

**Vanguard**<sup>®</sup>

# Vanguard's economic and investment outlook

Vanguard research

January 2013

**Executive summary.** In this annual outlook, we present Vanguard's global 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, as well as the need to consider 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<sup>®</sup> (VCMM—see the description in the Appendix) and reflect the collective perspective of our Investment Strategy Group. The expected risk premiums—and the uncertainty surrounding those expectations—are among a number of 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 present 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.** In a demand-constrained world, the U.S. economic recovery is likely to persist at a reduced 2% trend real GDP growth rate. Future U.S. economic growth should prove uneven given the downside risks of a full-blown European sovereign debt/banking crisis, a housing-related Chinese slowdown, and unaddressed U.S. fiscal imbalances. These and other (unanticipated) risks are likely to lead to periodic bouts of risk aversion and economic slowdowns in 2013 and beyond, followed by economic rebounds. Importantly, the U.S. housing market has bottomed.

**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 2014, with a bias toward the Federal Reserve remaining on hold even longer. The return on cash will likely average less than 2% over the next ten years through 2022, with real (inflation-adjusted) short-term interest rates remaining negative for some time, a classic example of “financial repression.” The eventual removal of extraordinary U.S. monetary policy accommodation may prove to be more volatile than currently anticipated.

**U.S. Treasury yields.** Based in part on our inflation outlook, we expect the yield on the 10-year Treasury bond to remain in its current range of 1.5%–2.5% over the next year at least, before eventually normalizing toward the 3.5%–4.5% range over the next decade.

**Bond market returns.** Regardless of the direction of U.S. interest rates over the next several years, the return outlook for fixed income is very muted, with an elevated risk of loss given the present low income levels. The expected long-run median return of the broad taxable U.S. fixed income market is centered in the 1%–3% range and thus most closely resembles the historical bond returns of the 1950s and 1960s. That said, 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 2022 remains higher than its equities equivalent.

**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 in light of the economic outlook and low-rate environment. However, our long-held view is that market valuations generally correlate with future stock returns, whereas consensus economic growth expectations or initial dividend yields do not.

**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. Even so, 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, it anticipates higher returns for more aggressive portfolios, accompanied by greater downside risk. We believe that a balanced and diversified low-cost portfolio can remain an extremely high-value proposition in the decade ahead.

### 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 U.S. Aggregate Bond Index thereafter. For U.S. stock market returns, we used the S&P 90 Index 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, including the possible loss of the money you invest. 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.*

*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.*

## Secular growth outlook

Over the decade ending 2022, 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.

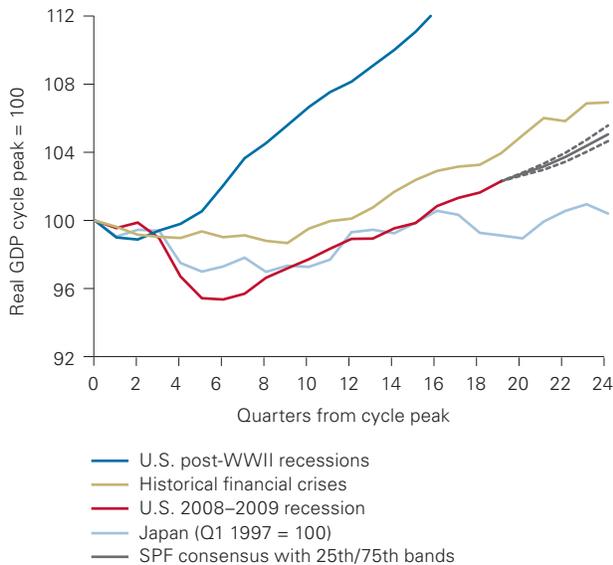
The U.S. economic recovery is likely to persist at a reduced trend pace of 2% real GDP growth, compared with the historical trend growth rate of 3.5%–4.0%. As we discussed in our 2010 *Economic and Capital Markets Outlook*,<sup>1</sup> this somewhat U-shaped recovery for both real GDP

(Figure 1a) and employment (Figure 1b) 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.

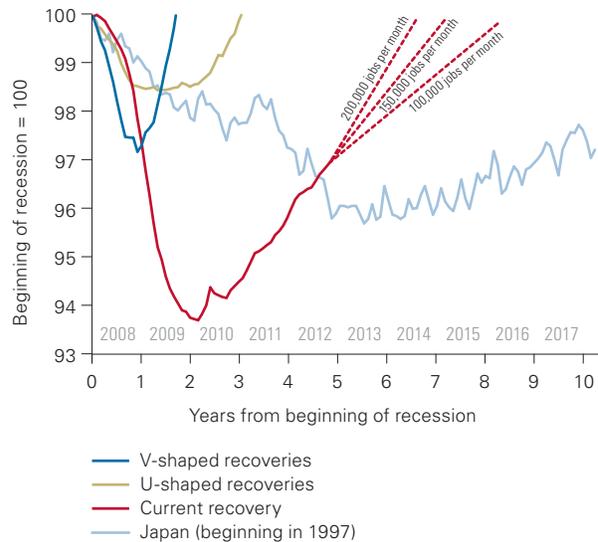
Despite its below-average trend growth rate, our secular U.S. economic outlook remains more cautiously optimistic than bearish. It is important to note that U.S. profit margins and corporate balance sheets are strong and productivity is high, thereby providing a level of shock-resistance to the U.S. private sector going forward. Progress has also been made to date in reducing consumer debt (Figure 2a) and, especially, housing imbalances (Figure 2b). Indeed, the U.S. housing market appears

**Figure 1.** U.S. economy continues to gradually recover

**a. Real GDP since business-cycle peak**



**b. Employment levels since business-cycle peak**



Notes: Historical financial crises include those occurring in Australia in 1960, Denmark in 1987, Finland in 1990, France in 1992, Germany in 1980, Italy in 1992, Japan in 1992 and 1997, Norway in 1988, and the United Kingdom in 1973 and 2007. V-shaped recoveries in Figure 1b 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. Japanese employment is represented by the number of persons employed as reported in the Labour Force Survey from June 1997 to present (by Japan’s Statistics Bureau, available at <http://www.stat.go.jp/english/data/roudou/index.htm>).

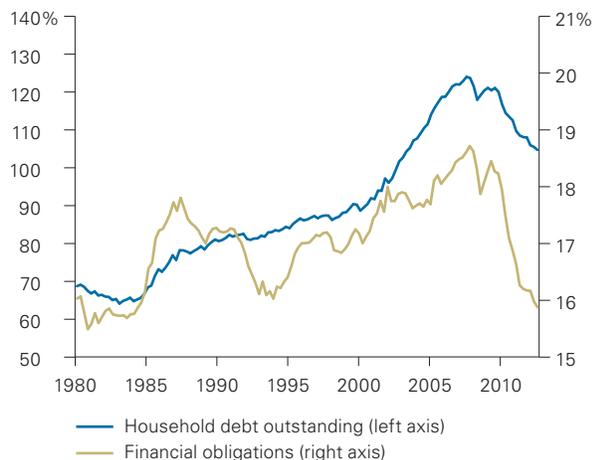
Sources: Vanguard, based on data from International Monetary Fund, Organisation for Economic Co-Operation and Development (OECD), National Bureau of Economic Research, Thomson Reuters Datastream, U.S. Bureau of Labor Statistics, and U.S. Department of Commerce.

