outlook, we would not be surprised if the next global recession were spawned by a fiscal crisis in a major economy. Ultimately, the most effective solution to the problem of government debt levels involves a credible commitment to fiscal austerity through a combination of reduced government spending and higher tax rates. Of course, how preemptive the U.S. Congress will be in addressing such issues is a critical risk factor going forward. For further discussion, see the August 2011 Vanguard webcast “Dealing with global debt,” available at https://advisors.vanguard.com/VGApp/iip/site/advisor/researchcommentary/research/article/IWE_VideoJDavis2q2011.

Figure 2. U.S. economy continues to gradually recover



Notes: V-shaped recoveries in panel b are those following recessions beginning in 1948, 1953, 1957, 1960, 1970, 1974, and 1981. U-shaped recoveries are those following recessions that began in 1990 and 2001. Employment in Japan is represented by the number of persons employed as reported in the *Labour Force Survey* from June 1997 through December 2011 (by Japan's Statistics Bureau, available at <http://www.stat.go.jp/english/data/roudou/index.htm>).

Sources: Vanguard, based on data from International Monetary Fund, Organisation for Economic Co-Operation and Development (OECD), National Bureau of Economic Research, Thomson Financial Datastream, and U.S. Bureau of Labor Statistics, U.S. Department of Commerce.

Alternatively, prospects for better-than-expected growth could be driven by marked increases in capital investment sparked by the widespread adoption of cost-saving technologies, increased housing and infrastructure spending following a prolonged period of depressed activity, substantial U.S. energy independence, and a lower trade deficit.

Cyclical growth risk assessment

It's important to stress that Vanguard expects significant year-to-year deviations from our 2.0%–3.0% long-run expected growth range. As stated in our June 2010 outlook (Davis et al., 2010a), it is highly likely that U.S. economic growth in 2012 will prove more uneven than the consensus view, which is anticipating an average growth rate of approximately 2.5% in each of the four quarters of 2012. Rarely, if ever, has such a "smooth" consensus growth outlook been realized.

Heading into 2012, our proprietary Vanguard Economic Momentum Index (VEMI) is indicating that the U.S. economy is continuing to build momentum since the summer 2011 slowdown. A growth forecast based solely on the VEMI would suggest upside risk to consensus expectations of 2.5% U.S. economic growth in 2012, similar to the risk profile assigned by the index in January 2011.⁴

Nevertheless, Vanguard remains cautious on the cyclical outlook, given several prominent top-down threats to U.S. growth, including (in order of potential severity to 2012 growth):

- A deep European recession worsened by a full-blown European sovereign-debt/banking crisis;⁵
- The (unresolved) process for addressing U.S. fiscal imbalances;

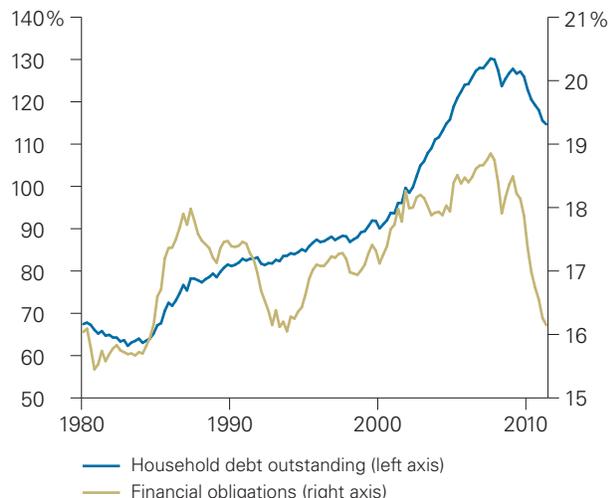
⁴ See the Vanguard paper *2011 U.S. Economic Outlook: Cautious Optimism* (Davis et al., 2011d).

⁵ See the Vanguard paper *For the Eurozone, Much Hinges on Self-Discipline—and Self-Interest* (Lemco, 2011).

Figure 3. Current status of consumer deleveraging and home prices

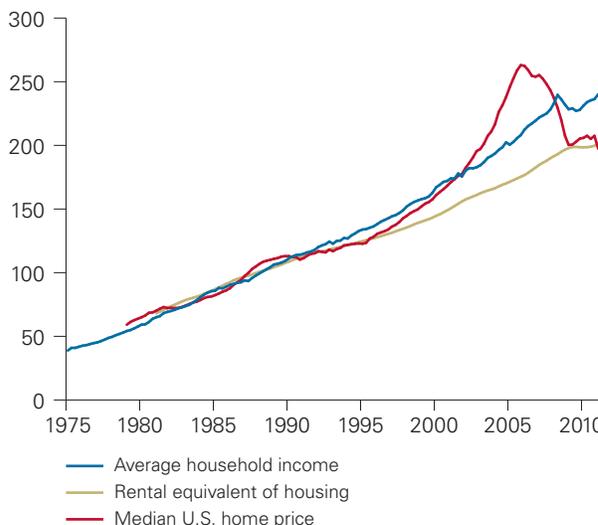
a. Consumer debt levels and household debt burdens

As a percentage of household income



b. Home prices and housing fundamentals

Indexes (base average, 1983–1993 = 100)



Notes: “Median U.S. home price” pertains to existing, single-family homes; “rental equivalent of home prices” is defined by apartment rents as measured by the CPI shelter index. To minimize base-year effects, all series in Figure 3b have been rebased to index values in which the average for 1983–1993 equals 100.

Sources: Vanguard, based on data from Federal Reserve, Moody’s Analytics, National Association of Realtors, U.S. Census Bureau, and U.S. Bureau of Labor Statistics.

- The unanticipated effects of significant regulatory reform on global financial markets;
- A supply shock that drives up oil prices to \$140 or more per barrel; and
- A sharp real estate-induced Chinese economic slowdown.⁶

Of these risks, we judge the interrelated concerns over European sovereign debt and banking capital as most likely to exert the strongest gravitational pull on the U.S. economy, leading to periodic bouts of risk aversion and U.S. economic soft patches or “growth scares” over the next two years.

Outlook for inflation

As stated in our 2010 outlook, trend inflationary pressures in the United States and most other developed markets are, at present, modest. The recent patterns in key core inflation drivers such as

labor costs, inflation expectations, economic slack, and the velocity of money suggest that core U.S. inflation is likely to remain within its recent range of 1.5%–3% over the next one to two years.

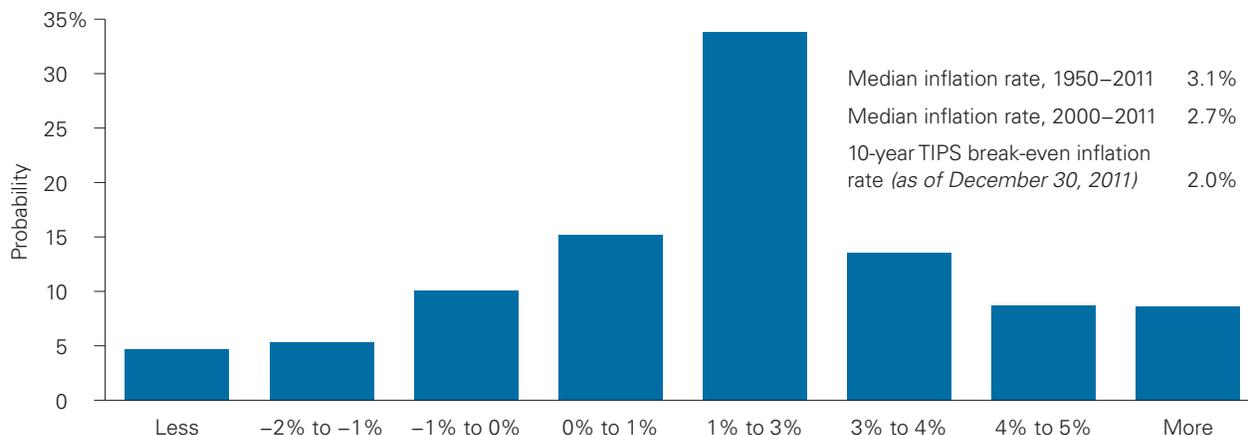
Over the next ten years, our simulations project a median inflation rate averaging close to 2% per year for the U.S. Consumer Price Index (see Figure 4, on page 8). The expected central inflation range of 1.5%–3% is roughly consistent with the Federal Reserve’s long-term goal of inflation stability, and is also near longer-term break-even inflation rates in the Treasury Inflation-Protected Securities (TIPS) market.

