Homework 3
Answer key

1. Problem 1, Chapter 11, page 311 K&W

The accompanying tables clearly show that the larger the marginal propensity to consume, the larger the size of the multiplier. In Westlandia, with the marginal propensity to consume of 0.5, the multiplier equals 2. In Eastlandia, with the marginal propensity to consume of 0.75, the multiplier equals 4.

<table>
<thead>
<tr>
<th>Rounds</th>
<th>Incremental change in GDP</th>
<th>Total change in GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$40 billion</td>
<td>$40 billion</td>
</tr>
<tr>
<td>2</td>
<td>$20 billion</td>
<td>$60 billion</td>
</tr>
<tr>
<td>3</td>
<td>$10 billion</td>
<td>$70 billion</td>
</tr>
<tr>
<td>4</td>
<td>$5 billion</td>
<td>$75 billion</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

\[
\frac{1}{1 - \text{MPC}} \times \Delta C = \frac{1}{1 - 0.5} \times 40 = 80 \text{ billion}
\]

<table>
<thead>
<tr>
<th>Rounds</th>
<th>Incremental change in GDP</th>
<th>Total change in GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$40 billion</td>
<td>$40 billion</td>
</tr>
<tr>
<td>2</td>
<td>$30 billion</td>
<td>$70 billion</td>
</tr>
<tr>
<td>3</td>
<td>$22.5 billion</td>
<td>$92.5 billion</td>
</tr>
<tr>
<td>4</td>
<td>$16.88 billion</td>
<td>$109.38 billion</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

\[
\frac{1}{1 - \text{MPC}} \times \Delta C = \frac{1}{1 - 0.75} \times 40 = 160 \text{ billion}
\]

2. Problem 3, chapter 11, page 312 K&W

a. Each resident’s consumption function and marginal propensity to consume are given in the table below. To determine autonomous consumer spending for each resident (the vertical intercept of his or her consumption function), we can look at each one’s consumer spending when disposable income is zero. To calculate each resident’s marginal propensity to consume (the slope of his or her consumption function), we can calculate the change in consumer spending when there is a change in disposable income. For example, Andre’s marginal propensity to consume is equal to \((29,000 - 15,000)/(40,000 - 20,000) = 0.70\).
b. To find the economy's consumption function, we calculate aggregate consumer spending at each level of aggregate disposable income:

- When each resident earns $0 in disposable income, aggregate consumer spending is $14,500.
- When each resident earns $20,000 in disposable income, aggregate disposable income is $100,000 and aggregate consumer spending is $83,500.
- When each resident earns $40,000 in disposable income, aggregate disposable income is $200,000 and aggregate consumer spending is $152,500.

Aggregate autonomous consumer spending is $14,500, and the marginal propensity to consume is 0.69 \[= \frac{($83,500 - $14,500)}{($100,000 - $0)}\]. The aggregate consumption function is:

\[ C = 14,500 + 0.69 \times YD \]

3. Complete the table and answer the questions.

<table>
<thead>
<tr>
<th>Real GDP</th>
<th>Consumption</th>
<th>Planned Investment</th>
<th>Government purchases</th>
<th>Net Exports</th>
<th>Total Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,800</td>
<td>3,000</td>
<td>900</td>
<td>1,300</td>
<td>-100</td>
<td>5,100</td>
</tr>
<tr>
<td>5,200</td>
<td>3,300</td>
<td>900</td>
<td>1,300</td>
<td>-100</td>
<td>5,400</td>
</tr>
<tr>
<td>5,600</td>
<td>3,600</td>
<td>900</td>
<td>1,300</td>
<td>-100</td>
<td>5,700</td>
</tr>
<tr>
<td>6,000</td>
<td>3,900</td>
<td>900</td>
<td>1,300</td>
<td>-100</td>
<td>6,000</td>
</tr>
<tr>
<td>6,400</td>
<td>4,200</td>
<td>900</td>
<td>1,300</td>
<td>-100</td>
<td>6,300</td>
</tr>
<tr>
<td>6,800</td>
<td>4,500</td>
<td>900</td>
<td>1,300</td>
<td>-100</td>
<td>6,600</td>
</tr>
<tr>
<td>7,200</td>
<td>4,800</td>
<td>900</td>
<td>1,300</td>
<td>-100</td>
<td>6,900</td>
</tr>
</tbody>
</table>

a. What is the value of the MPC? \[ MPC = \frac{300}{400} = 0.75 \]

b. What is the value of equilibrium GDP? \[ Y^* = 6000 \]

