THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

This exam paper must not be removed from the venue

Venue _____
Seat Number _____
Student Number |__|__|__|__|__|__|__|__|
Family Name _____
First Name _____

School of Business

Semester Two Examinations, 2024

FINM3407 Behavioural Finance

This paper is for St Lucia Campus students.

Examination Duration: 120 minutes

Planning Time: 10 minutes

Exam Conditions:

•No written or printed material permitted
•Casio FX82 series or UQ approved and labelled calculator only
•During Planning Time - Students are encouraged to review and plan responses to the exam questions

Materials Permitted in the Exam Venue:
(No electronic aids are permitted e.g. laptops, phones)

None

Materials to be supplied to Students:
Additional exam materials (e.g. answer booklets, rough paper) will be provided upon request.

None

Instructions to Students:
If you believe there is missing or incorrect information impacting your ability to answer any question, please state this when writing your answer.

Please answer all questions directly in the spaces provided in this question booklet. Any work completed on rough paper will not be graded.

Total Marks: 50.

For Examiner Use Only

Question	Mark

Total _____

Total Marks: 50

Question 1

Using the DHS model, consider the following parameters:

- $\theta = 2$: This is the true value of the signal.
- $\sigma_\theta^2 = 2$: The variance of the signal.
- $\sigma_\varepsilon^2 = 3$: The variance of the noise.
- $\sigma_C^2 = 2$: The error variance for overconfident investors.
- $s_2 = 3$: This is the received signal.

A. Given that $s_2 = \theta + \epsilon$, determine the path of prices when overconfident investors set prices compared to the rational path of prices. **[2 marks]**

From $s_2 = \theta + \epsilon$, $3 = 2 + \epsilon$, thus, $\epsilon = 1$.
When overconfident investors determine the path of prices, the price change is:

$$\mathbf{P_2} = \frac{\sigma_\theta^2}{\sigma_\theta^2 + \sigma_C^2} \times (\theta + \epsilon,) = \frac{\mathbf{2}}{\mathbf{2+2}} \times (\mathbf{2+1}) = \frac{\mathbf{3}}{\mathbf{2}} = \mathbf{1.5}$$

When rational investors determine the path of prices, the price change is:

$$\mathbf{P_2} = \frac{\sigma_\theta^2}{\sigma_\theta^2 + \sigma_\varepsilon^2} \times (\theta + \epsilon,) = \frac{\mathbf{2}}{\mathbf{2+3}} \times (\mathbf{2+1}) = \frac{\mathbf{6}}{\mathbf{5}} = \mathbf{1.2}$$

B. What does your answer in part (a) suggest? **[4 marks]**

This suggests that when overconfident investors are determining prices, they move the prices to 1.5. this is a slight underreaction to the true signal change, which is 2.
As for the rational investors, they move the prices to 1.2, which represents a more pronounced underreaction compared to the overconfident investors.
In summary, while overconfident investors typically overreact to signals in many cases, in this particular instance, they underreacted but less so than rational investors. The uniqueness of the signal and the relative variances influenced the reactions of both sets of investors.

C. How does the presence of overconfident investors impact the volatility of prices compared to a market with only rational investors? Analyse and discuss the implications for market efficiency. **[4 marks]**

The presence of overconfident investors impacts market volatility and efficiency in several ways:

1. **Increased volatility:** Overconfident investors' misjudgement of the noise variance leads to more frequent and larger price swings as they overreact to new information. This increased trading activity and price adjustment contribute to higher market volatility.
2. **Price deviations from fundamentals:** Because overconfident investors overestimate the precision of their information, prices may deviate more from their fundamental values. This can lead to bubbles.
3. **Market efficiency:** Market efficiency can be compromised as prices reflect not only true signals but also the biases of overconfident investors. While markets with rational investors tend to price assets based on all available information correctly, the presence of overconfident investors introduces noise, making prices less informative and markets less efficient.

