The Aggregate Expenditure Model

A Stylized Look at Business Cycle Dynamics

Outline

1. The Aggregate Expenditure Model

2. An Expanded Aggregate Expenditure Model

3. The Multiplier Effect

- Textbook Readings: Ch. 12

From Macro Variables to (Short-Run) Macro Models

- The first of three models - The Aggregate Expenditure Model
  - Solely **output** variables are in this model
- Next class: Aggregate Demand - Aggregate Supply Model
  - Both **output** and **prices** are in this model
- Later: Expanded Loanable Funds Model (Monetary Policy)
  - **Output**, **prices** and **financial markets** are in this model

A Quick Review

- We have measurements

$$GDP = C + I + G + NX$$

  - **Consumption**: Households purchases of goods and services
  - **Investment**: Housing, business investment in equipment, software, buildings plus **inventories**
  - **Government spending**: defense, infrastructure…
  - **Net exports**: Exports minus imports

- We need a model
  - What forces drive the overall economy?

What Are We Looking For With This Model?

- We acknowledge that **boom/bust cycles** are **regular** occurrences

- Periodically, we see **big imbalances**
  - Millions want jobs, but can't find them ➞ Unemployment jumps
  - Millions want to drive cars and trucks ➞ Gasoline prices soar and inflation jumps

- We want a model that identifies **equilibrium**, **BUT ALLOWS FOR IMBALANCES**

The Aggregate Expenditure Model: A Very Simple Picture

- **Expectations** drive decision makers. But the **future is uncertain**

- In the AE model:
  - When plans go awry, **inventories are the buffer**
  - **Inventory swings** explain periods in which production was too big or too small
  - Swings in inventories over time **drive** the economy **back toward equilibrium**

Four Key Considerations

- **Expectations** drive decisions amid uncertainty
- When expectations are misguided, **imbalances** arise
- **Market forces** then push the economy back toward equilibrium
- Thus, the AE model describes a **self-correcting system**

What Do We Assume Away?

- The AE model **ignores inflation** and **financial markets**
  - We **don't allow** for very **weak demand** to **lower** the overall level of **prices**
  - We **don't allow** interest rates, stock prices, or other **Wall Street dynamics to operate** on their own
- We assume that **swings in the economy** are completely captured by **swings in output**

Aggregate Expenditure and Output in the Short Run

- Aggregate expenditure is total amount of spending in an economy:
  - Consumption (C)
  - **Planned** investment (I^p)
  - Government purchases (G)
  - Net exports (NX)

- Actual Investment = ***Planned*** investment + ***Unplanned*** Investment

- Difference between planned investment and actual investment is unplanned investment (**flow**)
  - **Inventories**: Goods that have been produced but not yet sold (**stock**)

The Aggregate Expenditure Model

- AE **model** focuses on the **short-run** relationship between **total spending** and **real GDP**, *assuming* that the **price level is constant**

- Aggregate Expenditure:

$$AE = C + I^p + G + NX$$

- Remember:

$$\text{GDP} = \text{C} + \text{I} + \text{G} + \text{NX}$$

- Macroeconomic Equilibrium:

$$\text{AE} = \text{GDP}$$

Let’s Make the Model Simpler

- Let’s assume NO GOVERNMENT
  - No government taxes
  - No government spending

- Let’s assume NO FOREIGN SECTOR
  - No exports
  - No imports

$$AE = C + I$$

Interpretation

$$Y = C + I$$

Income
or
Output

Aggregate Expenditure
or
Aggregate Spending

GDP Identity vs. Equilibrium Condition

- **GDP identity**: $Y^a = C^a + I^a$

  Y^a = Actual Real Income = Actual Real Output

  C^a = Actual Real Consumption Expenditures

  I^a = Actual Real Investment Expenditures

- **Always true** when variables are **actual** magnitudes

GDP Identity vs. Equilibrium Condition

- **Equilibrium condition**: $Y^p = C^p + I^p$

Y^p = Planned Real Income = Planned Real Output

C^p = Planned Real Consumption Expenditures

I^p = Planned Real Investment Expenditures

- **Only true** in **equilibrium** when variables are **planned** magnitudes

Assumptions

$Y^a = Y^p = Y$: Actual Income = Planned Income

$C^a = C^p = C$: Actual Consumption Expenditures

= Planned Consumption Expenditures

$I^a = I^p + I^u$

I^a: Actual Investment Expenditures

I^p: Planned Investment Expenditures

I^u: Unplanned Investment Expenditures

- Assume: $I^p = I$ $\Longrightarrow$ $I^a = I^p + I^u = I + I^u$

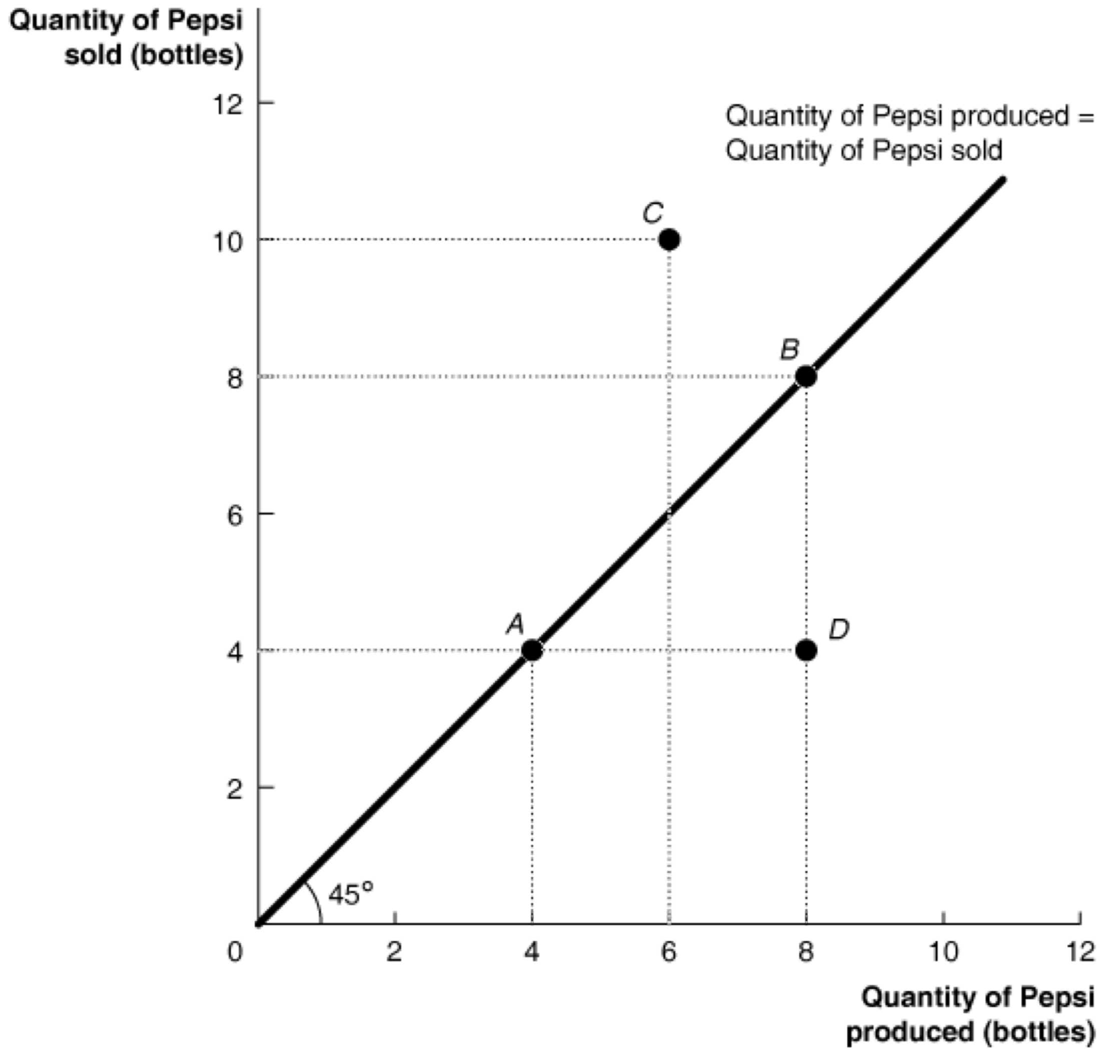
- Note: Income equals expenditures

- In equilibrium, unintended inventory expenditures equal zero

GDP Identity: $Y = C + I^a = C + I + I^u$

Equilibrium Condition: $Y = C + I$

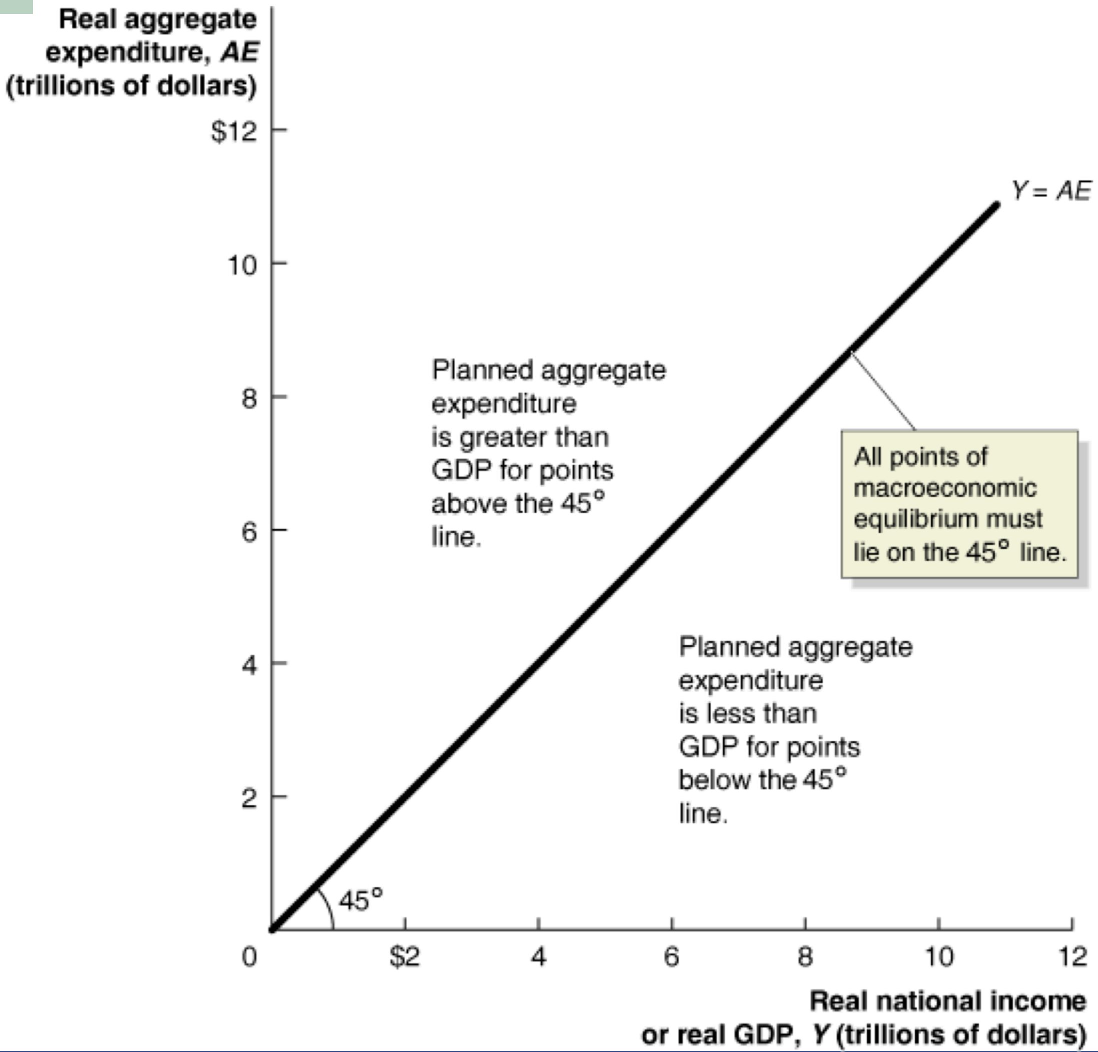
The AE Model: A Graphical Approach



The AE Model: The Graphical Backdrop

The Relationship between Planned Aggregate Expenditure and GDP on a 45° -Line Diagram