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

**Figure 2.** Progress made in consumer deleveraging and home prices

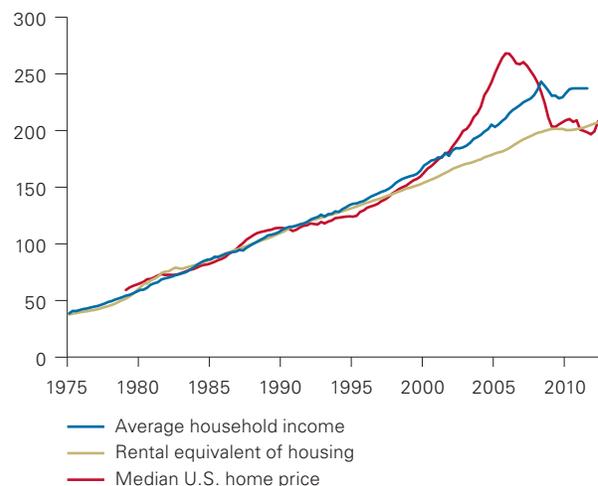
**a. Consumer debt levels and household debt burdens**

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 housing” is defined by apartment rents as measured by the CPI shelter index. To minimize base-year effects, all series in Figure 2b 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.

to have bottomed, and housing construction could be the fastest-growing segment of the U.S. economy in 2013–14.

That said, we anticipate that it will be some time before consumer and U.S. Federal government debt levels and U.S. housing prices reach their longer-term equilibrium levels, a critical condition for sustained above-trend 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.

On balance, Vanguard views the risk to this secular outlook as even-keeled. Over the next several years, primary risk factors that would contribute to lower-than-expected growth include a significant shift in long-term inflation expectations, a breakup of the European Union, and failure by the U.S. government to propose and enact a credible plan to address the nation’s long-term fiscal imbalances.<sup>2</sup>

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.

<sup>2</sup> 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](https://advisors.vanguard.com/VGApp/iip/site/advisor/researchcommentary/research/article/IWE_VideoJDavis2q2011).

### Cyclical growth risk assessment:

#### Same as 2012 (and 2011)

It's important to stress that Vanguard expects significant year-to-year deviations from our 2% long-run expected growth. As stated in our previous outlooks, it is highly likely that U.S. economic growth next year will prove more uneven than the consensus view, which is anticipating an average growth rate of approximately 2.0%–2.25% in each of the four quarters of 2013. Rarely, if ever, has such a “smooth” outlook been realized.

Heading into 2013, our proprietary Vanguard Economic Momentum Index (VEMI) is indicating that the U.S. economy has lost some momentum since the summer of 2012. A growth forecast based solely on the VEMI would suggest modest downside risk to the 2013 consensus expectations. While not our baseline expectation, a U.S. “recession scare” in 2013 cannot be ruled out.

Vanguard remains cautious on the cyclical outlook given several prominent top-down threats to U.S. growth, including (in order of potential severity to 2013 growth):

- An even deeper European recession worsened by a full-blown European sovereign-debt/banking crisis.
- The (unresolved) process for addressing U.S. fiscal imbalances.
- The unanticipated effects of significant regulatory reform on global financial markets.
- A supply shock that drives up oil prices to \$120 or more per barrel.
- A sharp Chinese economic slowdown.

Of these risks, we judge fiscal policy decisions in both the United States and Europe (and the risk of a policy error) as most likely to exert the strongest gravitational pull on the U.S. economy, leading to periodic bouts of risk aversion and economic soft patches or “growth scares” over the next two years.

### Outlook for inflation

As stated in previous Vanguard outlooks, 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 3**). 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 being equal, this implies that nominal asset-class returns may be 1% lower than historical long-run averages, even if their expected average real (inflation-adjusted) returns are identical.* We further discuss this point later in terms of our outlook for stocks, bonds, and asset allocation strategies.

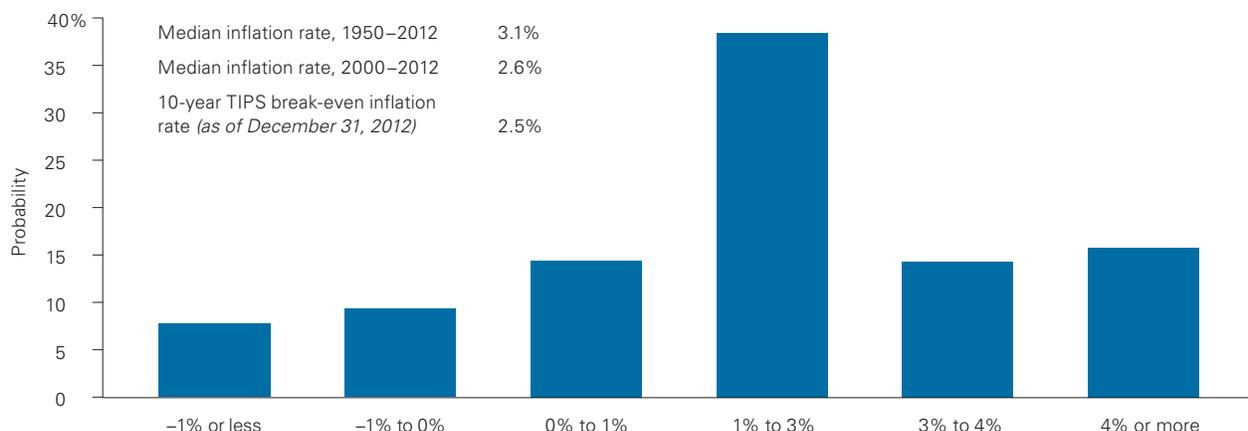
#### Risk of higher-than-expected trend inflation

Despite Vanguard's fairly sanguine median long-run outlook for U.S. inflation, **Figure 3** also reveals a nearly 20% chance that the average annual CPI inflation rate will exceed 4% over the decade ending 2022. 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.<sup>3</sup>

3 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.

**Figure 3.** Projected U.S. CPI inflation rate, 2013–2022

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



Sources: Vanguard and Moody's DataBuffet, as of November 30, 2012.

Why? Simply put, because the economic conditions that often precede (and *facilitate*) a broad, 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 4**, on page 8, shows growth rates for wages, the money multiplier, and bank credit in the two years *preceding* the double-digit inflation rates of the mid-1970s and early 1980s compared to the growth rates for the same variables today.

