

## **Ibbotson Managed Account and Advice Fund Selection and Portfolio Construction Overview**

Ibbotson Associates uses a proprietary system to construct fund specific portfolios for its advice and managed accounts services. Recent enhancements to this proprietary system will facilitate faster portfolio turnaround, better utilization of active managers and a more scalable process. A number of new processes have been created, including the formation of Ibbotson peer groups and a forward-looking alpha measure, to aid in better fund selection. Other processes have been improved or automated to improve efficiency and turnaround time. This document will serve to provide an overview of the entire process from start to finish of constructing the fund specific portfolios utilized in Ibbotson's advice services.

### **Asset Class Model Portfolios**

The most important decision in portfolio management is the asset allocation decision. Asset allocation is the practice of combining several asset classes together in a portfolio such that the risk and return tradeoff of the overall portfolio is better than any single asset class. Ibbotson Associates uses two major methods to determine the combination of asset classes that will maximize the return of a portfolio for any level of risk: Mean-Variance Optimization and Resampling.

Prior to assigning funds to a portfolio, asset class model portfolios are developed on an annual basis. Asset classes are chosen to represent the broad range of investable assets that can be implemented among available investment options. The selection of an asset class for inclusion in Ibbotson's advice services requires that there be significant benefit (generally through increased diversification) to adding the asset class to the model portfolios. In addition, investment options must be readily available within plans and provide significant exposure to the asset class for inclusion in Ibbotson's advice services. Recent additions to Ibbotson's asset class model portfolios are Treasury inflation-protected securities (TIPS) and direct real estate.

### **Benchmark Selection Rationale**

The selection criteria that Ibbotson uses in selecting our standard benchmark sets are based on the following criteria:

- 1) *Coverage and representation*: We prefer Indices that provide comprehensive coverage and fair representation of the market segment they covers.
- 2) *Objective methodology*: We prefer indices that are constructed based on objective, rules-based methodology.
- 3) *History*: We prefer indices that have long histories.
- 4) *Acceptance*: We prefer indices that are commonly accepted by money managers and consultants in the industry for which passive, low cost, implementation vehicles exist.

Indices that satisfy these above criteria form a solid foundation for using the index when constructing asset allocation and evaluating managers. These benchmarks are as follows:

<b><i>Asset Class:</i></b>	<b><i>Benchmark Indices:</i></b>
Large Capitalization Core	Russell 1000
Large Capitalization Growth	Russell 1000 Growth
Large Capitalization Value	Russell 1000 Value
Mid-Capitalization Core	Russell Mid-Cap*
Small Capitalization Core	Russell 2000
Small Capitalization Growth	Russell 2000 Growth
Small Capitalization Value	Russell 2000 Value
Small/Mid-Capitalization Core	Russell 2500*

Small/Mid-Capitalization Growth	Russell 2500 Growth*
Small/Mid-Capitalization Value	Russell 2500 Value*
International	MSCI EAFE
Emerging Markets	MSCI Emerging Markets Free
High Yield	LB High Yield
TIPS	LB TIPS
Long-term Bonds	LB LT Gov't/Credit
Short-term Bonds	LB 1-3 Year Gov't/Credit
Aggregate Bonds	LB Aggregate
REITs	NAREIT Equity
Direct Real Estate	MIT Transaction Based Index
Cash	CG U.S. Domestic 3 Mo Tbill

Please note that the above benchmarks are not all used together, but rather are available for the different complexity asset models. For instance, core benchmarks would not be used in conjunction with their growth and value counterparts.

*\*Though the Mid-capitalization benchmarks chosen are not mutually exclusive from the Large-Capitalization benchmarks, additional analysis of these indices supports their use as their return behavior is distinct. This distinct behavior can be attributed to the absence of the largest companies in these mid or small/mid capitalization benchmarks.*

### **Mean Variance Optimization**

Mean-variance optimization (MVO) refers to a mathematical process that calculates the security or asset class weights that provide a portfolio with the maximum expected return for a given level of risk; or, conversely, the minimum risk for a given expected return. The inputs needed to conduct MVO are asset class expected returns, expected standard deviations, and expected cross-asset class correlations. For his work in developing MVO, Harry Markowitz was awarded a share of the 1990 Nobel Prize in Economics.