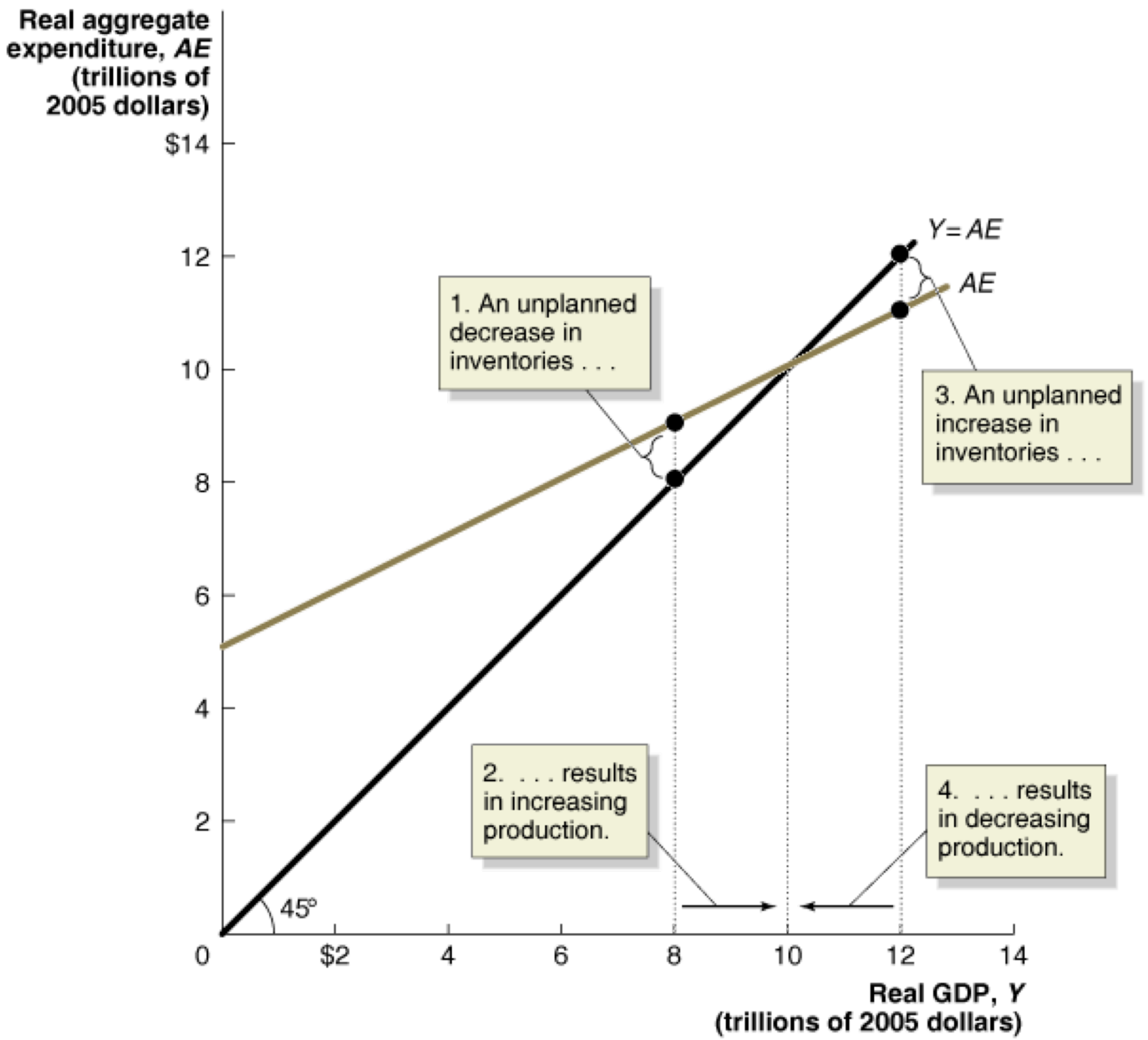
- The **X axis** tracks output, **Y**
  - Since output equals income, the X axis also tracks **income**
- The **Y axis** tracks aggregate expenditure, **AE**
- **Y = AE** along the 45° line



Aggregate Expenditure(AE), Output(Y) and Employment

Macroeconomic Equilibrium

- The 45º line: **AE = GDP**
  - Inventories are unchanged
  - Macro equilibrium
- AE **above** 45º line: **AE > GDP**
  - Unplanned inventory fall
  - GDP and jobs increase in the next period
- AE **below** 45º line: **AE < GDP**
  - Unplanned inventory rise
  - GDP and jobs decrease in the next period



Adjustments to Macroeconomic Equilibrium

The Relationship between Aggregate Expenditure and GDP

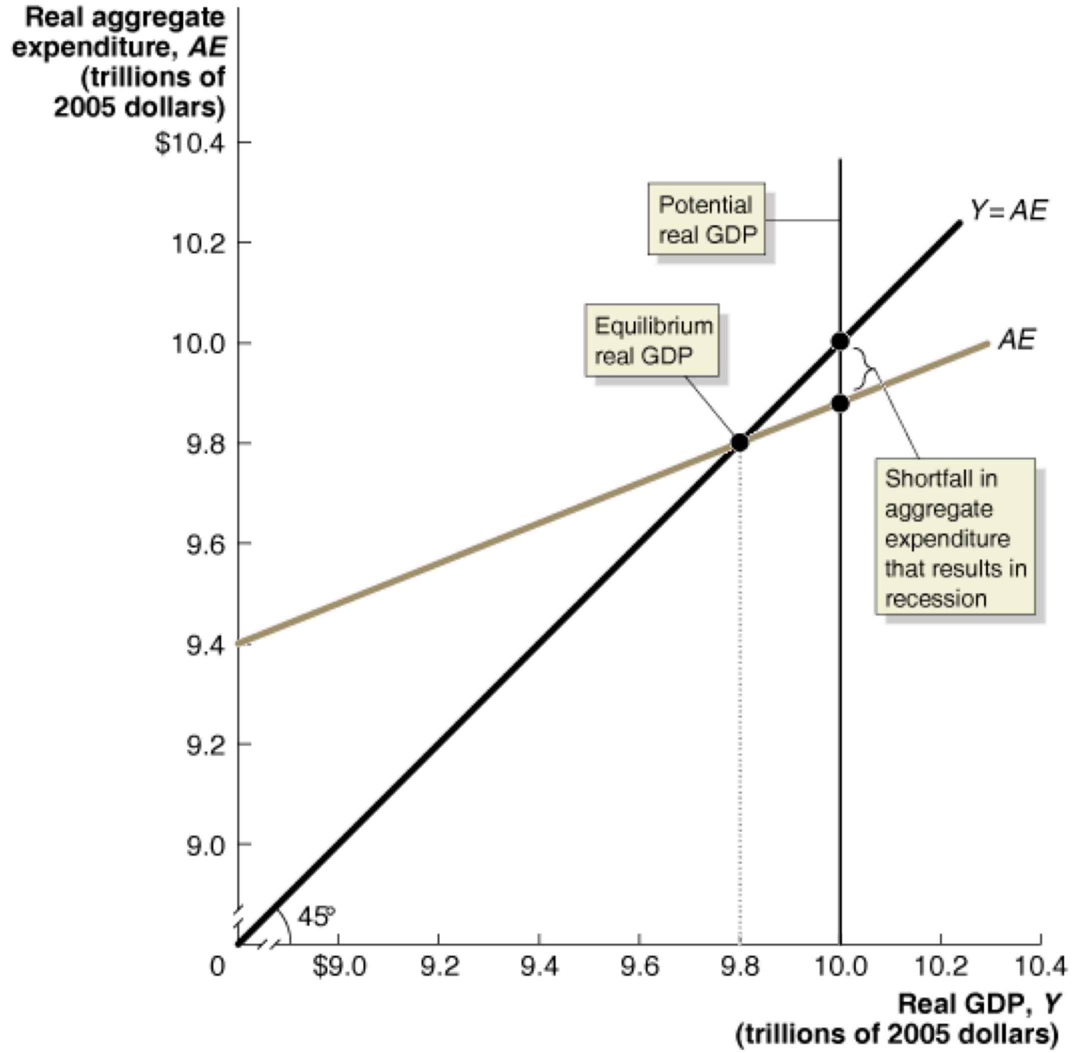
IF …	THEN …	AND …
Aggregate expenditure is *equal* to GDP	inventories are *unchanged*	the economy is in *macroeconomic equilibrium.*
Aggregate expenditure is *less* than GDP	inventories *rise*	GDP and employment *decrease.*
Aggregate expenditure is *greater* than GDP	inventories *fall*	GDP and employment *increase*.

The AE Model: An Equilibrium Seeking Framework

- In microeconomics, we saw shifts **toward equilibrium** in supply/demand charts
- AE model, with inventory swings, provide a storyline for a system that **seeks equilibrium**
  - When we introduce Wall Street, we discover forces that, at times, DON'T push us toward equilibrium: Adverse feedback loops

A Simple Model That Can Explain Recessions

Showing a Recession on the 45° -Line Diagram



What Drives AE Components?