#### Deflationary forces, reflationary monetary policy, and inflation fears

Looking ahead, we continue to 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, we would expect that some investors will continue to have significant concerns about future inflation. Our simulations suggest that an acceleration in core inflation beyond 3% 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.<sup>4</sup>

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 VCMM 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%.

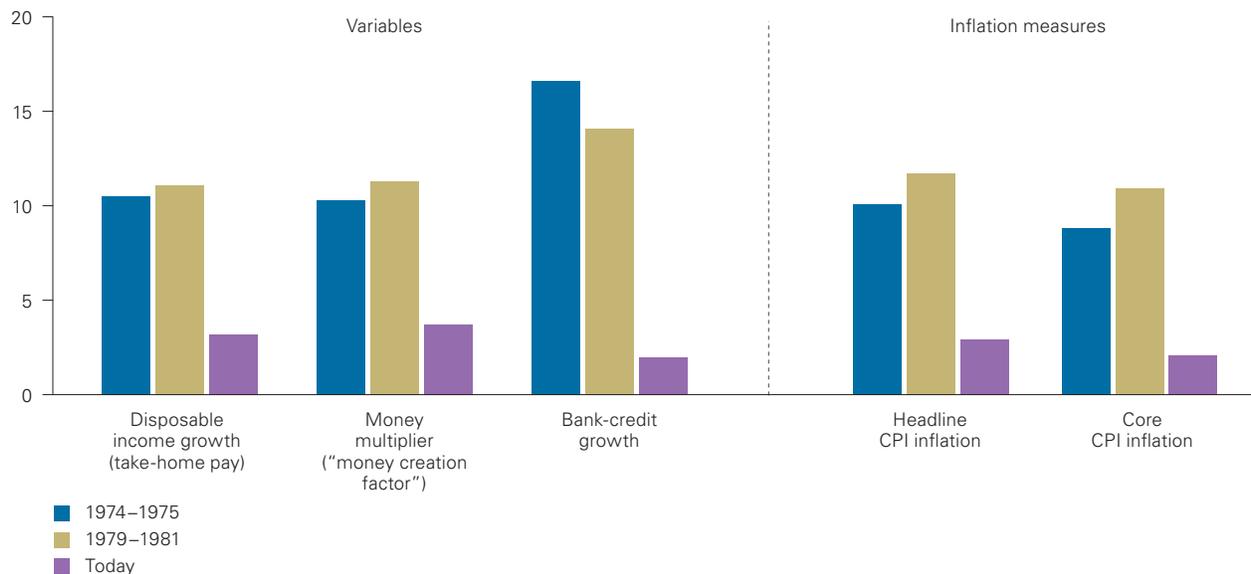
#### Outlook for U.S. interest rates

##### Federal Reserve policy

In the short term, the long end of the U.S. Treasury yield curve is expected to remain depressed, given the likelihood that the Federal Reserve will keep monetary policy on hold through at least early 2015. Based on the distribution of outlooks for U.S. real GDP growth and inflation from the Federal Reserve Bank of Philadelphia’s 2012 Survey of Professional Forecasters, our calculations suggest that the

4 See Bhardwaj, Hamilton, and Ameriks (2011) and Davis et al. (2012).

**Figure 4.** Comparing high-inflation environments of 1970s and early 1980s with that of today



Notes: The "money multiplier" is the ratio of the broad money supply (i.e., M2) to the monetary base. Data for "Today" are through January 2, 2013.  
Sources: Vanguard calculations, based on data from Moody's DataBuffet.

Federal Reserve is more likely to keep the federal funds target rate near 0% into 2015 than to raise rates preemptively before mid-2014. Further quantitative easing (QE) is likely in 2013 in a continuing effort to minimize recession risk, although we would view such an action as conditional on longer-term inflation expectations dropping meaningfully below 2.5% (as they did before QE1, QE2, and QE3).

#### 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% in nominal terms over the next ten years (see Figure 5). The real (inflation-adjusted) short-term interest rate should remain negative for some time, an unfortunate headwind for savers in the years ahead. This is a classic example of so-called "financial repression."

#### U.S. Treasury yield curve

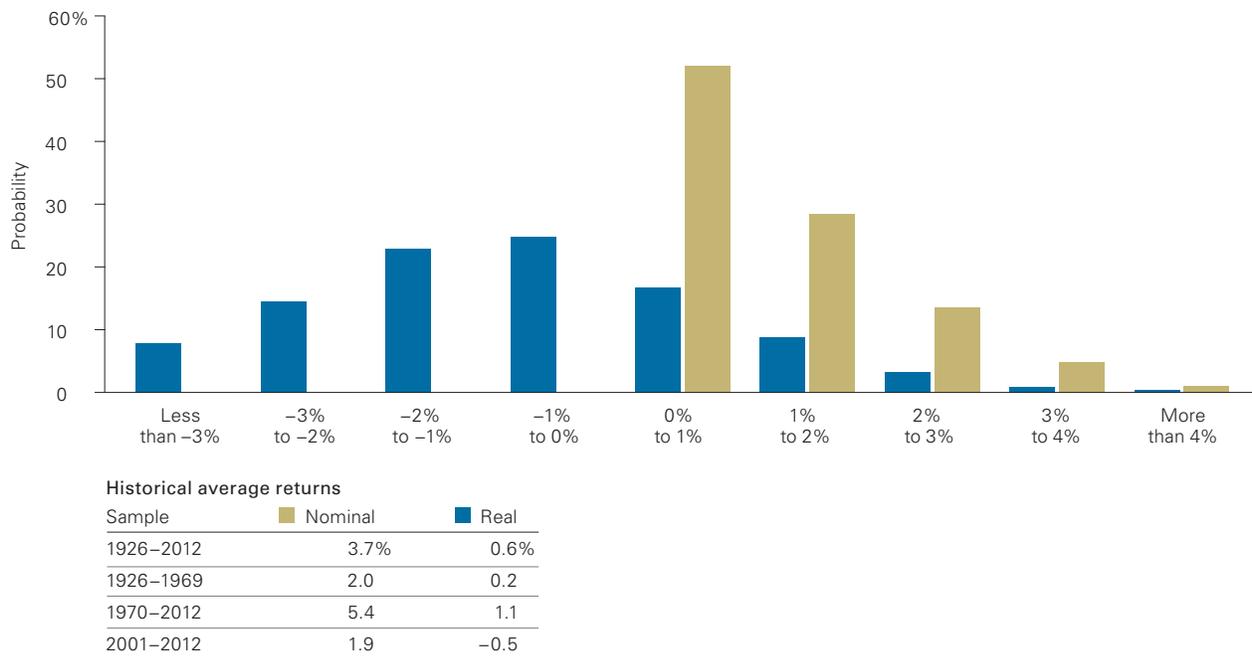
Consistent with the current depressed nature of the Treasury yield curve, our ten-year projections generally exhibit a gradual rising-rate bias, although the estimated risk of a sharp, imminent rise in long-term U.S. Treasury yields remains low in 2013. Based in part on our inflation and Federal Reserve outlook, we expect the yield on the 10-year Treasury bond to remain near its current range of 1.5%–3.0% for several years before normalizing toward the 3.5%–4.5% range over the next decade, a central tendency near its historical long-run average.<sup>5</sup>

We would stress that this secular rising-rate bias does *not* reflect a simplistic assumption for mean reversion. Rather, it 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.