When first developed, mean-variance optimization was applied (if at all) only to portfolios of individual stocks. Today, this technique is applied on an asset class level. This is appropriate for two reasons. First, the inputs required by the Markowitz model are more difficult to estimate for individual securities than they are for asset classes. Second, the range of asset classes available to investors is now much larger, especially given the increased willingness of U.S. investors to consider global investing.

The consequence of mean-variance optimization is a set of asset class weights that can be used as a long term guide for investing. This is often described as the portfolio's strategic asset allocation plan. The portfolio weights should be updated annually to reflect changes in estimates of the long-term parameters or different needs of the portfolio. However, if done correctly, these changes will likely result in small revisions in the portfolio composition.

Although the conceptual foundation of MVO is solid and its use has greatly enhanced the portfolio management process, it is difficult to implement properly. Uncritical acceptance of MVO output can result in portfolios that are unstable, counterintuitive, and ultimately unacceptable.

If the inputs (asset class expected returns, expected standard deviations, and expected cross-asset class correlations) are free of estimation error, MVO is guaranteed to find the optimal or efficient portfolio weights. However, the inputs are statistical estimates (created by analyzing current and historical data), and cannot be devoid of error. This inaccuracy will lead to overinvestment in some asset classes and underinvestment in others along with frequent shifts between asset classes.

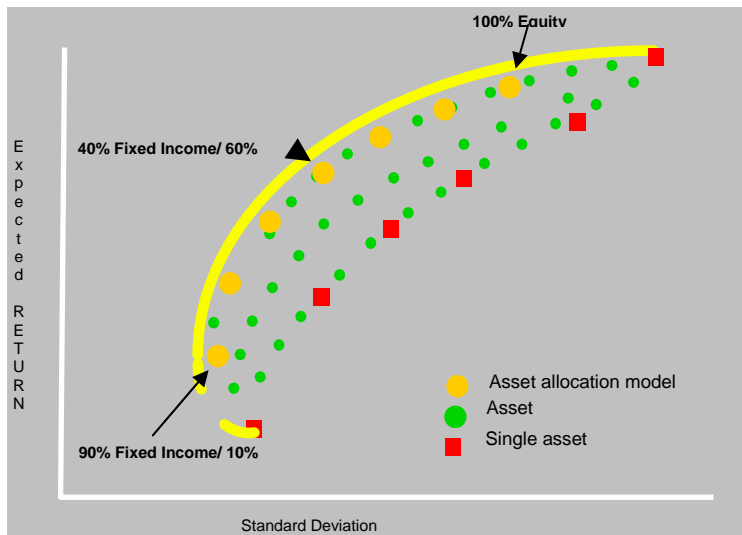
Ibbotson uses a variety of methods to minimize the effects of estimation error in the inputs by applying practical considerations to the results of the MVO and constraining certain allocations to limit the amount of overweighting or underweighting to certain asset classes. Ibbotson Associates conducts resampling to mitigate the impact that estimation error can have on the asset allocation targets. Further, Ibbotson conducts sensitivity analysis to ensure the stability of the portfolio recommendations under a variety of market scenarios.

**Resampling**

Resampling is a statistical procedure that reduces the sensitivity of optimization to forecast inaccuracies and increases the stability and intuitiveness of the resulting asset allocations. Conceptually resampling combines mean-variance optimization with Monte Carlo simulation. Monte Carlo simulation generates thousands of variations of the original inputs, creating thousands of simulation frontiers based on each set of simulated inputs, and ultimately, one final resampled frontier based on an average of all simulated frontiers. By incorporating multiple possible scenarios for asset class performance, resampling considers a wider range of outcomes and creates a more robust efficient frontier. The portfolio allocations found on a resampled frontier are less sensitive to imperfections in performance forecasts and tend to be more diversified.

