

266: FI. MARKETS AND INSTITUTIONS

JON FAUST

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MIDTERM 2, STUDY GUIDE AND PRACTICE QUESTIONS

# 1 Short definitions.

Note: All of these will come from the terms listed on the syllabus.

1 Definitions. Give the definition of the following words.

1.1 Nonsystematic risk (CAPM model)

**Answer/comment**

Nonsystematic risk is risk due to variability in an asset's return that is not correlated with the return on the market portfolio in the CAPM model.

(Note: An asset with only nonsystematic risk has a  $\beta$  of zero.)

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1.2 ADR (American Depository Receipt)

**Answer/comment**

ADRs provide a way for foreign stocks to effectively trade on U.S. markets. Specifically, the ADR is receipt for a foreign stock that is held by a trustee. The receipt then trades as a claim to the stock on U.S. markets.

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1.3 S&P 500 index

**Answer/comment**

A index reflecting the value of the stocks of 500 major firms listed in the US.

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1.4 Dark pool

**Answer/comment**

A dark pool is a private exchange (as opposed to public exchanges such as NYSE) where firms can conduct trades with little transparency as to information related to the trades. The lack of transparency was important for those wanting to execute large trades without disrupting the market or being targeted by predatory traders. Barclays has been accused of deceit and fraud by making its practices favor high-frequency and predatory trading. Other firms have also been charged with similar violations.

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1.5 Price earnings ratio

**Answer/comment**

Ratio of company's share price to its earnings per share.

(Note: Widely used variable used to get a rough sense of whether a stock is over or under priced. )

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## 1.6 Initial Margin Requirement

### Answer/comment

The percentage of the total security price an investor must have deposited with the broker in order to purchase shares.

(Note: This tends to be 50 percent. So, if you buy an asset worth \$10, you have to deposit at least \$5, the remainder is borrowed from the broker.)

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## 1.7 Bid-ask spread

### Answer/comment

The difference between the price at which you can sell a security (bid price) and the price at which you can buy a security (ask price) on a given market. The exchange pockets the spread. The more liquid the asset, the lower the spread between the bid and ask. When liquidity is low, the difference between the minimum price sellers are willing to accept and the highest price buyers are willing to pay can be very large.

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## 1.8 Market Order

### Answer/comment

An investor sends an order to his broker to buy or sell securities immediately at the best price available.

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## 1.9 Primary market (for a security)

### Answer/comment

The primary market is where marketable securities are first sold to the public. (Once offered, the securities trade on secondary markets).

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## 1.10 Credit risk

### Answer/comment

The risk that a borrower will fail to make contractual payments.

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## 1.11 Leverage Ratio

### Answer/comment

The magnitude of the firm's assets or liabilities relative to its capital (or net worth).

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## 1.12 Bank reserves

Answer/comment

A bank's vault cash plus the banks deposit with the Federal Reserve.

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1.13 Liquidity

Answer/comment

The relative ease, speed, and cost with which an asset can be converted into cash. A liquid asset can be quickly converted to cash with low transactions cost and at a relatively certain price.

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## 2 Facts

As on the first midterm, the values here can be approximate, and we try to ask about important facts or features of the system, not picky stuff.

1 **Facts.** Give the approximate size of the following. Be sure to state the units.

1.1 The typical or average price-earnings ratio on the S&P 500 in the U.S. over many decades.

Answer/comment

Anything in the 15–20 range (unit free) gets full points.

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1.2 While broad stock market indices rise or fall on any given day, over a 20-year period, broad stock indices for markets in major advanced economies have always increased. [true/false]

Answer/comment

False. Nikkei, Japan.

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1.3 While stock markets in the U.S. and across Europe had fallen considerably at the depth of the financial crisis, the broad stock market in the U.S. has bounced back more [rapidly—slowly] than the markets in most European economies. (Choose one)

Answer/comment

More rapidly.

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- 1.4 Of the 10 largest banks in the world (by total assets), about how many are U.S. banks?