- What key variables explain swings in

C = consumption

I = Investment

Key Drivers of Consumption

- **Current** Disposable **Income**
- **Expected** Future Disposable **Income**
- **Wealth**
- Interest **Rates**
- Consumers' State of **Confidence**

Consumption Function

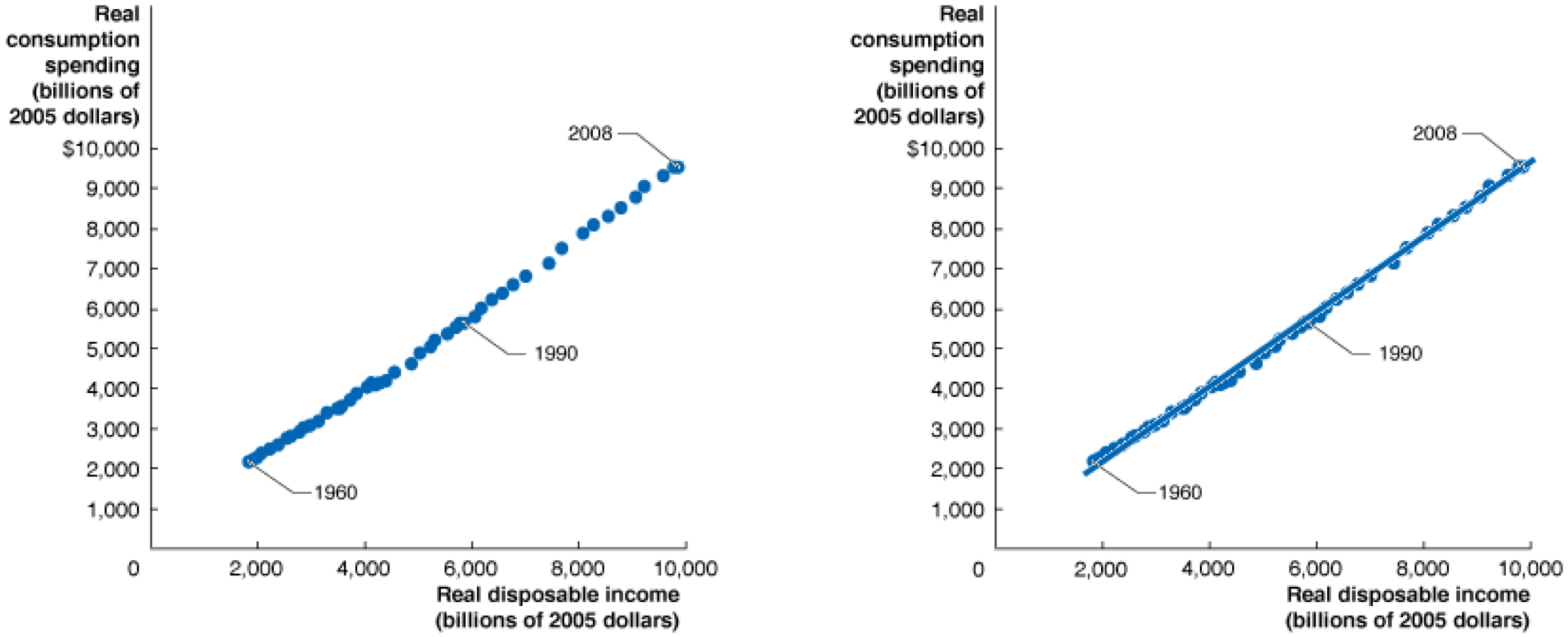
- Relationship between consumption spending and disposable income

$$C = C(Y_{dis}) = \bar{C} + bY_{dis}$$

- $\bar{C}$ = Autonomous Real Consumption Expenditure
- Determined by the "State of Consumer Confidence"

Consumption Function

The Relationship between Consumption and Income, 1960– 2008



(a) Consumption and income, 1960-2008

(b) The consumption function

Why Do Consumers Spend, Even When Income Is Zero?

- A consumer who loses her job and has no unemployment benefits has **zero income**
  - She will **still likely buy** food, heat/cool her abode
  - For a time—till her savings run out?—**she will likely pay** her rent/make her mortgage payment

- Thus **autonomous consumption**, $\bar{C}$, occurs even at zero income

- That explains why the consumption function, C, **intersects with the Y axis above zero**

Disposable Income

- Real Disposable Income:

$$Y_{dis} = Y - TX + TR$$

TX = Real Personal Taxes

TR = Real Transfer Payments

Slope of the Consumption Function

- **Marginal propensity to consume (MPC)**: Loosely, if you get one more dollar of income, how much more do you spend?

$$MPC = \frac{Change\ in\ consumption}{Change\ in\ disposable\ income} = \frac{\Delta C}{\Delta Y_{dis}}$$

Change in consumption = Change in disposable income × MPC

- Over long periods: MPC ≈ 0.9

MPC + MPS = 1

- **Marginal Propensity to Save (MPS)**: Loosely, if you get one more dollar of income, how much more do you save?

- 1970-2000: MPC = 96% & MPS = 4%

- 2000-2010: MPC = 86% & MPS = 14%

- MPS: The objective is wealth accumulation
  - Rising asset prices lessen the need to save

Consumption Function

$$C = C(Y_{dis}) = \bar{C} + bY_{dis}$$

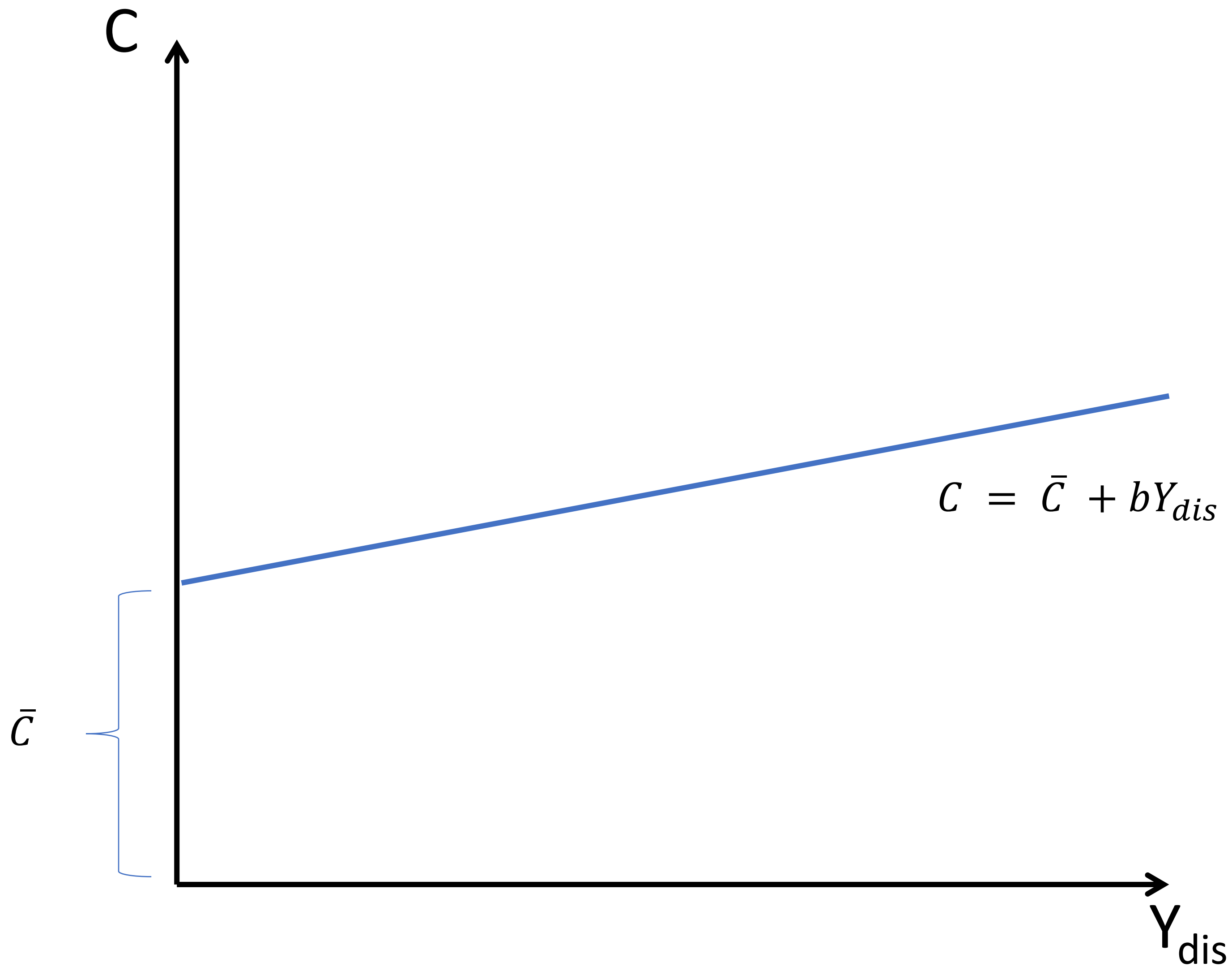
- $b = \dfrac{\Delta C}{\Delta Y_{dis}}$

