

Name: \_\_\_\_\_

Midterm exam  
266: Fi. Markets and Institutions  
Spring 2014  
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Directions:

You have 70 min. to do the exam.

Some questions offer a bit of choice on which parts you do, so read carefully.

If you do more parts than are asked for, we will take the first answers up to the number required and ignore any extras.

Where computations are required, full points will be given for the correct answer. Showing some correct work will get partial credit if the answer is wrong.

You may write on the backs of the exam pages and request additional paper.

If your answer extends outside the space provided, you must label clearly where the additional portion is located.

**State ALL interest rates and yield answers at an annual rate and in percent.**

1 [Do 5 of 6] (4 points each). Briefly define the following terms. A sentence or two should suffice.

1.1 Law of one price

**Answer/comment**

Identical items must sell for the same price. Hold under the conditions of perfect competition.

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1.2 Inverted yield curve

**Answer/comment**

The yield curve is said to be inverted when longer-term interest rates are lower than shorter term interest rates, so the slope of this curve is negative.

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1.3 Basis point

**Answer/comment**

It is  $1/100^{th}$  of a percentage point.

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1.4 Investment-grade bond

**Answer/comment**

A bond is considered to be investment grade if it is reasonably safe/unlikely to default (unlike junk bonds). To be more specific, if the credit rating of the bond is BBB or higher by Standard & Poor's or Baa or higher by Moody's, then it is an investment grade bond.

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1.5 Idiosyncratic risk

**Answer/comment**

The type of risk that is fully diversifiable (or is not associated with anything else), so by spreading this risk across the whole

society (see the coin flip example in lecture on “Risk, probability, statistics, risk, diversification”) it would be effectively eliminated. Since this sort of variation is not correlated with the market risk, the market will not pay you to bear a risk of this kind.

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## 1.6 Commercial paper

### Answer/comment

Short-term debt issued by companies. Detail: sold on pure discount basis like Treasury bills. It is unsecured, so only the most credit-worthy companies can issue. Usually less than 270 days (longer would require meeting certain regulations) scale.

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## 2 [Do all parts] (4 points each). General facts.

2.1 What is the approximate value of the nominal GDP of the United States at present?

### Answer/comment

About 15 trillion \$

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2.2 Approximately what has been the average real return on short-term U.S. Treasury securities over the last 50 or so years?

### Answer/comment

Less than 2 %

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2.3 Choose one of the options provided in square brackets: For [most countries in the world][some wealthy countries][many poor countries] total credit market debt exceeds the GDP of the country.

### Answer/comment

“some wealthy countries”.

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2.4 Each year, about what percentage of AAA-rated corporate bonds default?

Answer/comment

0 %.

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3 [Do all parts. ] (4 points per part). Statistics and yields.

The following table gives the one-year holding period yield (in percent) on assets A and B in 4 possible random outcomes.

Yields on assets A and B			
outcome	prob.	A	B
1	0.25	17.42	11.00
2	0.25	17.42	11.00
3	0.25	-9.42	11.00
4	0.25	-9.42	-20.00
mean		4.00	???
std. dev.		13.42	13.42

where ‘prob.’ is the probability of the outcome.

3.1 What is the expected return on asset B?

Answer/comment

$$\mathbb{E}(r^B) = 11 * 0.25 + 11 * 0.25 + 11 * 0.25 - 20 * 0.25 = 3.25\% \quad (1)$$

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3.2 What is the median return on asset B?

Answer/comment

11 %

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3.3 What is the mode of the return on asset B?

Answer/comment

11 %

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- 3.4 Both assets A and B have the same variance. Explain why B might have a lower expected rate of return due to having a lower risk premium.

Answer/comment

Assets with returns that covary negatively with your portfolio have the ‘insurance’ value to you and combining them can decrease the overall portfolio risk. Due to these insurance benefits, you may be willing to accept an expected return lower compared to your portfolio return. In this example, even if asset A and B have both the same variance, may have different covariance with the market portfolio and hence have different expected returns.

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- 4 [Do all parts. ] (4 points per part). Pricing a bond. We have a coupon bond with 2 years remaining to maturity. Principal value is \$100; annual coupon is \$2.23; yield to maturity is 3 percent.

- 4.1 The price of the bond today is what?