Answer/comment

1.

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- 1.5 What is the value of total assets for the largest U.S. bank (by assets)?

Answer/comment

About \$2 trillion.

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- 1.6 Approximately what share of commercial bank total liabilities in the U.S. is deposits (including both checkable and non-transaction deposits)?

Answer/comment

About 3/4.

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### 3 CAPM

There will probably be a question asking you to understand the basics of the CAPM—that is, the key CAPM equation and what it means, and the broad fact that everyone holds the same portfolio shares of risky assets.

#### 1 CAPM

- 1.1 Under the CAPM, what is the formula for the expected return on any given asset?

Answer/comment

For asset  $g$ , the expected return is

$$i_{g,t}^e = i_{f,t} + \beta_g(i_{m,t}^e - i_{f,t})$$

where  $i_{g,t}^e$  is the expected return on asset  $g$  at time  $t$ ,  $i_{f,t}$  is the risk free rate at time  $t$ ,  $i_{m,t}^e$  is the expected return on the market portfolio, and  $\beta_g$  is the CAPM beta for asset  $g$ .

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- 1.2 Because investors require compensation, no rational investor would ever hold a risk asset that is expected to pay a lower return than the risk free rate. True/False, explain.

**Answer/comment**

False. According to the CAPM formula, an asset with a negative beta is expected to pay less than the risk free rate. A negative beta means that the asset's return has a negative covariance with the market portfolio, and thus, the asset acts like insurance against bad outcomes for the market portfolio. People are willing to accept a lower return on average in order to obtain this insurance.

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- 1.3 Under the CAPM theory, if Joe is much more comfortable taking risk than Octavia, how will Joe's portfolio differ from Octavia's?

**Answer/comment**

Joe will have a larger share of assets in the market portfolio rather than in the risk free asset than will Octavia. Joe and Octavia's allocation of funds among the risky assets will be identical and be the 'market portfolio.'

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- 1.4 Suppose that in early April 2015, the expected 3-month holding period return on shares in XYZ corp. is 1 percent. If the CAPM theory is correct, what is the sign of the covariance between the market return and XYZ's return over this three month period?

**Answer/comment**

Since the 3-month risk free interest rate is about zero (it is certainly less than 1 percent), we know that the expected return on XYZ is higher than the risk free rate. Therefore, XYZ's beta is positive, implying a positive covariance with the return on the market portfolio. (Note: Remember that an asset's CAPM beta has the same sign as the covariance of the return with that of the market portfolio. )

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## 4 Stocks and the stock market

- 1 Buying/Owning shares.

- 1.1 Describe 2 things ownership of common stock entitles you to.

**Answer/comment**

Short version: dividends, and voting rights on certain firm decisions. Longer: If you own 1 percent of the shares in the firm, you are entitled to 1 percent of

all dividends paid and voting on certain decisions is determined by one-share one-vote, so you have 1 percent of the voting power.

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1.2 What is a margin call?

**Answer/comment**

After you have bought on margin, if the value of the shares falls, your broker will issue a margin call, requiring you to post more money in your margin account. If you are unable to do so, the broker will sell the shares.

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2 Suppose you own stock in Fly-by-night Oil Company. The current price of the stock is \$50 per share, but you are afraid that the price of oil may decline further causing the firm to go bankrupt. One way you could reduce the risk you face from a fall in the price of the shares is to place a stop loss (sell) order with your broker.

2.1 Explain a stop loss order.

**Answer/comment**

A stop loss order is an order in which you tell your broker a stop price which is below the current market price of the stock and number of shares to sell. If the price of the stock reaches the stop price, the stop loss order becomes a market order to sell the above-mentioned number of shares. In that event, the broker sells your shares at the best price she can get at the time (which need not have any relation to the stop price). If the stop price is never reached, your shares are never sold.

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2.2 Suppose you put in a stop loss (sell) order with a stop price of \$40. This means that the worst price you will get for selling the shares is \$40. True/false/explain.

