Lesson 2.3 Quiz: Democratizing Investment and Lending

Module 2: The Access Problem

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Digital Finance — BSc Course

Q1: Modern Portfolio Theory – Core Insight

What is the **key insight** of Modern Portfolio Theory (MPT)?

A. Higher-risk assets always produce higher returns
B. Diversification can reduce portfolio risk below the weighted average of individual asset risks
C. All investors should hold 100% equities for long-term growth
D. Portfolio risk depends only on the riskiest asset in the portfolio

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- (C) All investors should hold 100% equities for long-term growth
- (D) Portfolio risk depends only on the riskiest asset in the portfolio

Answer: (B) MPT shows that because asset returns are not perfectly correlated ($\rho < 1$), combining assets reduces portfolio risk below the weighted average of individual risks.

Q2: Efficient Frontier Definition

What does the **efficient frontier** represent?

A. The set of all possible portfolios
B. The set of portfolios that maximize return for each given level of risk
C. The portfolio with the absolute highest expected return
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Answer: (B) The efficient frontier is the upper boundary of the feasible set — portfolios offering the maximum expected return for each level of risk (standard deviation).

Q3: Sharpe Ratio Interpretation

A portfolio has a Sharpe ratio of 0.75. What does this mean?

A. The portfolio returns 75% annually
B. For every 1% of risk taken, the portfolio earns 0.75% above the risk-free rate
C. The portfolio has a 75% probability of positive returns
D. The portfolio beats the market 75% of the time

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Answer: (B) The Sharpe ratio measures excess return per unit of risk. $S = 0.75$ means each percentage point of standard deviation earns 0.75 percentage points of return above the risk-free rate.

Q4: Risk Tolerance Profiling Purpose

Why do robo-advisors require a risk tolerance questionnaire before investing?

A. To comply with anti-money laundering (AML) regulations
B. To determine the appropriate asset allocation based on the client's risk capacity and preferences
C. To verify the client's identity
D. To calculate the expected return of the portfolio

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Answer: (B) The questionnaire assesses time horizon, loss tolerance, income stability, and goals to map the client to an appropriate risk profile and corresponding asset allocation. This is also a regulatory requirement (MiFID II suitability).

Q5: Sharpe Ratio Calculation

A portfolio has an expected return of 10%, a standard deviation of 15%, and the risk-free rate is 2%. What is the Sharpe ratio?

- A 0.40
- B 0.53
- C 0.67
- D 0.80

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- (C) 0.67
- (D) 0.80

Answer: (B) $S = (10\% - 2\%)/15\% = 8\%/15\% = 0.533 \approx 0.53$.

Q6: Comparing Sharpe Ratios

Portfolio A has $E[r] = 12\%$, $\sigma = 20\%$. Portfolio B has $E[r] = 7\%$, $\sigma = 8\%$. Risk-free rate is 2%. Which portfolio has better risk-adjusted performance?

A. Portfolio A (higher return)
B. Portfolio B (higher Sharpe ratio)
C. Both are equal
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Answer: (B) $S_A = (12 - 2)/20 = 0.50$. $S_B = (7 - 2)/8 = 0.625$. Portfolio B has a higher Sharpe ratio ($0.625 > 0.50$) and therefore better risk-adjusted performance.

Q7: Fee Impact Calculation

An investor puts $10,000 into two portfolios that both earn 7% gross. Portfolio X charges 0.25% annually; Portfolio Y charges 1.25% annually. After 20 years, approximately how much more does Portfolio X have?

- A $1,000
- B $3,500
- C $5,500
- D $7,500

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Answer: (C) X: $\$10{,}000 \times (1.0675)^{20} = \$37{,}047$. Y: $\$10{,}000 \times (1.0575)^{20} = \$30{,}613$. Difference $\approx \$6{,}434$, closest to \$5,500. The 1% fee gap compounds to a significant loss over 20 years.

Q8: Rebalancing Trigger

A portfolio has a target allocation of 60% equity / 40% bonds with a $\pm 5\%$ threshold band. After a market rally, equity is now 68% and bonds are 32%. What should the robo-advisor do?

- **A** Nothing — the drift is within the threshold band
- **B** Rebalance — equity has drifted more than 5 percentage points from target
- **C** Sell all equity and move to bonds
- **D** Wait until the next calendar quarter

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Answer: (B) Equity drifted from 60% to 68%, an 8 percentage point deviation, exceeding the 5pp threshold. The robo-advisor should sell equity and buy bonds to restore 60/40.

Q9: Tax-Loss Harvesting Mechanics

An investor bought ETF-A for $10,000 and it is now worth $8,500. The robo-advisor sells ETF-A and buys a similar ETF-B. What is the tax benefit?

A. The investor earns $1,500 in cash
B. The investor realizes a $1,500 capital loss that can offset capital gains
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Answer: (B) Selling at a $1,500 loss creates a realized capital loss. This loss can offset $1,500 in capital gains elsewhere, reducing the investor's tax bill. The portfolio remains invested in a similar asset (ETF-B).

Q10: P2P Lending Definition

In peer-to-peer (P2P) lending, who bears the **credit risk** of borrower default?

A. The P2P platform
B. The investors who funded the loan
C. The government deposit insurance scheme
D. The borrower's bank

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Answer: (B) In P2P lending, investors directly fund loans and bear credit risk. The platform facilitates but does not guarantee repayment. P2P loans are not covered by deposit insurance.

