**Fundamental versus Traditional Portfolio Optimization**

Alpha Theory enforces a discipline upon a firm’s decision process (position selection, sizing, and trading) by creating an investment process based on risk-adjusted return. Alpha Theory then scales position sizes depending on the magnitude of the risk-adjusted return (ie. higher risk-adjusted return equals a larger position size) to maximize the risk-adjusted return of the portfolio.

Portfolio Optimization (Risk Management) Tools use Modern Portfolio Theory, specifically Markowitz mean-variance, to ensure that the portfolio resides on the Efficient Frontier. Additional measures like Value at Risk (VAR) and proprietary statistics tools are folded into the optimization equation to maximize the return of the portfolio.

Traditional Portfolio Optimization is well suited for quantitative managers but not designed for the deep research of fundamental asset managers. The primary difference is how each measures return and risk.

**Return.** Alpha Theory measures return by taking the analyst’s calculation of risk-adjusted return. Most Traditional Portfolio Optimization tools use historical returns as an indicator of future returns. Others use more realistic return estimators that are defined by the user, but still do not incorporate scenario analyses like Alpha Theory.

In addition, we have proven through Monte Carlo simulation that Alpha Theory is the superior method for maximizing portfolio expected return. Markowitz mean-variance does not beat equal weighting as a position sizing method and Alpha Theory beats equal weighting by almost 80%.

<table>
<thead>
<tr>
<th>Optimal Portfolio out of 10,000 iterations</th>
<th>Probability of being Optimal</th>
<th>Average Exposure</th>
<th>Average Expected Return</th>
<th>Expected Return per 1% of Exposure</th>
<th>Improvement using Alpha Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha Theory 8461</td>
<td>85%</td>
<td>141%</td>
<td>144%</td>
<td>104bps</td>
<td>at least 76%</td>
</tr>
<tr>
<td>Kelly Criterion 942</td>
<td>9%</td>
<td>139%</td>
<td>105%</td>
<td>75bps</td>
<td>39%</td>
</tr>
<tr>
<td>Up / Down Ratio 559</td>
<td>6%</td>
<td>216%</td>
<td>155%</td>
<td>71bps</td>
<td>45%</td>
</tr>
<tr>
<td>Equal Weighing 38</td>
<td>0%</td>
<td>169%</td>
<td>100%</td>
<td>59bps</td>
<td>76%</td>
</tr>
</tbody>
</table>

Markowitz Mean-Variance (Modern Portfolio Theory)*

*Two studies (DeMiguel et al (2006) / Jobson-Korkie): 14 most common mean-variance techniques no better than Equal Weighting

**Risk.** The more important element differentiating Alpha Theory and other tools is the measure of risk. This is illustrated by a simple question, “What is a better measure of risk? How much something moves (variance) or how much you can lose (potential downside)”? Most would say how much you can lose and would posit that VaR is a measure of how much a portfolio can lose. However, VaR is still measuring risk based on variance and correlation, not on the analyst’s estimation of downside. To drive the point home, let’s compare how Alpha Theory and Traditional Portfolio Optimization tools address risk of a hypothetical asset:

Company XYZ is trading at $25 and has a standard deviation of 40%, high by statistical measures, but has $24 per share in cash to protect the buyer on the downside. Traditional Portfolio Optimization would require a substantial return to get over the 40% standard deviation hurdle rate, but in actuality, the downside is limited. This downside scenario of $24 is factored into the scenario-based risk-adjusted return calculated by the analyst and if the upside merits a compelling risk-adjusted return then this position would subsequently be made a larger position in the portfolio.

**Other differentiations.** Modern Portfolio Theory and most Traditional Portfolio Optimization tools assume a log normal distribution of market returns to perform their calculations. However, the market is not log normally distributed (there are a myriad of sources that expound upon this idea, but “Tail Tales – CFA Magazine March 2007” has a very concise
Modern Portfolio Theory Comparison

explanation). The assumption of a log normal distribution of market returns limits the effectiveness of the variance, correlation and Betas used in traditional portfolio optimizations. It doesn’t mean that they are ineffective, just not superlative prognosticators.

Additionally, two studies, DeMiguel (2006) and the Jabson-Korkie findings both state that of the 14 most common mean-variance optimization alternatives, none beat equal weighting. These conclusions make it tough for a fundamental investor to place bets using Traditional Portfolio Optimization systems.

Even though there are some issues with the statistical assumptions of Traditional Portfolio Optimization, correlation and concentration are still practical concerns that must be addressed. Alpha Theory takes the approach that Traditional Portfolio Optimization are very important as a way to protect the portfolio from extremes (the Black Swan – multiple sigma event – for more information read “Fooled by Randomness”, Taleb).

Alpha Theory is not designed to replace Traditional Portfolio Optimization. Fundamental and Traditional Portfolio Optimization both have a place in fundamental portfolio management. Imagine the fund is a sports car. The engine of the sports car is the research of firm. Alpha Theory is the turbo charger that makes sure that every ounce of power is being translated into performance. Traditional Portfolio Optimization becomes the air bags and anti-lock brakes of the portfolio management car. They prevent you from dying in a crash, but they do not make the car go faster.

Alpha Theory’s goal is to maximize potential risk-adjusted return but also includes some additional risk controls designed for fundamental portfolio managers.

**Market Exposure.** Alpha theory allows the portfolio manager to Beta adjust position sizes to control overall market exposure. This is not an indication of Alpha Theory’s belief that the Beta will hold true in the future, but is our understanding that there are few better tools for appreciating market exposure of an individual asset.

**Industry Exposure.** Alpha Theory also allows the portfolio manager to set maximum exposures to industries / sectors. Industry exposure is a true risk and captures industry based correlation. This is different than historical statistical correlations that may not persist in the future.

**Liquidity.** The Alpha Theory algorithm includes parameters that allow the portfolio manager to define liquidity constraints, so that exposure to assets with low liquidity is reduced. The portfolio manager can set minimum liquidity, defined by dollar volume, and preferred levels of liquidity. If an asset’s liquidity falls below the minimum then the optimal position is automatically 0%, if the liquidity is greater than the preferred level, then no liquidity adjustments are made. If the liquidity falls in between the minimum and preferred, Alpha Theory will adjust the position size accordingly to minimize the exposure as liquidity approaches minimum levels.