Bait and Switch: Glide Path Instability

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Introduction

With the dramatic rise in popularity of target date or target maturity funds, a new graph has entered our lives—the target maturity glide path graph. For a given series (or family) of target date funds, the target maturity glide path graph plots the current equity exposure of each of the funds on the vertical axis and one of the following on the horizontal axis: the stated target retirement date in the name of the fund (e.g. 2050, 2045, etc.), the number of years pre- or post the assumed retirement age (e.g. +10, +5, 0, -5, etc.), or the assumed investor's age (e.g. 25, 30, 35, etc.).¹ These graphs are often used to compare multiple target date fund families, providing a general perspective about how aggressive or conservative a target date fund family is relative to peers and insight into funds' philosophies for post-retirement investing.

While it is widely known that the glide paths from different providers vary significantly, to date very little has been written about the year-over-year changes in the glide paths of different providers. A common assumption—and one that investors and plan sponsors make decisions based on—is that the snapshot of the current implied glide path is indicative of the changes investors can expect in the aggressiveness of their funds throughout their lives.² This is a bad assumption as we demonstrate that the glide paths of the major fund families have varied significantly through time.

In this paper, we document the changes in the implied (cross-sectional) glide paths of the major target date fund providers through time. Additionally, we introduce a new measure for tracking the stability, or perhaps we should say instability, of glide paths through time that we call the "Glide Path Stability Score".

Investor Expectations

A key implicit assumption within the industry is that the target "date" year identifies the expected or target retirement year of the investor. Furthermore, it is common to assume that the age of the investor at the target date year is 65 years old. For example, at the time of this writing in 2011 we assume the investor in a 2010 target date fund is one year past the retirement age of 65, and is now 66 years old. Assuming the use of the same target date funds series, back in 2006 the investor in the "2005 fund" would also have been 66 years old. If the glide path associated with a given target date series is steady overtime, the equity exposure for the 66-year-old of 2006 should be the same, or at minimum very similar to, the equity exposure for the 66-year-old of 2011. In fact, for all 66-year-olds through time in the same target date

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¹ Presumably the "Income" fund is typically drawn at a distance corresponding to five years after the target date fund with the lowest target "date," such as 2005.

² For example, well-meaning but misguided stakeholders often make this glide path stability assumption and then potentially compound this error by attempting to "evaluate" the glide path with a Monte Carlo simulation.

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fund family, the amount of equity should be similar if the glide path remains steady and properly adjusted each year.

A provider changing their glide path is not necessarily a bad thing as there are a variety of reasons why a glide path might evolve over time. The most obvious reason is a fund provider instituting a methodological change that materially changes the glide path. If the provider has justification and communicates the change along with the impact to the glide path, this change could serve as a benefit to investors. Another reason for a change to the glide path is the addition of asset classes that could change the respective equity allocations of the target date funds. For example, some fund families have added alternatives, such as commodities, that may not be clearly classified as equity or fixed income. However, the addition of an asset class that is clearly identifiable as either equity or fixed income is typically not a justifiable reason why the equity glide path would change. For example, the additional of emerging market equities would almost always be sourced from existing equity exposures and the additional of either TIPS or high yield bonds would almost always be sourced from existing fixed income exposure, neither of which would change the overall equity glide path. A tactical asset allocation overlay is yet another reason a glide path may change over time, as the level of tactical moves could result in a glide path becoming more or less equity-centric. Finally, at least one provider specifies their glide path based on volatility rather than equity exposure resulting in a natural instability of equity exposure as it varies through time to achieve the target volatility level.

There are also reasons for changes that may not be a direct result of active changes being made by the fund provider. One example is funds that incorporate relatively loose rebalancing bands around their strategic target glide path that results in the glide path "rising" when equity markets do well and "falling" when equity markets do poor. The data we use in our analysis is based on actual equity holdings, which may have drifted away from what the fund provider has identified as its "target" for that fund. Also the use of derivates that could influence the "effective" equity exposure that may result in what appears to be some instability as our holdings based data in some instances struggles to properly identify these investments.

Glide Path Instability

By controlling for age (based on an assumed retirement age of 65), we can determine the implied glide path through time for all of the possible ages covered by a glide path.

