Name: _____

Quiz 1: Answers
266: Fi. Markets and Institutions
Spring 2010
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ANSWERS NOTE: This is a quick draft of answers for the curious. After grading the quiz, we may add some comments about common mistakes (should there be any mistakes).

DIRECTIONS: We are looking for very concise answers. Write the answers in the space provided. Put your name on the quiz.

NOTE: There are three parts and in each part you have some choice about which items you answer. If you do more than the required number of elements, we will grade only those up to the required number and ignore the rest.

NOTE: Each correct answer is worth 2 points.

1 Give a brief definition of the following. DO ANY 5 OF THESE.

1.1 Basis point

Answer/comment

A basis point is $1/100^{th}$ of a percentage point. Further explanation: 15 basis points is 0.15 percent or 0.0015 in decimal form.

1.2 Commercial Bank

Answer/comment

A financial institution that takes deposits and makes loans.

1.3 Call option

Answer/comment

A financial asset giving the owner the right (but not the obligation) to buy a specified item at a fixed price at some point, or up until some point, in the future. Further explanation: You didn't have to say 'at some point or up until some point, in the future is ok.

1.4 Fisher's law or the Fisher equation

Answer/comment

Nominal interest rate equals real interest rate plus expected rate of inflation. Further stuff: We showed in class that this could be viewed as an approximation to a more exact relation.

1.5 Financial intermediation

Answer/comment

Financial intermediation: Folks who have funds to lend, lend them to a financial institution (an intermediary). This institution then lends to folks who need to borrow. More: The lenders have no direct claims on the borrowers. Each side just has claims involving the intermediary.

1.6 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. Further explanation: The yield curve is generally plotted with the interest rate horizon on the horizontal axis and the interest rate on the vertical. When the curve is inverted, the slope of this curve is negative.

1.7 Correlation (define in terms of our other statistical terms)

Answer/comment

$$cor(x,y) = \frac{\text{cov}(x,y)}{\sqrt{\text{var}(x)\text{var}(y)}}$$

where we mean correlation, covariance and variance by cor, cov, and var above. Further explantion: the denominator could equivalently be stated as the product of the standard deviations.

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2 Provide a very short answer. DO ANY 5 OF THESE.

2.1 What is the focus of economics?

Answer/comment

Economics studies decisionmaking in the face of scarcity. Further explanation: scarcity is crucial.

2.2 What is the focus of financial economics?

Answer/comment

It is economics where the scarce stuff has an intertemporal aspect. Further explanation: We are trading off scarce resources today vs. scarcity in the future. Should I eat the candy bar now or an hour from now. Should I spend my wealth now or save it?

2.3 Give an example of moral hazard

Answer/comment

Any case where a second party assumes some of the risk of the first party's behavior. As they are not bearing the full risk, the first party tends to behave in a more risky manner. E.g. if the government pays to rescue mountain climbers that get stuck, more folks will climb mountains than otherwise would.

2.4 What is the difference between credit risk and interest rate risk?

Answer/comment

Interest rate risk is the risk that my asset will change in value due to changes in market interest rates. Credit risk is the risk that my asset will change value because the contractual payments will not be made (default).

2.5 What distinguishes a 'callable' bond from those that are not 'callable'?

Answer/comment

The issuer of the callable bond has the option to pay off the bond early. Extra: A more complete answer (not required) is that the bond typically specifies certain conditions under which it can be called and the price at which it will be paid off—generally above par.

2.6 Someone says "Considering my possible portfolio outcomes over the next week, my 5 percent 'value at risk' is $1 million." What do they mean?

Answer/comment

The probability that I will lose more than $1 million over the next week is 5 percent. Or, with 95 percent probability, I will lose less than $1 million.

2.7 What is a primary distinguishing factor regarding municipal bonds in the United States?

Answer/comment

Interest on municipal bonds is not subject to federal income tax.

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3 Formal analysis. DO 3 OF THESE

3.1 Suppose I have a random variable, x, with possible realizations r_1, r_2, r_3, which will happen with probabilities pr_1, pr_2, pr_3, respectively. Give an expression for the mean of x.

Answer/comment

$$Ex = r_1 \times pr_1 + r_2 \times \mathrm{pr}_2 + r_3 \times pr_3 = \sum_j r_j \mathrm{pr}_j$$

3.2 Given an expression for the variance of x from the previous problem

Answer/comment

$$\mathrm{var}(x) = \sum_{j=1}^{3} (r_j - Ex)^2 \times \mathrm{pr}_j$$

3.3 Suppose I have a stream paying $\$a$ in 1 year and $\$b$ in 2 years. Suppose we call the present value of these two payments PV_1 and PV_2, respectively. Give an expression for the (Macauley) duration of the stream.

3.4 **Answer/comment**

$$\text{duration} = 1 \times \frac{PV_1}{PV_1 + PV_2} + 2 \times \frac{PV_2}{PV_1 + PV_2} = \sum_j j \frac{PV_j}{PV_1 + PV_2}$$

3.5 The current interest rates for 1, 2, and 3 years are $i_{1,t}$, $i_{2,t}$, and $i_{3,t}$, respectively. Give an expression for the 2-year forward rate 1 year in the future.

Answer/comment

$$1 + f = \left(\frac{(1 + i_{3,t})^3}{(1 + i_{1,t})} \right)^{1/2}$$