<sup>5</sup> For reference, the average 10-year U.S. Treasury yield for the year 1800 through December 31, 2012, has been 4.9%. Since 1900, the 10-year Treasury has yielded 4.7%. (Sources: Federal Reserve and Global Financial Data.)

**Figure 5.** Projected cash returns as measured by 3-month T-bill yield

VCMM simulated distribution of expected annualized ten-year returns



Note: Real returns are inflation-adjusted.

Source: Vanguard, as of November 30, 2012.

Short-term rates tend to rise more than long-term rates in substantially more than one-half of our VCMM 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.

### Asset-class outlook: Bonds

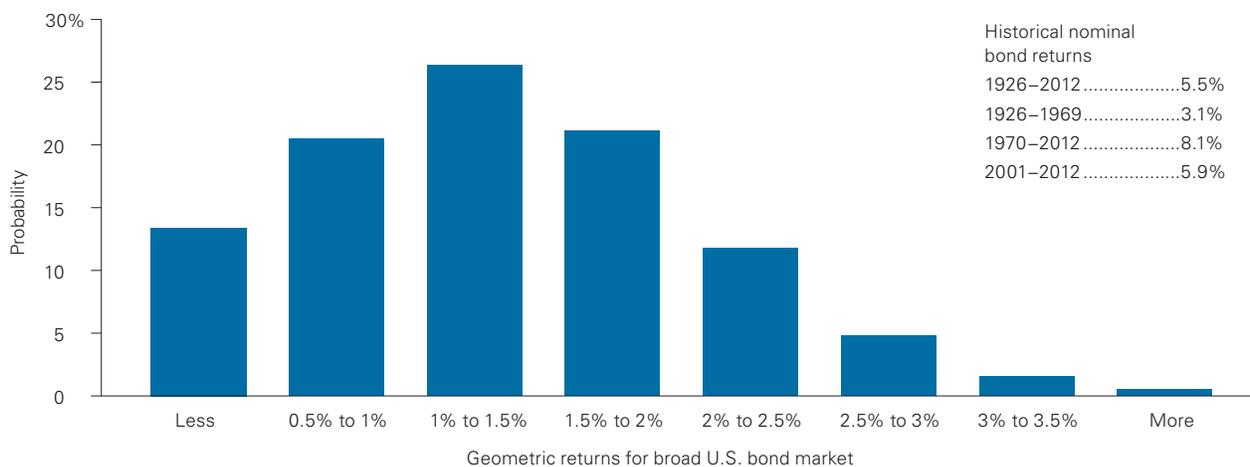
#### Range of expected returns on the broad taxable bond market

Indicative of the low nominal and real interest rate environment, the expected returns on fixed income portfolios are well below those realized over the past several decades. The central tendency for the

expected annualized return on the broad taxable U.S. fixed income market over the next ten years is only 1%–2%. As such, the expected long-run median return is near current benchmark yields and thus most closely resembles the historical bond returns of the 1950s and 1960s (see **Figure 6**, on page 10). According to our median simulation scenario, wider-than-average risk premiums for corporate bonds partially offset rising Treasury yields. Because of the low yield to maturities on most bond portfolios, the risk of a negative annual bond return over the next several years is elevated (see “Balanced portfolio returns under alternative macro scenarios” on page 14 for more details).

**Figure 6.** Projected total U.S. bond market returns

VCM simulation distribution of expected annualized nominal ten-year returns



Source: Vanguard, as of November 30, 2012.

### 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. The median correlation between the returns on U.S. bonds and U.S. stocks is expected to be low, with a 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 the risk to U.S. equity returns. That said, high-quality bonds may very well not provide the same *magnitude* of diversification benefits to negative equity returns during “flight-to-quality” episodes given the low level of interest rates.

### Corporate bonds and TIPS

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

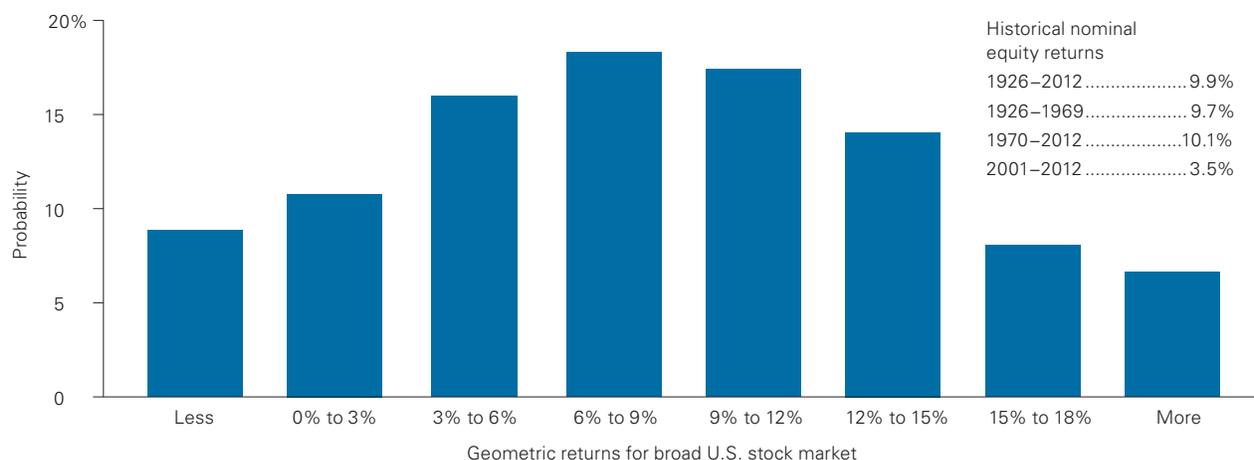
The expected median long-term return on a U.S. TIPS portfolio is lower than that for a similar-duration nominal U.S. Treasury portfolio by a modest amount that represents the estimated inflation risk premium. The distribution in our VCM scenarios of TIPS returns is wider than that for nominal U.S. Treasury 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 because of the sensitivity of these securities to a rise in real rates.