Of note, Vanguard’s median secular inflation expectation is approximately 1% lower than the average U.S. CPI inflation rate observed since 1950. *All else equal, this implies that nominal asset-class returns may be 1% lower than historical long-run averages, even if their expected average real*

⁶ Based on an analysis of government statistics, real estate investment exceeded 10% of China’s GDP in 2011. By comparison, real estate investment accounted for only 6% of U.S. GDP at the peak of the U.S. housing boom in 2006.

Figure 4. Projected U.S. CPI inflation rate, 2012–2021

VCOMM simulated distribution of expected annualized ten-year CPI inflation rates



Source: Vanguard.

(inflation-adjusted) returns are identical. We further discuss this point later in terms of our outlook for stocks, bonds, and asset allocation strategies.

Risk of higher-than-expected trend inflation

Despite Vanguard’s fairly sanguine median long-run outlook for U.S. inflation, Figure 4 also reveals an approximately 20% chance that the average annual CPI inflation rate will exceed 4% over the decade ending 2021. For those worried that the Federal Reserve’s current policies (in addition to the temptation for governments to “inflate away” their national debt) are setting the stage for a return to 1970s-style high inflation, we would point out that our estimate of the likelihood of CPI inflation averaging 5% or more over the next decade is approximately 10%, not trivial odds, but certainly not high.⁷

Why? Simply put, the odds of runaway and broad-based inflation over the next several years are currently low because the economic conditions that often precede (and *facilitate*) a broad and persistent run-up in the prices of a wide range of consumer products are not nearly so conducive to higher future

inflation as they were in the early 1970s. To illustrate, **Figure 5** presents what wage growth, the money multiplier, and bank credit growth were in the three years *preceding* the double-digit inflation rates of the mid-1970s and early 1980s, and compares them with the growth rates for those same three variables today.

Deflationary forces, reflationary monetary policy, and inflation fears

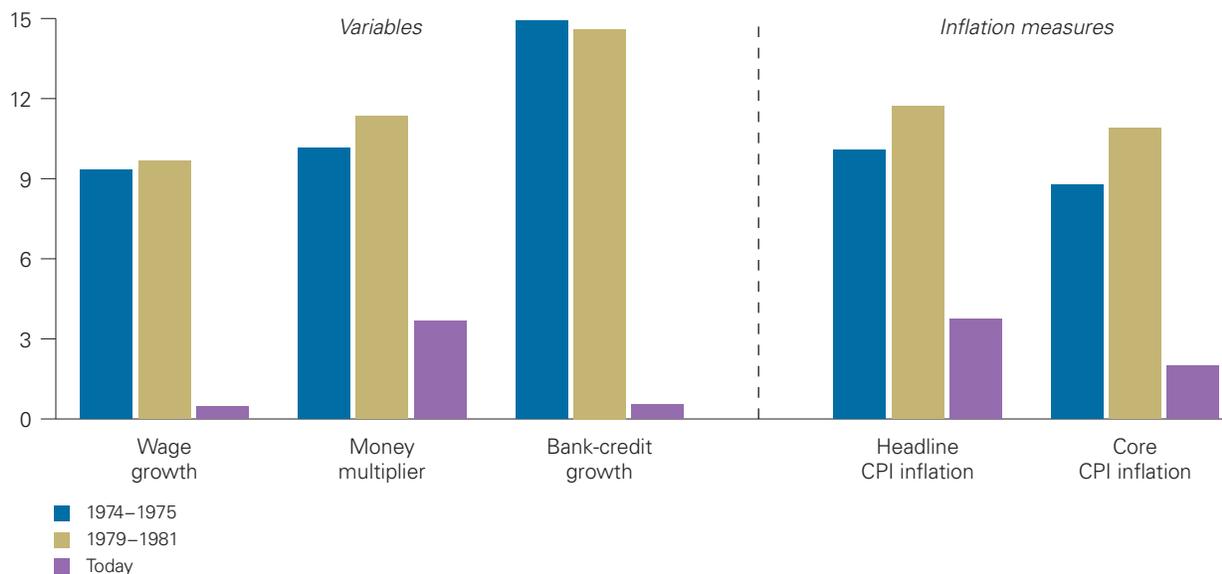
Looking ahead, we believe the countervailing forces of fiscal deleveraging and monetary-policy reflation in the United States and Europe will reinforce a “thematic paradox” with respect to inflation.

On the one hand, Vanguard would expect that some investors will continue to have significant concerns about future inflation. Our own simulations suggest that an acceleration in core inflation over the next several years cannot be ruled out. As a result, conversations about portfolio construction will include much discussion about inflation protection and the performance of various asset classes under different expected and unexpected inflation scenarios.⁸

⁷ For reference, the average annualized U.S. CPI inflation rate during the 1970s was approximately 6.5%, according to the U.S. Bureau of Labor Statistics.

⁸ See Bhardwaj, Hamilton, and Ameriks (2011).

Figure 5. Comparing high-inflation environments of 1970s and early 1980s with that of today



Notes: "Wage growth" is defined as unit labor costs for nonfarm businesses. The "money multiplier" is the ratio of the broad money supply (i.e., M2) to the monetary base. Data for "Today" are through December 2011.

Sources: Vanguard calculations, based on data from Federal Reserve and U.S. Bureau of Labor Statistics.

On the other hand, monetary policymakers in developed markets are likely to continue to guard against the pernicious deflationary forces of debt deleveraging for an extended period. Indeed, our VCOMM simulations reveal that the prospects of secular Japan-style deflation (where the average CPI inflation rate over the next decade is -1% or less) are approximately 10%.

Outlook for U.S. interest rates

Federal Reserve policy

In the near term, the U.S. Treasury yield curve is expected to remain steep, given the likelihood that the Federal Reserve will keep monetary policy on hold through at least mid-2013. Based on the distribution of outlooks for U.S. real GDP growth and inflation from the Federal Reserve Bank of Philadelphia's 2011 Survey of Professional Forecasters, our calculations suggest that the Federal Reserve is more likely to keep the federal funds target rate near 0% into 2014 than it is for the Fed to raise rates preemptively before mid-2013. Further quantitative easing (QE) is possible in 2012

in a continuing effort to minimize deflation risk, although we would view such an action as conditional on longer-term inflation expectations dropping meaningfully below 2% (as they did before QE1 and QE2).

