

INVESTMENTS

Final Exam – Thursday, June 20, 2019 – 10:00 a.m. – 1:00 p.m.

Spring 2019 – Instructor Han-Hsing Lee

I. Multiple Choices (46%)

1. A protective put strategy is long put

- A. a long put plus a long position in the underlying asset.
- B. a long put plus a long call on the same underlying asset.
- C. a long call plus a short put on the same underlying asset.
- D. a long put plus a short call on the same underlying asset.
- E. None of the options

2. You buy one Home Depot June 60 call contract and one June 60 put contract. The call premium is \$5 and the put premium is \$3.

Your strategy is called

- A. a strangle.
- B. a straddle.
- C. a spread.
- D. a covered call.
- E. None of the options

3. Asian options differ from American and European options in that before/on, 買 on

- A. they are only sold in Asian financial markets.
- B. they never expire.
- C. their payoff is based on the average price of the underlying asset.
- D. they are only sold in Asian financial markets and they never expire.
- E. they are only sold in Asian financial markets and their payoff is based on the average price of the underlying asset.

4. A 45(strike) put option on a stock priced at \$50 is priced at \$3.50. This put has an intrinsic value of _____ and a time value of _____.

- A. \$3.50; \$0
- B. \$5; \$3.50
- C. \$3.50; \$5
- D. \$0; \$3.50
- E. None of these is correct

5. Other things equal, the price of a stock put option is positively correlated with the following factors
- A. the stock price.
 - B. the time to expiration.
 - C. the stock volatility.
 - D. the exercise price.
 - E. the time to expiration, the stock volatility, and the exercise price.
6. Higher dividend payout policies have a _____ impact on the value of the call and a _____ impact on the value of the put compared to lower dividend payout policies.
- A. negative, negative
 - B. positive, positive
 - C. positive, negative
 - D. negative, positive
 - E. zero, zero
7. The lower bound on the market price of a convertible bond is
- A. its straight bond value.
 - B. its crooked bond value.
 - C. its conversion value.
 - D. its straight bond value and its conversion value.
 - E. None of these is correct
8. The elasticity of an option is
- A. the volatility level for the stock that the option price implies.
 - B. the continued updating of the hedge ratio as time passes.
 - C. the percentage change in the stock call option price divided by the percentage change in the stock price.
 - D. the sensitivity of the delta to the stock price.
 - E. volatility level for the stock that the option price implies and the percentage change in the stock call option price divided by the percentage change in the stock price.
9. The efficient frontier of risky assets is
- A. the portion of the investment opportunity set that lies above the global minimum variance portfolio.
 - B. the portion of the investment opportunity set that represents the highest standard deviations.
 - C. the portion of the investment opportunity set which includes the portfolios with the lowest standard deviation.
 - D. the set of portfolios that have zero standard deviation.
 - E. both the portion of the investment opportunity set that lies above the global minimum variance portfolio and the portion of the investment opportunity set that represents the highest standard deviations.

10. Which of the following statements is (are) false regarding the variance of a portfolio of two risky securities?
- A. The higher the coefficient of correlation between securities, the greater the reduction in the portfolio variance.
 - B. There is a linear relationship between the securities' coefficient of correlation and the portfolio variance.
 - C. The degree to which the portfolio variance is reduced depends on the degree of correlation between securities.
 - D. The higher the coefficient of correlation between securities, the greater the reduction in the portfolio variance and there is a linear relationship between the securities' coefficient of correlation and the portfolio variance.
 - E. The lower the coefficient of correlation between securities, the greater the reduction in the portfolio variance and the degree to which the portfolio variance is reduced depends on the degree of correlation between securities.
11. Which of the following statements is (are) true regarding time diversification?
- I. The standard deviation of the average annual rate of return over several years will be smaller than the 1-year standard deviation.
 - II. For a longer time horizon, uncertainty compounds over a greater number of years.
 - III. Time diversification does not reduce risk.
- A. I only
 - B. II only
 - C. III only
 - D. II and III only
 - E. I, II, and III
12. Which statement is true regarding the market portfolio?
- A. It includes all publicly traded financial assets.
 - B. It lies on the efficient frontier.
 - C. All securities in the market portfolio are held in proportion to their market values.
 - D. It is the tangency point between the capital market line and the indifference curve.
 - E. It includes all publicly traded financial assets, lies on the efficient frontier, *and* all securities in the market portfolio are held in proportion to their market values.
13. In the context of the Capital Asset Pricing Model (CAPM) the relevant risk is
- A. unique risk.
 - B. systematic risk.
 - C. standard deviation of returns.
 - D. variance of returns.
 - E. semi-variance.