Using the resampled portfolios as a starting point, Ibbotson adjusts the portfolios, if necessary, to reflect qualitative factors, such as practical restrictions. The resulting portfolios are feasible investment options that reflect Ibbotson’s experience in building long-term allocations.

Finally, Ibbotson tests the portfolios by plotting them in the space of the resampled frontier. The portfolios remain close to the frontier under a variety of scenarios, including scenarios with varying performance assumptions. These scenario tests Portfolio Management Methodology demonstrate the valuable combination of theoretical knowledge and practical experience in building investment portfolios.



Ibbotson constructs seven model portfolios as depicted by the orange dots on the above graph. These resampled portfolios are slightly below the efficient frontier, but are more robust as described above. They represent portfolios from most conservative to most aggressive. Portfolios are spaced by the change in standard deviation (risk) from one portfolio to the next. The goal is to ensure that the risk spread between each portfolio is relatively equal (i.e., there is no benefit in offering five to seven portfolios if

they all have similar risk characteristics). Because standard deviation estimations are based on historical data, they are more stable than nominal return estimations (which rely partly on current inflation expectations as expressed in the treasury yield curve). As a result, Ibbotson prefers to base “spacing” upon the variable that will change least from year to year. This helps to ensure that the target portfolios will not experience a drastic shift in asset class weightings from one year to the next.

### **Returns Based Style Analysis**

Returns-based style analysis (RBSA) is a method used to examine the performance of a fund in relation to a number of benchmarks. RBSA does not show the actual holdings of the fund; rather it measures the return behavior of a fund and attributes it to any number of selected benchmarks. RBSA allows the investment advisor or analyst to uncover the underlying fund exposures to various asset classes.

RBSA is a quadratic programming approach that is similar to a multiple regression. This approach incorporates two constraints: first, the coefficients of the regression must sum to 100 percent and second, the coefficients must be positive. RBSA compares a fund’s returns to a comprehensive set of market benchmarks over some period. If the fund’s style is relatively stable, this approach can provide a reasonable forecast of the style in the future. Ideally, the set of benchmarks should fully reflect the investing universe, but be mutually exclusive.

RBSA demonstrates the risk investors may actually experience while holding a fund. In this sense, the actual holdings are less important than how the fund behaves. If the securities contained in a fund behave differently than the asset class the securities are associated with, there may be additional risk inherent in the fund. Return behavior captures the risk the investor realized, as opposed to the actual holdings.

The R-square statistic evaluates the explanatory power of the RBSA model. The R-square statistic represents the percentage of fund return variation that the RBSA model explains. Index funds generally have high R-square statistics because they attempt to replicate passive benchmarks. Hedge funds usually have low R-square statistics.

### **Peer Grouping - *New***

Peer groups are needed to perform two key functions; 1) to calculate Forward Looking Alpha (described in detail later) and 2) to screen large lineups of funds to a more manageable and better sub-set of funds. Both of these functions improve the fund selection process.

Ibbotson begins by evaluating funds based on their Morningstar Category (if available). The category is validated through a series of regression analyses against sets of benchmark returns, returns based style analysis. The Morningstar Category determines which set of benchmarks is used in the initial regression. Based on this initial regression result, R-square and benchmark exposures, the fund may be sent for further regression analysis to better determine the appropriate peer group. If the R-square of the final regression is greater than or equal to 65, then the peer group is assigned. If through all sets of regression analysis, the fund does not achieve an R-square of 65 or greater, then the fund is unclassified and may not be used.

If an investment option is not a public fund or does not have a Morningstar Category, the same process is followed, but the initial set of benchmarks used in the regression analyses is a general set. Again the investment option goes through a series of regression tests to determine the best peer group fit.

### **Forward Looking Alpha - New**

Ibbotson has developed a method designed to improve the forward looking predictability of a fund's alpha. This forward looking alpha measure differs from a traditional historical alpha in several ways. First, traditionally alpha is measured through regression analysis using historical returns over a given period of time. The forward looking alpha measure uses regression results over two historical periods of time. Secondly, the forward looking alpha uses an investment option's peer group average alpha to normalize its alpha. Lastly, forward looking alpha uses statistical confidence of the regression results to weight the various alpha measures.

