

INTRODUCTION TO MACROECONOMICS

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What is Macroeconomics?

- Macroeconomics is the study of economic aggregates and economy-wide phenomena like the annual growth rate of a country's total economic output or the annual percentage increase in the total cost of living.

or

- Macroeconomics is concerned with the structure, performance and behaviour of the economy as a whole.

Macroeconomic Questions

In particular, macroeconomics asks the following questions:

- What is income per capita?
- How do we measure differences in income per capita?
- How large are differences in income per capita?
- What causes differences in income per capita?
- How long will differences in income per capita persist?

The Practice of Macroeconomics

- **Macroeconomics** is the study of economic activity and prices in the overall economy of a nation or a region
- Macroeconomic research draws heavily on **microeconomics**, which looks at the behavior of individual firms, households, or markets

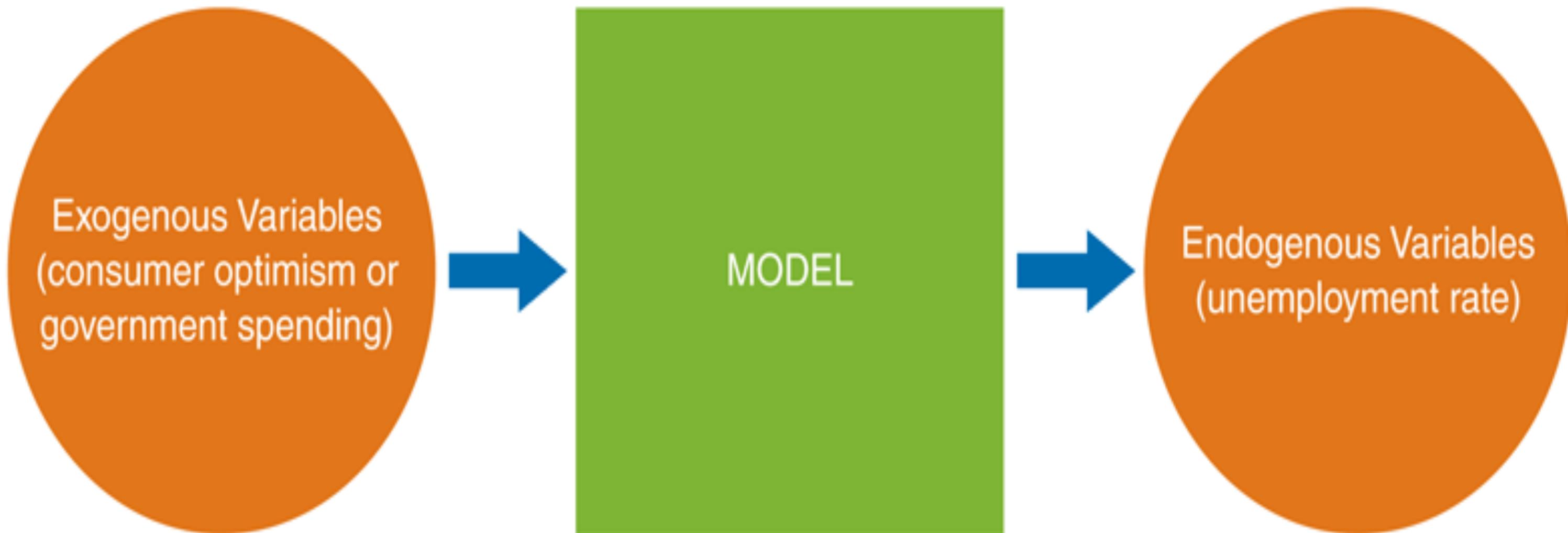
The Process: Developing Macroeconomic Models

- Macroeconomists explain how the overall economy works by using an **economic theory**—a logical framework to explain a particular economic phenomenon
- Economic theory involves developing an **economic model**—a simplified representation of the economic phenomenon that takes a mathematical or graphical form

The Process: Developing Macroeconomic Models

- The development of an economic theory or model typically involves five steps:
 1. Identify an interesting economic question
 2. Specify the variables to be explained by the model (**endogenous variables**) and the variables that explain them (**exogenous variables**)
 3. Posit a set of equations or graphical analysis to connect movements in the exogenous variables to the endogenous variables
 4. Compare the conclusions of the model with what actually happens
 5. Use the model to make further predictions

Variables in Macroeconomic Models



The Purpose: Interpreting Macroeconomic Data

- Macroeconomists focus in particular on three economic data series:
 - real GDP
 - unemployment rate
 - inflation rate

The Purpose: Interpreting Macroeconomic Data (cont'd)

- **Real Gross Domestic Product (GDP)**
 - measures the output of actual goods and services produced in an economy over a fixed period, usually a year

Macroeconomic Questions

Income per capita

The average income per person.

Income per capita

Calculated by dividing a nation's aggregate (or total) income by the number of people in that country.

Income per capita in the United States is more than several times the level in Ghana, 7 times the level in China, and 100 times the level in Zimbabwe!

Macroeconomic Questions

Differences in income per capita are caused by institutional differences (so-called economic rules of the games) and political policies that impact them.

Differences in income per capita can either narrow over time (e.g., China) or widen over time (e.g., Argentina).

Macroeconomic Questions

Why does economic growth sometimes slow down or even turn negative?

What is a recession?

ORIGIN & DEVELOPMENT OF MACROECONOMICS

- The lessons from the history of economic thought teach us that one of the main driving forces behind the evolution of new ideas is the march of events.
- While theoretical ideas can help us understand historical events, it is also true that ‘the outcome of historical events often challenges theorists and overturns theories, leading to the evolution of new theories’
- The Great Depression of the 1930s gave birth to modern macroeconomics as surely as accelerating inflation in the late 1960s and early 1970s facilitated the monetarist counter-revolution

ORIGIN & DEVELOPMENT OF MACROECONOMICS

- The birth of modern macroeconomics as a coherent and systematic approach to aggregate economic phenomena can be traced back to the publication in February 1936 of Keynes's book *The General Theory of Employment, Interest and Money*.
- It is important however, to stress that economists before Keynes discussed what we now call macroeconomic issues such as business cycles, inflation, unemployment and growth, as we have already noted,

ORIGIN & DEVELOPMENT OF MACROECONOMICS

- Keynes recognized that the drastic economic situation confronting the capitalist system in the 1930s threatened its very survival and was symptomatic of a fundamental flaw in the operation of the price mechanism as a coordinating device.
- To confront this problem Keynes needed to challenge the classical economists from within their citadel. The flaw, as he saw it, lay in the existing classical theory whose teaching Keynes regarded as not only ‘misleading’ but ‘disastrous’ if applied to the real-world problems facing the capitalist economies during the interwar period.

ORIGIN & DEVELOPMENT OF MACROECONOMICS

- His solution to the economic malaise that was sweeping the capitalist economies in the early 1930s was to accept ‘a large extension of the traditional functions of government’.
- To him, the most plausible explanation of the Great Depression is one involving a massive decline in aggregate demand.
- The elimination of mass unemployment during the Second World War had a profound influence on the spread and influence of Keynesian ideas concerning the responsibility of government for maintaining full employment.

ORIGIN & DEVELOPMENT OF MACROECONOMICS

- Whatever the causes, this ‘Golden Age’ came to an end after 1973 and the economic problems of the 1970s brought the Keynesian bandwagon to an abrupt (but temporary) halt.
- The acceleration of inflation, rising unemployment and a slowdown in economic growth during the 1970s were attributed, by Keynesian critics, to the misguided expansionary policies carried out in the name of Keynes
- To the critics of Keynesianism, stagflation was an inevitable legacy of the ‘Golden Age’ of demand management

INTRODUCTION TO SCHOOLS OF THOUGHT

1. The Classical School (David Hume, Adam Smith, Thomas Malthus, John Stuarts, David Ricardo, Karl Marx, Alfred Marshal, Arthur Pigou, Jean-Baptiste Say)

- Dominated the economic world before the Keynesian revolution
- Didn't have a coherent macroeconomic theory or model
- Their Main tenets were as follows:
- To them, if market forces of demand and supply are allowed to work freely, then
 - a. There will always be full employment in the long run, and unemployment, if any, will be a short-run phenomenon
 - b. There will neither over-production nor under-production at the aggregate level

INTRODUCTION TO SCHOOLS OF THOUGHT

1. The Classical School Cont'd

- c. The economy will always be in equilibrium in the long run.
- The great depression of the 1930s proved all the classical postulates wrong
- The inadequacy of the theoretical foundations of their laissez-faire doctrine was exposed

Evidence of Failure

- Large scale unemployment in most free-market industrial economies coupled with disastrous decline in their GNP during the great depression
- They could offer neither an explanation nor a solution to the economic problems created by the great depression.
- This marked the collapse of classical macroeconomics

INTRODUCTION TO SCHOOLS OF THOUGHT

2. The Keynesian Revolution (John Maynard Keynes, Paul Samuelson, James Tobin, Franco Modigliani, Robert Solow)

- Laid the foundation of macroeconomics
- Realized the classical economics was not capable of predicting, explaining and providing solution to economic problems resulting from economic debacles like the great depression
- His work was born out of his attempt to find solution to economic problems associated with the great depression.
- The central theme of Keynesian Macroeconomics can be summarized as follows:
 - a. The level of output and employment in an economy is determined by the aggregate demand given the resources

INTRODUCTION TO SCHOOLS OF THOUGHT

2. Keynesian Revolution Cont'd

- b. The unemployment in any country is caused by lack of aggregate demand and economic fluctuations are caused by demand deficiency
 - c. The demand deficiency can be removed through compensatory government spending.
- He stressed the role of demand management by the government for the stable growth of the economy
- Believed government spending had favourable macroeconomic effects on national income and employment through its multiplier effect

INTRODUCTION TO SCHOOLS OF THOUGHT

2. Keynesian Revolution Cont'd

- The Keynesian paradigm reigned the period between 1930s-mid 1960s
- Most economists as well as governments in developed countries adopted Keynesian policies.
- Some underdeveloped countries who were struggling to get out of the low-level equilibrium trap adopted the Keynesian approach to their economic development
- Keynesian economics started showing signs of failure in the early 1970s

2. Keynesian Revolution Cont'd

- His fiscal measures failed to provide solution to economic problems of low growth, high unemployment and high inflation faced by most developed countries
- It could also not offer a reasonable explanation nor an effective solution to the problem of 'Stagflation'
- This failure led to the emergence of other schools of thought.

3. Monetarist School (Milton Friedman, Karl Brunner, Allan Meltzer, David Laidler)

- They claimed Keynesian theory failed to predict national output, price level, rate of employment and unemployment and interest rate
- They believed that the role of money was central to the growth and stability of national output, not the role of aggregate demand for real output
- In their opinion, money supply is the main determinant of output and employment in the short-run and price-level in the long run
- They added a new dimension to both macroeconomic theory and policy

3. Monetarist School Cont'd

- At the theoretical level, the emphasis shifted from the analysis of the role of aggregate demand for real output to the aggregate demand for the supply of money.
- At the policy level, the emphasis shifted from demand management to monetary management.
- They held the view that changes in the money supply are far more important than all other forces in affecting nominal GNP in the short run and prices in the long run.
- The debate between the Monetarist and the Keynesians remain inconclusive

INTRODUCTION TO SCHOOLS OF THOUGHT

4. The Neo-Classical Macroeconomics (Robert Lucas, Neil Wallace, Thomas Sargent, Robert Barro)

- Rose in the early 70s
- They emphasized the role of individual's **rational expectations** about future economic events, especially those taking place at the supply-side of the economy and the expectations about future government policies

INTRODUCTION TO SCHOOLS OF THOUGHT

4. The Supply-Side Economics (Led by Arthur Laffer)

- They emphasized the role of the factors operating on the supply side of the market
- They argued that a cut in tax rate shifts aggregate supply curve rightward and leads to a rise in output and employment.
- They considered fiscal policy as the main instrument of economic management

INTRODUCTION TO SCHOOLS OF THOUGHT

5. The Neo-Keynesian School

- They argued that market does not clear always, inspite of individuals (households, firms and labour) working for their own interest.
- They explain that this is due to information problem and the cost of changing prices leading to some price rigidities which cause fluctuations in output and employment.
- They held the view that people's rational expectations about government monetary and fiscal policies determine the behaviour of aggregate demand and aggregate supply curves in such a way that real output remains unaffected, though prices and wages go up

INTRODUCTION TO SCHOOLS OF THOUGHT

- Macroeconomics is still in the process of developing as a perfect science.
- However, macroeconomic theories and policies as developed so far have gained wide recognition and application
- This gives credence to macroeconomics

MACROECONOMIC ISSUES

1. Achieving and maintaining high rate of economic growth
2. Preventing business cycles when symptoms come up
3. Controlling inflation and stabilizing price level
4. Solving the problems of unemployment and poverty
5. Containing growing budgetary deficits
6. Managing international economic issues.

Macroeconomic Policy

The goal of developing models is to the underlying goal is to determine what policies can produce better macroeconomic outcomes:

- How Can Poor Countries Get Rich?
- Is Saving Too Low?
- Do Government Budget Deficits Matter?
- How Costly Is It to Reduce Inflation?
- How Can We Make Financial Crises Less Likely?
- How Active Should Stabilization Policy Be?
- Should Macroeconomic Policy Follow Rules?
- Are Global Trade Imbalances a Danger?

Fiscal and Monetary Policy

- **Fiscal policy** deals with government spending and taxation
 - **Government budget deficit** is the excess of government spending over tax revenues for a particular year
- **Monetary policy** is the management of the money supply and interest rates
 - Conducted by **central banks**, e.g., the The Bank of Ghana

How Active Should Stabilization Policy Be?

- **Stabilization policy** is macroeconomic policy that aims at minimizing business cycle fluctuations and stabilizing economic activity
- *Activists* advocate the use of policies to eliminate excessive unemployment whenever it develops
- *Nonactivists* argue against the use of stabilization policies because the economy has a self-correcting mechanism

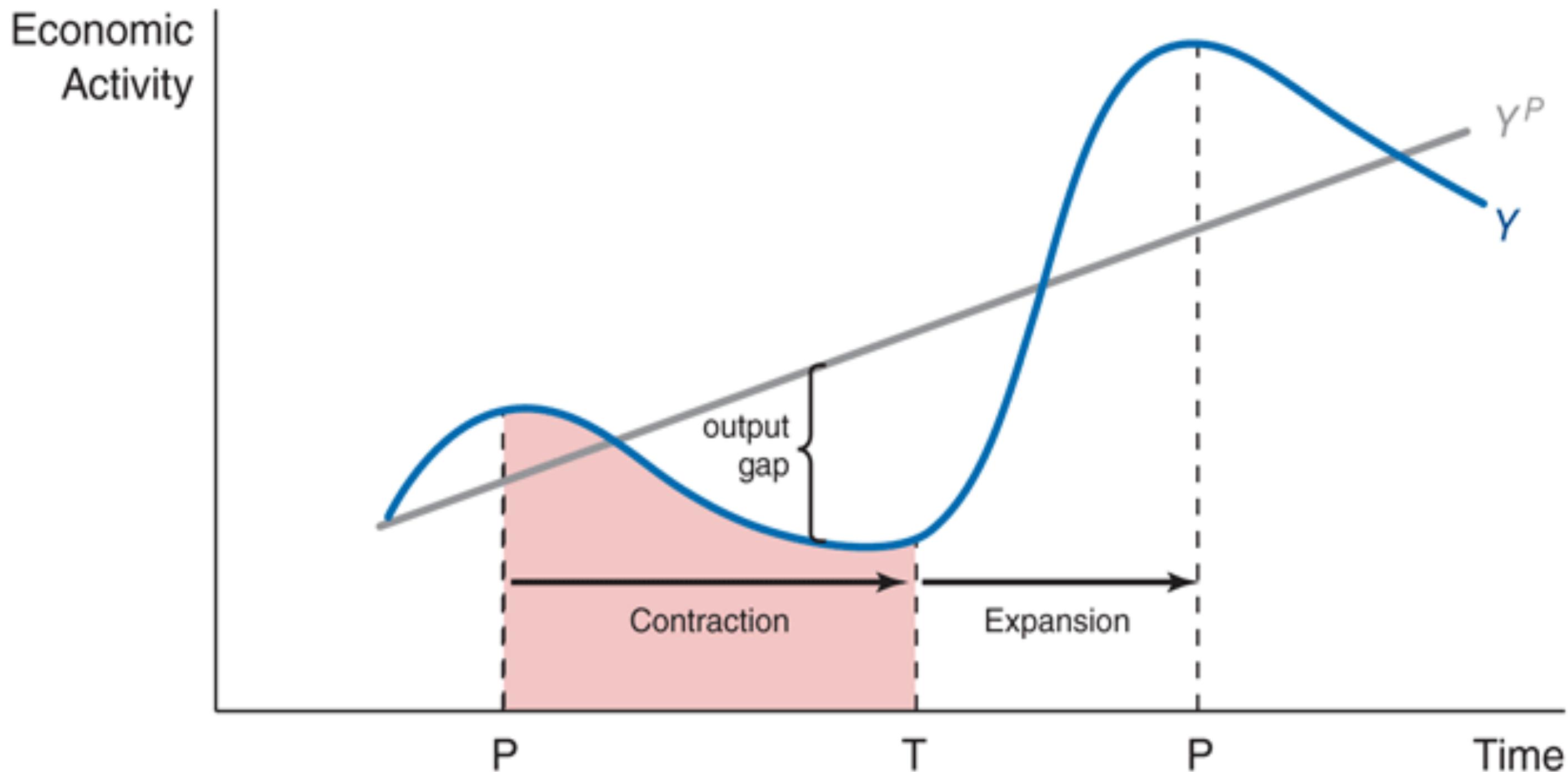
Business Cycle Basics

- Arthur Burns and Wesley Mitchell defined **business cycles** as fluctuations in aggregate economic activity in which many economic activities expand and contract together in a recurring, but not a periodic, fashion
- Economic activity typically follows a wavy line over time with four phases:
 - Trough
 - Business cycle expansion (boom)
 - Peak
 - Business cycle contraction (recession)

An Alternative view of the Business Cycle

- Another view of the business cycle is to break aggregate output into:
 - Long-run trend: potential output (Y^P)
 - Short-run deviations from trend: output gap ($Y - Y^P$)

The Business Cycle



Dating Business Cycles

- Recessions usually begin with lengthy periods of falling real GDP, but there are exceptions:
 - But there are also recessions, whereby GDP never fell more than one quarter in a row

Co-Movement and Timing of Economic Variables

- Many economic activities move together over the business cycle
- Co-movement of economic variables is either:
 - **Procyclical**—a variable moves up during expansions and down during contractions
 - **Countercyclical**—a variable moves down during expansions and up during contractions
 - **Acyclical**—a variable with ups and downs that do not coincide with those of the business cycle

Co-Movement and Timing of Economic Variables (cont'd)

- Timing relative to the business cycle:
 - **Leading variable**—reaches a peak or trough before the turning points of a business cycle
 - **Lagging variable**—reaches a peak or trough after the turning points of a business cycle
 - **Coincident variable**—reaches a peak or trough at the same time of a business cycle

Macroeconomic Variables and the Business Cycle

- **Real GDP:** A broad measure of aggregate economic activity so that it sometimes serves as a proxy for the business cycle
- **Real consumer spending and investment:** Both are procyclical and coincident, but investment is more volatile
- **Unemployment:** The unemployment rate is countercyclical
- **Inflation:** The inflation rate is procyclical and lagging the business cycle

Macroeconomic Variables and the Business Cycle (cont'd)

- **Financial variables**, such as stock and bond prices, are procyclical and tend to be leading the business cycle
- The **interest rate** paid on short-term Ghana government bonds, known as Treasury bills, is both procyclical and lagging

Macroeconomic Variables and the Business Cycle (cont'd)

- The spread (difference in interest rates) between long-term and short-term government bonds is leading and procyclical, and it is a good predictor of recessions
- The spread between interest rates on corporate bonds and government bonds is countercyclical as companies are more likely to run out of money in recessions and thus have to pay higher interest rates for corporate bonds

International Business Cycles

- In a globalized economy, business cycles of many countries are correlated with those of the United States (e.g., 2007–2009 recession)
- As financial markets throughout the world have become more integrated as well, the financial crisis in the United States during the fall of 2008 led to a global financial crisis and subsequently simultaneous economic contractions around much of the world

Time Horizons in Macroeconomics

- The study of business cycles focuses on short-run economic fluctuations
- John Maynard Keynes questioned the classical view that economies moved quickly to their long-run equilibriums
- Stating that “in the long run, we are all dead”, Keynes argued that the primary focus of macroeconomists should be the short run
- The followers of Keynes, or **Keynesians**, also argue that the government should pursue active policies to stabilize economic fluctuations

The Short Run Versus the Long Run

- In the long run, prices of goods and services as well as the price of labor (wages) are completely *flexible*: They adjust all the way to their long-run equilibrium where supply equals demand
- Classical models make use of a **flexible-price** framework

The Short Run versus the Long Run (cont'd)

- The flexible-price framework results in the classical dichotomy, in which there is a total separation between real and nominal variables
- **Keynesian models** focus on the short run when prices respond slowly to changes in supply and demand—**sticky prices**

LONG-RUN VERSUS SHORT-RUN MODELS

LONG-RUN VERSUS SHORT-RUN MODELS

	Long-Run Models	Short-Run Models
Prices	Flexible, adjust quickly to long-run equilibrium	Sticky, adjust slowly to long-run equilibrium
Model Type	Classical	Keynesian
Relation of Real and Nominal Variables	Total separation with classical dichotomy	Classical dichotomy does not hold
Model Elements	Production function with a given amount of capital and labor determines aggregate output; interest rate determined by the interaction of saving and investment	Monetary policy affects real variables (aggregate output, the real interest rate, saving, and investment)
Policy Focus	Economic growth	Stabilizing fluctuations in real GDP and unemployment rates

Price Stickiness

- There are different views of market structure that affect the views on the role of price stickiness
- Perfect competition versus monopolistic competition
 - Classical models commonly assume perfect competition in markets where buyers and sellers are price takers
 - Keynesians focus on the importance of market (monopoly) power in a market with monopolistic competition as firms have the ability to set prices

Sources of Price Stickiness

- **Menu Costs**

- Changing prices involves many hidden costs
- Collecting information is costly, so firms and households may engage in **rational inattention** by only making decisions about prices at infrequent intervals
- Changing prices frequently may alienate customers

- **Staggered Price Setting**

- Occurs when competitors adjust prices at different intervals, so that staggered prices slow down price adjustment

INTRODUCTION - MACROECONOMIC ISSUES AND MEASUREMENT

Why do We Need Macroeconomics?

