

Ibbotson Target Maturity Report Q1 2011



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The first quarter of 2011 saw turmoil erupt around the globe. From political unrest in Egypt, to the earthquake in Japan, to the uprising against the government in Libya, markets had every reason to deteriorate. Yet despite these major events markets seemed to remain positive with little negative impact. Both U.S. equities and U.S. bonds experienced three consecutive months of positive returns. Outside the United States, equity markets saw positive returns in two of the three months and bonds attained positive returns in two months with a third month ending flat. This was a pleasant surprise for investors around the globe, including target-maturity fund investors.

In our first-quarter 2011 report we again highlight the performance and performance drivers of target maturity funds, the fund flows of the target maturity universe, as well as review the updated Morningstar analysts fund family ratings of the top target maturity fund providers. In addition, we added a version of our working paper regarding considerations for choosing a benchmark for target maturity funds. We plan to release a final version of the paper later this year, but the working version can be viewed here and is titled "Simple Solutions for Selecting a Target Date Benchmark."



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Target Maturity Performance Summary

Performance by U.S. markets and target maturity funds slowed from the fourth quarter of 2010, but still remained solid during the first quarter. As outlined in Table 1, the S&P 500 Index rose 5.9% during the period with U.S. bonds, as represented by the BarCap U.S. Aggregate Bond Index, rising 0.4% after a negative fourth quarter 2010. Target maturity funds are typically made up of some combination of both equity and fixed income and for the quarter average performance for these funds ended up between the two. The average target maturity fund returned 4.0% compared with the average return of the Morningstar Lifetime Moderate Index of 4.6%. Over the last 12 months the Morningstar Lifetime Moderate Index also outperformed the average target maturity fund. One reason was the diversification among asset classes in the Morningstar Lifetime Moderate Index, which allowed the index to perform on par with the S&P 500 during this time. Table 3 displays an asset class performance summary which provides a deeper look at the individual drivers of this outperformance.

Table 1: Target Maturity Performance Summary

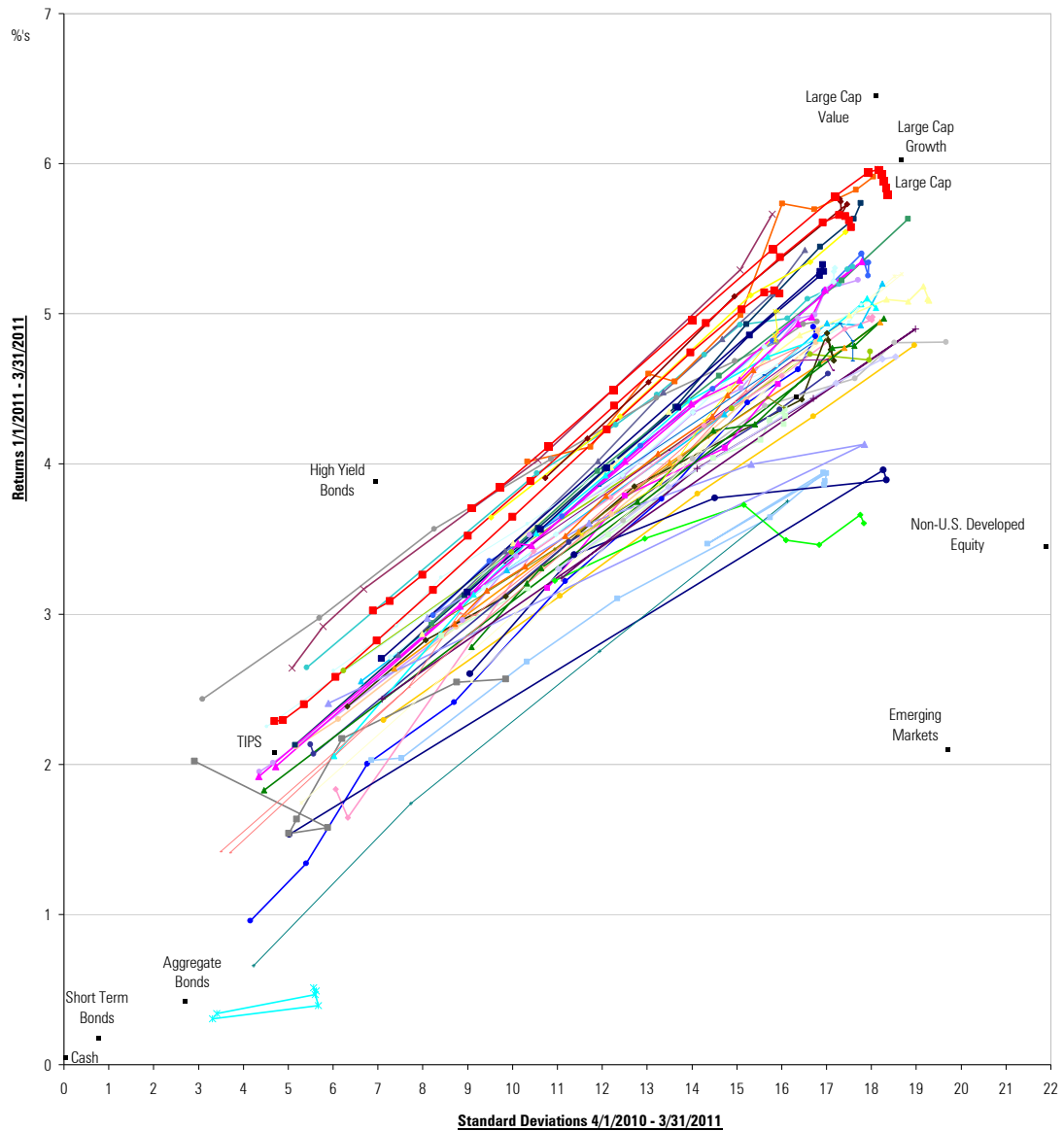
	Q1 Return	12-Month Return
Average Target Maturity Fund	4.0%	13.2%
Morningstar Lifetime Moderate Index	4.6%	15.6%
S&P 500 Index	5.9%	15.7%
BarCap U.S. Aggregate Bond Index	0.4%	5.1%

Source: Ibbotson Associates and Morningstar DirectSM

Fund Family Performance

The performance of target maturity fund families during the first quarter is summarized in Figure 1. We are now tracking 369 unique target maturity funds with at least a one-year track record representing 45 fund families. The lines in the graph connect funds from the same fund family. Quarterly returns are plotted on the vertical axis and 12-month standard deviations are plotted along the horizontal axis. As equities once again outperformed fixed income during the first quarter, the result is an upward sloping trend among the fund family lines. During the quarter, though, there were significant differences in asset class performance. This is reflected in the dispersion among fund family returns along the horizontal axis. The three Morningstar Lifetime Allocation Indexes, representing conservative, moderate, and aggressive glide paths are displayed in red with red squares.

