

## QFAT – Group Project

### Datasets

#### NL\_FR\_BE\_data\_monthly.csv

Monthly data for 1846 firms from the Netherlands, France and Belgium

Sample period: 1991/06 – 2020/06

##### Variables:

ISIN: International Securities Identification Number  
mdate: Date in format yyyy-mm  
RET: Return (in month t)  
RET11: Return over the past 11 months (including month t)  
ME: Market equity (size) in million US\$ (at the end of month t)  
b: Market beta from a regression of daily firm excess returns on the three FF factors over the past 12 months (including month t)  
h: HML beta from the same regression as above  
s: SMB beta from the same regression as above  
ivol: Standard deviation of residuals from a regression of daily excess returns on MktRF (in month t)

#### NL\_FR\_BE\_data\_annual.csv

Yearly data for 1846 firms from the Netherlands, France and Belgium

Sample period: 1990 – 2019

##### Variables:

ISIN: International Securities Identification Number  
fyear: Fiscal year  
BEME: Ratio of book equity to market equity (as of the end of fyear t)  
OP: Operating Profitability (in fyear t)  
INV: Investment (from fyear t-1 to fyear t)

#### NL\_FR\_BE\_firms.csv

Static information on 1846 firms from the Netherlands, France and Belgium

##### Variables:

ISIN: International Securities Identification Number  
name  
country  
dscode: Identifier for Datastream

Source: Datastream

#### Europe\_FF\_Factors.csv

##### Factor returns:

Rf: Risk-free rate  
MktRF: Market excess return  
SMB: SMB excess return  
HML: HML excess return

Source: [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)

### Task: Build your own quant strategy

Your task is to construct a quantitative trading strategy that delivers alpha for your Hedge Fund.

- It must be based on ex-ante available information (tradable!).
- It can be a pure stock selection strategy or a combination with a timing strategy.
- You can combine any of the signals available or create new ones from them.
- All weighting schemes are accepted – equal weighting, weighting based on size (market equity), volatility-weighting, or something else. Just make sure it is ex-ante available information!
- A pure momentum strategy is off limits (but it can be part of your combination strategy).
- The given stocks and the risk-free asset are the only investment opportunities, i.e., there are no funds that allow you to simply buy HML, SMB, or other international assets.
- The quantitative evaluation criterion will be the Information Ratio with respect to the CAPM (MktRF).

Some ideas:

Ang, Hodrick, Xing and Zhang (2006): The Cross-Section of Volatility and Expected Returns, *Journal of Finance* 61, pp. 259-299.

Asness, Moskowitz and Pedersen (2013): Value and Momentum Everywhere, *Journal of Finance* 68, pp. 929-985.

Daniel, Mota, Rottke and Santos (2020): The Cross-Section of Risk and Returns, *Review of Financial Studies* 33, pp. 1927-1979.

Frazzini and Pedersen (2014): Betting Against Beta, *Journal of Financial Economics* 111, pp. 1-25.

In your **10-minute** presentation, I want you to pitch your strategy to the investment committee. Your job is to convince them to approve trading on this strategy and to include it to its current portfolio, which currently consists of one European market ETF. The presentation will be graded, and the grade will not simply be given based on the best performance, but rather on how convincing your presentation was. You will also have to upload your code.

Some tips:

#### Backtesting results

- Calculate appropriate performance and risk measures
- Provide plots to show performance over time
- Any helpful additional information about diversification, turnover, the types of stocks you are trading (for example, their size), etc. is appreciated

#### Economic reasoning

- Briefly argue, why you think the strategy works (mispricing vs. risk premium) and why you are convinced that it will continue to work.
- Comment on expected trading costs, potential leverage and capacity.

In our last session, we will see how your strategy performs out-of-sample. I will provide those data after your presentations. Make your code sufficiently flexible to easily exchange the data for this out-of-sample test. The evaluation criterion, again, will be the Information Ratio with respect to the market factor (MktRF) for the new sample. Within each tutorial group, the group with the highest **out-of-sample Information Ratio** will get 3 extra points for the exam, the group with the second-highest will get 2 extra points, and the one with the third-highest will get 1 extra point.

In order to be eligible for the bonus points, the initial group project submission must include:

- A code file that is well-documented, understandable, and easy to run out-of-the-box
- A slide in the appendix that describes the algorithm step by step, with all parameter choices etc., in natural language, so that it can be replicated in any programming language

In case either running the code or replicating the code based on the description does not work out-of-the-box, the group loses eligibility for the bonus points.