Cash and money market returns

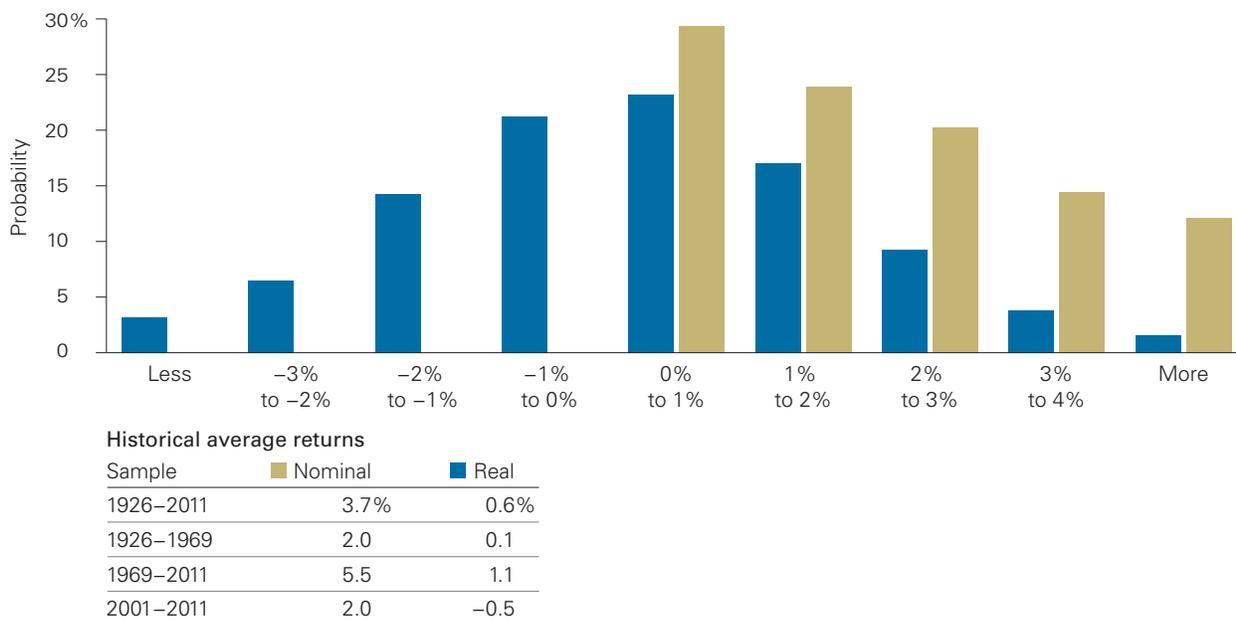
With the yield on the 3-month Treasury bill currently near 0% and the prospects for an extended period of a near-0% federal funds rate, the expected median return on cash is likely to average less than 2.0% in nominal terms over the next ten years (Figure 6, on page 10). The real (inflation-adjusted) short-term interest rate should remain negative for some time, an unfortunate headwind for savers in the years ahead.

U.S. Treasury yield curve

Consistent with the current steepness of the Treasury yield curve, our ten-year projections generally exhibit a gradual rising-rate bias, although dispersion around this median path remains considerable. Based in part on our inflation outlook,

Figure 6. Projected cash returns as measured by 3-month T-bill yield

VCOMM simulated distribution of expected annualized ten-year returns



Note: Real returns are inflation-adjusted.

Source: Vanguard.

the yield on the 10-year Treasury bond is expected to eventually normalize from its current range of 1.5%–2.5% toward the 3.5%–4.5% range over the next decade, a central tendency near its historical long-run average.⁹

We would stress that this secular rising-rate bias does *not* reflect a simplistic assumption for mean reversion, but rather is *conditional* on the evolution of the differentials between the current and expected future values for the fundamental components of long-term interest rates: inflation expectations, real yields, and inflation and other rate premiums. Short-term rates tend to rise more than long-term rates in substantially more than one-half of our VCOMM scenarios, which, as we discuss later, has important implications for those inclined to strategically tilt the duration exposure of their bond portfolios away from that of the broad fixed income market.

Interest rate risk and drivers of the yield curve

We feel compelled to underscore that the dispersion around our median interest rate path remains considerable. **Figure 7** displays the 25th, 50th (median), and 75th percentiles of the projected yield-curve distribution ten years from now. In approximately 20% of our scenarios (mostly those involving price deflation), U.S. interest rates at the end of 2021 are effectively unchanged from current yields.¹⁰

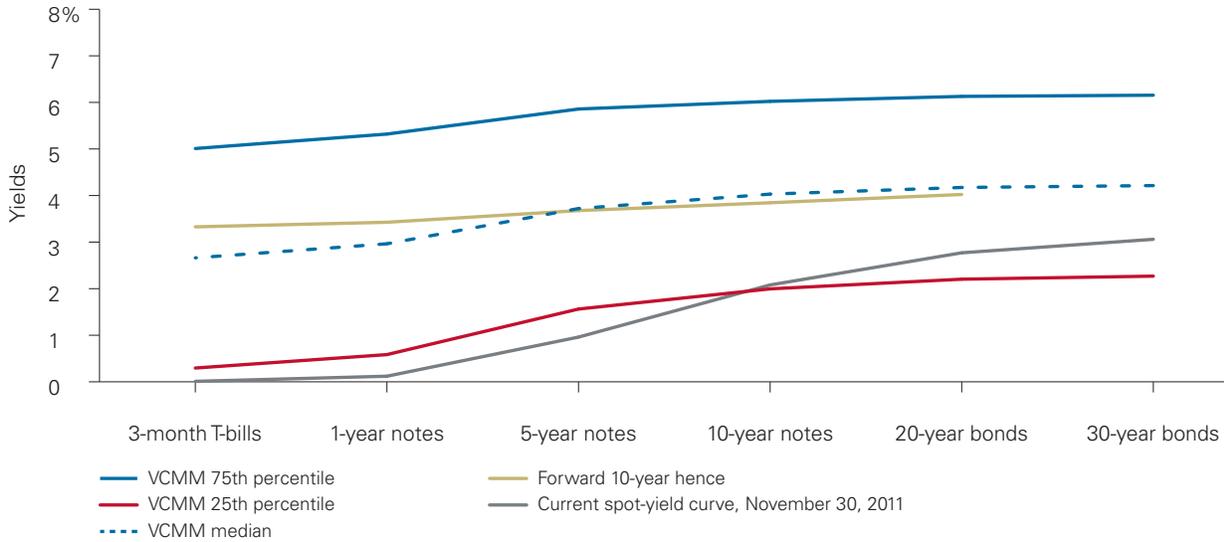
An explanation for the uncertainty surrounding our interest rate projections lies in the number of important—and at times offsetting—drivers of long-term Treasury yields. As reported in Vanguard’s research paper titled *Deficits, the Fed, and Rising Interest Rates* (Davis et al., 2010c), the upward pressure on long bond rates from increasing structural fiscal deficits has been more than offset to

9 For reference, the average 10-year U.S. Treasury yield since the year 1800 through December 31, 2011, has been 4.9%. Since 1900, the 10-year Treasury has yielded 4.7%. (Sources: Federal Reserve and Global Financial Data.)

10 It is also important to stress that the projections in Figure 7 reflect the *cross-sectional distribution* of future yield curves; as we discuss in the Appendix, the *individual time-series paths* for future interest rates vary markedly across VCOMM simulations.

Figure 7. U.S. Treasury yield curve

VCMM projections of Treasury yield curve in 2021



Source: Vanguard.

date by increased foreign demand, the expectation for an extended period of a low federal funds rate, increased U.S. investor demand for fixed income investments arising from higher U.S. domestic savings, and “flight-to-quality” effects.¹¹

This yield decomposition helps explain the surprisingly weak correlation over time between U.S. fiscal deficits and U.S. long-term interest rates (Figure 8, on page 12). It also suggests that the bond market’s anticipated rise in U.S. Treasury yields is not assured, despite the nation’s high structural deficits and the lower credit rating assigned to U.S. Treasury debt by Standard & Poor’s in August 2011.