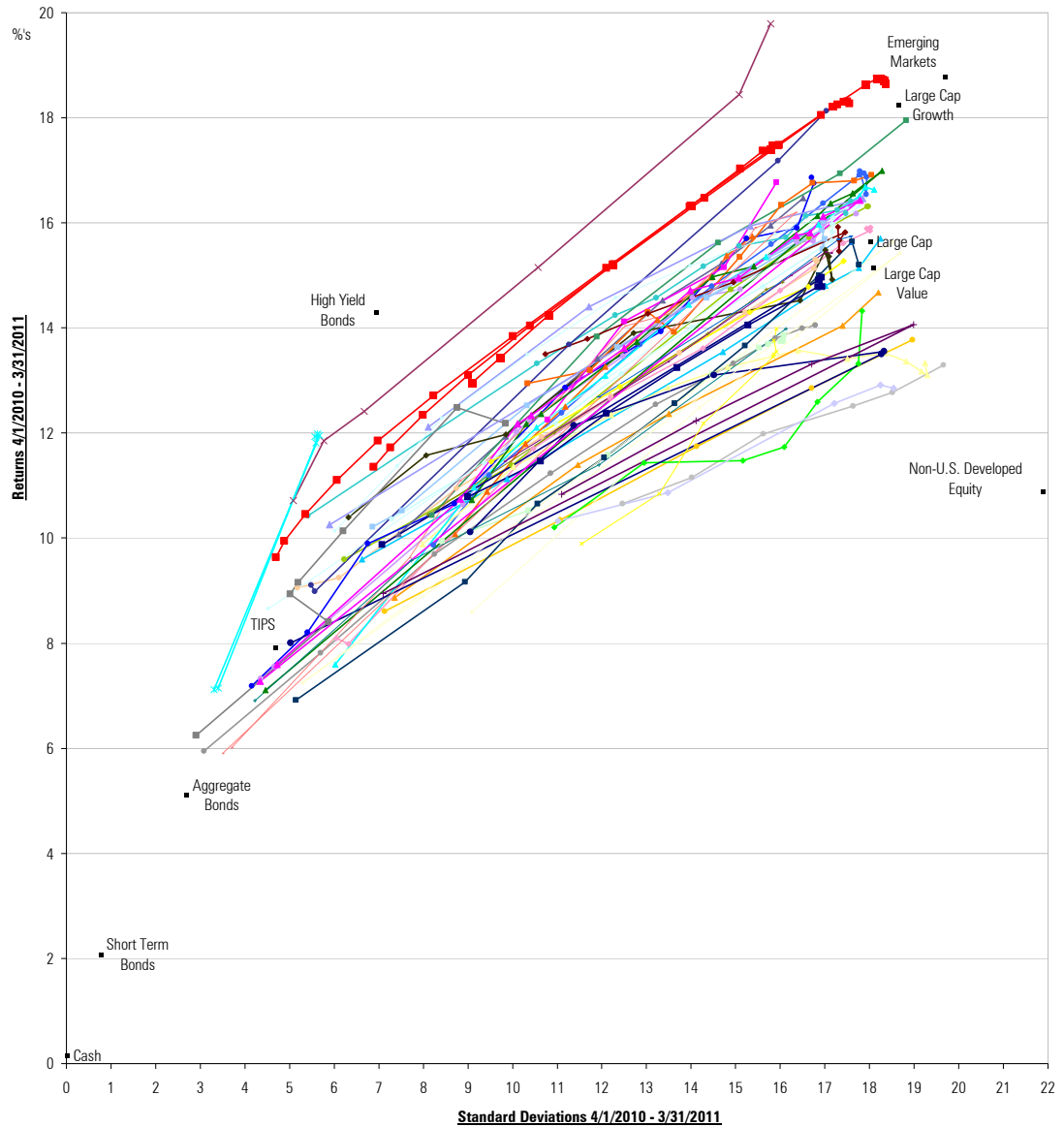
Figure 1: Fund Family Performance – Q1 Return and One-Year Risk Ending 3/31/2011



Source: Ibbotson Associates and Morningstar DirectSM

This same data is shown in Figure 2, although instead of using returns during the first quarter we show returns over the last 12 months. During this period equities have had a great run resulting in longer-dated target maturity funds returning well over 15%. During this period there were even greater differences in returns among asset classes which results in very large gaps in returns between funds of similar target dates. Because of their strong outperformance over this period, those funds with significant allocations to asset classes such as U.S. small-cap (growth and value), REITs, and commodities generally performed best. The three Morningstar Lifetime Allocation Indexes are again indicated in red with red squares.

Figure 2: Fund Family Performance – One-Year Return and One-Year Risk Ending 3/31/2011

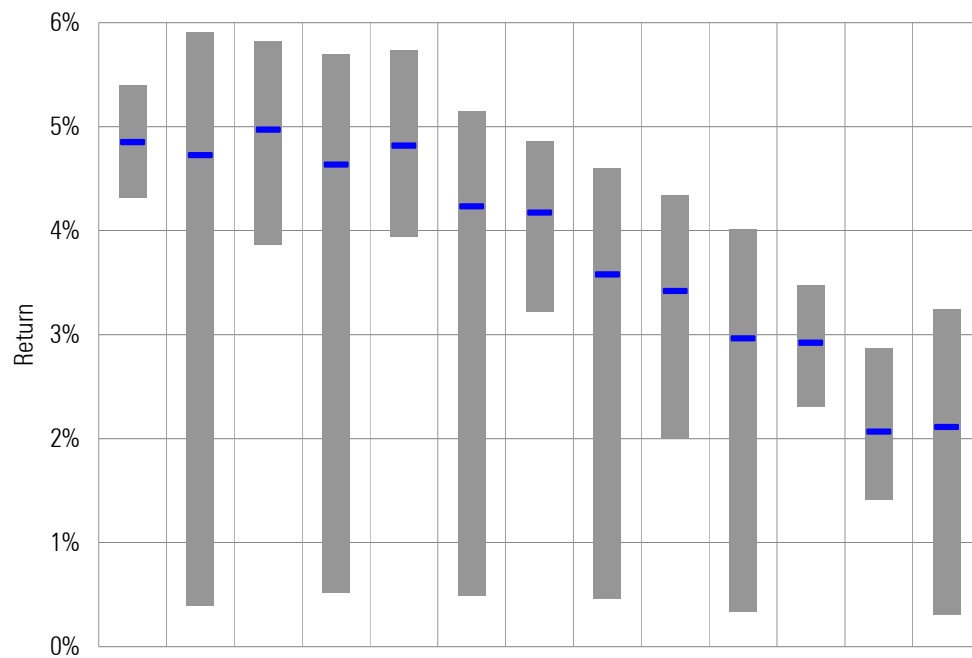


Source: Ibbotson Associates and Morningstar DirectSM

Target Maturity Fund Performance

Figure 3 offers performance data relative to each fund’s assigned Morningstar category as well as to the Morningstar Lifetime Allocation Moderate Index. The floating gray bars within the chart show the range of quarterly returns for the 13 target maturity fund categories. The blue line within each bar identifies the average fund performance for that category. There are meaningful differences between the best-performing funds (“Max” row within the table below) and the worst-performing funds (“Min” row within the table below) in each category, primarily reflecting the substantial “intra-category” differences in equity exposure. Normally during up markets, such as those experienced over the past three quarters, aggregate equity exposure is the primary driver of performance. The table also identifies the number of target maturity funds with a minimum return history of one year in each category that outperformed or underperformed the category’s corresponding Morningstar Lifetime Moderate Index based on Ibbotson’s Lifetime Asset Allocation methodology. Relative to the Morningstar Lifetime Moderate Indexes, only approximately 8% outperformed while nearly 92% of funds underperformed the Indexes.

