Answers to Text Questions and Problems in Chapter 9

Answers to Review Questions

1. The Bank of Canada is a central bank, responsible for the administration of monetary policy. In contrast, Canada’s commercial banks or chartered banks are profit-maximizing private firms.

2. The main policy objective of the Bank of Canada is to keep the inflation rate low. Specifically, its goal is to keep inflation as close as possible to two percent, and to keep it within a one- to three-percent range.

3. According to the modern central banking theory, when the Bank of Canada changes the key policy rate, it sends a signal regarding the direction it wants interest rates to go. Commercial banks respond by changing their prime rates, which affects the market interest rates charged to customers.

4. Low employment growth is indicative of a possible recessionary output gap. Typically the Bank of Canada responds to a slowing of the economy by lowering the nominal interest rate; financial markets anticipate this and reduce interest rates even in advance of formal Bank action. A weaker economy also reduces the demand for money, which reduces the nominal interest rate.

5. A higher real interest rate increases the reward for saving; if people save more in response to a higher real interest rate, then they are necessarily consuming less. A higher real interest rate also makes it more costly to finance consumer durables and housing, reducing spending on those items. Firms will be more reluctant to invest in new capital goods when the real interest rate is high, because the cost of borrowing is high. Thus a higher real interest rate is likely to reduce both consumption and investment spending, both of which are components of planned aggregate expenditure. The explanation associated with the Keynesian cross model is broadly similar to that of the Bank of Canada.

6. The Bank of Canada is likely to respond to a recessionary gap with an expansionary monetary policy intended to stimulate planned aggregate expenditure. The first step is a reduction in the key policy rate, which causes commercial banks to lower their interest rates. The reduction in interest rates encourages borrowing by households and firms, which stimulates planned aggregate expenditure (consumption and investment spending). An increase in planned aggregate expenditure in turn raises short-run equilibrium output, as firms produce enough to meet the extra demand.

7. The Bank of Canada has less precise knowledge of the economy than suggested by the numerical examples of this chapter. For example, at any given time the Bank of Canada does not know exactly the size of the output gap, the precise magnitude of the effect of a change in the interest rate on planned aggregate expenditure, or the time needed for the full impact of a policy change to be felt. For these reasons monetary policy is sometimes called “as much an art as a science”, and the Bank of Canada tends to be cautious in its actions.

Answers to Problems

1. If the overnight rate target is cut from 4 percent to 3.75 percent, then the bank rate will also fall, from 4.25 percent to 4 percent, since the bank rate is the upper limit of the operating band for the Bank of Canada’s overnight loans. The prime business rate has consistently been 1.5 percentage points above the bank rate, so if the bank rate falls, the prime business rate should also fall, from 5.75 percent to 5.5 percent.
2. \( PAE = C + I^p + G + NX. \)
\[
PAE = 2600 + 0.8(Y - T) - 10,000r + (2000 - 10,000r) + 1800 + 0
\]
Since \( T = 3000 \) and \( r = 0.10 \), the expression for planned aggregate expenditure simplifies to:
\[
PAE = 2600 + 0.8(Y - 3000) - 10,000(0.10) + 2000 - 10,000(0.10) + 1800
\]
\[
PAE = 2600 + 0.8Y
\]
Using the definition of short-run equilibrium output, \( Y = PAE \):
\[
Y = 2000 + 0.8Y
\]
\[
0.2Y = 2000
\]
\[
Y = 10,000
\]
3a. With net exports equal to zero and taxes fixed at 3000, planned aggregate expenditure in the economy described in problem 5 is given by:

\[ \text{PAE} = C + I^p + G + NX \]
\[ \text{PAE} = 2600 + 0.8(Y - 3000) - 10,000r + (2000 - 10,000r) + 1800 + 0 \]
\[ \text{PAE} = 4000 + 0.8Y - 20,000r \]

Short-run equilibrium output is defined by the condition \( Y = \text{PAE} \):

\[ Y = 4000 + 0.8Y - 20,000r \]
\[ 0.2Y = 4000 - 20,000r \]

To find the real interest rate that sets output equal to 12,000 (its potential level), we can set \( Y = 12,000 \) in the equation above and solve for \( r \):

\[ 0.2(12,000) = 4000 - 20,000r \]
\[ 20,000r = 4000 - 2400 = 1600 \]
\[ r = 0.08 \]

So to set output equal to its full-employment level, the Bank of Canada needs to set the real interest rate at 8%.

b. If we want \( Y = 9000 \), plug that value into the equation for short-run equilibrium output to obtain

\[ 0.2(9000) = 4000 - 20,000r \]
\[ 20,000r = 4000 - 1800 = 2200 \]
\[ r = 0.11 \]

4a. The relationship of planned aggregate expenditure to output and the real interest rate is as follows:

\[ \text{PAE} = C + I^p + G + NX \]
\[ \text{PAE} = 14,400 + 0.5(Y - 8000) - 40,000r + 8000 - 20,000r + 7000 - 1800 \]
\[ \text{PAE} = 23,600 + 0.5Y - 60,000r \]

b. Using the condition \( Y = \text{PAE} \):

\[ Y = 23,600 + 0.5Y - 60,000r \]
\[ 0.5Y = 23,600 - 60,000r \]

Potential output \( Y^* \) equals 40,000. To find the real interest rate consistent with full employment, set \( Y = 40,000 \) in the equation for short-run equilibrium output and solve for \( r \):

\[ 0.5(40,000) = 23,600 - 60,000r \]
\[ 60,000r = 2600 \]
\[ r = 0.06 \]

So the real interest rate that eliminates any output gap is 6%.

