Lecture 5 - Recommended Problems

François Geerolf
UCLA
Intermediate Macroeconomics, Econ 102

☆☆ Chapter 6, Problem 7

The Troubled Asset Relief Program (TARP)

Consider a bank that has assets of 100, capital of 20, and short-term credit of 80. Among the bank's assets are securitized assets whos value depends on the price of houses. These assets have a value of 50.

a. Set up the bank's balance sheet.

Suppose that as a result of a housing price decline, the value of the bank's securitized assets falls by an uncertain amount, so that these assets are now worth somewhere between 25 and 45. Call the securitized assets "troubled assets." The value of the other assets remains at 50. As a result of the uncertainty about the value of the bank's assets, lenders are reluctant to provide any short-term credit to the bank.

b. Given the uncertainty about the value of the bank's assets, what is the range in the value of the bank's capital?

As a response to this problem, the government considers purchasing the troubled assets, with the intention of reselling them again when the markets stabilize. (This is the original version of the TARP.)

c. If the government pays 25 for the troubled assets, what will be the value of the bank's capital? How much would the government have to pay for the troubled assets to ensure that the bank's capital does not have a negative value? If the government pays 45 for the troubled assets, but the true value turns out to be much lower, who bears the cost of this mistaken valuation? Explain.

Suppose instead of buying the troubled assets, the government provides capital to the bank by buying ownership shares, with the intention of reselling the shares when the markets stabilize. (This is what the TARP ultimately became.) The government exchanges treasury bonds (which become assets for the bank) for ownership shares.

d. Suppose the government exchanges 25 of Treasury bonds for ownership shares. Assuming the worst-case scenario (so that the troubled assets are worth only 25), set up the

new balance sheet of the bank. (Remember that the firm now has three assets: 50 of untroubled assets, 25 of troubled assets, and 25 of Treasury bonds.) What is the total value of the bank's capital? Will the bank be insolvent?

e. Given your answers and the material in the text, why might recapitalization be a better policy than buying the troubled assets?

☆ Chapter 6, Problem 8

Calculating the risk premium on bonds.

The text presents a formula where:

$$(1 + i) = (1 - p)(1 + i + x) + p(0)$$

where we define p as the probability the bond does not pay at all (the bond issuer is bankrupt) and has a zero return, i is the nominal interest rate, and x is the risk premium.

a. If the probability of bankruptcy is zero, what is the rate of interest on the risky bond?

b. Calculate the probability of bankruptcy when the nominal interest rate for a risky borrower is 8% and the nominal policy rate of interest is 3%.

c. Calculate the nominal interest rate for a borrower when the probability of bankruptcy is 1% and the nominal policy rate of interest is 4%.

d. Calculate the nominal interest rate for a borrower when the probability of bankruptcy is 5% and the nominal policy rate is 4%.

e. The formula assumes that the payment upon default is zero. In fact, it is often positive. How would you change the formula in this case?