Answer/comment

$$P_t = \frac{2.23}{1.03} + \frac{2.23 + 100}{1.03^2} \approx \$98.527 \quad (2)$$

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- 4.2 What is the coupon rate on this bond?

Answer/comment

$$\text{Coupon Rate} = \frac{2.23}{100}, \quad (3)$$

or  $\approx 2.23\%$ .

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4.3 What is the current yield on this bond?

**Answer/comment**

$$\text{Current Yield} = \frac{2.23}{98.527}, \text{ or } \approx 2.26\% \quad (4)$$

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4.4 Assuming that the expected price of the bond in 1 year's time is \$98.47, what is the expected 1-year holding period yield (assuming that the bond is purchased today and sold in 1 year's time)?

**Answer/comment**

You buy today at the current price; in 1 year you receive the coupon payment and then sell for the price at that time. One plus the return (as always) is future value divided by current price:

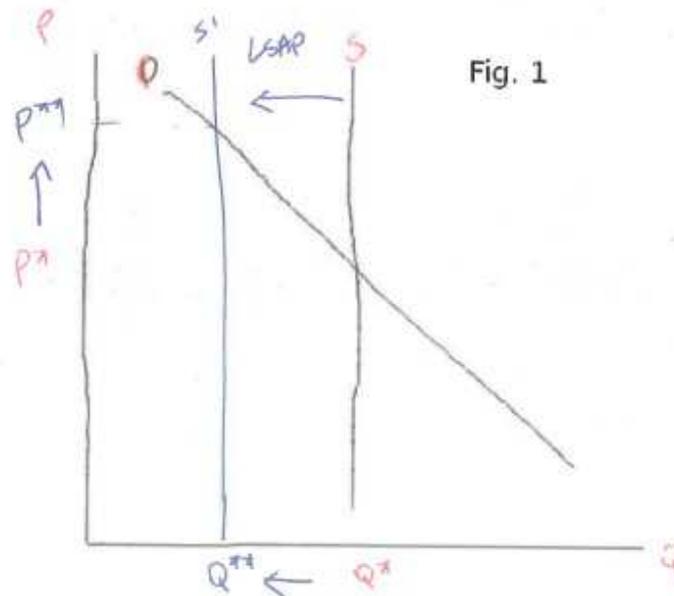
$$1 + i_{hp} = \frac{\$98.47 + \$2.23}{\$98.53} \Rightarrow i_{hp} \text{ which is } \approx 2.21\% \quad (5)$$

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Note: Some of the later parts require the price of the bond today from part 1. So long as you compute these correctly using whatever price you found in the first part, you will receive full credit.

5 [Do all parts. ] (4 points per part). Supply of and demand for bonds. Fig. 1 depicts the market for 10-year U.S. Treasury bonds held by the public. The quantity supplied is depicted as being fixed regardless of the price of the bonds.

5.1 Label both axes and the supply and demand curves on Fig. 1.



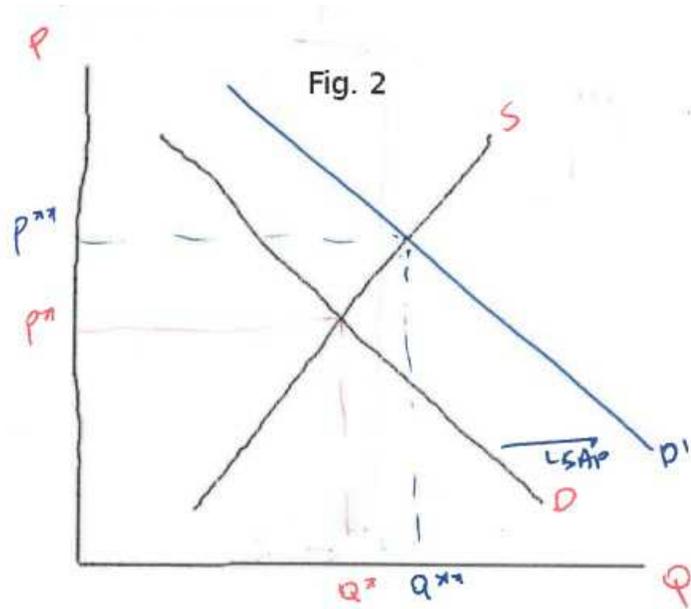
5.2 The Federal Reserve has been making large-scale purchases of longer-term treasury bonds from the public, reducing the supply of 10-year Treasury bonds in the hands of the public. On Fig. 1, draw the shift in the curve induced by these purchases, and indicate equilibrium price and quantity before and after the shift. What happens to the price of the bonds?  
[answer on Fig. 1]

**Answer/comment**

Price of the bond increases (as can be seen from figure 1).

