



Target-date funds: Looking beyond the glide path in 2014

Vanguard research

March 2014

Brian J. Scott, CFA; Scott J. Donaldson, CFA, CFP®; Matthew C. Brancato, CFA

- Asset growth in target-date funds (TDFs) and their use as a qualified default investment alternative (QDIA) in defined contribution plans have made it critical for plan sponsors to conduct thorough due diligence on the funds.
- Most due-diligence efforts by TDF plan sponsors have focused on understanding and finding the funds' optimal glide path—the predetermined schedule by which a portfolio's equity exposure is systematically reduced over time—but this standard, while important, is incomplete.
- During the due-diligence process, plan sponsors should consider factors beyond the glide path that differentiate TDFs, including the funds' tactical asset allocation policy, sub-asset allocation, and cost.
- These considerations, in addition to the glide path itself, can significantly affect the funds' short- and long-term returns as well as a participant's wealth creation over time.

A target-date fund's glide path, or how its level of equity changes over time, is a critical determinant in wealth-creation outcomes for retirement investors. With this in mind, there are other important factors for plan sponsors to consider when conducting due diligence on their TDFs, including the funds' sub-asset allocation, their cost, and the tactical flexibility of the glide path. All these factors need to be understood to complete thorough due diligence on a suite of TDFs.

Most TDFs are structured in a manner that takes into account human capital and, in doing so, seeks to balance risk and return throughout an investor's life cycle. For this reason, providers of TDFs typically have large exposures to equity for younger investors and reduce those as investors approach retirement. The logic is rather straightforward—equities have historically provided, and are widely expected to keep providing, a sizable return premium over more conservative investments such as bonds and cash. To maximize their probability of being financially ready for retirement, most investors will need some exposure to equities. Without any, investors will most likely have to dramatically increase their savings rates to build a sufficient balance for their income needs in retirement—something that most are unprepared to do. Younger investors are more capable of bearing the additional volatility experienced and expected in the equity markets because most of their total wealth is tied up in human capital, a fixed-income-like investment.¹ **Figure 1** compares the glide path used by Vanguard with those used by four large competitors and shows the range of glide paths used by all TDF providers.

Assets in TDFs are highly concentrated in the five largest providers of the funds that are highlighted in Figure 1. Collectively, these five firms managed approximately 83% of assets invested in TDFs as of December 31, 2013. A simple comparison of the glide paths used by these firms shows near-uniform agreement on the need for heavy exposure to equities for younger investors, but less agreement on the appropriate equity exposure for investors nearing retirement and those already retired. These differences in equity exposure are the source of much of the debate about the optimal glide path. Various quantitative tools have been used to test the adequacy of each glide path. Not surprisingly, most of these tools forecast a high probability for each glide path to achieve retirement readiness for investors who save adequately and invest with discipline over a 40-year-plus working career. Of course, forward-looking quantitative tools have limitations and cannot guarantee success, but they are helpful in conducting due diligence on TDFs.

Plan sponsors' due diligence should go beyond funds' glide paths and consider their historical and forward-looking stability.² Some providers periodically adjust the level or slope of their glide path to incorporate strategic changes in their asset allocation thinking. These changes are designed to be enduring and often draw considerable public attention and scrutiny from plan sponsors. Some TDF providers are also able to adjust the glide path on a tactical basis that is designed to benefit from a perceived shorter-term opportunity in the marketplace. These adjustments typically receive little attention but can significantly change the shape of the glide path.

