Economics 435   Menzie D. Chinn
Spring 2013   Social Sciences 7418
University of Wisconsin-Madison

Midterm Exam

You have 75 minutes to complete this 70 minute exam. Be sure to "box in" your answers. Show your work (so that partial credit can be granted if the final answer is incorrect).

1. [20 minutes] Suppose the yield on a five year bond is 1%, and the yield on a ten year bond is 1.5%.

1.1 (10 minutes) Calculate the average value of the one year interest rates prevailing in years 5, 6, 7, 8, and 9, assuming the expectations hypothesis of the term structure hold. Show your algebraic work!
1.2 (5 minutes) Can you solve for what the 5year bond yield is expected to be five years from now?
1.3 (5 minutes) Assume yields at various horizons are given by:

$$i_{nt} = \frac{(i_{1t} + i^e_{1t+1} + ... + i^e_{1t+n-1})}{n} + rp_{nt} \tag{1}$$

Suppose slope of the yield curve steepens, so that for n=10, the ten year yield rises. Does this necessarily mean that the one year interest rate in year 9 has increased? Use equation (1) to explain your answer.

2. [15 minutes] Asset prices. Suppose:

$$P_t = \frac{D_{t+1}}{1 + rf + rp} + \frac{E_t P_{t+1}}{1 + rf + rp} \tag{2}$$

2.1 (7 minutes) Solve for the stock price assuming expectations are rational and there are no bubbles.
2.2 (4 minutes) Calculate the price of a share of stock, assuming dividends are expected to be constant at $D_0 = 1$ and $(rf + rp)$ is also expected to be constant at 0.10. Show your algebraic work.
2.2 (4 minutes) Suppose that you revise your expectations regarding $(rf + rp)$ downward by 4 percentage points. What immediately happens to the price of the share of stock? Once again, show your work.

3. [20 minutes] Leverage, liquidity, and bank balance sheets. If you cannot reduce to actual numbers, **be sure to show your algebraic work!**

3.1 (5 minutes) Consider two banks, H (high bank capital) and L (low bank capital).

High Bank Capital		Low Bank Capital	
Assets	Liabilities	Assets	Liabilities
Reserves $9M	Deposits $90M	Reserves $10M	Deposits $96M
Loans $71M	Bank Capital $10M	Loans $70M	Bank Capital $4M
ABS $20M		ABS $20M	

Bank capital is the equity of the owners (shareholders) of the bank. ABS stands for asset backed securities.

Calculate the return on equity (ROE) for each bank, if the rate of return on loans is 5%, and 10% on ABS, and the interest rate on deposits is 2%.

3.2 (5 minutes) Show what happens to each of the bank balance sheets when the asset backed securities lose 25% of their value.

3.3 (5 minutes) Now consider two banks, one which borrows a nothing short term, and one that borrows a lot on short term money markets.

Bank Deposit Based				Money Market Based			
Assets		Liabilities		Assets		Liabilities	
Reserves $6M		Deposits	$60M	Reserves $3M		Deposits	$30M
Loans	$74M	Short term	$30M	Loans borrowing	$77M	Short term borrowing	$60M
ABS	$20M	Bank Capital $10M		ABS	$20M	Bank Capital $10M	

Calculate the return on equity (ROE) for each bank, if the rate of return on loans is 5%, and 10% on ABS, and the interest rate on deposits is 2%, and the interest rate on short term borrowing is 1%.

3.4 (5 minutes) In a world without deposit insurance, which bank is more vulnerable to a "run"? Explain your answer.

4. [15 minutes] Consider a Taylor rule of the following form:

$$i_t^{FedFunds} = \pi_t + (\pi_t - \pi_t^*) + r_t^* \qquad (4)$$

4.1 (5 minutes) Suppose the output gap is -6.0%, and the inflation rate is 1.0%. Calculate the central bank's implied policy rate, assuming the equilibrium real rate of interest is 2%, and target inflation rate is 2%. Show your work.

4.2 (10 minutes) Suppose the government increases spending so that the equilibrium real rate of interest rises to 3%. What should the central bank do, and what short term impact will this have on the economy? Be specific, and use an IS-LM diagram to explain.