  $=$ Marginal Propensity to Consume $=$ MPC

- Assume

$$0 < b < 1$$

$$0 < \text{MPC} < 1$$

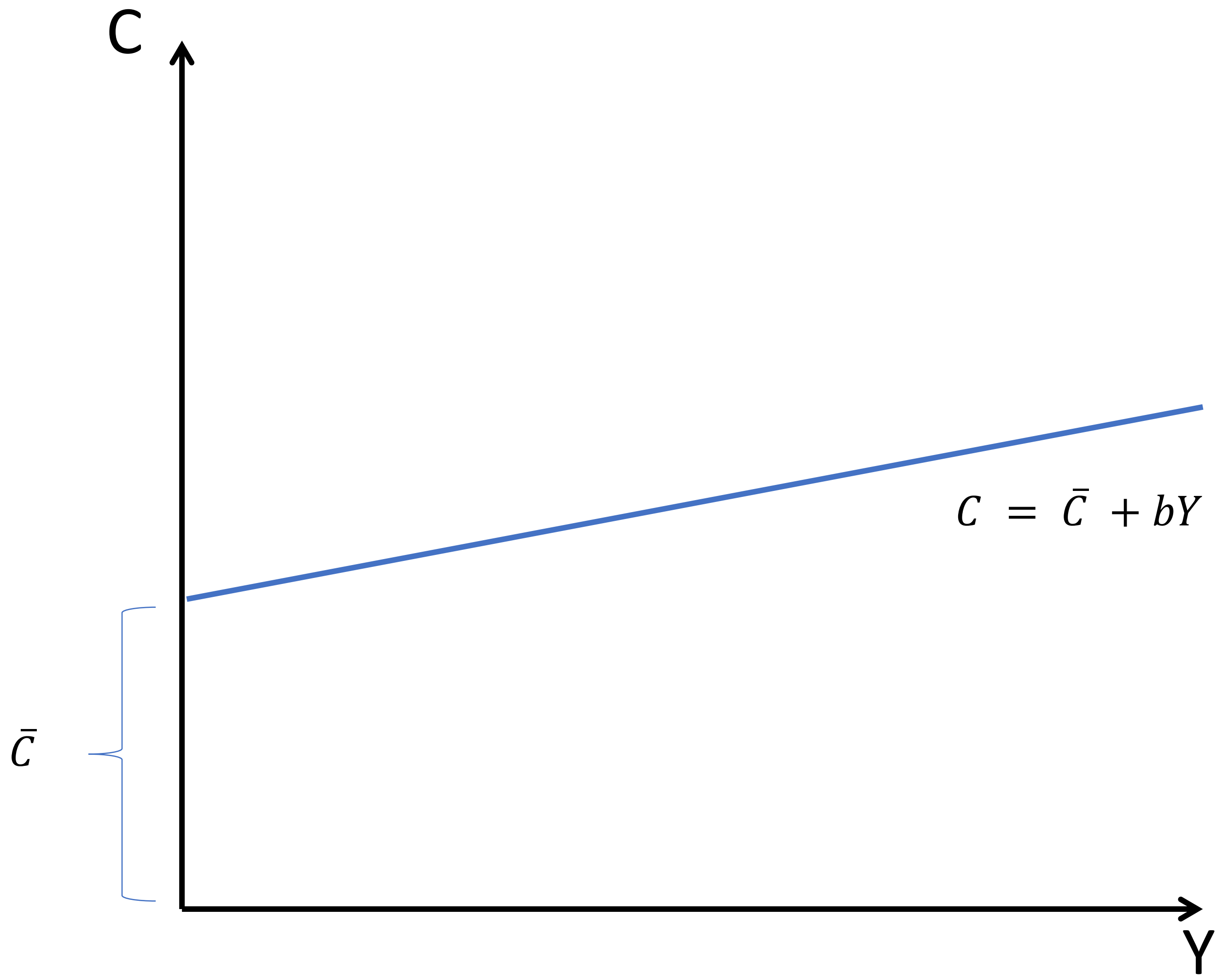


C
$C = \bar{C} + bY_{dis}$
$\bar{C}$
Y_{dis}

Revised Consumption Function

$$C = \bar{C} + bY$$

- $\bar{C} > 0$
- $0 < b < 1$


C
$C = \bar{C} + bY$
$\bar{C}$
Y

Key Drivers of Consumption

Shifts **along** the curve:

- **Current** Disposable **Income**

Shifts **of** the curve:

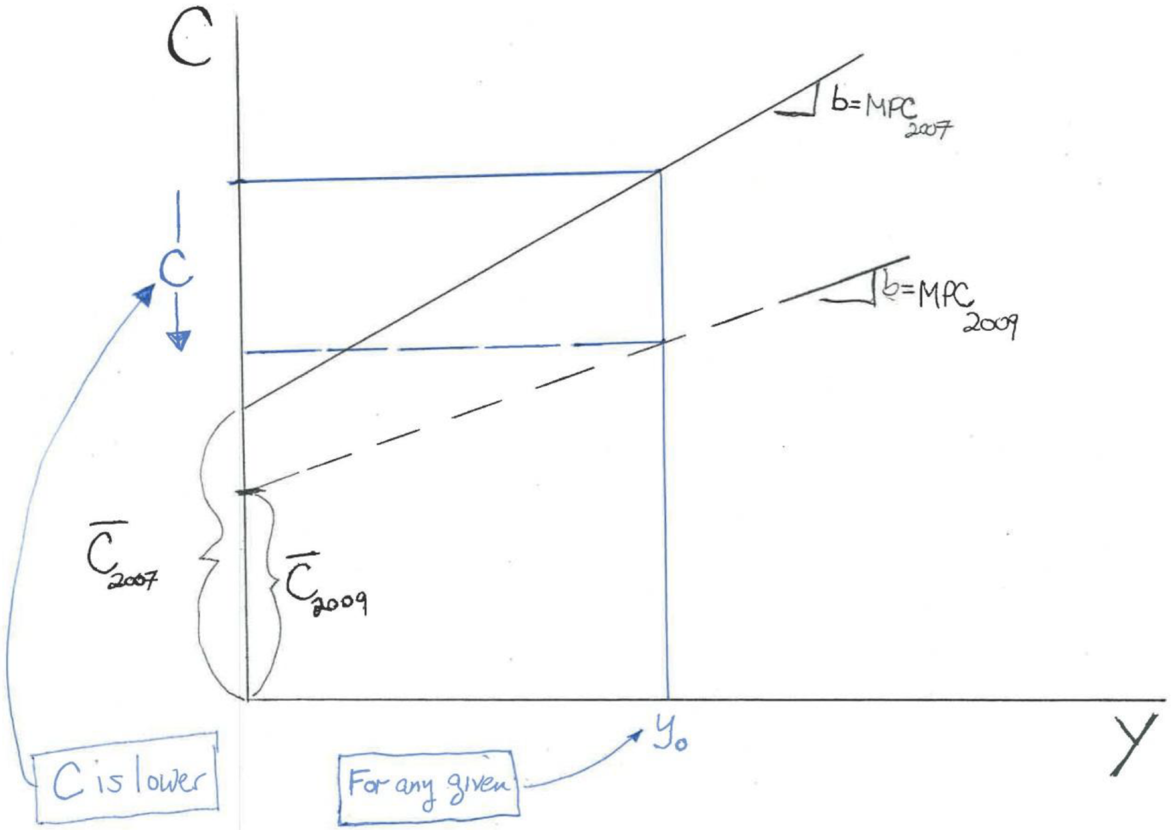
- Changes in MPC (**slope**):
  - **Expected** Future Disposable **Income**
  - **Wealth**
  - Interest **Rates**
- Changes in autonomous expenditures (**intercept**):
  - Consumers' State of **Confidence**

Consumer Spending Will Change…

1. A consequence of a change in **income**
   - This is a **movement along** the consumption function
2. A consequence of a change in **confidence**
   - Autonomous consumption changes as confidence changes
   - This **shifts the intersection** of the consumption function with the AE axis
   - The slope of the line, b, does not change
3. A consequence of a change in **wealth** or future **income expectations** or **interest rates**
   - MPC, b, changes when one of these variables change
   - A change in b, the MPC, **changes the slope** of the consumption function
   - The intercept of the line does not change

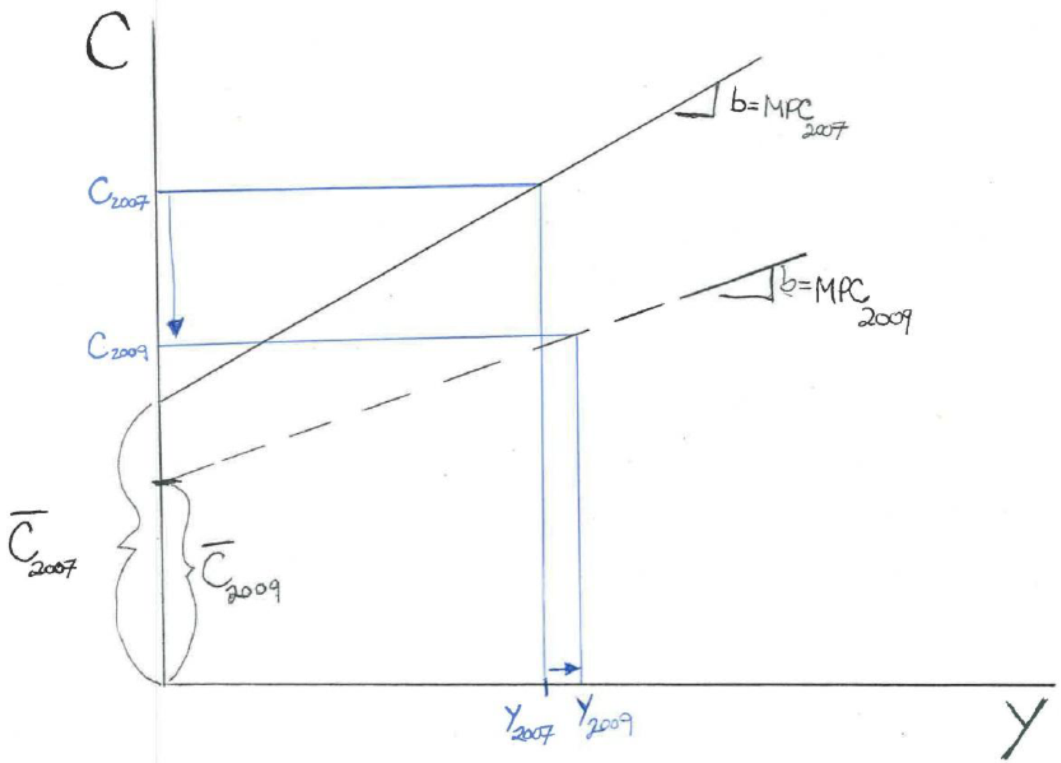
Application

- In 2009, **falling sentiment** drove autonomous spending down
- In 2009, **plunging wealth** drove the MPC down



Imagine Briefing President Obama in 2009

- In 2009 **C** is **down**, despite **Y** being slightly **up**
- AE model depicts sharp fall in spending and limited income rise
  - In 2009, autonomous consumption fell, the MPC fell



A Model: A Grand But **Useful** Simplification

- We strip away many important issues
- We find a streamlined picture of the world
- Despite the picture’s simplicity, we learn important things about how the real economy works
- The ‘art’ is to choose which model to use