Asset-class outlook: Bonds

Range of expected returns on broad taxable bond market

The expected long-run median return of the broad taxable U.S. fixed income market is near current benchmark yields and thus most closely resembles

the historical bond returns of the 1950s and 1960s (Figure 9, on page 13). According to our median simulation scenario, wider-than-average risk premiums for corporate bonds partially offset rising Treasury yields.

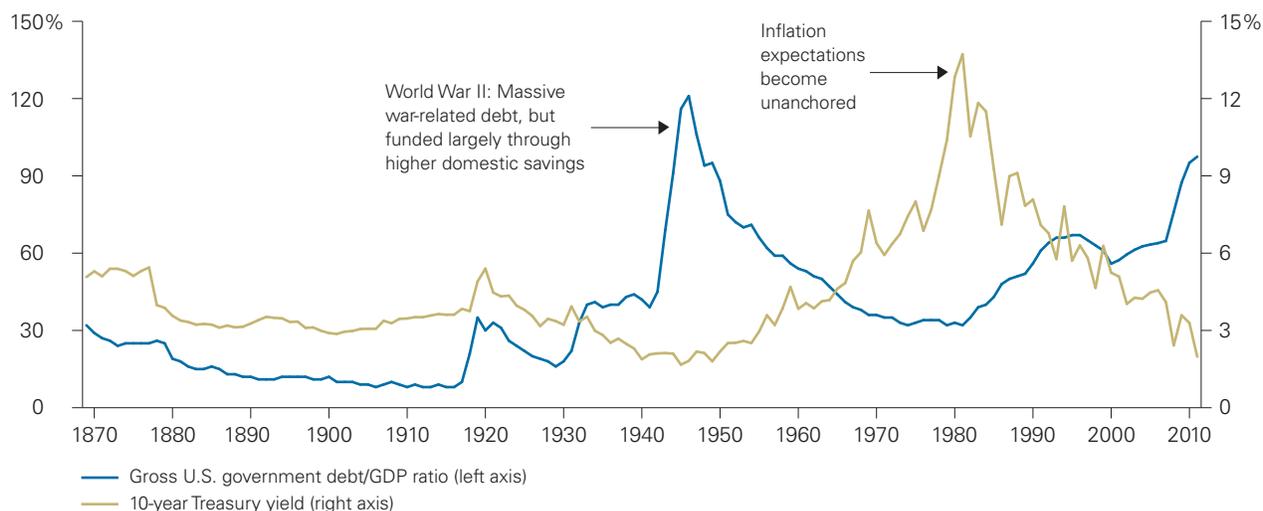
Implications for strategic duration positioning

Despite the modest secular bias toward rising U.S. interest rates, we caution investors against maintaining a secular short-duration bias in their fixed income portfolios. In our simulations, shorter-maturity Treasury yields tend to rise more than the yields on longer-maturity Treasury bonds.

This so-called bear-flattening bias produces expected median returns that are similar for all Treasury bond portfolios, regardless of their maturity or duration. This statement may come as a surprise to some readers, given the rising-rate bias in our simulations. However, Treasury benchmarks of different maturities should be expected to have the same total

¹¹ The net effect of these countervailing forces has been that the so-called term premium of the 10-year U.S. Treasury yield is estimated to be negative as of January 2012. The term premium is, in effect, the (unobserved) additional yield pickup that a holder of a 10-year Treasury bond demands over holding cash (i.e., a 3-month T-bill) for the next ten years. Typically, this term premium is positive, to compensate bond investors for bearing additional interest rate risk. It is unclear to what extent more transparent Federal Reserve communications or the recent macroeconomic environment have been factors in this development.

Figure 8. U.S. deficits and long-term interest rates since the late 1860s



Sources: Vanguard calculations, based on annual data from Global Financial Data, the Federal Reserve Board, U.S. Census Bureau, and U.S. Bureau of Labor Statistics. See also Davis et al. (2010c).

return if future interest rates evolve as expected today by the bond market's forward term structure and the steepness of the Treasury yield curve.¹²

Expected diversification effects

Despite the muted outlook for broad bond market returns, it is important to stress that we expect the key benefits of fixed income investing—diversification and income—to remain in the years ahead. Significantly, these benefits are apparent in most VCMM scenarios over the 2012–2021 decade. As discussed in the Appendix, the median correlation between the returns on U.S. bonds and U.S. stocks is expected to be low, with a correlation coefficient of approximately 0.15. In addition, the downside risk to U.S. fixed income returns over the full forecast horizon is less pronounced than that to U.S. equity returns. Specifically, the bottom decile of expected U.S. bond returns over the next ten years is positive and higher than that of the bottom-decile returns on stocks. TIPS and hedged international bonds are expected to diversify the return volatility of a broad taxable U.S. fixed income investment, as they have generally done historically.

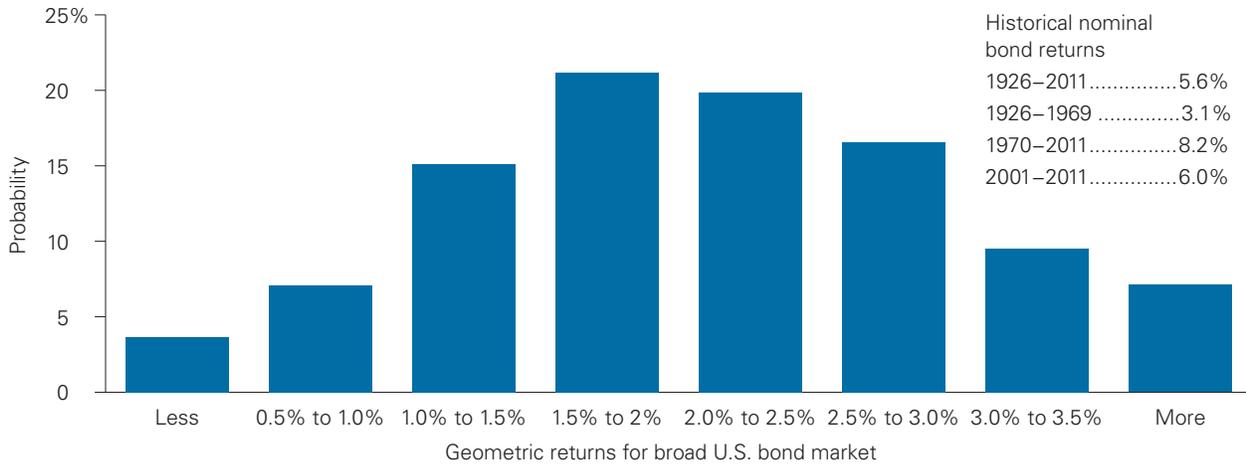
Within the broad taxable bond universe, the median expected total return on an investment-grade corporate bond index in our VCMM scenarios modestly exceeds that for a similar-duration U.S. government bond portfolio. This expected positive risk premium for investment-grade corporate bonds is a function of the current level of corporate bond spreads. Of course, this expected corporate bond risk premium is not realized in all scenarios, given corporate bonds' sensitivity to equity risk.

The expected median long-term return on a U.S. TIPS portfolio is lower than that for a similar-duration nominal U.S. Treasury portfolio by a modest amount that represents the estimated inflation risk premium. The distribution in our VCMM scenarios of TIPS returns is wider than that for nominal U.S. Treasury bonds. TIPS generally outperform nominal Treasuries in those scenarios with higher-than-average inflation rates over a ten-year outlook. On a more cautionary note, TIPS have displayed a higher probability of negative returns over shorter investment horizons, given the sensitivity of these securities to a rise in real rates.

¹² We discuss this in greater depth in Davis et al. (2010c).