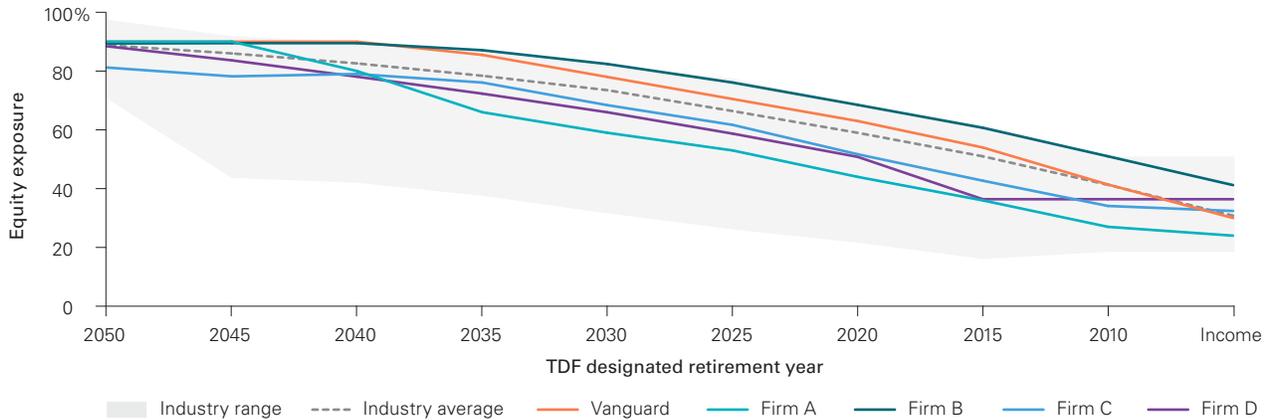
IMPORTANT: The projections or other information generated by the Vanguard Capital Markets Model[®] regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from VCMM is derived from 10,000 simulations for U.S. equity returns and fixed income returns. Simulations are based on market data and other information available as of June 30, 2013. VCMM results will vary with each use and over time. (See the Appendix on page 7.)

Notes on risk: 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 target-date funds are subject to the risks of their underlying funds. The year in the fund name refers to the approximate year (the target date) when an investor in the fund would retire and leave the work force. The fund will gradually shift its emphasis from more aggressive investments to more conservative ones based on its target date. An investment in target-date funds is not guaranteed at any time, including on or after the target date. Investments in bond funds are subject to interest rate, credit, and inflation risk. Foreign investing involves additional risks, including currency fluctuations and political uncertainty. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

¹ For a more detailed discussion about human capital theory, see Bennyhoff (2008); Hess, Ameriks, and Donaldson (2008); and Donaldson et al. (2013).

² Historical stability can be measured using Morningstar's Glide Path Stability Score, which the investment research firm publishes periodically.

Figure 1. Glide-path comparison of TDFs



Notes: The four largest providers of TDFs besides Vanguard are represented as Firms A, B, C, and D. Glide paths are as of December 31, 2013.
Sources: Vanguard; the websites of the four largest other TDF providers; and Morningstar, Inc.

Plan sponsors should consider whether unexpected tactical changes complicate their responsibility to monitor their TDFs.

Vanguard’s TDFs are restricted from tactical glide-path shifts. This approach is grounded in extensive research showing that tactical strategies fail to add value over time.³ Tactical changes to the glide path also reduce transparency and incur transaction costs that will create a performance drag without any assurance that plan participants will benefit. Finally, this approach recognizes that a growing share of participants in TDFs are enrolled in them automatically and therefore are less engaged than those who actively elect them. In our view, following a fully strategic approach increases transparency, removes performance risk, and reduces transaction costs, which are beneficial characteristics to incorporate into a QDIA.

TDFs: A balance of risk and return

Comparing one glide path with another gives plan sponsors an understanding of the level of equity exposure in a TDF but provides little other information. Within equities, most of the largest TDF providers have relatively similar allocations to large-, mid-, and small-capitalization stocks and to U.S. and non-U.S. stocks, even if the total equity level and the way that equity exposure is implemented between actively and passively managed strategies differ. The implication of the glide path is that