An Expanded AE Model

AE Model: The Complete Picture

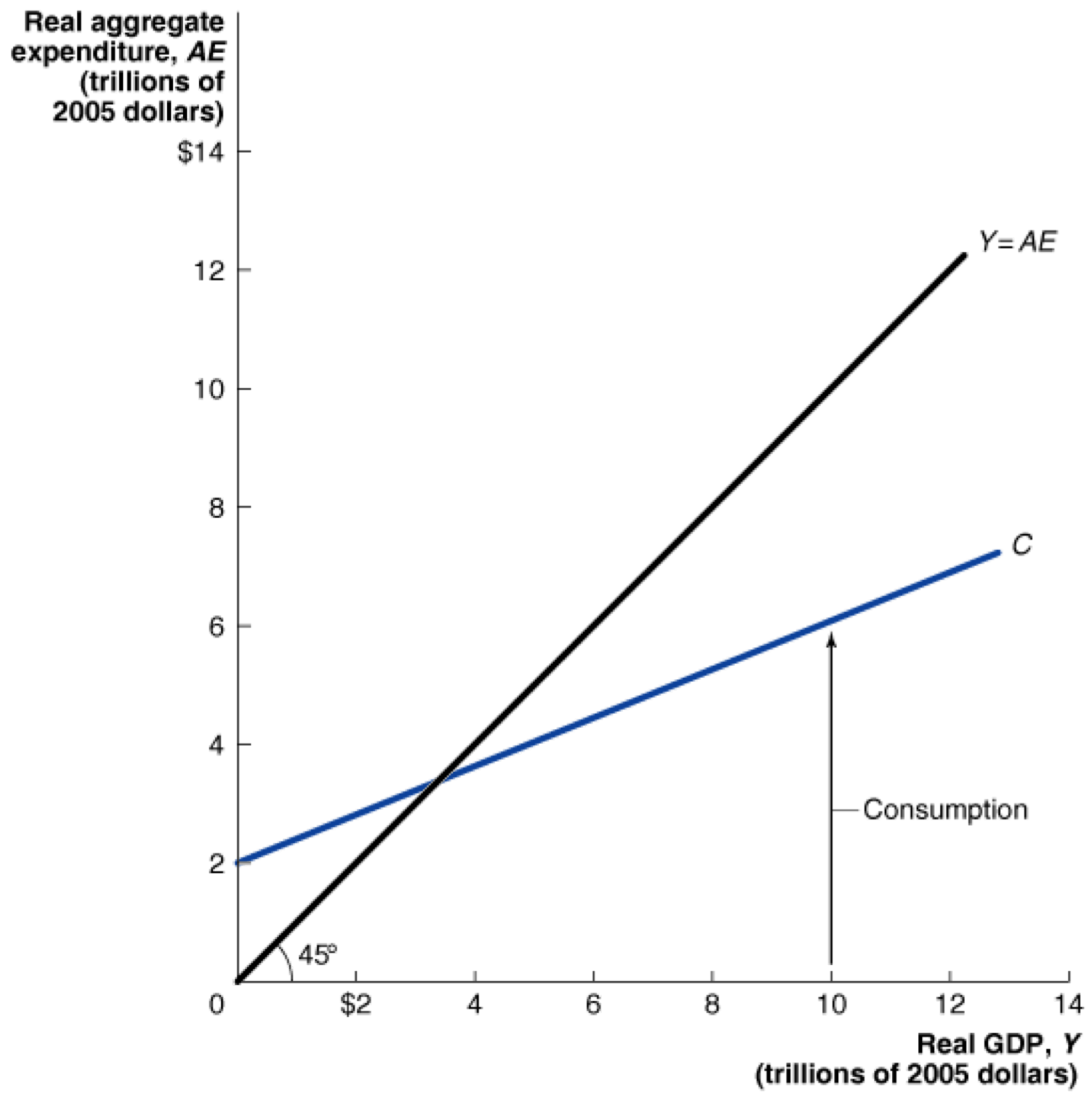
- We began with a super simple model
- No government, no foreign sector
- We began by assuming:

$$G = EX = IM = 0$$

- We focused on the consumption function

We Can Build on Our Simple Model

- We began with the consumption function on the diagram
- If there was no other expenditures, macroeconomic equilibrium would be where the consumption function crossed the 45° line



We Add the Additional Components of AE

- We assume they are **not affected by income**
  - They are predetermined

- **Autonomous expenditure**: An expenditure that does not depend on the level of GDP
  - Confidence about future affects autonomous expenditure

Key Drivers of Planned Investment

- Expectations of Future Profitability
- Interest Rate
- Taxes
- Cash Flow
- Political Uncertainty

Key Drivers of Net Exports

- P^{US} Relative to P^{ROW}
  - If $\pi^{US} < \pi^{ROW}$, prices of U.S. products increase more slowly than prices of products of other countries ➞ NX will rise
- Growth Rate of GDP^{US} Relative to the Growth Rates of GDP^{ROW}
  - When incomes in the US rise more slowly than incomes in other countries ➞ NX will rise
- Exchange Rate Between the Dollar and Other Currencies
  - As the value of the U.S. dollar rises, the foreign currency price of U.S. products sold in other countries rises, and the dollar price of foreign products sold in the United States falls ➞ NX will fall

We Now Can Identify Equilibrium for the Entire Economy

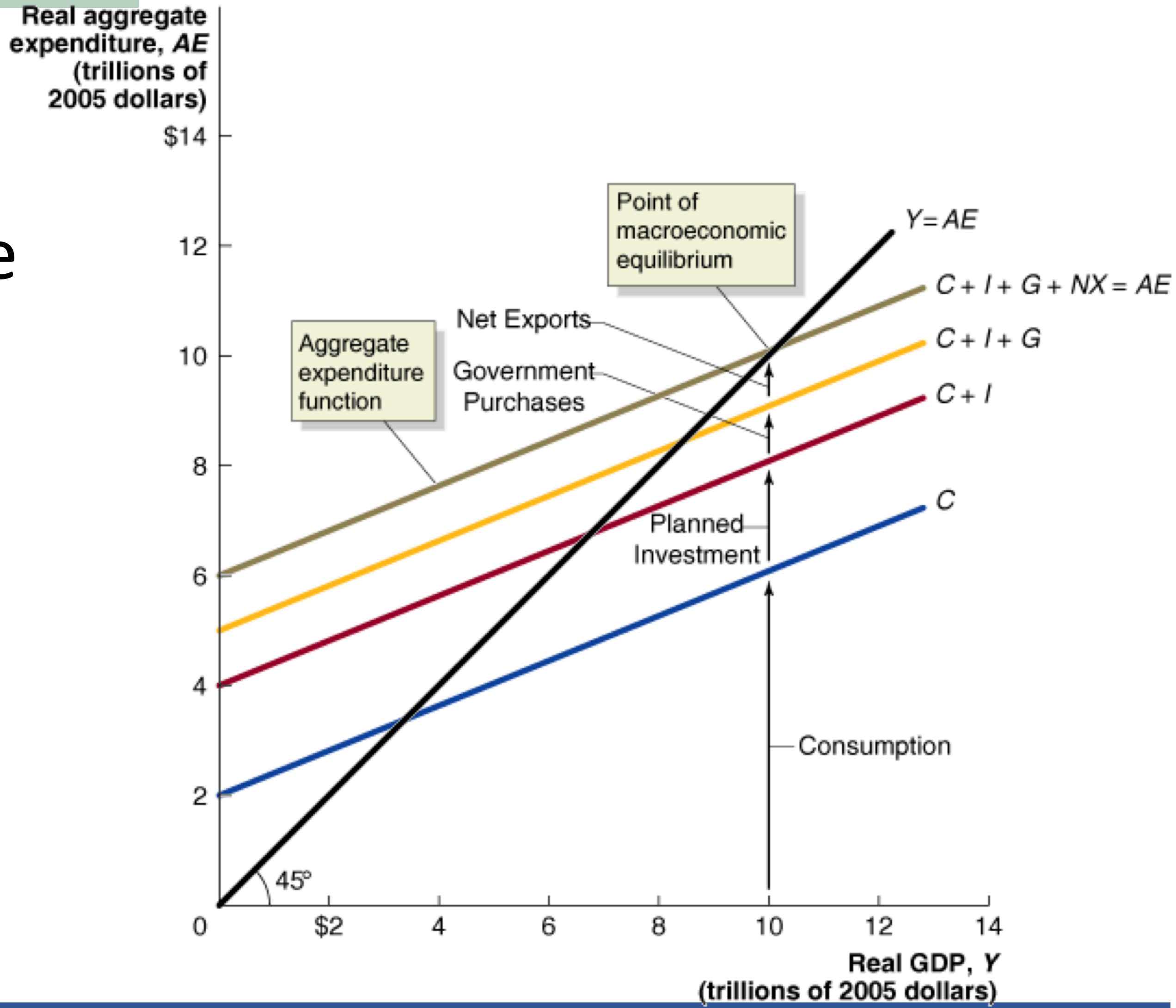
Macroeconomic Equilibrium on the 45º-Line Diagram

- These are **vertical shifts** in real expenditure, because their values do not depend on income

- We call the top-most line the **aggregate expenditure function**

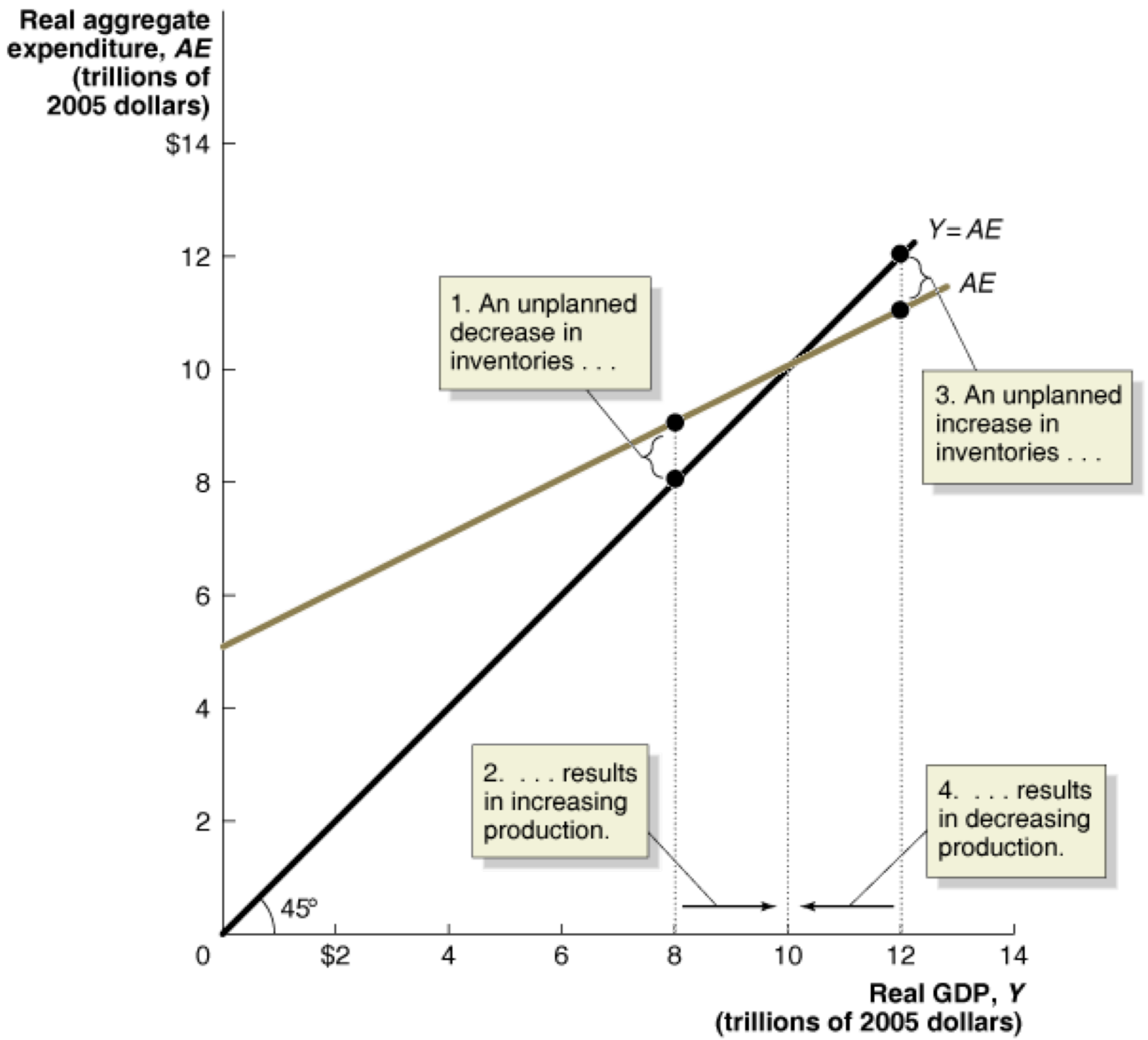
- **Macroeconomic equilibrium**:

  Income equals expenditure, i.e.
  Y = C + I + G + NX



Adjustment to Macroeconomic Equilibrium

- **Equilibrium** occurs at $10 trillion
- What if real GDP were $8 trillion?
  - AE would be higher than GDP. Inventories would fall
  - This would signal firms to increase production, increasing GDP
- The reverse would occur if real GDP were **above** $10 trillion



Exercise

- Find **equilibrium GDP** using the following macroeconomic model:

$C = 1000 + 0.75Y$	Consumption function
$I = 500$	Investment function
$G = 600$	Government spending function
$NX = -300$	Net export function
$Y = C + I + G + NX$	Equilibrium condition

a. 800
b. 1800
c. 2400
d. 7200

A Numerical Example of Macroeconomic Equilibrium

Macroeconomic Equilibrium

REAL GDP (*Y*)	CONSUMPTION (*C*)	PLANNED INVESTMENT (*I*)	GOVERNMENT PURCHASES (*G*)	NET EXPORTS (*NX*)	PLANNED AGGREGATE EXPENDITURE (*AE*)	UNPLANNED CHANGE IN INVENTORIES	REAL GDP WILL …
$8,000	$6,200	$1,500	$1,500	– $500	$8,700	–$700	increase
9,000	6,850	1,500	1,500	–500	9,350	–350	increase
10,000	7,500	1,500	1,500	–500	10,000	0	be in equilibrium
11,000	8,150	1,500	1,500	–500	10,650	+350	decrease
12,000	8,800	1,500	1,500	–500	11,300	+700	decrease

In Sum

- Our AE model is **expectations** based
- A **consumption function** is the driver
- **Unplanned inventory changes** can create a boom/bust cycle
- Responses to inventory changes drive the economy back toward **equilibrium**

What the AE Model Lacks

- AE model focuses EXCLUSIVELY on **real economy swings**

- When aggregate expenditures are strong and **inventories fall**, businesses **increase PRODUCTION AND EMPLOYMENT**

- What about when factories are operating at full capacity?
  - The model **cannot** account for inflationary swings
  - In the real world, sometimes strong growth leads to upward pressure on prices and wages
  - That is why the Federal Reserve Board sometimes steps on the gas and sometimes steps on the brake

Changes in Income and the Multiplier Process

AE Model: The Multiplier and the Multiplier Effect

- Autonomous expenditure does not depend on the level of GDP
- A change in autonomous spending clearly **shifts output**
- **By how much?**
- That is what we examine as we develop the **multiplier analysis**

Assumptions

- No Government: G = TX = TR =0
- Closed Economy: EX = IM = 0
- "Completely Slack" Economic Conditions:
  - Prices are "sticky": $P = \bar{P}$ ➞ So we don't see falling wages moving output costs down and employment up
  - Unemployment and Excess Capacity: $Y < Y^{Cap}$ ➞ Ample resources so there is room to produce above identified equilibrium

Why Those Conditions?

- Why do we need ‘**slack**’?
  - Analysis focuses on the total rise for output that we will get from an initial increase in aggregate expenditures
  - If all factories are operating all day, and everyone is working, the economy has no capacity to produce additional output

- Why do we need **sticky prices**?
  - In the AE model we assume that the economy responds to strength or weakness **SOLELY** by increasing or decreasing production
  - In the real world, a surging economy can lift prices as well as production—and an economy in free fall likely witnesses falling prices

For An Economy that Is Closed and Has No Government

Model

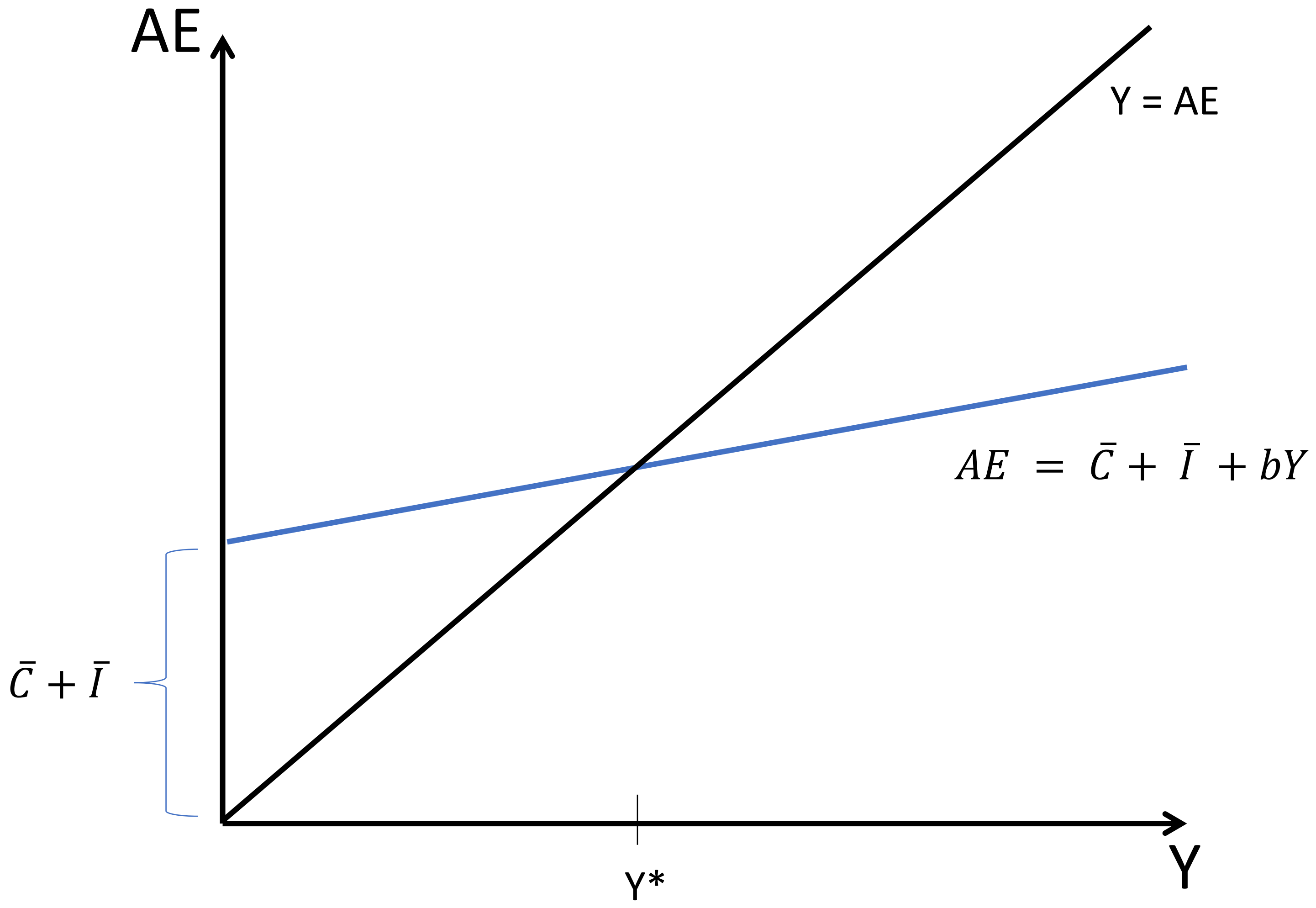
$$\left.\begin{aligned} Y &= AE \\ AE &= C + I \\ C &= \overline{C} + bY \\ I &= \overline{I} \end{aligned}\right\} AE = \overline{C} + \overline{I} + bY$$

- Assume: $0 < b < 1$ or $0 < MPC < 1$
- Mathematical derivation: Equilibrium level of real income

$$Y = AE$$

Basic Diagram

- Closed economy with no government
- Autonomous C and I are not a function of Y
- $\bar{C} + \bar{I}$ identifies the intercept of the AE line
- MPC, b, determines the slope of the AE line



What If Autonomous Investment Spending Increase?

- **Assumption**: Increase in the “State of Confidence” of business firms
- **Why?** We posit there is an improved outlook for the economy
- **Effects**: Firms increase autonomous investment spending

Effects on the Model

- Define:

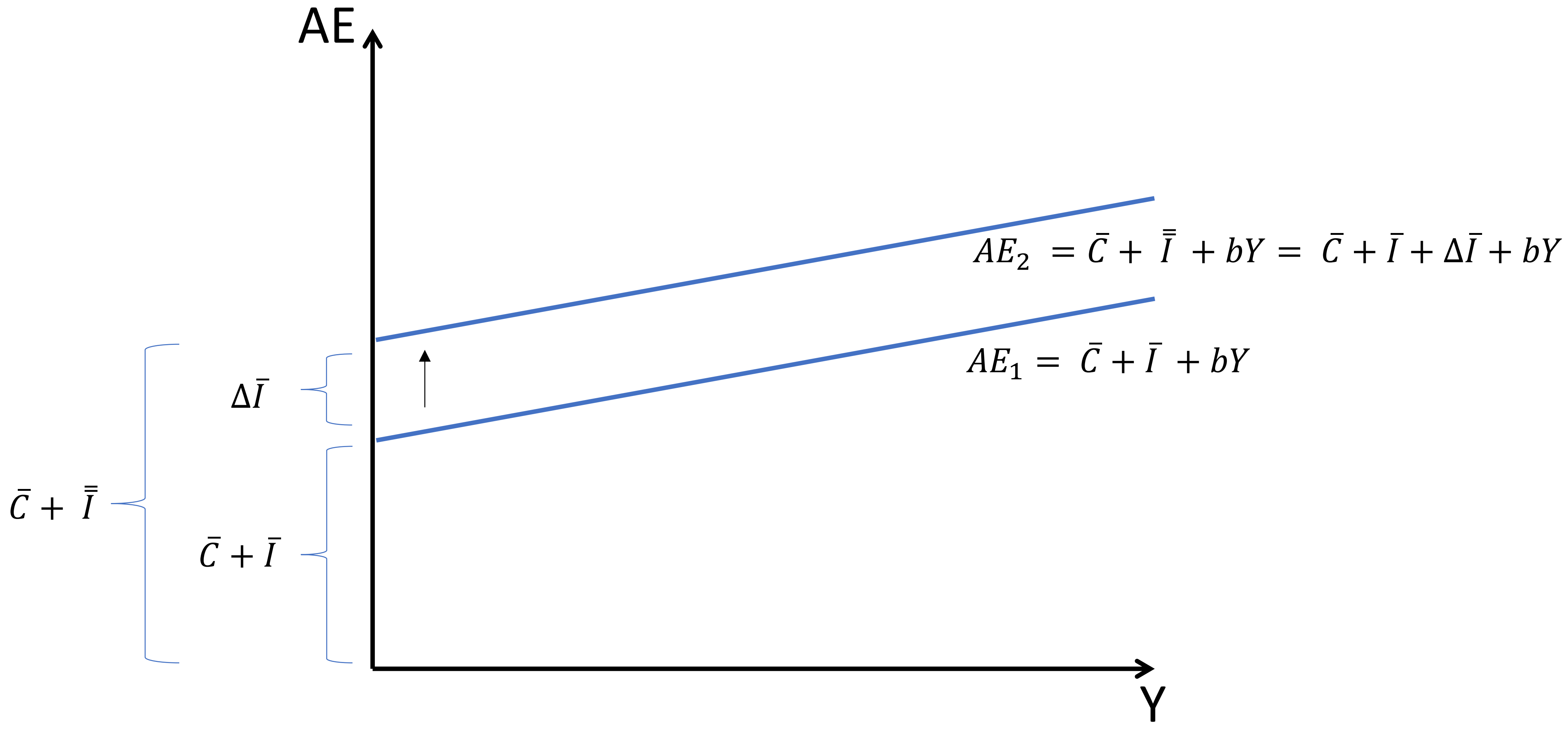
$\bar{I} =$ Original Level of Autonomous Investment Spending

