Construction Rules for Morningstar Asset Allocation Index Family

Morningstar Methodology Paper

Version 1.2 – April 28, 2015

Contents

Introduction

Individual investors are driving strong demand for retirement investment products thanks to increases in longevity, increases in post-retirement expenses such as healthcare, and shrinking income streams from corporate pensions and government entitlements. The financial services industry recognizes this demand and offers a growing line of funds that incorporate professional asset allocation advice to help investors meet their goals. Unlike single asset-class funds, asset allocation funds have unique properties that can make benchmarking complex. Fiduciaries and investors alike are grappling with the issue of how to choose and evaluate today's asset allocation securities.

Morningstar has developed a group of asset allocation indexes to support product benchmarking efforts across two dimensions:

- Strategy – decades of internal research and interviews with industry experts underpin Morningstar's definition of lifetime asset allocation best practices. The indexes are designed to offer solutions that help investors mitigate the challenges related to rising life expectancies, evolving risk appetites, inflation in major retirement expense categories, and post-retirement income investing.
- Performance Measurement – there are several established principles to follow when designing a benchmark index to track investment performance. Key design principles embedded in Morningstar's asset allocation indexes include:
    - Transparency – Morningstar indexes are rules-based to provide a level of continuous transparency that committee-based indexes are not able to offer
    - Comprehensive – global asset coverage for an optimal efficient frontier
    - Investable – Morningstar index security selections pass liquidity and pricing screens to ensure index accuracy and promote index replication
    - Seamless asset-class representation – index building blocks from one source enhance attribution analysis by eliminating asset-class overlap
    - Expense efficiency – the passive, low turnover nature of the asset allocation index family provides a benchmark for both investors and product developers.

The Morningstar Asset Allocation Indexes

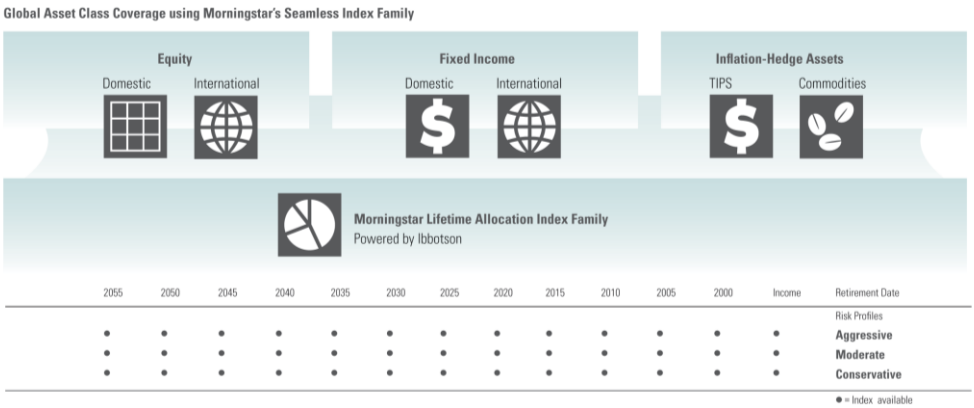
Overview

Morningstar Asset Allocation Indexes exist to meet the benchmarking needs of target-date and target-risk investors. There are two main components to these indexes – the asset allocation methodology and the security selection methodology. Morningstar uses asset allocations created by Ibbotson Associates for all the indexes. The security selection methodology is defined by the rules-based methodology applicable to each Morningstar Index in the constituents list. Conceptually, the Morningstar Asset Allocation Indexes are indexes of indexes.

Morningstar Lifetime Allocation Index Family

Morningstar has combined the principles of Ibbotson's asset allocation methodology with its family of asset class index building blocks to create a family of asset allocation indexes that serve investors for a lifetime, not just up to the retirement date.

