


**Macroeconomics: Principles & Applications**

CHAPTER II



*The Short-Run Macro Model*

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**Short-Run Macro Model**

- **Short-run macro model**
  - Macroeconomic model that explains how changes in spending can affect real GDP in the short run
- **In the short run:**
  - Spending depends on income
  - Income depends on spending

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**Consumption Spending**

- **Consumption spending increases when:**
  - Disposable income rises
  - Wealth rises
  - The interest rate falls
  - Households become more optimistic about the future

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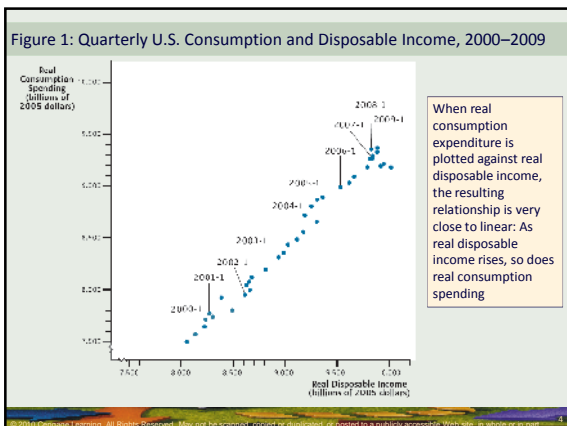
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### Consumption Spending

- **Consumption function**
  - Positively sloped relationship
  - Between real consumption spending and real disposable income
- **Autonomous consumption spending**
  - The part of consumption spending
  - That is independent of income
  - Vertical intercept of the consumption function

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Table 1: Hypothetical Data on Disposable Income and Consumption

Real Disposable Income (billions of dollars per year)	Real Consumption Spending (billions of dollars per year)
0	2,000
1,000	2,600
2,000	3,200
3,000	3,800
4,000	4,400
5,000	5,000
6,000	5,600
7,000	6,200
8,000	6,800

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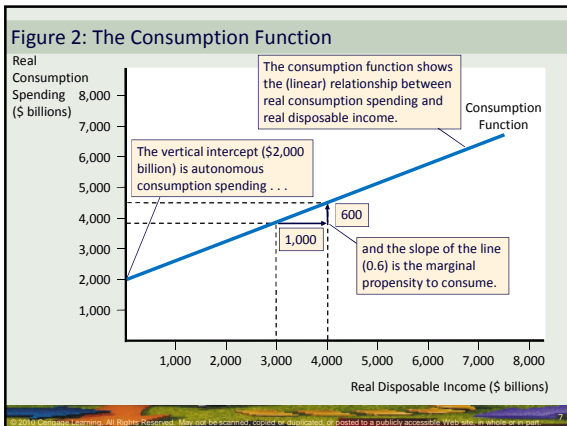
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### Consumption Spending

- Marginal propensity to consume (MPC) is
  - The slope of the consumption function
  - The change in consumption divided by the change in disposable income
  - The amount by which consumption spending rises when disposable income rises by one dollar

$0 < MPC < 1$

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### Consumption Spending

- Straight line consumption function
  - $C = a + b$  (Disposable income)
  - a – vertical intercept of the consumption function
  - b – slope of the consumption function

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### Consumption Spending

- **Consumption and income**
  - Assume net taxes = fixed amount
- **Consumption–income line**
  - A line showing aggregate consumption spending
  - At each level of income or GDP

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**Table 2: The Relationship between Consumption and Income**

Income or GDP (billions of dollars per year)	Tax Collections (billions of dollars per year)	Disposable Income (billions of dollars per year)	Consumption Spending (billions of dollars per year)
2,000	2,000	0	2,000
3,000	2,000	1,000	2,600
4,000	2,000	2,000	3,200
5,000	2,000	3,000	3,800
6,000	2,000	4,000	4,400
7,000	2,000	5,000	5,000
8,000	2,000	6,000	5,600
9,000	2,000	7,000	6,200
10,000	2,000	8,000	6,800

