

CHAPTER 3

THE GOODS MARKET



TIME HORIZONS

The following discussion uses the **short-run time horizon**:

- When focusing on **year-to-year movements** in economic activity, economists concentrate on the interactions between **aggregate production, income and demand**
- Later we will switch to a medium run perspective, which extends the extreme short-run view by allowing for **variable prices**.

CLASSICAL VERSUS KEYNESIAN

- In 1929, Great Depression. Classical Theory suggests that changes in output comes from factor supplies and technology
- No significant change in factor supplies and technology in Great Depression
- John Maynard Keynes suggest that changes in aggregate demand is responsible for aggregate output changes
- Government can reduce economic hardship by changing aggregate demand.

COMPONENTS OF DEMAND

Our model economy consists of **four sectors**:

- Households
- Firms
- The government
- The rest of the world

All four sectors exhibit a certain demand for **goods** and **services**.

COMPONENTS OF DEMAND

- In analyzing demand, we start from **GDP** once more.
- Remember, that we defined GDP as the **value of all final goods and services produced** in an economy in a specific period of time.
- Now, since in **equilibrium** all goods and service markets clear, aggregate **output** must **equal** aggregate **demand**.

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THE COMPOSITION OF GDP

Table 3-1 The Composition of Turkish GDP, 2009

		Turkish Lira	Percent of GDP
	GDP (Y)	97,143,611	100
1	Consumption (C)	68,625,617	70
2	Investment (I)	19,345,308	20
3	Government spending (G)	11,111,079	11.4
4	Net exports	23,340	
	<i>Exports (X)</i>	24,604,677	25.3
	<i>Imports (IM)</i>	24,581,337	25.3
5	Inventory investment	-1,961,733	-2

Source: Turkish State Institute of Statistics.

THE COMPOSITION OF GDP

- **Consumption (C)** All goods and services consumed by households within one period.
- **Investment (I)** All capital goods acquired by firms and households within one period.
- **Government Spending (G)** All goods and services consumed by the public sector.
G does not include transfers.

THE COMPOSITION OF GDP

- **Imports (IM)** are the purchases of foreign goods and services by consumers, business firms, and the domestic government.
- **Exports (X)** are the purchases of domestic goods and services by foreigners.

- **Net exports ($X - IM$)** is the difference between exports and imports, also called the **trade balance**.

Exports = imports $\Leftrightarrow$ trade balance

Exports > imports $\Leftrightarrow$ trade surplus

Exports < imports $\Leftrightarrow$ trade deficit

Inventory investment is the difference between production and sales.

THE DEMAND FOR GOODS

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The total demand for goods is written as:

$$Z \equiv C + I + G + X - IM$$

Under the assumption that the economy is closed, $X = IM = 0$, then:

$$Z \equiv C + I + G$$

CONSUMPTION (C)

Disposable income, (Y_D), is the income that remains once consumers have paid taxes and received transfers from the government.

$$C = C(Y_D)_{(+)}$$

The function $C(Y_D)$ is called the **consumption function**.

Disposable income is defined as:

$$Y_D \equiv Y - T$$

CONSUMPTION (C)

Assume that consumption function is a linear.

$$C = c_0 + c_1 Y_D$$

Two **parameters**, c_0 and c_1 :

- c_1 : the (marginal) **propensity to consume** / the effect of an additional dollar of disposable income on consumption.
- c_0 : basic consumption (independent of Y_D), the intercept of the consumption function.