the remaining non-equity asset classes are included to diversify the funds’ market risk—the largest source of volatility in a TDF. A common misperception is that all non-equity TDF holdings are relatively safe investment-grade bonds and that there is little difference between these investments. **Figure 2**, on page 4, highlights the non-equity holdings of Vanguard’s target-date income fund and those of the four other leading providers and shows clear distinctions. Compared with Vanguard, which uses a market-cap-proportional allocation within nominal investment-grade bonds,⁴ most TDF providers are overexposed to corporate bonds at the expense of being underexposed to government bonds. Further, not all non-equity holdings in TDFs are investment-grade bonds. The “Other” bucket in Figure 2 primarily contains a mixture of high-yield (below-investment-grade) bonds, floating-rate bonds, below-investment-grade emerging-market bonds, real estate investment trusts (REITs), and commodities (Vanguard’s small holdings in this category consist of investment-grade securitized bonds).

It has been argued that a reduced allocation to government bonds improves a TDF’s overall diversification and makes it more efficient from a risk–return perspective. This approach is designed to create a more efficient portfolio by combining asset classes that are more volatile and whose returns are less than perfectly correlated with one another, such as we have observed over time with high-yield bonds, emerging-market bonds, floating-rate

³ For more on the challenges of tactical asset allocation strategies, see Davis, Kinniry, and Sheay (2007) and Wallick et al. (2012).

⁴ Investment-grade (high-quality) bonds include U.S. Treasuries and other fixed income securities with a credit rating of Baa3 or higher by Moody’s Investors Service or a credit rating of BBB– or higher by Standard & Poor’s or Fitch.

Figure 2. Non-equity holdings of target-date income funds offered by Vanguard and its largest competitors



Notes: The four largest providers of TDFs besides Vanguard are represented as Firms A, B, C, and D. Holdings are as of December 31, 2013.

Sources: Vanguard; the websites of the four largest other TDF providers; and Morningstar, Inc.

bonds, and equities. The same can be said when other non-equity asset classes such as commodities and investment-grade corporate bonds are added to a portfolio of equities. Because most of these non-equity asset classes are also widely expected to outperform high-quality⁵ government and mortgage-backed bonds, it seems logical to structure TDFs with allocations that are greater than those implied by their market caps.

The shortcoming of this approach is that it does not account for the dynamic nature of correlations, particularly in times of acute market stress. Long-run average correlations—particularly among nongovernment bonds, commodities, and equities—often break down in sharply declining equity markets.⁶ More simply put, when equities realize sharp losses, emerging-market bonds, high-yield bonds, floating-rate bonds, commodities, and REITs can behave more like stocks than bonds. Plan sponsors expecting ballast or diversification when they value it most may find it lacking in these asset classes. In extreme market events, like a flight to quality where government bonds are in high demand, even investment-grade corporate bonds may not provide as much downside protection as we have ordinarily observed. In effect, TDFs with large exposures to nongovernment bonds may have more equitylike exposure than plan sponsors might have anticipated from simply examining their glide path.

Vanguard’s TDFs are constructed with a market-proportional allocation within U.S. and international nominal government, mortgage-backed, and investment-grade corporate bonds. This structure reflects both our belief that the expected return premium associated with nongovernment bonds is not adequate compensation for the increased risk of an overallocation to them in our TDFs and our recognition that investor behavior during volatile periods is an important consideration. If the desire is to maximize return, we believe that increasing equity exposure and accepting more downside risk is a more prudent approach than being overexposed to asset classes that may behave like equities in a turbulent market environment.⁷ Vanguard’s TDFs are designed to balance the risk–return trade-off across the entire glide path, not solely to maximize return.