Figure 3: Target Maturity Fund Category Performance Q1 2011



Category	2055	2050	2045	2040	2035	2030	2025	2020	2015	2010	2005	2000	Income
Max	5.4%	5.9%	5.8%	5.7%	5.7%	5.2%	4.9%	4.6%	4.3%	4.0%	3.5%	2.9%	3.2%
Average	4.9%	4.7%	5.0%	4.6%	4.8%	4.2%	4.2%	3.6%	3.4%	3.0%	2.9%	2.1%	2.1%
Min	4.3%	0.4%	3.9%	0.5%	3.9%	0.5%	3.2%	0.5%	2.0%	0.3%	2.3%	1.4%	0.3%
# of Funds (vs. Index)													
Outperformers	0	3	3	2	2	0	0	4	7	6	2	0	1
Underperforms	10	29	29	37	31	39	34	35	30	22	6	4	33
Total	10	32	32	39	33	39	34	39	37	28	8	4	34
Index													
Aggressive	5.8%	5.8%	5.9%	5.9%	6.0%	5.9%	5.8%	5.4%	5.0%	4.5%	4.1%	3.8%	3.7%
Moderate	5.6%	5.6%	5.6%	5.7%	5.6%	5.4%	4.9%	4.4%	3.9%	3.5%	3.3%	3.1%	3.0%
Conservative	5.1%	5.2%	5.1%	5.0%	4.7%	4.2%	3.6%	3.2%	2.8%	2.6%	2.4%	2.3%	2.3%

Source: Ibbotson Associates and Morningstar, Inc.

Asset Class Performance

Quarterly performance for some of the most common asset classes that comprise target maturity funds are displayed in Table 2. This data allows us to determine which asset classes were the primary drivers and detractors from performance during the first quarter.

Table 2: Asset Class Performance – Q1 2011

Asset Class	Q1 2011 Return	12-Month Standard Deviation
U.S. Large Growth Equity	6.0%	18.7%
U.S. Large Value Equity	6.5%	18.1%
U.S. Small Growth Equity	9.2%	22.8%
U.S. Small Value Equity	6.6%	23.3%
Non-U.S. Developed Equity	3.5%	21.9%
Emerging Market Equity	2.1%	19.7%
Real Estate	7.5%	16.7%
Commodities (Futures)	4.5%	16.3%
High-Yield Bonds	4.4%	9.2%
U.S. Aggregate Bonds	0.4%	2.7%
U.S. Short-Term Bonds	0.2%	0.8%
TIPS	2.1%	4.7%
Cash	0.1%	0.0%

Source: Ibbotson Associates and Morningstar DirectSM

As has been seen quite often over the past few years, overall equities outperformed bonds during the quarter. U.S. small cap growth equity was the big winner, although all U.S. equities enjoyed a smooth run over this period. U.S. large cap value outperformed U.S. large cap growth slightly although the trend did not carry down to the small cap space as small cap growth outperformed small cap value by approximately 2.6%. Funds with sizable allocations to U.S. small cap growth reaped the benefits of this outstanding performance. Similar to last quarter, non-U.S. equity (both developed and emerging) underperformed U.S. equity with developed non-U.S. outperforming emerging markets equity. REITs and Commodities enjoyed a solid quarter, particularly those commodity vehicles with sizable allocations to energy. The S&P GSCI index, which is a commodity index with a heavy energy allocation, outperformed the Dow Jones UBS Commodity index (used by this report to represent the commodity asset class) by 7.1% as a result of its heavy energy weight. Funds that allocate to an energy heavy commodity option received this additional boost in performance.

With the exception of the 4.4% return of High Yield bonds, returns within fixed income were fairly mild. TIPS did return more than 2% during the quarter, but U.S. aggregate bonds, short-term bonds, and cash all returned less than 0.5%.

Table 3 displays asset class returns and standard deviations for the past 12 months.

Table 3: Asset Class Performance – 3/31/2011 Trailing 12 Months

Asset Class	12-Month Return	12-Month Standard Deviation
U.S. Large Growth Equity	18.3%	18.7%
U.S. Large Value Equity	15.2%	18.1%
U.S. Small Growth Equity	31.0%	22.8%
U.S. Small Value Equity	20.6%	23.3%
Non-U.S. Developed Equity	10.9%	21.9%
Emerging Market Equity	18.8%	19.7%
Real Estate	25.0%	16.7%
Commodities (Futures)	28.5%	16.3%
High-Yield Bonds	14.7%	9.2%
U.S. Aggregate Bonds	5.1%	2.7%
U.S. Short-Term Bonds	2.1%	0.8%
TIPS	7.9%	4.7%
Cash	0.2%	0.0%

Source: Ibbotson Associates and Morningstar DirectSM

During the past 12 months we see a pattern similar to the first quarter of 2011. Equities significantly outperformed fixed income, U.S. small cap outperformed U.S. large cap, and U.S. equity outperformed non-U.S. equity. Digging a bit deeper we see that U.S. growth outperformed U.S. value during this time benefiting funds with a growth tilt. Despite the lackluster performance of non-U.S. developed equity over this time, emerging markets equity actually performed quite strongly with a nearly 19% return. Of these asset classes, U.S. small cap growth was again the big winner with a 31% return. This was followed by the returns of commodities and REITs, returning 28.5% and 25%, respectively.

High-yield bonds had an outstanding run over this time with an equity-like return of 14.7% which was tops for the fixed income asset classes. TIPS also had strong performance with a nearly 8% return, followed by U.S. aggregate bonds (5.1%) and U.S. short-term bonds (2.1%).

Morningstar Lifetime Allocation Indexes

Table 4 presents the performance figures for the complete Morningstar Lifetime Allocation Index family, which is based on Ibbotson's Lifetime Asset Allocation methodology. Because of the strong performance of equities during the quarter the returns of the indexes further from retirement performed best, although all of the indexes were positive during the quarter. Over the past 12 months the performance of the target maturity indexes has come through with returns nearing 19% in the more aggressive funds. Overall, 1-year performance for the indexes ranged from 9.6% to 18.8%.

Table 4: Morningstar Lifetime Allocation Indexes

(As of 3/31/2011; multiyear periods annualized)

	1 Month	3 Month	1 Year	3 Year	5 Year
Income					
Conservative Income	0.6%	2.3%	9.6%	4.5%	6.1%
Moderate Income	0.6%	3.0%	11.3%	4.6%	5.9%
Aggressive Income	0.6%	3.7%	13.0%	4.6%	5.7%
2000					
Conservative 2000	0.6%	2.3%	9.9%	4.7%	6.2%
Moderate 2000	0.6%	3.1%	11.7%	4.7%	6.0%
Aggressive 2000	0.6%	3.8%	13.4%	4.6%	5.7%
2005					
Conservative 2005	0.5%	2.4%	10.5%	4.9%	6.3%
Moderate 2005	0.6%	3.3%	12.3%	4.8%	6.0%
Aggressive 2005	0.6%	4.1%	14.2%	4.6%	5.6%
2010					
Conservative 2010	0.5%	2.6%	11.1%	5.0%	6.3%
Moderate 2010	0.6%	3.5%	13.1%	4.8%	5.9%
Aggressive 2010	0.7%	4.5%	15.2%	4.5%	5.4%
2015					
Conservative 2015	0.6%	2.8%	11.9%	5.1%	6.3%
Moderate 2015	0.6%	3.9%	14.0%	4.7%	5.7%
Aggressive 2015	0.7%	5.0%	16.3%	4.2%	5.1%
2020					
Conservative 2020	0.6%	3.2%	12.7%	5.1%	6.2%
Moderate 2020	0.7%	4.4%	15.2%	4.5%	5.5%
Aggressive 2020	0.8%	5.4%	17.4%	3.9%	4.8%
2025					
Conservative 2025	0.6%	3.6%	13.8%	4.9%	6.0%
Moderate 2025	0.8%	4.9%	16.5%	4.3%	5.1%
Aggressive 2025	0.9%	5.8%	18.2%	3.7%	4.5%
2030					
Conservative 2030	0.7%	4.2%	15.1%	4.7%	5.7%
Moderate 2030	0.9%	5.4%	17.5%	4.1%	4.9%
Aggressive 2030	0.9%	5.9%	18.6%	3.6%	4.5%
2035					
Conservative 2035	0.8%	4.7%	16.3%	4.6%	5.5%
Moderate 2035	0.9%	5.6%	18.1%	4.0%	4.8%
Aggressive 2035	1.0%	6.0%	18.7%	3.6%	4.5%
2040					
Conservative 2040	0.9%	5.0%	17.0%	4.5%	5.4%
Moderate 2040	1.0%	5.7%	18.3%	4.0%	4.8%
Aggressive 2040	1.0%	5.9%	18.8%	3.6%	4.5%
2045					
Conservative 2045	0.9%	5.1%	17.4%	4.5%	5.4%
Moderate 2045	1.0%	5.6%	18.3%	3.9%	4.9%
Aggressive 2045	1.0%	5.9%	18.7%	3.7%	4.6%
2050					
Conservative 2050	1.0%	5.2%	17.5%	4.5%	5.4%
Moderate 2050	1.0%	5.6%	18.3%	3.9%	4.9%
Aggressive 2050	1.1%	5.8%	18.7%	3.7%	4.7%
2055					
Conservative 2055	1.0%	5.1%	17.5%	4.5%	5.4%
Moderate 2055	1.1%	5.6%	18.3%	4.0%	5.0%
Aggressive 2055	1.1%	5.8%	18.7%	3.7%	4.7%