Figure 1: Morningstar Global Index Family

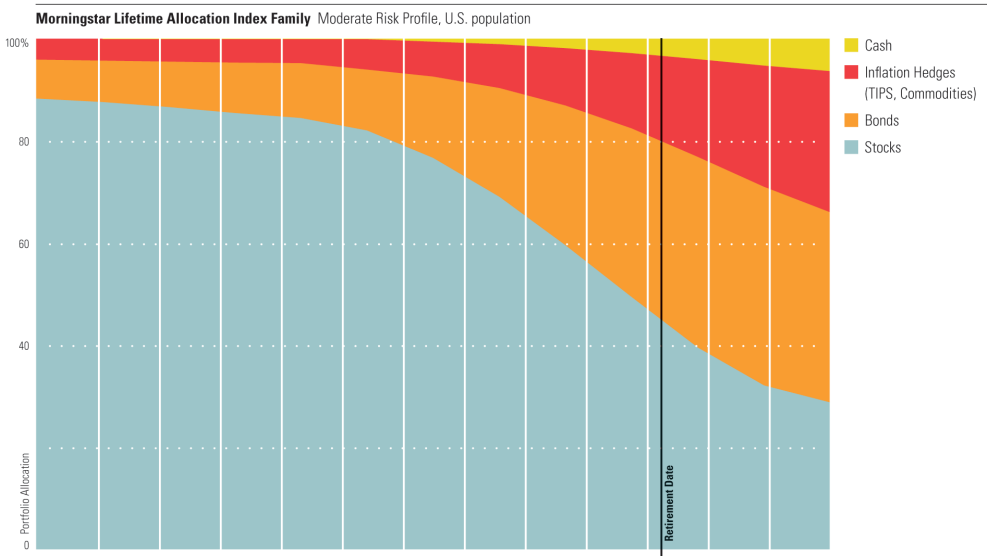


The Morningstar Lifetime Allocation Index family consists of three categories of indexes - aggressive, moderate, and conservative - to provide appropriate target date risk tracks based on an individual's risk capacity and risk preference. Within each risk category there are indexes ranging from 2055 target retirements to an Income allocation covering 1995 and earlier retirements, spaced in 5-year increments. The 2055 to 2010 indexes cover pre-retirement accumulation needs. The 2005, 2000 and Income indexes cover the distinctly different asset allocation needs of investors who are in various stages of their retirement years. Morningstar will maintain a rolling set of 10 accumulation indexes and 3 retirement-income indexes in each risk preference category going forward.

The resulting Morningstar Lifetime Allocation Indexes deliver the features investors and fund manufacturers need when it comes to investing for a lifetime:

- Allocations grounded in capital markets assumptions and financial theory rigorously developed over several decades
- A family of asset class specific constituent indexes seamlessly engineered to provide style-pure exposure to respective asset classes in a low-cost, investable, and daily priceable manner
- A comprehensive set of asset classes that deliver exposures to not just global equities but global fixed-income and inflation-fighting assets as well
- An adequate number of sub-class allocations that deliver true tactical allocation options where appropriate

Figure 2: Morningstar Lifetime Allocation Index Glide Path



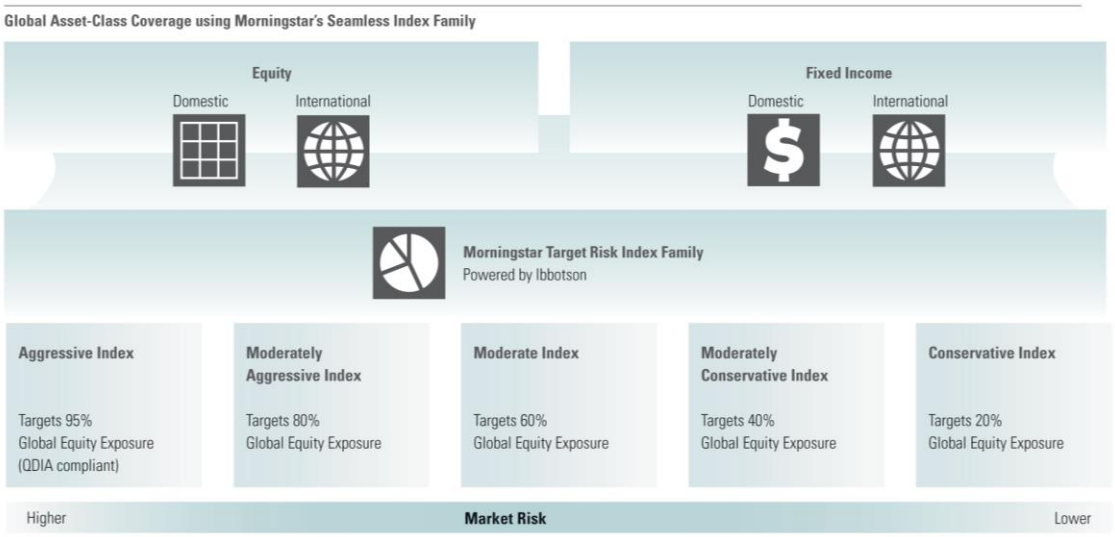
Retirement Date	2055	2050	2045	2040	2035	2030	2025	2020	2015	2010	2005	2000	1995
Age Today (2009)	19	24	29	34	39	44	49	54	59	64	69	74	79
Stocks %	89	89	89	88	86	81	73	63	53	45	39	35	32
Bonds %	7	7	7	8	9	13	19	27	33	36	38	37	35
Inflation Hedges %	4	4	4	5	5	6	7	9	12	16	19	23	27
Cash %	0	0	0	0	0	0	1	1	2	3	4	5	6