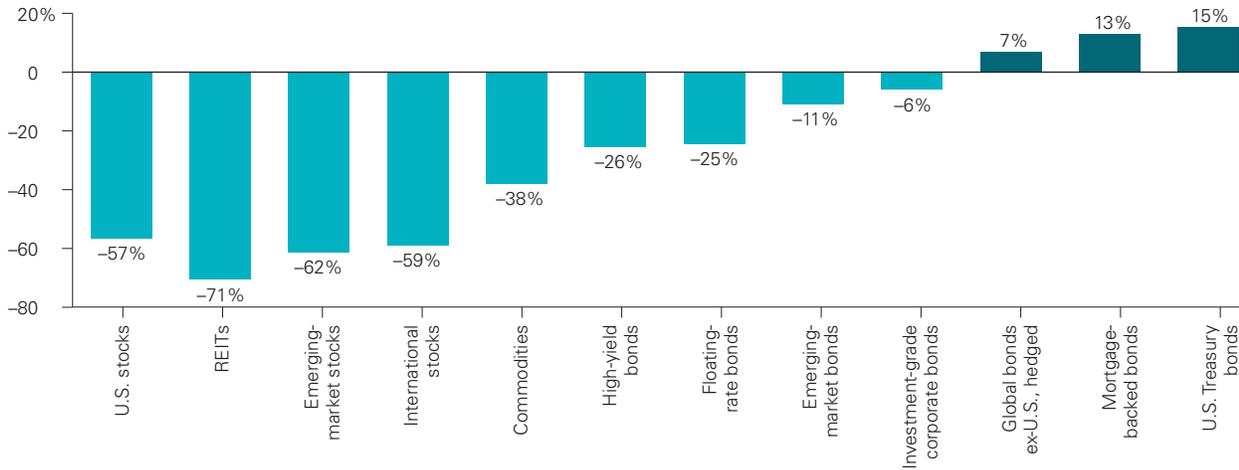
The bear market in equities that took place from October 2007 to March 2009 illustrates the dynamic nature of sub-asset-class correlations and their implications for portfolio construction in TDFs. **Figure 3** shows that high-quality bonds such as hedged international bonds, mortgage-backed bonds, and U.S. Treasury bonds provided a positive return during that period, while high-yield bonds, REITs, commodities, emerging-market bonds, and even investment-grade corporate bonds produced losses. This analysis illustrates that some market segments, including high-yield bonds, REITs, and commodities, can display equitylike volatility at a time when a diversifier to equities is most desirable. Plan sponsors seeking to measure a

⁵ Ibid.

⁶ For more on the dynamic nature of asset-class correlations, see Philips, Walker, and Kinniry (2012).

⁷ For more on the portfolio trade-offs involved with deviating from a market-cap-proportional allocation to investment-grade bonds, see Kinniry and Scott (2013).

Figure 3. Cumulative sub-asset-class returns, October 9, 2007–March 9, 2009



Notes: Returns for U.S. stocks, international stocks, and REITs represent price returns. Returns for commodities and bonds represent total returns. Benchmarks: U.S. stocks—MSCI US Broad Market Index; international stocks—MSCI All Country World ex USA Index; emerging-market stocks—MSCI Emerging Markets Index; REITs—FTSE NAREIT Equity REITs Index; commodities—Dow Jones-UBS Commodity Index; emerging-market bonds—J.P. Morgan Emerging Markets Bond Index Global; high-yield bonds—Barclays U.S. Corporate High Yield Bond Index; floating-rate bonds—Credit Suisse Leveraged Loan Index; investment-grade corporate bonds—Barclays U.S. Corporate Bond Index; global bonds ex-U.S., hedged—Barclays Global Aggregate Index ex USD, hedged; mortgage-backed bonds—Barclays U.S. Mortgage Backed Securities Bond Index; Treasury bonds—Barclays U.S. Treasury Bond Index.

Sources: Vanguard and Thomson Reuters Datastream.

glide path’s equity market risk should consider its equity-like exposure, including those sub-asset classes such as REITs, commodities, and high-yield bonds that are not as reliable a diversifier as high-quality government and mortgage-backed bonds.