Source: Ibbotson Associates and Morningstar DirectSM

Fund Flows

Flows into open-end target maturity funds were \$16.6 billion in the first quarter, a 7% increase over the first quarter of 2010. Only the \$17.3 billion in flows during the fourth quarter of 2007 exceeded this quarter's result.

Among top-tier mutual fund providers, Vanguard had the strongest quarter growing at a 7.2% organic growth rate. T. Rowe Price also turned in a solid quarter growing at a 5% clip which was higher than any of the three previous quarters. Aspiring providers continued to achieve positive flows, including JP Morgan and USAA, with \$402 million and \$203 million takes for the quarter, respectively. On the flipside, AllianceBernstein continued its run of outflows as it saw \$48 million move out during the quarter.

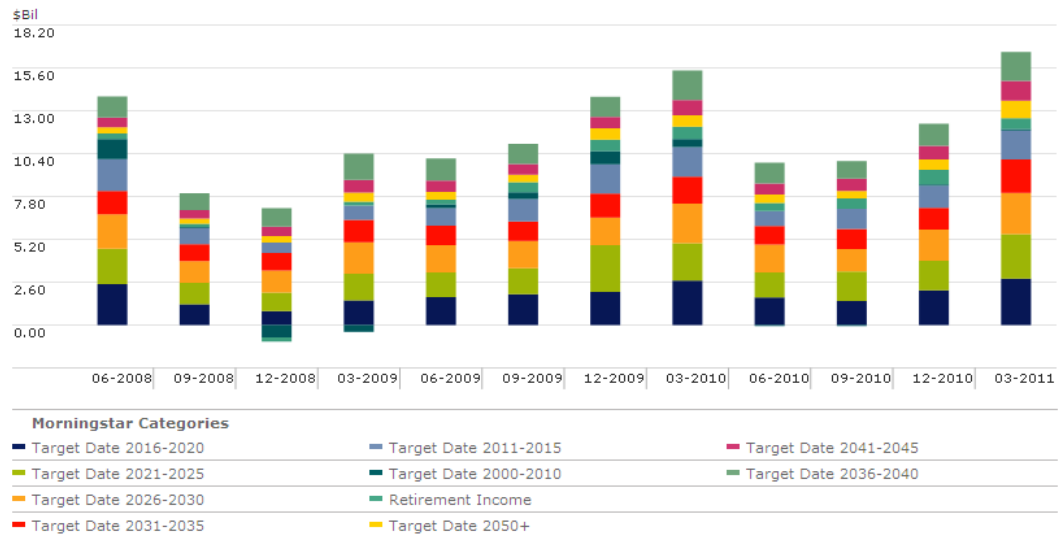
Assets in collective investment trust (CIT) target maturity strategies continue to gain steam. Total assets in target maturity CITs reached \$54 billion at the end of 2010, the most recent quarter for which data is available. These vehicles enjoyed \$4.8 billion in flows for the quarter, raising AUM by almost \$10 billion in the process. BlackRock dominates this space, with \$21 billion in AUM for a 39% market share. Vanguard in particular has moved a handful of large retirement clients from a mutual fund structure to the CIT structure.

Table 5: Target Maturity Fund Flows Q1 2011

Target Date	Asset Under Management (\$Mil)		Estimated Net Flow (\$Mil)	
	End Q4 2010	End Q1 2011	Q4 2010	Q1 2011
Income	15,378	16,459	899	638
2000-2010	35,654	36,782	74	95
2011-2015	39,546	42,715	1,344	1,772
2016-2020	66,680	72,156	2,114	2,820
2021-2025	45,024	49,662	1,791	2,699
2026-2030	52,584	57,523	1,892	2,506
2031-2035	30,166	33,689	1,315	2,021
2036-2040	33,755	37,180	1,334	1,735
2041-2045	14,087	16,017	843	1,213
2050+	8,881	10,407	618	1,066
Total	341,756	372,591	12,224	16,566

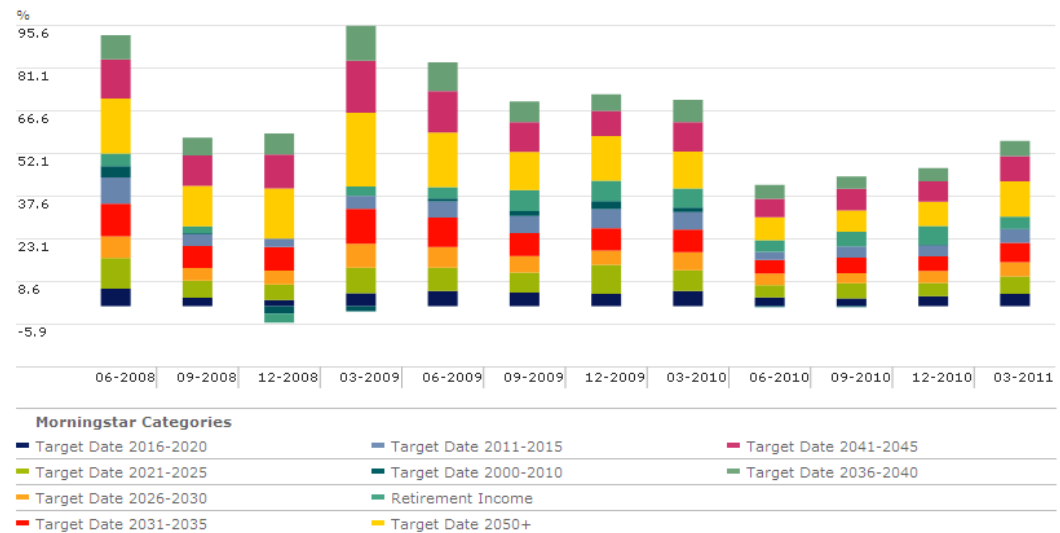
Source: Morningstar DirectSM

Figure 6: Quarterly Estimated Net Flows by Morningstar Category as of 3/31/2011



Source: Morningstar DirectSM

Figure 7: Quarterly Organic Growth Rate as of 3/31/2011



Source: Morningstar DirectSM

Fund Family Ratings and Research Reports

Morningstar's mutual fund research team's target maturity fund series ratings as of 12/31/2010 are summarized in Table 7. This table reflects the 21 largest target maturity fund series tracked by Morningstar's fund analysts. With the 12/31/2010 update there were a few changes that occurred. TIAA-CREF was upgraded from "Average" to "Above Average" due primarily to owning a greater share of assets in its cheapest share class as well as increased target maturity fund transparency. MassMutual was also upgraded, moving from the "Below Average" category to the "Average" category as it has seen gradual improvement in its portfolio quality and performance. Fidelity's Freedom fund series ("Fidelity" in Table 6) was downgraded from "Above Average" to "Average" due mainly to a downgrade in its Corporate Culture grade. Finally, BlackRock was added to the ratings (BlackRock LifePath funds) with an "Average" category rating.