- Macroeconomics is useful because it enables us to study events that affect the economy as a whole without getting into too much detail about specific products and sectors.

Measuring Economic Activity: National Income Accounting

- National income accounting is an accounting system that measures economic activity and its components
- Fundamental identity of national income accounting:

Total Production = Total Expenditure = Total Income

Measuring Economic Activity: National Income Accounting

GDP versus GNI

- GDP can be measured as the sum of value added by all producers, as the sum of income claims generated in producing goods and services, or as the spending on all final goods and services produced.
- GDP measures the value of what is produced in this country, while GNI (or GNP) measures the income accruing to Ghanaian residents, including net income from overseas.
- GDP is a specific measure of output in the market economy, and is not a measure of welfare or happiness.

Measuring Economic Activity: National Income Accounting

Market Value

- Not all goods and services are counted in GDP because they are:
 - Nonmarket goods and services, which do not have a market price (e.g., household services produced within a family), or
 - Produced in the **underground economy**
- Many nonmarket goods and services are counted in GDP by their **imputed values**

Measuring Economic Activity: National Income Accounting

Newly Produced Goods and Services

- GDP includes only goods and services that are newly produced in the current period
- If you buy a 3-year-old car from a car dealership
 - The cost of the used car is not included in GDP
 - The value of the services provided by the car dealership is included in GDP

Measuring Economic Activity: National Income Accounting

Value-Added Technique

- **Value added** is the value of a firm's output minus the cost of the intermediate goods purchased by the firm
- By adding up the value added from each firm, we get the final value of the goods and services produced

Measuring Economic Activity: National Income Accounting

Capital Goods

- A **capital good** (e.g., a robot) is used in the production of other goods that is not used up in the stages of production
- New capital goods are classified as final goods because they are not included in spending on other final goods and yet their production is part of economic activity

Measuring Economic Activity: National Income Accounting

Inventory Investment

- **Inventory investment** is the change in inventories (firms' holdings of raw materials, unfinished goods and unsold finished goods) over a given period of time
- Inventory investment is included in GDP for the same reason that we include capital goods

Measuring Economic Activity: National Income Accounting

Fixed Period of Time (Stock versus Flow)

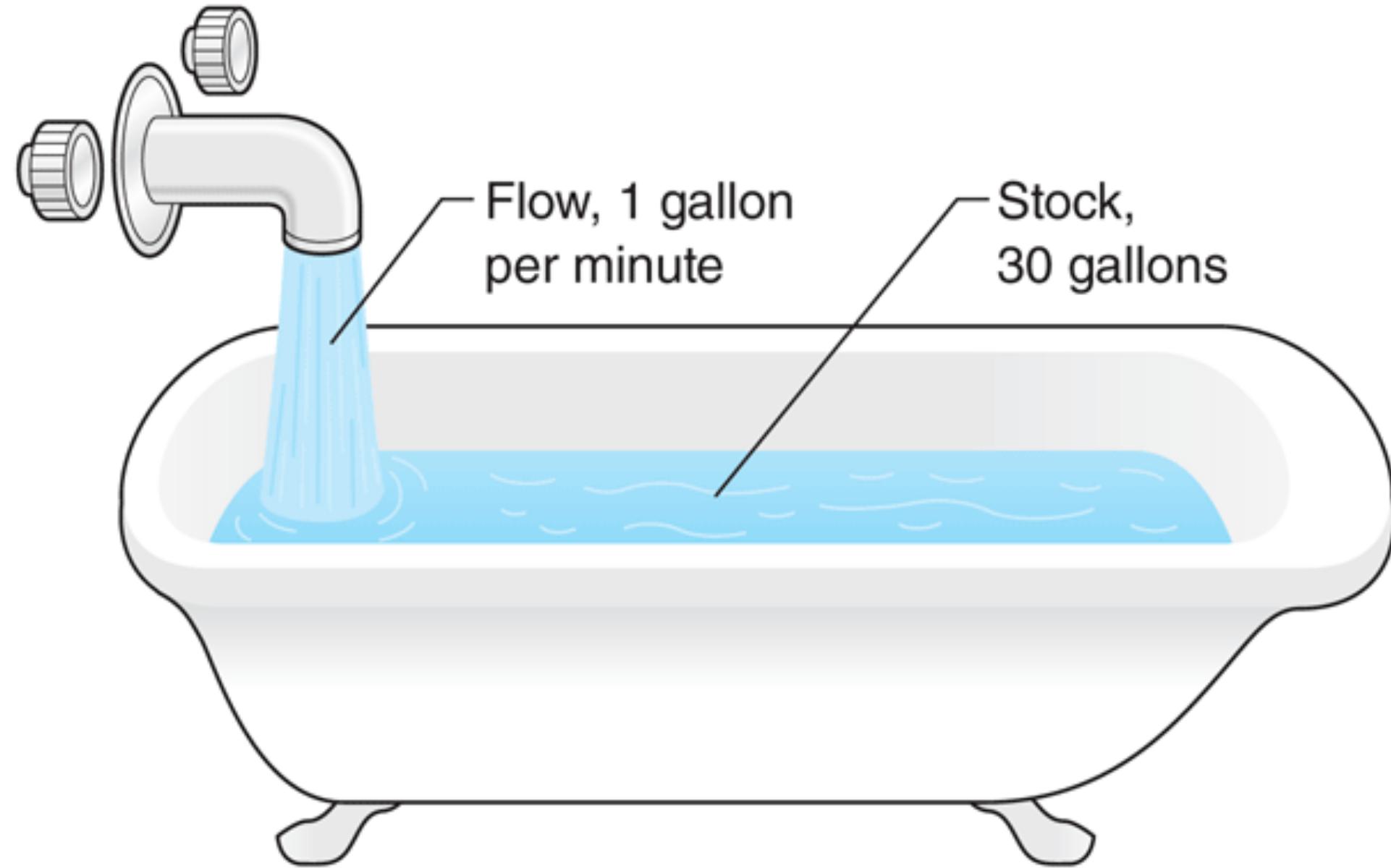
- We calculate GDP over a fixed period of time, such as a quarter or a year
- GDP is a **flow**, which is an amount *per* a given unit of time
- By contrast, a **stock** is a quantity *at* a given point in time
- A stock is often an accumulation of flows over time

Examples:

- Inventory investment is a flow, which accumulates into the stock of inventories
- Saving is a flow, which accumulates into a person's wealth

Measuring Economic Activity: National Income Accounting

Stocks Versus Flows



Measuring Economic Activity: National Income Accounting

Real Versus Nominal GDP

- A **nominal variable** is a measure at current market (nominal) prices (e.g., nominal GDP)
- A **real variable** is a measure in terms of quantities of actual goods and services (e.g., real GDP)

Measuring Economic Activity: National Income Accounting

Final versus Intermediate Goods

- Each firm's contribution to total output is equal to its value added, which is the gross value of the firm's output minus the value of all intermediate goods and services - that is, the outputs of other firms - that it uses.
- Goods that count as part of the economy's output are called final goods; all others are called intermediate goods.
- The sum of all the values added produced in an economy is called gross value added at basic prices.
- Basic prices are the prices received by producers net of taxes on products [plus subsidies].

Measuring Economic Activity: National Income Accounting

The circular flow of income, output and spending

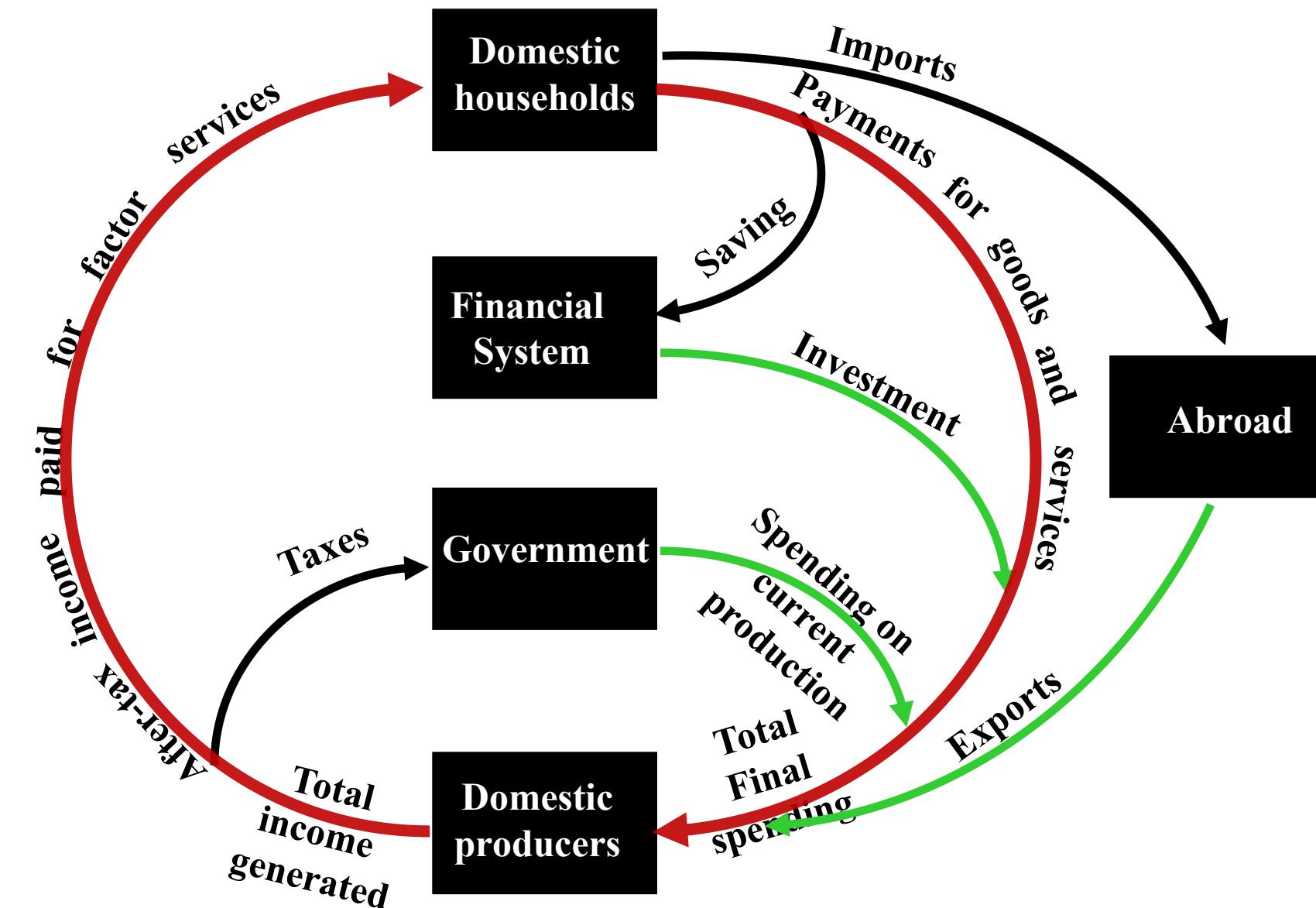
- The determination of GDP and national income can be represented as a circular flow of income and spending.

Measuring Economic Activity: National Income Accounting

The circular flow of income, output, and spending

- Withdrawals of spending arise when income received is not spent on the domestic economy.
- Injections of spending are those that are not the result of domestic income receipts, but rather come from sources other than domestic income recipients.

The Circular Flow of Income, Output, and Expenditure



The Circular Flow of Income, Output, and Expenditure

- Individuals provide labour to firms and they buy the firms' output.
- National output or income can be measured from the expenditure side in terms of expenditure on the final output, or on the income side in terms of value added and factor incomes generated.
- Saving, taxes and imports represent a leakage from the circular flow.

The Circular Flow of Income, Output, and Expenditure

- Investment, government consumption and exports represent injections into the circular flow.
- For any equilibrium level of national activity (GDP) injections must equal leakages.
- So saving plus taxes plus imports must equal investment plus government consumption plus exports.

Measuring Economic Activity: National Income Accounting

GDP, GNI, and GNP

- Gross domestic product, [GDP] can be calculated in three different ways:
 - [1] as the sum of all values added by all producers of both intermediate and final goods
 - [2] as the income claims generated by the total production of goods and services; and
 - [3] as the expenditure needed to purchase all final goods and services produced during the period.

Measuring Economic Activity: National Income Accounting

GDP, GNI, and GNP

- By standard accounting conventions these three aggregations define the same total, so long as we add taxes on products [minus subsidies] to the first two in order to measure GDP at market prices.
- Market prices are the prices paid by consumers.

Measuring Economic Activity: National Income Accounting

- Approaches to Measuring National Income

1. GDP-Expenditure Based

- GDP is the total spending on currently produced final goods and services in the economy.
- The expenditure approach allows us to get information on the different components of spending that add up to GDP
- The national income accounts divide spending into four basic categories: *consumption expenditure, investment, government purchases (spending), and net exports*

Measuring Economic Activity: National Income Accounting

1. GDP-Expenditure Based Cont'd

- The national income accounts add up these four categories of spending to determine GDP in the **national income identity**.

$$Y=C+I+G+NX$$

where

- Y = GDP = total production (output)
- C = consumption expenditure
- I = investment
- G = govt. purchases of goods & services
- NX = net exports = exports - imports

Measuring Economic Activity: National Income Accounting

Consumption Expenditure

Total spending for currently produced consumer goods and services

Basic categories:

1. Consumer durables
2. Nondurable goods
3. Services

Measuring Economic Activity: National Income Accounting

Investment

Spending on currently produced capital goods that are used to produce goods and services over an extended period of time

Basic categories:

1. Fixed investment
2. Inventory investment
3. Residential investment

Measuring Economic Activity: National Income Accounting

Meaning of the Word *Investment*

- For non-economists, an investment normally refers to the purchase of common stocks or bonds
- For economists, investment spending refers to the purchase of physical assets, such as *new* machines or new houses—purchases that add to GDP

Measuring Economic Activity: National Income Accounting

Government Purchases

Spending by the government on currently produced goods and services

- **Government consumption** includes government purchases for short-lived goods and services like health care and police
- **Government investment** includes spending for capital goods like buildings and computers represents
- Pure government transfers (e.g., Leap, Social Security and Medicare) are excluded from G

Measuring Economic Activity: National Income Accounting

Net Exports

Net exports (or trade balance) are exports minus imports

Why subtract imports from GDP?

- Answer: Spending on imports is included in consumption expenditure, investment, and government purchases, but is not produced in this country

HYPOTHETICAL ESTIMATION OF NATIONAL EXPENDITURE	Amount
ITEMS	GH¢ millions
Private consumption expenditure (C)	786
General government final consumption (G)	530
Gross domestic fixed capital formation (I)	135
Value of physical increase in stocks and work-in-progress	11
Total Domestic Expenditure at market prices	1462
Export of goods and services	92
Total final expenditure	1554
Less import of goods and services	-127
Gross Domestic Expenditure at market prices	1427
Less taxes on expenditure	-192
Add subsidies	50
Gross Domestic Expenditure at factor cost	1285
Net property income from abroad (P) [±]	-65
Gross National Expenditure at factor cost (GNE)	1220
Less Depreciation (Capital consumer allowance)	-58
Net National expenditure at factor cost = national income	1162

Measuring Economic Activity: National Income Accounting

Adjustments to national income statistics

A number of adjustments are required when calculating the economy's total flow of national income using the above three methods: These involve:

- the inclusion of net income from abroad;
- allowance for capital depreciation and stock appreciation;
- valuation of output at market prices or factor (i.e. production) costs.

Measuring Economic Activity: National Income Accounting

Net income from abroad

$$\left. \begin{array}{l} \text{Domestic product} \\ \text{Domestic income} \\ \text{Domestic expenditure} \end{array} \right\} + \text{Net income from abroad} = \left\{ \begin{array}{l} \text{National product} \\ \text{National income} \\ \text{National expenditure} \end{array} \right.$$

Measuring Economic Activity: National Income Accounting

Gross and net values – capital depreciation

$$\left. \begin{array}{l} \text{Gross national product (GNP)} \\ \text{Gross national income (GNI)} \\ \text{Gross national expenditure (GNE)} \end{array} \right\} - \text{Depreciation} = \left\{ \begin{array}{l} \text{Net national product (NNP)} \\ \text{Net national income (NNI)} \\ \text{Net national expenditure (NNE)} \end{array} \right\}$$

Measuring Economic Activity: National Income Accounting

Market prices and factor costs

Gross national expenditure at factor cost = Gross national expenditure at market prices
– Indirect taxes
+ Subsidies

Measuring Economic Activity: National Income Accounting

2. GDP-INCOME-BASED

- GDP income-based adds up all factor rewards in production.
- The main income categories making up GDP are operating surpluses, mixed incomes, and compensation of employees.
- Ghana's GDP measures production that is located in the Ghana, and Ghana's gross national income [GNI] measures income accruing to Ghanaian residents.
- The difference is due to net income from overseas.
- GNI is the same thing as what used to be called gross national product [GNP].

