Problem Set 4 Answers

Due in lecture on Monday, November 20th. No late submissions will be accepted. Make sure your name is on your problem set, as well as the name of your (official) TA.

1. “If inflation had not risen in the 1960’s and 1970’s, the banking industry might be healthier today.” Is this statement true, false, or uncertain? Explain your answer.

True. Higher inflation helped raise interest rates which caused the disintermediation process to occur and which helped create money market mutual funds. As a result banks’ lost cost advantages on the liabilities side of their balance sheets and this has led to a less healthy banking industry. However, improved information technology would still have eroded the banks’ income advantages on the assets side of their balance sheet, so the decline in the banking industry would still have occurred.

2. What bank regulation is designed to reduce adverse selection problems for deposit insurance? Will it always work?

Chartering banks is the bank regulation that helps reduce the adverse selection problem because it attempts to screen proposals for new banks to prevent risk prone entrepreneurs and crooks from controlling them. It will not always work because risk prone entrepreneurs and crooks have incentives to hide their true nature and thus may slip through the chartering process.

3. What are the costs and benefits of a too-big-to-fail policy?

The benefits of a too big to fail policy are that it makes bank panics less likely. The costs are that it increases the incentives or moral hazard by big banks who know that depositors do not have incentives to monitor the bank’s risk taking activities. In addition, it is an unfair policy because it discriminates against small banks.

4. How can the S&L crisis be blamed on the principal agent problem?

The S&L crisis can be blamed on the principal agent problem because politicians and regulators (the agents) have not had the same incentives to minimize costs of deposit insurance as do the taxpayers (the principals). As a result, politicians and regulators relaxed capital standards, removed restrictions on holdings of risky assets, and engaged in regulatory forbearance, thereby increasing the cost of the S&L bailout.

5. If you buy a put option on a $100,000 Treasury bond futures contract with an exercise price of 95 and the price of the Treasury bond is 120 at expiration, is the contract in the money, out of the money, or at the money? What is your profit or loss on the contract if the premium was $4,000?

The put option is out of the money because you would not want to take the option to sell the futures at 95 when the price at expiration is 120. Since the premium is $4,000 and you did not exercise the contract, your loss on the contract is $4,000.

6. Consider the following interactions between the Fed and First National Bank.
6.1 If the Fed buys $2 million of bonds to the First National Bank, what happens to reserves and the monetary base? Use T-accounts to explain your answer.
Banking System

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securities</td>
<td>-$2 million</td>
</tr>
<tr>
<td>Reserves</td>
<td>+$2 million</td>
</tr>
</tbody>
</table>

Money base rises by $2 million since \( MB = C + R \)

6.2 Again using T-accounts, show what happens to checkable deposits in the banking system when the Fed buys $2 million of bonds from the First National Bank. Assume the required reserve ratio is 10%

<table>
<thead>
<tr>
<th>Federal Reserve</th>
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<tbody>
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<tr>
<td>Reserves</td>
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</tbody>
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The effect on the Fed’s balance sheet is that it has gained $2M of securities in its assets column, while it has an increase of $2M of reserves in its liabilities column. The net result of this open market operation is that reserves have increased by $2M, the amount of the sale. The initial effect is that there has been no change of currency in circulation, and the monetary base has also risen by $2M.

However, taking into account the entire analysis in Chapter 13, one knows that an increase in reserves induces a multiple increase in checkable deposits, equal to

\[
\Delta D = \Delta R \times \left( \frac{1}{1 - r_D} \right) = 2 \times \left( \frac{1}{1 - (1 - 0.10)} \right) = 20
\]

7. If the required reserve ratio on checkable deposits is set to 5%, how much multiple deposit creation will take place when reserves are increased by $50 million. Use the appropriate equation(s) to obtain the answer (and show your work).

\[
\Delta D = \Delta R \times \left[ 1 + (1 - r_D) + (1 - r_D)^2 + (1 - r_D)^3 + \ldots \right] = \Delta R \times \left[ 1 + a + a^2 + a^3 + \ldots \right]
\]

\( (1 - r_D) = a \)

\[
\Delta D = \Delta R \times \left[ 1 + a + a^2 + a^3 + \ldots \right] = \Delta R \times \frac{1}{1 - a}
\]

Required reserve ratio on checkable deposits is 5%. Reserves increased by $50M, so excess reserve is $500M, all will be lent out to keep excess reserves at zero.

\[
\Delta D = \Delta R \times \left( \frac{1}{1 - a} \right) = \Delta R \times \left( \frac{1}{1 - r_D} \right) = 50 \times \left( \frac{1}{1 - (1 - 0.05)} \right) = 50 \times 20 = 1000
\]

8. In general, when the required reserve ratio falls, what happens to the simple deposit multiplier? Refer to a specific equation to demonstrate show your answer.

If no excess reserves are held, then:

\[
D = (1 / r)R
\]
Where the term in the parentheses (.) is the money multiplier \( \tilde{m} \). It is thus clear that increasing \( r \) decreases the multiplier. This can also be seen by taking the differential of \( \tilde{m} \) with respect to \( r \).

\[
\tilde{m} \equiv r^{-1}
\]

\[
\frac{\partial \tilde{m}}{\partial r} \equiv -1(r)^{-2} < 0
\]

In other words, the money multiplier increases when the required reserve ratio falls, holding all else constant.

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