SS&C ALPS Advisors

Registered Investment Advisor for GuidancePlus & AdvicePlus Programs

Introduction

As a Registered Investment Advisor (RIA), the goal of SS&C ALPS Advisors ("ALPS Advisors, Inc." or "AAI") is to help our end clients achieve their investment goals. The AAI Multi-Asset Research Team consists of 12 individuals with typical experience of more than 15 years in equity and fixed income research and portfolio management, quantitative research and/or systems engineering. The team is responsible for the development and application of analytical tools used in managing asset allocation portfolios and conducting rigorous due diligence of asset managers, funds and separately managed accounts.

AAI works directly with the product and engineering teams supporting the GuidancePlus and AdvicePlus Programs ("Programs") and performs oversight responsibilities with respect to (1) the portfolio optimization engine and quarterly updated return, risk and correlation inputs used within GuidancePlus and AdvicePlus and (2) the quarterly updated scoring of mutual funds, exchange-traded funds (ETFs) and separately management accounts used in final portfolio allocations of AdvicePlus.

AAI evaluates the Programs annually, providing a review of system logic as well as methodology recommendations if appropriate. AAI reviews the system parameters and recommends updates as market conditions or industry changes warrant. In conducting its review, AAI assesses the following parameters:

- The Programs are based on generally accepted investment theory that take into account historical periodic returns of asset classes.
- There is an objective correlation between the asset allocations generated by the Programs and the information and data supplied by the plan participant.
- Any material inputs from plan participants, including retirement ages, life expectancies, income levels, financial resources, replacement income ratios, inflation rates and capital market expectations accompany the Programs or are explicitly specified by the participant.

As a final review, AAI requests and relies on confirmation from the teams supporting the Programs regarding:

- Any material disruption due to inadequacies arising from system software in the past year
- Any material changes made to the system software in the past year
- Any material changes to system input or output parameters in the past year

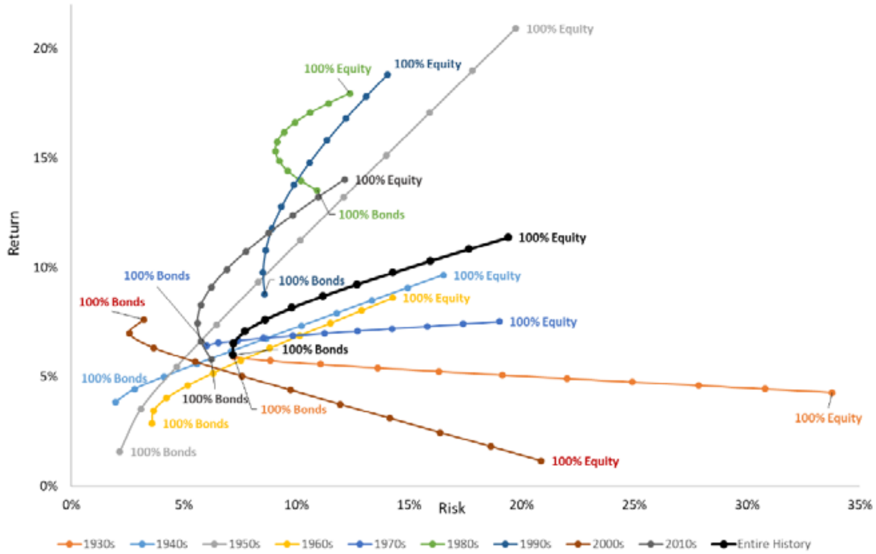
Capital Markets Assumptions

In generating the return, risk and correlation inputs for the Programs, the investment process begins with a deep history analysis of asset class and asset class segment returns and risk. Large capitalization US equities, Treasuries and corporate bonds have reliable monthly periodic history dating back to the 1920s, while asset classes without such history can be analytically extrapolated back to that time period utilizing industry-standard techniques.[1] Deep history asset class returns provide an important perspective of long-run returns, variance and covariance through multiple market cycles.

These long-run returns are then augmented by the evolving long-term capital markets assumptions of the Multi-Asset Research Team ("MART"), which are forward-looking risk and return assumptions formulated for each asset class and asset class segment. The team performs this exercise because asset classes and their relative segments move around in price and time, becoming more or less attractive in serving their role in a given portfolio objective. The changes in attractiveness have been empirically related to forward-looking returns, so the adjustments made to long-run returns are paramount to producing reasonable forecasts.

