Group Assignment :

Estimating & evaluating ex-ante portfolio risk

This group assignment is about the estimation of appropriate risk measures for a US multi-asset Total Return fund and the evaluation of the resulting risk profile.

Due dates :

- Wednesday **February 7** before noon, a document of max 2 pages in which you (1) outline your plans so far for your analyses & the report, and (2) can ask questions that you may have on the set-up or content of your report. I will provide feedback on this;
- Monday **February 26** before noon, for your final research report; I will provide feedback too.
- Submit both documents in PDF format by email at winfried.hallerbach@EDHEC.com. Please let your file names start with [cohort][group_number], for example "B7 report.pdf", so I do not have to rename all your PDFs to ensure a proper sorting…

The fund and the portfolio manager

Consider the following representative US asset mix of a "Yale-type" portfolio : 50% Equities; 20% Treasuries (Tsies), 5% Corporate Investment Grade (IG) credits and 5% Corporate High Yield credits for the fixed income part; and 20% alternative investments. The latter investments consist of two parts : a 15% position in an Absolute Return (AR) long/short equity strategy fund, and a 5% position in oil. This default mix is shown in Table 1.

weights	**Equities**	**Fixed Income**			**Alternatives**		
portfolio :	**Equities**	**Tsies**	**CorpIG**	**CorpHY**	**AbsReturn**	**Oil**	**Total**
default	50%	20%	5%	5%	15%	5%	100%
active	-10%	15%	-5%	-5%	10%	-5%	0%
augmented	40%	35%	0%	0%	25%	0%	100%

Table 1 : *The representative (default) portfolio mix, the active positions, and the resulting augmented portfolio composition of the US multi-asset Total Return portfolio.*

The representative mix portfolio is held without active positions until Thursday 30-Nov-2023 (the last day in the data set provided). On the afternoon of Friday 1-Dec-2023, the portfolio manager (PM)

plans to implement active over- and under-weights with respect to the default mix. These active positions and the resulting augmented portfolio are also shown in Table 1.

The active weights reflect the PM's beliefs that equities have become less attractive (because of an increasing head wind from geopolitical turmoil and a looming recession). In this expected risk-off scenario, also credits (both IG and HY) are deemed less attractive (their spreads being close to historical lows) and despite their less liquid nature, the PM has decided to remove them from the portfolio. Treasuries, in contrast, have become more attractive since the PM expects future rate cuts (after 11 rate hikes by the FED since 2022 and a stabilizing policy rate); Treasuries will also benefit from "flight to safety" when economic & political risks surge, and hence their weight will be increased. Absolute Return Equities have recovered over the past 6 months and since the PM is positive on long/short factor investing going forward, she wishes to increase the position in the Absolute Return Equities fund. To satisfy increasing sustainability & environmental (climate change) concerns, the position in oil is reduced to zero.

Your role

As a team of junior quants, you are providing quant support to the PM of this fund. Each week on Friday morning 11:00 am, the PM has a sparring meeting with you. In this meeting you are supposed to analyze and challenge the active trades the PM plans to implement in the course of Friday afternoon. In that meeting you are expected to present your critical analyses & recommendations on the impact of the planned trades on the ex-ante risk profile of the fund. For the meeting on Friday morning 1-Dec-2023, the PM expects your analysis on the impact of the active positions as discussed above.

Research questions

Your analyses must address the following questions :

- what is the **ex-ante risk profile** of the augmented portfolio on Thursday 30-Nov-2023 close and how does this compare against the default mix ? For tackling this question you have to decide on what risk measures and what parameter settings you deem relevant to capture the ex-ante risks of these portfolios. Motivate your choices and interpret the estimated risk statistics;
- how do the **tail risks** of the portfolio change after implementing the active positions ? This draws on Lecture 5;
- how is this augmented portfolio expected to perform in **stressed market scenarios** and how does this compare against the default mix ? This draws on Lecture 6.

Regarding the relevant **time horizon(s)** you have the following information :

- for investors, the recommended holding period of the Total Return fund is 3-5 years;
- official fund performance reporting is monthly (or 4-weekly);
- the PM can implement (active) portfolio trades once a week;
- a regulatory daily 99% VaR must be reported on a daily basis.

The data

On Blackboard you find a spreadsheet with the daily total return index series of these components over the period 30-Dec-1994 through 30-Nov-2023. You must use these data as your source data, but you are free to use additional data (up to Thursday 30-Nov-2023 close).[1] The data appendix at the end of this document contains details about these data series; for the sake of brevity, you don't have to repeat these sources in your assignment report. Note that you have to decide yourself (!) how to process these data (frequency, sample period etc) before you start your calculations.