Figure 9. Projected total U.S. bond market returns

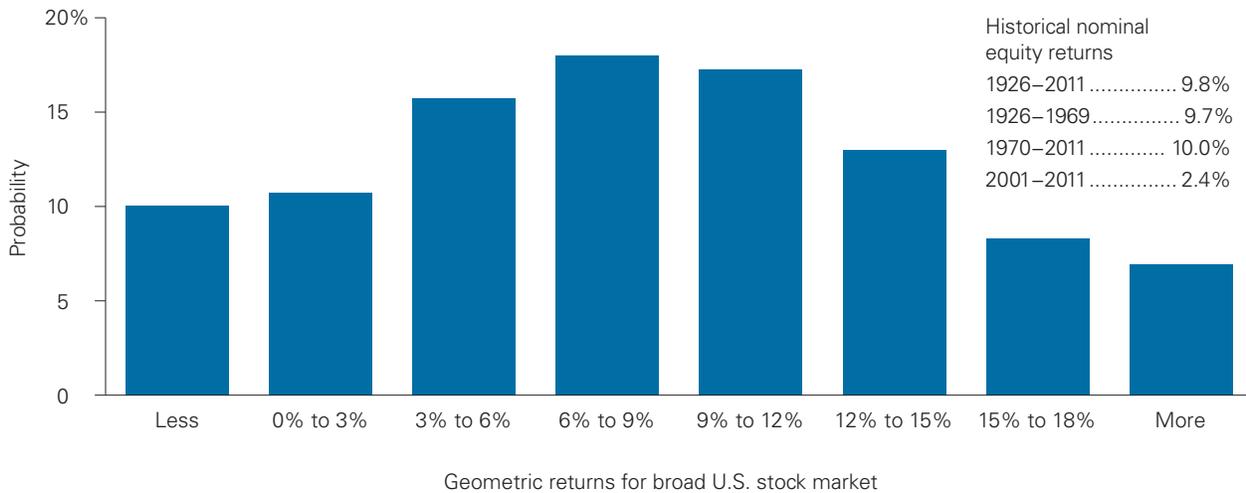
VCMM simulated distribution of expected annualized nominal ten-year returns



Source: Vanguard, as of November 30, 2011.

Figure 10. Projected total U.S. equity returns

VCMM simulated distribution of expected annualized nominal ten-year returns



Source: Vanguard, as of November 30, 2011.

Asset class outlook: Global equities

Centered in the 6%–9% return range, the long-term median return for global equity markets is modestly below the historical averages as a result of current market valuations and the projected equity risk premium (Figure 10, on page 13). But when a global equity portfolio is adjusted for potential future inflation, we estimate a 50% likelihood that over the 2012–2021 decade, the portfolio will earn at least the 6% average annualized real return that has been observed since 1926.

This generally formative global equity outlook may surprise some readers, considering the expected

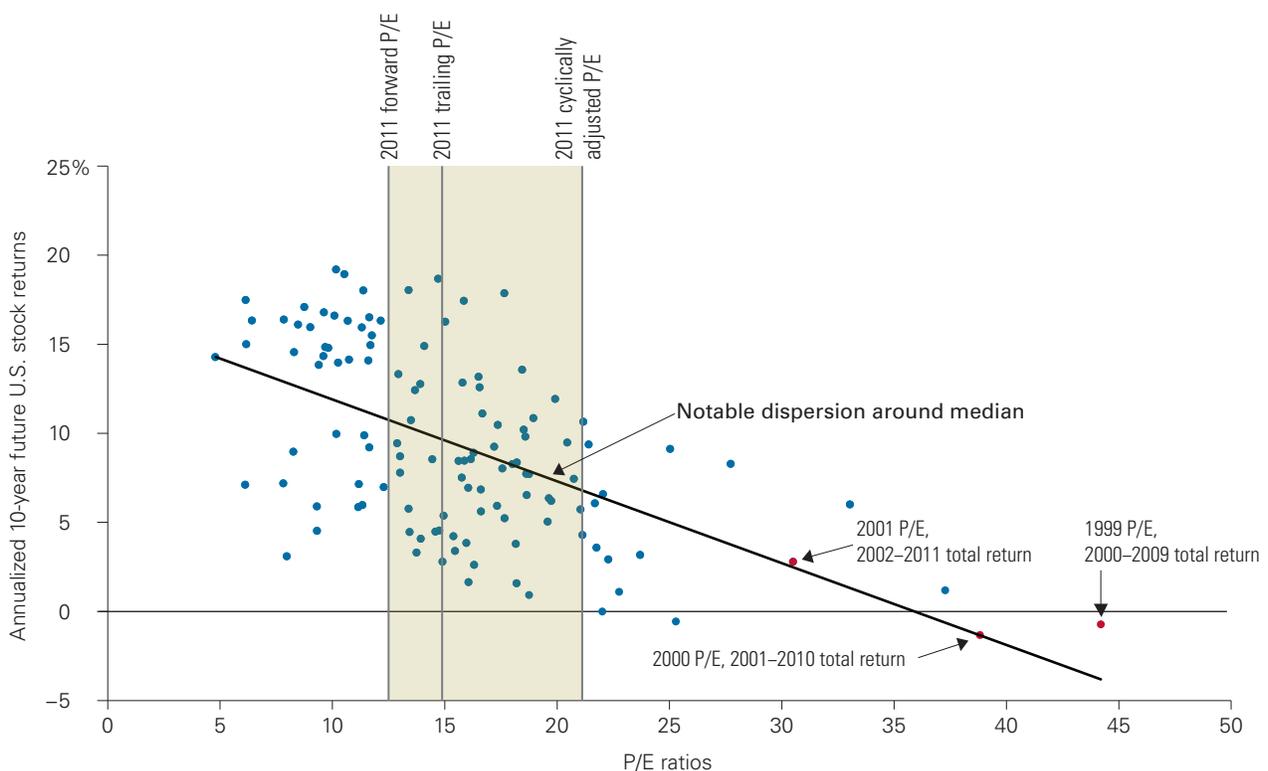
global economic outlook. However, our long-held view is that market valuations generally correlate with future stock returns (as illustrated in Figure 11), and that consensus economic growth expectations do not.¹³ In fact, a positive realized future equity risk premium has tended to correlate with conditions similar to those of today: somewhat normal market valuations, heightened macroeconomic volatility, and higher perceived risk aversion.

Wide dispersion in long-run stock returns

Readers will also note that Figure 10's projected distribution of annualized ten-year U.S. stock returns displays *wide and fat tails*. A key reason is that,

Figure 11. U.S. equity valuations and stock returns

Various trailing P/E ratios and subsequent annualized ten-year returns, 1871–2011



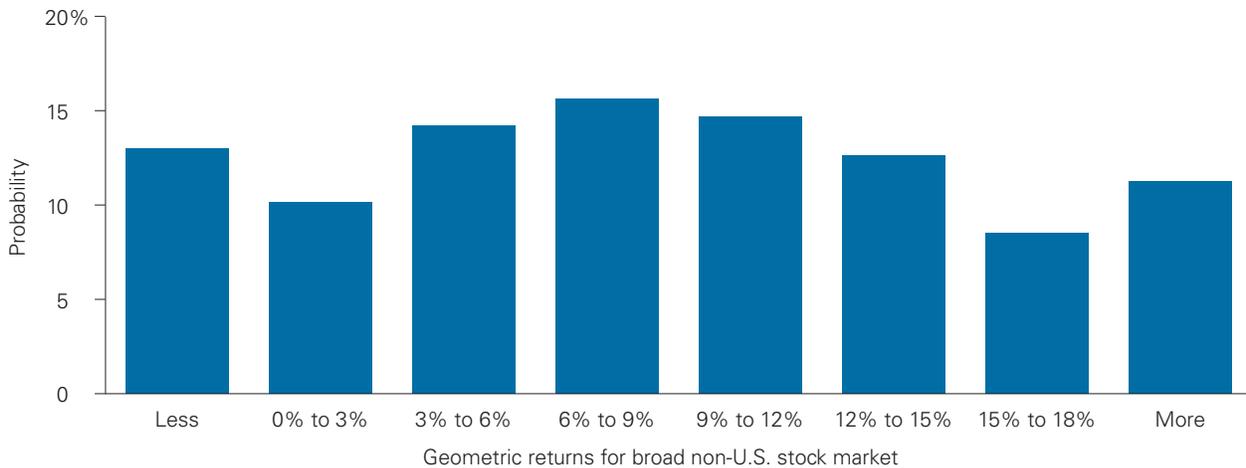
Note: Trailing price/earnings (P/E) ratio reflects the so-called Graham P/E ratio as used by the economist Robert J. Shiller, calculated as the ratio of the previous year's price/ten-year average earnings.