4. Problem 9, chapter 11, page 313 K&W
We can find the aggregate consumption function by calculating aggregate autonomous consumer spending and the marginal propensity to consume. Aggregate autonomous consumer spending equals aggregate consumer spending when disposable income is zero; in this case, aggregate autonomous consumer spending is $100 billion. The marginal propensity to consume is the change in aggregate consumer spending divided by the change in disposable income; in this case, it is 0.75 \[= \frac{($400 - $100)}{($400 - $0)}\]. The aggregate consumption function is:

\[C = \$100 \text{ billion} + 0.75 \times YD\]

c. \(Y^*\) is the level of GDP at which planned aggregate spending equals GDP. From the accompanying table, \(Y^*\) is $1,600 billion.

d. The multiplier equals \(1/(1 - MPC)\); the value of the multiplier is \(4 = 1/(1 - 0.75)\).

e. If planned investment spending falls to $200 billion, the new \(Y^*\) will equal $1,200 billion. If planned investment spending equals $200 billion, it has fallen by $100 billion. Since the multiplier is 4, \(Y^*\) will change by four times the change in planned investment spending, or decrease by $400 billion.

f. If autonomous consumer spending rises to $200 billion, the new \(Y^*\) will equal $2,000 billion. If autonomous consumer spending equals $200 billion, it has risen by $100 billion. Since the multiplier is 4, \(Y^*\) will change by four times the change in autonomous consumer spending, or increase by $400 billion.

5. Problem 13, chapter 11, page 313 K&W

a. The payments increase the disposable income of American consumers. The \(MPC\) can be used to calculate the effect of the rebates on consumer spending. \(\Delta C = MPC \times \Delta YD = 0.7 \times $145 \text{ billion} = $101.5 \text{ billion}\). We can then use the change in consumer spending along with the multiplier to calculate the resulting change in real GDP. \(\Delta Y = (1/(1 - MPC)) \times \Delta C = (1/(1 - 0.7)) \times $145 \text{ billion} = $483.33 \text{ billion}\).

b. As shown in the accompanying diagram, the payments result in an autonomous increase in planned aggregate spending. This change results in an increase in real GDP.
6. Distinguish between a movement along the aggregate supply curve and a shift of the entire aggregate supply curve. What factors cause each to occur?

**See textbook**

7. Problem 1, chapter 12, page 347 K&W

You are right. When a fall in the value of the dollar against other currencies makes U.S. final goods and services cheaper to foreigners, this represents a shift of the aggregate demand curve. Although foreigners may be demanding more U.S. goods because the price of those goods in their own currency is lower, there is no change in the U.S. aggregate price level. From the U.S. perspective, there is an increase in aggregate output demanded at any given aggregate price level.

8. Problem 4, chapter 12, page 347 K&W

a. As the value of the dollar in terms of other currencies increases and American producers pay less in dollar terms for foreign steel, producers’ profit per unit increases and they are willing to supply a greater quantity of aggregate output at any given aggregate price level. The short-run aggregate supply curve will shift to the right.

b. As the Federal Reserve increases the quantity of money, households and firms have more money, which they are willing to lend out, and interest rates fall. The lower interest rates will increase investment spending and consumer spending, leading to a greater quantity of aggregate output demanded at any given aggregate price level. The aggregate demand curve will shift to the right.

c. If unions are able to negotiate higher nominal wages for a large portion of the workforce, this will increase production costs and reduce profit per unit at any given aggregate price level. The short-run aggregate supply curve will shift to the left.

d. As the aggregate price level falls and the purchasing power of households’ and firms’ money holdings increases, the public tries to reduce its money holdings by borrowing less and lending more. So interest rates fall, leading to a rise in both investment spending and consumer spending. This is the interest rate effect of a change in the aggregate price level, represented as a movement down along the aggregate demand curve.