**Answer/comment**

False. If the market price of the bank's stock falls to \$40, your stop loss order becomes a market order and the shares are sold at the market price when that order is executed. If the price is falling quickly, you might sell at a price far below the stop price.

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3 You own a large block of shares in this bank and (although you don't have any special or private information), you decide to sell all your shares. In this case, why might your broker choose to execute this trade through a dark pool rather than on a conventional exchange.

**Answer/comment**

Your broker might choose to sell through a dark pool because your large sale might

move the market price against you (down) if it is observed by market participants. The large sale might depress the price either because of the standard supply and demand story or because market participants, seeing your large sale, might interpret it as an indication that you have private information which tells you selling a good idea. In either case, you end up getting less money from your sale of stock. By selling in a dark pool, where your sale is not publicly observable (ie, is hidden) and might anonymously be matched up with many small buy orders, neither of these forces would act to depress the price of the stock.

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#### 4 Stock valuation.

- 4.1 Suppose that a company is expected to pay an annual dividend of  $d_{t+1}^e, d_{t+2}^e, d_{t+3}^e, \dots$ , in years  $t+1, t+2, t+3, \dots$ . Give a formula for the value of the share price today, at time  $t$ , using our standard discounted present value relation and assuming that the appropriate discount rate for a constant interest rate for discounting.

**Answer/comment**

Present value is equal to the properly discounted sum of future payments:

$$PV_t = \frac{d_{t+1}^e}{1+r} + \frac{d_{t+2}^e}{(1+r)^2} + \frac{d_{t+3}^e}{(1+r)^3} + \dots$$

or more compactly

$$PV_t = \sum_{j=1}^{\infty} \frac{d_{t+j}^e}{(1+r)^j}$$

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- 4.2 The Gordon growth model of stock prices is consistent with the present value formula you've just given, but makes certain simplifying assumptions. What is the main additional assumption?

**Answer/comment**

The model assumes that dividends grow each period at constant rate.

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- 4.3 The stock of LAX corp. is currently selling for \$20 per share. LAX is expected to pay an annual dividend of 65 cents per share. Analysts expect the price of LAX shares to be \$23 in one year. Using these expectations, what is the expected rate of return for holding LAX over the next year?

Answer/comment

One plus  $i$  equals future value over current price:

$$1 + i^e = \frac{d_1^e + P_1^e}{P_0}$$
$$1 + i^e = \frac{0.65 + 23}{20}$$

Annualized rate of return:  $i^e = 18.25\%$ .

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## 5 Commercial banks

- 1 Why do we need commercial banks to intermediate the flow of funds between lenders and borrowers?

Answer/comment

We need commercial banks primarily because of asymmetric information between borrowers and lenders. Folks with money to lend generally will not understand the businesses that want to borrow, and so the lenders won't know if any given borrower represents a good lending opportunity. Further, since borrowing may involve moral hazard (it "dulls the edge of husbandry") the lenders will have to monitor the borrowers to ensure that the borrowers behave in a manner consistent with re-paying the loan. Since the lender should diversify, it would be necessary for the lender to overcome these asymmetries with regard to a large range of borrowers.

Banks specialize in overcoming these asymmetries. In particular, they become efficient in overcoming these information asymmetries by "brute force," i.e. by actually sending someone out to learn about and monitor the borrowers.

This allows more credit to flow to firms than would otherwise be possible.

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- 2 Below are the balance sheets of two banks, Bank of Zeus and Bank of Jupiter.

Balance Sheet: Bank of Zeus			
A		L	
Reserves	50	Deposits	98
Mortgages	50		
<b>Total Assets</b>	100	<b>Total Liab.</b>	98
		<b>Net worth</b>	2

Balance Sheet: Bank of Jupiter			
A		L	
Reserves	5	Deposits	80
Mortgages	95		
<b>Total Assets</b>	<b>100</b>	<b>Total Liab.</b>	<b>80</b>
		<b>Net worth</b>	<b>20</b>

Note: Amounts in millions of dollars.