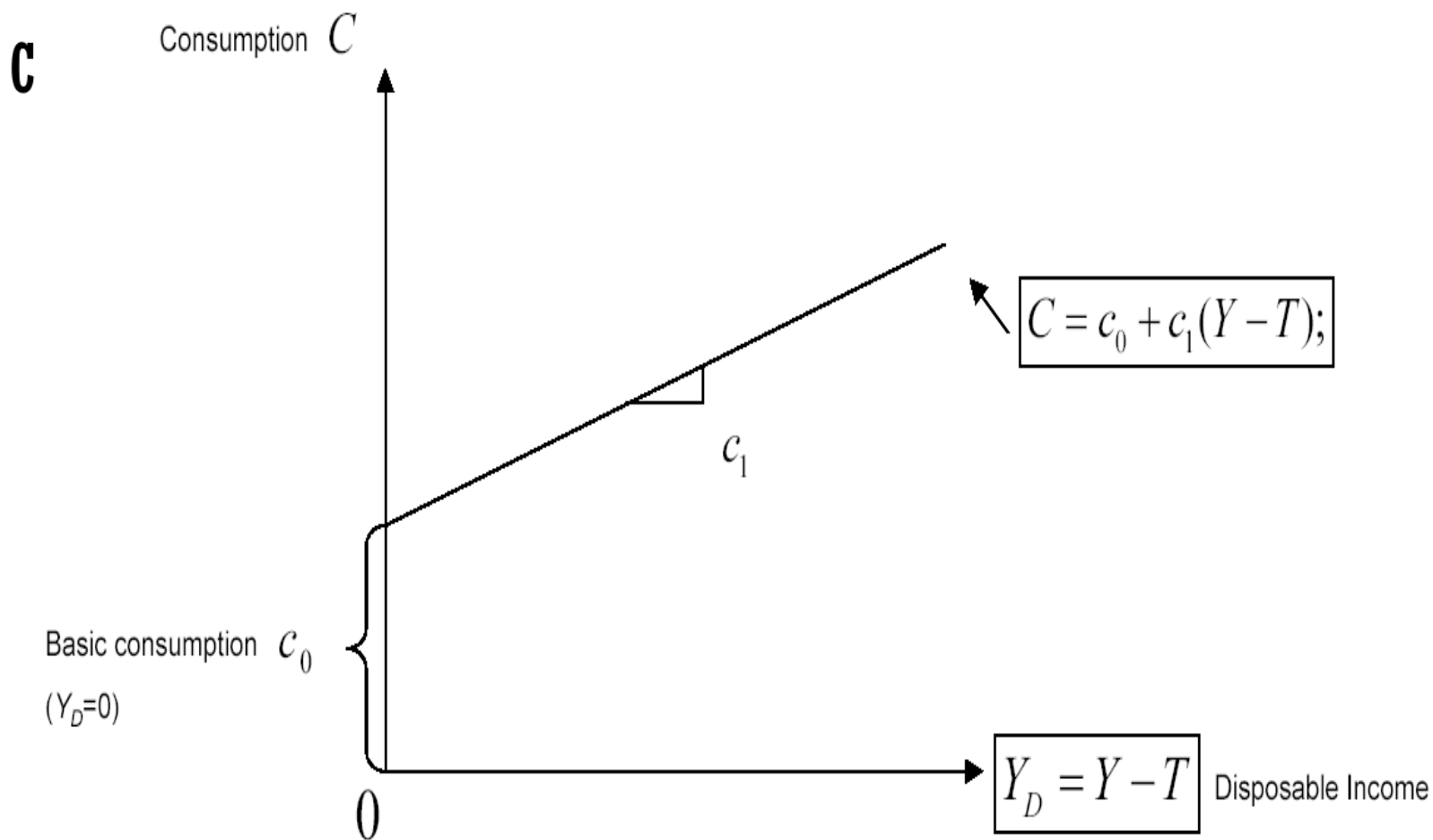


Figure 3.1. Household consumption

INVESTMENT (I)

Variables that depend on other variables within the model are called **endogenous**. Variables that are not explain within the model are called **exogenous**. Investment here is taken as given, or treated as an exogenous variable:

$$I = \bar{I}$$

GOVERNMENT SPENDING (G)

Government spending, G , together with taxes, T , describes **fiscal policy**—the choice of taxes and spending by the government.

We shall assume that G and T are also exogenous for two reasons:

- Modeling government behavior is significantly harder than modeling behavior.
- T and G are policy variables. Since Economics ultimately aims at policy advice, we develop a model which will allow us to make predictions about the impact of different policies.