Source: Ibbotson

Morningstar Target Risk Index Family

The Morningstar Target Risk Index family is designed to meet the needs of investors who would like to maintain a target level of equity exposure. The index family provides global equity market risk levels that are scaled to fit five equity market risk profiles: aggressive, moderately aggressive, moderate, moderately conservative, and conservative.

Figure 3: Target Risk Indexes



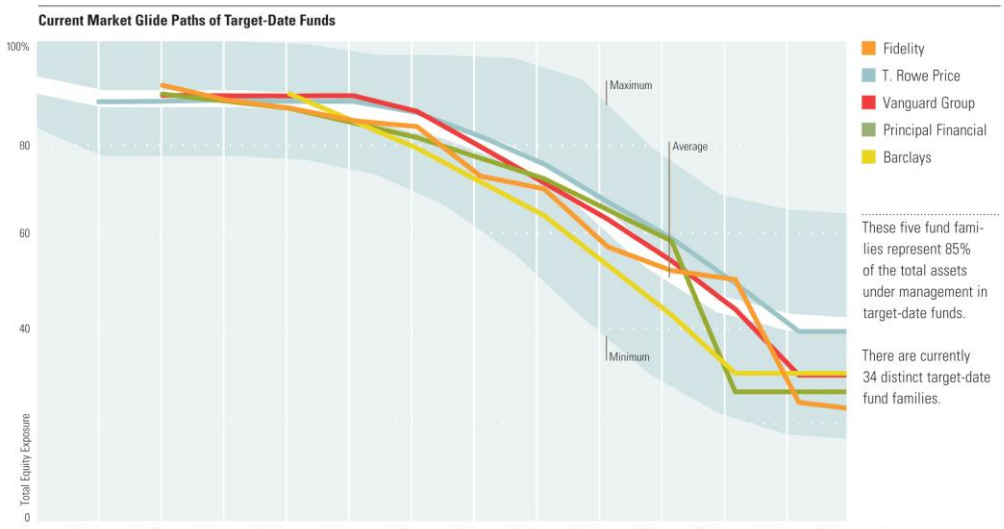
Methodology

The Ibbotson Lifetime Allocation Methodology

The industry approach to target-date funds initially was to allocate a majority of assets to equities early on, with the remainder in various interest-bearing assets such as bonds and cash. The percentage in equities was reduced over time and allocated to the other, usually safer, asset classes as the investor nears the retirement date. This adjustment in asset-class exposure over time is referred to as a glide path. An automatic adjustment designed to reduce risk over time is the central theme of a target-date index or fund.

A review of existing target-date funds reveals a fairly wide variety of glide path strategies for equity exposure.

Figure 4: Equity Glide Paths of the Largest Target-Maturity Families



Retirement Date	2055	2050	2045	2040	2035	2030	2025	2020	2015	2010	2005	2000	1995
Age Today (2009)	18	23	28	33	38	43	48	53	58	63	68	73	78
Minimum %	81.0	80.6	79.6	77.5	72.1	62.7	51.5	41.5	34.2	28.6	23.9	20.3	18.1
Average %	89.0	88.8	88.5	87.9	86.2	81.5	73.1	62.5	52.5	44.8	39.1	34.8	32.1
Maximum %	93.0	92.8	92.7	92.5	92.1	90.9	87.1	79.8	70.3	61.1	53.8	48.4	44.8

Source: Ibbotson; data as of 03-31-09

The breadth of this equity allocation range raises a question: how were these allocations determined? The answer is, in the beginning, most target-date funds appear to have borrowed various risk profiles from their target-risk cousins and combined them with "60/40" or "100-minus-your-age"-type heuristics.