The two time periods evaluated are 12 and 60 months in separate regressions. The resulting alphas from these regressions are then weighted based on the statistical confidence of the regression. This creates an alpha measure that awards managers for consistent performance over both the short and long period.

Lastly, the short/long alpha is shrunk towards the average alpha for the investment options peer group. Again, the statistical confidence of the investment option's alpha is used. More weight is given to the peer group average alpha when the statistical confidence in the fund's alpha is lower. Conversely, more weight is given to the fund alpha when the statistical confidence measure is high.

### **Enhanced Fund Screening Process**

Fund screening is particularly important when working with a plan that has many investment options from which to choose. There are several places in the process of creating portfolios where funds may be excluded from inclusion in a portfolio. All fund lineups will be evaluated according to the following criteria.

#### ***Data History***

The first screen to determine fund inclusion is if a fund has sufficient return history to be analyzed. For actively managed funds, 36 months of return history is required. For index funds, only 12 months of return history is required as index funds rarely experience style drift.

#### ***Sector Funds***

Though sector funds may be appropriate to offer in a retirement plan, they are excluded from the process as they do not fit well with the goals of Ibbotson's managed account service. Ibbotson's asset class model portfolios do not target specific sectors. Therefore, sector funds tend to be too narrowly managed for inclusion in these portfolios.

#### ***Lifestyle Funds***

Lifestyle funds are also excluded for conflicting goals with Ibbotson's advice services. Lifestyle funds with a target maturity date are designed with a similar goal as Ibbotson's managed account program; to meet an investor's retirement goals. These funds will change their asset allocation over time as the target date approaches, generally becoming more conservative over time. One of Ibbotson's goals is to create portfolios that remain true to a targeted asset allocation; these types of instruments clearly conflict with this goal. One of the key differences between Ibbotson's managed account service and a target maturity lifestyle fund is that Ibbotson's retirement solution is customized for each participant based on a number of factors, while a target maturity fund is selected based solely on age. For example, despite two participants being the same age and having the same desired retirement goal, one would not advise the plan participant that has a sizable pension to meet their retirement goals the same way as an individual relying solely on their 401(k).

Ibbotson will also exclude other lifestyle funds, those without a target maturity date (e.g. conservative, moderate, aggressive lifestyle funds), if the target asset allocation can be met without their use. Lifestyle funds are intended to be used as the sole means for meeting an individual's retirement needs, not to be used as part of a broader portfolio of funds. Though typically not used, these options may be utilized in some instances where a plan lineup is lacking particular exposures that can be met with these funds.

### ***Peer Grouping***

As described above, funds that do not meet the criteria for inclusion in one of Ibbotson's peer groups are excluded from fund level portfolios. When a fund cannot be assigned to a particular peer group based on the above criteria, it is typically an indicator that the fund has a specialized investment style or has experienced considerable style drift over time. In either instance, the fund would not be an appropriate choice to meet Ibbotson's specific asset allocation targets. In addition, certain peer groups are excluded due to conflicts with the goals of Ibbotson's advice services. A couple peer groups described above include sector and lifestyle funds.

### ***R-square***

Ibbotson uses returns based style analysis as another method of screening. It is used to determine the combination of benchmarks that best tracks a fund's return. Unlike the peer group analysis, this process calculates a custom style benchmark for each fund. Like regression analysis the better the custom benchmark tracks a fund's performance the higher the R-square. A high R-square means a higher confidence in the style of the fund.

This step can be used to classify funds too, but rather than assigning a single benchmark as determined by the peer group analysis, the behavior is explained by the whole spectrum of benchmarks. Ibbotson uses this step in a fund selection process for asset allocation purposes. It is difficult to use funds with low R-square to implement an asset allocation policy since the asset class exposures may vary considerably through time. This causes the fund performance to drift away from the desired asset allocation policy.