1) ANALYTICAL SOLUTION:

Remember that aggregate production is equal to Y .

Aggregate demand is given by:

Equilibrium in the goods market requires that production, Y , be equal to the demand for goods, Z (firms do not hold inventories)

$$Y = c_0 + c_1(Y - T) + \bar{I} + \bar{G}$$

$$Y = Z$$

$$Y^* = \frac{1}{1 - c_1} \left[c_0 + \bar{I} + G - c_1 T \right];$$



Multiplier



Autonomous
spending

ANALYTICAL SOLUTION

A numeric example:

Let $c_1 = 0.8$

Assume that basic consumption increases by \$1 million. By how much does equilibrium output increase?

Intuition:

1. Basic consumption increased
2. Demand increased
3. As a result supply (= production) increased
4. Household income increased
5. And as a consequence consumption increased by
6. etc.

$$c_0 \uparrow \Rightarrow Z \uparrow \Rightarrow Y \uparrow \Rightarrow C \uparrow [= c_0 + c_1(Y - T)] \Rightarrow Z \uparrow \Rightarrow \dots$$

ANALYTICAL SOLUTION

- This process could –in principle – go on forever, but since households only consume a fraction of their additional income c_1 , smaller than one, it will eventually come to an end.

GRAPHICAL SOLUTION

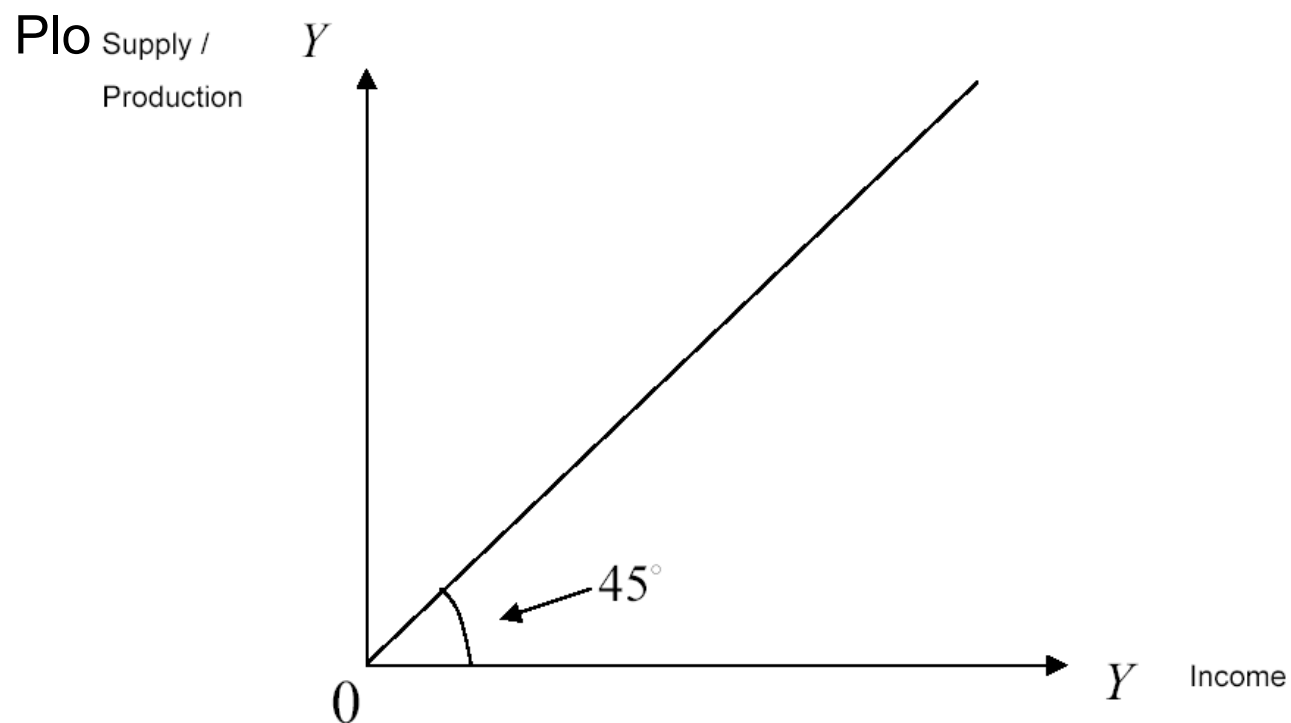


Figure 3.4. Aggregate Output

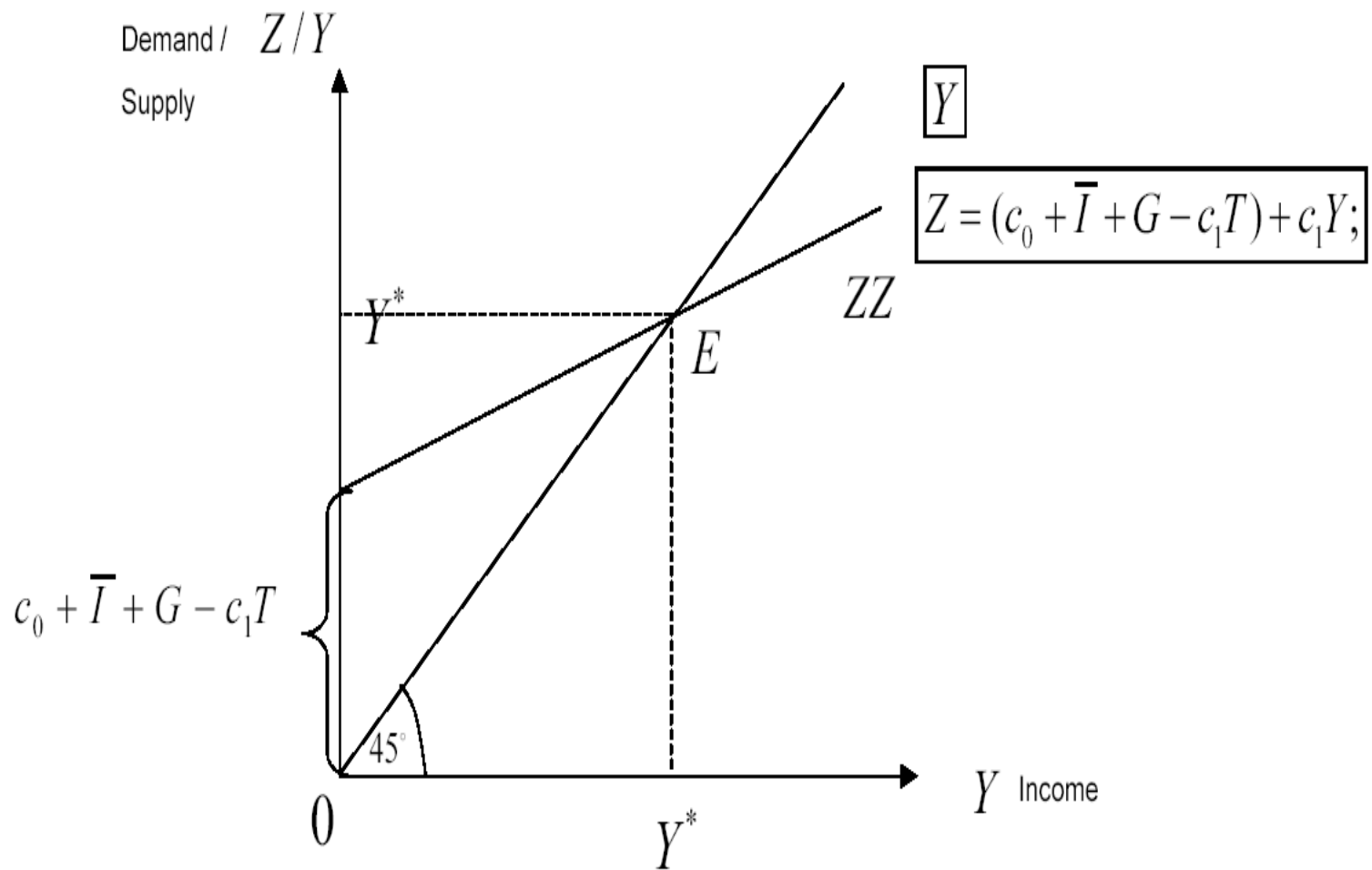


Figure 3.5. Equilibrium in the Goods Market

ADJUSTMENT IN EQUILIBRIUM

- Assume that $Y > Y^*$, $\text{Production} > \text{Aggregate Demand}$.