9. Problem 5 chapter 12, page 348 K&W

In the short run, as the aggregate price level rises from $P_1$ to $P_2$, nominal wages will not change. So profit per unit will rise, leading to an increase in production from $Y_1$ to $Y_2$. The economy will move from point A to point B in the accompanying diagram. In the long run, however, nominal wages will be renegotiated upward in reaction to low
unemployment at $Y_2$. As nominal wages increase, the short-run aggregate supply curve will shift leftward from $SRAS_1$ to a position such as $SRAS_2$. The exact position of $SRAS_2$ depends on factors such as the aggregate demand curve.

10. Problem 8, chapter 12, page 348 K&W

a. if the government reduces the minimum nominal wage, it is similar to a fall in nominal wages. Aggregate supply will increase, and the short-run aggregate supply curve will shift to the right.

b. If the government increases TANF, consumer spending will increase because disposable income increases (disposable income equals income plus government transfers, such as TANF payments, less taxes). Aggregate demand will increase, and the aggregate demand curve will shift to the right.

c. If the government announces a large increase in taxes on households for next year, consumer spending will fall this year. Since households base their spending in part on their expectations about the future, the anticipated increase in taxes will lower their spending this year. There will be a decrease in aggregate demand, and the aggregate demand curve will shift to the left.

d. If the government reduces military spending, this will decrease aggregate demand. The amount of aggregate output demanded at any given aggregate price level will fall, and the aggregate demand curve will shift to the left.

11. Problem 11, chapter 12, page 348 K&W
b. The rise in the price of oil usually causes a supply shock. The short-run aggregate supply (SRAS) curve shifts to the left, from SRAS1 to SRAS2. The economy settles at a new short-run macroeconomic equilibrium at E2, with a higher aggregate price level, P2, and lower real GDP, Y2.

![Diagram of SRAS and AD curves with E1 and E2 equilibrium points]

b. The rise in the price of oil usually causes a supply shock. The short-run aggregate supply (SRAS) curve shifts to the left, from SRAS1 to SRAS2. The economy settles at a new short-run macroeconomic equilibrium at E2, with a higher aggregate price level, P2, and lower real GDP, Y2.

![Diagram of SRAS and AD curves with E1 and E2 equilibrium points]

c. The fall in home prices would cause a demand shock because of the wealth effect. The aggregate demand (AD) curve shifts leftward, from AD1 to AD2. The new aggregate price level, P2, could either be equal to, above, or below P1. The new level of real GDP, Y2, is below the original level, Y1.

c. The fall in home prices would cause a demand shock because of the wealth effect. The aggregate demand (AD) curve shifts leftward, from AD1 to AD2. The new aggregate price level, P2, could either be equal to, above, or below P1. The new level of real GDP, Y2, is below the original level, Y1.

d. The effect on the aggregate price level is indeterminate. As drawn in the diagram for part c, P1 and P2 coincide because the negative supply and demand shocks have exactly offsetting price effects. However, prices could either rise or fall when both a negative demand shock and a negative supply shock occur. The fall in real GDP is unambiguous because the two shocks reinforce their negative effects on GDP.

d. The effect on the aggregate price level is indeterminate. As drawn in the diagram for part c, P1 and P2 coincide because the negative supply and demand shocks have exactly offsetting price effects. However, prices could either rise or fall when both a negative demand shock and a negative supply shock occur. The fall in real GDP is unambiguous because the two shocks reinforce their negative effects on GDP.

