Name: ______________________

Midterm exam II
ANSWERS 266: Fi. Markets and Institutions
Spring 2017
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Directions: You have 70 min. to do the exam (unless other arrangements have been made).

Some questions offer a bit of choice on which parts you do, so read carefully. If you answer too many parts, we will grade the first ones and ignore extras.

Where computations are required, full points will be given for the correct answer. Partial points will be given for correct work.

You may write on the backs of the exam pages. If your answer extends outside the space provided, you must label clearly where the additional portion is located.

Each part of each question will be given equal value.

Formulas you may find useful

- The variance of a random variable x is given by

$$\text{var}(x) = \sum_{j=1}^{J} pr_j d_j^2$$

where $d_j = x_j - x^e$, and x_j is the jth outcome, which happens with probability pr_j and x^e is the mean of x.

- The covariance between random variables x and y is given by

$$\text{cov}(x, y) = \sum_{j=1}^{J} pr_j d_{x,j} d_{y,j}$$

where $d_{x,j} = x_j - x^e$ and $d_{y,j} = y_j - y^e$.

- CAPM: $i_X^e = i_{rf} + \beta_X(i_m^e - i_{rf})$

1 Definitions. Do 5 of 6.

1.1 Credit risk (in, say, a loan)

Answer/comment

Credit risk refers to the risk that contractual payments on a financial instrument will not be paid. For example, the risk that a borrower defaults.

1.2 Idiosyncratic risk (in, say, an equity return)

Answer/comment

Idiosyncratic risk is risk in a financial asset return that is not associated with (or independent of) other market risks.

(Extra: The opposite is systematic risk. Under standard portfolio theory, idiosyncratic risk is perfectly diversifiable and thus, the market offers no risk premium to bear idiosyncratic risk.)

1.3 Insolvent firm

Answer/comment

Insolvent firm is one for which liabilities exceed assets. Thus, the firm can no longer can meet its financial obligations.

1.4 Credit default swap

Answer/comment

A credit default swap is a financial instrument that provides a way to hedge the credit risk in the underlying asset, often a bond. The protection buyer makes periodic payments to the protection provider so long as the underlying instrument does not default. In the event of default, the protection buyer gives the protection provider the bond and the protection provider makes a fixed payment to the protection provider.

1.5 Over the counter market (for a financial instrument)

Answer/comment

A decentralized market, without a centralized exchange. All deals are bi-lateral agreements between the counterparties.

1.6 Central counterparty (in the market for a financial instrument)

Answer/comment

Central counterparty (CCP), is a financial institution that provides clearing and settlement services for trades in a market for a financial instrument such as foreign exchange, securities, options and derivative contracts. The CCP stands in as counterparty to both the ultimate buyer and seller of the instrument. That is, the ultimate seller does not have a contactual relation with the ultimate buyer. The seller sells to the CCP and the CCP sells to the buyer.

2 Facts/Real world stuff.

2.1 Almost all bank reserves in the U.S. at present are [pick one: excess reserves/held in the form of Treasury Bills].

Answer/comment

excess reserves

2.2 The return on equity for the U.S. banking system has been roughly what since the time that the economy stabilized after the worst of the financial crisis?

Answer/comment

roughly 10%. 9-12% got full points

2.3 The gross notional value of credit default swap protection outstanding just before the crisis was [pick one: less than/roughly the same as/much greater than] the value of the underlying securities on which default protection was provided.

Answer/comment

much greater than

2.4 In return for underwriting an IPO, investment banks generally receive about 2 percent of the value of the deal in compensation. [pick one: true/False]

Answer/comment

false (2 percent is the lower end). Note: this question was confusing and has been nullified. If you got any points off, bring your exam to Burak and he will restore the points.

2.5 Correlations of returns across a broad array of assets were abnormally [pick one: high /low] in the aftermath of the crisis. Especially since the election, correlations seem to have [pick one: become even more extreme/moved back nearer to pre-crisis levels].

Answer/comment

high, moved back nearer to pre-crisis levels

Short questions

3 Commercial banking.

3.1 Commercial banks evolved as intermediaries, in part, to facilitate loans flowing between folks with funds to lend and folks who needed to borrow. Describe THREE advantages that commercial banks have in making loans relative to the individuals making the loans directly.

Answer/comment

Commercial banks pool the funds of many potential lenders and thereby can make larger loans.

Commercial banks, by pooling the funds of many potential lenders, will also be able to diversify across a large number of loans and thereby better manage credit risk.

Commercial banks specialize in making loans (evaluating ex ante, monitoring ex post, etc.) and thereby will gain expertise and be able to do it at lower cost.