Measuring Economic Activity: National Income Accounting

Income-based GDP and Its Components

INCOME	GH¢ Million
Operating surplus, gross (profits)	424,804
Mixed incomes	84,884
Compensation of employees	769,191
Taxes on production and imports	178,312
<i>Less</i> subsidies	-11,611
Statistical discrepancy	0
GDP at market prices	1,445,580
Employees' compensation	
Receipts from rest of world	1,046
<i>Less</i> payment to rest of world	-1,761
Total	-715
Less taxes on production paid to rest of world <i>Plus</i> subsidies received from rest of world	-4,906
Other subsidies on production	3,049
Property and entrepreneurial income	
Receipts from rest of world	260,967
<i>Less</i> payments to rest of world	-232,217
Total	28,750
Gross national income (GNI) at market prices	1,471,758

MEASURING ECONOMIC ACTIVITY: NATIONAL INCOME Accounting

HYPOTHETICAL ESTIMATION OF NATIONAL INCOME

FACTOR INCOMES	AMOUNT
	GH₵M
Incomes from employment	666
Incomes from self-employment	123
Gross trading profits of companies	411
Gross trading surpluses of public corporations	50
Gross trading surpluses of state owned enterprises	10
Rent, Royalties, etc.	22
Imputed charges for self-dwellings (non traded capital)	15
Total Domestic Income	1297
Less Stock Appreciation (Effects of price level changes on stocks)	-12
Gross Domestic Income at Factor Cost	1285
Add/Less: Net property income from abroad	-65
Gross National Income at Factor cost	1220
Less Capital Consumption allowance (Depreciation)	-58

Measuring Economic Activity: National Income Accounting

3. GDP-PRODUCTION-BASED

- Production-based accounting sums up each firm's value added, which is the firm's sales revenue minus the firm's purchases of intermediate products from other firms.
- The reason that getting a total for a nation's output is not quite straightforward as it may seem at first sight is that one firm's output is often another firm's input.
- Production occurs in stages: some firms produce outputs that are used as inputs by other firms, and these other firms in turn produce outputs that are used as inputs by yet other firms

Measuring Economic Activity: National Income Accounting

Gross Value Added at Current Basic Prices, by Sector,

Sector	GH million
Agriculture, hunting, forestry and fisheries	9,715
Mining and quarrying	37,718
Manufacturing	150,298
Electricity, gas and water supply	21,342
Construction	80,756
Distribution, hotels & catering	183,586
Transport and communications	91,347
Business services and finance	419,980
Public administration and defence	65,090
Education, health and social work	170,268
Other services	65,563
Gross value added at current basic prices	1,295,663
Plus adjustment to current basic prices (taxes minus subsidies on products)	149,917
= GDP at market prices	1,445,580

Measuring GDP using the value-added method

An alternative method to measure GDP is to measure the *value added*: the market value a firm adds to a product.

The final selling price of a product must equal the sum of the values added to the product at each stage of production.

The table below illustrates this method for a shirt sold on Mr. Bean's web site.

Firm	Value of Product	Value Added	
Cotton farmer	Value of raw cotton = GH₵1	Value added by cotton farmer	= 1
Textile mill	Value of raw cotton woven into cotton fabric = GH₵3	Value added by cotton textile mill = (GH₵3 – GH₵1)	= 2
Shirt company	Value of cotton fabric made into a shirt = GH₵15	Value added by shirt manufacturer = (GH₵15 – GH₵3)	= 12
Mr. Bean	Value of shirt for sale on Mr. Bean's Web site = GH₵35	Value added by Mr. Bean = (GH₵35 – GH₵15)	= 20
	Total Value Added		= ₦35

Shortcomings of GDP

- GDP can be a useful tool to measure total output in an economy. Many people go further than this, interpreting GDP as a measure of the well-being of citizens.
- However GDP has shortcomings, both in its *measure of total production*, and in its usefulness as a *measure of well-being*.

Measuring Economic Activity: National Income Accounting

Problems in measuring economic activity

- Arbitrary definitions
- errors in data
- underground economy
- double-counting
- transfer payments
- provision of public services

Shortcomings of GDP as a measure of total production

- Two important types of production are omitted from the GSS's measurement of GDP:

• **Household Production**

Household production such as childcare, cleaning, and cooking is not typically paid for with money. However such contributions are real—if they were performed by a non-household-member, they *would* be paid for and counted in GDP.

• **The Underground Economy**

Buying and selling of goods and services might be concealed from the government to avoid taxes or regulations, or because the goods and services are illegal. This constitutes the *underground economy*.

This may be substantially more in low-income households.

Measuring Economic Activity: National Income

Types of underground economic activities

<i>Type of activity</i>	<i>Monetary transactions</i>	<i>Non-monetary transactions</i>		
Illegal activities	Trade in stolen goods; drug dealing and manufacturing; prostitution; gambling; smuggling; fraud	Barter of drugs, stolen, or smuggled goods. Producing or growing drugs for own use. Theft for own use		
	<i>Tax evasion</i>	<i>Tax avoidance</i>	<i>Tax evasion</i>	<i>Tax avoidance</i>
Legal activities	Unreported income from self-employment. Wages, salaries, and assets from unreported work related to legal services and goods.	Employee discounts, fringe benefits.	Barter of legal services and goods.	All do-it-yourself work and neighbour help.

How important are these shortcomings?

- If we are comparing GDP from year to year, the size of household production and the underground economy is probably about the same from year to year, so *GDP growth* is a reasonable measure of the *growth in total production*.
- However over long periods of time, these shortcomings might be more serious.
- *Example: As women have entered the workforce in larger numbers, some household production has been replaced by paid childcare and restaurant meals. So increases in GDP may exaggerate the increase in actual total production.*

Underground economies in developing countries

- In developing countries, the underground economy is often referred to as the *informal sector*, as opposed to the *formal sector*, in which output of goods and services is measured.
- In many developing countries, the informal sector is very large; often above 50% of total output.
- Economists studying economic development say this often reflects poor government policies: high taxes and regulations, and low confidence in the security of private property from government seizure.



Shortcomings of GDP as a measure of well-being

- *GDP per capita* (i.e. GDP divided by population) is often used to represent differences in standards of living from country to country. However, even if it accurately measured total production, it would not reflect:
- *The value of leisure*
- *Pollution and other negative effects of production*
- *Crime and other social problems*
- *The distribution of income*

- In fact, improvements in many of these will result in *lower* GDP per capita.
- *Example: Lower crime would allow lower spending on police, prisons, and private security. This would decrease GDP, but surely result in improvements in economic well-being.*

Measuring Economic Activity: National Income

Uses of national income statistics

National income statistics are calculated for many purposes, the most important ones being:

- to measure the total income (standard of living) of a country – for this purpose national income is commonly measured in terms of national income per head (per capita) of population;
- to measure the improvement (deterioration) in national wealth and the standard of living over time;
- to compare the economic activity of different countries;
- to identify trends in consumer expenditure;
- to identify trends in industrial production;
- to assist central government in its economic planning.

Measuring Economic Activity: National Income Accounting

Factors influencing the size of national income

- Availability of natural resources
- nature of the labour force
- amount of capital investment
- utilization of resources
- innovation
- political stability
- foreign direct investment

Measuring Economic Activity: National Income Accounting

Computing Personal Income & Personal Disposable Income

National Income – Corporate Profits –Net Taxes on Production and Imports –Net Interest – Contributions for Social Insurance +Personal Interest Income +Personal Current Transfer Receipts = **Personal Income** – Personal Tax and Nontax Payments = **Disposable Personal Income**

Calculating real GDP

- Since GDP is measured in “value” terms, we might have problems interpreting changes over time if prices change. Is an increase in GDP due to production increasing, or due to prices increasing?
- To separate these effects, the GSS calculates both ***Nominal GDP***—the value of final goods and services evaluated at current-year prices—and ***Real GDP***—the value of final goods and services evaluated at base-year prices.
- The choice of a base-year is arbitrary; we might use any year’s prices to compare real GDP in each year. The current standard is 2009.
- Unfortunately, the *relative prices* also change from year to year, distorting real GDP calculations. This problem has been overcome this problem by using *chain-weighted* prices, using previous-year prices to adjust current-year production measure.

Calculating real GDP: an example

The table shows output and prices in 2009 and 2015.

Calculating the total value of output in 2009 gives:

$$\text{€}3200 + \text{€}990 + \text{€}1350 = \text{€}5540.$$

To calculate real GDP in 2015, we use the prices from 2009.

- This gives real 2015 GDP in 2009 dollars of €6680.

Product	2009		2015	
	Quantity	Price	Quantity	Price
Eye examination	80	€40	100	€50
Pizzas	90	11	80	10
Textbooks	15	90	20	100

Product	2015 Quantity	2009	
		Price	Value
Eye examinations	100	€40	€4,000
Pizzas	80	11	880
Textbooks	20	90	1,800

Most prices increased from 2009 to 2015, so using nominal GDP would have yielded a higher figure: € 7800.

- This highlights the need to use real GDP to avoid exaggerating growth.

The GDP deflator

- Economists and policy-makers are interested in the *price level*: a measure of the average prices of goods and services in the economy.
- Why? Stable prices are desirable because they allow households and firms to plan for the future appropriately.
- In order to know whether we are achieving price stability, we need to *measure* the price level.
- One way to do this is using the *GDP deflator*: a measure of the price level, calculated by dividing nominal GDP by real GDP and multiplying by 100:

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

Since nominal and real GDP will be the same in the base year, the GDP deflator will be 100 in the base year.

Calculating the GDP deflator

The table on the right gives the values of nominal and real GDP for 2011 and 2012.

We can use this to calculate the GDP deflator in each year:

	2011	2012
Nominal GDP	€15,534 billion	€16,245 billion
Real GDP	€15,052 billion	€15,471 billion

Formula	Applied to 2011	Applied to 2012
$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$	$\left(\frac{\text{€15,534 billion}}{\text{€15,052 billion}} \right) \times 100 = 103$	$\left(\frac{\text{€16,245 billion}}{\text{€15,471 billion}} \right) \times 100 = 105$

The GDP deflator increased from 103 to 105 between the two years. This is a 1.9% increase:

$$\left(\frac{105 - 103}{103} \right) \times 100 = 1.9\%$$

So we say the price level rose 1.9% over this period.

THE BASICS OF ECONOMIC GROWTH

Economic growth is a sustained expansion of production possibilities measured as the increase in real GDP over a given period.

■ Calculating Growth Rates

Economic growth rate is the annual percentage change of real GDP.

THE BASICS OF ECONOMIC GROWTH

To calculate this growth rate, we use the formula:

$$\text{Growth of real GDP} = \frac{\text{Real GDP in current year} - \text{Real GDP in previous year}}{\text{Real GDP in previous year}} \times 100$$

For example, if real GDP in the current year is \$8.4 trillion and if real GDP in the previous year was \$8.0 trillion, then the growth rate of real GDP is

$$\text{Growth of real GDP} = \frac{\$8.4 \text{ trillion} - \$8.0 \text{ trillion}}{\$8.0 \text{ trillion}} \times 100 = 5 \text{ percent.}$$

THE BASICS OF ECONOMIC GROWTH

The standard of living depends on real GDP per person.

***Real GDP per person* is real GDP divided by the population.**

The contribution of real GDP growth to the change in the standard of living depends on the growth rate of real GDP per person.

THE BASICS OF ECONOMIC GROWTH

We use the above formula to calculate this growth rate, replacing real GDP with real GDP per person.

Suppose, for example, that in the current year, when real GDP is \$8.4 trillion, the population is 202 million.

Then real GDP per person is \$8.4 trillion divided by 202 million, which equals \$41,584.

And suppose that in the previous year, when real GDP was \$8.0 trillion, the population was 200 million.

Then real GDP per person in that year was \$8.0 trillion divided by 200 million, which equals \$40,000.

THE BASICS OF ECONOMIC GROWTH

Use these two values of real GDP per person in the growth formula to calculate the growth rate of real GDP per person. It is

$$\text{Growth rate of real GDP per person} = \frac{\$41,584 - \$40,000}{\$40,000} \times 100 = 4 \text{ percent.}$$

9.1 THE BASICS OF ECONOMIC GROWTH

The growth rate of real GDP per person can also be calculated by using the formula:

$$\text{Growth of real GDP per person} = \text{Growth rate of real GDP} - \text{Growth rate of population}$$

$$\text{Growth of population} = \frac{202 \text{ million} - 200 \text{ million}}{200 \text{ million}} \times 100 = 1 \text{ percent.}$$

THE BASICS OF ECONOMIC GROWTH

This formula makes it clear that real GDP per person grows only if real GDP grows faster than the population grows.

If the growth rate of the population exceeds the growth of real GDP, real GDP per person falls.

**Growth of real
GDP per person = 5 percent – 1 percent = 4 percent.**

THE BASICS OF ECONOMIC GROWTH

■ The Magic of Sustained Growth

Sustained growth of real GDP per person can transform a poor society into a wealthy one. The reason is that economic growth is like compound interest.

Rule of 70 is the number of years it takes for the level of any variable to double, which is approximately 70 divided by the annual percentage growth rate of the variable.

LABOR PRODUCTIVITY GROWTH

To understand what determines the growth rate of real GDP, we must understand what determines the growth rates of the factors of production and rate of increase in their productivity.

Real GDP growth contributes to improving our standard of living.

But our standard of living improves only if we produce more goods and services with each hour of labor.

So our main concern is to understand what makes labor more productive.

LABOR PRODUCTIVITY GROWTH

■ Labor Productivity

Labor productivity is the quantity of real GDP produced by one hour of labor.
It is calculated by using the formula:

$$\text{Labor productivity} = \frac{\text{Real GDP}}{\text{Aggregate hours}}$$

LABOR PRODUCTIVITY GROWTH

For example, if real GDP is \$8,000 billion and aggregate hours are 200 billion, then we can calculate labor productivity as

$$\text{Labor productivity} = \frac{\$8,000 \text{ billion}}{200 \text{ billion}} = \$40 \text{ per hour}$$

LABOR PRODUCTIVITY GROWTH

When labor productivity grows, real GDP per person grows, so the growth in labor productivity is the basis of rising living standards.

The growth of labor productivity depends on two things:

Saving and investment in physical capital

Expansion of human capital and discovery of new technologies

LABOR PRODUCTIVITY GROWTH

■ Saving and Investment in Physical Capital

Saving and investment in physical capital increase the capital per worker and increase labor productivity.

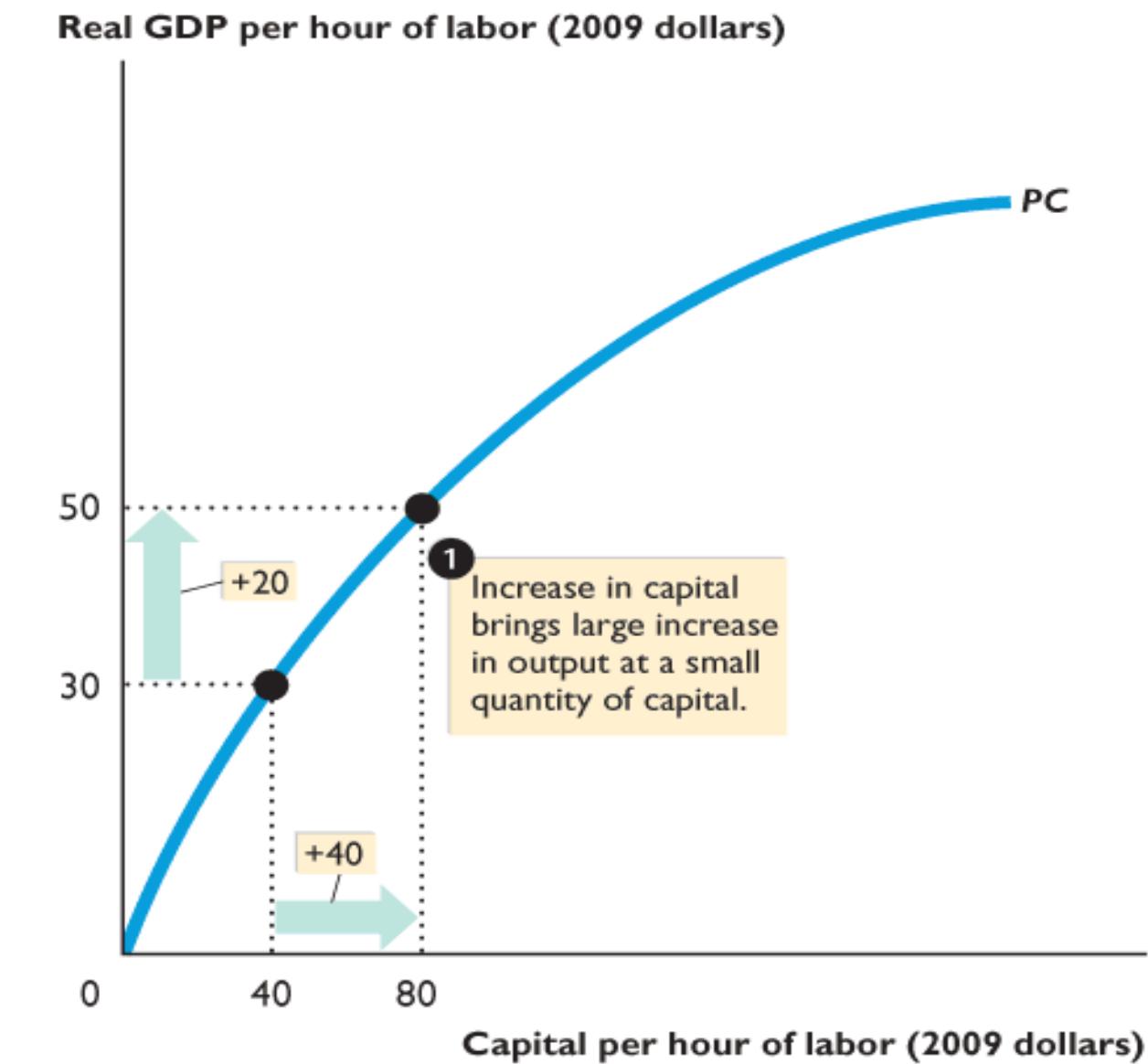
But additional capital will not bring sustained economic growth because the law of diminishing returns applies to capital:

If the quantity of capital is small, an increase in capital brings a large increase in production.

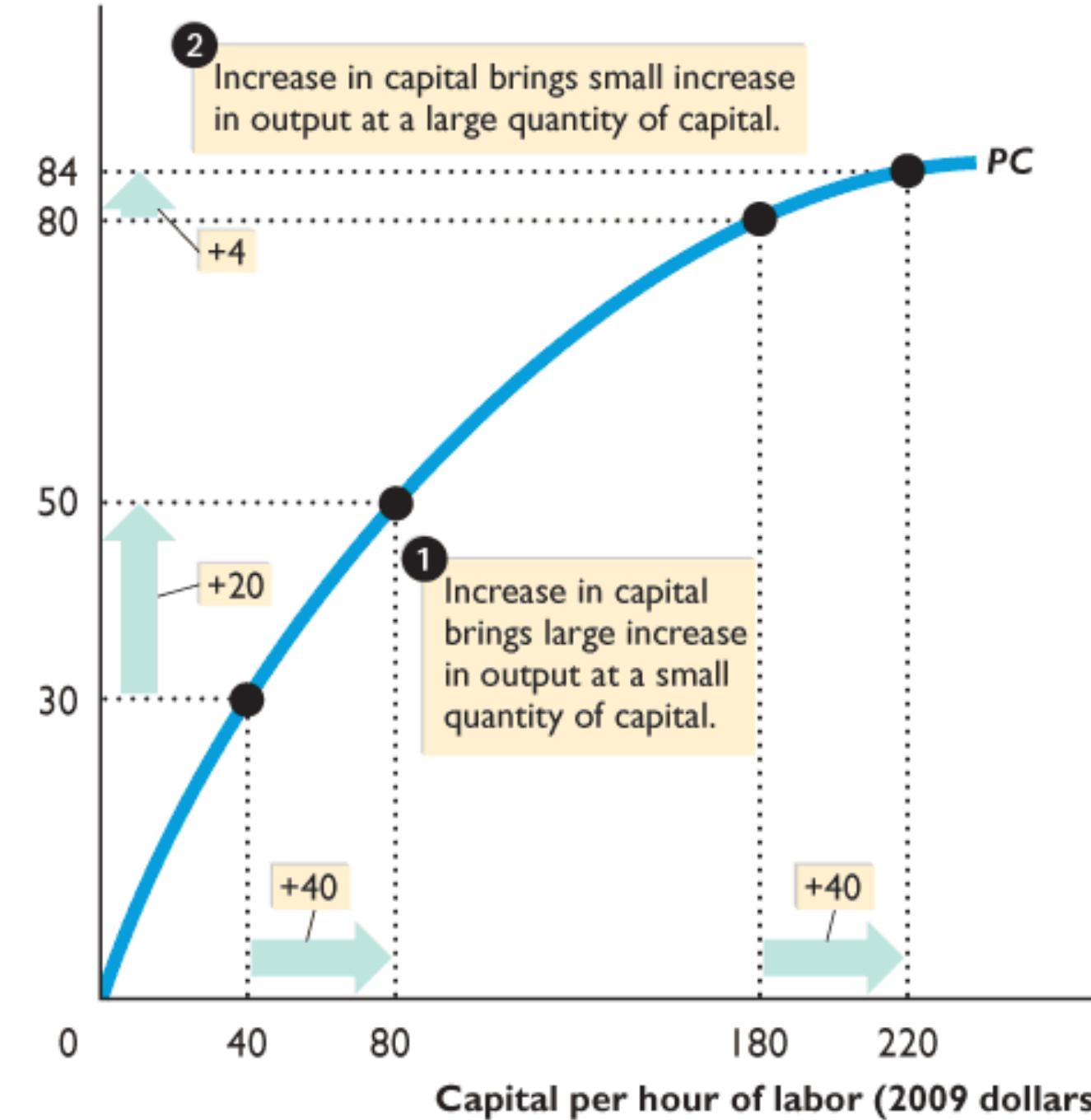
LABOR PRODUCTIVITY GROWTH

Figure 9.1 illustrates the relationship between capital and productivity. The curve PC is the productivity curve.