Therefore, funds with R-square below 75 are excluded from inclusion in portfolios. If a fund has been used in a portfolio in the past, and its R-square deteriorates, it will be phased out from inclusion in portfolios once the R-square falls below 70. If the R-square drops below 65 the fund will be dropped from any portfolio at the next rebalance. In order to be included again, it must sustain an R-square over 75 for at least four consecutive quarters. Funds whose R-square drops below 75 but does not reach the 70 threshold may be maintained, but are monitored closely.

### ***Forming the Main and Select Lists - New***

From the funds that pass all of the prior screening criteria, Ibbotson will form a main and select list. For each peer group, Ibbotson selects one index fund and two actively managed funds to form its select list. As a result, with smaller fund lineups, few, if any, funds are eliminated from consideration in the optimization process provided each fund meets the minimum set of criteria described above.

The process of arriving at the select list is a two tiered screening process where funds are first eliminated based on a set of criteria to form a main list. From the resulting main list funds, further screening results in the select list. Index funds and actively managed funds are selected based on different sets of criteria. This two-tiered screening process ensures that those funds that make it to the select list are thoroughly evaluated on a number of different criteria.

First the plan lineup is divided into index and actively managed funds. Within each peer group, index funds are ranked by their tracking error to the peer group set of benchmarks. Tracking error is a measure of the deviation of the fund's returns from those of the benchmarks. The top two funds form the main list.

Where there aren't enough index funds available, the actively managed fund with the lowest tracking error is chosen instead. The funds in the main list are then ranked by their expense ratio. The index fund with the lowest expense ratio is included in the select list.

Actively managed funds are evaluated on two criteria initially to form the main list; 1) information ratio (alpha divided by tracking error) and 2) forward looking alpha. The two best information ratio and two best alpha funds form the main list. These main-list funds are then ranked on three additional criteria; 1) R-square relative to a single peer-group primary benchmark; 2) the number of years the fund outperformed its customized benchmark over the past 5 years; and 3) consistency score described below. The main list funds are ranked on each of these three criteria, and their average rank taken. One high information ratio fund and one high alpha fund are then selected based on the best average rank of these three additional criteria to form the select list.

### ***Consistency Score - New***

Using information from the returns-based style analysis process, Ibbotson calculates a consistency score for each fund's underlying exposures to the asset class benchmarks. The higher the consistency score, the greater confidence one may place in future style exposures estimated by returns-based style analysis.

Sometimes funds with high levels of performance are not as consistent in investment style as others. Fund managers that consistently outperform the market may switch styles regularly. These timing moves cause their consistency score to be lower than other funds. While eliminating these funds will tend to ensure that a portfolio is more consistent in style, it may also eliminate some good performers in the process. This is why Ibbotson looks at a variety of measures in its screening process, rather than basing the selection criteria solely on the consistency score.

### ***Qualitative Considerations***

All of the measures in the screening process so far have been quantitative. Ibbotson may also consider qualitative measures such as holdings analysis, style changes, style drift over time, manager changes, and SEC actions when screening funds. These qualitative steps are mainly used when the quantitative results are questionable due to low statistical significance, quantitative results differing from expectations or simply to ensure that the quantitative techniques are accurate.

For example, analysis of a fund's holdings may help confirm the returns based style analysis and any style changes that come from this technique. Examining manager changes and SEC actions helps to confirm that the processes in place that generated past returns are still relevant. This step also gives an analyst an opportunity to apply some human judgment to the process.

### **Enhanced Fund Optimization**

The Ibbotson fund implementation process is accomplished by using a proprietary alpha-tracking error optimization. The objective is to build portfolios with high alpha and low tracking error. Typically there is a tradeoff between these two measures. The optimization is designed to find the fund combination that will maximize the forward-looking alpha for any given level of tracking error while hitting the target asset allocation.

This alpha-tracking error optimization is similar to mean-variance optimization. While the mean-variance optimization is conducted using the expected return, standard deviation and correlations of the asset class returns as inputs, the alpha-tracking error optimization is conducted using the forward-looking alpha and tracking errors of each fund and the exposures of the available funds to the various asset classes determined using returns based style analysis. The alpha and tracking error used in the optimization are

forward looking estimates based on the Ibbotson's proprietary methodology described in the previous section.

