

You have the entire class period to answer these questions. You may use scrap paper, a calculator, and a writing implement. If you think certain assumptions are important in determining the answer and those assumptions are not made clear in the question, feel free to write them down, as it may affect the extent to which you receive partial credit.

Total points = 100.

PART I. Answer every question in this section to receive full credit (80 points possible).

1. Bank Barbie, KenBank and First Federal Bank of Malibu (FFBM) each have assets of \$100 million which are comprised solely of 8% fixed rate home mortgages due in 30 years. Bank Barbie has funded three-quarters of the mortgages with deposits (1 year CDs paying 5%) and one quarter with a 10 noncall 0 bond with semi-annual coupons of 6%. KenBank has funded all of its mortgages with 5 year CDs at 5.5%. FFBM has funded all of its mortgages with a 10 noncall life bond that pays semi-annual coupons of 5.88%. In each question below, rank the answers from largest to smallest (Each question: 2 pts.).

	Bank Barbie	KenBank	FFBM
a. Rank the banks' maturity gaps	1	2	3
b. Rank the increase in profits if rates drop 100bp	1	2	3
c. Rank the decrease in profits if rates rise 100 bp	1	2	3

(6 pts) 2. Best Buy and Kmart each have bonds outstanding that pay semi-annual coupons of 10% and have durations of 6 years. Both bonds trade at par. Kmart's bond is noncallable for life while Best Buy's is callable immediately at 103. If rates on Treasuries fall by 100 bp and each firm's spread is unchanged, how much do they pay to retire their bonds? (Show your work for full credit and state the prices to the nearest penny per \$100 face value).

Kmart: 105.71 Best Buy: 103

$$\frac{\% \text{ change in } P = -6 * (-100 \text{ bp})}{1 + (.1/2)} = \frac{600 \text{ bp}}{1.95} = 571.4 \text{ bp or } 5.714\%$$

As the bonds were trading at par originally, the market price would be 105.71, which is what Kmart pays to retire its bond. Best Buy has the option to pay 103 for its bonds, which is a considerable savings over the true value. Hence Best Buy would call their bonds at 103.

(2 pts.) 3 . True or **False**: Given two firms that are identical in terms of financial distress, the one in the United States is less likely to continue as a going concern than the one located in Germany.

The U.S. has a very pro-debtor bankruptcy system, meaning compared to most other countries, the U.S. is more likely to let the firm continue operations. The only countries that would have a higher chance would be those seen in the Asian crisis to ignore their own bankruptcy rules and let the companies continue without dealing with the debt.

(4 pts.) 4. Investors expect inflation in England to average 7% over the next year, while investors expect inflation in the U.S. to average 3% over the same time period. Interest rates in England on one year bonds are 11% while interest rates on the U.S. 1 year bond is 5.5%. The exchange rate is currently .67 British Pounds to one U.S. dollar (i.e., the exchange rate is .67). Holding all else constant, would you expect the pound/dollar rate to rise, fall or stay the same over the next year?

Why? **Rise**. In order to avoid an arbitrage on riskfree investments (interest rate parity), the pound has to depreciate. Real rates are very high in England and if the pound does not depreciate, investors could take those very high real returns and convert them back to dollars at no risk.

(6 pts.) 5. In each pair of debt instruments offered in the U.S., circle the one that is most likely to have the higher yield to maturity or coupon (assume all other features are the same).

- | | |
|---|--|
| a. A Baa3 10 year corporate bond | A Baa1 10 year corporate bond |
| b. A MBS with a WAC of 7% | A MBS with a WAC of 8.5% |
| c. A U.S. Dollar bond offering by Nestle | A Euro denominated bond offered by Nestle |
| d. A 5 year U.S. Treasury | A 5 year government bond issued by Turkey |
| e. A senior subordinated bond issued by TWA | A senior secured bond issued by TWA |
| f. A 30 year noncall 10 bond offered by Disney | A 30 year noncall life bond offered by Disney |

(3 pts) 6. Each of the following attributes of companies either make the restructuring process faster (F) or slow it down (S). Put an F or S next to each one, depending on how it affects restructuring.