- 1. With a small amount of capital an increase in the capital brings a large increase in real GDP per hour of labor.**



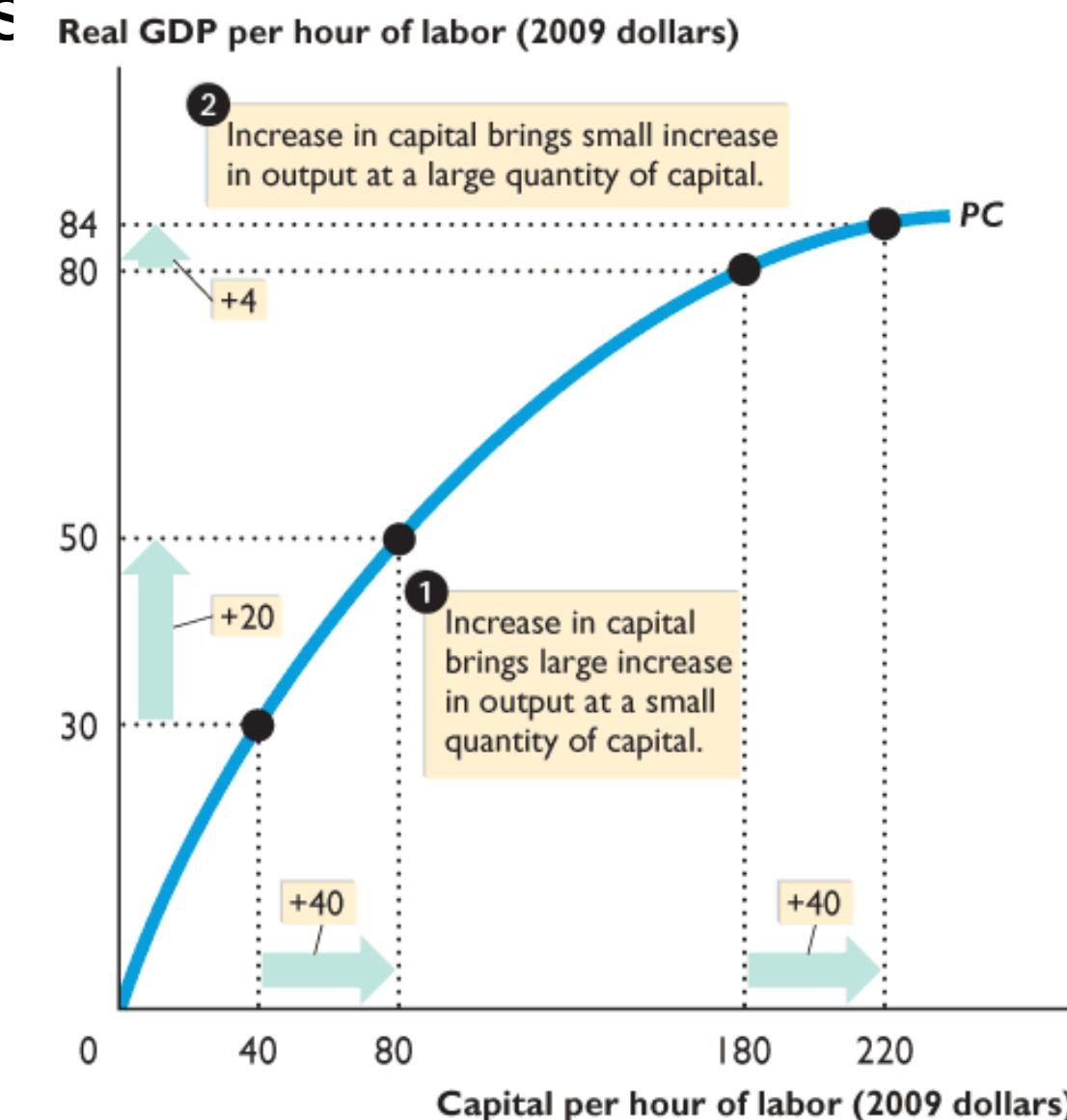
Real GDP per hour of labor (2009 dollars)



9.2 LABOR PRODUCTIVITY GROWTH

2. With a large amount of capital, an increase in the capital brings a small increase in real GDP per hour of labor.

If capital per hour of labor keeps increasing, labor productivity increases by ever smaller amounts and eventually stops rising.



9.2 LABOR PRODUCTIVITY GROWTH

Expansion of Human Capital and Discovery of New Technologies

Human capital—the accumulated skill and knowledge of people—comes from three sources:

Education and training

Job experience

Health and diet

9.2 LABOR PRODUCTIVITY GROWTH

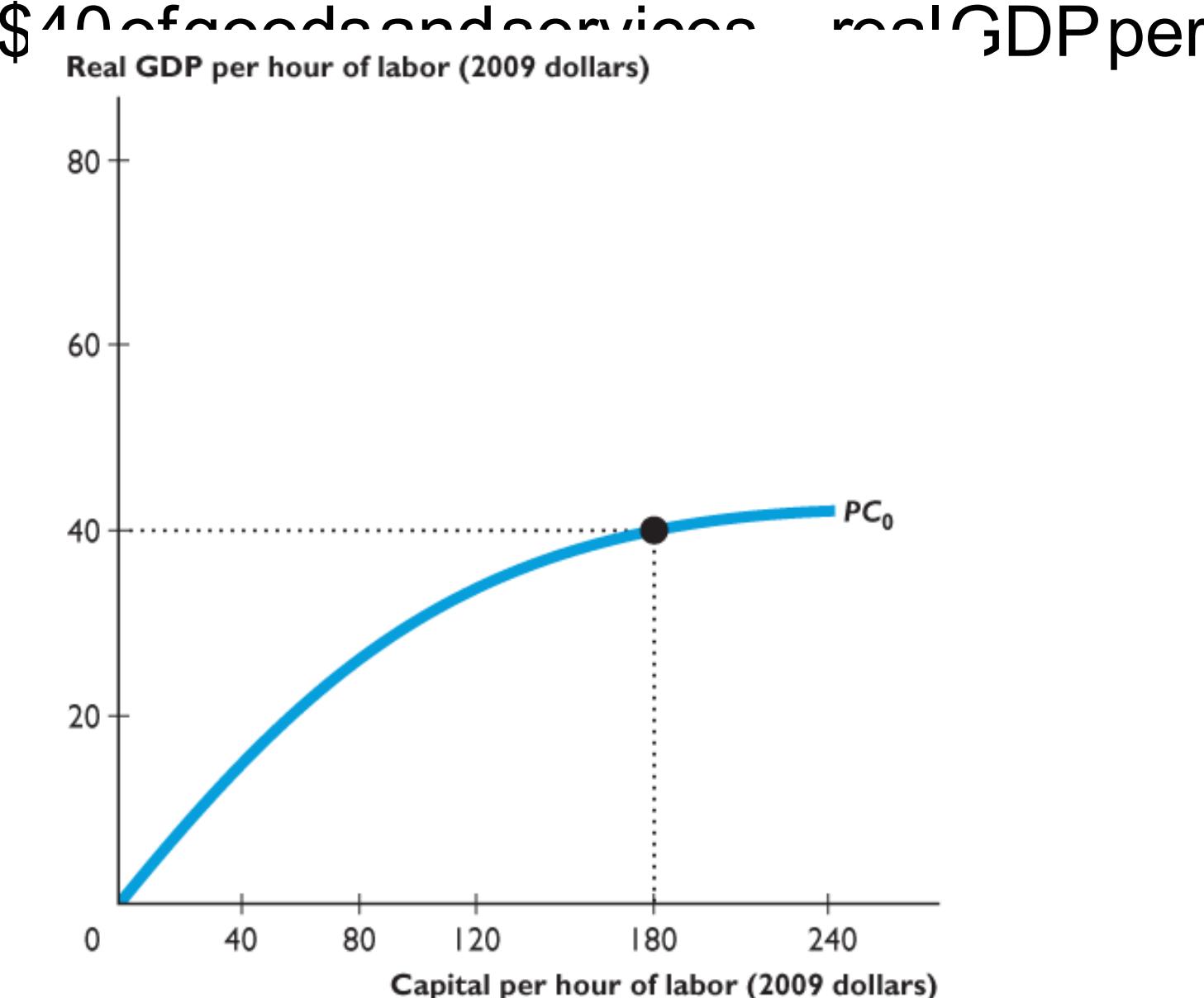
The discovery of new technologies has made an even greater contribution to economic growth than the growth of physical capital and the expansion of human capital.

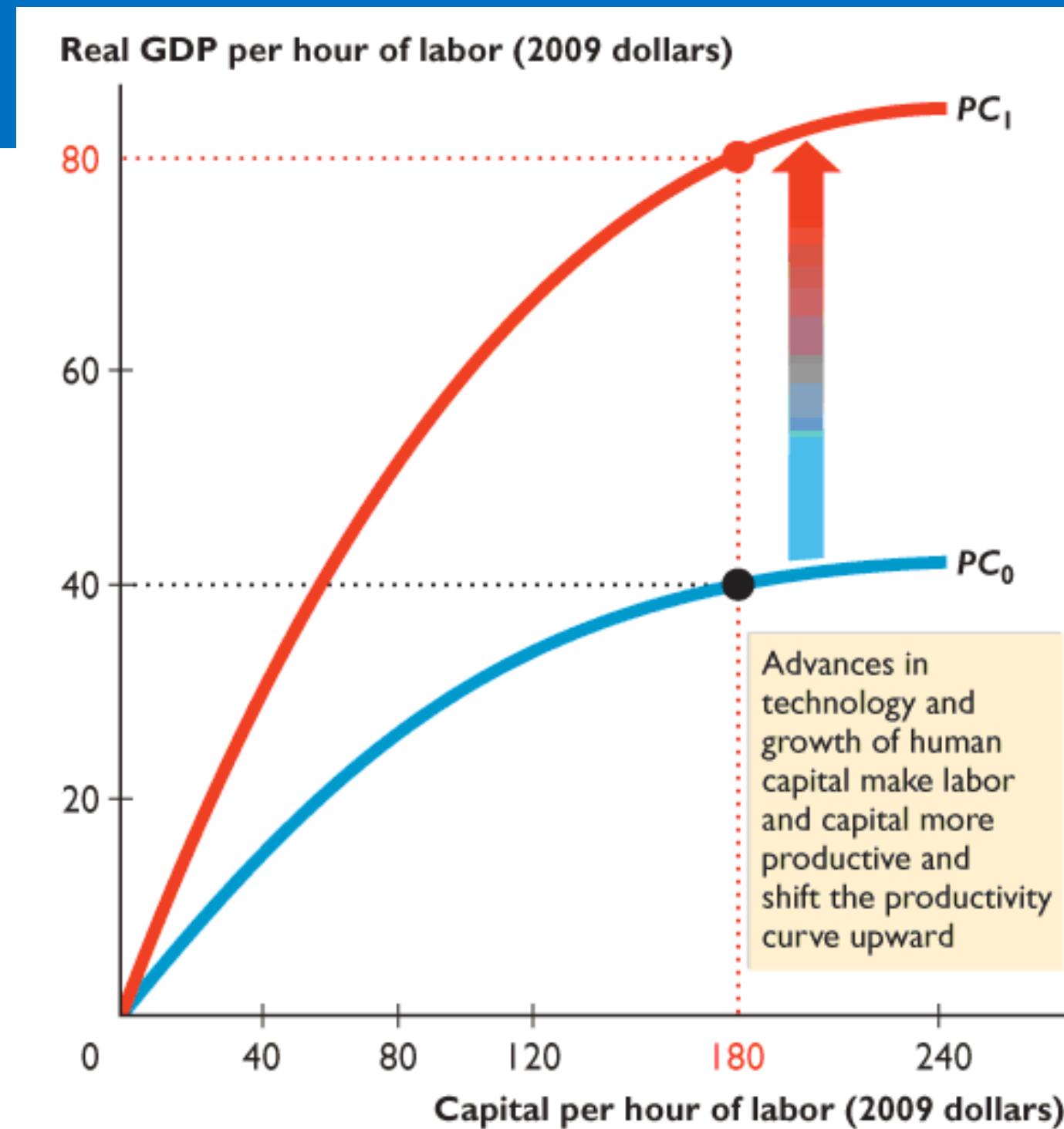
9.2 LABOR PRODUCTIVITY GROWTH

Figure 9.2 illustrates the effects of increased human capital and technological change.

The curve PC_0 is the productivity curve in 1960.

\$180 of capital per hour of labor produced \$^{10 of goods and services} real GDP per hour of labor.





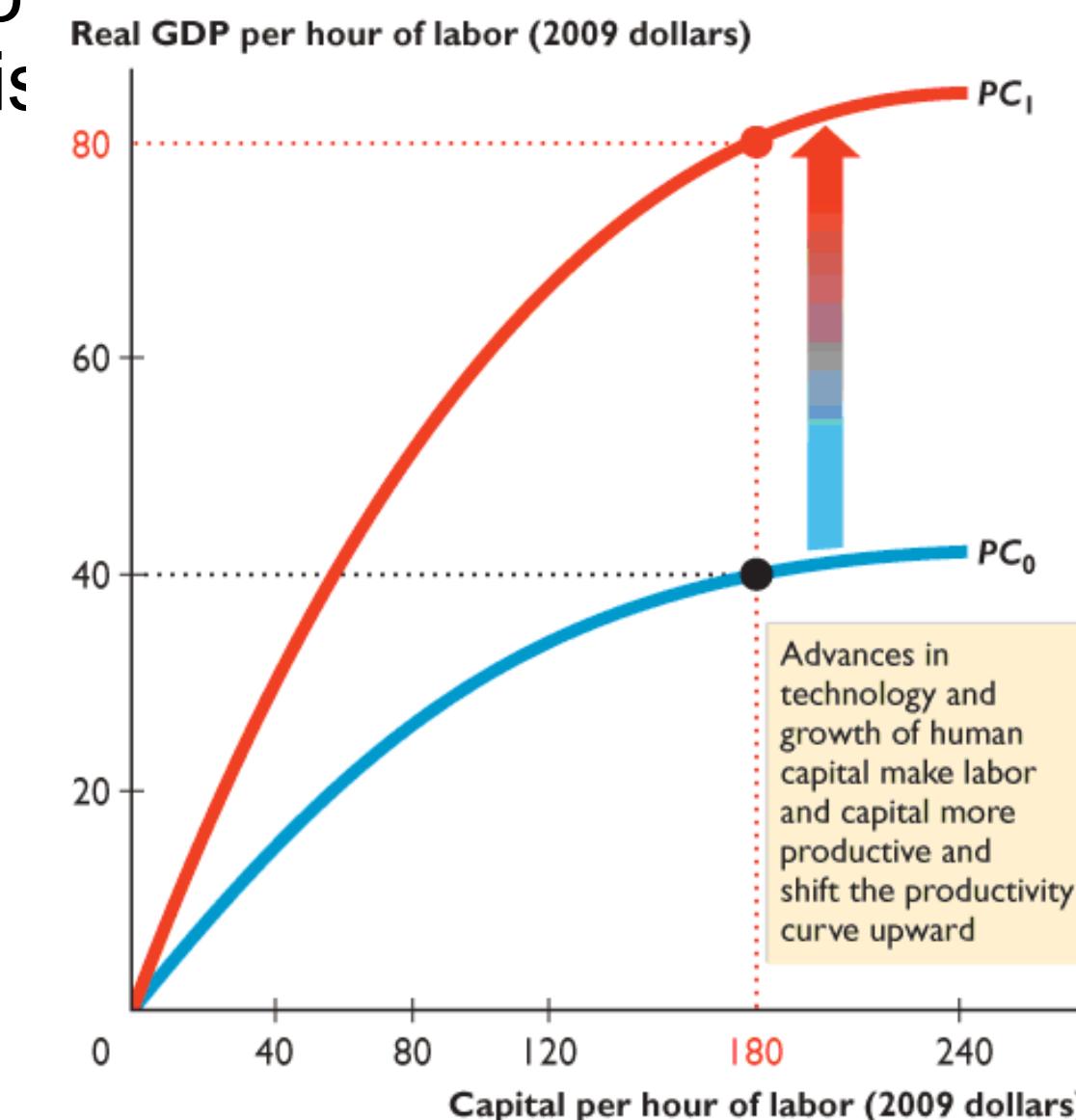
9.2 LABOR PRODUCTIVITY GROWTH

The curve PC_1 is the productivity curve in 2010.

\$180 of capital per hour of labor produced \$80 of goods and services—real GDP per hour of labor.

The expansion of human capital and discovery shift the productivity curve upward and are not subject to diminishing returns.

Advances in technology and growth of human capital make labor and capital more productive and shift the productivity curve upward.