Sources: Vanguard, Robert J. Shiller (<http://www.econ.yale.edu/~shiller/>), Standard & Poor's, and Thomson Financial Datastream. For details, see Vanguard's *What Does the Crisis of 2008 Imply for 2009 and Beyond?* (Davis, Aliaga-Díaz, and Ren, 2009a).

¹³ As discussed in previous Vanguard research, including Davis, Aliaga-Díaz, and Ren (2009), consensus macro expectations tend to be priced in by markets and so have effectively zero correlation with future stock returns over both short and longer-term investment horizons.

Figure 12. Projected international equity returns

VCMM simulated distribution of expected annualized nominal ten-year returns



Source: Vanguard, as of November 30, 2011.

despite the importance of market valuations shown in Figure 11, more than one-half of the volatility in long-run stock returns is unexplained by valuations. As a result, our VCMM simulations in Figure 10 reveal that, although there is roughly a 35% probability of U.S. stocks achieving an average annual return of between 6% and 12% over the next ten years, even greater odds favor average returns outside of this central tendency. The odds of a “lost decade” of negative average U.S. stock returns are approximately 10% by our calculations; this alone provides a strong case for maintaining fixed income exposure despite a more muted outlook for nominal bond returns.

Outlook for international stocks

The projected distribution for international equities shown in Figure 12 is not unlike that for U.S. equities, with similarly wide-tail outcomes. The expected return differential between U.S. and non-U.S. equity portfolios is not statistically significant under most VCMM scenarios, in part because valuations across broad geographic areas of the global equity market are similar as well (Figure 13,

on page 16). We expect the diversification properties of international investing to persist in the future, despite the higher correlations observed between U.S. and international equity markets since the global financial crisis (see the Appendix for expected median correlation statistics).

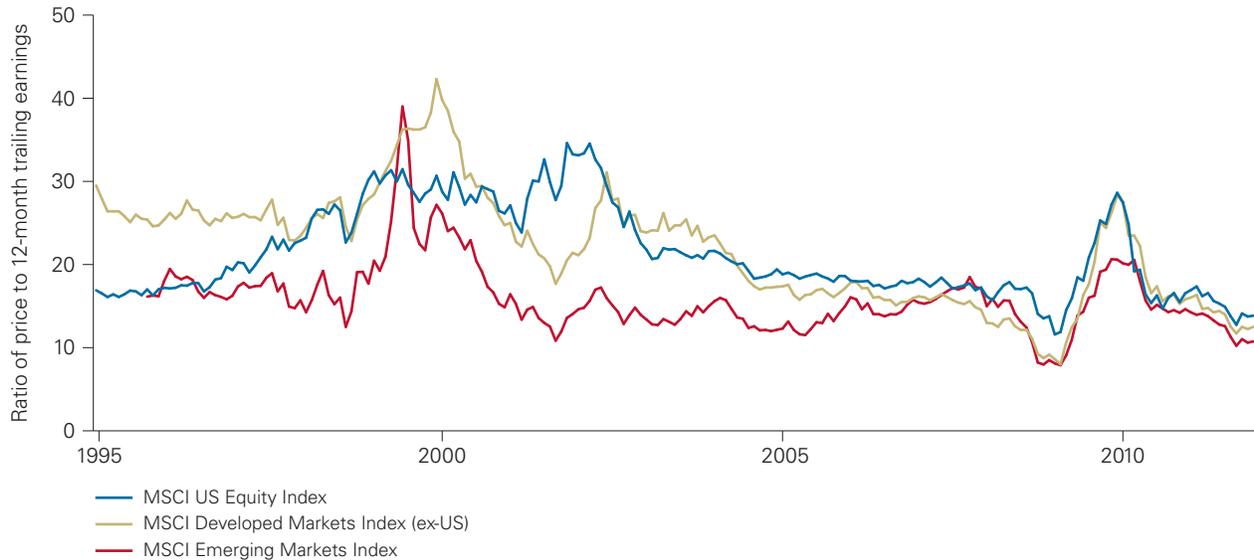
Emerging-market stocks

A strategic allocation to emerging markets in a global equity portfolio is a sound investment strategy based on the principle of diversification. That said, Vanguard continues to caution investors against significantly overweighting emerging markets solely because the investors subscribe to the widely held view that emerging markets will grow faster than developed economies over the next few years.¹⁴ It should be noted that emerging-market equities in 2011 significantly underperformed U.S. stocks, despite posting higher aggregate economic growth rates.

Looking ahead, the expected central range of long-run returns on emerging-market equities is statistically identical to that of developed-market

14 See *Investing in Emerging Markets: Evaluating the Allure of Rapid Economic Growth* (Davis et al., 2010b).

Figure 13. Market valuations are similar across the major equity benchmarks



Source: Vanguard.

equities, and is in fact generally lower when adjusted for emerging markets' higher expected risk. As shown in Figure 13, differences were negligible between the P/E ratios of the MSCI Emerging Markets Index and those of the broad developed markets at the end of 2011; historically, emerging-market stocks have tended to possess lower relative market valuations, in recognition of the higher perceived investment risk of this sub-asset class.

Implications for asset-allocation strategies

To examine the potential portfolio-construction implications of Vanguard's range of expected long-run returns, Figure 15, on page 18, presents simulated real (inflation-adjusted) return distributions for 2012–2021 for three hypothetical portfolios ranging from more conservative to more aggressive:

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

For reference, the figure also shows how the hypothetical portfolios would have performed over two past periods: 1926–2011 and 2000–2011.¹⁵ Figure 15 has several key implications for strategic asset allocation, as discussed next.

Outlook for long-run real returns: More normal than abnormal

Given widespread concern over the currently low level of dividend yields and long-term U.S. Treasury yields, Figure 15's real long-run return profile for balanced portfolios may be better than some readers might have expected. However, Vanguard believes it's important for investors to consider real-return expectations when constructing portfolios, since today's low level of dividend yields and U.S. Treasury yields is, in part, associated with lower expected inflation today than, say, 20 or 30 years ago.

Indeed, Figure 15 shows that the inflation-adjusted returns on a balanced portfolio over the decade ending 2021 are likely to be moderately below long-run

¹⁵ For further details, see the Vanguard paper *Asset Allocation in a Low-Yield and Volatile Environment* (Davis, Aliaga-Díaz, and Patterson, 2011c).

Challenges of short-term market forecasts

Readers may observe that this paper is devoid of short-term “point forecasts” of the kind that, unfortunately, are the cornerstone of most market-outlook publications in the investment industry.

