ECON131  
Principles of Macroeconomics  
Spring 2012, Problem Set 5  
Suggested Answer  

Due on April 30, 2012  

Topic: Monetary policy  
Question 1-5 and 7 on page 275 on the textbook.  

**Question 1 on page 275 (15 points)**  
**Answer:** In each case, there is $60 billion in the form of cash in circulation, and the rest of the money supply is held in bank deposits, backed by $60 billion in reserves. The total money supply is calculated as follows:  

<table>
<thead>
<tr>
<th>Reserve Ratio</th>
<th>Money Multiplier</th>
<th>Total Deposits</th>
<th>Money Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>10</td>
<td>600</td>
<td>660</td>
</tr>
<tr>
<td>12.5%</td>
<td>8</td>
<td>480</td>
<td>540</td>
</tr>
<tr>
<td>16 2/3%</td>
<td>6</td>
<td>360</td>
<td>420</td>
</tr>
</tbody>
</table>

The M1 money supply always exceeds total deposits by the $60 billion in cash outside banks.  

**Question 2 on page 275 (15 points)**  
**Answer:**  

<table>
<thead>
<tr>
<th>CITIBANK</th>
<th>NEW YORK FED</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSETS</td>
<td>LIABILITIES</td>
</tr>
<tr>
<td>Reserves +100</td>
<td>no change</td>
</tr>
<tr>
<td>Building</td>
<td>–100</td>
</tr>
</tbody>
</table>

Comparison with Table 1 in the text shows that the Fed increases bank reserves by purchasing any asset. A building will do as well as a government security.
Question 3 on page 275 (20 points)
Answer:

<table>
<thead>
<tr>
<th></th>
<th>Bil Gates</th>
<th></th>
<th>BoA</th>
<th></th>
<th>Fed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>Liabilities</td>
<td>Assets</td>
<td>Liabilities</td>
<td>Assets</td>
<td>Liabilities</td>
</tr>
<tr>
<td>+5</td>
<td>0</td>
<td>+5</td>
<td>+5</td>
<td>+5</td>
<td>+5</td>
</tr>
<tr>
<td>-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Fed simply creates the $5 billion (in the form of bank reserves) to buy the bonds. In the long run, it makes no difference whether the Fed buys the bonds from a bank or from an individual. In this case, Bank of America’s $5 billion in new reserves are offset by $5 billion in new deposits, so that not all of the new reserves are excess reserves, whereas if the Fed had bought the bonds from Bank of America directly there would have been no change in deposits, and all the new reserves would have been excess. In the long run, however, the new reserves of $5 billion will support the same increase in deposits. Why? Because in this case, the original transaction between the Fed and Bill Gates already creates $5 billion in new deposits.

Question 4 on page 275 (15 points)
Answer:
(a) If the price of the $1,000 Treasury bill falls to $925, it will earn $75 over its life, so the interest rate is $75/$925, or 0.08108 (8.11 percent).
(b) At a price of $975, the interest rate is $25/$975, or 0.0256 (2.56 percent).
(c) for a one-year Treasury bill with a face value of $1,000, interest rate r and current price P: \[ r = \frac{1000 - P}{P} \]. Thus an increase in P lowers r, because it reduces both the numerator and the denominator.

Question 5 on page 275 (15 points)
Answer:
(a) A $5 billion increase in the bank reserves lowers interest rates by 2.5 percentage points.
(b) A reduction in interest rates of 2.5 percentage points stimulates $75 billion of new investment spending.
(c) Aggregate demand rises by $150 billion.
(d) The aggregate supply curve is horizontal, and GDP rises by $150 billion.
**Question 7 on page 275 (20 points)**

**Answer:** There are several ways to solve this problem. Investment \((I)\) can be found at the three different interest rates, and then equilibrium GDP can be calculated three times using the three different values for \(I\). Alternatively, a more general solution just works with the symbol \(r\) for the interest rate:

\[
Y = C + I
\]

\[
C = 300 + 0.75Y
\]

\[
I = 1,000 - 100r
\]

\[
Y = 300 + 0.75Y + 1,000 - 100r
\]

\[
Y = 1,300 + 0.75Y - 100r
\]

\[
0.25Y = 1,300 - 100r
\]

\[
Y = 4(1300 - 100r)
\]

\[
Y = 5,200 - 400r
\]

Therefore

(a) if \(r = 0.02\), \(Y = 5,192\).

(b) if \(r = 0.05\), \(Y = 5,180\).

(c) if \(r = 0.1\), \(Y = 5,160\).