The industry quickly evolved and equity exposures converged during the early years to more aggressive profiles with bigger returns. The strategies continue to remain diverse in the later years as the industry grapples with finding the appropriate transition formula to move investors from the accumulation phase to the post-retirement income phase.

The intra-equity allocations between value vs. growth, domestic vs. international, and large cap vs. mid/small are also diverse. The fund architect that sets the mix usually has a sound reason for why the sub-asset class is a legitimate addition, but the rationale behind how much to allocate to that asset class remains opaque in many cases.

The non-equity allocations may also have some enhancements; adding international debt and minimizing cash levels are two popular decisions. Some funds may also add a small percentage of alternative assets such as real estate, TIPS or commodities to fight inflation and provide the portfolio with a return that is uncorrelated to equities or bonds.

Security selection to represent each allocation is another important topic. Most target-date funds embrace actively managed funds for their security selections as a potential incremental source of return. Some funds advocate using passively managed investments such as index funds, asserting the lower expense ratios offset potential outperformance from active management.

Industry research and Morningstar's ongoing analysis of active and passive fund managers lead us to believe that it will likely be asset allocation, not security selection that drives a significant portion of a target-date portfolio's return over time (Ibbotson, Kaplan 2000). It is likely, however, that some fund providers will deliver outperformance with active security selection from time-to-time.

Given the wide variety of frameworks guiding asset allocations today it is natural, with so much at stake for investors, to wonder who's right. Ibbotson Associates believes there are numerous right answers and glide path diversity is beneficial. The right answer is really relative to the individual investor's situation.

Understanding that situation starts by understanding *human capital*. For younger investors, human capital is typically the individual's most valuable asset. It is defined as the present value of a person's future earnings. The details can vary, but basically human capital - the ability to work and earn money over time - is like a giant bond that should provide the individual with relatively stable cash inflows. The phrase "relatively stable" is used because business cycles, job skills, structural industry changes, and personal quirks can all help or hinder income flow

periodically. The dependability of an average human's bond-like income stream is therefore not usually investment grade, but rather "junk-bond"-like in reality. Not a welcome comparison perhaps, but necessary so the right planning can take place.

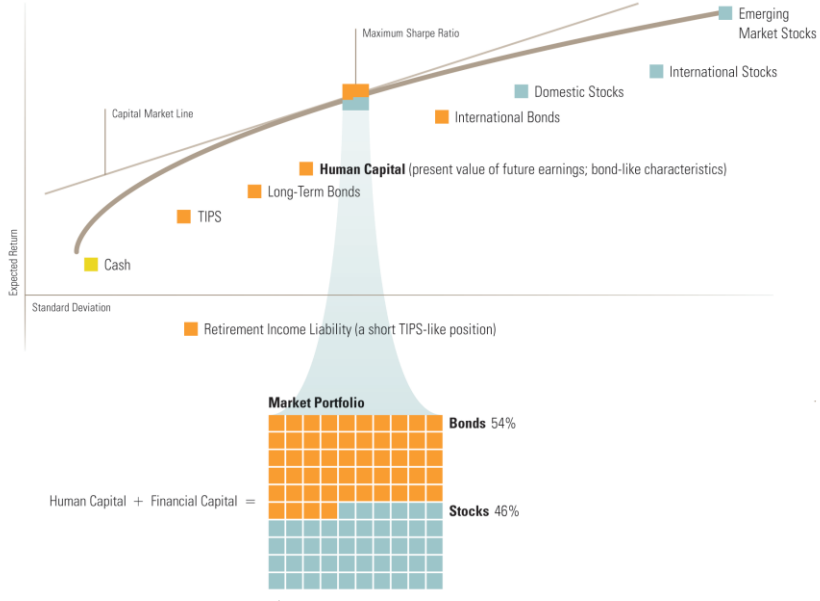
Due to this overweighting in bond-like, untradeable human capital, younger investors are counseled to invest the vast majority of their retirement savings, or financial capital, in equities to create a balanced overall portfolio.

How much equity is appropriate? Ibbotson starts with a high-level perspective that determines both an investor's capacity and preference for risk.