3.2 Fill in the blanks on the balance sheet of First National Bank of Spicer (ticker: WTF):

Balance Sheet: Bank of Spicer

A		L	
Reserves	10	Deposits	305
Securities	115	Borrowings	25
Loans	233		
Phys. Capital	5		
Total Assets:	363	Total Liab.:	330
		Net worth:	33

Note: Amounts in $millions.

3.3 Spicer Bank has a deposit outflow of $100. It funds this outflow by selling $100 in securities. Fill in all the blanks in the balance sheet below reflecting Spicer bank after these transactions.

Balance Sheet: Bank of Spicer

A		L	
Reserves	10	Deposits	205
Securities	15	Borrowings	25
Loans	233		
Phys. Capital	5		
Total Assets:	263	Total Liab.:	230
		Net worth:	33

Note: Amounts in $millions.

3.4 State a measure of balance sheet leverage and give the value of this leverage measure for Spicer bank for the two balance sheets above.

Answer/comment

Using net worth as our measure of equity, two measures are:

Debt to equity ratio = (Total Liabilities / Equity):

$$\begin{aligned} 330/33 &= 10\text{first balance sheet} \\ 230/33 &= 6.97\text{second balance sheet} \end{aligned}$$

Total Assets / Total Equity:

$$\begin{aligned} 363/33 &= 11\text{first balance sheet} \\ 262/33 &= 7.97\text{second balance sheet} \end{aligned}$$

4 Derivatives and Hedging. Suppose that one ton of malting barley (a grain used in the brewing industry) currently costs \$140 on the spot market. The table below presents a risk model of what the (spot) price of barley will be in 3 months:

Barley price in 3 months

Outcome	Prob.	Price (\$)
1	0.1	300
2	0.3	155
3	0.6	130

4.1 What is the expected spot price of 1 ton of barley in 3 months?

Answer/comment

$$0.1 \times 300 + 0.3 \times 155 + 0.6 \times 130 = 154.5$$

4.2 What is the variance of the spot price of barley in 3 months?

Answer/comment

$$\text{variance} = 0.1 \times (300 - 154.5)^2 + 0.3 \times (155 - 154.5)^2 + 0.6 \times (130 - 154.5)^2$$

or 2477.25

4.3 Suppose that Bannon brewing company knows it will need to buy 1 ton of barley in 3 months. Bannon is concerned about the risk that the spot barley price will jump. Bannon buys a 3-month European call option on 1 ton of barley with a strike price of \$170.

Taking the option into account, what now is Bannon's expected cost for obtaining one ton of barley in 3 months? (Note: do not include the purchase price today of the option).

Answer/comment

Ten percent of the time, the spot price will be $300 and Bannon will buy at $170 by excercising the option. In the other two cases, the option will not be excercised and Bannon will buy at the spot price:

$$0.1 \times 170 + 0.3 \times 155 + 0.6 \times 130 = 141.5$$

4.4 Jared Capital, a hedge fund, develops improved weather forecasting techniques and assesses that the barley growing season will be much drier than Bannon and the rest of the market participants generally expect. The drier season would mean that the barley harvest will be poor and that the price of barley is likely to be higher than the prices reflected in the risk model above.

Jared Capital could profit from this new information by selling Bannon the call option described above at the current market price. [true/false and explain]

Answer/comment

FALSE. With Jared's information, the likelihood of the price exceeding $170 is higher than the market perceives, and so the current market price for the option will be too low. Jared will lose money selling the option for a price that is too low.

5 CAPM.

5.1 The CAPM implies that an equity return with higher variance will generally pay a higher expected return. True/false, explain.

Answer/comment

FALSE. The CAPM says that a higher beta implies a higher expected return; beta rises with the covariance of the asset return with the market portfolio and need not rise with the asset's variance. (As noted above, idiosyncratic variance will not raise beta.)

5.2 Why would investors be willing to hold a negative beta stock even though on average the stock is expected to pay a return less than the risk-free rate?

Answer/comment

Because the asset acts as a hedge against other risks in the portfolio. For example fire insurance may have a very low (negative) expected return, it is most useful when you need it the most—that is, when your house burns down.

5.3 Under the CAPM, what is be the beta of asset ABC if the expected return of ABC is 18% the risk free rate is 5% and the expected return on the market portfolio is 14%.

Answer/comment

$$\begin{aligned} 18 &= 5 + \beta(14 - 5) \\ \beta &= 13/9 = 1.44 \end{aligned}$$

Congratulations. The End.