Question 2

Tiffany is a hedge fund manager with a history of outstanding performance. For the past 10 years, Tiffany's fund has used an equity market neutral strategy (long/ short strategy that strives to eliminate market risk, i.e., beta should be zero) which has proved to be effective as a result of Tiffany's hard work. An equity market neutral strategy normally generates large daily trading volume and shifts in individual security positions. Tiffany's reputation has grown over the years as her fund has consistently beaten its benchmark. Employee turnover on Tiffany's team has been high; she has a tendency to be quick to blame, and rarely gives credit to team members for success. During the past twelve months, her fund has been significantly underperforming against its benchmark. One of Tiffany's junior analysts, Tang, is concerned about the underperformance and notes the following::

- **Observation 1:** Certain positions are significantly underwater with higher risk profiles and have been held for longer than normal.
- **Observation 2:** Trading volume has decreased by more than 40%.
- **Observation 3:** The portfolio is more concentrated in a few sectors.

Tang is worried that the portfolio may be in violation of the fund's Investment Policy Statement (IPS). Tang brings this to Tiffany's attention during a regular weekly team meeting. Tiffany dismisses Tang's analysis and tells the team not to worry because she knows what she is doing. Tiffany indicates that since she believes the pricing misalignment will correct itself, the portfolio will not be able to take advantage of the reversion to the mean if she sells certain losing positions. She reassures the team that this strategy has performed well in the past and that the markets will revert, and the fund's returns will return to normal levels.
Tang tactfully suggests that the team review the fund's IPS together, and Tiffany interrupts him and reminds the team that she has memorised the IPS by heart. Tang contemplates his next

step. He is concerned that Tiffany is displaying behavioural biases which are affecting the fund's performance.

a. Identify and discuss the behavioural biases that Tiffany might be exhibiting. Provide examples from the case to support your analysis. **[3 marks]**

- **Self-attribution bias:** Tiffany takes credit for the fund's successes but assigns blame for failures. This is evident when she attributes the historical performance of the fund to her expertise and dismisses the team's concerns about current underperformance. By doing so, she may be ignoring external factors that contributed to past successes and is reluctant to accept responsibility for recent failures.
- **Loss-aversion bias**: Tiffany demonstrates loss-aversion bias by holding on to losing positions, hoping they will recover instead of cutting losses. This bias is shown when she mentions that the portfolio will take advantage of the reversion to the mean if she doesn't sell certain losing positions. Her reluctance to realise losses could lead to prolonged underperformance.
- **Overconfidence or illusion of control**: Tiffany's dismissal of Tang's analysis and her assertion that she has memorised the IPS suggest overconfidence and an illusion of control. She believes that her knowledge and skills can predict and control market outcomes, which may not be realistic.

b. How can herd behaviour among team members impact the decision-making process within Tiffany's fund, especially given her authoritative leadership style? **[4 marks]**

Herd behaviour refers to the tendency of individuals to mimic the actions of a larger group, often ignoring their own judgment or information. In the context of Tiffany's fund, herd behaviour can significantly impact decision-making:

- **Reduced Innovation**: If team members are primarily following Tiffany's lead rather than contributing their own ideas and insights, the fund may miss out on innovative strategies and approaches that could improve performance.
- **Reinforcement of Biases**: Herd behaviour can reinforce Tiffany's behavioural biases. If team members are reluctant to challenge her views due to fear of blame or retribution, her biases such as overconfidence and loss-aversion may go unchecked and continue to influence investment decisions negatively.
- **Conformity Pressure:** Given Tiffany's authoritative leadership style, team members might feel pressured to conform to her views and decisions. This pressure can suppress dissenting opinions and critical analysis, leading to a lack of diverse perspectives in the decision-making process.
- **Moral Hazard:** Team members might also rely too heavily on Tiffany's reputation and past success, assuming that following her lead will automatically result in favourable outcomes. This reliance can reduce individual accountability and due diligence, increasing the risk of collective mistakes.