Vanguard does not focus on near-term market forecasts, mainly because predicting such short-term movements is difficult at best, and acting on them can be foolhardy at worst. As often discussed in previous Vanguard research, the predictability of stock market returns over short-term horizons is low, even when based on

current market valuations and other market signals.¹⁶ Thus, the simulated return distribution for U.S. equities over a one-year horizon, as shown in **Figure 14**, is extremely wide, characterized by a return distribution with little central mass and notable “fat tails.”

The lack of predictability of the VCMM statistical model over shorter horizons is evident when comparing the one-year simulated distribution against a similar distribution of annualized ten-year returns, also shown in Figure 14.

Figure 14. Outlook for U.S. equities: Expected return distributions over one-year and ten-year horizons

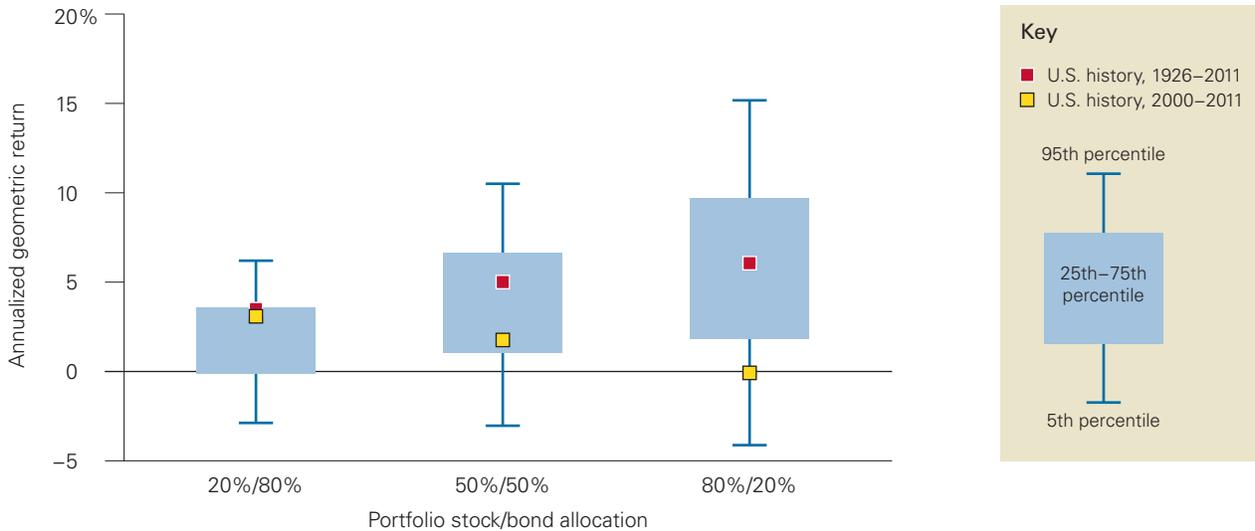


Source: Vanguard.

¹⁶ See, for instance, Davis, Aliaga-Díaz, and Ren (2009a), as well as Figure 10 in the June 2010 edition of *Vanguard's Economic and Capital Markets Outlook* (Davis et al, 2010a).

Figure 15. Real return outlook for various stock/bond portfolios over the next ten years

Real returns, ten-year horizon



Underlying data for this figure

Portfolio stock/bond allocation	20%/80%	50%/50%	80%/20%
Bottom 5th percentile	-2.9%	-3.0%	-4.0%
25th percentile	-0.1%	1.1%	1.7%
Median	1.8%	3.8%	5.6%
75th percentile	3.6%	6.6%	9.5%
Top 95th percentile	6.2%	10.5%	15.2%
■ U.S. history, 1926–2011	3.5%	5.0%	6.1%
■ U.S. history, 2000–2011	3.1%	1.8%	-0.1%

Notes: Percentile distributions were 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 were combined, and the 5th, 25th, 75th, and 95th percentiles of return results are shown in the box and whisker diagrams. The small red and yellow boxes indicating U.S. historical returns for 1926–2011 and 2000–2011 represent equity and bond market annualized returns over these periods less the inflation rate, as defined by the U.S. Consumer Price Index. 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 4.

Sources: Vanguard calculations, including VCMM simulations (see Appendix); Barclays Capital; and Thomson Reuters Datastream. For further details, see Davis, Aliaga-Díaz, and Patterson (2011c).

historical averages (indicated by the small red boxes for 1926–2011) and yet above those real returns since 2000 for all but the most conservative portfolios.

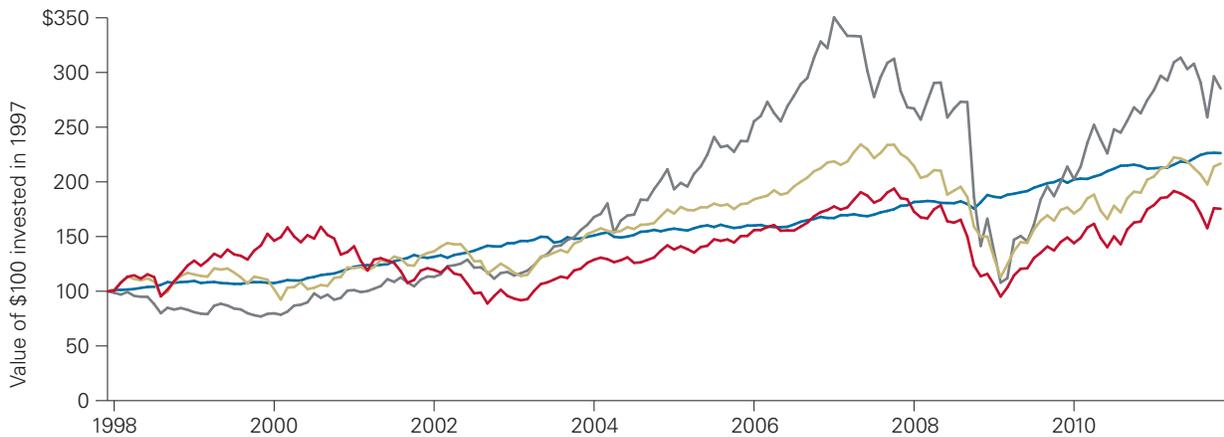
Specifically, our VCMM simulations indicate that the average annualized returns on a 50% equity/50% bond portfolio for the decade ending 2021 are expected to center in the 3.0%–4.5% real-return range, or moderately below the actual average real return of 5.0% for the same portfolio since 1926. Viewed from another angle, the likelihood that our 50%/50% portfolio would achieve the 1926–2011 average real return is estimated at approximately 35%–40%, while the odds of achieving a higher real return than that achieved since 2000 (1.8%) are near 70%.

Principles of portfolio construction are intact

Contrary to those suggesting that the next decade warrants some radically new investment strategy, Figure 15 reveals 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.

Figure 16. Dividend-paying stocks are not bonds

December 31, 1997, through November 30, 2011



	Annualized return	Standard deviation	Divided yield/ Yield to maturity	Correlation to indexes over past ten years	
				S&P 500 Index	Barclays Capital U.S. Aggregate Bond Index
— U.S. stocks	4.2%	17.3%	2.2%	1.00	-0.06
— U.S. dividend stocks	5.7	15.3	3.7	0.94	0.03
— U.S. bonds	6.1	3.6	2.3	-0.06	1.00
— REITs	8.2	23.4	4.1	0.71	0.15

Notes: U.S. stocks are represented by the Dow Jones Wilshire 5000 Index through April 30, 2005, and the MSCI US Broad Market Index thereafter; dividend stocks are represented by the S&P 500 Dividend Aristocrats Index through December 31, 2003, and the FTSE Dividend Yield Index thereafter; U.S. bonds are represented by the Barclays Capital U.S. Aggregate Bond Index; and REITs are represented by the MSCI US REIT Index.