The critical role of costs

Most plan sponsors have come to recognize the critical role of low costs in investment success. A large volume of industry research—including work from Vanguard, Morningstar, and other organizations—has consistently shown that costs are the best (though still imperfect) predictor of outperformance in actively managed funds.⁸ In the context of TDFs, cost is also a critical variable to pay attention to because regulatory guidance has made clear that plan sponsors need to give cost serious consideration when selecting and evaluating TDFs.⁹

Most of the research on the role of costs in predicting success has focused on the probability of active funds’ outperformance of their benchmark. For plan sponsors evaluating TDFs, a more relevant framework is to measure how costs affect wealth accumulation over a participant’s lifetime. **Figure 4**, on page 6, illustrates

this for a middle-income participant in Vanguard’s TDFs compared with the results of hypothetical TDFs that are identical to Vanguard’s except that their expense ratios are either 0.30% or 0.70% higher. These cost differences are reasonable comparisons between Vanguard TDFs with expense ratios of 0.16% to 0.18% and competitor TDFs with an asset-weighted average expense ratio of 0.91% (Charlson et al., 2013). For this exercise, we ran various financial simulations using the Vanguard Capital Markets Model and examined wealth accumulation in a “normal” market environment, which is the median expected outcome of more than 10,000 simulated lifetime returns. Over a full working life, with all other variables held constant and assuming median market returns, an investor in low-cost TDFs such as Vanguard’s will have accumulated nearly \$123,000 more than an investor in identical funds that charge 0.70% more.

The impact of costs on wealth accumulation in TDFs is significant enough that it should always be a consideration in the ongoing due diligence of TDFs beyond their initial selection. From time to time, TDF providers change their glide path or alter the asset mix used in their funds. When this happens, plan sponsors should consider how the change affects the funds’ cost structure. If it pushes

⁸ For more on the impact of costs on investment performance, see Philips (2012) and Kinnel (2010).

⁹ See U.S. Department of Labor (2013).

Figure 4. Costs matter with TDFs, too: Wealth-creation outcomes by cost

	In dollars	Difference	As a multiple of age-65 salary
Vanguard TDFs	\$833,637	—	13.9x
Vanguard TDFs + 0.30%	\$778,293	(\$55,344)	13.0x
Vanguard TDFs + 0.70%	\$710,919	(\$122,718)	11.8x

Note: “+ 0.30%” and “+ 0.70%” indicate hypothetical differences in expense ratios compared with those of Vanguard TDFs.

Source: Vanguard.

costs up, then all parties involved should be reasonably confident that the benefits of the change outweigh the costs.

A good example of this type of decision is whether to add alternative or more costly asset classes, such as hedge funds, commodities, and high-yield bonds, to TDFs. Assuming no diversification benefit or improvement in investment returns, the greater costs of these asset classes are guaranteed to reduce wealth-creation outcomes for investors who use low-cost index-based TDFs. For this reason, plan sponsors and TDF providers must have a high degree of conviction that adding these asset classes will improve risk-adjusted returns and wealth-creation outcomes to justify their greater costs. Another example is the decision to use higher-cost actively managed funds in place of low-cost index funds in TDFs. Providers and plan sponsors must have a high degree of conviction in each actively managed fund in their TDFs to justify their greater costs and potential for reduced wealth creation.

Conclusion

Thorough due diligence on TDFs requires plan sponsors to fully understand their funds’ glide path, but that is only the first step. A more complete standard also considers glide-path stability, sub-asset allocation, and costs. We encourage plan sponsors to recognize that effective diversification means more than having a large number of asset classes and funds in your TDFs. This is particularly true if some of your non-equity holdings are poor diversifiers when diversification is needed most: during sharp equity market downturns. It is also important to understand how costs affect potential retirement readiness and how they should influence asset allocation decisions. Finally, we urge plan sponsors to understand the tactical flexibility available to their TDF providers and its potential for reshaping the glide path. Complete due diligence requires more than just understanding the glide path; you must look beyond it.