Table 6: Overall Ratings Summary as of 12/31/2010

<i>Top</i>	<i>Above Average</i>	<i>Average</i>	<i>Below Average</i>	<i>Bottom</i>
American Funds	American Century	BlackRock	DWS	AllianceBernstein
T. Rowe Price	JP Morgan	Fidelity	Putnam	Oppenheimer
Vanguard	TIAA-CREF	Fidelity Advisor		
	Vantagepoint	ING Solution		
	Wells Fargo	John Hancock		
		MassMutual		
		MFS		
		Principal		
		Schwab		

Source: Morningstar

The Morningstar Target Maturity Fund Series Ratings and Research Reports are available in Morningstar Principia[®], Morningstar Advisor WorkstationSM, Morningstar DirectSM, Morningstar Office[®], Morningstar Site BuilderSM, and through licensed data feeds. Morningstar.com, the company's website for individual investors, publishes the ratings and an abbreviated version of the report.

For additional information about Morningstar's target maturity fund evaluation and rating methodology, please visit <http://global.morningstar.com/TargetDateReports>.

About Ibbotson

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Important Disclosures

The performance data shown are gross of fees; if fees were accounted for returns may be substantially less from the returns shown. The performance data shown represents past performance. Past performance does not guarantee future results. The above commentary is for informational purposes only and should not be viewed as an offer to buy or sell a particular security. The data and/or information noted are from what we believe to be reliable sources, however Ibbotson has no control over the means or methods used to collect the data/information and therefore cannot guarantee their accuracy or completeness. The opinions and estimates noted herein are accurate as of a certain date and are subject to change. The indices referenced are unmanaged and cannot be invested in directly.

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Appendix: Index Definition

Morningstar Lifetime Allocation Indexes are a family of multi-asset class target maturity indices available in three risk tracks: Aggressive, Moderate, and Conservative. Each risk track consists of 13 indices ranging from a 2055 index to an income index. The glide paths and strategic asset allocations of the indices is based on Ibbotson's Lifetime Asset Allocation methodology. Security selection for each sub-asset class in the index family is provided by a matching Morningstar market index.

Standard & Poor's 500 Index: Market-capitalization-weighted index of 500 widely held stocks. Member companies are chosen based on market size, liquidity, and industry group representation. Included are the stocks of industrial, financial, utility, and transportation companies.

Barclays Capital US Aggregate Bond Index – Broad-based benchmark that measures the investment grade, U.S. dollar-denominated, fixed-rate taxable bond market, including Treasuries, government-related and corporate securities, MBS (agency fixed-rate and hybrid ARM passthroughs), ABS, and CMBS.

Simple Solutions for Selecting a Target Date Benchmark

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The logo for Ibbotson, featuring the word "ibbotson." in a blue, lowercase, serif font. The period at the end of the word is a small dot.

a Morningstar company

Introduction

When it comes to the benchmarking of target maturity funds, the cart has been in front of the horse. In the single-asset-class world, most managers are given a specific mandate and to some degree that mandate is defined by a benchmark that is assigned to them by the fund manufacturer (e.g. a firm starts a new small-cap value fund, establishes the Russell 2000 Value as the index, and hires a portfolio manager or team to run the fund). In the target maturity world, the largest target maturity funds were started prior to the creation of target maturity benchmarks.

Due to the lack of target maturity benchmarks, each fund manufacturer went about creating their own proprietary methodology for developing their target maturity fund family. This resulted in a vast array of target maturity fund families with substantially different investment characteristics. Additionally, as more money has continued to pour into target maturity funds, manufacturers have devoted more resources to these funds. This has caused periodic methodology enhancements that have resulted in substantial changes to the investment characteristics of a number of firms' fund families. As practitioners and investors stuck in our old ways of thinking, there is an unfortunate tendency to view similar funds, for example all 2030 funds, as a homogeneous peer group or category, even though the investment characteristics of all 2030 funds are substantially less homogeneous than that of traditional peer groups or categories.

Now that a wide range of target maturity benchmarks from established benchmark creators are available, the challenge is how to select an appropriate one? Operating under the typical problem faced by a typical target maturity fund stakeholder, we assume a fund family has already been chosen and the stakeholder needs to select an appropriate benchmark. Here we outline both a qualitative and a quantitative approach to selecting an appropriate target maturity benchmark family for a particular target maturity fund family.

We will reserve the difficult topics of: 1) how to select the best / most appropriate fund family; and 2) how to properly use a target maturity benchmark series to evaluate and monitor a fund family, for separate articles.

The CFA Institute curriculum defines a benchmark as "...a collection of securities or risk factors and associated weights that represents the persistent and prominent investment characteristics of asset category or manager's investment process."¹ As it pertains to target maturity benchmarking, we must expand our thinking beyond a single benchmark to the "investment process" associated with a given manager's overall target maturity fund family relative to a target maturity benchmark family. In other words, the philosophies inherent in the benchmark family should be reasonably consistent with the "manager's investment process" or philosophies. When it comes to target maturity benchmarks there are three major decisions that will determine the fund family risk and return characteristics:

- Overall stock-bond glide path
- Various intra-stock and intra-bond asset classes in the benchmark
- Weighting scheme of the individual asset classes

¹ Tuttle, Donald L., McLeavey, Dennis W., Maginn, John L. and Pinto, Jerald E. eds. "Evaluating Portfolio Performance," *Managing Investment Portfolios: A Dynamic Process*, (JohnWiley & Sons, 2007), pp. 731-732

As such, we have attempted to expand upon the CFA Institute's curriculum's list identifying the six characteristics of a good benchmark by adding three additional factors in italics:

- Unambiguous
- Investable
- Measurable
- Appropriate
- Reflective of current investment opinions
- Specified in advance

- *Robust overall glide path methodology*
- *Robust opportunity set of individual asset classes*
- *Robust methodology for determining the detailed intra-stock and intra-bond asset class allocations*

Qualitative Aspects of Selecting a Target Date Benchmark Series

From a qualitative stand point considerable work is required. The benchmark selector must understand and evaluate a) the overall glide path methodology, b) the asset classes used, and c) the methodology for determining the detailed intra-stock and intra-bond allocations for not only the fund family in question, but for all of the possible target maturity benchmarks in order to make an informed selection. To assist the reader in this endeavor we have identified the key qualitative elements of the three major target maturity index families (representing seven potential benchmark series) in Tables 1, 2, and 3.²

² As one of our authors is also the author of "Lifetime Asset Allocations: Methodologies for Target Maturity Funds", which serves as the basis for the Morningstar Lifetime Allocation Indexes, and is thus potentially biased, we encourage readers to review the various methodologies and form their own conclusions.