- **Groupthink**: The team may experience groupthink, where the desire for harmony and consensus results in poor decision-making outcomes. Critical thinking and risk assessment are compromised as team members prioritize agreement over effective analysis.

c. Recommend strategies that Tang and the team could employ to address and mitigate the impact of Jordan's behavioural biases on the fund's performance. **[3 marks]**

- **Revisiting the IPS:** Tang's suggestion to review the IPS together should be pursued. This can ensure that everyone is on the same page regarding risk management, diversification, and trading volume. It can also serve as a reminder to adhere to the guidelines, reducing the impact of personal biases.
- **Checks and balances:** Implementing a more robust decision-making process that includes input from all team members can help mitigate the impact of Tiffany's biases. This might involve regular performance reviews, risk assessments, and peer evaluations to provide balanced perspectives.
- **Fostering an open culture:** Creating an environment where team members feel comfortable voicing concerns and suggestions without fear of retribution is crucial. Encouraging open dialogue can help identify and address issues more effectively.
- **Data-driven approaches:** Utilizing quantitative models and data analytics can help make more objective investment decisions. Relying on data can counteract subjective biases and ensure that decisions are aligned with the fund's strategic goals.
- **Performance metrics and accountability:** Establishing clear performance metrics and holding team members, including Jordan, accountable for deviations from the IPS can reinforce discipline and adherence to the fund's investment strategy.

Question 3

Momentum is the anomaly that gives those subscribing to efficient markets the most trouble.

a. What cognitive biases might contribute to momentum in financial markets? **[3 marks]**

- **Confirmation bias:** Investors tend to seek out information that confirms their existing beliefs. In momentum investing, this can lead them to focus on positive news and past performance data for winning stocks, while ignoring or downplaying negative information or potential risks. This reinforces the notion that past winners will continue to outperform.
- **Overconfidence:** Investors may believe they can predict market trends based on past performance, leading them to continue buying assets that have been performing well.
- **Herd behaviour:** Investors tend to follow the actions of others, buying assets that are increasing in value because others are doing so, which can drive prices even higher.

b. How might these biases potentially create market inefficiencies that momentum strategies exploit? **[4 marks]**

Momentum investing can create market inefficiencies in several ways:

- **Asset bubbles:** Prolonged periods of positive momentum can lead to asset bubbles, where prices are driven far above their intrinsic values due to continuous buying.
- **Overconfidence:** Investors might overreact to positive news, pushing prices higher than justified by fundamentals, leading to eventual corrections.
- **Delayed reactions:** Similarly, investors may underreact to negative news initially, causing a delayed correction as the market eventually adjusts to the true value of the asset.

c. Are there any potential risks associated with relying solely on momentum as an investment strategy? **[3 marks]**

- **Mean reversion:** Past performance doesn't guarantee future success. Momentum can reverse course unexpectedly, leading to significant losses if investors are heavily invested in "winning" stocks that suddenly underperform.
- **Volatility:** Momentum strategies can be more volatile than value or growth investing approaches. This can lead to larger swings in portfolio value, which may not be suitable for all investors.
- **Limited diversification:** Focusing solely on momentum stocks can leave a portfolio overly exposed to a specific investment style and potentially miss out on opportunities in other areas of the market.

Question 4

Mike is a well-known energy industry analyst; he has worked in the energy industry for over 30 years and has won The Best Analyst Award multiple times, even though all of them were achieved when he just joined the industry. Mike recently came across a portfolio which heavily invested in an energy company, TheNexGreen. TheNexGreen is currently undergoing a new project, PowerBugs, in which they aim to develop a machine that will generate and store power using insects. When reading the report conducted by their head of R&D, Mike was excited and attracted to the novelty of PowerBugs, but he also noticed that the project was overdue with their target timelines. Nonetheless, it was mentioned in the conclusion that the R&D department has seen positive signs that PowerBugs is achievable. While Mike has never been directly involved in the R&D process and had difficulty understanding the scientific reports, combining his past experience and the concluding statement, he feels reassured. Mike stated "Investing over 75% in TheNexGreen is a bit risky but I believe it is appropriate and a high return decision. What they are doing is innovative and very likely to succeed. Even if PowerBugs fails I will be able to use my superior knowledge of the energy industry to outperform the market".

a. Identify the specific behavioural biases that Mike appears to be exhibiting in his evaluation of the PowerBugs project. Provide examples from the scenario to support your assessment of each bias. **[4 marks]**