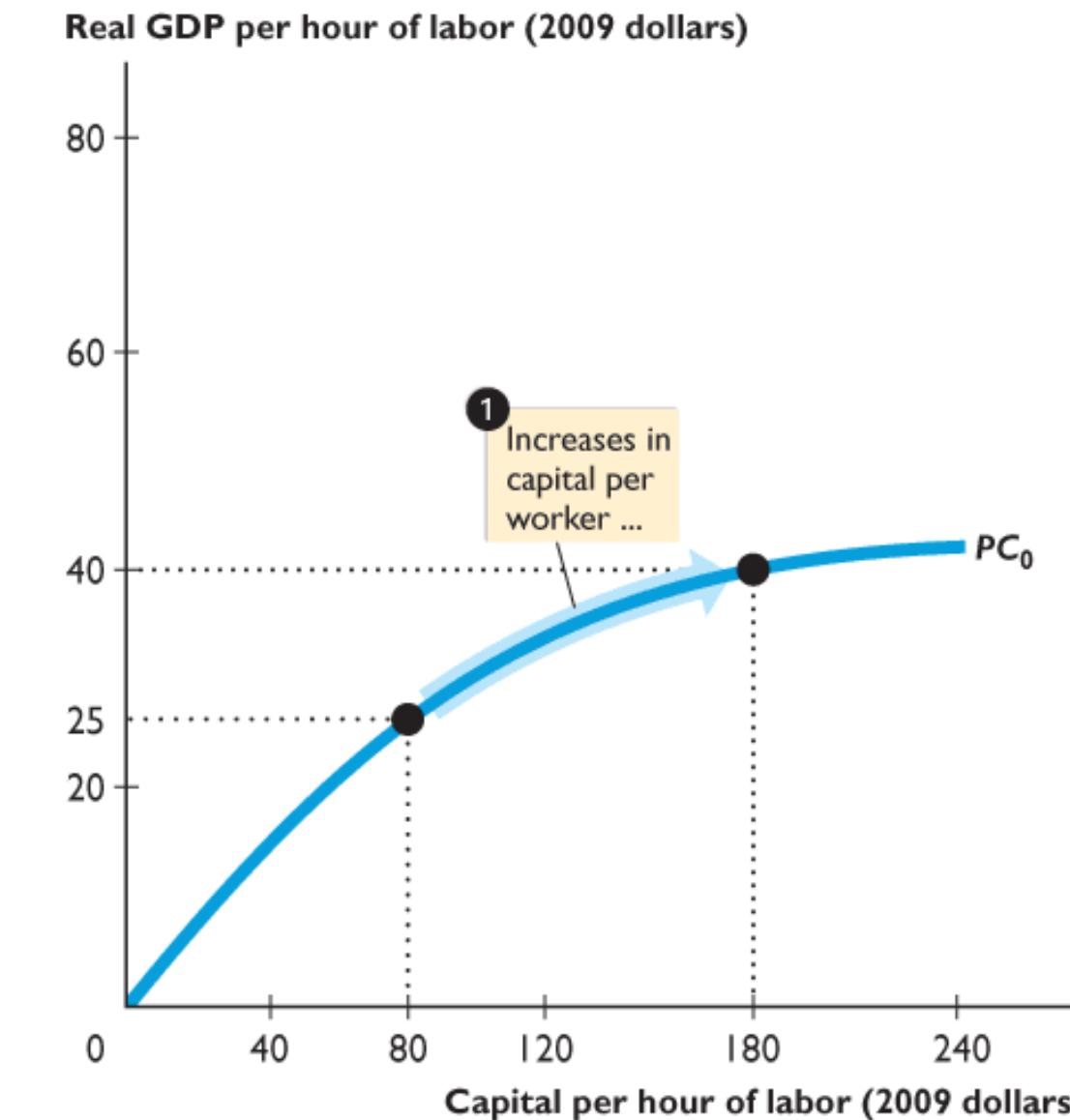


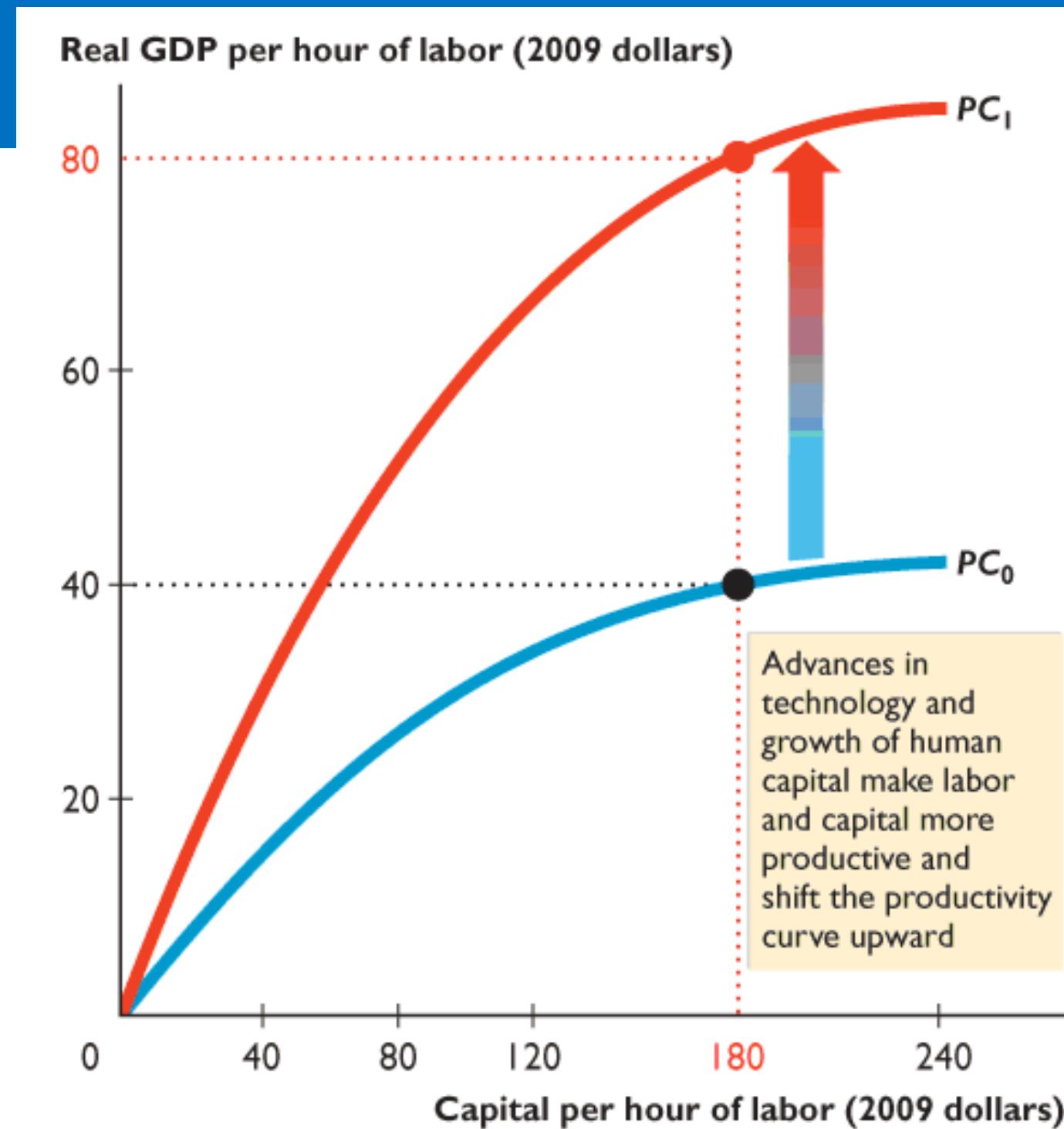
9.2 LABOR PRODUCTIVITY GROWTH

Figure 9.3 illustrates how labor productivity grows.

In 1960, workers had \$80 of capital per hour of labor and produced \$25 of real GDP per hour of labor.

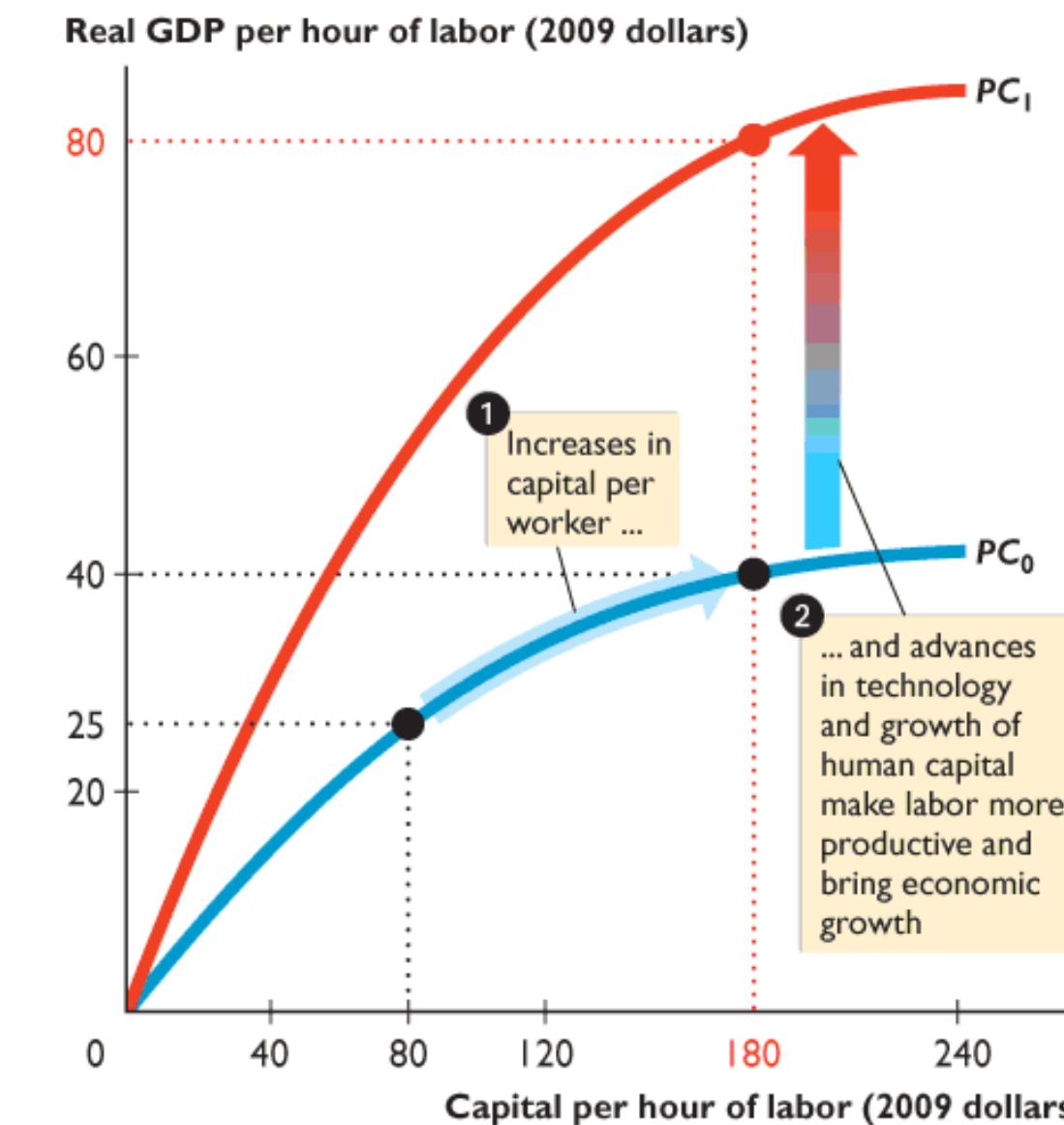
1. When capital increased to \$180 per hour of labor in 2010 real GDP per hour of labor increased to \$40.





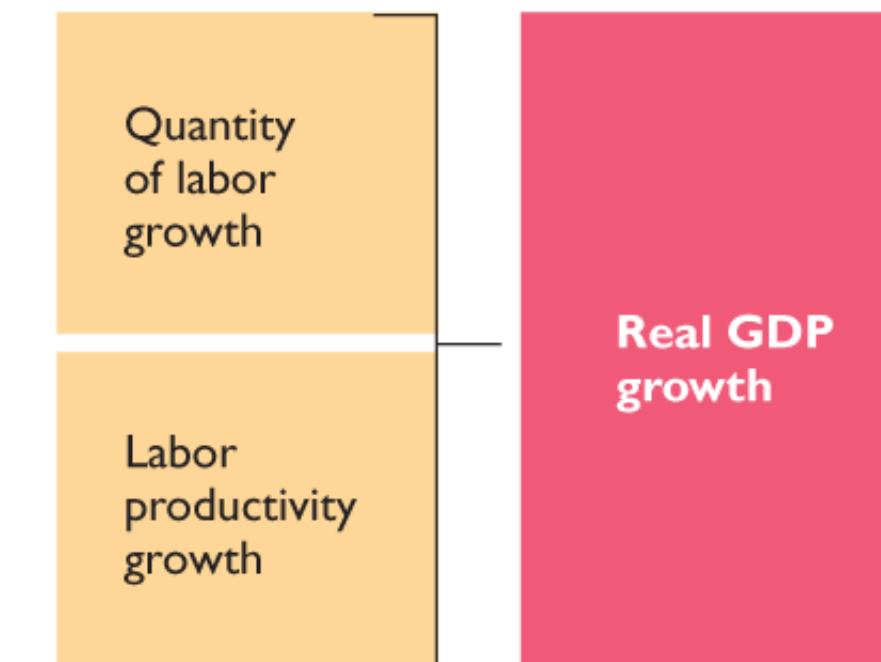
9.2 LABOR PRODUCTIVITY GROWTH

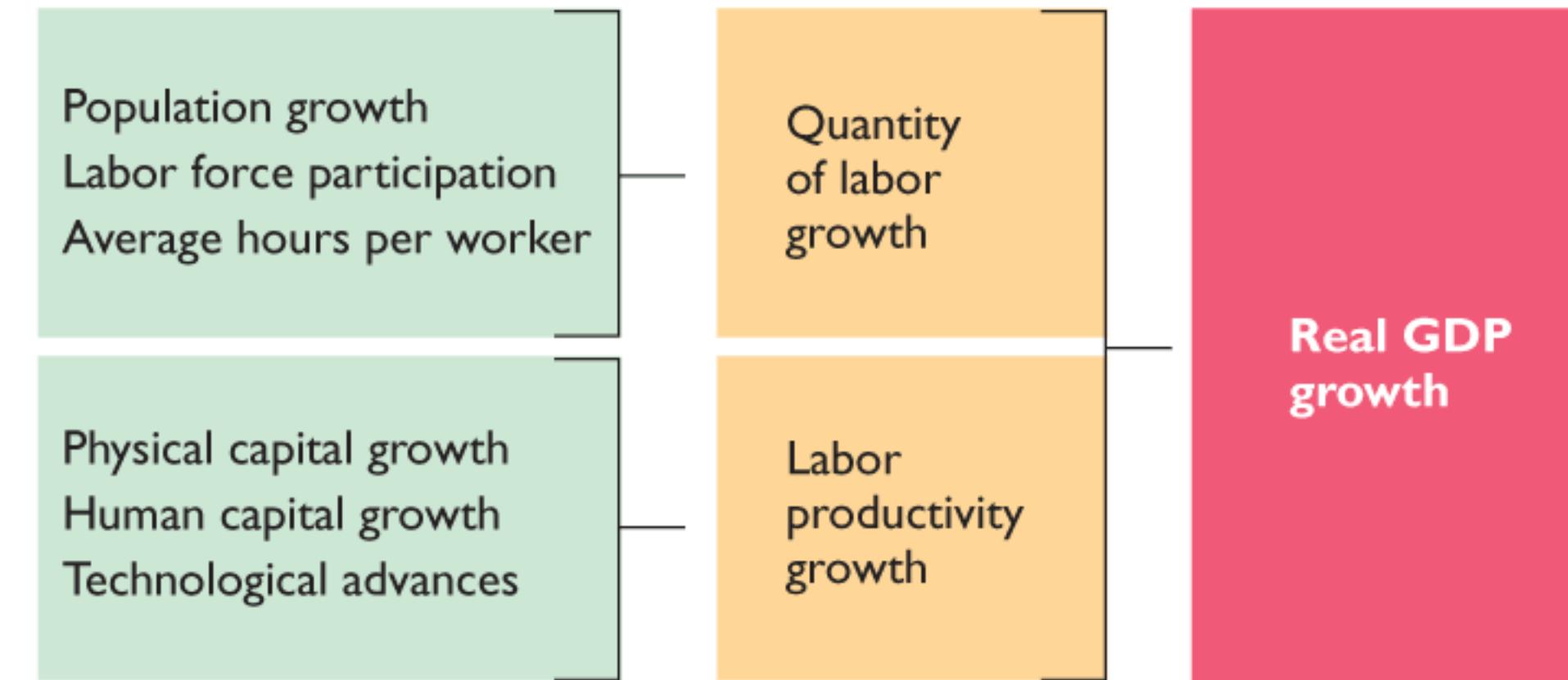
2. The expansion of human capital and discovery of new technologies shifted the productivity curve upward to PC_1 and... increased real GDP per hour of labor to \$80.



9.2 LABOR PRODUCTIVITY GROWTH

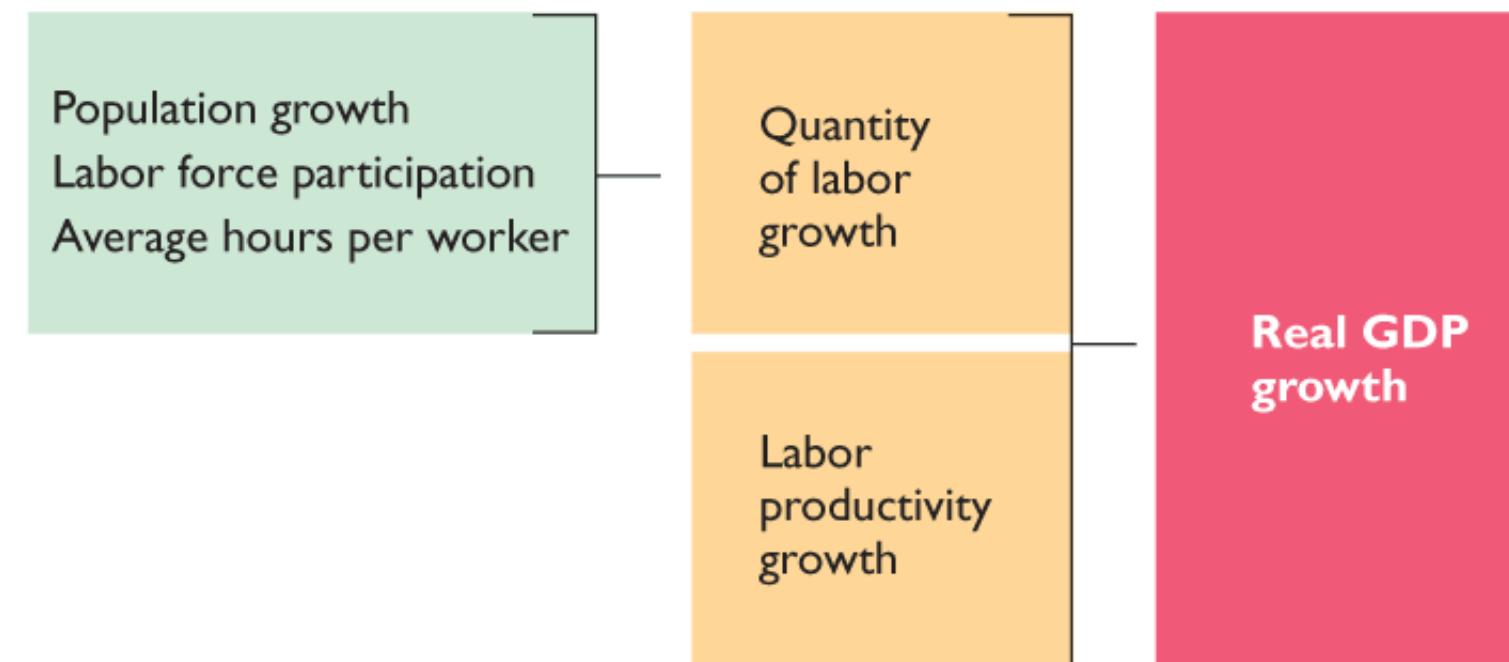
Real GDP grows for two reasons: Labor becomes more productive and the quantity of labor increases.





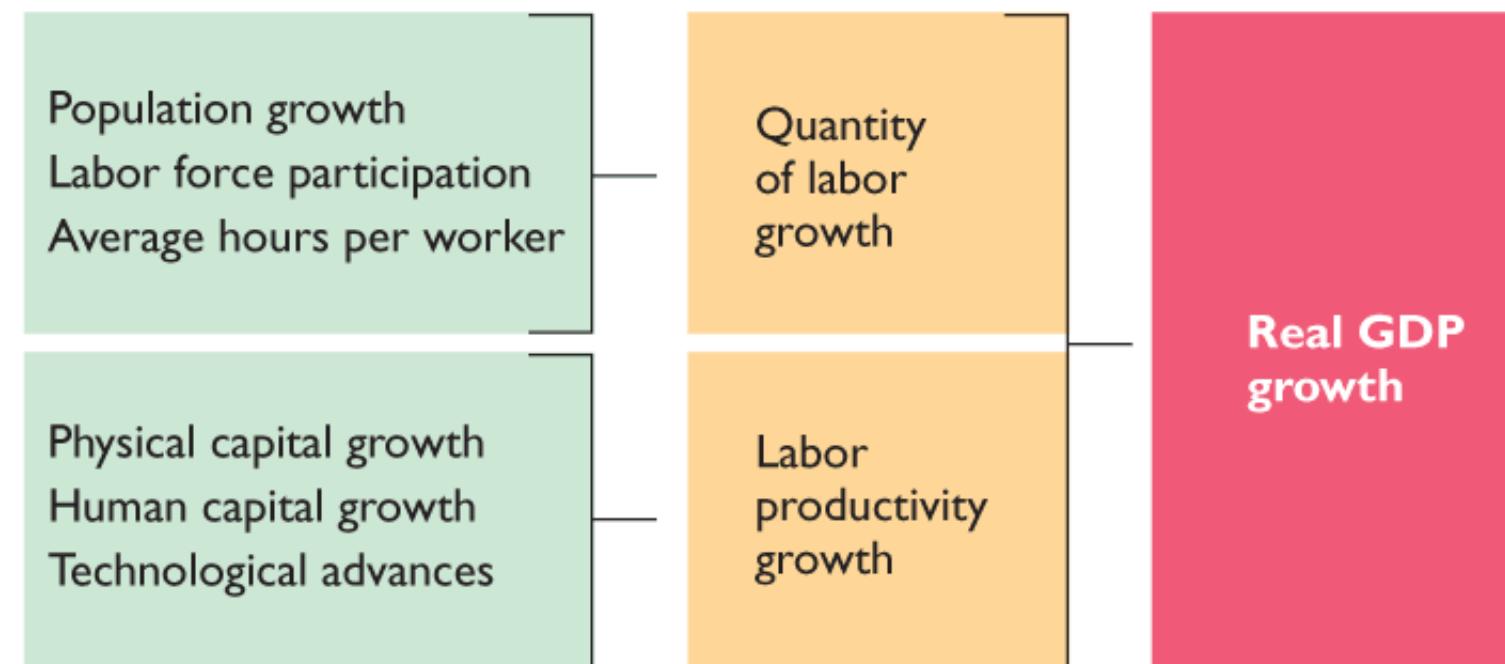
9.2 LABOR PRODUCTIVITY GROWTH

Quantity of labor growth depends on
Population growth



9.2 LABOR PRODUCTIVITY GROWTH

Labor productivity growth depends on
Physical capital growth



Measuring the Cost of Living

The Consumer Price Index

- ❖ The *consumer price index (CPI)* measures the overall cost of the goods and services bought by a typical consumer.
- ❖ Or It measures the trend in the prices of certain goods and services purchased for consumption purposes.
- ❖ Or It is a measure of the average change over time in the prices a typical urban family of four pays for the goods and services they purchase.
 - The Ghana Statistical Service (GSS) reports the CPI each month.
 - It is used to monitor changes in the cost of living over time.
- ❖ When the CPI rises, the typical family has to spend more money to maintain the same standard of living.