As an example, we draw the reader's attention to Figure 1. This scatter plot of historical risk and return shows the *realized* "efficient frontier" of portfolios with varying levels of bonds and equities for each decade back to 1930. As one can see, the long-run efficient frontier in black looks familiar; however, each decade's frontier has a different shape and location, with several far away from the long-term assumptions. Our goal is to estimate as close as possible to the future efficient frontier in order to build the most robust, forward-looking portfolios for participants.

| Figure 1



Adjustments to historical risk and returns reflect both the current environment and expectations for the future environment relative to historical trends and regimes. While estimating returns is a generally useful exercise, the unfortunate fact is that mean-variance portfolio optimization assumes 100% confidence in these inputs. Consequently, our confidence in estimating these inputs is also a focus of our capital markets assumptions.

Simply put, we do not know the future exactly. To accommodate for this, we take steps to consider "estimation error", or how closely the historical *in-sample* asset behaviors (returns, volatility and correlation) resemble the future *out-of-sample* behaviors we are trying to predict. We explicitly consider the possibility that our expectations of the future are wrong because returns and risk can vary from their long-term averages for extended periods of time, distorting both participant expectations and outcomes.

There are at least three ways of dealing with estimation error in portfolio optimization. Table 1 describes each method, its respective mechanism and outcome. We make use of all three methods in an attempt to import estimation error into our capital markets assumptions.

| Table 1

Method	Mechanism	Outcome
Constraints	Add explicit hard or soft asset weight constraints in the optimization	Most popular method, but can be costly when constraints prevent portfolios that would have been better when estimate errors were low
Resampling	Add Monte-Carlo style random draws of perturbations of the return and risk inputs, then solve for average of optimal portfolios for each set of inputs	Communicates optimal asset weights as ranges rather than point values, works very well for asset allocation
Bayesian Methods (e.g. Black-Litterman)	Condition expectations not only on historical data, but other "prior beliefs", such as the cost of being wrong	Wrongness costs are highest for extreme outlier estimates

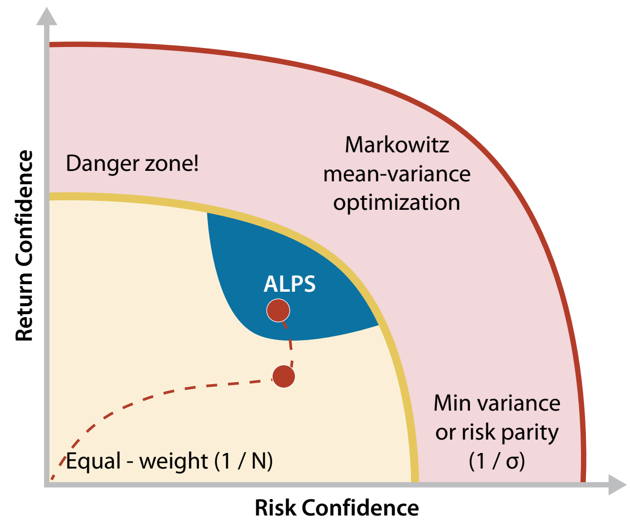
Constraints are used as a part of overall risk management. These are asset class weight constraints based on participant risk level and years to retirement (or other financial goal), as well as minimum and maximum weightings for asset class segments as a percentage of their overall asset class group.

Resampling is used as a way to investigate the distribution of expected returns, risk, covariance and optimal portfolio weights for historical regimes in financial markets. These distributions can inform our MART capital markets assumptions to the extent the team believes we are in an environment that closely resembles a historical regime.

Black-Litterman[2] is a Bayesian processing of estimates that precedes the final portfolio optimization. Specifically, the Black-Litterman process considers the likelihood our capital market assumptions are correct, giving more weight to our expectations as they take on a greater likelihood of manifesting themselves in the return distribution of the current regime. As our expectations drift further from the returns distribution of the current regime, more weight is given to the equilibrium returns, or the returns extracted directly from asset class weights in the global market portfolio and its associated deep history covariance matrix. Building a portfolio with these equilibrium returns can be thought of as building a risk-efficient portfolio according to long-term average return and risk.

In summary, AAI blends its MART capital market assumptions with that of the benchmark portfolio in a way that prioritizes specific capital market assumptions when they do not look like a statistical outlier. This process navigates our portfolio up in the risk-return confidence graphic shown in Figure 2, thoughtfully building incremental confidence in our return expectations without assuming 100% confidence.

| Figure 2



Manager Due Diligence & Fund Scoring

In pursuit of our goal to help our end clients achieve their investment goals, we have developed a mutual fund and ETF evaluation process that identifies and ranks investment strategies to help identify suitable investments based on individual client characteristics. This scoring process occurs continuously but is reported quarterly to the AdvicePlus program as a final measure to reduce uncertainty in participant portfolios.

