Economics 435 Menzie D. Chinn

Fall 2021 Social Sciences 7418

University of Wisconsin-Madison

**Problem Set 3**

Due ***in Canvas*** on Thursday, November 4. 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:

Assume no news regarding dividends is coming out between t and t+1 (e.g., each period is one day).

* 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.

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

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1.3 Suppose P refers to the price of Bitcoin. Further suppose that overnight the US government announced a ban on the use of Bitcoin to take effect one year from today. What would happen to the price of Bitcoin going from today to tomorrow (i.e., what would look like)? You can assume that no other information comes in overnight.

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

2.1 Suppose the bank has the following structure:

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| **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; calculate the capital ratio for this bank. Show your work. (Note also reserves carry zero weight in the calculation of risk weighted assets.)

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

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3. Leverage, liquidity, and bank balance sheets

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

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| **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%.

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

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| **High Bank Capital** | | | | **Low Bank Capital** | | | |
| Assets | | Liabilities | | Assets | | Liabilities | |
| Reserves | $9M | Deposits | $90M | Reserves | $10M | Deposits | $96M |
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| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **High Bank Capital** | | | | **Low Bank Capital** | | | | | Assets | | Liabilities | | Assets | | Liabilities | | | Reserves | $\_\_M | Deposits | $\_\_M | Reserves | $\_\_M | Deposits | $\_\_M | | Loans | $\_\_M | Bank Capital | $\_\_M | Loans | $\_\_M | Bank Capital | $\_\_M | | ABS | $\_\_M |  |  | ABS | $\_\_M |  |  | |

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

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| **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%.

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3.4 Show what each bank must do when short term money markets freeze, so that the banks cannot continue to borrow short term.

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