How the Consumer Price Index IS Calculated

- *Five stages to calculating CPI*

① Fix the Basket: Determine what prices are most important to the typical consumer.

- The GSS identifies a market basket of goods and services the typical consumer buys.
- The GSS conducts regular consumer surveys to set the weights for the prices of those goods and services.

② Find the Prices: Find the prices of each of the goods and services in the basket for each point in time.

How the Consumer Price Index Is Calculated

③ Compute the Basket's Cost:

- Use the data on prices to calculate the cost of the basket of goods and services at different times.

④ Choose a Base Year and Compute the Index:

- Designate one year as the base year, making it the benchmark against which other years are compared.
- Compute the index by dividing the price of the basket in one year by the price in the base year and multiplying by 100.

⑤ Compute the inflation rate:

- The inflation rate is the percentage change in the price index from the preceding period.

$$\pi_t = \frac{P_t - P_{t-1}}{P_{t-1}} = \frac{\Delta P_t}{P_{t-1}}$$

How the Consumer Price Index IS Calculated

$$CPI = \frac{\text{Expenditure in the current Year}}{\text{Expenditure in the base Year}} \times 100$$

Calculating the Consumer Price Index and the Inflation Rate: An Example

Product	Base Year (1999)			2014		2015	
	Quantity	Price	Expenditures	Price	Expenditures (on base-year quantities)	Price	Expenditures (on base-year quantities)
Kenkey	1	¢50.00	¢50.00	¢100.00	¢100.00	¢85.00	¢85.00
Fish	20	10.00	200.00	15.00	300.00	14.00	280.00
Textbooks	20	25.00	500.00	25.00	500.00	27.50	550.00
TOTAL			¢750.00		¢900.00		¢915.00

How the Consumer Price Index IS Calculated

- The table above gives the information we need to create the CPI in 2014 and 2015, using the basket of goods from 1999.

Formula	Applied to 2014	Applied to 2015
$CPI = \frac{\text{Expenditure in the current Year}}{\text{Expenditure in the base Year}} \times 100$	$\left(\frac{\$900}{\$750} \right) \times 100 = 120$	$\left(\frac{\$915}{\$750} \right) \times 100 = 122$

- Based on these data, the inflation rate from 2014 to 2015 is the percentage change in the CPI:

$$\pi_t = \frac{P_t - P_{t-1}}{P_{t-1}} = \frac{\Delta P_t}{P_{t-1}} \quad \left(\frac{122 - 120}{120} \right) \times 100 = 1.7\%$$

How the Consumer Price Index Is Calculated

- Since the CPI measures *consumer* prices, it is often referred to as the *cost of living index*.
- CPI-inflation is sometimes used to generate “fair” increases in wages for workers, and government benefits.

Is the CPI an accurate measure of inflation?

Some potential problems with the CPI include:

- ***Substitution bias***: Consumers may change their purchasing habits away from goods that have increased in price.
- ***Increase in quality bias***: Products like cars and computers have become more durable and better quality over time. It is hard to isolate the pure-inflation part of price increases.
- ***New product bias***: The basket of goods changes only every 10 years. There is a delay to including new goods like cell phones.
- ***Outlet bias***: Increases in purchases from discount stores like the internet are not incorporated into the CPI; it still uses full-retail price.
- For these reasons, economists believe the CPI overstates true inflation by 0.5 to 1 percentage point.

Producer price index (PPI)

- The *producer price index* is an average of the prices received by producers of goods and services at all stages of the production process.
- It is conceptually similar to the CPI, in that it uses a basket of goods, but the goods are those used by producers.
- The PPI can give early warning of future movements in consumer prices.
- Because firms eventually pass on higher costs to consumers in the form of higher prices on products, the producer price index is believed to be helpful in predicting changes in the CPI.

The GDP Deflator versus the Consumer Price Index

- The GDP deflator is calculated as follows:

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

The GDP Deflator versus the Consumer Price Index

- Economists and policymakers monitor both the **GDP deflator** and the **consumer price index** to gauge how quickly prices are rising.
- There are two important differences between the indexes that can cause them to diverge.
- The *GDP deflator* reflects the prices of all goods and services *produced domestically*, whereas...
- ...the *consumer price index* reflects the prices of all goods and services *bought by consumers*.

The GDP Deflator versus the Consumer Price Index

- The *consumer price index* compares the price of a *fixed basket* of goods and services to the price of the basket in the base year (only occasionally does the GSS change the basket)...
- ...whereas the *GDP deflator* compares the price of *currently produced* goods and services to the price of the same goods and services in the base year.

Using price indexes to adjust prices

Suppose your mother received a salary of GH₵25,000 in 1987. This would have bought much more than a salary of GH₵25,000 in 2012.

We can use the CPI to estimate the purchasing power of that GH₵ 25,000 in 2012 cedis:

$$\text{Value in 2012 cedis} = \text{value in 1987 cedis} \times \left(\frac{\text{CPI in 2012}}{\text{CPI in 1987}} \right)$$

$$= GH₵25,000 \times \left(\frac{230}{114} \right) \approx GH₵50,000$$

So GH₵25,000 in 1987 would have bought about as much as GH₵ 50,000 in 2012.

Nominal and real values

The current standard base “year” for the CPI is an average of 1982-1984 prices.

Values like wages in current-year dollars are called *nominal variables*. When we adjust them for inflation, by dividing by the current year’s price index and multiplying by 100, we convert them to *real variables*.

Example: Caterpillar employees signed a contract freezing wages until 2018. How much less will their wages be worth then?

Year	Nominal Average Hourly Earnings	CPI (1982–1984 = 100)	Real Average Hourly Earnings (1982–1984 cedis)
2013	GH¢27.00	233	GH¢11.59
2018	27.00	260 (est)	10.38

If the CPI rises to 260, then Caterpillar employees will receive a real wage decrease of:

$$\left(\frac{GH¢10.38 - GH¢11.59}{GH¢11.59} \right) \times 100 = -10.4\%$$

THE LASPEYRES INDEX

$$I_L = \frac{\sum P_n Q_0}{\sum P_0 Q_0} \times 100$$

I_L =Laspeyres index

P_n =the price of goods in a given year

P_0 = the price of goods in a base year

Q_0 =the quantity of goods in the base year

Apply the Laspeyres formula to the data below

THE LASPEYRES INDEX ILLUSTRATION

Price and Quantity Data for an Illustrative Economy

Units of:	Year 1 Prices (GH₵)	Year 2 Prices (GH₵) (Base Yr)	Year 3 Prices (GH₵) (Current Yr)	Year 1 Quantity	Year 2 Quantity	Year 3 Quantity
Clothing	1	2	3	2	3	6
Drink	0.5	1	2	4	6	4
Food	1	2	2	3	3	7
Chocolate	3	4	4	2	3	3

THE PAASCHE INDEX

$$I_P = \frac{\sum P_n Q_n}{\sum P_0 Q_n} \times 100$$

I_P =Paasche index

P_n =the price of goods in a given year

P_0 = the price of goods in a base year

Q_n =the quantity of goods in the current year

Apply the Paasche Formula to the data above

THE FISHER INDEX

The Fisher Index is the geometric average of the Laspeyres and Paasche indices. It uses baskets from both the base year and the current period

$$I_F = \sqrt{\frac{\sum P_n Q_0}{\sum P_0 Q_0} \times \frac{\sum P_n Q_n}{\sum P_0 Q_n}} \times 100$$

$$I_F = \sqrt{I_L \times I_P}$$

Apply the Fisher Index to the data above

Correcting Economic Variables for the Effects of Inflation

- To compare money figures over a period of time we need to know the level of prices both the historical year and the level of prices today.
 - A. To compare money figures, we need to inflate the historical figure into today's currency.
 - B. A price index determines the size of this inflation correction.
 - C. To change pound values from year T to the today, we can use this formula:

Amount in today's cedis = amount in year T × $\frac{\text{the price level today}}{\text{the price level in year T}}$

Correcting Economic Variables For The Effects Of Inflation

- Price indexes are used to correct for the effects of inflation when comparing money figures from different times.
- Example:
 - In 1947 MPs earned GH₵1000
 - In 2015 MPs earned GH₵74,000 but prices have risen since 1947.
 - RPI index in 1947 = 28.9
 - RPI index in 2015 = 1018.6

Money Figures from Different Times

- Do the following to convert (inflate) MPs' salary in 1947 to a figure in 2015 values:

$$\text{Salary}_{2015} = \text{Salary}_{1947} \times \frac{\text{Price level in 2015}}{\text{Price level in 1947}}$$

$$= \text{GH¢}1000 \times \frac{1018.6}{28.9}$$

$$= \text{GH¢}35,246$$

Rebasing the Index

- Since the purpose of the index is to make comparison with the base period, the choice of the base period is important.

Why Rebasing?

- The CPI is rebased to make the indices reflect current households consumption patterns.
- Household consumption patterns changes over time in response to a change in products and/or incomes of households.
- As a rule, re-basing should take place within every five years or at any time when it has been observed that the spending pattern of the consumers' had changed and these are mostly the appropriate time to revise the CPI basket

Rebasing the Index

- Divide through all Index by the new Base year index and Then multiply Through by 100

Year	Inflation Index, 2010 = 100	Inflation Index, 2015 = 100
2010	100	66.67
2011	112	74.67
2012	124	82.67
2013	138	92.00
2014	145	96.67
2015	150	100.00
2016	155	103.33
2017	158	105.33
2018	162	108.00

A BASIC MODEL OF THE DETERMINATION OF GDP IN THE SHORT TERM

Outline and Learning Objectives

The Keynesian Theory of Consumption

- Explain the principles of the Keynesian theory of consumption.

Planned Investment (I) versus Actual Investment

- Explain the difference between planned investment and actual investment.

Planned Investment and the Interest Rate (r)

- Understand how planned investment is affected by the interest rate.

Outline and Learning Objectives

The Determination of Equilibrium Output (Income)

- Explain how equilibrium output is determined.

The Multiplier

- Describe the multiplier process and use the multiplier equation to calculate changes in equilibrium.

Deriving the Multiplier Algebraically

- Show that the multiplier is 1 divided by 1 minus the *MPC*.

Aggregate Expenditure and Equilibrium Output

- ▶ **aggregate output** The total quantity of goods and services produced (or supplied) in an economy in a given period.
- ▶ **aggregate income** The total income received by all factors of production in a given period.
- In any given period, there is an exact equality between aggregate output (production) and aggregate income. You should be reminded of this fact whenever you encounter the combined term *aggregate output (income)*.

Aggregate Expenditure and Equilibrium Output

- **aggregate output (income) (Y)** A combined term used to remind you of the exact equality between aggregate output and aggregate income.
- You must think in “real terms”: Output Y refers to the quantities of goods and services produced, not the Ghana cedis circulating in the economy.

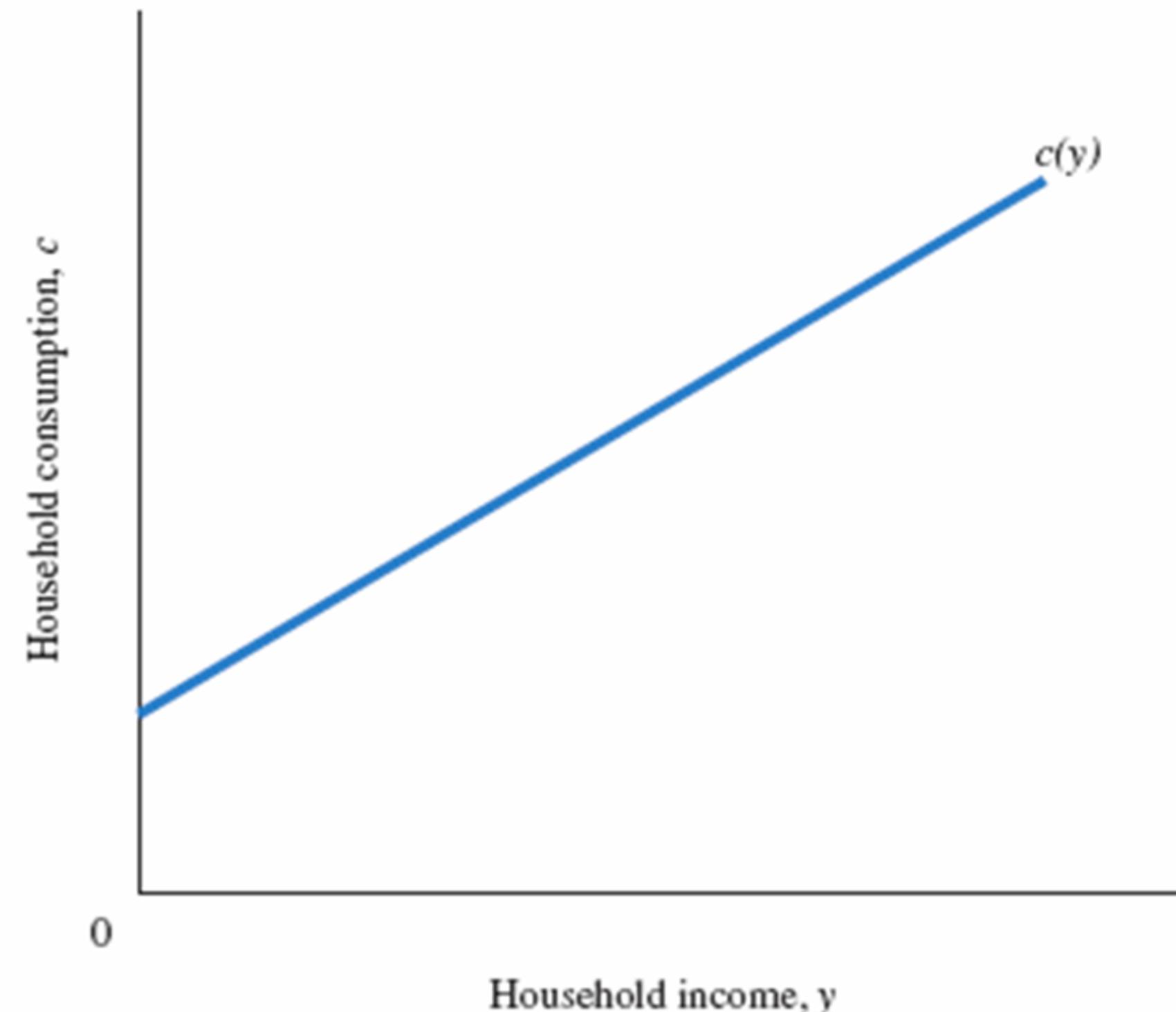
The Keynesian Theory of Consumption

In Keynes's classic *The General Theory of Employment, Interest, and Money*, current income played the key role in determining consumption levels in the economy.

- **Consumption function-** The relationship between consumption and income.

A Consumption Function for a Household

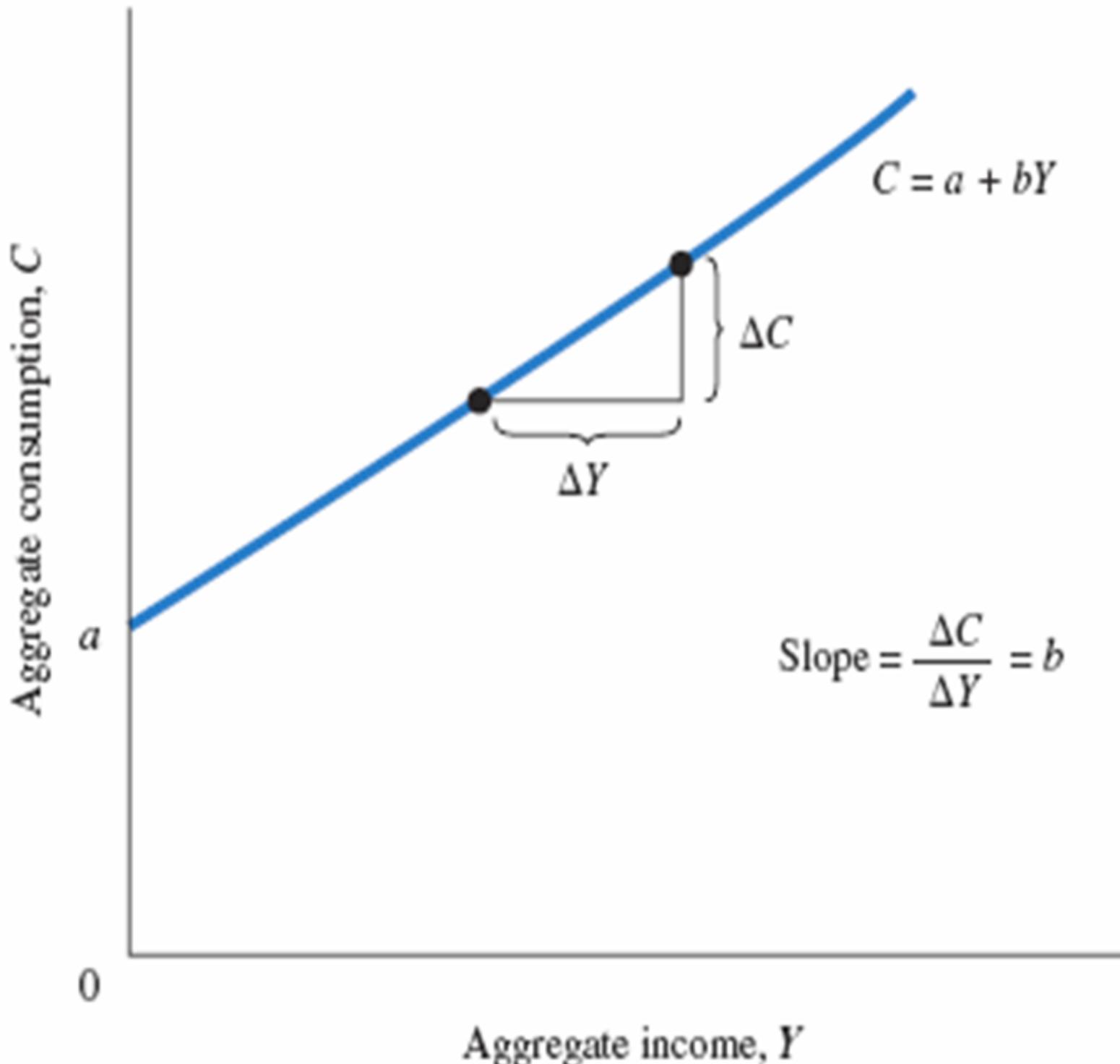
A consumption function for an individual household shows the level of consumption at each level of household income.



An Aggregate Consumption

The aggregate consumption function shows the level of aggregate consumption at each level of aggregate income.

The upward slope indicates that higher levels of income lead to higher levels of consumption spending.