Some investors, such as tenured professors, have secure jobs with stable income. Ibbotson defines these investors as those with safe human capital who have the capacity to take on a little more investment risk. Investors with jobs in cyclical industries or those with high levels of variable compensation fall into Ibbotson's risky human capital category. These investors theoretically have a lower capacity for investment risk when it comes to retirement savings. The average investor falls in the middle, with average human capital.

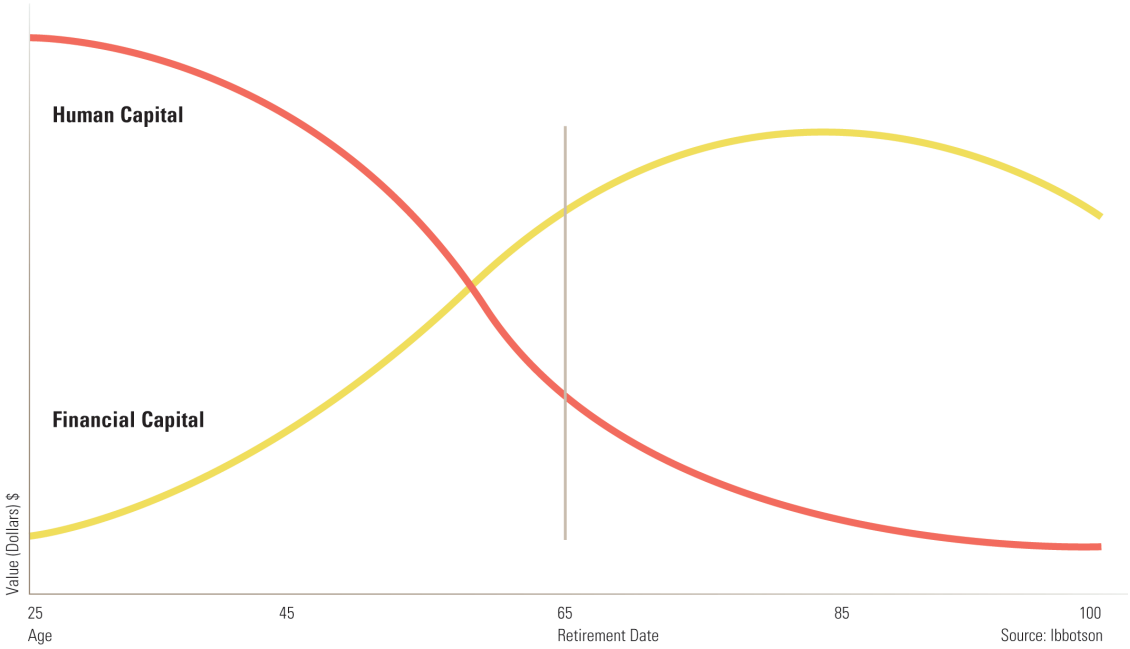
To provide solutions beyond arbitrary glide paths or one-size-fits-all solutions, Ibbotson has conducted a significant amount of research on lifetime asset allocation. The Ibbotson model combines Modern Portfolio Theory (MPT) with annual government survey data on investor wealth, income and savings trends to define the optimal portfolio of global securities that theory says investors should hold over a lifetime. This mix is called the "market portfolio" – currently defined as 54% bonds and 46% equities. According to MPT, this all-inclusive portfolio has the best risk and return characteristics of all possible portfolios; all investors should invest in this market basket, levering it up or down to meet their particular risk appetite.

Figure 5: Ibbotson Methodology – Grounded in Modern Portfolio Theory



The Ibbotson model then isolates the human capital portfolio from the market portfolio to solve for the financial capital portfolio that brings the investor's total economic worth closest to the target. For a typical investor, the proportion of their total economic worth that is represented by human capital decreases over time. The decreasing proportion of the investor's total economic worth represented by bond-like human capital creates a parallel need to adjust the asset allocations in the financial capital portfolio. This evolution is depicted in Figure 6.