Sources: Vanguard, Dow Jones, MSCI, S&P, FTSE, and Barclays Capital.

Implications of ‘searching for yield’

In fact, the upward-sloping and wider-tail pattern in Figure 15 reaffirms the beneficial role that bonds should be expected to play in a broadly diversified portfolio, *despite their currently 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 for the decade ending 2021—a central tendency of 2%–3% annually, on average—bonds should be expected to moderate the volatility in equity portfolios in the years ahead.

Still, we are concerned that the low nominal rate environment may encourage savers and bond investors to aggressively pursue higher *nominal* total returns by making investment decisions based solely on asset-class *yields* rather than a more holistic total-return approach. Popular considerations at the moment include substituting away from conservative bond

portfolios and into either higher-yielding junk bonds or income-oriented equity funds such as dividend-focused equity funds or REIT funds (to name two).

Past Vanguard research and commentary have highlighted the importance of understanding total return and the risks that can accompany a narrow focus on income (Davis, 2011a). As the recent performance of stocks and bonds over the 15 years through 2011 reminds us (Figure 16), investors who increase their allocation to higher-yielding bonds or dividend-paying stocks should realize that their portfolio volatility will likely increase as a result. Such a change in strategic asset allocation from, say, 50% bonds/50% stocks to 20% bonds/30% dividend-paying stocks/50% broader stocks is, in effect, a “move to the right” along the expected-return frontiers in Figure 15, as the effective risk exposure of this new portfolio would then resemble that of a 20% bonds/80% stocks portfolio.

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Key terms

Beta. A measure of the volatility of a security or a portfolio relative to a benchmark.

Price/earnings ratio. The ratio of a stock's current price to its per-share earnings over a designated period.

Risk premium. The amount by which an asset's expected return exceeds the risk-free interest rate.

Appendix: Vanguard Capital Markets Model

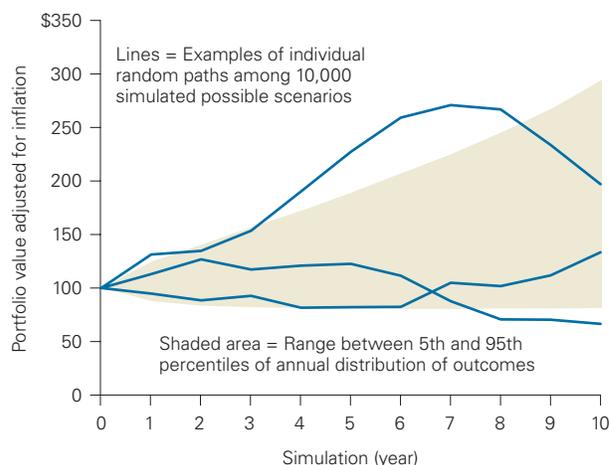
The Vanguard Capital Markets Model (VCMM) is a proprietary financial simulation tool developed and maintained by Vanguard's Investment Strategy Group and the Investment Counseling & Research group. The VCMM uses a statistical analysis of historical data for interest rates, inflation, and other risk factors 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 November 30, 2011.

The VCMM is grounded in 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 primary value of the VCMM is in its application to analyzing potential client portfolios. VCMM asset-class forecasts—comprising distributions of expected returns, volatilities, and correlations—are key to the evaluation of potential downside risks, various risk–return trade-offs, and diversification benefits of various asset classes. Although central tendencies are generated in any return distribution, Vanguard stresses that focusing on the full range of potential outcomes for the assets considered, such as the data presented in this paper, is the most effective way to use VCMM output.

Figure A-1. Sample paths for 60%/40% stock/bond portfolio

VCMM simulation

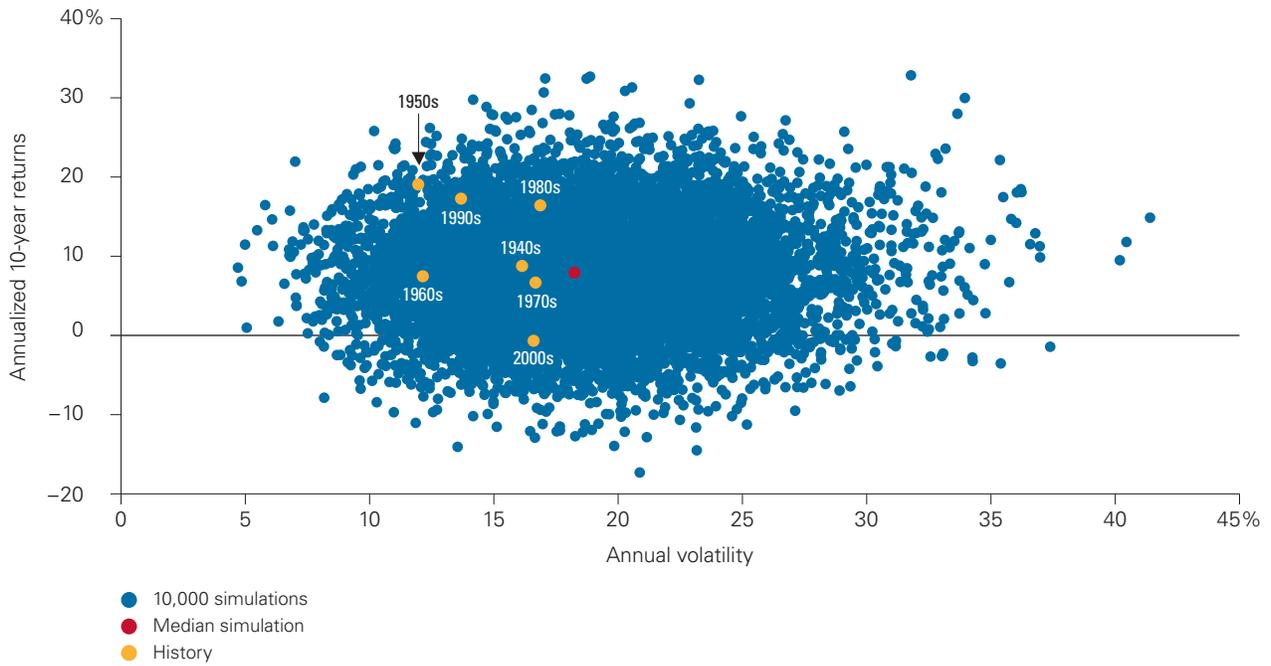


Source: Vanguard.

As **Figure A-1** illustrates, the VCMM seeks to represent the uncertainty in the forecast by generating a wide range of potential outcomes. It is important to recognize that the VCMM does *not* impose “normality” on the return distributions, but rather is influenced by the so-called fat tails and skewness in the empirical distribution of modeled asset-class returns. Within the range of outcomes, individual experiences can be quite different, underscoring the varied nature of potential future paths.

Figure A-2, on page 22, further illustrates this point by showing the full range of scenarios created by the model. The scatter plot displays 10,000 geometric average ten-year returns and standard deviations for U.S. equities. The dispersion in returns and volatilities is wide enough to encompass historical market performance for various decades.

Figure A-2. VCMM simulation output for broad U.S. stock market (10,000 simulations)



Source: Vanguard.

Figure A-3. VCMM asset-return correlation matrix (median correlation statistics)

	Total bond market	Inflation	Domestic equity	International equity
Total bond market	1.00			
Inflation	-0.08	1.00		
Domestic equity	0.15	-0.06	1.00	
International equity	0.04	-0.03	0.68	1.00

Source: Vanguard.



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