

BAYLOR UNIVERSITY
HANKAMER SCHOOL OF BUSINESS
DEPARTMENT OF FINANCE, INSURANCE & REAL ESTATE

Problem Set #10
Dr. Garven

Name: _____

Problem 1.

Suppose that the (pre-loss and pre-tax) value of your company one period from now will be \$600. However, your company's assets are subject to the following loss distribution:

Loss (L_s)	Probability (p_s)
\$600	25%
\$400	25%
\$200	25%
\$0	25%

The government assesses a tax rate of 50% on asset values exceeding \$300, and a 0% tax rate whenever asset values fall below this amount. Assume that investors are risk neutral and the interest rate is 0 percent. Furthermore, assume that any insurance premiums paid are fully tax deductible, as are uninsured losses.

- A. Suppose that your company may fully insure this risk at an actuarially fair price. What would be the after-tax value of your company if you decided not to purchase insurance? What would be its value if you purchased insurance?
- B. What is the net present value of purchasing insurance?
- C. Do you recommend purchasing actuarially fair insurance? Why or why not?
- D. What would be your recommendation about buying insurance if the premium loading on this policy was 20 percent? Be sure to justify your answer.

Problem 2.

Suppose that shareholders are contemplating making an investment today (at $t=0$) and are considering different financing alternatives. The payoffs on this investment occur one period from today (at $t=1$). At $t=1$, only two states of the world (loss and no loss) may occur with equal probabilities. If the loss occurs, the investment will be worth \$2,000, and if there is no loss, then the firm will be worth \$4,000. However, the firm has an option to rebuild the asset at a cost of \$1,600 should a loss occur. Assume that shareholders are risk neutral, the interest rate is zero and bankruptcy is costless.

- A. What is the net present value of rebuilding the asset?
- B. Suppose the firm is all equity financed. Will shareholders rebuild the asset in the event of a loss? Why or why not?
- C. Suppose that as an alternative to equity financing, shareholders can issue zero coupon bonds. If the promised payment on the bonds equals \$2,000, will shareholders rebuild the asset in the event of a loss? Why or why not?
- D. Suppose shareholders issue zero coupon bonds and promise to repay \$3,000 at $t=1$. With this type of financing arrangement, will shareholders rebuild the asset in the event of a loss? Why or why not?
- E. Suppose that instead of issuing zero coupon bonds with a promised repayment of \$3,000, shareholders decide to issue zero coupon bonds with a promised repayment of \$2,600 and purchase an actuarially fair insurance policy with a deductible of \$1,400. With this type of financing arrangement, will shareholders rebuild the asset in the event of a loss? Why or why not?