To calculate the equity exposure through time, we use Morningstar's database of mutual fund holdings that reflects the mandatory holdings disclosure that open-end mutual funds are required to make at least each quarter. By combining the specified target "date" in the fund name with the assumption that the investor is 65 at that date, we can create glide path graphs at different points in time using age on the horizontal axis. Figures 1 – 3 display the evolving implied glide paths of the three largest fund families (Fidelity Freedom funds, Vanguard Target Retirement funds, and T. Rowe Price Retirement funds). Collectively, these three fund families represent approximately 76% of the open end target date universe as of June 2011. In each of these cases we have left the "Income" fund off of the glide path because the implied age of the "Income" fund investor is not known with certainty. One can obtain a strong sense of "stability" or "instability" of a given glide path by simply looking at the historical glide path graphs of a fund provider's series over time.

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Starting with the largest fund family, Fidelity Freedom funds, in Figure 1 the changes in the fund family's glide path are shocking, especially at older ages. Although it's difficult to clearly identify each individual line for each year-end, in aggregate it can clearly be seen that the level of equity for any given age changed drastically over this time. The greatest dispersion has been on the right half of the glide path where individuals close to or in retirement typically invest. Here one would usually expect to see the most stability as investors in retirement have a shorter investment time horizon and therefore typically should know how much equity they will hold during these years. For example, the glide path of 2002 contained 34% equity for a 60-year-old, dramatically lower than the 53% equity a 60-year-old would have received at the end of 2006. During a severe down market (worst 1% of downturns), we estimate the expected or average loss on \$100,000 to be approximately \$27,000 on a 35% equity asset allocation and \$37,000 on a 53% equity asset allocation. Because of this dispersion in glide paths it is very difficult to predict how much equity today's 35-year-old (or anyone not yet at retirement) will hold at retirement, and therefore hard to determine if the glide path is appropriate for those investors.



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Source: Ibbotson Associates and Morningstar DirectSM

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In contrast with Fidelity Freedom's seemingly chaotic glide paths, during the Vanguard Target Retirement Funds family's much shorter history, there are clearly two distinct regimes depicted in Figure 2. Prior to 2006, the Vanguard glide paths were much more conservative than they were starting in 2006. This graph does not explain what the cause of this shift was, nor does it tell why it occurred. But it does alert investors that a relatively dramatic one-time change occurred and could potentially occur again in the future. Both before and after that one-time change the glide path has been extremely stable indicating the potential to better predict where investors will fall on the glide path as they continue to age and approach retirement. To Vanguard's credit, when they changed their glide path they informed investors of the change, as well as the rationale behind the regime switch. Within each of the two regimes, Vanguard has produced extremely stable glide paths. Given the simplicity and importance of keeping a stable glide path, we are surprised that more fund families don't exhibit similar stability.



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Source: Ibbotson Associates and Morningstar DirectSM

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In Figure 3, rounding out the top-three dominant target date fund families based on AUM are the T. Rowe Price Retirement fund glide paths. While T. Rowe Price's glide paths were not quite as stable as the two separate regimes of Vanguard, overall T. Rowe Price had the most stable glide path of all the fund families that we examined. Since inception, the glide path has remained similar to how it was originally created in 2002. Barring any fundamental methodological shifts, this allows an individual investor to deduce with strong conviction what their level of equity will be as they approach retirement. This peace of mind for investors should be a key factor for plan sponsors to consider when determining which fund family is right for them.



While one can make a visual assessment of the various glide path graphs to get a feel for the degree of stability, we present a quantitative measure for measuring glide path stability.

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Source: Ibbotson Associates and Morningstar DirectSM

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Glide Path Stability Score

The data points used to create glide path graphs, such as those in Figures 1-3, can also be displayed in tabular form. Table 1 displays a subset of the data for the Fidelity Freedom Funds for the year-end equity exposures for the last five years as well as the assumed age of the investor.

It is worth highlighting that the jump from the 10 or so discrete x-y data points associated with a rather complete target date fund family with funds every five years ranging from 2010 to 2050 to the typically displayed glide path is quite large. In most cases this is done in a spreadsheet program, such as Excel, in which the spreadsheet's graphing ability interpolates between adjacent data points, often with a line "smoothing" feature. The spirit of the implicit assumptions that move one from discrete data points to a continuous glide path graph can be applied to develop a more complete data set for calculating quantitative measures of glide path stability.