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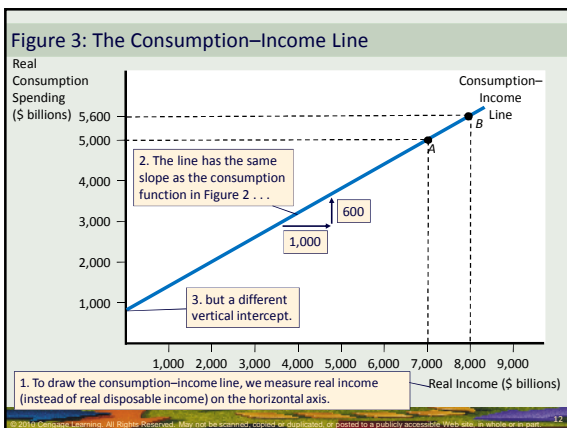
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### Consumption Spending

- **Fixed taxes**
  - Consumption-income line shifts downward
    - By the amount of the tax times the marginal propensity to consume (MPC)
    - The slope = MPC, unaffected by taxes

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### Consumption Spending

- **Income - increase**
  - With no change in taxes
  - Disposable income – increase
  - Consumption spending – increase
  - Movement rightward along the consumption-income line

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### Consumption Spending

- **Net taxes – decrease**
  - Disposable income at each income level – increase
  - Consumption at each income level – increase
  - Shift upward of the consumption-income line

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### Consumption Spending

- **Household wealth – increase**
  - Autonomous consumption – increase
  - Consumption at each level of disposable income – increase
  - Consumption spending at each level of income – increase
  - Shift upward of the consumption-income line

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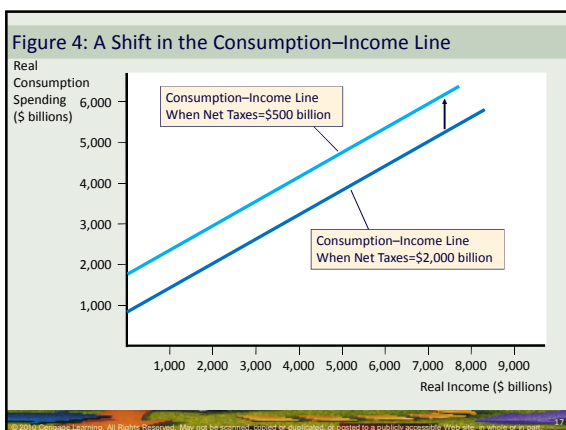
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### Consumption Spending

- **Move along the consumption–income line**
  - When a change in income causes consumption spending to change
- **Shift in the consumption-income line**
  - When a change in anything else besides income causes consumption spending to change

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**Table 3: Shifts in the Consumption–Income Line**

Consumption–Income Line Shifts Upward When:		Consumption–Income Line Shifts Downward When:	
Net taxes ↓	Transfers ↑ Taxes ↓	Net Taxes ↑	Transfers ↓ Taxes ↑
Autonomous consumption (a) ↑	Household wealth ↑ Interest rate ↓ Greater optimism	Autonomous Consumption (a) ↓	Household wealth ↓ Interest rate ↑ Greater pessimism

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### Getting to Total Spending

- **Investment spending ( $I^p$ )**
  - Plant and equipment purchases by business firms and new home construction
  - Inventory investment
    - Unintentional and undesired
    - Excluded from investment spending
  - A given value
    - Determined by forces outside of our model

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### Getting to Total Spending

- **Government purchases**
  - A given value – determined by forces outside of our model
- **Net exports (NX)**
  - = Total Exports – Total Imports
  - A given value – determined by forces outside of our model

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### Getting to Total Spending

- **Aggregate expenditure (AE)**
  - Sum of spending by
    - Households, business firms, the government, and foreigners
  - On final goods and services produced in the United States
- **Aggregate expenditure =  $C + I^P + G + NX$**
- **Increase in income by  $\Delta GDP$** 
  - AE increases by:  $\Delta AE = MPC \times \Delta GDP$

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Table 4: The relationship between income and aggregate expenditure