Unplanned inventory accumulation result in firms cut production until $Y = Y^*$
- Assume that $Y < Y^*$, $\text{Production} < \text{Aggregate Demand}$.
Unplanned drop in inventories result in firms increase production until $Y = Y^*$

INCREASE IN GOVERNMENT PURCHASES (OR AUTONOMOUS SPENDING)

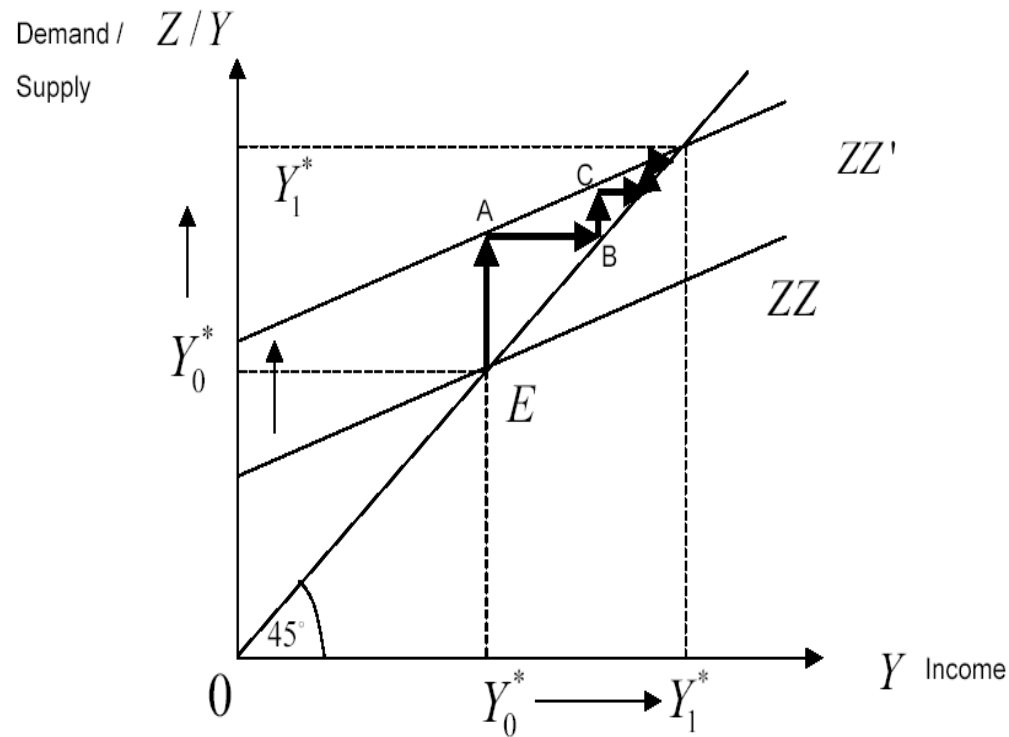


Figure 3.6. The multiplier effect

GRAPHICAL SOLUTION

- The first-round increase in demand, shown by the distance AB equals \$1 billion.
- This first-round increase in demand leads to an equal increase in production, or \$1 billion, which is also shown by the distance in AB .
- This first-round increase in production leads to an equal increase in income, shown by the distance in BC , also equal to \$1 billion.