References

- Bennyhoff, Donald G., 2008. *Time Diversification and Horizon-Based Asset Allocations*. Valley Forge, Pa.: The Vanguard Group.
- Charlson, Josh, Laura Pavlenko Lutton, David Falkof, Kailin Liu, Kathryn Spica, and Janet Yang, 2013. *Target-Date Series Research Paper 2013 Survey*. Chicago: Morningstar.
- Davis, Joseph H., Francis M. Kinniry Jr., and Glenn Sheay, 2007. *The Asset Allocation Debate: Provocative Questions, Enduring Realities*. Valley Forge, Pa.: The Vanguard Group.
- Donaldson, Scott J., Francis M. Kinniry Jr., Roger Aliaga-Díaz, Andrew J. Patterson, and Michael A. DiJoseph, 2013. *Vanguard’s Approach to Target-Date Funds*. Valley Forge, Pa.: The Vanguard Group.
- Hess, Michael, John Ameriks, and Scott J. Donaldson, 2008. *Evaluating and Implementing Target-Date Portfolios: Four Key Considerations*. Valley Forge, Pa.: The Vanguard Group.
- Kinnel, Russell, 2010. How Expense Ratios and Star Ratings Predict Success. *Fund Investor* 18 (2). Chicago: Morningstar.
- Kinniry, Francis M., and Brian J. Scott, 2013. *Reducing Bonds? Proceed With Caution*. Valley Forge, Pa.: The Vanguard Group.
- Philips, Christopher B., 2012. *The Case for Indexing*. Valley Forge, Pa.: The Vanguard Group.
- Philips, Christopher B., David J. Walker, and Francis M. Kinniry Jr., 2012. *Dynamic Correlations: The Implications for Portfolio Construction*. Valley Forge, Pa.: The Vanguard Group.
- U.S. Department of Labor, 2013. *Target Date Retirement Funds—Tips for ERISA Plan Fiduciaries*. Washington, D.C.: Employee Benefits Security Administration; fact sheet available at www.dol.gov/ebsa/newsroom/fsTDF.html.
- Wallick, Daniel W., Roger Aliaga-Díaz, and Joseph H. Davis, 2009. *Vanguard Capital Markets Model*. Valley Forge, Pa.: The Vanguard Group.
- Wallick, Daniel W., Julieann Shanahan, Christos Tasopoulos, and Joanne Yoon, 2012. *The Global Case for Strategic Asset Allocation*. Valley Forge, Pa.: The Vanguard Group.

Appendix. Vanguard Capital Markets Model

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 is a proprietary financial simulation tool developed and maintained by Vanguard's primary investment research and advice teams. 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. 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 June 30, 2013.

The VCMM forecasts distributions of future returns for a wide array of broad asset classes. Those asset classes include U.S. and international equity markets, several maturities of the U.S. Treasury and corporate fixed income markets, international fixed income markets, U.S. money markets, commodities, and certain alternative investment strategies. The theoretical and empirical foundation for the Vanguard Capital Markets Model is that the returns of various asset classes reflect the compensation investors require for bearing different types of systematic risk (beta). At the core of the model are estimates of the dynamic statistical relationship between risk factors and asset returns, obtained from statistical analysis based on available monthly financial and economic data from as early as 1960. Using a system of estimated equations, the model then applies a Monte Carlo simulation method to project the estimated interrelationships among risk factors and asset classes as well as uncertainty and randomness over time. The model generates a large set of simulated outcomes for each asset class over several time horizons. Forecasts are obtained by computing measures of central tendency in these simulations. 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. (For further details, see Wallick, Aliaga-Díaz, and Davis, 2009.)

Wage scale

Investor salary growth is modeled after the Social Security Administration's wage index. The index is based on reported wages across workers' age spectrum of 25–65 for low-, middle-, and high-income earners. This wage scale allows us to trace the earnings progression of an average earner over 40 years of work, accounting for factors such as career development. Therefore, as modeled, the average participant reaches a peak salary at age 55 (in real terms) and experiences a decline in real salary through age 65. In our life-cycle simulations, we also allow for 1.1% annual salary growth, on a real basis, in addition to the cross-sectional increase in the wage scale, which reflects the historical average productivity growth of the U.S. economy.