(1) Income or GDP (billions of dollars per year)	(2) Consumption Spending (billions of dollars per year)	(3) Investment Spending (billions of dollars per year)	(4) Government Purchases (billions of dollars per year)	(5) Net Exports (billions of dollars per year)	(6) Aggregate Expenditure (AE) (billions of dollars per year)	(7) Change in Inventories (billions of dollars per year)
4,000	3,200	800	1,000	600	5,600	-1,600
5,000	3,800	800	1,000	600	6,200	-1,200
6,000	4,400	800	1,000	600	6,800	-800
7,000	5,000	800	1,000	600	7,400	-400
<b>8,000</b>	<b>5,600</b>	<b>800</b>	<b>1,000</b>	<b>600</b>	<b>8,000</b>	<b>0</b>
9,000	6,200	800	1,000	600	8,600	400
10,000	6,800	800	1,000	600	9,200	800
11,000	7,400	800	1,000	600	9,800	1,200
12,000	8,000	800	1,000	600	10,400	1,600

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### Equilibrium GDP

- **When aggregate expenditure < GDP**
  - Output will decline in the future
- **When aggregate expenditure > GDP**
  - Output will rise in the future
- **Equilibrium GDP**
  - In the short run
  - The level of output at which output and aggregate expenditure are equal

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### Equilibrium GDP

- **Change in inventories**
  - During any period
  - Will always equal output minus aggregate expenditure

$\Delta \text{Inventories} = \text{GDP} - \text{AE}$

$\text{AE} < \text{GDP} \Rightarrow \Delta \text{Inventories} > 0 \Rightarrow \text{GDP} \downarrow$  in future periods  
 $\text{AE} > \text{GDP} \Rightarrow \Delta \text{Inventories} < 0 \Rightarrow \text{GDP} \uparrow$  in future periods  
 $\text{AE} = \text{GDP} \Rightarrow \Delta \text{Inventories} = 0 \Rightarrow$  No change in  $\text{GDP}$

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### Equilibrium GDP

- **AE line**
  - C, consumption-income line
  - $C+I^p$  at each level of income
  - $C+I^p+G$  at each level of income
  - AE line:  $C+I^p+G+NX$  at each level of income
  - Slope = MPC
- **A 45° line = translator line**
  - It allows us to measure any horizontal distance as a vertical distance instead

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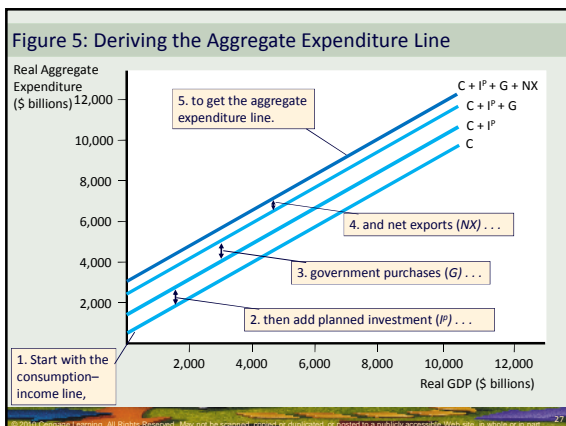
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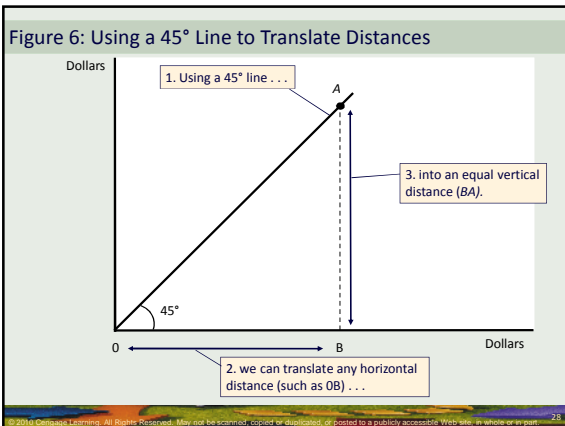
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**Equilibrium GDP**

- **AE line below 45° line**
  - $AE < GDP$
  - Inventories will grow
  - Reduce output in the future
- **AE line above 45° line**
  - $AE > GDP$
  - Inventories will decline
  - Increase their output in the future