	Holdings as of 12/31/2006		Holdings as of 12/31/2007		Holdings as of 12/31/2008		Holdings as of 12/31/2009		Holdings as of 12/31/2010	
Year	Assumed Age	Equity Exposure %								
2000	72	28.81	73	24.18	74	24.93	75	22.12	76	21.28
2005	67	49.83	68	46.59	69	47.23	70	44.78	71	39.79
2010	62	51.28	63	46.92	64	49.81	65	49.15	66	46.86
2015	57	58.11	58	53.08	59	52.31	60	51.80	61	47.91
2020	52	68.81	53	63.05	54	63.42	55	63.17	56	56.01
2025	47	71.37	48	66.74	49	67.59	50	69.40	51	63.84
2030	42	81.24	43	76.14	44	76.35	45	77.13	46	67.65
2035	37	81.7	38	77.78	39	78.88	40	79.72	41	74.64
2040	32	83.72	33	79.6	34	81.75	35	81.90	36	75.58
2045	27	86.83	28	81.57	29	82.57	30	81.63	31	76.82
2050	22	88.33	23	84.48	24	86.65	25	85.26	26	80.28

Table 1: Fidelity Freedom Funds Equity Exposures

Source: Ibbotson Associates and Morningstar DirectSM

Notice in Table 1 that each age (ranging from 22 to 76 in this case) is only represented once. For target date fund families with a fund every five years, the age cycle only begins to repeat after five years severely limiting the number of equity exposure observations for a given age, and hence, our ability to calculate glide path variability. In order to dramatically increase our number of data points, at each point in time we use straight-line interpolation to infer the equity exposure for every single age in the applicable age range for all of the ages for which there is not a data point.³ For example, from the top left of Table 1 corresponding to the holdings of two funds from 12/31/2006 we observe that the Fidelity Freedom 2000 fund (corresponding to a 72-year-old) has equity exposure of 28.81% and the Fidelity Freedom 2005 fund (corresponding to a 67-year-old) has an equity exposure of 49.83%. Using strait line interpolation we infer that a 68-, 69-, 70-, and 71-year-old would have had equity exposures of 33.01%, 37.22%, 41.42%, and 45.63%, respectively. Using this type of interpolation at the end of each calendar year enables us to have an estimated equity exposure for all of the possible ages regardless if the

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³ The method of interpolation described here was used for all of the fund families except ING Solution Portfolios. Prior to 2011, ING Solution Portfolios used a unique stair-step approach. Based on ING published materials we assumed that the step downs in equity exposure occurred at age 35, 45, 55, and 60. It appears that an additional step down occurs at age 62.5, but at the time of this writing ING did not offer a 2010 fund and the assumed 2015 fund investor has not yet reached age 62.5.

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fund family in question has funds at 5- or 10-year intervals. This also provides us with significantly more data points when applying quantitative measures of glide path stability.

Armed with annual equity exposures for each possible age for each year that a given target date fund family was in existence, we can calculate a variety of glide path statistics. For the 21 fund families for which Morningstar currently offers a qualitative in-depth analysis, Table 2 reports the maximum, average, and minimum equity exposure for ages 30, 40, 50, 60, and 70 over the history of the fund. The "NA" indicates that the equity exposure for that age was not available. The final column identifies if the fund family has an income fund.⁴ In almost all cases, the difference between the maximum and minimum equity exposure for a particular fund family is quite large. The one exception is the T. Rowe Price Retirement Funds family. The wide ranges for the bulk of the fund families highlight the significant changes that have occurred overtime. This is alarming given that most individuals investing in target date funds typically expect a steady and consistent glide path as they grow older.

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⁴ As a reminder, given the ambiguity of the age of an "Income" fund investor, we have excluded them from our analysis and not interpolated equity exposure between the "lowest dated" fund and the Income fund; thus, it is possible that some of the fund families receiving an "NA" at age 70 do in fact have a fund for a 70 year old.