Instructions for the written report :

- Do the **empirical work** to answer these research questions. Always start with critically examining the data. You may surprise me with additional (relevant) analyses, but in any case do answer the **research questions** !
- Each group writes a **research report** with their findings. Each student in a group should be able to answer all questions regarding the research and the report : you have full ownership of the work. "I did not write that part" is not a valid excuse.
- **Document & explain** what you do in a clear way. **Motivate** your methodology. **Discuss** your results and draw clear **conclusions**.
- I will grade your report on the basis of both **content ànd form**. After all, if your report is badly structured or badly written, nobody will want to read it… The following instructions are comparable to those you have to comply with when submitting a journal article.
- The **outline** of your report should be : title page, table of contents, main text (in sections), reference list (if you refer to literature; use correct & consistent format), appendices (if any).
- The **title page** should (also) contain your names, student numbers - and don't forget the cohort & group number.

[1] Because the portfolio changes will be implemented on Friday afternoon, you must consider Thursday 30-Nov-2023 as the last day for which data are available. To avoid any forward-looking bias, you are not allowed to use more recent data.

- The **main text** should contain ALL relevant information. You start with an introduction section which contains the research questions and which announces the following sections in which you answer the research questions. You end with a conclusion & summary section. Reading only your introduction and summary sections should give me a good idea of what you did, why you did it, and what you found (i.e. the answers to the research questions).
- **Appendices** should ONLY contain background or supplemental information. Ignoring them should go without consequences.
- Make sure your report has a **logical structure**; divide your report accordingly into sections.
- Hint : start writing your report in **bullet points** (short & simple). This makes it easier to keep an overview of the (structure of the) text, especially when you are working with 5 or 6 people on the text. In addition, it is much easier to revise the text by editing & shifting bullet points than by rearranging full sentences. Moreover, by postponing making full sentences you avoid having to "kill your babies". Finally, if you're happy with the bullets you can start adding articles and conjugating the verbs. The resulting text will be much more concise & much better structured compared to starting with full sentences right away !
- Be clear on what you did, why you did it, what the results are, and what the results mean.
- Be especially explicit about how you use the **data**, viz. the sample period and the data frequency. I should be able to replicate your calculations based on your report. To save space, you don't have to describe the data sources for the data set provided, you can simply refer to the data appendix of this case assignment. You do have to document any additional data you use.
- Edit the final text to be consistent in terminology, layout etc (so it seems that it was written by only one person).
- The maximum size of your report is **effectively 8 pages A4** when using standard new document settings in MS Word with 1.5 lines line spacing; compare with this document. The line spacing & sufficient margins are important because I need room to annotate your report with my comments. To ensure a level playing field across groups, everything in excess of this limit I will NOT read and hence will NOT be graded.
- "Effectively" means NOT counting the title page, contents page, any graphs, reference list, any (technical) appendices, and partly empty pages (because of the start of a new section, e.g.). However, tables and footnotes DO count for effective report size.
- Do insert tables & graphs in the text where they belong (so NOT at the end of your report).
- Make your tables & graphs **self-contained**. Each table/graph should have a number, a title, and an explanation. If you do not **refer** to a table/graph in the text & **discuss** it, I will NOT look at it.

However, simple / small tables you can simply insert into the text, referring to them as "the table below (above)".

- **Number** all pages of your report. This is standard practice and allows me to refer to specific parts of your report when annotating.

Data appendix

- **Equities :** taken from Kenneth French's data library, this is the US market factor Mkt-RF plus the riskfree retun RF. Download from https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Research.
- **Treasuries :** this is a synthetic returns series we constructed from the US Treasury 10-year constant maturity yield, available from https://fred.stlouisfed.org/series/DGS10. To derive the synthetic returns, we assume a par bond on time t (hence a market value of 100%) and revalue the bond using the yield on time t+1 (and the coupon [i.e. yield] of time t).
- **Corporate IG / HY credits :** these data represent the ICE BofA US Corporate / High Yield Index value, which tracks the performance of US dollar denominated investment grade rated / below investment grade rated corporate debt publicly issued in the US domestic market. Download from https://fred.stlouisfed.org/series/BAMLCC0A0CMTRIV and https://fred.stlouisfed.org/series/BAMLHYH0A0HYM2TRIV , respectively.
- **Absolute Return fund of equity strategies :** the return series is constructed from adding 70% exposures to the HML (High Minus Low value), RMW (Robust Minus Weak profitability), and CMA (Conservative Minus Aggressive investment) factors to the risk free return RF. Download from https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/ftp/F-F_Research_Data_5_Factors_2x3_daily_CSV.zip .
- **Oil :** this series reflects the price in USD per barrel of West Texas Intermediate (WTI) oil, delivered at Cushing, Oklahoma, USA. Download from https://fred.stlouisfed.org/series/DCOILWTICO . This data series proxies the return on an investable oil ETF, giving exposure to changes in the oil price.