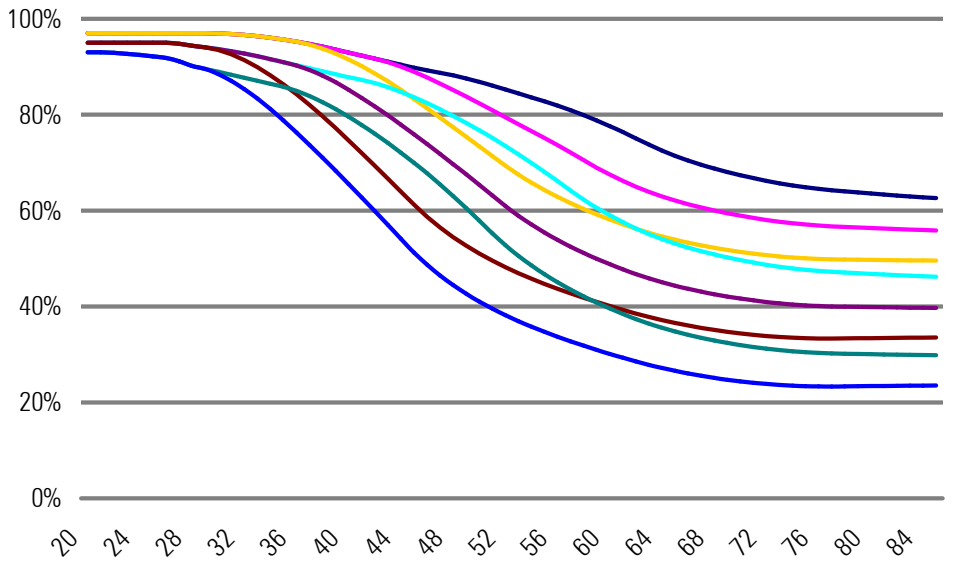
Figure 6: Human Capital and Financial Capital Trends



Ibbotson estimates the median amount of human capital and financial capital for U.S. investors age 18 to 95. Coupling these estimates with the target market portfolio, leads to the standard or moderate glide path for a typical U.S. investor.

Changing the characteristics of human capital, making them either more bond-like or less bond-like, or altering the target market portfolio to account for investors with different risk preferences leads to an infinite number of possible optimal glide paths under this framework. Figure 7 depicts some of the possible glide paths one obtains by altering these inputs.

Figure 7: Possible Optimal Glide Paths



It is worth noting that the range of possible glide path depicted in Figure 7 is extremely similar to the range of currently available glide paths depicted earlier in Figure 4. Given this wide range of possibilities, we now face the difficult, and unfortunately subjective, decision of settling on a specific set of assumptions for the three risk profile series in the Morningstar Lifetime Allocation Index benchmarks.

We have established that the two key dimensions that affect the glide path are risk capacity (e.g. human capital characteristics) and risk preference. This enables one to construct custom glide paths for individuals or specific populations (e.g. a specific retirement plan). Additionally, we have shown that by making reasonable moves away from Ibbotson's average investor human capital model of 70% bonds and 30% stocks and by altering Ibbotson's estimate of the overall market portfolio of 54% bonds and 46% stocks lead to multiple possible glide paths that cover the spectrum of glide paths currently available in the market place.

High risk capacity in the form of safe human capital or a high risk preference leads to an aggressive glide path. Putting the two together – high risk capacity and high risk preference –

leads to a very aggressive glide path. Conversely, low risk capacity in the form of risky human capital or a low risk preference leads to a conservative glide path. Putting the two together – low risk capacity and low risk preference – leads to a very conservative glide path.

Ultimately, the Index Committee had to rely on profession judgment when establishing assumptions for the three risk tracks. For the moderate glide path, Ibbotson's average investor human capital model of 70% bonds and 30% stocks and Ibbotson's estimate of the overall market portfolio of 54% bonds and 46% stocks were used. The aggressive glide path follows a human capital model of 80% bonds and 20% stocks, while the conservative glide path uses a human capital model of 60% bonds and 40% stocks. The target market portfolio remains the same 54% bonds and 46% stocks in both cases.

These assumptions reflect the Index Committee's desire to 1) use "reasonable" assumptions believed to correspond with the risk capacity and risk preference of the majority of investors, 2) result in unique glide paths with substantive risk and return differences, and 3) create benchmarks representing the spectrum of different glide paths in the market.

The glide paths also reflect constraints on the maximum and minimum allowable equity allocations. The constraints are most prevalent (and binding) at the left side of the glide path when Ibbotson's methodology would typically recommend 100% equities. The Department of Labor has come out "firmly" to say that solutions with a 100% equity allocation or 100% fixed-income allocation do not qualify as a qualified default investment alternative (QDIA). To qualify as a QDIA there must be a 'mix' of equity and fixed-income exposure. As a result, the most aggressive glide path is limited to 97% equities. The moderate glide path is limited to 92% equities. And, the conservative glide path is limited to 85% equities.

