GROUP & INDIVIDUAL PROJECT DESCRIPTION

Overview: The projects consist of investigating the empirical properties of financial market returns and testing the performance of alternative selected portfolio investment strategies.

A. **GROUP PROJECT DESCRIPTION** (14/20 points)

MINIMUM TASKS:

1. Select a diversified portfolio of listed securities (e.g. stocks, ETF, stock index, cryptoassets), and download market data from 01-01-2010 to the most recent data. For each stock, compute the daily, weekly, and monthly log-return using the adjusted closing price information and empirically investigate the following financial market returns stylized facts for the three data frequencies (daily, weekly, monthly data):

   - Absence of auto-correlation
   - The unconditional distribution of daily returns does not follow the normal distribution / Fat Tails
   - The return distribution is asymmetric or negatively skewed
   - Volatility Clustering
   - Leverage Effects
   - Conditional Non-Normality

2. Consider a vanilla portfolio walk-forward (aka rolling-window) Backtesting approach with daily historical market data. Generate 100 2-year datasets from historical market data on a randomized fashion by randomly choosing different periods of time and randomly choosing a subset of the universe of securities. Empirically investigate the performance of the following investment strategies.

   o Equally weighted portfolio

   o Markowitz's mean-variance portfolio (MVP)

   o Global Minimum Variance Portfolio (GMVP)

   o Maximum Sharpe ratio portfolio (MSRP)

   o Inverse Volatility Portfolio (IVP)

   o Risk parity portfolio (RPP)

   o Most diversified portfolio (MDP)

   o Maximum decorrelation portfolio (MDC)

3. Critically discuss the results considering alternative risk-adjusted performance metrics (e.g., returns, volatility, Sharpe ratio, Sterling ratio, drawdown).

B. INDIVIDUAL PROJECT DESCRIPTION (6/20 points)

MINIMUM TASKS:

1. Consider the dataset selected for the group project. Use the same data set to investigate the performance of a selection of alternative portfolio management strategies, e.g.,
   - Mean-downside (Semivariance) risk portfolio
   - Hierarchical Risk Parity Portfolio
   - Mean-CVaR (Conditional Value At Risk or expected shortfall) portfolio
   - Minimum CDar (Conditional Drawdown At Risk) portfolio
   - Mean Absolute Deviation portfolio (MAD)
   - Maximum Omega Ratio (MOR)
   - Tactical Dual Momentum strategy
   - Adaptive Asset Allocation strategy
   - other

2. Critically discuss the results considering alternative risk-adjusted performance metrics (e.g., returns, volatility, Sharpe ratio, Sterling ratio, drawdown).

GROUP SIZE, PROJECT MILESTONES & REPORTS

The standard (and recommended) group size is 4. You are responsible for organizing your own groups. The group and individual projects outputs consist of a single digital written PDF/Word/TeX/Bookmark report detailing the outline, methods and results obtained for the problems set above. The reports must be sent by email to jbravo@novaims.unl.pt no later than November 8, 2024. The individual project report should be identified as follows **FirstName_Surname_Student#.PDF** Additionally, you are asked to send the Word/LaTeX, EXCEL, PDF, R Script, Python or other files used for eventual replication of the results.