### Asset class outlook: Global equities

Centered in the 6%–9% range, the long-term median return for global equity markets is modestly below the historical average as a result of current market valuations and the projected equity risk premium (see **Figure 7**). But when this figure is adjusted for potential future inflation, we estimate a 50% likelihood that over the decade 2013–2022, a global equity portfolio will earn at least the 6% average annualized real return observed since 1926.

**Figure 7.** Projected total U.S. equity returns

VCM simulation distribution of expected annualized nominal ten-year returns



Source: Vanguard, as of November 30, 2012.

This generally formative outlook may surprise some readers, considering the global economic outlook. However, our long-held view is that market valuations generally correlate with future stock returns (as illustrated in **Figure 8**, on page 12) and that consensus economic growth expectations do not.<sup>6</sup> 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 uncertainty, and higher perceived risk aversion. A wildcard in our global equity outlook is the strong influence that monetary and fiscal policy decisions will have on the economy and financial markets in the years ahead.

**Wide dispersion in long-run stock returns**

The projected distribution of annualized ten-year U.S. stock returns shown in **Figure 7** displays *wide and fat tails*. A key reason is that, despite the importance of market valuations shown in **Figure 8**, more than one-half of the volatility in long-run stock returns is unexplained by valuations. As a result, our VCM simulations in **Figure 7** 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.

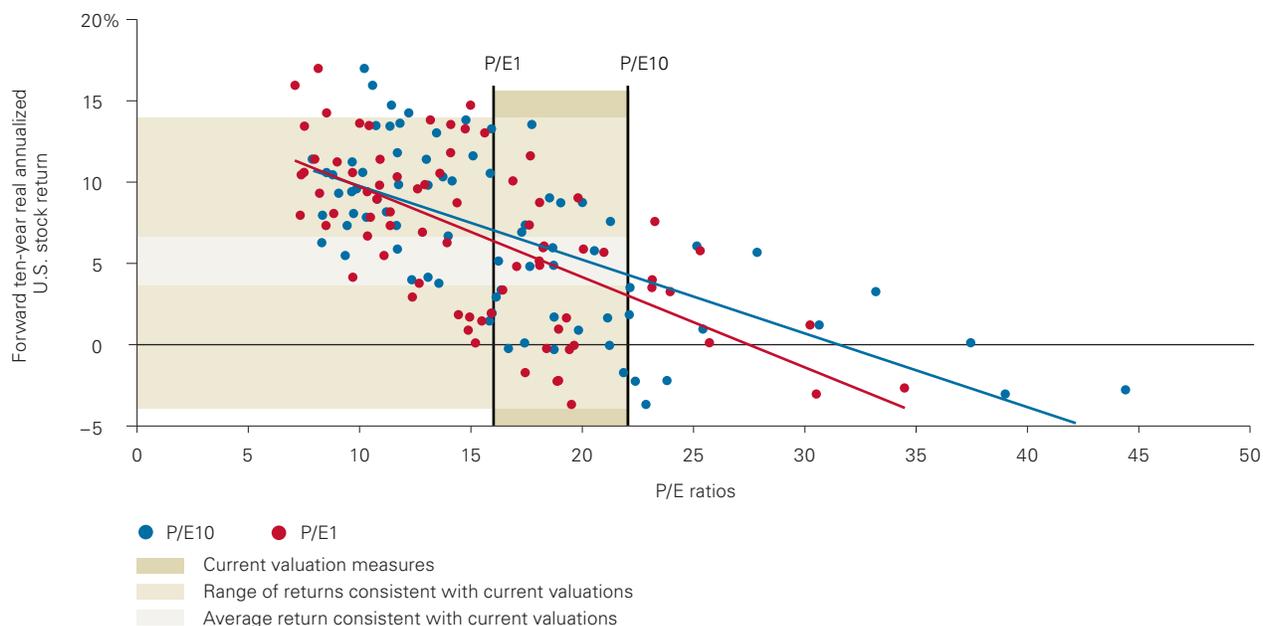
**Outlook for international stocks**

The projected distribution for international equities shown in **Figure 9**, on page 13, 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 VCM scenarios, in part because valuations across broad geographic areas of the global equity market are similar as well (see **Figure 10**, on page 13). 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.

<sup>6</sup> As discussed in previous Vanguard research, including Davis, Aliaga-Díaz, and Thomas (2012), 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 8.** U.S. equity valuations and stock returns

Various trailing P/E ratios and subsequent annualized ten-year returns, 1926–2011



Notes: The chart displays the P/E10 and P/E1 ratios in December of each year from 1925 through 2001 versus the subsequent ten-year annualized real U.S. stock return for periods ended each December from 1935 through 2011. P/E1: Nominal price over the prior 12 months, average nominal earnings. P/E10: Real price over the prior 120 months, average real earnings. Various X-year cyclical adjustments: Real price over the prior X years' average real earnings.

Source: Vanguard. For details, see Davis, Aliaga-Díaz, and Thomas, 2012.

### Emerging-market stocks

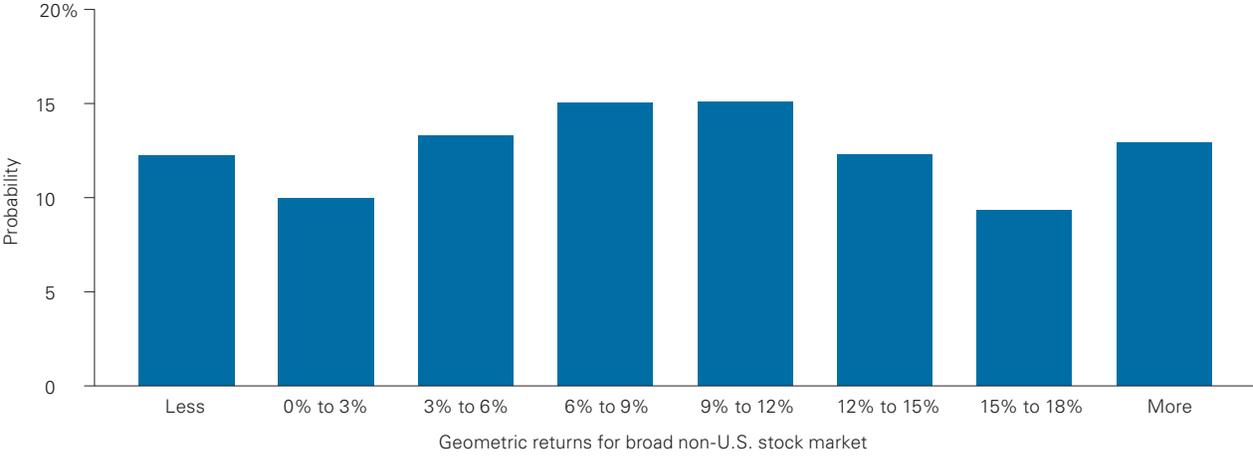
A strategic allocation to emerging markets in a global equity portfolio is a sound investment strategy based on the principle of diversification. That said, Vanguard continues to caution against significantly overweighting emerging markets solely because the investor subscribes to the widely held view that emerging markets will grow faster than developed economies over the next few years.<sup>7</sup> 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 similar to that of developed-market equities when adjusted for emerging markets' higher expected volatility. As shown in Figure 10, 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 2012. Historically, emerging-market stocks have tended to possess lower relative market valuations in recognition of their higher perceived investment risk.