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Table 2: Glide Path Equity Exposure Range							
Fund Family		Age 30	Age 40	Age 50	Age 60	Age /U	income fund
AllianceBernstein Retirement Strategy	Max	97.8	95.8	82.8	70.0	53.0	
	Average	94.4	92.1	80.6	66.5	49.6	No
	Min	92.0	87.1	/3.0	55.8	38.4	
American Century LIVESTRUNG	Max	80.4 79.5	73.4 70.9	63.2 59.2	48.3 48.3	NA NA	Yes
	Min	79.0	69.8	57.7	48.3	NA	100
American Funds Target Date Retirement	Max	83.8	82.1	74.9	62.1	NA	
	Average	80.7	79.5	74.0	56.9	NA	No
	Min	77.5	76.8	72.6	51.6	NA	
BlackRock LifePath	Max	92.7 80.8	81.0 70.1	66.8 65.3	NA	NA	Voc
	Min	87.7	76.8	63.2	NA	NA	163
DWS LifeCompass	Max	NA	94.8	95.7	63.5	NA	
	Average	NA	91.6	77.7	63.5	NA	Yes
	Min	NA	87.7	57.2	63.5	NA	
Fidelity Adviser Freedom	Max	85.2	82.3	69.2	51.4	38.9	
	Average	82.4 76 F	/8./	60.0	48.9	38.9	Yes
Eidelity Freedom	IVIII Max	70.0	74.1	70.2	52.6	30.9	
	Average	82.1	oz.o 76 1	70.Z 63.8	52.0 44.7	40.Z 34.9	Yes
	Min	76.8	65.9	54.7	34.3	24.8	100
ING Solution	Max	93.9	86.6	75.6	42.9	NA	
	Average	88.0	79.8	68.8	42.9	NA	Yes
	Min	74.2	65.9	53.8	42.9	NA	
John Hancock Lifecycle	Max	93.1	92.3	80.4	61.1	NA	
	Average	90.b 97.0	89.3	78.2 76.2	58.2	NA	Yes
ID Margan SmartDatiromant	IVIII Max	07.9	07.9	70.Z	20.7		
JP Worgan Smarketrement	Average	04.3 82.1	82.6	68.8	49.0 46.8	NA	Yes
	Min	79.4	77.5	64.8	42.6	NA	
MassMutual Select Destination Retirement	Max	97.1	88.6	80.4	62.5	NA	
	Average	92.7	84.6	69.0	52.2	NA	Yes
	Min	90.0	80.1	57.1	38.9	NA	
MFS Lifetime	Max	100.0	100.0	78.6	43.0	NA	V
	Average	93./	91.8	/3.5	39.7 27.6	NA	Yes
Opportunition	IVIII Max	07.3	03.0	07.0	37.0		
	Average	90.1 89.3	00.4 85.2	05.7 82.0	73.5 67.6	NA	No
	Min	88.4	85.1	75.5	62.3	NA	
Principal LifeTime	Max	89.0	83.4	75.3	64.7	NA	
	Average	82.3	75.1	65.8	58.3	NA	Yes
	Min	68.5	57.9	47.3	48.2	NA	
Putnam RetirementReady	Max	90.3	80.9	67.5	26.3	NA	
	Average	80.5 72 7	/5.5 57.4	59.4 40.7	20.3 26.2	NA	Yes
Schwah Targat	Max	77.0	9/ 2	71.0	61.7		
	Average	77.9	75.6	67.9	56.8	NA	No
	Min	77.9	70.1	63.3	50.0	NA	
TIAA-CREF Lifecycle	Max	89.8	88.1	74.1	58.2	NA	
	Average	85.5	79.8	67.2	54.0	NA	No
	Min	78.4	68.7	58.9	46.9	NA	
T. Rowe Price Retirement	Max	89.8	88.7	78.3	64.9	47.2	V
	Average	00.5 96.7	07.Z	/0.0 75.1	0J.0 61.0	4/.Z	res
Vanguard Target Retirement	Max	00.7 20.2	00.4 QQ 1	7/1 2	UI.9 50.0	4/.2	
vanyuaru tatyet netirement	Average	09.3 86.0	79.1	74.3 65.3	50.9 50.7	34.3 34.3	Yes
	Min	80.2	64.8	51.3	38.0	34.3	
Vantagepoint Milestone	Max	91.6	88.3	72.6	57.1	NA	
	Average	89.2	82.4	69.0	48.8	NA	Yes
	Min	86.8	80.3	67.1	45.8	NA	
Wells Fargo Advantage Dow Jones Target	Max	90.9	80.3	67.9	45.6	NA	
botson	Average	83.9 60 0	/2.4 50.0	53.8 25.6	3∠.b วว ว	NA NA	Yes
	iviin	0ö.Z	JJ.J	30.0	<u>ک.</u> ۲	NA	

Turning to potential quantitative measures of glide path stability, Table 3 reports the average standard deviation of the equity exposures over time and the average (absolute) change in equity exposure per year. The average standard deviation of the equity exposures over time is arrived at by calculating the standard deviation of the equity exposures for each possible age (e.g. 20 through 75) for each of the years that the fund existed (e.g. 2010, 2009, 2008, etc.) and then calculating the average of those standard deviations. Somewhat similarly, the average (absolute) change in equity exposure per year is arrived at by determining the average absolute change in equity exposure for each possible age (e.g. 20 through 75) for each of the years that the fund existed (e.g. 2010, 2009, 2008, etc.) and then calculating the average of those average absolute year-over-year changes. The average (absolute) change in equity exposure per year seems extremely intuitive and is our preferred measure of glide path stability; thus, we refer to it as the Glide Path Stability Score (GPSS). Both measures of stability are reported over the previous three years and since inception. Low numbers indicate greater stability and higher numbers indicate less stability. As a rough quide for GPSS ranges, scores below 1.5 are stable, between 1.5 and 3.0 are somewhat unstable, and scores beyond 3.0 are progressively more unstable.