Table 1: Overall Glide Path Methodology

Index	Glide Path Methodology	Robustness of Theory
S&P Target Date Series	Modified peer group average based on survey of fund families with AUM of \$100 million or more. If an asset class is included in 25% of target maturity funds it is included in the average. Summed survey results lead to the equity glide path. Final curve fitting procedure smoothes the results.	Low Theory Robustness
Dow Jones Global	Semi-variance-based glide path. Starting 40 years prior to the target date, the funds target 90% of the semi-variance of equity. This decreases to 20% of the semi-variance of equity 10 years after the retirement date.	No Listed Theory
Dow Jones US Target	Semi-variance-based glide path. Starting 40 years prior to the target date, the funds target 90% of the semi-variance of equity. This decreases to 20% of the semi-variance of equity 10 years after the retirement date.	No Listed Theory
Dow Jones Real Return Target Date Series	Semi-variance-based glide path. Starting 40 years prior to the target date, the funds target 90% of the semi-variance of equity. This decreases to 20% of the semi-variance of equity 10 years after the retirement date. Gradual increases in the allocations to TIPS and bonds occur 25 years prior to the target date.	No Listed Theory
Morningstar Lifetime Allocation (w/risk tracks)	Modern Portfolio Theory (MPT)-based glide path evolves with the median U.S. citizen's total economic situation (including an evolving picture of their financial capital, human capital, and retirement income liability). The glide paths attempt to maximize a participant's total financial health by investing their financial capital in such a way that it brings their total wealth closest to MPT's Sharpe maximizing portfolio (adjusted for risk preferences) while considering the nature of the participants' liabilities.	High Theory Robustness (Published)

Source: Internal Morningstar Investment Management analysis based on information collected in March 2011 - see References for specific sources.

Table 2: Asset Classes

Index	Asset Classes	Number of Asset Classes
S&P Target Date Series	<ul style="list-style-type: none"> ▶ Equity: U.S. Large Cap, U.S. Mid Cap, U.S. Small Cap, International Equities, Emerging Markets, U.S. REITs ▶ Fixed Income: Core Fixed Income, Short Term Treasuries, TIPS 	9
Dow Jones Global	<ul style="list-style-type: none"> ▶ Equity: U.S. Large Cap Growth, U.S. Large Cap Value, U.S. Mid Cap Growth, U.S. Mid Cap Value, U.S. Small Cap Growth, U.S. Small Cap Value, Europe/Canada, Asia/Pacific, Emerging Markets ▶ Fixed Income: U.S. Government Bonds, U.S. Corporate Bonds, U.S. Mortgage Bonds, Majors (ex U.S.), 1-3 month T-bill 	14
Dow Jones US Target	<ul style="list-style-type: none"> ▶ Equity: U.S. Large Cap Growth, U.S. Large Cap Value, U.S. Mid Cap Growth, U.S. Mid Cap Value, U.S. Small Cap Growth, U.S. Small Cap Value ▶ Fixed Income: U.S. Government Bonds, U.S. Corporate Bonds, U.S. Mortgage Bonds, 1-3 month T-bill 	10
Dow Jones Real Return Target Date Series	<ul style="list-style-type: none"> ▶ Equity: Global Equities, Global REITs ▶ Fixed Income: U.S. Aggregate Bonds, U.S. TIPS ▶ Other: Commodities 	5
Morningstar Lifetime Allocation (w/risk tracks)	<ul style="list-style-type: none"> ▶ Equity: U.S. Large Cap Growth, U.S. Large Cap Value, U.S. Large Cap Core, U.S. Mid Cap Growth, U.S. Mid Cap Value, U.S. Mid Cap Core, U.S. Small Cap Growth, U.S. Small Cap Value, U.S. Small Cap Core, Non-US Developed, Emerging Markets ▶ Fixed Income: Long-Term Core Bonds, Intermediate-Term Bonds, Short-Term Bonds, Global Government Bonds, Emerging Market Bonds, TIPS, Cash ▶ Other: Commodities 	19

Source: Internal Morningstar Investment Management analysis based on information collected in March 2011 – see References for specific sources.

Table 3: Intra-Stock / Intra-Bond Detailed Asset Allocation Methodology

Index	Intra-Stock / Intra-Bond Methodology	Robustness of Theory
S&P Target Date Series	Modified peer group average based on survey of fund families with AUM of \$100 million or more. If asset class is included in 25% of target maturity funds it is included in the average. Summed survey results lead to the equity glide path. Final curve fitting procedure smoothes the results.	Low Theory Robustness
Dow Jones Global	Optimization based on historical 36-month inputs determines the optimal stock, bond, and cash split at target semi-variance levels.	Low Theory Robustness
Dow Jones US Target	None specified in methodology document.	No Listed Theory
Dow Jones Real Return Target Date Series	None specified in methodology document.	No Listed Theory
Morningstar Lifetime Allocation (w/risk tracks)	Gradual movement from asset-only asset class allocations to liability-relative optimization-based asset allocations. In addition, there is a gradual movement from mean-variance asset allocation to mean-conditional value-at-risk optimizations.	High Theory Robustness (Published)

Source: Internal Morningstar Investment Management analysis based on information collected in March 2011 - see References for specific sources.

From Table 1 and Table 3, we see that the S&P Target Date Series is based on a modified peer-grouping process coupled with a final curve-fitting algorithm. In our opinion, while there is little in the way of theory, S&P-based documents such as Murphy and Tsui 2011 provide a clear description of their philosophy and methodology.

In contrast, documentation for the three disparate index series from Dow Jones – the Real Return series, the U.S. series, and the Global series – offers virtually no explanation behind their index families. Additionally, based on our research, each of their indexes does something that is so out of step with what is being done by the vast majority of target maturity fund families, making the Dow Jones target maturity indexes inappropriate for all but a few target maturity fund families. More specifically, the Real Return series follows a global total stock market weighting scheme for equities, meaning that the equity component of the index is more than 50% non-U.S. In contrast, the U.S. series ignores non-U.S. investment completely. Finally, looking at the Dow Jones Target Date Indexes (the Global Series), we see that within the U.S. portion of equity they equally weight U.S. Large Cap, U.S. Mid Cap, and U.S. Small Cap, which results in a small cap bias that far exceeds that of actual target maturity funds. Likewise, within non-U.S. equities, the Global series equally weights the three non-U.S. asset classes of Europe/Canada/Middle East, Asia/Pacific, and Emerging markets.

While some fund families are forthcoming with critical methodological underpinnings such as the overall glide path methodology, the asset classes used, and the methodology for determining the detailed intra-stock and intra-bond asset class allocations, others hide behind a wall of impenetrable marketing babble making it necessary to also use quantitative measures based on available data.