- **Overconfidence**: Mike is showing overconfidence bias by having too much faith in his "superior knowledge of the energy industry", stating he can use his knowledge to outperform even if PowerBugs fails. Winning analyst awards early in his career, despite the timing suggesting luck, has likely inflated his self-confidence inappropriately.
- **Self-Attribution Bias:** Mike is showing self-attribution bias by believing his early career success, like winning analyst awards, was due entirely to his own skills. He ignores the possibility that luck or other factors helped him succeed. This makes him overconfident in his ability to invest in TheNexGreen, without fully considering the risks of the PowerBugs project.
- **Familiarity Bias**: As an energy industry veteran, Mike is drawn to the PowerBugs project at TheNexGreen simply because it operates in his familiar domain. His preference seems driven more by the project's energy ties than its actual technological/scientific merits.
- **Recency Bias**: Mike anchors heavily on the positive R&D report conclusion, discounting the behind-schedule timelines. He oversells the likelihood of success based on recent encouraging signs rather than the full project history.

b. How might these biases lead Mike to make a suboptimal capital budgeting decision regarding investing in PowerBugs? **[6 marks]**

- Overconfidence in his abilities as an energy analyst, despite lack of specific R&D expertise, may cause him to grossly underestimate the risks and challenges of the PowerBugs technology succeeding.
- Self-attribution bias makes Mike think his past success was all due to his own skills, ignoring the role of luck. This could lead him to overestimate his ability to judge the PowerBugs project and invest too much, despite not fully understanding the risks.
- His familiarity bias towards the energy industry makes him latch onto PowerBugs simply because it is an energy-related project, even though it utilizes very different and unfamiliar underlying technologies that he lacks direct knowledge of.
- Recency bias leads him to anchor too heavily on the positive recent R&D report conclusions while largely discounting the fact the project is behind schedule, reflecting a more troubling overall progress history.

Collectively, these behavioural biases may cause Mike to be overly optimistic about PowerBugs' chances of success and its projected returns. As a result, he could grossly underestimate the risk of failure and overall allocate capital to the project in a way that is unsupported by a rational, unbiased analysis of the facts.
Investing 75% of the portfolio in a single, unproven, high-risk venture like PowerBugs seems very likely to be an imprudent capital budgeting decision driven primarily by Mike's behavioural shortcomings rather than a comprehensive risk/return assessment.

Question 5

In housing markets, there is a positive correlation between prices and trading volume. When there is a housing boom, many houses sell at, or even above, the prices asked by sellers. In times of bust, homes sit on the market for a long time with asking prices that exceed the prices that can reasonably be expected.

a. During a housing boom, what behavioural factors contribute to the increase in both housing prices and trading volume? **[4 marks]**
   In a housing boom, several psychological factors contribute to rising prices and increased trading volume.

   Buyers
   - Buyer behaviour is influenced by **fear of missing out**, leading them to accept higher prices to secure a home quickly.
   - **Overconfidence** can also play a role, where buyers believe prices will continue to rise, justifying higher purchase prices.
   - **Herd behaviour** encourages buyers to follow the trend of others purchasing homes.
   - **Greater Fool Theory** influences buyers by encouraging speculative purchases. Buyers believe that even if they pay an inflated price, they will be able to sell it to someone else at t higher price.

Sellers

- Seller behaviour is influenced by **anchoring**, where they set prices based on recent high sales rather than market fundamentals.
- Sellers might also experience **overconfidence** in the continued appreciation of their property values.

b. What market dynamics and buyer/seller behaviours lead to homes sitting on the market longer and asking prices exceeding reasonable expectations during a housing bust? **[4 marks]**

Sellers:

- Sellers often display **loss-aversion bias**, where they are reluctant to lower prices below what they originally paid or expected to receive.
- **Anchoring** also affects sellers, as they set prices based on peak market values rather than current market conditions.

Buyers:

- Buyers, on the other hand, may exhibit **risk aversion**, becoming more cautious and negotiating harder, leading to fewer transactions.

Economic factors:

- Economic factors such as rising interest rates and stricter lending standards further decrease buyer affordability, prolonging the time homes stay on the market.

c. How do buyer and seller behaviours differ during housing booms and busts? **[2 marks]**

In housing booms, buyers are often more eager and willing to pay higher prices quickly to secure a home, driven by optimism and fear of missing out. Sellers, in turn, are confident and may raise prices. In contrast, during busts, buyers become more cautious and selective, often negotiating for lower prices due to concerns about the economy and future price drops. Sellers may hold out for higher prices, resulting in fewer successful transactions and longer market times for homes.

END OF EXAMINATION