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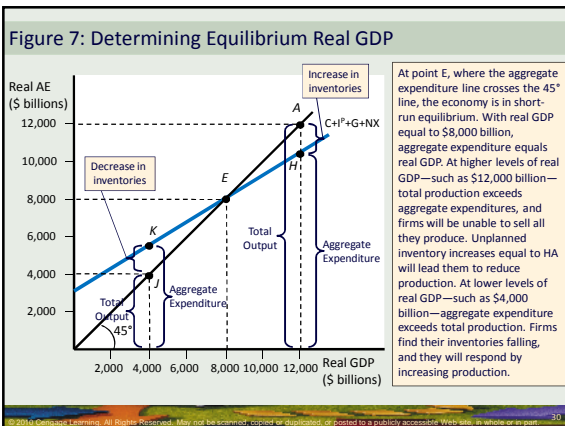
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### Equilibrium GDP

- **Equilibrium GDP**
  - AE line intersects the 45° line
  - No change in inventories
  - No change in output in the future

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### Equilibrium GDP

- **Short-run equilibrium**
  - And yet have abnormally high unemployment
  - Aggregate expenditure line is too low to create an intersection at full-employment output
  - Cyclical unemployment is caused by insufficient spending
  - As long as spending remains low
    - Production will remain low
    - Unemployment will remain high

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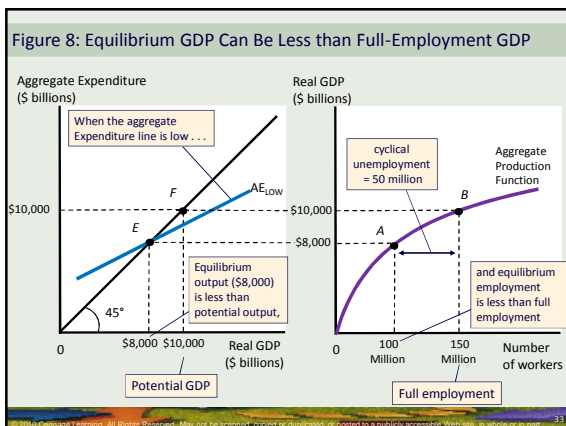
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### Equilibrium GDP

- **Short-run equilibrium**
  - And abnormally high employment and abnormally low unemployment
  - Economy can overheat because spending is too high
  - As long as spending remains high
    - Production will exceed potential output
    - Unemployment will be unusually low

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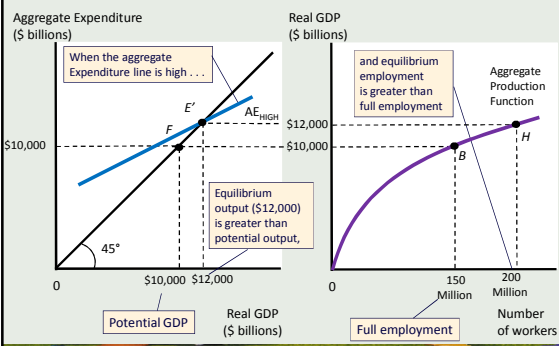
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Figure 9: Equilibrium GDP Can Be Greater than Full-Employment GDP




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### What Happens When Things Change?

- **Increases in investment by \$x**
  - \$x additional sales revenue
  - \$x additional income
  - \$x additional disposable income
  - MPC \$x additional consumption spending
  - MPC \$x additional sales revenue
  - ...
  - ...
  - Equilibrium GDP rises by a multiple of \$x

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### What Happens When Things Change?

- Expenditure multiplier =  $1 / (1 - MPC)$
- Increase in investment
  - Equilibrium GDP rises by a multiple of the change in spending
- Decrease in investment spending
  - Equilibrium GDP falls by a multiple of the change in spending

$$\Delta GDP = \left[ \frac{1}{(1 - MPC)} \right] \times \Delta I^P$$


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### What Happens When Things Change?

$$\Delta GDP = \left[ \frac{1}{(1 - MPC)} \right] \times \Delta I^P \qquad \Delta GDP = \left[ \frac{1}{(1 - MPC)} \right] \times \Delta G$$

$$\Delta GDP = \left[ \frac{1}{(1 - MPC)} \right] \times \Delta C \qquad \Delta GDP = \left[ \frac{1}{(1 - MPC)} \right] \times \Delta NX$$