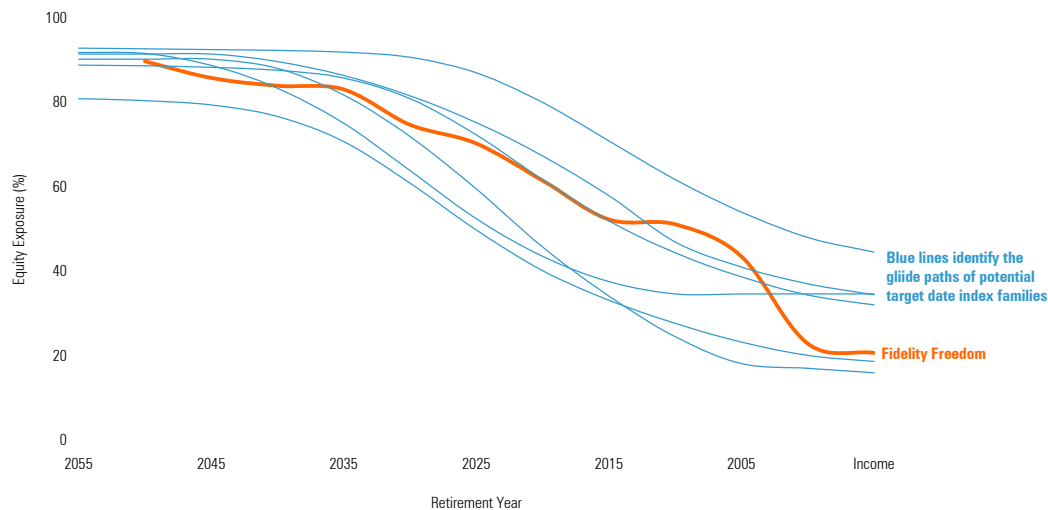
Quantitative Aspects of Selecting a Target Date Benchmark Series

We propose three quantitative measures to help select a “best-fit” target maturity benchmark series for a given fund family. Following is a case study using these measures for the largest target maturity fund family in terms of assets, Fidelity Freedom Funds.

Average Absolute Difference in Glide Paths

The first measure, average absolute difference in glide paths, is the most simplistic. It is a quantitative assessment of simply trying to eyeball on a glide path graph which of the index glide paths is the overall closest to that of the target maturity fund family, in this case Fidelity Freedom Funds. Figure 1 displays the glide path for Fidelity Freedom Funds (orange) and the seven benchmark families (blue lines).

Figure 1: Absolute Difference in Glide Paths



In some cases eyeballing the graph to make an assessment is quite easy; other times it is difficult to find the best-fit benchmark series. Table 4 displays the absolute difference in glide paths (i.e. equity exposure) of each of the target maturity benchmark series relative to the Fidelity Freedom Funds.

Table 4: Absolute Differences in Glide Paths (Percentage Points)

Fidelity Freedom Fund	Morningstar Lifetime Allocation Index - Aggressive	Morningstar Lifetime Allocation Index - Moderate	Morningstar Lifetime Allocation Index - Conservative	S&P Target Date Series	DJ Target Global	DJ Real Return Target Date Series	DJ US Target
2050	2.91	1.07	9.34	1.67*	0.15	0.05	1.81
2045	6.72	2.52	6.42	5.64	3.82	4.02	2.98
2040	8.38	3.66	7.25	5.73	3.16	3.43	0.60
2035	8.82	2.67	12.36	3.28	2.81	2.34	8.04
2030	15.98	6.16	13.81	6.84	4.79	4.01	10.83
2025	16.72	2.07	20.48	4.95	13.07	11.92	17.80
2020	18.48	0.24	21.33	5.82	17.95	16.53	17.93
2015	18.61	0.35	19.09	5.64	20.09	20.01	14.70
2010	10.59	6.72	23.41	4.18	28.17	28.10	16.47
2005	10.50	4.80	20.24	2.48*	26.47	26.42	8.86
2000	25.15	11.54	2.76	14.15*	6.85*	6.85*	11.77*
Income	23.83	11.39	2.01	13.77	5.58	5.53	13.95
Average	13.89	4.43	13.21	6.18	11.08	10.77	10.48

* Target date indexes did not exist for these target dates; thus, the stock-bond split was inferred from corresponding near-dated indexes from the same index family.

Source: Glide paths are estimated by Morningstar Investment Management using information collected in March 2011 from Dow Jones website, S&P website, and Morningstar databases.

From Table 4 we see that on average the Morningstar Moderate Index series is the best fit index series with an average absolute difference in glide paths of 4.43 percentage points of equity exposure. While the Morningstar Moderate Index series had the lowest average differential, there were substantial differences for the 2000 and Income funds, with differences greater than 11 percentage points.

Average Historical Tracking Error

The next measure is historical tracking error. Historical tracking error measures how closely a portfolio tracked a given index in the past. All seven benchmark families have historical backfilled return series going back at least five years. This enables one to calculate the historical tracking error of a given fund, such as the Fidelity Freedom 2030 fund, relative to each of the seven 2030 target maturity indexes. Table 5 contains the historical annualized tracking error for all of the Fidelity Freedom funds relative to the corresponding target maturity benchmarks during the last five years ending February 2011.

Table 5: Historical Tracking Error (%)

Fidelity Freedom Fund	Morningstar Lifetime Allocation Index - Aggressive	Morningstar Lifetime Allocation Index - Moderate	Morningstar Lifetime Allocation Index - Conservative	S&P Target Date Series	DJ Target Global	DJ Real Return Target Date Series	DJ US Target
2050*	1.88	2.00	3.08	N/A	2.04	2.94**	3.89
2045*	2.11	1.97	2.78	2.11	2.06	3.88	3.72
2040	2.14	1.93	2.82	2.22	2.05	4.07	3.60
2035	2.24	1.82	3.10	2.25	1.97	4.57	3.48
2030	2.49	1.81	4.02	2.53	2.18	5.62	3.47
2025	3.11	1.85	4.62	2.41	2.71	6.13	3.59
2020	2.91	2.17	5.61	2.76	4.01	6.85	4.57
2015	3.41	2.15	4.97	2.33	4.22	6.01	4.59
2010	2.50	2.56	5.37	3.37	5.63	6.06	5.89
2005	2.09	2.91	5.50	N/A	6.44	N/A	6.65
2000	4.76	2.97	2.97	N/A	N/A	N/A	N/A
Income	4.50	2.88	2.74	2.74	3.09	4.30	3.06
Average	2.85	2.25	3.96	2.53	3.31	5.04	4.23

The N/A indicates that index does not exist.

* Fidelity's 2045 and 2050 started in July 2006 and thus have 56 monthly data points at the time of analysis.

** DJ Real Return 2050 started in January 2011 reducing the monthly data points for this historical tracking error to 13.

Once again the target maturity index family with the best fit was the Morningstar Moderate Index series with annualized historical tracking error of 2.25%, followed relatively closely by the S&P Target Date Index series and the Morningstar Aggressive Index series.

A potential strength of the historical analysis is that it reflects any historical changes and differences in the detailed asset allocations that may have occurred in the past. This strength is also a potential weakness, as the current implied glide paths of the fund family and index families may be a better indication of the "best-fit" benchmark series moving forward; hence, our final quantitative measure.

Average Forward-Looking (or Current) Expected Tracking Error

Our most-sophisticated quantitative measure is a forward-looking (or current) expected annual tracking error measure based on the current detailed asset allocations of the fund family versus the detailed asset allocations of the respective target maturity index. To calculate this measure one must obtain the current detailed asset allocations of all of the funds in a fund family as well as the current detailed asset allocations for all of the target maturity indexes. For a given fund (e.g. Fidelity Freedom 2030), assuming that one orders the detailed asset allocations in a consistent fashion (including a placeholder with a 0% for any non-common asset classes) one can estimate the "active" asset allocation weights by subtracting each detailed asset allocation weight of the index from the corresponding detailed asset allocation index. This list of active asset allocation positions relative to the index will sum to zero and can then be coupled with a forward-looking covariance matrix of returns to calculate the

forward-looking tracking error.³ Table 6 lists the forward-looking tracking error estimates of the Fidelity Freedom Funds relative to the various indexes.