$\bar{\bar{I}} =$ New Level of Autonomous Investment Spending

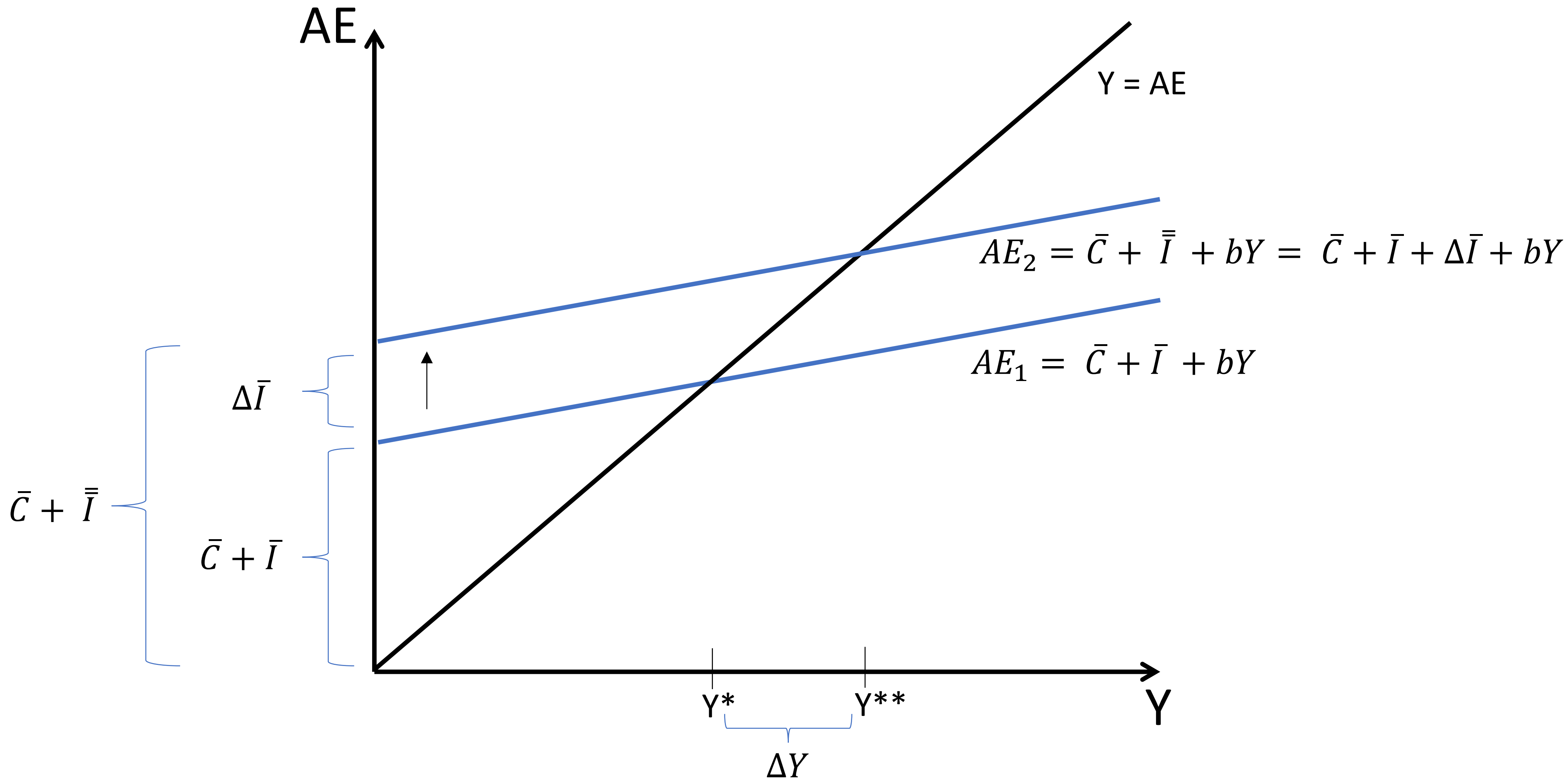
$$\underbrace{\Delta\bar{I}}_{\text{change in autonomous investment spending}} = \underbrace{\bar{\bar{I}}}_{\text{new level}} - \underbrace{\bar{I}}_{\text{original level}} > 0$$

- What is the Effect on Y or GDP?

Effect of an Increase in $\bar{I}$ on the Expenditure Schedule

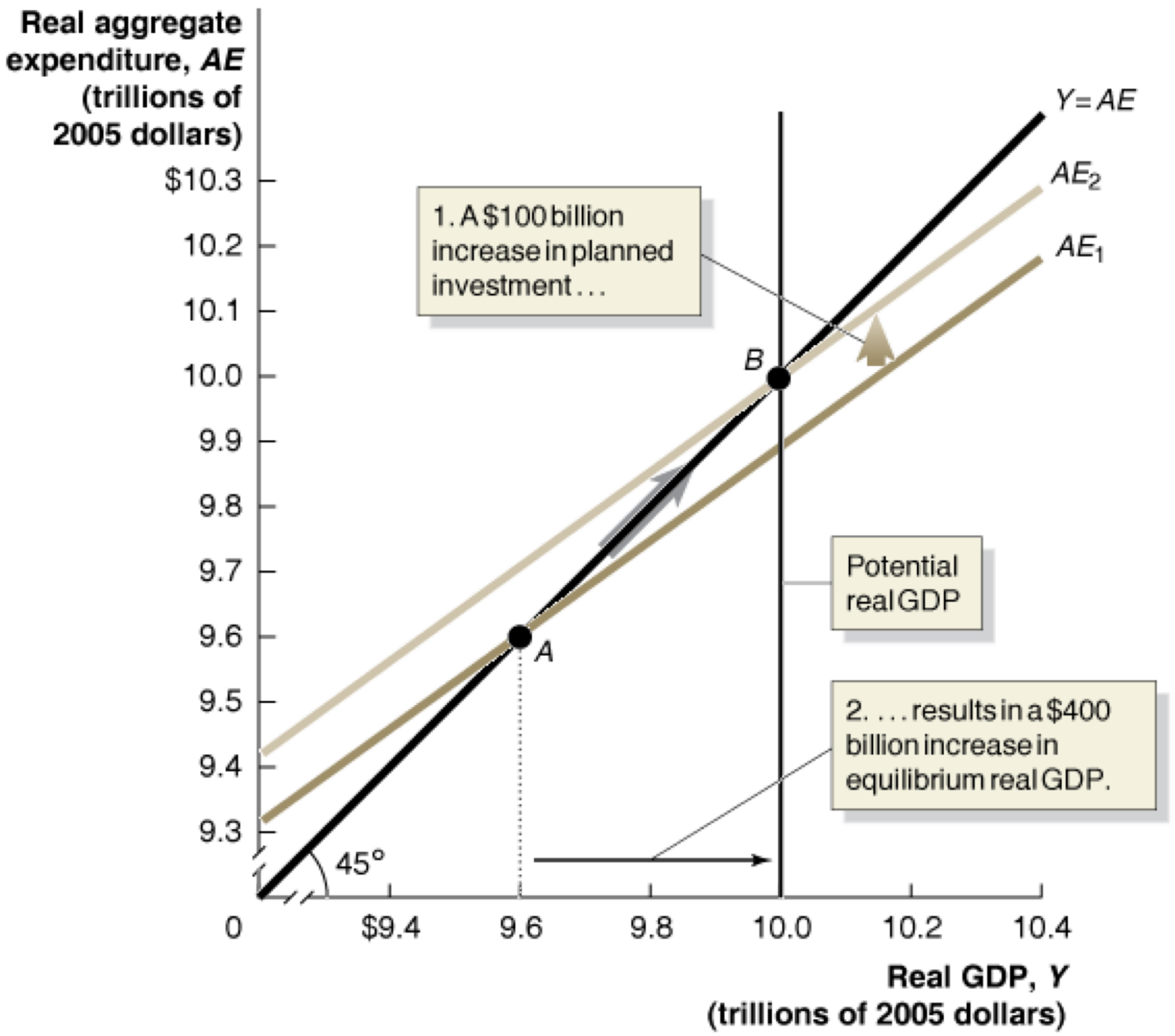


Effect of $\Delta\bar{I}$ on the Equilibrium Level of Real Income



The Multiplier Effect

- An increase in autonomous expenditure ➞ **AE line shifts upward**
- **Multiplier effect** ➞ Process by which real GDP increases by more than AE
- **Multiplier** ➞ The increase in equilibrium real GDP divided by the increase in autonomous expenditure



Implications

- **Principle**: Shifts in autonomous spending cause changes in **real income and output** in the same direction

- **Why?** Shifts in autonomous spending cause changes in **aggregate planned spending** in the same direction

Applications

- Shifts in autonomous spending are **one** reason that changes in Y take place

- When Y changes, look for **shifts in autonomous spending** as a possible cause

Multiplier

- Observe from the diagram that $\Delta Y > \Delta \bar{I}$

- **Question**: Why is the change in Income bigger than the change in Autonomous Investment Spending?

