ETF Methodology

M1 creates several Pies based off of quantitative models. In the construction of these models, the prior performance of various indexes is used to inform the inputs of the model. The output of the model is a portfolio allocation of how much to invest in each index. To make the output of the model investible, M1 substitutes the index with an ETF that seeks to replicate the performance of the index. M1 makes a determination of which ETF is the best substitute by looking at overall size and liquidity, expense ratio, AUM, and tracking error. The methodology employed to select the ETF is as follows:

- ETFs must have two years of performance history
- ETF scoring system includes three data points:
  - Expense Ratio = the annual fee that an ETF charge their shareholders, it is expressed as a percentage of assets
  - AUM = the total market value of investments managed by the ETF
  - Tracking Error (annualized) = the standard deviation of the difference in the portfolio and benchmark returns
- Each of the ETFs is compared against the two best performing in each of the three categories (lowest expense ratio, highest AUM, lowest tracking error)

$$\textbf{Expense Ratio Grade} = \frac{\textit{Expense Ratio}}{\textit{Average of Two Lowest Expense Ratios}}$$

$$\textbf{AUM Grade} = \frac{\textit{Average of Two Highest AUMs}}{\textit{AUM}}$$

$$\textbf{Tracking Error Grade} = \frac{\textit{Average Tracking Error Last 4 Years}}{\textit{Average of Lowest Tracking Errors Over Last 4 Years}}$$

- The Final ETF Grade is calculated:

$$\textbf{Final Grade} = (5 * \textit{Expense Ratio Grade}) + (2 * \textit{AUM Grade}) + \textit{Tracking Error Guide}$$

- The ETF in each asset class that has the lowest Final Grade is used in our allocation