12. Problem 13, chapter 12, page 349 K&W

a. An increase in taxes will decrease consumer spending by households. Beginning at E1 in the accompanying diagram, the aggregate demand curve will shift leftward from AD1 to AD2. In the short run, nominal wages are sticky, and the economy will be in short-run macroeconomic equilibrium at point E2. The aggregate price level is lower than at E1, and aggregate output is lower than potential output. The economy
faces a recessionary gap. As wage contracts are renegotiated, nominal wages will fall and the short-run aggregate supply curve will shift gradually to the right over time until it reaches $SRAS_2$ and intersects $AD_2$ at point $E_3$. At $E_3$, the economy is back at its potential output but at a much lower aggregate price level.

b. An increase in the quantity of money will encourage people to lend, lowering interest rates and increasing investment and consumer spending; at any given aggregate price level, the quantity of aggregate output demanded will be higher. Beginning at long-run macroeconomic equilibrium, $E_1$ in the accompanying diagram, the aggregate demand curve will shift from $AD_1$ to $AD_2$. In the short run, nominal wages are sticky, and the economy will be in short-run macroeconomic equilibrium at point $E_2$. The aggregate price level is higher than at $E_1$, and aggregate output is higher than potential output. The economy faces an inflationary gap. As wage contracts are renegotiated, nominal wages will rise and the short-run aggregate supply curve will shift gradually to the left over time until it reaches $SRAS_2$ and intersects $AD_2$ at point $E_3$. At $E_3$, the economy is back at its potential output but at a much higher aggregate price level.
An increase in government spending will increase aggregate demand; at any given aggregate price level, the quantity of aggregate output demanded will be higher. Beginning at long-run macroeconomic equilibrium, $E1$ in the accompanying diagram, the aggregate demand curve will shift from $AD1$ to $AD2$. In the short run, nominal wages are sticky, and the economy will be in short-run macroeconomic equilibrium at point $E2$. The aggregate price level is higher than at $E1$, and aggregate output is higher than potential output. The economy faces an inflationary gap. As wage contracts are renegotiated, nominal wages will rise and the short-run aggregate supply curve will shift gradually to the left over time until it reaches $SRAS2$ and intersects $AD2$ at point $E3$. At $E3$, the economy is back at its potential output but at a much higher aggregate price level.

13. Problem 15, chapter 12, page 340 K&W

a. As the result in the increase in the price of oil and the shift to the left of the short-run aggregate supply curve, real GDP decreases to $Y2$ (and with it unemployment rises) and the aggregate price level increases to $P2$ as shown in the accompanying diagram. This combined problem of inflation and unemployment is known as stagflation.

b. The government can use fiscal and monetary policies to either increase real GDP or lower the aggregate price level, but not both. If the government
increases government spending, decreases taxes, or increases the quantity of money in circulation, it can raise real GDP but it will also raise the aggregate price level. This is illustrated in the diagram accompanying part a by the rightward shift of AD1 to AD2.

If the government decreases government spending, increases taxes, or decreases the quantity of money in circulation, it can lower the aggregate price level but it will also lower real GDP, worsening the recessionary gap. This is illustrated in the accompanying diagram by the leftward shift of AD1 to AD3.

c. The government cannot use fiscal and monetary policies to correct for the lower real GDP and higher aggregate price level simultaneously. It can only use policies to alleviate one problem but at the expense of making the other worse.

14. Assume that an economy is characterized by the following equations

\[ C = 1,500 + 0.5 \text{Yd} \]

\[ \text{Yd} = 0.2Y \text{ where } \text{Yd} \text{ is disposable income}=Y-T \]

\[ T=300; I = 1,250; G = 1,250; \text{NX} = -500 \]

Recall the equilibrium condition is given by \( Y = C + I + G + \text{NX} \)

Find the equilibrium GDP, and the equilibrium Consumption

There are two acceptable answers

Applying the equilibrium condition we have:

a) Using taxes into disposable income, i.e. \( T=300 \) implies \( \text{Yd} = 0.5Y-150 \)

\[ Y = 1500 + 0.5(Y-300) + 1250 + 1250 - 500 \]

\[ Y = 3350 + 0.5Y \]

\[ Y^* = 6700 \text{ and } C^* = 4850 \]

b) Using \( \text{Yd}=0.2Y \)

\[ Y= 1500 + 0.1Y + 1250 + 1250 - 500 \]

\[ Y^* = 3888.9 \text{ and } C^* = 1888.9 \]