<sup>7</sup> See *Investing in Emerging Markets: Evaluating the Allure of Rapid Economic Growth* (Davis et al., 2010).

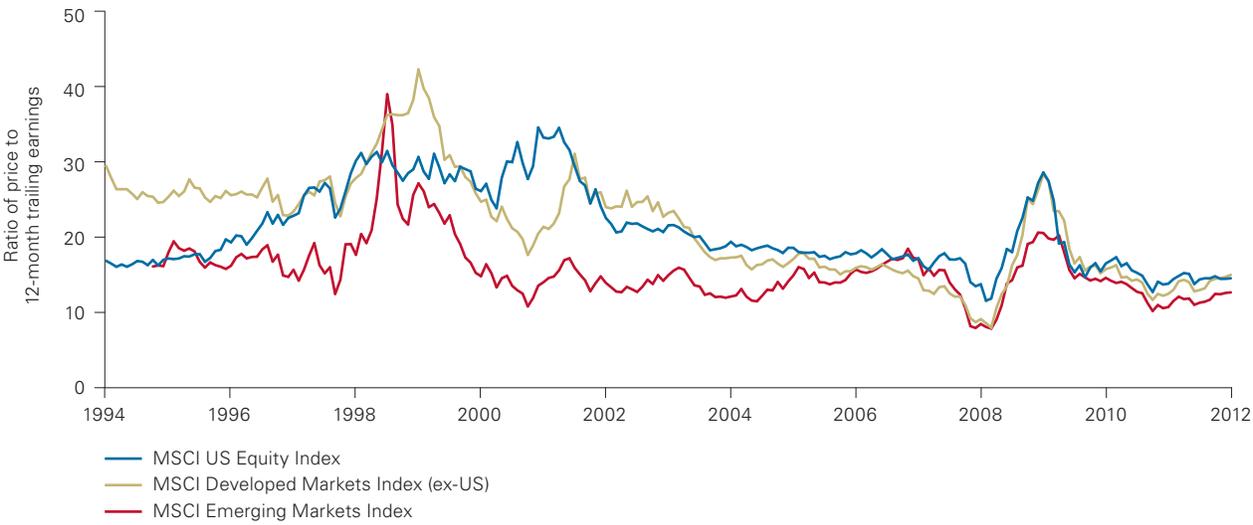
**Figure 9.** Projected international equity returns

VCMM simulated distribution of expected annualized nominal ten-year returns



Source: Vanguard, as of November 30, 2012.

**Figure 10.** Market valuations are similar across the major equity benchmarks



Source: Thomson Reuters Datastream.

## Balanced portfolio returns under alternative macro scenarios

What are the portfolio implications of our macro-economic outlook? The baseline scenario calls for a continuation of the subdued economic recovery with negative real interest rates (an economic environment known as “financial repression”). However, other theoretical macroeconomic scenarios are also possible. In this textbox we assess the long- and short-term performance of a balanced portfolio across these potential environments.

We start by filtering 10,000 simulations from the Vanguard Capital Markets Model based on parameters used to identify likely economic and capital market conditions.<sup>8</sup> Next, we estimate the probabilities of the scenarios playing out over the next three years based on the number of simulations that fit each set of parameters. Ranked in order of likelihood, the four macroeconomic scenarios we focus on are:

- A consensus-like scenario of subdued below-trend growth (30% odds).
- A stronger-than-expected U.S. economic recovery (26%).
- A Japan-like stagnation of the U.S. economy (15%).
- A U.S. fiscal crisis/hard landing of the U.S. dollar (6%).

**Figure 11** presents the range of returns that meet each scenario’s parameters. We found that over the next three years, notably different distributions of returns should be expected across asset classes depending upon the macro scenario that is ultimately realized. However, our simulations reveal that the long-term ten-year expected return distributions on a hypothetical 60% stock/40% bond portfolio are *fairly similar* across the four potential scenarios. Although these results may surprise some readers, we believe they underscore the benefits of a long-term, diversified investment approach.

While the benefits of diversification persist in most of the VCMM scenarios, a key concern to investors is the case of simultaneous negative returns over the short term for bonds as well as stocks. **Figure 12** helps highlight the risk of experiencing negative returns in any one of the next three years in a portfolio’s equity or bond holdings under each macro scenario. The diversification benefits of a balanced portfolio are seen most prominently in the two tail-risk cases of stronger-than-expected recovery and Japan-like recession, whereas the fiscal crisis environment is much more challenging. Interestingly, the risks of negative bond returns in any one year in our simulations are clearly elevated relative to history, given the current low yields and the risk of muted bond returns going forward. However, collectively, these results emphasize how critical a place bonds still hold in a diversified portfolio.

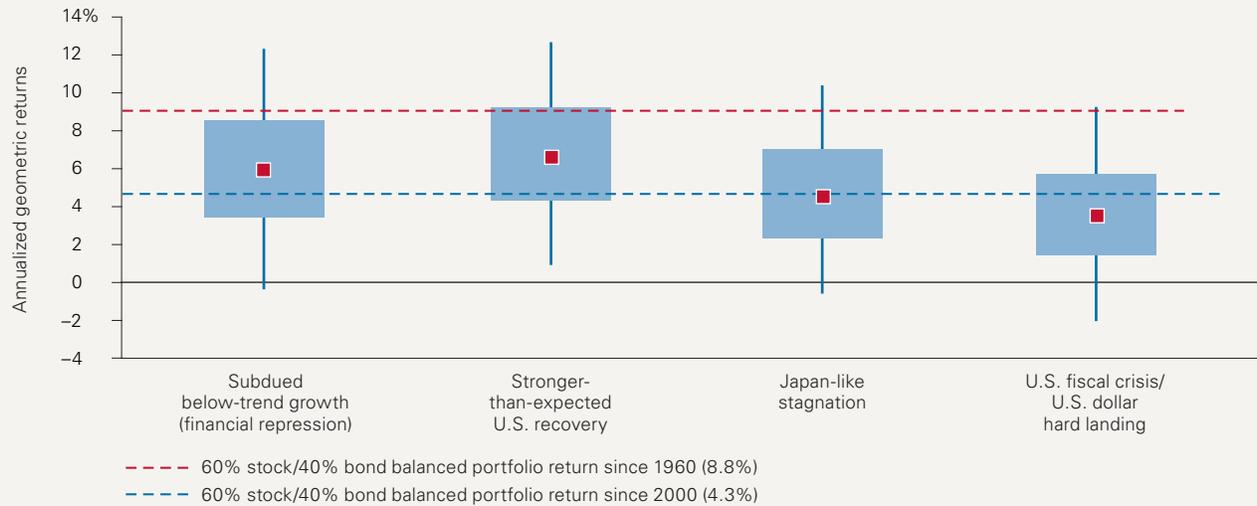
8 The simulations are filtered based on three parameters representing economic and capital market conditions over the next three years: the yield on the 10-year U.S. Treasury, inflation, and equity returns.