14. Which statement is not true regarding the Capital Market Line (CML)?
- A. The CML is the line from the risk-free rate through the market portfolio.
 - B. The CML is the best attainable capital allocation line.
 - C. The CML is also called the security market line.
 - D. The CML always has a positive slope.
 - E. The risk measure for the CML is standard deviation.
15. Which of the following factors were used by Fama and French in their multi-factor model?
- A. Return on the market index.
 - B. Excess return of small stocks over large stocks.
 - C. Excess return of high book-to-market stocks over low book-to-market stocks.
 - D. All of these factors were included in their model.
 - E. None of these factors were included in their model.
16. Advantage(s) of the APT is(are)
- A. that the model provides specific guidance concerning the determination of the risk premiums on the factor portfolios.
 - B. that the model does not require a specific benchmark market portfolio.
 - C. that risk need not be considered.
 - D. that the model provides specific guidance concerning the determination of the risk premiums on the factor portfolios and that the model does not require a specific benchmark market portfolio.
 - E. that the model does not require a specific benchmark market portfolio and that risk need not be considered.
17. _____ the return on a stock beyond what would be predicted from market movements alone.
- A. The risk premium is $-r_f$
 - B. An excess return is
 - C. An abnormal return is
 - D. The risk premium and an abnormal return are
 - E. An excess return and an abnormal return are
18. The weak form of the efficient market hypothesis contradicts
- A. technical analysis, but supports fundamental analysis as valid.
 - B. fundamental analysis, but supports technical analysis as valid.
 - C. both fundamental analysis and technical analysis.
 - D. technical analysis, but is silent on the possibility of successful fundamental analysis.
 - E. None of these is correct.

19. Your professor finds a stock-trading rule that generates excess risk-adjusted returns. Instead of publishing the results, he keeps the trading rule to himself. This is most closely associated with _____.

- A. regret avoidance
- B. selection bias
- C. framing
- D. insider trading
- E. None of these is correct.

20. Studies of negative earnings surprises have shown that there is

- A. a negative abnormal return on the day negative earnings surprises are announced.
- B. a positive drift in the stock price on the days following the earnings surprise announcement.
- C. a negative drift in the stock price on the days following the earnings surprise announcement.
- D. both a negative abnormal return on the day negative earnings surprises are announced and a positive drift in the stock price on the days following the earnings surprise announcement.
- E. both a negative abnormal return on the day negative earnings surprises are announced and a negative drift in the stock price on the days following the earnings surprise announcement.

21. Evidence suggests that there may be _____ momentum and _____ reversal patterns in stock price behavior.

- A. short-run, short-run
- B. long-run, long-run
- C. long-run, short-run
- D. short-run, long run

22. Jaffe (1974) found that stock prices _____ after insiders intensively sold shares.

- A. decreased
- B. did not change
- C. increased
- D. became extremely volatile
- E. became much less volatile

23. A finding that _____ would provide evidence against the semistrong form of the efficient market theory.

- A. low P/E stocks tend to have positive abnormal returns
- B. trend analysis is worthless in determining stock prices
- C. one can consistently outperform the market by adopting the contrarian approach exemplified by the reversals phenomenon
- D. A and B
- E. A and C

II. Calculation (54%)

1. (8%) Consider the following options portfolio: You write a October 2011 expiration call option on IBM with exercise price \$165. You also write a October expiration IBM put option with exercise price \$160.

a. (2%) Graph the payoff of this portfolio at option expiration as a function of IBM's stock price at that time.

b. (2%) What will be the profit/loss on this position if IBM is selling at \$157 on the option expiration date? What if IBM is selling at \$165.