With certain lineups, hitting the target asset allocation may be difficult with the funds available. The inclusion of a set of index managers along with active managers generally alleviates this problem. The portion of the manager portfolio allocated to index managers in this setting has popularly been called the completion portfolio, since it complements the active managers such that the combination hits the target asset allocation. Ibbotson considers both active and passive managers in the construction of its portfolios.

The alpha-tracking error frontier offers an entire spectrum of efficient allocations among all funds for the target asset allocation. Ibbotson selects the appropriate portfolio based on multiple iterations of evaluating possible outcomes. This iterative process starts with a higher emphasis on alpha, producing portfolios with higher excess returns. These portfolios are evaluated within the constraints described herein to ensure they are within tolerances for tracking error and hitting the desired asset allocation. If the portfolio is found to be outside these tolerances, the emphasis on alpha is lowered and a new set of portfolios is generated for evaluation. The final step is to generate portfolios that place all the emphasis on the tracking error, to ensure the asset allocation targets are met. If at this point the portfolios generated are not within the tolerances set, including hitting the asset allocation targets, then the lineup would not qualify for Ibbotson's advice services. This multiple iterative process ensures that for each portfolio the funds chosen maximize the portfolio alpha within the tolerances for tracking error while hitting the asset allocation targets.

#### ***Additional Tolerances and Constraints "Misfit"***

While attempting to meet an asset allocation target for a portfolio, it is difficult to do so without some tolerance for deviation from the target asset allocation. Ibbotson calls the difference between the target asset allocation and the effective asset allocation of the fund level portfolio the "misfit." For each asset class, Ibbotson sets this tolerance for misfit at three percent. In addition, to ensure that portfolios are not overly skewed towards fixed income or equity in aggregate, Ibbotson ensures that the sum of the misfits for all fixed income asset classes does not exceed five percent. These criteria can be a bit too constraining for more aggressive portfolios, primarily because many equity funds have residual exposure to cash or fixed income securities. In these more aggressive portfolios, the misfit tolerance for each individual fixed income asset classes is increased to five percent and the fixed-income group misfit tolerance is increased to eight percent. Generally portfolios are selected that fall well below these tolerances.

#### ***Tracking Error***

Tracking error of each fund is used in the optimization process. Once portfolios are constructed, tracking error of the entire portfolio is measured and must be less than 30% of the asset class target standard deviation. This allows for less variability in the more conservative portfolios than in the more aggressive portfolios.

#### ***Maximum Fund Allocations***

To ensure that a portfolio is not concentrated in any one fund, Ibbotson limits the percentage that can be allocated based on the type of fund. For conservative investments, like fixed income, these maximum allocations are higher than for more aggressive investments. For index funds, the maximum allocation is set equal to the target asset class allocation. Since index managers cannot deviate from their benchmark, the constraint is more lenient. Another factor that influences the maximum fund allocation is the target asset class allocation within each Ibbotson portfolio. Those asset classes with higher targets tend to have corresponding higher maximum fund allocations. For actively managed funds, the maximum allocations are as follows:



- 25% for single domestic equity fund
- 30% for international equity fund
- 60% for fixed income fund
- 60% for GIC fund
- 30% for cash fund
- 20% for any specialty funds (REITs, High Yield Bond, etc.)

### **GIC and Stable Value Funds**

The first step in modeling stable value and GIC type investment options is to gather data to understand how the option is managed. Ibbotson considers the average duration of the underlying investments in these options as a primary means of mapping them to the appropriate asset class. In instances where the portfolio contains a significant number of securities with prepayment options, effective duration is the appropriate duration measure. Other factors that impact the extent of the allocation to these options include any guaranteed rate of return (above any book value guarantee that may be standard for a stable value option), liquidity restrictions, and the expenses for the option.

Investment options that have a duration of less than 1 year are mapped to cash, those between 1 and 3 years will be considered as short-term bonds, between 3 and 10 years will be classified as Aggregate Bonds, and greater than 10 will be considered a Long-Term vehicle.