- **Subdued below-trend growth (financial repression):** Economic and U.S. interest rates evolve as expected (i.e., the forward Treasury yield curve is roughly realized over the next two years. The fed funds rate remains near 0% through the end of 2015. Real interest rates remain negative, indicative of “financial repression”). Parameters are set such that 10-year Treasury rates are between 1% and 2% and three-year annualized inflation is positive.
- **Stronger-than-expected U.S. recovery:** Interest rates rise more than expected, and stocks post a positive annualized return. Inflation tends to rise above the Fed’s preferred 2% target. Parameters are set such that 10-year Treasury rates are greater than 2% and three-year annualized inflation and three-year annualized U.S. equity returns are positive.
- **Japan-like stagnation:** A lower-than-expected inflation scenario, with distribution of interest rates by the end of 2015 effectively near today’s levels. Federal Reserve policy is less effective in maintaining positive inflation expectations. Parameters are set such that 10-year Treasury rates are less than 1% and three-year annualized U.S. equity returns are less than 10%.
- **U.S. fiscal crisis/U.S. dollar hard landing:** Rising interest rates because of default risk, a run out of the dollar based on fear of monetary financing of the fiscal deficits, and a recessionary environment. Bond returns suffer in the face of higher interest rates, and short-term equity returns are also negative. Parameters are set such that 10-year Treasury rates are greater than 2.5% and three-year annualized U.S. equity returns are negative.

**Figure 11.** Range of long-run returns across scenarios: More similar than different

VCMCM simulated distribution of expected annualized ten-year returns

Potential future scenarios



Notes and general assumptions: These hypothetical data do not represent the returns on any particular investment. The projections or other information generated by Vanguard Capital Markets Model simulations regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Results from the model may vary with each use and over time. Data for international equity begins in 1970; data for U.S. domestic equity begins in 1960. Domestic equity returns are represented from 1960–1974 by the S&P 500 Index; from 1974–April 2005 by the Dow Jones Wilshire 5000 Index; and thereafter by the MSCI Broad Market Index. Global equity is 100% U.S. domestic equity until 1970 and 70% U.S. domestic equity and 30% international thereafter. International equity is represented by the MSCI EAFE Index until 1988 and the MSCI EAFE+EM Index thereafter. Boxes and whiskers represent 10th, 25th, 75th and 90th percentiles of the simulated 10-year annualized return distributions.

Source: Vanguard.

**Figure 12.** Risk of loss

Percentage of calendar years over the next three years that experience negative returns

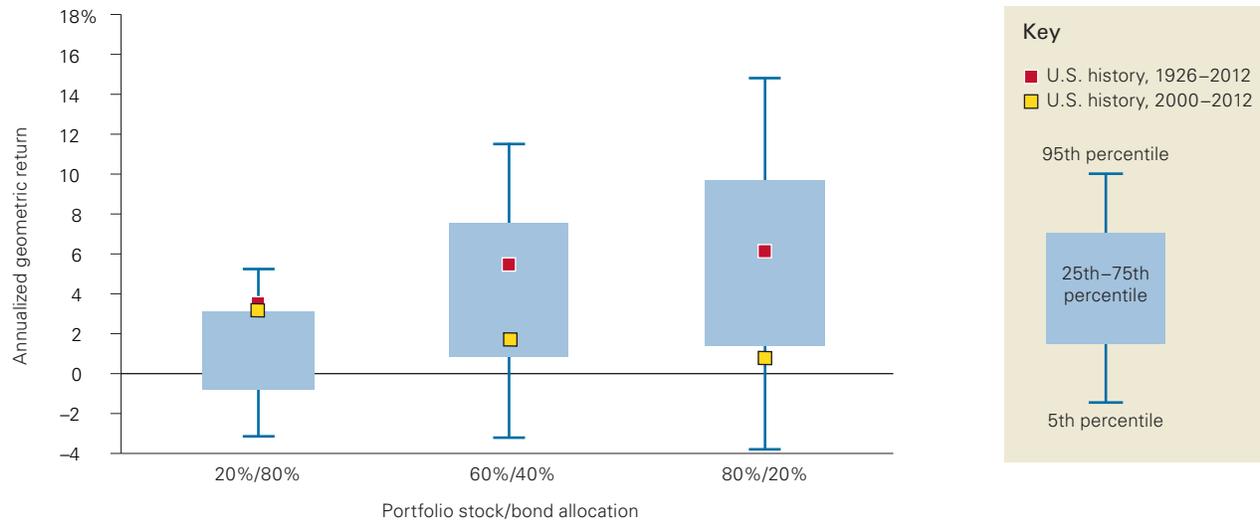


Notes: Historical equity returns represented from 1926–March 3, 1957, by the S&P 90 Index; from March 4, 1957–1974 by the S&P 500 Index; from 1974–April 2005 by the Dow Jones Wilshire 5000 Index; and thereafter by the MSCI Broad Market Index. Bond returns represented from 1926–1968 by the S&P High Grade Corporate Index; from 1969–1972 by the Citigroup High Grade Index; from 1973–1975 by the Lehman Brothers U.S. Long Credit AA Index; and thereafter by the Barclays U.S. Aggregate Bond Index.

Sources: Vanguard and Thomson Reuters Datastream.

**Figure 13.** 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%	60%/40%	80%/20%
Bottom 5th percentile	-3.2%	-3.2%	-3.8%
25th percentile	-0.6%	1.1%	1.7%
Median	1.1%	4.1%	5.6%
75th percentile	2.8%	7.2%	9.4%
Top 95th percentile	5.2%	11.6%	14.8%
Annualized portfolio volatility	6.6%	11.5%	14.6%
■ U.S. history, 1926–2012	3.6%	5.5%	6.2%
■ U.S. history, 2000–2012	3.2%	1.8%	0.9%

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 1926–2012 and 2000–2012 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 3.

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

**Implications for asset-allocation strategies**

To examine the potential portfolio construction implications of Vanguard’s range of expected long-run returns, Figure 13 presents simulated real (inflation-adjusted) return distributions for 2013–2022 for three hypothetical portfolios ranging from more conservative to more aggressive:

- 20% equities/80% bonds.
- 60% equities/40% bonds.
- 80% equities/20% bonds.