IBM (IBM)		Underlying stock price: 166.76						
Expiration	Strike	Call			Put			Open Interest
		Last	Volume	Open Interest	Last	Volume		
Sep 2011	160.00	9.15	796	1835	2.62	1271	4298	
Oct 2011	160.00	11.95	301	2369	5.35	296	7443	
Jan 2012	160.00	15.00	101	7890	9.40	102	4920	
Apr 2012	160.00	17.35	111	122	13.30	4	71	
Sep 2011	165.00	5.80	1805	3542	4.10	1711	5085	
Oct 2011	165.00	8.70	329	3866	7.00	131	2651	
Jan 2012	165.00	11.70	93	4045	10.85	303	4466	
Apr 2012	165.00	14.30	58	781	-	-	54	
Sep 2011	170.00	3.00	3053	7959	6.20	2744	12436	
Oct 2011	170.00	5.86	457	7506	9.25	148	4584	
Jan 2012	170.00	8.93	73	6876	13.00	58	2929	
Apr 2012	170.00	11.32	36	58	-	-	52	

c. (2%) At what two stock prices will you just break even on your investment?

d. (2%) What kind of "bet" is this investor making; that is , what must this investor believe about IBM's stock price in order to justify this position.

2. (6%) a. Use the Black-Scholes formula to find the value of a call option on the following stock:

- T Time to maturity = 12 months
- S Standard deviation 50% per year
- X Exercise price = \$50
- S Stock price = \$50
- r Interest rate = 5%

(6%) b. Suppose one can find a \$9 put option on the stock in part (a) with the same exercise price and maturity as the call option. Would an arbitrage opportunity

exist? If so, what would be the arbitrage strategy? (You need to specify long and short of these positions.)

3. (7%) A collar is established by buying a share of stock for \$47, writing a six-month call option with exercise price \$50, and buying a six-month put option with exercise price \$45. Based on the volatility of the stock, you calculate that for an exercise price of \$50 and maturity of six months, $N(d_1)=0.4730$, whereas for the exercise price of \$45, $N(d_1)=0.6660$.

- a. (3%) What will be the gain or loss on the collar if the stock price increases by \$1?
- b. (4%) What happens to the delta of the portfolio if the stock price becomes very large?
Very small? Please explain your result in detail.

4. Suppose the annual average expected return of large stocks and long-term Treasury bonds portfolios are 20% and 15%, respectively. The standard deviation of annual returns of large stocks and long-term Treasury bonds are 20% and 10%. The correlation coefficient is 0.1. T-bill has annual expected return 5% and standard deviation 0.

- (5%) a. Find the minimum variance portfolio (MVP) and its expected return and standard deviation.
- (6%) b. Find the optimal risky portfolio (O) and its expected return and standard deviation.
- (3%) c. Find the slope of the CAL generated by T-bill and portfolio O. What is the equation for the CAL?

5. (5%) Suppose the yield on risk-free securities is about 2%. Suppose also that the expected return required by the market for a portfolio with a beta of 1 is 12%. You consider buying a share of stock at a price of \$20. The stock is expected to pay a dividend of \$3 next year and to sell then for \$21. The stock risk has been evaluated at beta= 2. Is the stock overpriced or underpriced?

6. (8%) Consider the following data for a one-factor economy. All portfolios are well diversified.

Portfolio	Expected Return	Beta
A	7%	1.0
F	4%	0

E 6% 0.8

Suppose another portfolio E is well diversified with a beta of 0.8 and expected return of 6%.

- (2%) a. Would an arbitrage opportunity exist?
- (6%) b. If so, what would be the arbitrage strategy? (You need to specify long and short of these portfolios.)