Project Python M1 Économie-Finance

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Project

From the file "Data_projets_M1EEF - fige.xlsx", create thematic indices :

- Geographical
- Sectoral
- Style-based (Value, Momentum, Size, Dividend, Low Volatility, ...)

Instructions

Build these indices using the indicators available to you. Many methodologies are possible you are encouraged to look online for information on style factors and propose indices with a consistent underlying financial rationale.
Bonus points will be awarded for the most relevant and well-justified methodologies.

Data

You have access to a large amount of data :

- Time series of the S&P 500 (SPX) and Stoxx Europe 600 (SXXP) indices.
- Price series of the constituents of these indices.
- The list of index constituents as of 31/10/2022 (we do not account for the **survivorship bias**).
- BICS classifications from level 1 to level 4.
- A series of Forex rates for all calendar days.
- Technical and accounting information on the stocks.

Data

Specific features of the dataset :

- The calendar for Stoxx stocks follows French business days, while the one for S&P 500 stocks follows the US calendar.
- The currency is the euro for Stoxx stocks and the US dollar for S&P 500 stocks.
- Missing values are set to #N/A by default you are responsible for handling them appropriately.

Instructions

- Propose 3 different indices, including at least 2 style-based ones (Value, Growth, Momentum, Low Volatility, Long-term/Mid-term Reversal, ...). You may also design any other type of thematic index.
- The code must be dynamic and allow for easy modification of countries, sectors, or styles. For style indices, this may be more challenging the style component should therefore be implemented through a dedicated function for stock selection, for example.
- Build the indices using price data from 01/04/2010 to 28/12/2018 and qualitative data as of 28/12/2018. Track the indices over the year 2019. Update the indices on 30/12/2019 using 2019 prices (rebalancing) and qualitative data as of 30/12/2019, then track them over 2020. Finally, update the indices once more on 30/12/2020 using 2020 prices and qualitative data as of 30/12/2020. (**You must not recode everything from scratch !**)

Instructions

- Propose visualization functions for your results (e.g., sectoral breakdown, country allocation, index vs. benchmark chart over time, securities entering or leaving the indices during the 2019, 2020 and 2021 rebalancings, etc.).
- Allow the indices to be expressed in different currencies, for instance through arguments in your functions.
- You may outsource additional data if your indices require extra information. This will be positively valued in the grading, but it is not mandatory.
- Provide a risk and performance monitoring of these indices over a defined period : for example, build the indices using data up to 31/12/2018 and track their performance from 31/12/2018 to 31/12/2021 (with or without rebalancing). Finally, produce a risk and performance report including basic indicators (total return, beta, annualized performance, maximum drawdown, volatility, alpha relative to broad indices, Sharpe ratio, etc.).

Instructions

- Enable the automated preparation (in Python, via Outlook) of a risk and performance report email. The report should include quantitative risk/performance metrics and visualization charts of the constructed indices (prefer Plotly). You may attach both an image and the HTML version of the charts to enhance interactivity.
- **Caution :** Do *not* implement the actual email sending. Only prepare the email fully ; the user must always have the option to review and send the final email themselves.

Instructions

- The goal of the project is to develop your work in Python. Finance is the application context, but it should not be overlooked.
- Submit a Jupyter Notebook with Markdown sections explaining your approach. Some parts of the code may be written in separate `.py` files and then imported into the notebook.
- Organize your code in a logical and coherent manner.
- You may make your own choices regarding data processing, but all of them must be justified in comments (e.g., removing certain stocks due to excessive missing data).
- You may also include one or more additional files serving as a toolbox for your computation or visualization functions.
- The project must be completed in groups of 3 students. Each group will have to present their work during an oral defense session. Please send your group compositions by email before **December 19th**.

Data

You can download the dataset from the following Drive link :

The dataset is named : "Data_projets_M1EEF - fige.xlsx". You will also find the version "Data_projets_M1EEF - non_fige.xlsx", which contains Bloomberg formulas that can serve as examples if you wish to outsource additional data from the Bloomberg terminal.

Submission

- The project must be submitted by **January 16th before 11 :59pm**.
- If your instructor is Louis Briens, please send it by email to : `projet.m1.eif@gmail.com`.
- If your instructor is Renzhi Liu, please send it by email to : `projectm1.liu.2025@gmail.com`.
- If your instructor is Benjamin Mat, please send it by email to : `mat.benjamin@outlook.fr`.
- The oral defense will take place in **January 2026 after the submission on a date** that will be communicated later.