2.1 What is the difference between a liquidity crisis and a solvency crisis?

**Answer/comment**

A solvency crisis is when the value of a firm's assets threaten to decline below the value of liabilities; thus, the bank faces the prospect of insolvency and bankruptcy.

A liquidity crisis is when a firm is solvent ( $\text{Assets} > \text{Liabilities}$ ), but its assets are in a form which makes it difficult or costly to make current payment obligations.

2.2 Based on the information in these balance sheets, explain which bank is more likely to have a solvency crisis and which is more likely to have a liquidity crisis. Why? (Note: Take it as given that one bank is more likely to have a solvency crisis and the other is more likely to have a liquidity crisis.)

**Answer/comment**

Bank of Zeus is more likely to have a solvency crisis since its net worth is relatively small compared to its assets and liabilities (i.e., it is more highly leveraged). The ratio of assets to net worth is 50 for Zeus and the ratio of risky assets (mortgages) to net worth is 25. For Jupiter, these ratios are both closer to 5. A smaller fall in the value of its risky assets would wipe out Zeus's net worth.

Bank of Jupiter is more likely to face a liquidity crisis, since (despite its larger net worth) its assets are mostly illiquid mortgages. A small deposit outflow could force Jupiter to have to sell illiquid mortgages, while Zeus could cover the outflow from reserves. For example, Jupiter's ratio of deposits to liquid assets is 16, while Zeus's ratio is closer to 2.

2.3 Suppose Bank of Zeus wanted to decrease its leverage. What might it do?

**Answer/comment**

It could reduce the dividend it pays shareholders, which overtime will raise assets relative to liabilities. It could sell additional shares, which also raises assets relative to liabilities. It could also take steps to 'shrink' its balance sheet.

That is, it could lower assets and liabilities by similar amounts, which raises each relative to equity. For example, it could meet deposits withdrawals by drawing down reserves.

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- 3 Give 3 reasons why market interest rates in a competitive market should be such that the rate paid on bank deposits is less than the rate the bank receives on loans.

**Answer/comment**

1. The deposits have less credit risk than the loans. Being safer, they carry a lower return.
  2. The deposits are more liquid; thus, depositors are willing to accept a lower rate. The loan is not liquid, so the bank demands a higher rate.
  3. The loans generally have longer duration than the deposits. There is generally a positive term premium, so that longer duration means higher yield.
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- 4 Explain the effect of leverage on the return on equity of a firm.

**Answer/comment**

For any given return on assets, the higher is leverage, the higher is return on equity.

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- 5 Both our visitors John Geanakoplos and Patricia Little (CFO Hershey) spoke a great deal about leverage. Name one lesson you took away.

**Answer/comment**

There are many acceptable answers here.

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- 6 Bank Regulation.

- 6.1 What is the too big to fail problem? Why does it arise?

**Answer/comment**

Certain financial institutions may be so large and important to the functioning of the economy that their failure would be extremely costly to economic activity. If such a firm approaches failure, the government has a strong incentive to bail the firm out. Because the government is assuming part of the cost of risks taken on by the firm, the firm has an incentive to behave in a riskier manner than it would otherwise choose. (This is called moral hazard.)

The problem arises because banks play a vital role in the functioning of a modern market economy. If any one bank or small number of banks is providing a large share of these essential services to the economy, the problem will arise.

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6.2 How is stress testing used in capital regulation?

**Answer/comment**

Banks and their regulators both use risk models based on the actual business model and portfolio choices of the bank in order to predict how bank capital would be affected by various bad economic scenarios. The goal is to make sure that even in relatively bad (severely adverse) scenarios, the bank would still have enough capital to allow it to continue functioning effectively. If it appears that the bank's capital might fall too much in such scenarios, the regulators force the banks to make a capital plan to raise capital.

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