

Week 8 Midterm Practice Problem Set

1 Module 1 Practice Questions (30 points)

Short-answer conceptual questions testing understanding of economic position, spending behavior, marketing psychology, and mental accounting

1.1 Structure and Instructions

Format:

- Short-answer questions
- Incorporate personal experiences and class materials

Coverage: Weeks 1-4 materials

- Week 1: Fundamentals of Investment Behavior
- Week 2: Spend Less and Save More
- Week 3: You as an Asset and a Company
- Week 4: Mental Accounting and Choice Bracketing

Question 1: Economic Position and Income Sources (3 points)

Using the GDP decomposition into **Wages, Rents, Interest, and Profits (WRIP)**:

- (a) Currently, where do you (or most students) derive income? Which component(s) of WRIP dominate? (1 point)
- (b) Suppose you execute the course goals: reduce spending through behavioral tools and start a side consulting business. How might your WRIP decomposition change in 5 years? (1 point)
- (c) Why is understanding your position in the WRIP decomposition a prerequisite for investment? (1 point)

Question 2: The Four Categories of Spending (3 points)

Week 2 classified spending into four categories:

- (a) Briefly define **Needs**, **Wants for Self-Fulfillment**, **Wants Influenced by Others (Strategic)**, and **Wants Influenced by Others (Impulsive)**. Give one example of each from your own spending. (1.5 points)
- (b) Which category poses the greatest behavioral risk for overspending, and why? What psychological mechanism drives this category? (1.5 points)

Question 3: Behavioral Obstacles to Spending Reduction (3 points)

Week 2 identified several behavioral reasons for overspending. For each scenario below, name the primary behavioral bias or psychological mechanism at work:

- (a) You purchase a premium coffee every morning (costing \$5/day, or \$1,825/year), though you tell yourself you're saving for a house down payment. Why does this seem inconsequential to you, yet amounts to \$30,000+ over a decade? (1.5 points)
- (b) Your friend suggests going to an expensive restaurant, and though you didn't plan to spend \$80 that evening, you feel anxiety about saying no and appearing poor. What psychological mechanism influences your decision? (1.5 points)

Question 4: Marketing Psychology and Vulnerability (3 points)

Week 3 examined marketing strategies that exploit behavioral vulnerabilities.

- (a) You receive a text: "*Flash Sale: 70% off luxury sneakers. Only 3 pairs left. Expires in 2 hours.*" Which two psychological vulnerabilities does this exploit? Explain how each works. (1.5 points)
- (b) What is one defensive strategy you could employ before entering a high-temptation shopping environment (e.g., mall, social media)? (1.5 points)

Question 5: Mental Accounting and Fungibility (4 points)

Week 4 explored how mental accounting violates the principle that money should be fungible (interchangeable).

- (a) Explain the **Savings-Debt Paradox**: Why do households hold both low-interest savings (\$5,000 in a savings account at 2%) and high-interest debt (\$5,000 credit card balance at 18%) simultaneously? Which mental accounting concept explains this? (2 points)
- (b) The **Peanuts Trap** describes how small, recurring expenses accumulate invisibly. Calculate the 10-year opportunity cost of a \$10/month subscription service, assuming a 5% annual return on invested money. Would you describe this cost as "peanuts"? Why or why not? (2 points)

Question 6: Choice Bracketing and Financial Outcomes (3 points)

Week 4 distinguished between **narrow bracketing** (evaluating decisions in isolation) and **broad bracketing** (evaluating decisions as a portfolio).

- (a) The "military analogy" describes winning every battle but losing the war. Give one real-world financial example of how narrow bracketing causes this outcome. (1.5 points)
- (b) How can narrow bracketing *help* with financial discipline? Give a specific example from Week 4 materials. (1.5 points)

Question 7: Mental Accounting by Design (2 points)

Week 4 showed that mental accounting can be harmful by default but helpful by design.

Name and briefly explain two strategies from the "Strategic Toolkit" that deploy mental accounting deliberately for better financial outcomes: (2 points)

Question 8: Self-Control and Temporal Inconsistency (4 points)

Week 4 examined how mental accounting and present bias create self-control problems, particularly in the tension between “planning selves” and “doing selves.”