Once Ibbotson determines which asset class best represents the stable value or GIC option, an allocation to the option is carved out from the asset class target. If there are no other investment options in the plan lineup that fill the same asset class, the stable value or GIC option may be used to fill the entire target allocation. Stable value options that have an equity wash feature are not used if there are other options available within their asset class, but may be used if they are the sole option in the plan lineup. In all other cases, if there are other investment options within this asset class target, the target allocation will be divided between the stable value or GIC and the other investment options. Information collected on return guarantees, liquidity and expense are used to adjust the allocations between the options. Investment options that have liquidity restrictions (other than an equity wash) or no return guarantee will have their allocation penalized. Options that have excessive fees or low returns have their allocations penalized, while allocations to options with low fees or high returns are augmented.

### **Sample Asset Class Model Portfolios**

Ibbotson's target asset models vary in complexity. The following tables show an example of our most complex and least complex asset class model. Table 1 shows the asset class target at the most complex level including all the optional asset classes. There are six optional asset classes available: Mid Cap Stocks, Emerging Markets, REITs, Direct Real Estate, High Yield Bonds, and TIPs. In order for an optional asset class to be included, there must be a fund available that has at least 80% exposure (based on RBSA) to that particular asset class and an R-square above 75. However, a fund only needs to have 60% exposure to the Mid Cap asset class for inclusion. Table 2 shows the most basic complexity which is Ibbotson's minimum requirement to build fund specific portfolios.

**Table 1**

<b>Higher Complexity Portfolios</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Expanded Asset Classes							
Large Cap Growth Stocks	3%	6%	10%	12%	13%	16%	17%
Large Cap Value Stocks	3%	10%	13%	16%	17%	19%	20%
Mid Cap Stocks	0%	4%	5%	7%	10%	12%	14%
Small Cap Growth Stocks	0%	0%	0%	3%	3%	4%	5%
Small Cap Value Stocks	0%	0%	3%	3%	5%	6%	8%
International Stocks	3%	7%	11%	13%	16%	19%	22%
Emerging Markets	0%	0%	0%	3%	3%	4%	5%
REITs	0%	0%	0%	0%	3%	4%	5%
Direct Real Estate	3%	3%	3%	3%	3%	3%	4%
High yield bonds	10%	6%	5%	3%	3%	0%	0%
TIPs	15%	14%	10%	7%	5%	3%	0%
Long Term Bonds	23%	21%	18%	14%	10%	6%	0%
Short Term Bonds	31%	26%	19%	13%	9%	4%	0%
Cash Equivalents	9%	3%	3%	3%	0%	0%	0%

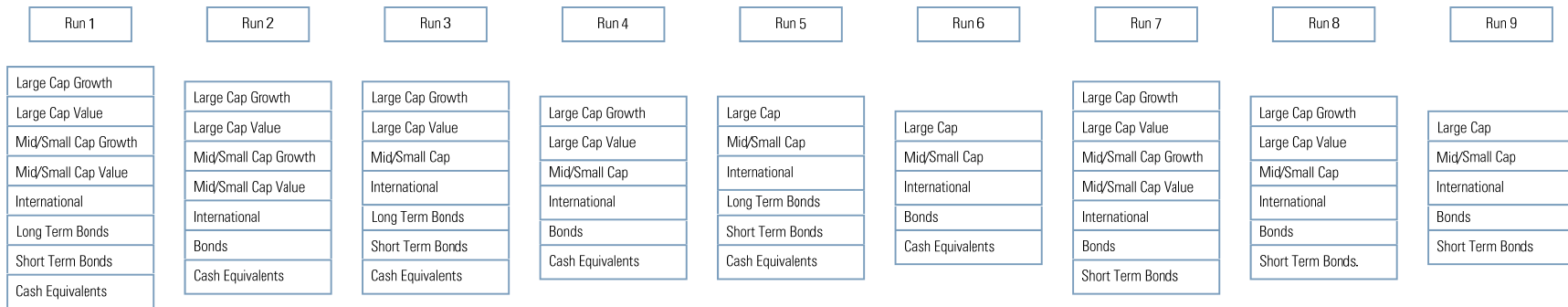
**Table 2**

<b>Lower Complexity Portfolios</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Basic Asset Classes							
Large Cap	7%	19%	26%	31%	36%	42%	46%
Mid/Small Cap	0%	4%	8%	13%	18%	22%	27%
International	3%	7%	11%	16%	19%	23%	27%
Bond	70%	60%	47%	35%	27%	13%	0%
Cash Equivalents/Short Term	20%	10%	8%	5%	0%	0%	0%