Table 6: Forward-Looking Tracking Error (%)

Fidelity Freedom Fund	Morningstar Lifetime Allocation Index - Aggressive	Morningstar Lifetime Allocation Index - Moderate	Morningstar Lifetime Allocation Index - Conservative	S&P Target Date Indexes	DJ Target Date	DJ Real Return Target Date Indexes	DJ US Target Date
2050	4.14	3.40	2.18	N/A	4.27	4.56	6.26
2045	4.31	3.50	2.07	2.98	4.54	4.37	4.54
2040	4.48	4.48	1.86	3.24	4.70	4.44	6.50
2035	4.53	3.34	1.55	3.08	4.06	5.01	5.86
2030	5.39	3.45	1.78	3.28	3.45	5.30	5.14
2025	5.38	2.57	2.96	3.02	2.42	5.96	4.23
2020	5.27	1.97	3.58	2.84	2.23	6.11	3.65
2015	5.08	1.79	3.35	2.67	2.65	5.57	3.59
2010	3.66	1.56	4.03	1.73	4.17	5.85	4.52
2005	3.43	1.79	3.88	N/A	5.05	5.66	5.02
2000	5.46	3.06	2.21	N/A	N/A	N/A	N/A
Income	4.97	2.88	2.26	3.21	3.42	3.31	3.32
Average	4.67	2.82	2.64	2.89	3.72	5.10	4.78

In contrast with our first two quantitative measures of “best fit” that favored the Morningstar Moderate Index series, the lowest average forward-looking tracking error was for the Morningstar Conservative Index series. In addition, based on this measure both the Morningstar Moderate Index series and the S&P Target Date Index series fit quite nicely as well.

³ Assuming that \mathbf{h}_p is an $n \times 1$ column vector of asset class weights for the fund, \mathbf{h}_B is an $n \times 1$ column vector of asset class weights for the benchmark, and Σ is an $n \times n$ covariance matrix of asset class returns, the forward-looking tracking error (TE) equals

$$\sqrt{[(\mathbf{h}_p - \mathbf{h}_B)^T \Sigma (\mathbf{h}_p - \mathbf{h}_B)]}$$

Summary of Quantitative Measures

Table 7 provides a summary of our three quantitative measures applied to the Fidelity Freedom funds.

Table 7: Best Fit Analysis Summary

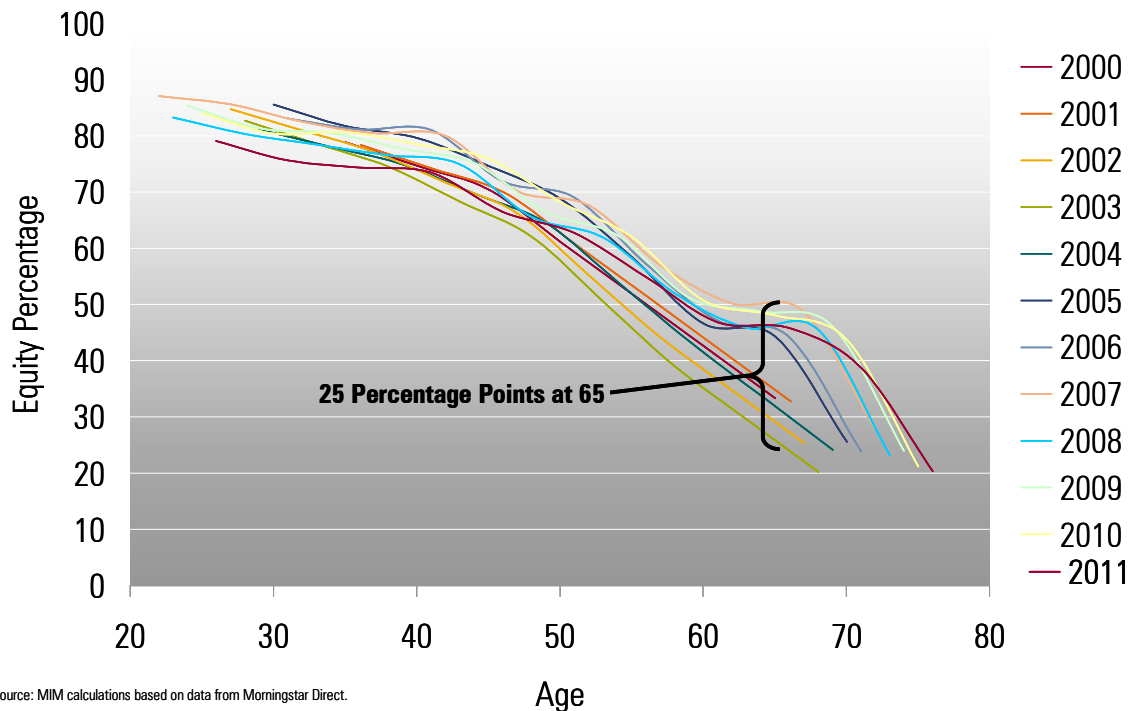
Benchmark	Average Absolute Glide Path Equity Differential	Average Annual Tracking Error (%)	Average Forward-Looking Tracking Error (%)
Morningstar Lifetime Allocation Index - Aggressive	13.89	2.85	4.67
Morningstar Lifetime Allocation Index - Moderate	4.43	2.25	2.82
Morningstar Lifetime Allocation Index - Conservative	13.21	3.96	2.64
S&P Target Date Series	6.18	2.53	2.89
Dow Jones Global	11.08	3.31	3.72
Dow Jones Real Return Target Date Series	10.77	5.04	5.10
Dow Jones US Target	10.48	4.23	4.78

We think that all three measures in Table 7 provide valuable information for choosing a best-fit benchmark based on a non-subjective measure. Furthermore, we believe that reasonable practitioners may prefer one measure over another or to weight them differently. While we believe the takeaway from our example is that the Morningstar Moderate Index series is the best-fit benchmark for Fidelity Freedom Funds, clearly different benchmarks series will provide a better fit for other fund families. We should also point out that although we indicate the best fit index for each quantitative measure is based on the lowest average across all of the individual fund family target maturity funds, for any individual fund the best fit may vary among the different index series. We do not think it is practical to choose multiple index funds for different target maturity funds along a single fund family's glide path, but rather a single index series should be chosen.

Additional Considerations

In the case of Fidelity Freedom Funds, since 2000 the implied glide path has changed substantially (see Figure 2).

Figure 2: Fidelity Freedom Funds Implied Glide Paths (2000 – 2011)



Source: MIM calculations based on data from Morningstar Direct.

If one thinks the current implied glide path is the best predictor of the glide path moving forward, then more emphasis should be placed on our first and third quantitative measures – average glide path differential and average forward-looking tracking error – as these measures are based on current allocations. If one thinks the Fidelity Freedom glide path is likely to bounce around, it could make sense to put more weight on our second quantitative measure – historical tracking error.

Conclusion

Perhaps in the future the cart will once again be behind the horse. As target maturity benchmarks become more well-known and the number of good benchmarks increases, fund manufacturers may begin to hire managers, or insist that their current managers, manage relative to a specified target maturity benchmark. For now, the wide range of target maturity stakeholders needs viable techniques for identifying an appropriate benchmark. From a qualitative standpoint, an appropriate target maturity benchmark should have a similar glide path philosophy, asset classes set, and methodology for determining the detailed intra-stock and intra-bond allocations. From a quantitative standpoint, we have introduced three relatively simple-to-calculate measures for identifying a best-fit benchmark: average absolute difference in glide paths, average historical tracking error, and average forward-looking tracking error.

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