The Keynesian Theory of Consumption

- We can use the following equation to describe a straight-line consumption curve:

$$C = a + bY$$

➤ **marginal propensity to consume (MPC)** That fraction of a change in income that is consumed, or spent.

$$\text{marginal propensity to consume} \equiv \text{slope of consumption function} \equiv \frac{\Delta C}{\Delta Y}$$

The Keynesian Theory of Consumption

- **aggregate saving (S)** The part of aggregate income that is not consumed.

$$S \equiv Y - C$$

- The triple equal sign (\equiv) means that this equation is an identity, or something that is always true by definition.
- **identity** Something that is always true by definition.

The Keynesian Theory of Consumption

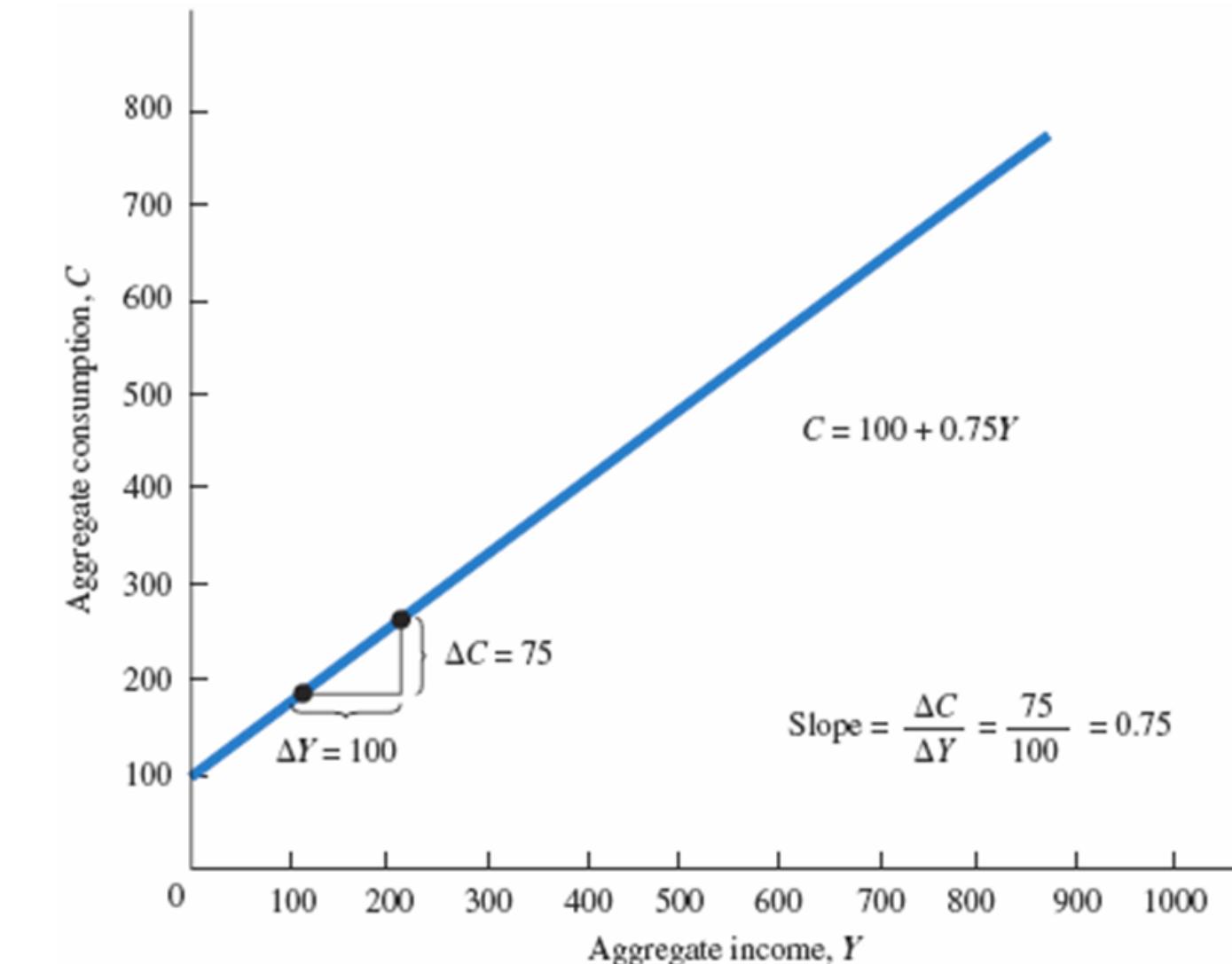
- **marginal propensity to save (*MPS*)** That fraction of a change in income that is saved.

$$MPC + MPS \equiv 1$$

- *MPC* is the fraction of an increase in income that is consumed (or the fraction of a decrease in income that comes out of consumption).
- *MPS* is the fraction of an increase in income that is saved (or the fraction of a decrease in income that comes out of saving).

The Aggregate Consumption Function Derived from the Equation $C = 100 + 0.75Y$

Aggregate Income, Y	Aggregate Consumption, C
0	100
80	160
100	175
200	250
400	400
600	550
800	700
1,000	850

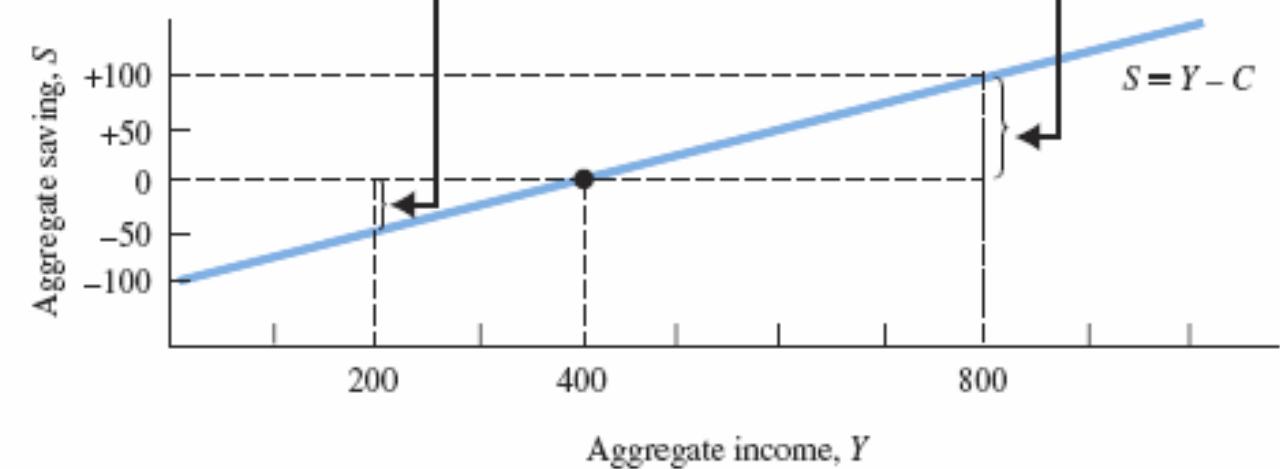
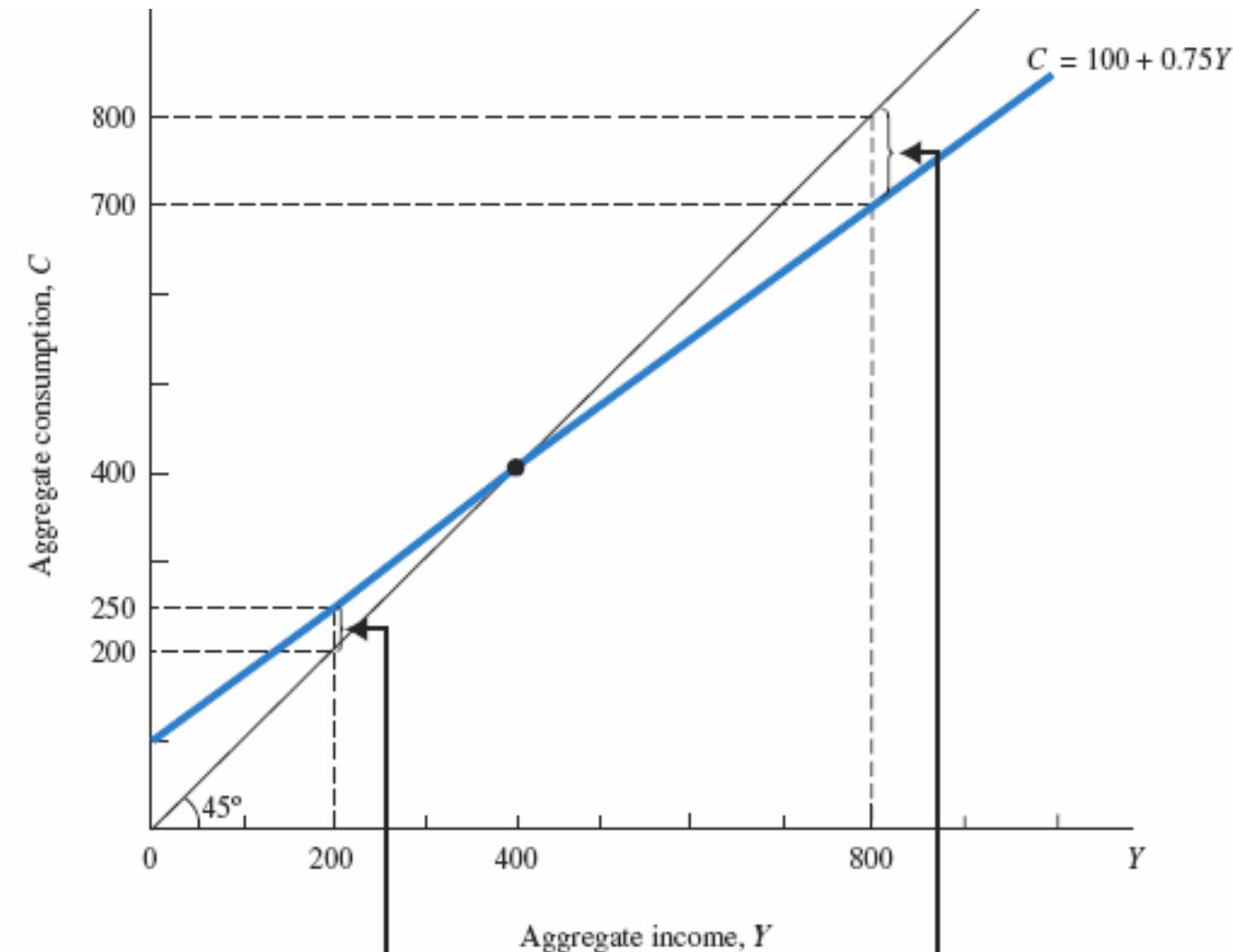


In this simple consumption function, consumption is 100 at an income of zero. As income rises, so does consumption. For every 100 increase in income, consumption rises by 75. The slope of the line is 0.75.

Deriving the Saving Function from the Consumption Function

Y	C	=	S
Aggregate Income	Aggregate Consumption		Aggregate Saving
0	100		-100
80	160		-80
100	175		-75
200	250		-50
400	400		0
600	550		50
800	700		100
1,000	850		150

Because $S \equiv Y - C$, it is easy to derive the saving function from the consumption function. A 45° line drawn from the origin can be used as a convenient tool to compare consumption and income graphically. At $Y = 200$, consumption is 250. The 45° line shows us that consumption is larger than income by 50. Thus, $S \equiv Y - C = -50$. At $Y = 800$, consumption is less than income by 100. Thus, $S = 100$ when $Y = 800$.



Other Determinants of Consumption

- In practice, the decisions of households about how much to consume in a given period are also affected by:
 - Their wealth
 - The interest rate
 - Their expectations of the future

ECONOMICS IN PRACTICE

Saving decisions involve thinking about trade-offs between present and future consumption.

Recent work in behavioural economics has highlighted the role of psychological biases in saving behaviour.

In studying retirement systems, researchers have found that simply changing the enrollment process from an opt-in structure to an opt-out system increases enrollment in retirement pension plans.



THINKING PRACTICALLY

1. The Save More Tomorrow Plans encourage people to save more by committing themselves to future action. Can you think of examples in your own life of similar commitment devices you use?

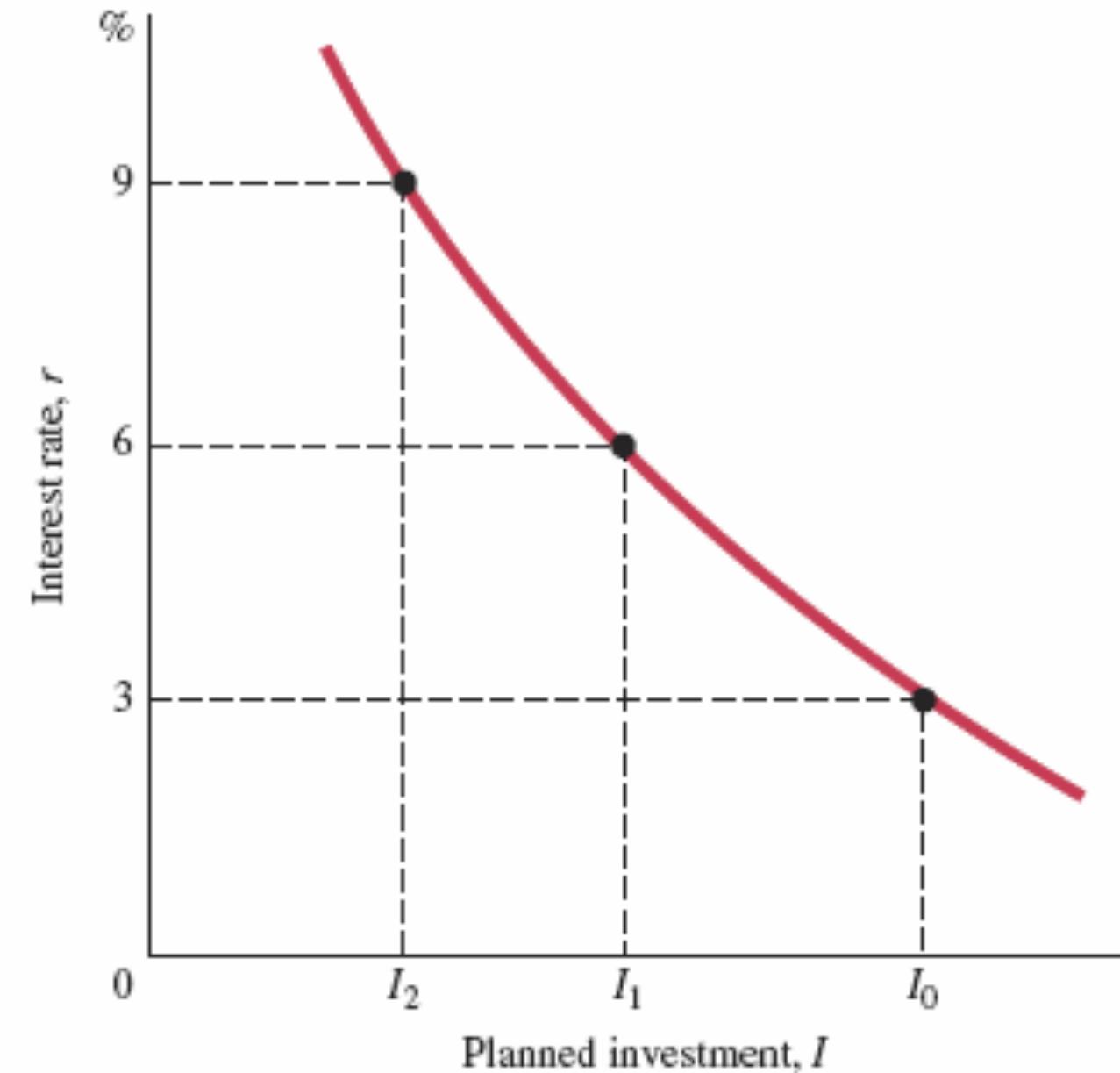
Planned Investment (I) versus Actual Investment

- Inventory is the stock of goods that a firm has awaiting sale.
 - **planned investment (I)** Those additions to capital stock and inventory that are planned by firms.
 - **actual investment** The actual amount of investment that takes place; it includes items such as unplanned changes in inventories.
- If a firm overestimates how much it will sell in a period, it will end up with more in inventory than it planned to have.

Planned investment and the interest Rate (r)

- Increasing the interest rate, *ceteris paribus*, is likely to reduce the level of planned investment spending.
- When the interest rate falls, it becomes less costly to borrow, and more investment projects are likely to be undertaken.

Planned Investment Schedule



Planned investment spending is a negative function of the interest rate. An increase in the interest rate from 3% to 6% reduces planned investment from I_0 to I_1 .

Other Determinants of Planned Investment

- The decision of a firm on how much to invest depends, among other things, on its expectation of future sales.
- The optimism or pessimism of entrepreneurs about the future course of the economy can have an important effect on current planned investment.
- Keynes used the phrase *animal spirits* to describe the feelings of entrepreneurs.

(Income)

- **equilibrium** Occurs when there is no tendency for change. In the macroeconomic goods market, equilibrium occurs when planned aggregate expenditure is equal to aggregate output.
- **planned aggregate expenditure (AE)** The total amount the economy plans to spend in a given period. Equal to consumption plus planned investment:

$$AE \equiv C + I$$

- So, equilibrium can also be written:

$$\text{equilibrium: } Y = C + I$$

The Determination of Equilibrium Output (Income)

$$Y > C + I$$

aggregate output > planned aggregate expenditure

$$C + I > Y$$

planned aggregate expenditure > aggregate output

Deriving the Planned Aggregate Expenditure Schedule and Finding Equilibrium*

(1)	(2)	(3)	(4)	(5)	(6)
Aggregate Output (Income) (Y)	Aggregate Consumption (C)	Planned Investment (I)	Planned Aggregate Expenditure (AE) $C + I$	Unplanned Inventory Change $Y - (C + I)$	Equilibrium? ($Y = AE?$)
100	175	25	200	- 100	No
200	250	25	275	- 75	No
400	400	25	425	- 25	No
500	475	25	500	0	Yes
600	550	25	575	+ 25	No
800	700	25	725	+ 75	No
1,000	850	25	875	+ 125	No

* The figures in column 2 are based on the equation $C = 100 + 0.75Y$.