**Asset Class Model Portfolio Selection Process**

Ibbotson attempts to build fund specific portfolios at the highest level of complexity first, which is shown in Diagram 1. The diagram does not include any optional asset classes, however, if an optional asset class does qualify for inclusion that particular asset class would be included in all of the runs from the most complex to the least complex. At the most complex level, large cap is split out into growth and value. Similarly, mid/small cap is broken out into growth and value. Also, bonds are split into short and long term. If Ibbotson is unable to hit the asset class targets at the highest complexity, then a second attempt is made at a lower complexity. This will continue until the asset class targets are met (within the tolerances) and we minimize tracking error while maximizing alpha. If a plan happens to fail to run at all of the complexities, the client will be notified. Once we build fund level portfolios, the portfolios are reviewed, and Ibbotson releases them to the client. At that point Ibbotson will continue to rebalance the portfolios on a quarterly basis.

**Diagram 1**



### **Fund Additions and Deletions**

If a fund option is added, it will be considered for inclusion in portfolios at the next scheduled quarterly rebalance date for the plan in question. It is not imperative that new funds be included immediately as there will already be a diversified portfolio available that meets the target asset allocation. Any optional asset classes will be re-evaluated at the next scheduled rebalance date to see if the new fund qualifies as an optional asset class. This may result in the selection of a different asset class model portfolio targeting the additional optional asset class. See the prior section on optional asset classes for more details.

When a fund that is used in a portfolio is dropped from a plan lineup or closes, the plans portfolios will be immediately rebalanced as it would not be possible to implement the existing fund-level portfolios. If a new fund is added to replace the closing or dropped fund, it will be considered within the rebalance. If the dropping of a fund causes the plan to no longer qualify (the asset class targets can no longer be met within stated tolerances), then Ibbotson will provide for a transition period of ninety days in which a new fund must be added to satisfy any deficiencies. If an alternative fund option cannot be added within this time frame, the plan would no longer be eligible for Ibbotson's advice services.

### **Rebalancing Bands**

Ibbotson establishes a range of +/- 5% to prevent large fluctuations in investment option allocations. If a more attractive alternative is present, an investment option will be phased out over time rather than in one quarter to minimize large portfolio reallocations on a quarterly basis. This approach also minimizes short-term redemption fees to investors should they exist.

Annually this restriction may be released to facilitate hitting a new asset class target. Additionally, funds being dropped from a lineup may also require this restriction to be lifted to be able to hit asset class targets.

### **Warnings and Failures**

Occasionally events may occur that cause a plan that once qualified for Ibbotson's advice services to no longer qualify (i.e. fund closure, style drift, fund failing one or more screening criteria). Ibbotson will attempt to send a notification whenever a plan gets close to hitting one of these triggers, but it may not be possible to identify some problems ahead of time. Once it has been determined that a change is necessary, notification will be provided of that change. This notification will require either: 1) change to the recommendation/lineup at the next quarterly reallocation (a one quarter "grace period"), or 2) an immediate change to the fund recommendation/lineup. The decision to allow for a grace period or immediate action will be determined by the severity of the situation. However, it is our feeling that most changes will be acceptable within the grace period. It is important to note that should a client fail to execute on the plan lineup change, Ibbotson will no longer be able to render advice as of the end of that quarter. We understand the operational headaches and cost impact of adding new funds and making changes to the advice recommendations on a mass basis. These factors will be measured, along with the prudence of the advice recommendation, when deciding which course should be taken.