

Econ 252 - Financial Markets

Spring 2011

Professor Robert Shiller

Midterm Exam #2 – Practice Exam

Instructions:

- The exam consists of a total of seven pages including this coversheet.
- There are two parts to this exam.
- In Part I, answer any eight of the ten questions, five minutes each.
The total for Part I is 40 minutes.
- In Part II, answer all four questions.
The total for Part II is 30 minutes.
- For the exam, there are 70 question minutes total, each question minute corresponding to 1 point.
- You have 75 minutes to do the exam.
- The exam is CLOSED BOOK.
- You are allowed to use a non-programmable calculator.

Part I.

Answer eight of the ten questions (5 points each - 40 points total).

1. What are real rates of interest? What are nominal rates of interest? What is the *exact* relation between them and the inflation rate?
2. What is the Eurobond market?
3. What are examples of the kinds of assets that back asset-backed securities?
4. Why do mortgage investors care about prepayment risk? Isn't getting a loan paid back early a good thing?
5. What was Henry David Thoreau's attitude toward money and finance?
6. What are Blue Sky laws? When were they enacted, and what are their shortcomings?
7. What kind of bad practices in the insurance industry might the "kink" at the origin of the Kahneman-Tversky value function predict?

PART I CONTINUES ON THE NEXT PAGE.

CONTINUATION OF PART I.

8. What criticisms have been made of rating agencies in the wake of the recent financial crisis?

9. How does an amortizing mortgage differ from a balloon payment mortgage, and why should people care?

10. What happens on the ex-dividend date for a stock? Should investors be worried about this?

Part II.

Answer ALL FOUR of the following questions.

(Question 1: 6 points, Question 2: 10 points,

Question 3: 9 points, Question 4: 5 points - 30 points total).

Question 1 (6 points)

Suppose that you have a standard coupon bond with principal value \$125,000 that matures in 10 years. The coupon rate is 2.5% and the coupon is paid annually with the first coupon payment occurring twelve months from now.

("Standard" refers to a non-callable bond contract.)

- (a) **(3 points)** If the yield of the bond is 5%, what is the price of the bond today if the coupon is paid annually?
- (b) **(3 points)** Suppose that the yield of the bond remains at 5%, but the coupon is paid semiannually with the first coupon payment occurring six months from now. What is the new price of the bond?

Question 2 (10 points)

For this question, please use the 6-month convention for interest rates.

Suppose that the annualized 72-month spot rate today is 4.5% and that the (annualized) forward rate today between 30 and 72 months equals 3.5%.

(a) **(3 points)** Which spot rate (known today) can you compute from the information above? What is the annualized value of this spot rate?

(b) **(5 points)** Assume that you will collect \$ a ($a > 0$) 30 months from now and describe an investment strategy for this amount of money that allows you to replicate the forward rate today between 30 and 72 months. Importantly, you are only allowed to use the 72-month spot rate and the spot rate computed in (a).

When describing your investment strategy, carefully describe the steps that you take today and the consequences that these steps will have at any future moment in time.

(Hint: In case that you are not able to compute the spot rate in part (a), you can describe the investment strategy by referring to the missing spot rate as z .)

(c) **(2 points)** What is today's expectation of the 42-month spot rate 30 months from now according to the Pure Expectations Theory?

Question 3 (9 points)

Consider a borrower that is approved for a standard 15-year, fully amortizing mortgage with an original balance of \$425,000 and a note rate of 10.8%.

("Standard" refers to a fixed rate mortgage contract with level payments.)

(a) **(2 point)** If the borrower purchases a house that is appraised for \$550,000, what is the borrower's LTV? In what regard is a borrower's LTV helpful for a bank's decision whether to accept or reject a loan application?

(b) **(7 points)** Imposing the assumption that the borrower neither prepays nor defaults, write down part of the amortization schedule, limiting attention to months 91 and 92. Your amortization schedule should contain four columns: (1) Month, (2) Interest Payment, (3) Principal Repayment, (4) Remaining Mortgage Balance (in the beginning of the month).

Question 4 (5 points)

Consider a hypothetical non-agency CMO whose collateral has a par value of \$600,000,000:

Tranche	Principal Amount	Credit Rating
1	\$300,000,000	AAA
2	\$80,000,000	AA
3	\$30,000,000	A+
4	\$x	A
5	\$55,000,000	BBB-
6	\$40,000,000	BB
7	\$20,000,000	B+
8	\$5,000,000	not rated

(a) **(2 points)** If the credit enhancement (provided by the senior-subordinate structure) of tranche 5 is \$90,000,000, what is the over-collateralization of this CMO?

(b) **(3 points)** Using your answer in (a), compute the principal amount of tranche 4 and the credit enhancement (provided by the senior-subordinate structure) of tranche 2.

(Hint: If you could not solve for the overcollateralization in part (a), use an overcollateralization of \$30,000,000 for part (b).)