- | | |
|-----------------------|-------------------------|
| a. Hold out problems | <u> S </u> |
| b. Asbestos claimants | <u> S </u> |
| c. Vulture investors | <u> F </u> |

(3 pts.) 7. Name three variables (factors) that are useful in predicting sovereign defaults:

_____ variance of exports, reliance on imports, inflation, investment/gdp, debt service,
political stability _____

(3 pts.) 8. Some people say the head of the European Central Bank, Willem Duisenberg, has a lot to learn from Alan Greenspan. Which of the following is NOT a lesson to learn from Greenspan. (Circle one)

- a. Do not try to justify your actions as head of the Central Bank.
- b. Never say you are done taking action - leave your options open.
- c. Ignore the yield curve, as markets are overly pessimistic whenever someone new takes control of a central bank.
- d. Build a reputation for being more of a hawk than a dove.

(3 pts.) 9. If Moody's Investors Service and Standard and Poor's are equally good at rating bonds, the average default rate on Ba2 bonds will be lower than the average default rate on bonds rated:

- a. BBB-
- b. BB+
- c. BB
- d. BB-

(3 pts) 10. The Fed Funds futures rate implied in the contract ending March 31, 2001 is 6.30%. Whereas, today's FF rate is at 6.5%. What can you infer from these rates? (Circle one.)

- a. The Fed is most likely to tighten 25 bp at the Nov and Dec. meetings and ease 25 bp at both the January and March meetings.
- b. Rates probably will not change until the second meeting in 2001 (the March one), and then most likely by only 25 bp.
- c. The Treasury buyback plan is expected to continue into next year, driving down rates.
- d. The Fed has decided that to it will no longer intervene to support the Euro and will follow a monetary policy that is most consistent with inflation fighting.

(5 pts.) 11. A 3 year bond has a coupon of 10% (paid semi-annually) and has a yield to maturity of 8%. What is the bond's duration (show your work for full credit and report duration to the nearest hundredth of a year.) 2.67

$$PV = 105.24 = \frac{5}{1.04} + \frac{5}{1.04^2} + \frac{5}{1.04^3} + \frac{5}{1.04^4} + \frac{5}{1.04^5} + \frac{105}{1.04^6}$$

Weights:	4.808	4.623	4.444	4.274	4.1096	82.983
	-----	-----	-----	-----	-----	-----
	105.24	105.24	105.24	105.24	105.24	105.24

Multiply weights by .5, 1, 1.5, 2, 2.5 and 3 respectively:

$$.0228 + .0439 + .0634 + .0812 + .0976 + 2.3655 = 2.67$$

(1 point if you fail to correctly answer the question but are able to put an upper limit on D).

(5 pts.) 12. A bank has a leveraged adjusted duration gap of 2.3 and assets of \$200 million. Assuming that coupons are paid annually, and interest rates are now 10%, what happens to the equity in this bank when rates fall to 9%? (Show your work for full credit and report the change in equity to the nearest hundredth of a million.) _____

$$\text{Change in equity} = - \text{LADG} * \text{Assets} * (\text{change in } r / (1+r))$$

$$= - 2.3 * 200 * -.01/1.1$$

$$= 4.18 \text{ million}$$

(4 pts) 13. An applicant is seeking a mortgage with an LTV of 95%. Describe in a few sentences some of the important characteristics that this applicant is likely to have and the likely attributes of her mortgage. An LTV of 95% means she will put down 5%, which is low for a mortgage. She must have other characteristics that offset the low downpayment to make her loan safer - high income (now or expected soon), low TDS (maybe it is only a condo mortgage), good credit history, etc. The mortgage will have to have private mortgage insurance (PMI) unless it is not conventional (maybe she got it through the FHA) and it might be a negative amortization loan if her income is expected to grow a lot. It is probably fixed rate, as most ARMs require a 10% downpayment

(2 pts) 14. True or False: An typical prepackaged bankruptcy requires 90% approval by creditors for the company to emerge from Chapter 11. **F**

(3 pts.) 15. Which of the following best describes the difference between a pass-through and a CMO structure of a mortgage-backed security? (choose one)

- a. CMOs eliminate all prepayment risk, whereas pass-through MBS bondholders all share in the prepayment risk according to how much of the MBS they own.
- b. CMOs offer a better method for distributing prepayment risk among bondholders**
- c. CMOs do not offer as much flexibility as pass-throughs when it comes to using MBS to adjust the desired duration of a bank's asset portfolio
- d. Pass-throughs allow greater geographic diversity for a bank whereas CMOs do not

