Problem Set 2

Due *in lecture* on Thursday, November 29. Be sure to put your name on your problem set. Put "boxes" around your answers to the algebraic questions.

1. Suppose the price change of a stock is given by:

$$P_{t+1} - P_t = (E_t P_{t+1} - P_t) + \left[\frac{D_{t+2} - E_t D_{t+2}}{(1 + rp + rf)} + \frac{E_{t+1} P_{t+2} - E_t P_{t+2}}{(1 + rp + rf)} \right]$$

Assume no news regarding dividends is coming out between t and t+1.

1.1 Why how might changes in expectations from t to t+1 regarding events at t+4 have an impact on the price change from t to t+1? Be explicit about the channel.

1.2 Should the change in the stock price be a completely uncorrelated random error? Show why or why not.

2. Consider a Bank that has the following balance sheet:

2.1 Suppose the bank has the following structure:

Assets		Liabilities	
Reserves	$50M	Checkable Deposits	$230M
Securities	$25M		
Govt Securities	$25M		
Loans	$150M	Bank Capital	$20M

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

Under the Basel II guidelines, government securities would have zero weight in assets; recalculate the capital ratio for this bank. Show your work. (Note also reserves carry zero weight in the calculation of risk weighted assets.)

2.2 Suppose the government securities are actually as risky as non-government securities. Calculate the true capital ratio.

3. Leverage, liquidity, and bank balance sheets

3.1 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 Show what happens to each of the bank balance sheets when the asset backed securities lose 25% of their value.

3.3 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 $77M borrowing	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 Show what each bank must do when short term money markets freeze, so that the banks cannot continue to borrow short term.

4. Consider a Taylor rule of the following form:

$$i_t^{FedFunds} = \pi_t + 0.5 \times (y_t - y_t^*) + 0.5 \times (\pi_t - \pi_t^*) + r_t^*$$

4.1 Calculate the implied Fed funds rate, assuming the equilibrium real rate is 2.5%, and target inflation rate is 2%. You will need to obtain information on the output gap and inflation rate. Show your work.

4.2 Suppose there is uncertainty surrounding the estimates of $y-y^*$ and $\pi-\pi^*$. Suppose further the standard deviation of each series is 0.026 and 0.012 respectively. What is the range of changes consistent with the Taylor rule, and this degree of uncertainty, using 95% confidence intervals? Show your work. What assumptions do you need to make in order to obtain your answer?