Our fund scoring process has five pillars:

	Pillar	Measurement
1	**Portfolio Management**	Consistency and Stability
2	**Investment Philosophy**	Logical and Intended Return Opportunity Set
3	**Investment Process**	Rigorous, Risk Managed and Repeatable
4	**Performance**	Risk-Adjusted Skill Over Multiple Cycles
5	**Portfolio Efficiency**	Appropriate Explicit and Implicit Costs

We integrate universal fund data from Morningstar and Bloomberg alongside proprietary measurement techniques to provide fund selection data to the Programs. Each pillar shown above is distilled into measurable components to evaluate absolute statistics and relative rankings for each fund. Finally, rankings across pillars are combined in a proprietary algorithm to create an overall fund score. Funds must have at least a one-year history to be ranked, and greater weight is given to longer track records.

Overall Score

Consistency & Stability

Funds are evaluated based on the consistency of portfolio construction. We evaluate Size, Style and Risk Profile over time versus a comparable peer group. Funds that exhibit consistency across each of the three construction components score highest.

Portfolio manager tenure and experience is an important measure to help identify funds with a stable philosophy and process. Individual portfolio manager experience is measured by evaluating total experience and diversity of experience across various market regimes.

Investment Philosophy

Funds can generate returns from various categories of risk, so we analyze each fund in our universe to quantitatively understand the investment philosophy. Specifically, we decompose historical returns[3] to understand the sources of return. From this analysis we rank strategies based on consistency of return drivers such as sector or style attribution. A fund can consistently add value by repeatedly finding excess returns in a specific area or through demonstrated skill of finding excess returns from a combination of return sources.

Investment Process

We measure the quality of an investment process by evaluating the risk-efficiency of funds. Risk-efficiency, as defined by strong risk-adjusted statistics, demonstrates effective risk management. This can be sourced from efficient portfolio diversification (complementary active positions), a unique expression of investment insight (active share) or a reliable application of risk management and trading disciplines (position concentration, buy or sell discipline).

Performance

Although historical performance is not a reliable predictor of the future on its own, we believe that by studying the character of past performance we can better evaluate the suitability and capability of a fund manager or strategy to meet a given portfolio objective. We rank funds on historical absolute returns, risk-adjusted returns and drawdown experience to better understand the repeatability of risk-adjusted skill.

Portfolio Efficiency

We evaluate fund cost by measuring both explicit fees and expenses as well as the embedded costs of managing a particular strategy. Total costs include management fees, administrative and distribution costs shared by investors, as well as implementation costs approximated by portfolio turnover.

References

[1] *Stambaugh, R. F. (1997). Analyzing Investments Whose Histories Differ in Length. Journal of Financial Economics, 45 (3), 285-331.*

[2] *Global Portfolio Optimization (Black, Fischer, Litterman, Robert, 1992).*

[3] *Sharpe, W.F. (1992). Asset allocation: Management style and performance measurement. Journal of Portfolio Management (Winter), 7-19.*

Important Disclosures

ALPS Advisors, Inc. ("SS&C ALPS Advisors" or "ALPS Advisors") is a SEC registered investment adviser located in Denver, Colorado. Registration does not imply a certain level of skill or training. ALPS Advisors may only transact business in those states in which it is registered or qualifies for an exemption or exclusion from registration requirements.

Information presented herein is provided for educational or informational purposes only. ALPS Advisors does not transact business via this material. Nothing herein should be construed as financial advice.

Information developed by ALPS Advisors is subject to change at any time without notice. ALPS Advisors provides such information for illustrative and informational purposes only. This information may represent personal opinions and viewpoints of the commentators and should not be regarded as a description of advisory services provided by ALPS Advisors.

Information presented herein does not constitute investment, legal or tax advice; performance data; an endorsement of any third party or such third party's views; or any recommendation that any particular security, portfolio of securities, transaction or investment strategy is suitable for any specific person. Information is impersonal and not tailored to the circumstances or investment needs of any specific person. Any mention of a particular security and related performance data is not a recommendation to buy or sell that security. Whenever there are hyperlinks to third-party content, this information is intended to provide additional perspective and should not be construed as an endorsement of any services, products, guidance, individuals or points of view outside ALPS Advisors. All examples are hypothetical and for illustrative purposes only.

ALPS Advisors does not warrant information presented herein to be correct, complete, accurate or timely, and is not responsible for any errors or omissions in the information or for any investment decisions, damages or other losses resulting from, or related to, use of the information. No assurance can be made regarding the profitability of any security mentioned or regarding the accuracy of any forecast made. Not all past forecasts were, nor future forecasts may be, as accurate as those presented. Past performance is no guarantee of future returns.

Investing involves risk, including the possible loss of principal and fluctuation of value. There is no assurance that the stated objective will be met. Please consider the charges, risks, expenses and investment objective carefully before investing. Information presented herein is for discussion and illustrative purposes only and is not a recommendation or an offer or solicitation to buy, sell or hold any securities. Past performance is no guarantee of future results.

AAI000872