The Ibbotson Target Risk Methodology

For over thirty years Ibbotson Associates has been a leading developer of target risk asset allocation models. Ibbotson Associates opened its doors in 1977 to bridge the gap between modern financial theory and real-world investment practice. Professor Roger G. Ibbotson, the company's founder, pioneered the collection of the requisite historical data used in asset allocation and quantified the benefits of diversification.

Many of the methodologies used to create the target risk asset allocation models are discussed in greater detail in the Stocks, Bonds, Bills and Inflation annual year book.

Based on the available asset classes in the Morningstar Index family, Ibbotson has defined five asset allocations ranging from conservative to aggressive. These asset allocations support a family of target risk indexes that adequately cover the risk and return spectrum.

To create the asset allocation for the benchmarks, Ibbotson employs mean-variance analysis and re-sampled mean-variance analysis to evaluate and to help determine appropriate asset allocation. Mean-variance optimization refers to a mathematical process that calculates the asset class weights that provide an asset allocation combination with the maximum expected return for a given level of risk; or, conversely, the minimum risk for a given expected return.

The inputs that drive the optimization are the capital market assumptions. Ibbotson's industry-leading methodology for forecasting asset class optimization inputs grew out of the pioneering work of Roger Ibbotson and Rex Sinquefield in the 1970s. During the last 30 years, Ibbotson has continued to refine this process while maintaining a stable and consistent methodology.

Ibbotson uses a "building block" approach, combining historical relationships with current market expectations to generate expected returns. The "building block" approach separates the expected return of each asset class into three key components: a real risk-free rate, an estimate of future inflation, and a specific premium that make the return of the asset class commensurate with its risk level. A different premium is calculated for each asset class in the expected return development process.

Ibbotson chooses robust asset allocation models that are very close to the frontier under many different economic and investment performance scenarios rather than taking asset allocation combinations directly from any one mean-variance efficient frontier. This sensitivity analysis ensures that the characteristics of the asset allocation models will be relatively stable over time. Because it is highly likely that there will be some uncertainty in forecasts, stable asset allocations minimize the need for frequent changes to the asset allocation models.

Ibbotson believes strongly in the benefits of diversification. All else equal a larger opportunity set of investable asset classes should result in an efficient frontier with improved risk and return characteristics. The Morningstar family of individual asset class indexes allows Ibbotson to

construct asset allocation models that should produce long-term risk and return characteristics that represent best-in-class benchmarks.

Morningstar's Asset Allocation Index committee oversees the creation of the target-risk benchmarks. The target risk asset allocations are updated annually in June. At least one month prior to the update (the Scheduled Reconstitution Date), any changes to the benchmark weights will be announced. To insure predictability in the index weights, the maximum year-over-year change in the indexes' asset allocations is set at 2 percentage points per asset class, with one exception. The exception occurs when an asset class is either added or deleted from an index. In the unusual case of an addition or deletion of an asset class, the weights of the asset classes will be appropriately rescaled proportionately and the 2 percentage point per asset class maximum change will by applied to the rescaled weights.

Construction Rules

Overview

The Morningstar Lifetime Asset Allocation Index family consists of three groups of indexes - aggressive, moderate, and conservative - to provide appropriate target date risk tracks based on an individual's risk capacity and risk preference. Within each risk category there are a series of asset allocation indexes ranging from 2055 target retirements to an Income allocation covering 1995 and earlier retirements, spaced in 5-year increments. The 2055 to 2010 series covers pre-retirement accumulation needs. The 2005, 2000 and Income indexes cover the distinctly different asset allocation needs of investors who are in various stages of their retirement years.

Morningstar will maintain a rolling set of 10 accumulation indexes and 3 retirement-income indexes in each risk preference category going forward. Every five years a new index will be added in a five-year increment after the highest-year index present in the Morningstar series. At that time, the index with the lowest-year value will convert to the Income Index role and maintain a static asset allocation, subject to the annual reconstitution adjustments received from Ibbotson that are applied to all indexes in the Asset Allocation Index family.

