

Suggested Solutions to Assignment 5

Part A

Multiple-Choice Questions

1. C
2. C
3. B
4. C
5. C
6. D
7. B
8. B
9. A
10. C
11. A
12. C
13. A
14. C
15. B
16. C
17. B
18. A
19. C
20. C
21. A
22. C
23. B
24. C
25. D
26. C
27. D
28. A
29. A
30. A
31. B
32. B
33. C
34. B
35. C
36. B
37. C

- 38. D
- 39. B
- 40. B
- 41. B
- 42. C
- 43. C
- 44. A
- 45. A
- 46. A
- 47. B
- 48. C
- 49. C
- 50. D
- 51. B
- 52. C
- 53. C
- 54. D
- 55. A
- 56. A
- 57. C
- 58. B
- 59. D
- 60. C

Part C

Problem Solving Questions

Answer all parts of the following question.

C-1

Chapter 13 (Appendix B): Questions for Thought and Review – Number 1

Starting with the initial balance sheet:

Assets		Liabilities & Net Worth	
Cash	20,000	Demand dep	200,000
Loans	225,000	Net worth	150,000
<u>Phys assets</u>	<u>105,000</u>		
Total	350,000	Total	350,000

a. If an immigrant enters the country and deposits \$10,000 in a bank, the result is:

Assets		Liabilities & Net Worth	
Cash	30,000	Demand dep	210,000
Loans	225,000	Net worth	150,000
<u>Phys assets</u>	<u>105,000</u>		
Total	360,000	Total	360,000

b. If the bank keeps 10% of this deposit and lends the rest, the result is:

Assets		Liabilities & Net Worth	
Cash	21,000	Demand dep	210,000
Loans	234,000	Net worth	150,000
<u>Phys assets</u>	<u>105,000</u>		
Total	360,000	Total	360,000

c. 80% of the loan amount (\$9000) gets deposited back in the bank, and the result is:

Assets		Liabilities & Net Worth	
Cash	28,200	Demand dep	217,200
Loans	234,000	Net worth	150,000
<u>Phys assets</u>	<u>105,000</u>		
Total	367,200	Total	367,200

d.

Here, the money multiplier = $1/(\cdot 10 + \cdot 20) = 3.3333333$

So, after the money multiplier is all through multiplying, the initial \$10,000 deposit will create \$33,333.333 (Multiplier * Initial Deposit = $3.3333333 * 10000$) new deposits. 10% of the new deposits will be held as cash and the rest will be loaned out. So, the final balance sheet will be:

Assets		Liabilities & Net Worth	
Cash	23,333.33	Demand dep	233,333.33
Loans	254,999.99	Net worth	150,000
<u>Phys assets</u>	<u>105,000</u>		
Total	383,333.32	Total	383,333.33

C-2.

Below is a simplified consolidated balance sheet of the banking system. [Hint: assume that the banking system is in equilibrium and the public holds all of its money in the bank].

Assets:	\$ B	Liabilities:	\$ B
Cash	30	Demand Deposits	900
Deposits at Bank of Canada	24		
Government Bonds	46		
Loans Outstanding	800		

- (a) Suppose the Bank of Canada sells \$5 B worth of government to the banks. Show the initial effect on the consolidated balance sheet of the banking system. What effect does this transaction have on the money supply? [Hint: Write out the changes to the various assets and liabilities before and after the banks make any new, or call-in any old, loans.]

Reserves are the sum of currency held within the banking system and deposits by banks at the Bank of Canada (B of C). Therefore initial reserves = $30 + 24 = 54$. If the system is in equilibrium, then the banks are holding their desired reserve ratio given by $rr = \text{Desired Reserves/Deposits} = 54/900 = 6\%$.

A sale of government bond results in a decrease in reserves held by the banking system. Deposits at the Bank of Canada or Cash are reduced by 5 and government bond holdings on asset side increase by 5 to 51. The initial effects on the balance sheet are summarized as follows:

Assets:	\$ B	Liabilities:	\$ B
Cash	30	Demand Deposits	900
Deposits at Bank of Canada	19		
Government Bonds	51		
Loans Outstanding	800		

The banking system has reserves of 49 that support 900 of deposits (5.44%). As a result of this transaction the reserve ratio falls below 6% that the banking system was holding in the equilibrium.

In order to increase the reserve ratio back to its original level (6%), the banking system will start calling back some of its loans early. The banking system starts by recalling 5 billion worth of loans that are required to increase the reserves. Since, individuals hold all money in the banks, repayment of loan results in a reduction of demand deposits by 5. Since there is a withdrawal and deposit of 5, the cash amount on the asset side remains unchanged after the first call-in of loan. However, the new reserve ratio becomes $49/895=5.47\%$, which is still lower than desired 6%. The banking system continues to call back additional loans. At every stage loans outstanding and demand deposits decrease resulting in contraction of money supply. This process continues until reserve ratio reaches 6%.

The final effect on money supply can be calculated using the money multiplier, which is defined as $1/rr = 1/0.06=16.67$.

Thus, a reduction of reserves by 5 billion would result in a decrease of money supply by $5*16.67=83.33$. At the final stage, the loans outstanding and deposits have decreased by $5*money\ multiplier = 5*16.67=83.33$. The final balance sheet is as shown below.

Assets:	\$ B	Liabilities:	\$ B
Cash	30	Demand Deposits	816.67
Deposits at Bank of Canada	19		
Government Bonds	51		
Loans Outstanding	716.67		

- (b) **Return to the original balance sheet of the banking system given in the table above and suppose that the Bank of Canada announces a decrease in the bank rate which causes the banking system to reduce its desired reserve ratio to 4%. What effect does this transaction have on the outstanding loans, reserves and money supply?**

A decrease in desired reserve ratio, would result in excess reserves held by the banking system. If reserve ratio is 4% they would be required to hold only 36B in reserves instead of 54B. Banks would start to loan out these excess reserves of 18B. Since public holds all money at the banks, an increase in loans also results in an increase of demand deposits by 18B. This leaves them with excess reserves which are loaned out again. The banks will continue to increase loans until reserve ratio of 4% is reached, i.e. when 54 B of reserves would constitute 4% of deposits: 1350B.

As a result loans outstanding, demand deposits have increased by 450B.

You can also use money multiplier to calculate the change in money supply as follows:

Change in money supply = excess reserves loaned out * money multiplier

Change in money supply = 18 * 1/0.04=18*25=450

Assets:	\$ B	Liabilities:	\$ B
Cash	30	Demand Deposits	1350
Deposits at Bank of Canada	24		
Government Bonds	46		
Loans Outstanding	1250		

- (c) How would your answer to parts (a) and (b) change if individuals actually hold some of their money in cash? In particular, would the money supply expand or contract by more or less than you found above? [10]**

Part A: After the initial round of loans recall totaling \$5B is made (see part (a) above), the fact that individuals hold some of their money in cash means that deposits would decrease by less than \$5B. This reduces the amount of additional loans that need to be recalled at each subsequent stages of contraction process. Therefore, the contraction of the money supply will be smaller than in part (a)

Part B: After the initial round of new loans totaling \$18B is made (see part (b) above), the fact that individuals hold some of their money in cash means that less than \$18B is deposited back into the banking system. Therefore there are less excess reserves to be loaned out at the next stage of the process. This is true for all subsequent stages of the process. Therefore the expansion of the money supply will be less due to this “cash drain”.

Intuition: When individuals hold money in cash, the money multiplier is less effective, due to “cash” drain when new loans are made or old loans called back.