$$\Delta GDP = \left[ \frac{1}{(1 - MPC)} \right] \times \Delta Spending$$


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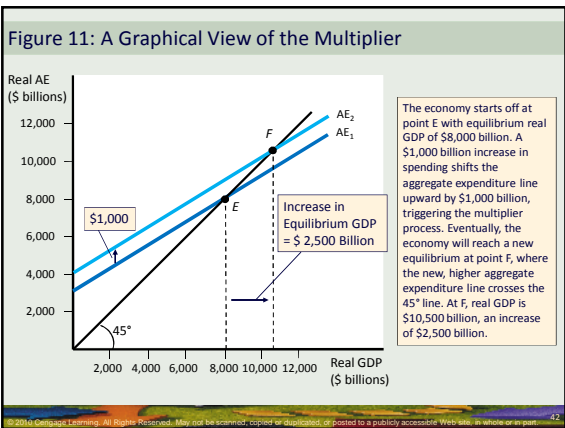
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### What Happens When Things Change?

- **An increase in:**
  - Autonomous consumption spending, investment spending, government purchases, or net exports
  - Will shift the aggregate expenditure line upward
    - By the initial increase in spending
  - Equilibrium GDP will rise
    - By the initial increase in spending times the expenditure multiplier

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### The Multiplier Process and Economic Stability

- **The larger the multiplier**
  - The more unstable the economy
  - All else equal
- **Automatic stabilizer**
  - Feature of the economy
  - Reduces the size of the expenditure multiplier
  - Diminishes the impact of spending changes on real GDP
    - Reduce fluctuations in GDP and employment
    - Makes the economy more stable in the short run

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### The Multiplier Process and Economic Stability

- **Taxes and transfers depend on income**
  - Increase in income
    - Higher taxes
    - Lower transfers
    - Less spending each round
    - Smaller multiplier

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graph TD
    Income[Income $1,200 billion] --> Taxes[Taxes $200 billion]
    Income --> Transfers[Transfers $100 billion]
    Taxes --> NetTaxes[Net Taxes $300 billion]
    Transfers --> NetTaxes
    NetTaxes --> DisposalIncome[Disposal Income $700 billion]
    DisposalIncome --> Consumption[Consumption $420 billion]
    Consumption --> FurtherRounds[Further Rounds of Multiplier Process]
    
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### The Multiplier Process and Economic Stability

- **Imports depend on income**
  - Increase in income
    - Increase spending on imports
    - Smaller spending on domestic output
      - Each round
- **People - economic fluctuations as temporary**
  - Spending - less sensitive to changes in income
  - Smaller spending changes
    - Each round

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### The Multiplier Process and Economic Stability

- **Automatic de-stabilizers**
  - Feature of the economy
  - Increases the size of the expenditure multiplier
  - And enlarges the impact of spending changes on real GDP
    - Enlarge fluctuations in GDP and employment
    - Makes the economy less stable in the short run

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### The Multiplier Process and Economic Stability

- **Household wealth**
  - Changes with income
  - Rising income
    - Rising wealth
    - Rising consumption spending
    - Larger multiplier effect on GDP

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**The Multiplier Process and Economic Stability**

- **Investment spending**
  - Changes during the multiplier process
  - GDP rises
    - Increase investment
    - Larger multiplier effect on GDP

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**The Multiplier Process and Economic Stability**

- **In the long run**
  - Given the growth of potential GDP
  - The value of the expenditure multiplier is zero
    - No matter what the change in spending
    - Economy will ultimately return to its potential GDP—just as it would have without the spending change

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**Using the Theory**

**The recession of 2008–2009**

- **Recession in U.S., causes**
  1. 2007, spike in oil prices
    - Decrease spending in automobiles
    - Laid-off workers
  2. 2007, collapse of the housing bubble
    - Rapid fall in home prices
      - Decline in wealth
      - Decline in autonomous consumption spending
      - AE line shifted downward
    - Investment spending fell
      - AE line shifted downward

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Using the Theory

**The recession of 2008–2009**

- **Recession in U.S., causes:**
  3. 2008, financial crisis
    - Defaults on mortgage payments
    - Decrease in lending throughout the economy
    - Fear and gloom about the economy's future
      - Households - cut back dramatically on spending
    - Corporate profits - falling
      - Share prices - began to plummet
      - Major hit to household wealth

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Using the Theory

**The recession of 2008–2009**

- **Automatic de-stabilizers:**
  - Falling output caused falling asset prices
    - Homes and stocks
  - Falling asset prices led to further decreases in spending and output
  - By the end of the process
    - Wealth of U.S. households declined by \$14 trillion in a little over a year