The Morningstar Target Risk Index series consists of five indexes with five levels of global equity exposure set at 95%, 80%, 60%, 40%, and 20%. These target equity risk exposures will remain fixed; adjustments to the sub-asset class allocations will occur annually when Ibbotson provides updated allocations for all the asset allocation indexes that reflect Ibbotson's latest capital markets, asset allocation assumptions, and asset allocation guidelines.

Inception Dates and Base Market Values

The inception dates of the Morningstar Asset Allocation Indexes are December 31, 1998. Daily price and total return series are available from this date forward. The index base market values at inception are all 1,000.

Calculation and Dissemination of Index Values

Index values are calculated end-of-day and disseminated by Morningstar.

Index Value Currencies

The closing values of all Morningstar indexes are calculated in $US and converted to yen, pounds sterling, and Euro using an average of Reuters bid and ask price.

Scheduled Reconstitution Date

The Morningstar Asset Allocation Indexes are reconstituted—i.e., the index membership is reset—once annually. Adjustments are performed after the close of business on the third Friday of June and are effective on the following Monday. If Monday is a holiday, reconstitution occurs on the Tuesday immediately following.

Scheduled Rebalancing Dates

The Morningstar Asset Allocation Indexes are rebalanced—i.e. the security are adjusted—four times annually. Adjustments are performed after the close of business on the third Friday of March, June, September, and December. If Monday is a holiday, rebalancing occurs on the Tuesday immediately following.

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Index Constituents

Morningstar indexes utilized in the Asset Allocation family are listed below. The rules governing security inclusion into the index, index reconstitution/rebalancing, security splits/dividends/contract expirations and other index mechanics are detailed in the rulebooks that govern each index. These rulebooks are available on the Morningstar website at http://indexes.morninstar.com.

Constituent indices:

- Morningstar Large Cap Growth Index
- Morningstar Large Cap Core Index
- Morningstar Large Cap Value Index
- Morningstar Mid Cap Growth Index
- Morningstar Mid Cap Core Index
- Morningstar Mid Cap Value Index
- Morningstar Small Cap Growth Index
- Morningstar Small Cap Core Index
- Morningstar Small Cap Value Index
- Morningstar Developed Market ex-US Equity Index
- Morningstar Emerging Market Equity Index
- Morningstar Short-Term Core Bond Index
- Morningstar Intermediate Core Bond Index
- Morningstar Long-Term Core Bond Index
- Morningstar Global Ex-US Gov Bond Index
- Morningstar Emerging Market Composite Bond Index
- Morningstar Global Government Bond Index
- Morningstar TIPS Index
- Morningstar Long-Only Commodity Index
- Morningstar Cash Index

Data Correction and Precision

Intraday Index Data Corrections

Commercially reasonable efforts are made to ensure the correctness of data used in real-time index calculations. If incorrect price or corporate action data affects index daily high or lows, it is corrected retroactively as soon as feasible.

Index-Related Data and Divisor Corrections

Incorrect pricing and corporate action data for individual issues in the database will be corrected upon detection. In addition, an incorrect divisor of an index, if discovered within five days of its occurrence, will always be fixed retroactively on the day it is discovered to prevent an error from being carried forward. Commercially reasonable efforts are made to correct an older error subject to its significance and feasibility.

Computational and Reporting Precision

All calculated and adjusted data are stored in real numbers. For reporting purposes, index values are rounded to two decimal places and divisors are rounded to appropriate decimal places.

Undocumented Events

Any matter arising from undocumented events will be resolved at the discretion of the Morningstar Index Committee.

Morningstar Index Committee

The Morningstar Index Committee oversees all of the Morningstar Indexes. The committee seeks to create indexes of the highest quality that meet the recognized qualities of a "good benchmark." The individual asset class indexes and sub-asset class indexes are constructed using a purely mechanical transparent approach. The multi-asset class or mixed indexes of the Morningstar Asset Allocation Index Family are not the result of a purely mechanical transparent approach. The weights of Morningstar Asset Allocation Index Family are overseen by the Morningstar Index Committee. All Morningstar Indexes are constructed based on their respective published Construction Rules.

The following sections were modified:

Between Version 1.1 and 1.2

- Scheduled Reconstitution Date : The adjustment for reconstitution is made at the close of third Friday instead of the close of business day following third Friday

- Scheduled Rebalancing Date : The adjustment for rebalance is made at the close of third Friday instead of the close of business day following third Friday