Q11: P2P Return Calculation

An investor lends $1,000 across 100 P2P loans at an average 8% annual rate. If 5% of loans default completely, what is the approximate net return?

A. 8% (defaults do not affect return)
B. 3% (8% interest minus 5% losses)
C. 5% (only performing loans generate returns)
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Answer: (B) Gross interest: $\$1{,}000 \times 8\% = \$80$. Defaults: $\$1{,}000 \times 5\% = \$50$ lost. Net: $\$80 - \$50 = \$30$, or 3% return. This illustrates why default rates must be below the interest rate for positive returns.

Q12: P2P Diversification

Why do P2P platforms recommend investing small amounts across many loans rather than large amounts in a few loans?

- A. Smaller amounts earn higher interest rates
- B. Diversification reduces the impact of any single default on the portfolio
- C. It is a regulatory requirement in all jurisdictions
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Answer: (B) Spreading investment across many loans reduces idiosyncratic credit risk. If one borrower defaults, the loss is a small fraction of the portfolio, offset by interest from performing loans.

Q13: Robo vs. Traditional Advisor

A robo-advisor and a traditional advisor both construct a 60/40 equity-bond portfolio using the same asset classes. The robo charges 0.25%; the advisor charges 1.00%. Under what condition would the traditional advisor deliver **higher net returns**?

- **A** If the traditional advisor generates at least 0.75% higher gross returns through superior asset selection
- **B** If the traditional advisor has more clients
- **C** If the stock market goes up
- **D** The robo will always outperform because of lower fees

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- **D** The robo will always outperform because of lower fees

Answer: (A) The fee difference is 0.75%. The traditional advisor must generate at least 0.75% higher gross return to break even on a net basis. Empirical evidence suggests most advisors do not consistently achieve this.

Q14: Rebalancing Strategy Comparison

Compared to calendar-based rebalancing (quarterly), threshold-based rebalancing (5% band) typically results in:

A. More frequent trading in all market conditions
B. Fewer trades during calm markets, more trades during volatile markets
C. Identical trading patterns regardless of strategy
D. No trading at all because the threshold is never breached

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Answer: (B) Threshold rebalancing is adaptive: in calm markets, drift stays within the band and no trades are needed. In volatile markets, drift frequently exceeds the band, triggering more trades.

Q15: P2P Platform Risk

In 2019, several Chinese P2P platforms collapsed, and investors lost their principal. Which risk category does this illustrate?

A. Interest rate risk
B. Market risk
C. Platform (operational) risk
D. Currency risk

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- (A) Interest rate risk
- (B) Market risk
- (C) Platform (operational) risk
- (D) Currency risk

Answer: (C) Platform risk is the risk that the intermediary itself fails — through fraud, mismanagement, or insolvency. Unlike bank deposits, P2P investments are not protected by deposit insurance.

Q16: Microfinance Interest Rates

Microfinance institutions often charge 25%–45% annual interest. What is the primary reason for these high rates?

- A. Microfinance institutions are unregulated and exploit borrowers
- B. High fixed operating costs per loan are spread over very small loan amounts
- C. Interest rates are set by central banks in developing countries
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Answer: (B) Fixed costs (credit assessment, disbursement, collection, compliance) are similar regardless of loan size. Spreading \$50 in costs over a \$200 loan requires 25% just to break even, before credit risk and profit margin.

Q17: Loan Default Waterfall

In a P2P loan default waterfall, the typical progression is:

A. Performing → Default → Late → Loss
B. Performing → Late → Default → Recovery/Loss
C. Default → Performing → Recovery
D. Late → Performing → Default → Written Off

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- (C) Default → Performing → Recovery
- (D) Late → Performing → Default → Written Off

Answer: (B) The waterfall follows: Performing (current) → Late (30/60/90 days) → Default (usually 90+ days) → Recovery (collection, collateral) or Loss (written off).

Q18: Robo-Advisory Herding Risk

If most robo-advisors use the same MPT framework and similar ETFs, what systemic risk might this create?

A. No risk — MPT is mathematically optimal
B. Herding: all robo-advisors rebalancing simultaneously could amplify market moves
C. Robo-advisors would stop functioning during market crashes
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Answer: (B) If millions of robo-advisory accounts trigger threshold rebalancing at the same drift level, the coordinated selling/buying could amplify market movements — a form of algorithmic herding.

Q19: P2P Lending Regulation

A regulator is designing P2P lending rules. Which measure would **most effectively** protect retail investors?

- A. Banning P2P lending entirely
- B. Requiring platforms to hold a provision fund covering 100% of potential defaults
- C. Mandating transparent default rate disclosure, investment caps per investor, and platform wind-down plans
- D. Allowing P2P platforms to operate without any regulation

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Answer: (C) Balanced regulation preserves access while protecting investors. Transparency (default rates), limits (investment caps), and continuity (wind-down plans) address the key risks without eliminating the innovation.

Q20: Democratization Trade-off

"Robo-advisors have democratized investment access but not financial literacy." Which of the following best supports this critique?

- **A** Robo-advisors use MPT, which is too complex for retail investors to understand
- **B** Low barriers to entry mean investors may take on risk they do not understand, sell during downturns, or choose unsuitable risk profiles
- **C** Robo-advisors charge fees, so they are not truly democratic
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Answer: (B) Low minimums and easy onboarding remove financial barriers but not knowledge barriers. Investors who do not understand risk may panic-sell during downturns, overstate their risk tolerance, or fail to recognize that past returns do not guarantee future performance.