(5 pts.) 16. Using the following information, make up a table that shows the foreign currency position of Second Cleveland Bank (SCB). SCB has 200 million Australian dollars in loans to a variety of agricultural firms and one branch in Sydney that owes 75 million Australian dollars to depositors. SCB also has a branch in Mexico that has 1 billion pesos in NOW accounts. The pesos were invested in 600 million of Mexican government bonds (peso-denominated) and the rest in U.S. Treasury bonds. Finally, SCB has a trading section that has bought 200 million Swiss francs and has sold short 200 million yen. The rest of their assets and liabilities are in U.S. dollars. The exchange rates are: \$Australian/\$US = .5; peso/\$ = 10; SwFr/\$=.6; yen/\$=100. After you create the table showing their net exposures, state how much the bank will gain or lose money if the peso/dollar exchange rate rises to 11 and the \$Australian/\$US exchange rate falls to .4. (Show your work for full credit) 66.14

	Assets	Liabilities	FX Bought	FX Sold	Net Exposure
Australian	\$400	\$150	0	0	\$250
Peso	\$60	\$100	0	0	-\$40
Swiss Franc	0	0	\$333.33	0	\$333.33
Yen	0	0	0	-\$2	-\$2

If the Australian dollar appreciates (the rate falls to .4) then the bank will gain on that exposure:

I presented the formula in class incorrectly - it should have been the percentage change in the dollar/foreign currency ratio not the percentage change in the foreign currency/dollar ratio. Your text has it correctly, but for people who did not catch the difference I did not take points off for the incorrect formula.

Percent change in Australian rate: $(2.5-2.0)/2.0 = 25\%$

Gain on Australian position is 25% times exposure or \$62.50 million.

As the bank went short on pesos, if the peso depreciates as it did, it gains there as well.

The percent change in peso rate: $(.0909 - .1)/.1 = -.0909$

multiplied by -40, means a gain of 3.64 million

Total gain = $62.50 + 3.64 = 66.14$ million

(3 pts) 17. You just started a job in the asset-backed securities market working on collateralized debt obligations and a bond you are working on needs some more collateral behind it. Right now the collateral consists of \$100 million in casino bonds, \$100 million in oil exploration and production firm bonds, and \$100 million in specialty retail bonds. The average rating is a B2. You have the choice of adding \$100 million in CCC-rated telecom bonds or another \$100 million in energy related bonds, which are currently rated B. Which do you choose and why?

___The energy bonds offer no diversification as the portfolio already has the E&P bonds, which also energy bonds. The fact that the rating is higher is easily dealt with, as this is an asset-backed. All that needs to be done is to change the degree of overcollateralization to deal with the lower CCC rating. As the telecom bonds put the portfolio closer to the efficient frontier, it is worthwhile to adjust the credit enhancement on the ABS._____

(6 pts.) 18. Rank the following debt obligations in order of increasing sensitivity to interest rates (least sensitive is number one, most sensitive is number 6):

- a. A 30 year noncall life bond with semi-annual coupons of 8% 6
- b. A 3 year auto loan with an interest rate of 8% 2
- d. A 3 year inflation- indexed bond (TIPS) with semi-annual coupon payments, coupon rate of 3% with principal linked to the CPI 1
- e. A 12 year bond with semi-annual coupon payments, coupon rate of 10% 4
- f. A 12 year bond with semi-annual coupon payments, coupon rate of 3% 5
- g. A 3 year zero-coupon bond 3

(2 pts)19. True or False: All else constant, a PSA 120 passthrough MBS should have a higher OAS than a 100 PSA passthrough. **T**_____

(3 pts) 20. Which is a better measure of a country's allocational efficiency, the degree to which investors are able to obtain best execution on stock trades or the ease with which NASDAQ firms can complete primary offerings? Why? ___Allocational efficiency refers to whether firms that have the best use of funds for investing get them, and in many countries small growing firms are not able to do so, so the NASDAQ firms offerings are a better indication of how which firms get funding. Best execution is a measure of the secondary market's efficiency which only has an indirect effect on whether firms get funding (if the market is really sloppy, it is harder to do IPOs and SEOs)._____