5. The answer depends on current information.
Sample Homework Assignment

1. How will each of the following changes affect the interest rate, planned expenditure, and equilibrium output?
   a. The Bank of Canada pursues contractionary monetary policy.
   b. The Bank of Canada pursues expansionary monetary policy.

2. The economy of Kappa is described by the following equations:
   \[ C = 5000 + 0.75(Y - T) - 8000r \]
   \[ I = 2500 - 10,000r \]
   \[ G = 1600 \]
   \[ NX = 0 \]
   \[ T = 2500 \]
   \[ r = 0.10 \]
   Solve for short-run equilibrium output.

Multiple Choice Quiz

1. The Bank of Canada claims that its sole policy objective is
   a. low inflation.
   b. low unemployment
   c. rapid economic growth.
   d. exchange rate stability.
   e. profit maximization.

2. To achieve its monetary policy objectives, the Bank of Canada’s primary tool is control over
   a. tax rates.
   b. federal spending.
   c. the stock market.
   d. interest rates.
   e. the GDP growth rate.

3. The interest rate that commercial banks charge each other for very short-term loans is called the
   a. discount rate.
   b. reserve rate.
   c. real interest rate.
   d. overnight rate.
   e. prime business rate.

4. To change monetary policy, the Bank of Canada changes the ________, which changes the ________ and thus the ________.
   a. prime business rate; overnight rate target; overnight rate
   b. prime business rate; overnight rate; overnight rate target
   c. overnight rate target; overnight rate; prime business rate
   d. overnight rate; overnight rate target; prime business rate
   e. overnight rate target; prime business rate; overnight rate

5. When the real interest rate rises, which of the following is true?
   a. Consumption and planned investment spending rise.
   b. Consumption and planned investment spending fall.
c. Consumption spending rises, while planned investment spending falls.
d. Consumption spending falls, while planned investment spending rises.
e. Consumption spending falls, while planned investment spending is unchanged.

6. Suppose that planned aggregate expenditure equals \( PAE = 2000 + 0.8Y - 5000r \). If the central bank raises the real interest rate from 5% to 6%, then equilibrium output will ________ from ________ to ________.
   a. fall; 8750; 8500
   b. fall; 9875; 9850
   c. rise; 8500; 8750
   d. rise; 9850; 9875
   e. rise; 1700; 1750

7. To fight inflation, the Bank of Canada should do which of the following?
   a. Raise the real interest rate.
   b. Lower the real interest rate.
   c. Keep the real interest rate constant.
   d. Allow the real interest rate to fluctuate with the market.
   e. Raise the nominal interest rate.

8. To fight a recession, the Bank of Canada should do which of the following?
   a. Raise the real interest rate.
   b. Lower the real interest rate.
   c. Keep the real interest rate constant.
   d. Allow the real interest rate to fluctuate with the market.
   e. Raise the nominal interest rate.

9. An increase in the interest rate by the Bank of Canada, made with the intention of reducing an expansionary gap, is called
   a. expansionary monetary policy.
   b. monetary loosening.
   c. contractionary fiscal policy.
   d. expansionary fiscal policy.
   e. contractionary monetary policy.

10. Since changes in the interest rate produce changes in the exchange rate, a rise in the interest rate will cause net exports to ________, and a fall in the interest rate will cause net exports to ________.
    a. rise; rise
    b. fall; fall
    c. rise; fall
    d. fall; rise
    e. rise; remain constant

Problems/Short Answer

1. Suppose that the economy of Beta can be described by the following equations:
   \[ C = 4000 + 0.9(Y - T) - 25,000r \]
   \[ I = 2000 - 15,000r \]
   \[ G = 1000 \]
   \[ T = 1000 \]
Suppose that the interest rate \( r \) is 3%. What is equilibrium output? Does the economy have a recessionary or an expansionary gap?

2. Use the equations from question 1 above. If the central bank wants to eliminate any expansionary or recessionary gaps, what interest rate should be set? Show planned aggregate expenditure, equilibrium output, and potential output graphically.

Answer Key to Extra Questions in Instructor’s Manual

Sample Homework Assignment

1a. The interest rate will rise, so consumption and investment will fall, causing planned expenditure to fall and equilibrium output to decrease.

b. The interest rate will fall, so consumption and investment will rise, causing planned expenditure to rise and equilibrium output to increase.

2. \( PAE = 5000 + 0.75(Y - 2500) - 8000(0.1) + 2500 - 10,000(0.1) + 1600 \)
   \[ PAE = 5425 - 0.75Y \]
   \[ Y = PAE \]
   \[ Y = 5425 - 0.75Y \]
   \[ 0.25Y = 5425 \]
   \[ Y = 21,700 \]

Multiple Choice

1. a
2. d
3. d
4. c
5. b
6. a
7. a
8. b
9. e
10. d

Problems/Short Answer

1. \[ PAE = 4000 + 0.9(Y - 1000) - 25,000r + 2000 - 15,000r + 1000 + 500 \]
   \[ PAE = 6600 + 0.9Y - 40,000r \]
   \[ PAE = 6600 + 0.9Y - 40,000(0.03) \]
   \[ PAE = 6600 + 0.9Y - 1200 \]
   \[ PAE = 5400 + 0.9Y \]
   \[ Y = PAE \]
   \[ Y = 5400 + 0.9Y \]
   \[ 0.1Y = 5400 \]
   \[ Y = 54,000 \]

As output is greater than potential, this economy is experiencing an expansionary gap.
2. \( PAE = 6600 + 0.9Y - 40,000r \)
\[ 50,000 = 6600 + 0.9(50,000) - 40,000r \]
\[ 40,000r = 6600 + 0.9(50,000) - 50,000 \]
\[ r = 1600 \]
\[ r = 0.04 = 4\% \]