- (a) You commit to a monthly savings target of \$500 (your “planning self”). However, by mid-month, you encounter an attractive purchase (new shoes, electronics, dining out) that costs \$200. You have the money available. Your “doing self” wants to make the purchase now. Describe two specific behavioral mechanisms that explain this self-control failure, and explain how each one operates in this scenario. (2.5 points)
- (b) Propose one concrete pre-commitment or environmental design strategy from Week 4 that could help your “planning self” overcome your “doing self” in this situation. How would this strategy work, and why would it be effective against the behavioral mechanisms you identified in part (a)? (1.5 points)

2 Module 2 Practice Questions (70 points)

Formal assessment covering Expected Utility Theory, EU Anomalies, and Prospect Theory

2.1 Structure and Instructions

Format:

- Part A: Short-answer conceptual questions (30 points)
- Part B: Problem-solving and application (40 points)
- Closed book; notes prohibited; calculator allowed

Coverage: Weeks 5-7 materials

- Week 5: Expected Utility (EU) Theory
- Week 6: EU Anomalies
- Week 7: Prospect Theory

2.2 Part A: Conceptual Foundations (30 points)

2.2.1 Question A1: Risk and Ambiguity (3 points)

Define and distinguish between **risk** and **ambiguity**. Provide one real-world example of each. Why is this distinction important for investment decisions?

2.2.2 Question A2: Risk Attitudes (3 points)

Describe the three types of risk attitudes: risk-averse, risk-neutral, and risk-seeking. For each attitude, sketch the shape of the utility function and explain what that shape means psychologically.

2.2.3 Question A3: The St. Petersburg Paradox (3 points)

- What is the mathematical expected value of the St. Petersburg game?
- Why do people refuse to play despite the infinite expected value?
- How did this paradox motivate the development of Expected Utility Theory?

2.2.4 Question A4: Certainty Equivalent and Risk Premium (3 points)

A risk-averse person faces a gamble: 50% chance of gaining \$100, 50% chance of losing \$50.

- Define the **certainty equivalent (CE)** for this gamble
- Define the **risk premium (RP)**
- How would these values differ for a risk-neutral person?

2.2.5 Question A5: The Allais Paradox (4 points)

Scenario 1:

- Option A: \$2,500 (33%), \$2,400 (66%), \$0 (1%)
- Option B: \$2,400 (100%)

Scenario 2:

- Option C: \$2,500 (33%), \$0 (67%)
- Option D: \$2,400 (34%), \$0 (66%)

Questions:

- What are the typical choices, and why are they inconsistent with Expected Utility Theory? (2 points)
- What axiom of EUT does this violate? (2 points)

2.2.6 Question A6: The Framing Effect (4 points)

The Asian Disease Problem presents the same decision in two frames:

- Describe the **gain frame** (Problem 1) and the typical choice (2 points)
- Describe the **loss frame** (Problem 2) and the typical choice (2 points)
- Explain why the same objective outcomes produce opposite risk preferences (included in above scoring)

2.2.7 Question A7: Reference Dependence (3 points)

Reference dependence is a core insight of Prospect Theory.

- Define what a **reference point** is (1 point)
- Explain why individuals evaluate outcomes as **gains or losses from a reference point** rather than as absolute wealth (1 point)
- How does this explain the Reflection Effect? (1 point)

2.2.8 Question A8: The Value Function (4 points)

The Prospect Theory value function is S-shaped: concave for gains, convex for losses.

- What does the concavity for gains imply about risk attitudes? (1.5 points)
- What does the convexity for losses imply about risk attitudes? (1.5 points)
- Define and explain **loss aversion**. What is the empirical loss-aversion coefficient λ ? (1 point)

2.3 Part B: Problem-Solving and Application (40 points)

2.3.1 Problem B1: Expected Utility Calculation (6 points)

Consider a lottery: 60% chance of \$1,000, 40% chance of \$0.

An individual has the utility function $u(x) = \sqrt{x}$.