(3 pts). 21 An adjustable rate mortgage has a yearly cap of 1% and a lifetime cap of 3% and pays a spread of 200 bp over LIBOR. LIBOR is currently 6.5%. If LIBOR is expected to rise by 150 bp in each of the next three years and then fall by 300 bp in each of the fourth year and fifth years, and not change again, what should the ARM rate be in the sixth year? 7%

Year	Now	1	2	3	4	5	6
LIBOR	6.5	8	9.5	11	8	5	5
ARM	8.5	9.5	10.5	11.5	10	7	7

Part II. Choose two of the following three questions to answer. If you answer all three questions, only the first two will be graded. (10 points for each correct answer.)

II.1. Defaults in the junk bond market each calendar year have ranged as high as 11% and as low as 1% over the period 1980-1996. (a) In a short, concise essay, explain why these default rates vary from year to year and (b) make a prediction for defaults in the year 2001 based on your analysis (your prediction need not be a precise number but simply a range relative to the average).

(7 pts) A. _____ Default rates in the junk market are largely a function of the average riskiness of the market (if they are mostly CCCs instead of BBs, there will more defaults), the economy, the age of the bonds (when they were issued). In addition, the market is not perfectly diversified by industry, so if an important industry in the market does poorly, the default rate will rise. Hence we saw a lot of defaults in 90-91 because the economy was bad, the bonds were typically quite risky and had been issued in the mid to late 1980s. In contrast, the worse recession of 1980-81 had a low default rate because the bond market was young and mostly fallen angels, which are safer. Despite a strong economy in 1986, we saw a lot of defaults because oil prices had fallen and the energy sector was a fairly large segment of the junk market then. _____

(3 pts) B. _____ The economy might be slowing, which would raise the default rate, but the more important factor is that the last few years have seen a lot of CCC issuance in the junk market and this is the time for their prime default period. So the riskiness of the market combined with the right age means defaults should rise, even if the economy holds steady (which might not happen.) Also, the telecom sector is a large part of the junk market now and there have been more and more firms having operating troubles in that area these days. _____

II.2. Integrity Bank makes a one year vacation loan to Carmen Rodrigues for \$3000. The loan is due at the end of a year and there are no intervening payments (principal and interest are due at year end). The bank aims to make 6% on its vacation loan portfolio. Integrity perceives that Ms. Rodrigues has a 3% chance of default. The contract rate on her loan is 8.5%. If default occurs, the bank can claim the proceeds of a CD she has posted as collateral. (Show your work for full credit and report prices to the nearest penny and interest rates to the nearest basis point).

(6 pts) a. What does Integrity expect the value of the collateral to be, should she default? _____

(4 pts) b. If instead, she had posted no collateral, what would the rate on her loan be? _____

a. $1.06 = .97 (1.085) + .03 (x/3000)$
 $1.06 = 1.05245 + .03 (x/3000)$ (the more you round on these the less precise the answer)
 $.00755 = .03 (x/3000)$
 $x = 755$

b. $1.06 = .97 (1+k) + .03(0)$
 $1.06 / .97 = 1 + k$ $k = 9.28\%$

II.3. A semi-annual coupon bond with a yield to maturity of 9% has a duration of 4.81 years and sells for a price of \$97.26. Show your work for full credit and state prices to the nearest penny per \$100 face value.

(5 pts.) a. Using duration, estimate the bond's new price if its YTM goes to 7%. _____

(2 pts) b. The convexity factor for this bond is 26.47, causing some estimation error in your answer in (a). If instead the convexity factor were 30, would your the estimation error in your answer in (a) be increased or decreased? _____

(3 pts) c. Draw a graph that shows the new price using your answer in (a), as well as the actual price if convexity were 26.47 or if it were 30. Make sure to label both axes and all points of interest.

$$\begin{aligned} \text{Percentage change in } P &= -4.81 * -.02 / (1.045) \\ &= 9.2057\% \\ \text{New price} &= 106.27 \end{aligned}$$

Convexity makes duration a less accurate estimate of the price change - duration overstates price losses and understates price gains. So in (b) the answer is that the estimation error is increased if convexity is greater.

Below is the graph I expected for (c). As I did not expect you to calculate the price with convexity, it was not necessary to show the actual price.