- **Reason**: Increases in ***Autonomous*** Investment Spending give rise to increases in ***Induced*** Consumption Spending

The Underlying Cause of the Multiplier Effect

- Autonomous increase in expenditure increases output
- Output equals income
- Some portion of income received (wages + profits) is **spent** ➞ **INDUCED CONSUMPTION**
- How much?
  - By the **marginal propensity to consume**
- This spending raises output and income, which again raises spending… **MORE INDUCED CONSUMPTION**…

Components of Aggregate Expenditure

$$E = C + I = \underbrace{\overline{C} + \overline{I}}_{\text{Autonomous Spending}} + \underbrace{bY}_{\text{Induced Spending}}$$

Multiplier Stages

Primary Stage:

Effects of an Increase in Autonomous Spending

$$\uparrow \bar{I} \Rightarrow \uparrow Y$$

Secondary Stage:

Effects of the Induced Spending Increase

$$\uparrow Y \Rightarrow \uparrow C \Rightarrow \uparrow Y$$

The Multiplier Effect in Action

- Assume MPC = 0.75

	ADDITIONAL AUTONOMOUS EXPENDITURE (INVESTMENT)	ADDITIONAL INDUCED EXPENDITURE (CONSUMPTION)	TOTAL ADDITIONAL EXPENDITURE = TOTAL ADDITIONAL GDP
ROUND 1	$100 billion	$0	$100 billion
ROUND 2	0	75 billion	175 billion
ROUND 3	0	56 billion	231 billion
ROUND 4	0	42 billion	273 billion
ROUND 5	0	32 billion	305 billion
...	...	...	...
ROUND 10	0	8 billion	377 billion
...	...	...	...
ROUND 15	0	2 billion	395 billion
...	...	...	...
ROUND 19	0	1 billion	398 billion
...	...	...	...
n	0	0	$400 billion

How We Add Up the Multiplier Effect?

This becomes the infinite sum:

$$\text{Total change in GDP} = \$100 \text{ billion} + MPC \times \$100 \text{ billion} + MPC^2 \times \$100 \text{ billion} + MPC^3 \times \$100 \text{ billion} + MPC^4 \times \$100 \text{ billion} + \ldots)$$

Which we can rewrite as:

$$\text{Total change in GDP} = \$100 \text{ billion} \times (1 + MPC + MPC^2 + MPC^3 + MPC^4 + \ldots)$$

by factoring out the initial $100 billion increase in investment.

The general formula for the multiplier is:

$$\text{Multiplier} = \frac{\text{Change in equilibrium real GDP}}{\text{Change in autonomous expenditure}} = \frac{1}{1 - MPC}$$

What is the multiplier in the previous example?

Infinite Geometric Series; Mathematical Backdrop

- An **infinite geometric series** is the sum of an infinite geometric sequence (i.e. the series has no last term)

- When the common ratio is **greater than one**, the terms in the sequence will get larger and larger and the only possible answer would be **infinity**

- The sum S of an infinite geometric series with **$-1 < r < 1$** is given by the formula,

$$S = \frac{a_1}{1-r}$$

Eventual Effect of the Multiplier

- We **cannot say how long** this adjustment to macroeconomic equilibrium will take
- But we can calculate the **value of the multiplier**, as the eventual change in real GDP divided by the change in autonomous expenditures:

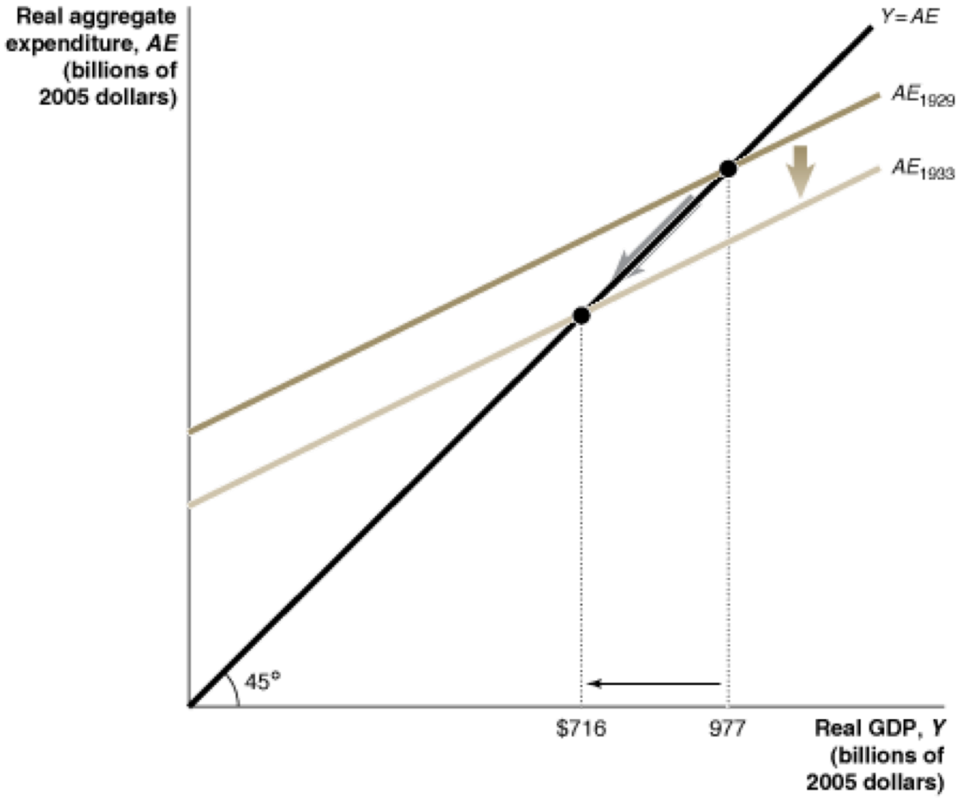
$$\frac{\Delta Y}{\Delta I} = \frac{\text{Change in real GDP}}{\text{Change in investment spending}} = \frac{\$400 \text{ billion}}{\$100 \text{ billion}} = 4$$

- With a multiplier of 4, each \$1 increase in planned investment or any other autonomous expenditure, eventually increases **equilibrium real GDP** by \$4

Summarizing the Multiplier Effect

1. The multiplier effect occurs both when autonomous expenditure **increases** and when it **decreases**
2. Because the multiplier is greater than 1, the economy is **sensitive** to changes in autonomous expenditure
3. The **larger** the MPC, the **larger** the value of the multiplier
4. The model **omits** some real-world complications
   - For example, as real GDP changes, imports, inflation, interest rates, and income taxes will change
   - This generally means that the value we estimate for the multiplier, from the MPC, is **too high**. We will address some of these shortcomings later

The Multiplier in Reverse: Great Depression of the 1930s



YEAR	CONSUMPTION	INVESTMENT	NET EXPORTS	REAL GDP	UNEMPLOYMENT RATE
1929	$737 billion	$102 billion	-$11 billion	$977 billion	3.2%
1933	$601 billion	$19 billion	-$12 billion	$716 billion	24.9%

Remember: MPC Determines the Multiplier

- Redo the analysis, with a surge in precautionary saving
- MPC falls to 0.5
- $100 billion rise in autonomous investment
- Multiplier = 1/(1-MPC) = 2
- Y increases by $200 billion, not $400 billion

Implications

- **Principle**: A change in Autonomous Spending has a "**multiplier**" effect on Real Income

- **Observations**:
  - **Size of multiplier** depends on b, which is the MPC
  - **Reason**: The larger is b, the greater is the induced consumption spending that takes place in the secondary stage

MPC and the Multiplier: Examples

- If the MPC is **0.6**, the multiplier is $\frac{\Delta\,\mathrm{Y}}{\Delta\,\mathrm{I}} = \frac{1}{1-0.6} = \frac{1}{0.4} = \mathbf{2.5}$
  - If $\Delta I = 100$, then $\Delta Y = 100 * 2.5 = 250$
  - If $\Delta I = -80$, then $\Delta Y = -80 * 2.5 = -200$

- Suppose the MPC increases to **0.8**, then the multiplier is $\frac{\Delta\,\mathrm{Y}}{\Delta\,\mathrm{I}} = \frac{1}{1-0.8} = \frac{1}{0.2} = \mathbf{5}$

- If the MPC decreases to **0.5**, the multiplier is $\frac{\Delta\,\mathrm{Y}}{\Delta\,\mathrm{I}} = \frac{1}{1-0.5} = \frac{1}{0.5} = \mathbf{2}$

What If the Government Uses Fiscal Policy?

- Why might policymakers use **fiscal stimulus**?
  - The AE model drives the economy to an equilibrium, but one that may leave some **jobless** (remember: sticky wages don't adjust quickly)

- How might policymakers **change the equilibrium** in this model?
  - Policymakers decide upon the level for '**G**'

$$AE = C + I + G$$

  - Policymakers also decide upon the level for '**T**' ➞ Disposable income

- What is the value of the **fiscal multiplier**?

“Size of the Multiplier” vs. “Supply Side” Effects

- For **Keynesians** the **size of the multiplier** is the **flux capacitor** for fiscal policy.

- For **Classical Economists**, **supply side effects** are the **flux capacitor** for fiscal policy

"Size of the Multiplier": Debate Is Furious

- Maybe the MPC = 0.5, not 0.75, for policy changes
- An MPC of 0.5 gives a multiplier of 2 not 4
- What is the MPC, for a one time tax cut?
  - If you think you only get one check, you may react differently, spending only a small portion of the funds
  - If the tax cut goes to Bill Gates, is he likely to spend as much of it as if it goes to a struggling family with 4 in college?

Some Classical Economists Argue the Multiplier is **ZERO**

Ricardian Equivalence

- If the government cuts taxes, we must think about **how household 'expectations' change**
- "I can't spend this tax cut, cause I know they will raise my taxes later"
- It has important implications because it implies a multiplier of zero

How Does Ricardian Equivalence Square with the Facts?

- **Poorly**
- Households may save some portion of the tax cut
- But a multiplier of zero **doesn’t** square with the facts

Fiscal Multiplier Amid the Great Recession

- In January 2009, economist Robert Barro argued fiscal multipliers in the US were essentially **ZERO**
- Christina Romer, Obama's CEA Chair, asserted that in 2010 economic slack suggested they were as high as **1.6**
- **Note**: These numbers are nowhere near 4

Multiplier for A Change in Taxes

- Unlike with I, G and NX, with a change in T the initial change in expenditure is $-\mathrm{MPC} * \Delta\mathrm{T}$
- Thus, the overall effect on income of the change in T is

$$\Delta Y = -\mathrm{MPC} * \Delta\mathrm{T} * \frac{1}{1 - MPC}$$

- So the **multiplier for taxes** is $\frac{\Delta\,\mathrm{Y}}{\Delta\,\mathrm{T}} = \frac{-\,MPC}{1-MPC}$

- **Example**: When MPC= 0.75, a change in T has a multiplier effect of 3 instead of 4 [-MPC/(1-MPC) = -0.75/0.25 = -3]

Recall the Paradox of Thrift

- Saving = Investment

- But if everyone tries to **save more**
  - Demand plunges (later we'll see why)
  - Slashed jobs = Sharp declines in income
  - Sharp fall for output and income so **SAVING FALL**
  - Investment fall

- As everyone tries to save more, saving actually goes down!

- That is Keynes's **paradox of thrift**

The Multiplier Effect: The Paradox of Thrift

- In discussing the AE model, Keynes argued that **if many households** decide **at the same time** to **increase their saving**, they may **make themselves worse off by causing AE to fall**, thereby pushing the economy into a recession
- **Lower incomes** in the recession might mean that **total saving does not increase**
  - Despite the attempts by many individuals to increase their own saving
- Keynes referred to this outcome as **the paradox of thrift**
  - What appears to be something favorable to the *long-run* performance of the economy might be counterproductive in the *short-run*