5.3 Fig. 2 depicts the market for 10-year corporate bonds. Assume that these corporate bonds are close substitutes for 10-year government bonds. Under this assumption, depict on Fig. 2 what the the Federal Reserve's purchases described in Fig. 1 will imply for the market for coroporate bonds.

Specifically, label the axes and curves in Fig. 2 and then show the initial equilibrium price and quantity and any shifts in the equilibrium price and quantity induced by the Fed's purchases of government securities.



6 [Do one of two. ] (8 points). Market imperfections.

6.1 Explain the problem in lending markets that bond rating agencies help overcome. Do rating agencies entirely overcome this problem, or how can this solution go awry?

Answer/comment

Most bond buyers don't know how likely any given bond issuer is to default. The problem of asymmetric information is compounded by the fact that, unlike in the perfectly competitive

market paradigm, every bond is different in its risk characteristics, so bonds are not homogenous goods. Ratings agencies, however, learn about the bonds and group them in coarse categories pushing the market overall closer to the perfect information ideal of lots of buyers and sellers fully informed about identical items.

However, rating agencies can't really overcome informational asymmetry problem as well as one might hope because users still don't know if the agency's ratings can be trusted. (We replaced lack of information about the bond seller by lack of information about the agency).

As we discussed in class, under various circumstances, the agency may have an incentive to 'mis-rate' bonds. We gave an example in which bonds would be systematically rate too highly.

Quick version: Borrowers of funds prefer their debt to be rated too highly so they can borrow more cheaply. Suppose that lenders are limited by regulations to hold only highly rated debt, but would otherwise prefer to hold riskier debt. Such lenders will also prefer risky debt to get a high rating (effectively circumventing the regulation). In such cases, ratings agencies might oblige the wishes of both sides of the market.

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- 6.2 Explain the problem in financial markets that government-provided deposit insurance helps overcome? What additional problem does deposit insurance give rise to?

**Answer/comment**

In general, depositors have no clue whether the bank is well managed and could re-pay their deposits. To know whether the investments or loans of the banks are sound, depositors would need to learn all about the bank's investments, but this would eliminate the big information cost advantage that the bank is supposed to provide. If the depositors lose faith in the bank for some reason, all depositors may 'run' to the bank to withdraw. At this point (unless there is some failsafe in place) the bank will fail.

To prevent this from happening and allow banks to play the key

role in reducing information demands on depositors, the government steps in and provides a guarantee—deposit insurance.

However, deposit insurance may induce banks to act in a riskier manner than is ideal. This is a moral hazard problem. If the government assumes some of the risk that the bank takes on, the bank may act in a riskier manner. Thus, we may end up with big pile of non-performing loans; the ‘fix’ for this is government bank regulation.

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7 [Do all parts. ] (4 points per part). Liquidity.

7.1 In general terms, what is meant by the ‘liquidity’ of an asset?

**Answer/comment**

An asset is more liquid if it can more easily/reliably/cheaply be used to complete market transactions or to back transactions. For instance, an asset that can reliably be exchanged for cash at a “fair market price” on short notice is more liquid.

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7.2 Explain how the assumptions of the perfect competition paradigm essentially imply that any asset traded in a perfectly competitive market is quite liquid.

**Answer/comment**

Under perfect competition, we have many potential buyers and sellers of the same (homogenous) product that all have symmetric information. We also have no transaction costs.

Any asset of this type can cheaply (freely) be traded for cash at the fair market price.

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7.3 For the typical household, things stored in the attic are assets, but they are not very liquid assets. Discuss how the internet (or some other innovation) has made stuff in people’s attics more liquid.

**Answer/comment**

The short answer is Ebay, Paypal, etc.

The internet provides a way to bring lots of buyers and sellers together, share information, and complete transactions with low transactions costs.

Buyers of an item know they can go to the Web and find many sellers of almost anything. Sellers can peruse the Web and get a sense of the fair price for stuff like what they have in their attics. Sites like Ebay and Paypal then allow the deal to be completed with fairly low transactions costs.

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