Introduction

- Inefficiency of proposed performance measures ranging from very simple to more advanced, measured in different scales. Literature therein etc are used to assess targets, evaluate portfolios, create asset allocation profiles, capital adequacy/efficiency, risk management and so on (e.g., returns, VaR, Sharpe, Calmar, etc).

- Assessment range on the relative range of individual performance measures, and usage is based on some form of grid of subsets measures with associated weights.

- We propose a Unifying Framework of Performance Measures or an Explainability Index (EI) that captures the multi-dimensional and nuances measured by the individual measures, where it balances the different input categories of performance measures according to default or specified preferences and gives a composite benchmark score between 0 and 1.

- We also propose a relative measure as the Risk of Target (RoT) that leverages the EI for comparing the performance of asset/portfolio to their targets and assesses the degree of divergence.

Construction Framework

1. Select Assets and/or Portfolio with reference to target/benchmarks
2. Set evaluation period and intervals for estimating performance measures. Option to (a) use historic, predicted, simulated, or measured data
3. Option to categorize performance measures that target a specific assessment facet
4. Transform performance measures to a scale of 0-1 and assigned basis and direction
5. Assign weights (e.g., equally with categorization)
6. Estimate Explainability Index as:
   a. arithmetic (EI) \( \frac{w_1 E_1 + w_2 E_2 + \ldots + w_n E_n}{w_1 + w_2 + \ldots + w_n} \)
   b. geometric \( \prod_{i=1}^{n} \left( \frac{E_i}{w_i} \right) ^{w_i} \)
   c. distribution shift (3SD) \( 3 \left( E - \mu \right) \times \left( 1 - \mu \right) \) where the Hellinger Distance
7. Estimate Risk of Target (RoT) as percentage of difference of the file for Asset/Portfolio and Benchmark/Target

RoT Efficient Frontier

- The standard efficient frontier in a 2-dimensional approach to evaluating risk and reward
- A 2D approach could lead to taking undesirable risk
- Plotting the RoT as a color scale improves understanding in higher dimensional hidden risk
- RoT allows us to identify key behavioral differences in behavior that using the efficient frontier standalone would have yielded identical behaviors
- By adjusting the weights of each category to the user’s preferences, it is possible to tailor the user desired risk level

Results

- Benchmark [60% S&P 500 40% US Agg] vs Portfolios

Conclusion

- EI and RoT is a unify process to capture measures in a simple and explainable manner
- Compare asset/Portfolios in an informative manner at a point in time
- Extend to construct multi-objective asset allocation profiles and portfolios