For reference, the figure also shows how the hypothetical portfolios would have performed over two past periods: 1926–2012 and 2000–2012.<sup>9</sup> Figure 13 has several key implications for strategic asset allocation, as discussed next.

**Modest outlook for long-run real returns**

Given widespread concern over the current low level of dividend yields and long-term U.S. Treasury yields, Figure 13’s real long-run return profile for balanced portfolios may seem better than expected. However, Vanguard believes it’s important for investors to consider real-return expectations when constructing

<sup>9</sup> For further details, see the Vanguard paper *Asset Allocation in a Low-Yield and Volatile Environment* (Davis, Aliaga-Díaz, and Patterson, 2011).

portfolios because today's low dividend and Treasury yields are, in part, associated with lower expected inflation than those of 20 or 30 years ago.

Figure 13 does show that the inflation-adjusted returns on a balanced portfolio over the decade ending 2022 are likely to be moderately below long-run historical averages (indicated by the small red boxes for 1926–2012). However, the likelihood of achieving real returns in excess of those since 2000 for all but the most conservative portfolios is considerably higher.

Specifically, our VCMM simulations indicate that the average annualized returns on a 60% equity/40% bond portfolio for the decade ending 2022 are expected to center in the 3%–4% real-return range, moderately below the actual average real return of 5.5% for the same portfolio since 1926. Viewed from another angle, the likelihood that our 60%/40% portfolio will achieve the 1926–2012 average real return is estimated at approximately 35%–40%, while the odds of attaining a higher real return than that achieved since 2000 (1.8%) are near 70%.

#### Principles of portfolio construction are intact

Contrary to suggestions that the next decade warrants some radically new investment strategy, Figure 13 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, even if expected returns are lower.

#### Implications of “searching for yield”

In fact, the upward-sloping and wider-tail pattern in Figure 13 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 slim, below-average nominal returns for a broad taxable bond index for the next ten years—a central tendency of 1%–2% 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 very aggressively pursue higher *nominal* total returns by making investment decisions based solely on asset-class *yields* rather than on 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. As the recent performance of stocks and bonds over the 15 years through 2012 reminds us (see Figure 14, on page 18), 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 13, as the effective risk exposure would then resemble that of a 20% bonds/80% stocks portfolio.

#### Key terms

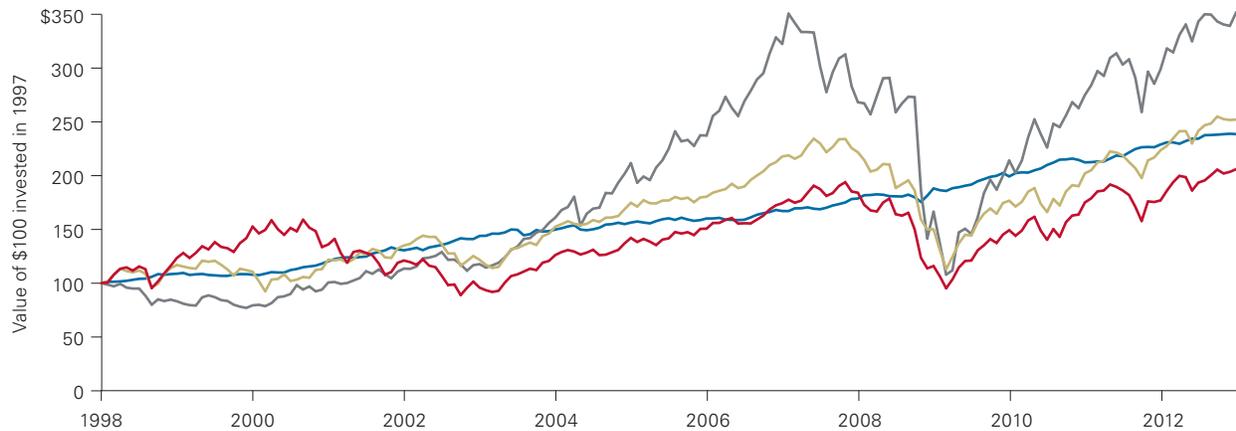
**Beta.** A measure of the volatility of a security or a portfolio relative to a benchmark.

**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.

**Figure 14. Dividend-paying stocks are not bonds**

December 31, 1997, through December 31, 2012



	Annualized return	Standard deviation	Correlation to indexes over past ten years	
			S&P 500 Index	Barclays U.S. Aggregate Bond Index
— U.S. stocks	5.1%	16.1%	1.00	-0.06
— U.S. dividend stocks	6.6	14.9	0.93	0.02
— REITs	8.9	22.7	0.70	0.15
— U.S. bonds	6.0	3.5	-0.06	1.00

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; U.S. 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 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.

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## 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, 2012.

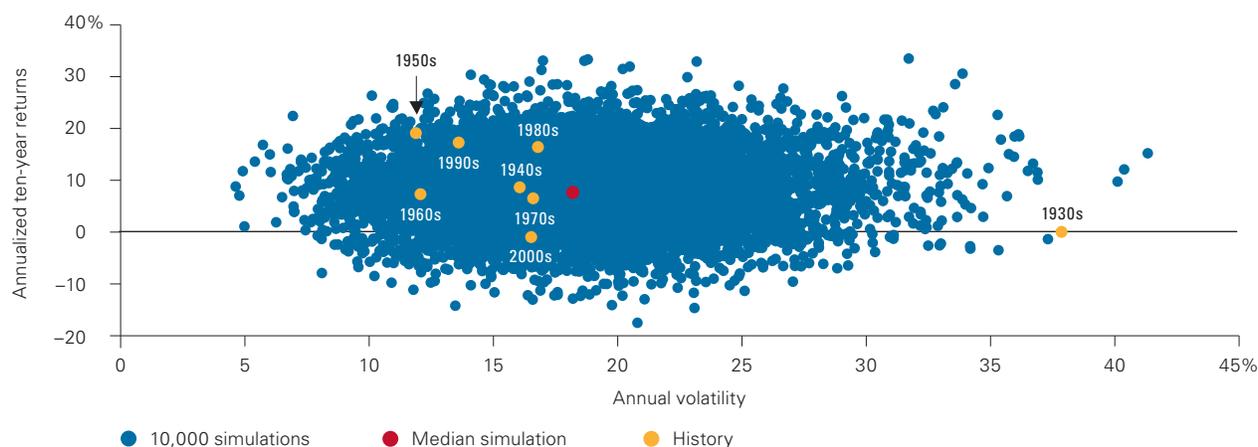
The VCMM is grounded in the empirical view that the returns of various asset classes reflect the compensation investors receive for bearing different types of systematic risk (or beta). Using a long span of historical monthly data, the VCMM estimates a dynamic statistical relationship among global risk 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.

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-1 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-1.** VCMM simulation output for broad U.S. stock market (10,000 simulations)



Source: Vanguard.



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