1. Calculate the **expected value (EV)** of the lottery (1 point)
2. Calculate the **expected utility (EU)** of the lottery (1.5 points)
3. Calculate the **certainty equivalent (CE)** (1.5 points)
4. What is the **risk premium?** (1 point)
5. Is this person risk-averse, risk-neutral, or risk-seeking? Justify your answer. (1 point)

2.3.2 Problem B2: Comparing EUT vs. PT (7 points)

A professional faces two investment options:

- Option A: Guaranteed gain of \$5,000
 - Option B: 50% chance of \$10,000, 50% chance of \$0
1. Under Expected Utility Theory with typical risk aversion, which would most people prefer? Why? (2 points)
 2. Now consider the same decision framed in terms of **losses from a reference point** of \$5,000 (current wealth)
 - Option C: Certain loss of \$0 (reference point maintained)
 - Option D: 50% chance of gain of \$5,000, 50% chance of loss of \$5,000
 3. How does Prospect Theory's **loss aversion** predict behavior would change? (2.5 points)
 4. Explain the **Reflection Effect** using this example (2.5 points)

2.3.3 Problem B3: Probability Weighting (8 points)

Prospect Theory's decision weight function $w(p)$ is inverse S-shaped, meaning:

- Small probabilities are **overweighted**: $w(p) > p$ for small p
- Large probabilities are **underweighted**: $w(p) < p$ for large p

Consider two investment scenarios:

1. **Scenario 1:** Lottery ticket offering a jackpot of \$10 million with probability $p = 0.0001$ (1 in 10,000)
 - Under Expected Utility Theory, what is the rational decision? Why? (2 points)
 - Under Prospect Theory with probability overweighting, why might people buy tickets despite unfavorable odds? (2 points)
2. **Scenario 2:** Investment in a portfolio with 95% probability of 8% annual return
 - Under EUT, this should be attractive given high probability. Why might people underinvest? (2 points)
 - How does probability underweighting (with loss aversion) explain insufficient equity investing? (2 points)

2.3.4 Problem B4: The Editing Phase in Action (5 points)

A prospect is offered: “80% chance of \$300, 20% chance of \$200”

Describe how Prospect Theory’s four editing operations would handle this prospect:

1. **Coding:** Set the reference point and identify as gains or losses (1 point)
2. **Combination:** Identify any outcomes that can be combined (1 point)
3. **Segregation:** Identify any riskless components that can be separated (1 point)
4. **Cancellation:** Identify components that would be cancelled when comparing to another prospect (1 point)

Then write the **simplified edited representation** of this prospect. (1 point)

2.3.5 Problem B5: “Deal or No Deal?” (14 points)

The game show “Deal or No Deal” presents a contestant with a final choice between accepting a sure offer from the banker or keeping a briefcase that is still unrevealed. On September 1, 2008, Jessica Robinson faced two remaining amounts: \$200,000 and \$1,000,000. The banker offered \$561,000.

Fundamentally, the contestant chooses between:

- A sure amount: \$561,000, or
- A lottery: \$200,000 with probability 1/2, and \$1,000,000 with probability 1/2.

Answer the following:

- (a) Compute the expected value (EV) of the lottery. (2 points)
- (b) Assume a risk-averse utility function $u(x) = \sqrt{x}$. Compute the expected utility (EU) of the lottery and the certainty equivalent (CE) for this utility. Based on the CE, would a person with this utility accept the banker’s offer of \$561,000? Show your calculations. (4 points)
- (c) Suppose the contestant’s preferences follow a CRRA utility function

$$u(x) = \begin{cases} \frac{x^{1-\alpha}}{1-\alpha}, & \alpha \neq 1, \\ \ln x, & \alpha = 1. \end{cases}$$

Find the value of the relative risk aversion parameter α (numerically) for which the contestant’s certainty equivalent equals \$561,000 (i.e., the α that makes the contestant indifferent between the sure \$561,000 and the lottery). Show the equation you would solve and provide the numeric solution (you may state the solution to three significant figures). (5 points)

- (d) Briefly discuss two reasons (one behavioral, one strategic) why the banker might offer \$561,000 rather than the full expected value. (3 points)