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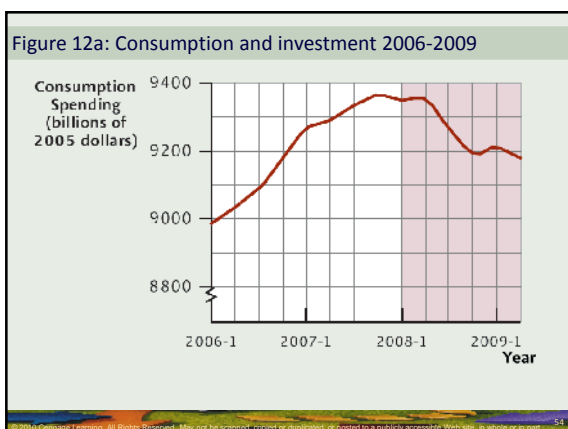
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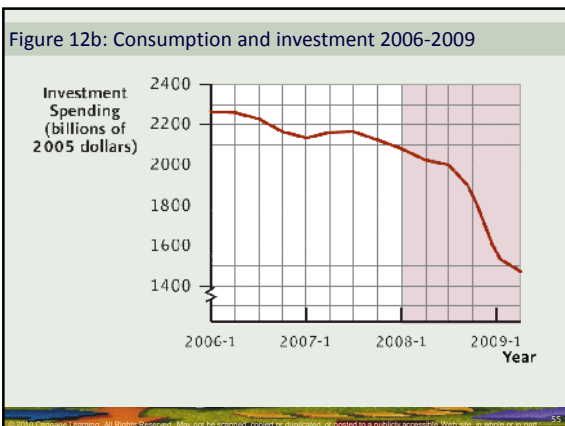
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Using the Theory

### The recession of 2008–2009

- Automatic stabilizers:
  - Government's tax revenues fell and transfer payments rose
    - Helping to cushion the decline in disposable income and maintain spending
  - Imports declined
    - Shifting some of the impact of lower spending to firms in other countries

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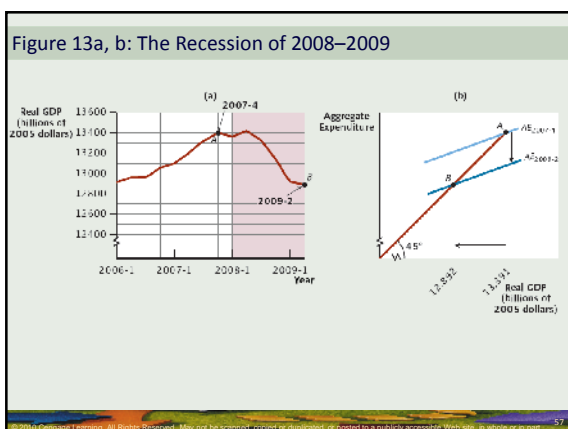
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Figure 13c: The Recession of 2008–2009




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Using the Theory

The recession of 2008–2009

- Recession in other countries
  - Global recession, closely synchronized
  - Other countries – housing boom and bust
    - At the same time
    - Lengthy period of low interest rates around the globe
      - Leverage and speculation
  - Financial crisis

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Using the Theory

The recession of 2008–2009

- Recession in other countries
  - Germany and Japan
  - Did *not* have housing bubbles
    - Very strong growth in exports
  - Especially severe downturns
    - Because of net exports

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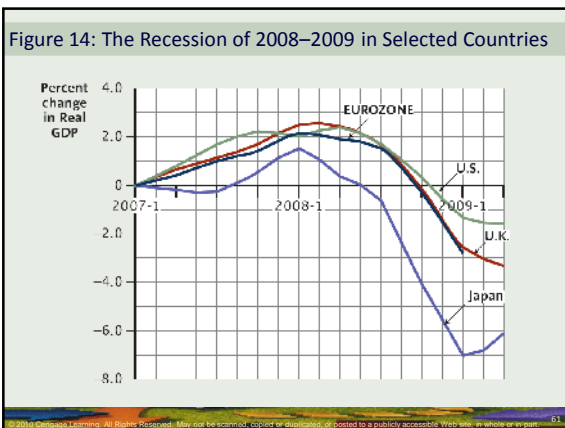
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