GRAPHICAL SOLUTION

- The second-round increase in demand, shown by the distance in CD , equals \$1 billion times the propensity to consume.
- This second-round increase in demand leads to an equal increase in production, also shown by the distance DC , and thus an equal increase in income, shown by the distance DE .
- The third-round increase in demand equals $\$c_1$ billion, times c_1 , the marginal propensity to consume; it is equal to $\$c_1 \times c_1 = \c_1^2 billion.

GRAPHICAL SOLUTION

Following this logic, the total increase in production after, say, n rounds, equals \$1 billion times the sum:

$$1/(1-c_1) = 1 + c_1 + c_1^2 + \dots + c_1^n$$

Such a sum is called a **geometric series**.

Ex1: Assume marginal propensity to consume is 0.6, if government spending increases by 1 billion dollars how much will equilibrium income rise?

● Answer: 2.5 billion

TAX MULTIPLIER



TAX MULTIPLIER

- How changes in taxes affect equilibrium income?

A decrease in taxes by ΔT immediately raises disposable income $Y-T$ by ΔT , therefore increases consumption by $MPC \times \Delta T$

$$\frac{\Delta Y}{\Delta T} = -\frac{c_1}{1-c_1}$$

TAX MULTIPLIER

Example 2: Assume marginal propensity to consume is 0.6, if government spending increases by 1 billion dollars how much will equilibrium income rise?

Answer: 1.5 billion

To summarize:

An increase in demand leads to an increase in production and a corresponding increase in income. The end result is an increase in output that is larger than the initial shift in demand, by a factor equal to the multiplier.

GOODS-MARKET EQUILIBRIUM WITH INVESTMENT AND SAVING

Saving is the sum of private plus public saving.

- **Private saving** (S), is saving by consumers.

$$S \equiv Y_D - C$$

$$S \equiv Y - T - C$$

- **Public saving** equals taxes minus government spending.
 - If $T > G$, the government is running a **budget surplus**—public saving is positive.
 - If $T < G$, the government is running a **budget deficit**—public saving is negative.

$$Y = C + I + G$$

$$Y - T - C = I + G - T$$

$$S = I + G - T$$

$$I = S + (T - G)$$

INVESTMENT EQUALS SAVING: AN ALTERNATIVE WAY OF THINKING ABOUT GOODS-MARKET EQUILIBRIUM

$$I = S + (T - G)$$

The equation above states that equilibrium in the goods market requires that investment equals saving—the sum of private plus public saving. This equilibrium condition for the goods market is called the **IS relation**. What firms want to invest must be equal to what people and the government want to save.

Investment Equals Saving: An Alternative Way of Thinking about Goods-Market Equilibrium

- Consumption and saving decisions are one and the same.

$$S = Y - T - C$$

$$S = Y - T - c_0 - c_1(Y - T)$$

$$S = -c_0 + (1 - c_1)(Y - T)$$

- The term $(1 - c_1)$ is called the **propensity to save**.

In equilibrium:

$$I = -c_0 + (1 - c_1)(Y - T) + (T - G)$$

Rearranging terms, we get the same result as before:

$$Y = \frac{1}{1 - c_1} [c_0 + \bar{I} + \bar{G} - c_1 T]$$

GOODS MARKET EXAMPLE

Closed Economy, all units are billion dollars

$$C = 220 + (0.6)YD$$

$$I = 50$$

$$T = 200$$

$$G = 250$$

$$NX = 0$$

1. Solve for the good market equilibrium. (Find equilibrium Y , Z , C , and YD .)
2. Graph (with correct labels) equilibrium Y and Z .

GOODS MARKET EXAMPLE

3. Solve for private saving and public saving.
4. What is the value of marginal propensity to consume (mpc)? What does it mean?
5. What is the value of marginal propensity to save (mps)?
6. What is the relationship between mpc and mps?
7. Find the multiplier and autonomous spending. Explain what they mean.
8. Now, in order to deal with a natural disaster, the government purchases \$100 million worth of supplies. Find the new equilibrium demand, output, consumption, and disposable income, then graph. (Instead of calculating from scratch, try to reason out your answer from the original equilibrium calculations followed by a discussion of multiplier.)