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Fund Family Name	Start Year of Data	Avg Standard Deviation (3-Year)	Avg Standard Deviation (Inception*)	(Absolute) Change Per Year (3-Year)	(Absolute) Change Per Year (Inception*)
AllianceBernstein Retirement Strategy	2006	5.22	4.12	3.26	2.79
American Century LIVESTRONG	2005	2.05	1.65	2.08	1.53
American Funds Target Date Retirement	2007	3.07	3.13	2.94	2.94
BlackRock LifePath	2004	1.19	1.66	1.08	1.30
DWS LifeCompass	1997	4.36	8.35	3.09	4.61
Fidelity Adviser Freedom	2004	2.86	2.34	2.26	2.03
Fidelity Freedom	1996	2.56	4.77	2.58	3.32
ING Solution	2005	3.22	7.40	3.94	6.05
John Hancock Lifecyle	2006	2.39	2.00	2.39	2.35
JP Morgan SmartRetirement	2006	1.95	3.28	3.14	3.50
MassMutual Select Destination Retirement	2004	2.88	6.91	2.30	2.94
MFS Lifetime	2005	3.93	4.04	2.62	2.46
Oppenheimer Transition	2007	3.75	3.67	2.83	2.96
Principal LifeTime	2001	2.95	7.76	3.05	3.73
Putnam RetirementReady	2004	9.97	7.63	6.06	4.08
Schwab Target	2005	5.43	4.33	4.11	3.23
TIAA-CREF Lifecycle	2004	1.17	6.49	1.06	2.46
T. Rowe Price Retirement	2002	0.81	1.03	0.81	1.02
Vanguard Target Retirement	2003	0.44	8.58	0.52	2.62
Vantagepoint Milestone	2005	4.20	3.66	3.29	2.45
Wells Fargo Advantage Dow Jones Target	1994	1.25	7.37	1.39	4.62

Source: Ibbotson Associates and Morningstar DirectSM

Continuing to focus on the largest three fund families the fund family with the lowest GPSS since inception (the final column) is T. Rowe Price with 1.02 percentage points. Relative to the T. Rowe Price Retirement Fund family, the Fidelity Freedom Fund family's GPSS since inception is more than three times greater with an average (absolute) change per year of 3.32 percentage points. Vanguard's GPSS since inception is in the moderate range at 2.62 percentage points. During the past three years, the Vanguard Target Retirement Fund family had the lowest GPSS at 0.52 percentage points. Moving outside of the largest three fund families, BlackRock had the 2nd lowest GPSS since inception, posting a 1.30. The 2nd lowest three year GPSS belonged to TIAA-CREF.

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Conclusion

The implied glide path is one of the main criteria investors and plan sponsors use to evaluate and select a target date fund family. Investors should select a more equity centric or less equity centric fund family based on risk tolerance and risk capacity. Plan sponsors typically use the current implied glide path to determine which fund family best fits their participant base. Unfortunately, the glide path that they "signed up for," the implied glide path at the time of the decision making process, may not be what they are actually receiving. While it is widely known—especially following the scrutiny target date funds received following the 2008 downturn—that the equity exposure of funds with the same target date vary significantly from one family to the next, investors and plan sponsors are less aware, arguably unaware, that the glide path from a single manufacturer can change dramatically over time, often with no explanation.

We highlight this important finding, demonstrating how much the glide paths from the major target date fund providers have changed over time and presenting a framework for scoring their stability based on standard deviation and average (absolute) change in equity exposure per year (Glide Path Stability Score). While glide path changes are not necessarily bad, we believe unannounced and unjustified changes in glide paths should be viewed with extreme scrutiny given investors and sponsors select these investments based on expectations of risk.

Hopefully the recognition that glide path stability is being monitored will encourage greater stability amongst providers and encourage them to provide proper disclosures and transparency around glide path changes. Additionally, these two new quantitative measures of glide path stability will help investors, advisors, and plan sponsors to monitor glide path stability moving forward.

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