Glide-path allocations

The simulations use two different glide-path allocations: Vanguard's glide path and a more aggressive one. The Vanguard glide path reflects Vanguard's current allocations, and the more aggressive glide path increases the Vanguard glide path's equity allocation by 10%, which is taken proportionately from the other asset classes.

Contribution rates

Age-specific contribution rates are derived from *How America Saves 2009*, a report surveying the 3 million participants served by Vanguard's recordkeeping business. Contribution patterns account for the likelihood that investors will start with a lower savings rate in their early working years and increase their contributions as they approach retirement. Contributions start at approximately 5% at age 25 and increase to approximately 10% at age 65. In addition, the simulations include a company match of 50 cents on the dollar up to 3% of salary, which is consistent with industry averages.

Asset-class returns and correlations

The model uses index returns, without any fees or expenses, to represent asset classes. Taxes are not factored into the analysis. Inflation is modeled based on historical data from 1962 and simulated going forward, with the median and volatility displayed in **Figure A-1**, on the back cover. **Figure A-2**, also on the back cover, displays projected asset-class correlations.

Figure A-1. Annualized 75-year asset-return distributions

	Median return	Standard deviation
Domestic equity	9.2%	18.5%
U.S. nominal bonds	4.5	6.6
Inflation	2.4	3.4
International equity	9.2	21.9
International bonds	3.6	5.4
Short-term TIPS	3.4	4.5

Notes: Domestic stocks represented by Dow Jones Wilshire 5000 Composite Index, U.S. bonds by Barclays U.S. Aggregate Bond Index (a former Lehman Brothers index), international stocks by MSCI EAFE Plus Emerging Markets Index, and international bonds by Barclays Global Aggregate ex-USD Bond Index. Inflation is calculated from the Consumer Price Index, and short-term TIPS (Treasury Inflation Protected Securities) are derived from underlying U.S. Treasury yield data from the Federal Reserve Board.

Source: Vanguard.

Figure A-2. Asset-class correlations

	Domestic equity	U.S. nominal bonds	Inflation	International equity	International bonds	Short-term TIPS
Domestic equity	1.0					
U.S. nominal bonds	0.1	1.0				
Inflation	-0.1	0.1	1.0			
International equity	0.7	0.0	0.0	1.0		
International bonds	0.2	0.8	0.0	0.1	1.0	
Short-term TIPS	0.0	0.5	0.7	0.0	0.3	1.0

Notes: Domestic stocks represented by Dow Jones Wilshire 5000 Composite Index, U.S. bonds by Barclays U.S. Aggregate Bond Index (a former Lehman Brothers index), international stocks by MSCI EAFE Plus Emerging Markets Index, and international bonds by Barclays Global Aggregate ex-USD Bond Index. Inflation is calculated from the Consumer Price Index, and short-term TIPS (Treasury Inflation Protected Securities) are derived from underlying U.S. Treasury yield data from the Federal Reserve Board.

Source: Vanguard.

Connect with Vanguard® > vanguard.com > research@vanguard.com

For more information about Vanguard funds, visit vanguard.com, or call 800-662-2739, to obtain a prospectus. Investment objectives, risks, charges, expenses, and other important information about a fund are contained in the prospectus; read and consider it carefully before investing.

Morningstar data: ©2014 Morningstar, Inc. All Rights Reserved. The information contained herein: (1) is proprietary to Morningstar and/or its content providers; (2) may not be copied or distributed; (3) does not constitute investment advice offered by Morningstar; and (4) is not warranted to be accurate, complete, or timely. Neither Morningstar nor its content providers are responsible for any damages or losses arising from any use of this information. Past performance is no guarantee of future results.

Chartered Financial Analyst® is a trademark owned by CFA Institute.



Vanguard Research

P.O. Box 2600
Valley Forge, PA 19482-2600

© 2014 The Vanguard Group, Inc.
All rights reserved.
Vanguard Marketing Corporation, Distributor.

ICRTDF2 032014