MFE Quant Workshop: Case Questions and Format

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1 Overview

Each group will deliver a presentation lasting approximately 20-30 minutes, followed by a 15-minute question period. The presentation time limit is strictly enforced. I will provide warnings to each group at the 5-minute and 1-minute remaining marks. After the presentation, the class and I will have 15 minutes to ask questions about the case. Be prepared to defend your analyses and justify your conclusions.

The 15-minute question segment will also include *spontaneous* quantitative technical questions. These questions will come directly from the MFE Quant Workshop Technical Questions PDF. After a question is posed, the team can deliberate to select one person to answer. Each member can only answer one question. (Hint: the teams have been strategically composed with a mix of more and less quant-focused students.) This deliberation time is solely for determining who will answer the question and not for discussing the answer itself.

For the presentation, please allocate 10-15 minutes to review the case and any relevant topics. The remaining time should be spent addressing and explaining your answers to the open questions within the case, as well as the questions provided below.

The performance of each group will be judged based on the quality of their analysis and presentation, as well as their performance during the 15-minute question period. The winners of the case competition will be rewarded a free lunch and bubble tea with me and some of my quant friends for some unique networking.

2 Alpha Architect

1. Discuss the psychological biases that underpin momentum investing, particularly focusing on investor overreaction and under-reaction. How do these biases influence the sustainability of momentum strategies? Can you provide a risk-premia based explanation for momentum? Which do you believe is the underpinning to this strategy?

2. Given the historical context and performance data presented in the case, speculate on the future of momentum investing. What emerging trends or potential disruptions could influence its viability as a strategy in the coming years? Provide any relevant research to support your claim.

3. Go to Ken French's website (link in slides) and download Momentum Factor (Mom), the 49 industry portfolios, and Fama/French 3 Factors. Perform a univariate regression of each industry portfolios *excess return* on momentum for the whole sample. Report your findings. Do you see any patterns? Perform the same exercise but with a sample of 2013-01 and onward. How have things changed? Why would things change or not change?

3 AQR Delta Strategy

1. Discuss the philosophical differences between AQR's bottom-up approach to hedge fund replication and the top-down approach used by its competitors. How do these differences impact the risk-adjusted return profile of the DELTA strategy?

2. Despite the innovative structure and fee model of the DELTA strategy, why do you think it has not achieved the explosive growth in AUM that was anticipated? What market dynamics and investor behaviors might be influencing this outcome?

3. Collect the data provided in Exhibits 8. Then using *any* of the data from Ken French's website (link in slides) try to explain the performance of the Delta portfolio's excess return as a function of a single variable. (Hint: do not just data-mining this, read the case and come up with a hypothesis on why a certain factor or portfolio would explain the excess returns.)

4 CPPIB

1. Do not answer all of the questions provided within the case. You will answer most of these naturally when summarizing the case itself. Instead, please explicitly focus on questions 21, 23, 25, and 27.

2. Using data provided and external sources if required, answer all of question 24.

5 Credit Default Swap

1. Critically analyze AIG's risk assessment model for super-senior tranches of CDOs. How did AIGFP's reliance on historical data and correlation assumptions impact their risk management strategy? What alternative method to calculating correlation would you use?

2. Analyze the concept of systemic risk as illustrated by AIG's involvement in the CDS market. How did AIG's position as a major credit protection seller contribute to the broader financial instability during the 2008 crisis? If their contagion to the market was large, would their beta be high or low?

3. Go to Ken French's website and download 10 Industry Portfolios. Estimate rolling correlations and variances of the industry portfolio returns. What do you find? Are these correlations stable? What impact might unstable correlations have on portfolio choice?

6 Smart Beta

1. Discuss the philosophical implications of smart beta strategies in the context of market efficiency. How do these strategies challenge or reinforce the Efficient Market Hypothesis? What happens if more and more capital is passively managed under such portfolios?

2. Analyze the concept of factor rotation and its practical challenges. Given the cyclicality of factor returns, how feasible is it for investors to successfully time their exposure to different factors?

3. Download QQQ total return from Yahoo Finance. Go to Ken French's website and download the relevant data to perform a Fama French 5 factor regression. Does QQQ have alpha? Why would QQQ have alpha? What do QQQ's factor loadings mean? Is 20 years worth of monthly data enough?