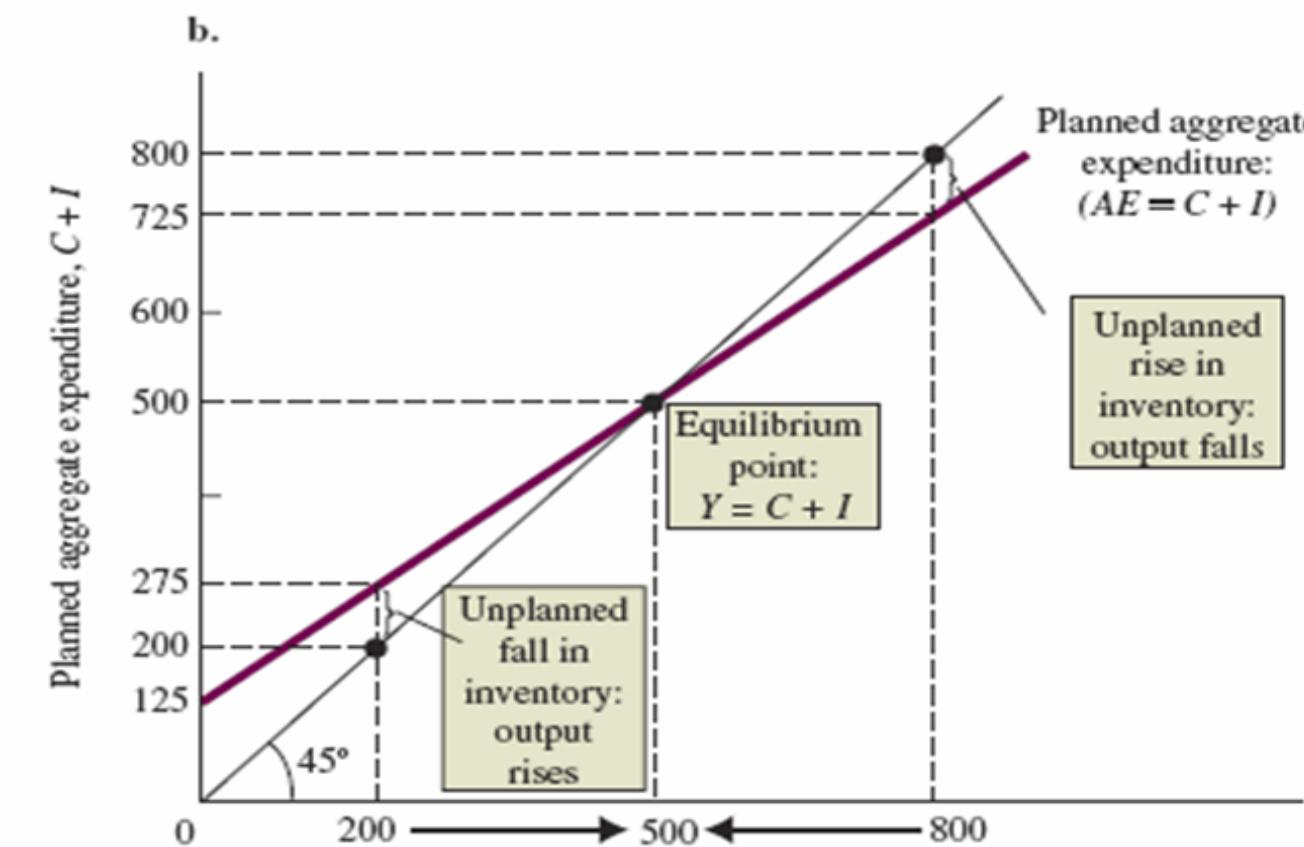
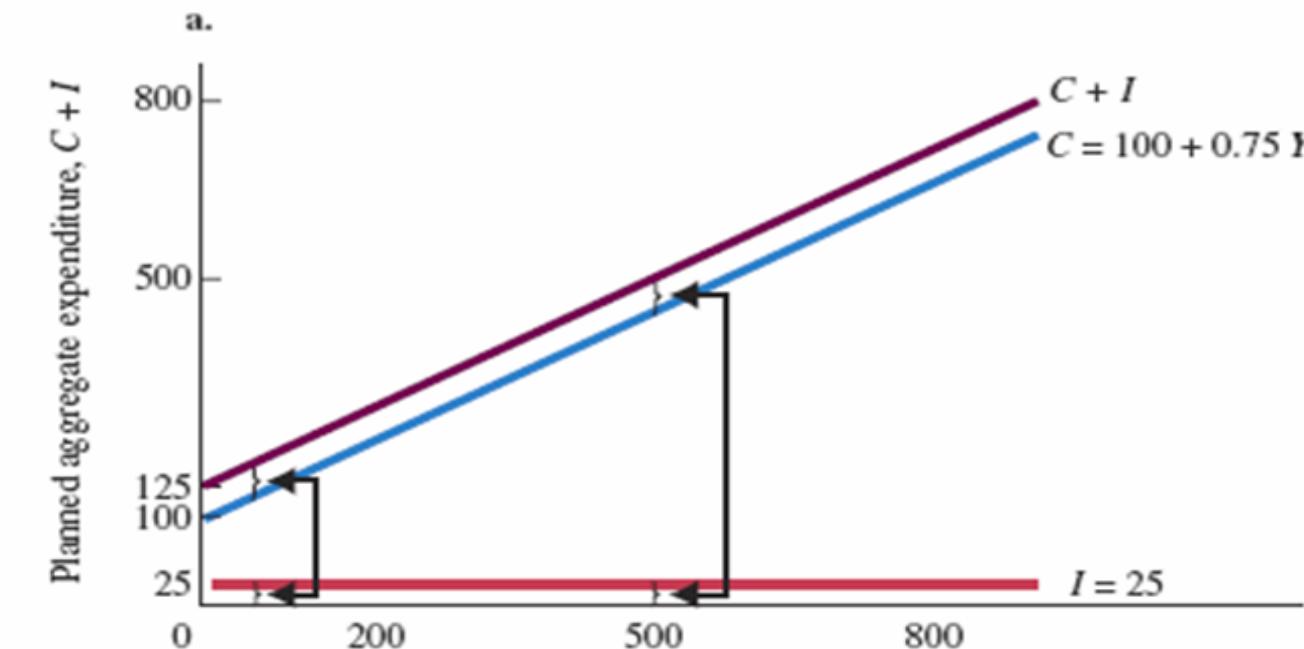
Equilibrium Aggregate Output

Equilibrium occurs when planned aggregate expenditure and aggregate output are equal.

Planned aggregate expenditure is the sum of consumption spending and planned investment spending.

The planned aggregate expenditure function crosses the 45° line at a single point, where $Y = 500$.

The point at which the two lines cross is sometimes called the Keynesian cross.



The Determination of Equilibrium Output (Income)

- Find the equilibrium level of output (income) algebraically:

$$Y = C + I \quad (\text{equilibrium})$$

$$C = 100 + 0.75Y \quad (\text{consumption function})$$

$$I = 25 \quad (\text{planned investment})$$

$$Y = \underbrace{100 + 0.75 Y}_C + \underbrace{25}_I$$

Rearranging terms:

$$Y - 0.75Y = 100 + 25$$

$$0.25Y = 125$$

$$Y = \frac{125}{0.25} = 500$$

The Saving/Investment Approach to Equilibrium

• $Y \equiv C + S$, which is an identity. The equilibrium condition is $Y = C + I$, but this is not an identity because it does not hold when out of equilibrium.

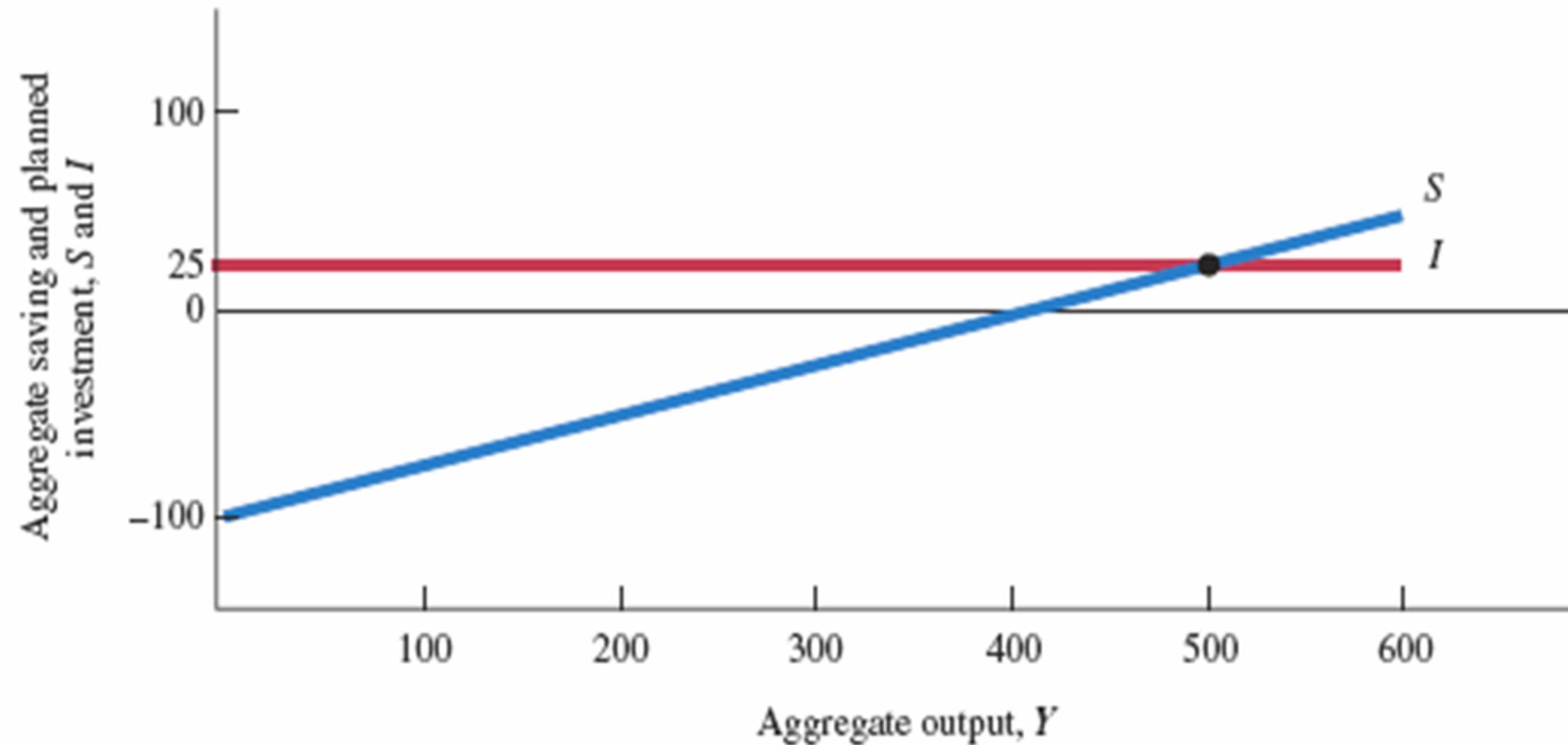
- By substituting $C + S$ for Y in the equilibrium condition:

$$C + S = C + I$$

$$S = I$$

- Equilibrium occurs only when planned investment equals saving.

The $S = I$ Approach to Equilibrium



Aggregate output is equal to planned aggregate expenditure only when saving equals planned investment ($S = I$).

Saving and planned investment are equal at $Y = 500$.

Adjustment to Equilibrium

- If firms react to unplanned inventory reductions (increases) by increasing output, an economy with planned spending greater (less) than output will adjust to equilibrium, with Y higher (lower) than before.
- Figure shows that at any level of output above (below) $Y = 500$, output will fall (rise) until it reaches equilibrium at $Y = 500$.

ECONOMICS IN PRACTICE

In 2011, GM increased production of its most profitable pickup truck, the Silverado. But the economy did not recover as fast as business people had expected.

As a result, the inventory of Silverados rose to the level equivalent to 122 days of sales, compared with the normal inventory levels of about 90 days.



THINKING PRACTICALLY

1. Do you expect inventory turns for the average firm in the economy to increase or decrease as we enter a recession?

The Multiplier

- **multiplier** The ratio of the change in the equilibrium level of output to a change in some exogenous variable.
- **exogenous variable** A variable that is assumed not to depend on the state of the economy—that is, it does not change when the economy changes.
- The size of the multiplier depends on the slope of the planned aggregate expenditure line. The steeper the slope of this line, the greater the change in output for a given change in investment.

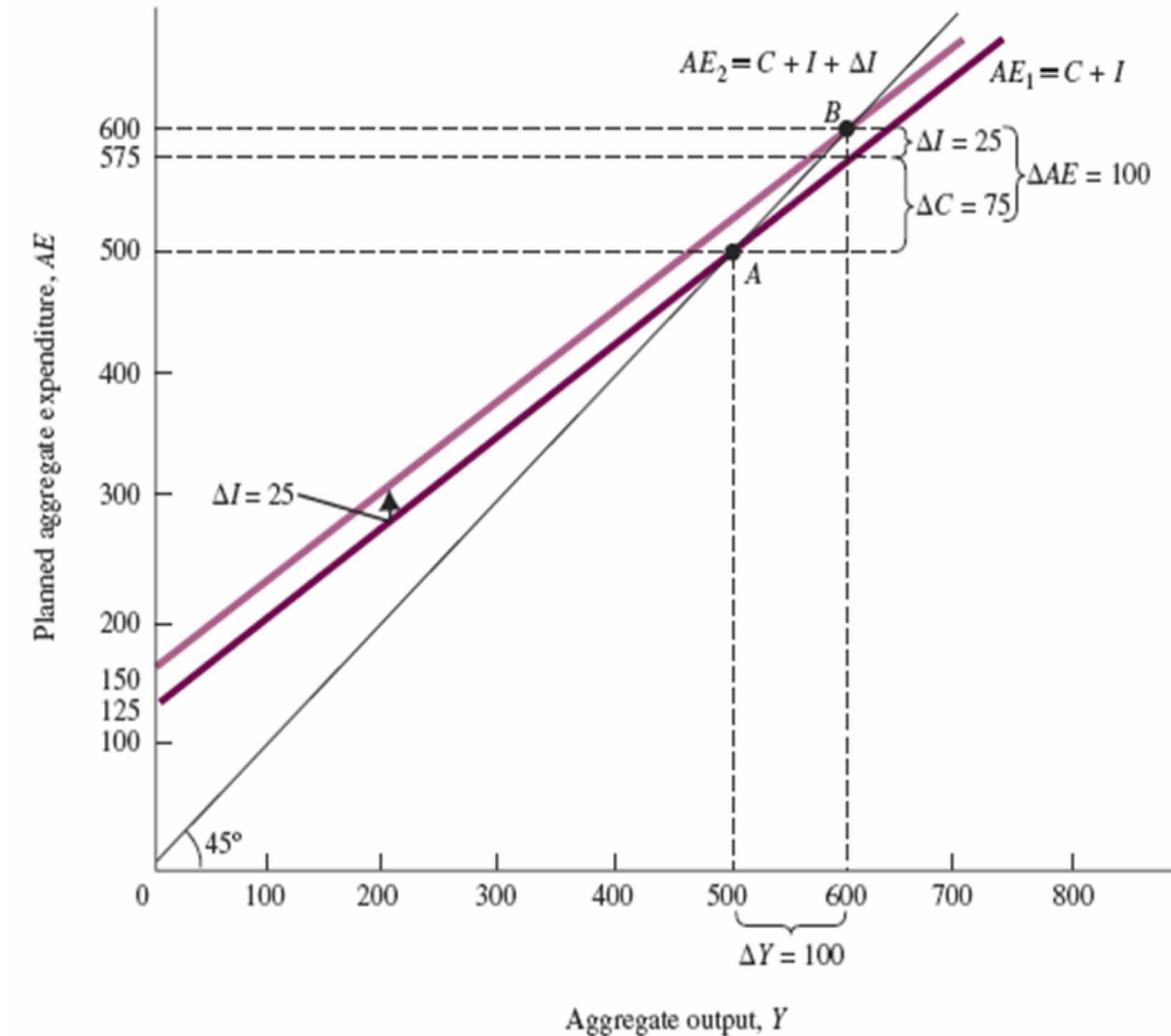
The Multiplier as Seen in the Planned Aggregate Expenditure Diagram

At point *A*, the economy is in equilibrium at $Y = 500$. When I increases by 25, planned aggregate expenditure is initially greater than aggregate output.

As output rises in response, additional consumption is generated, pushing equilibrium output up by a multiple of the initial increase in I .

The new equilibrium is found at point *B*, where $Y = 600$.

Equilibrium output has increased by 100 ($600 - 500$), or *four times* the amount of the increase in planned investment.



The Multiplier Equation

- Recall:

$$MPS = \frac{\Delta S}{\Delta Y}$$

- Because ΔS must be equal to ΔI for equilibrium to be restored, we can substitute ΔI for ΔS and solve:

$$MPS = \frac{\Delta I}{\Delta Y}$$

- Therefore:

$$\Delta Y = \Delta I \times \frac{1}{MPS}$$

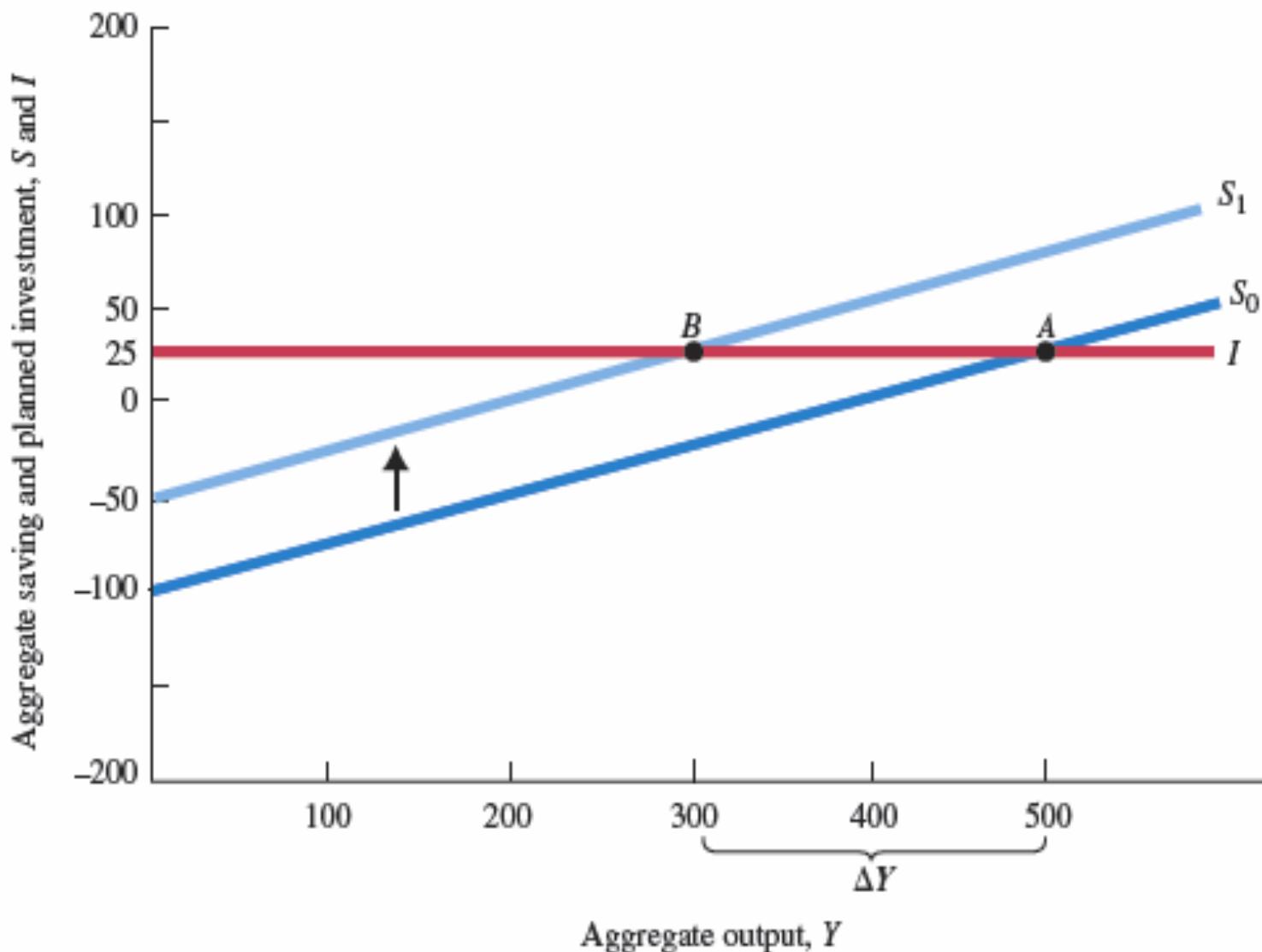
$$\text{Multiplier} \equiv \frac{1}{MPS} , \text{ or } \text{Multiplier} \equiv \frac{1}{1-MPC}$$

ECONOMICS IN PRACTICE

An increase in planned saving from S_0 to S_1 causes equilibrium output to decrease from 500 to 300.

The corresponding decreased consumption leads to a reduction of income.

Increased efforts to save have caused a drop in income but no overall change in saving.



THINKING PRACTICALLY

1. Draw a consumption function corresponding to S_0 and S_1 and describe what is happening.

The Size of the Multiplier in the Real World

- The size of the multiplier is reduced when:
 1. Tax payments depend on income
 2. We consider Central Bank behaviour regarding the interest rate
 3. We add the price level to the analysis
 4. Imports are introduced
- In reality, the size of the multiplier is about 2.

REVIEW TERMS AND CONCEPTS

- $MPC + MPS \equiv 1$
- $AE \equiv C + I$
- **equilibrium condition:** $Y = AE$ or
 $Y = C + I$
- saving/investment approach to equilibrium:
 $S = I$
- multiplier $\equiv \frac{1}{MPS} \equiv \frac{1}{1-MPC}$

The Government and Fiscal Policy

The Government and Fiscal Policy

- In macroeconomics, the policy instruments are fiscal policy and monetary policy.
 - **fiscal policy** The government's spending and taxing policies.
 - **monetary policy** The behaviour of the Central Bank concerning the nation's money supply.

Government in the Economy

- Taxes and government spending often go up or down in response to changes in the economy.
- **discretionary fiscal policy** Changes in taxes or spending that are the result of deliberate changes in government policy.

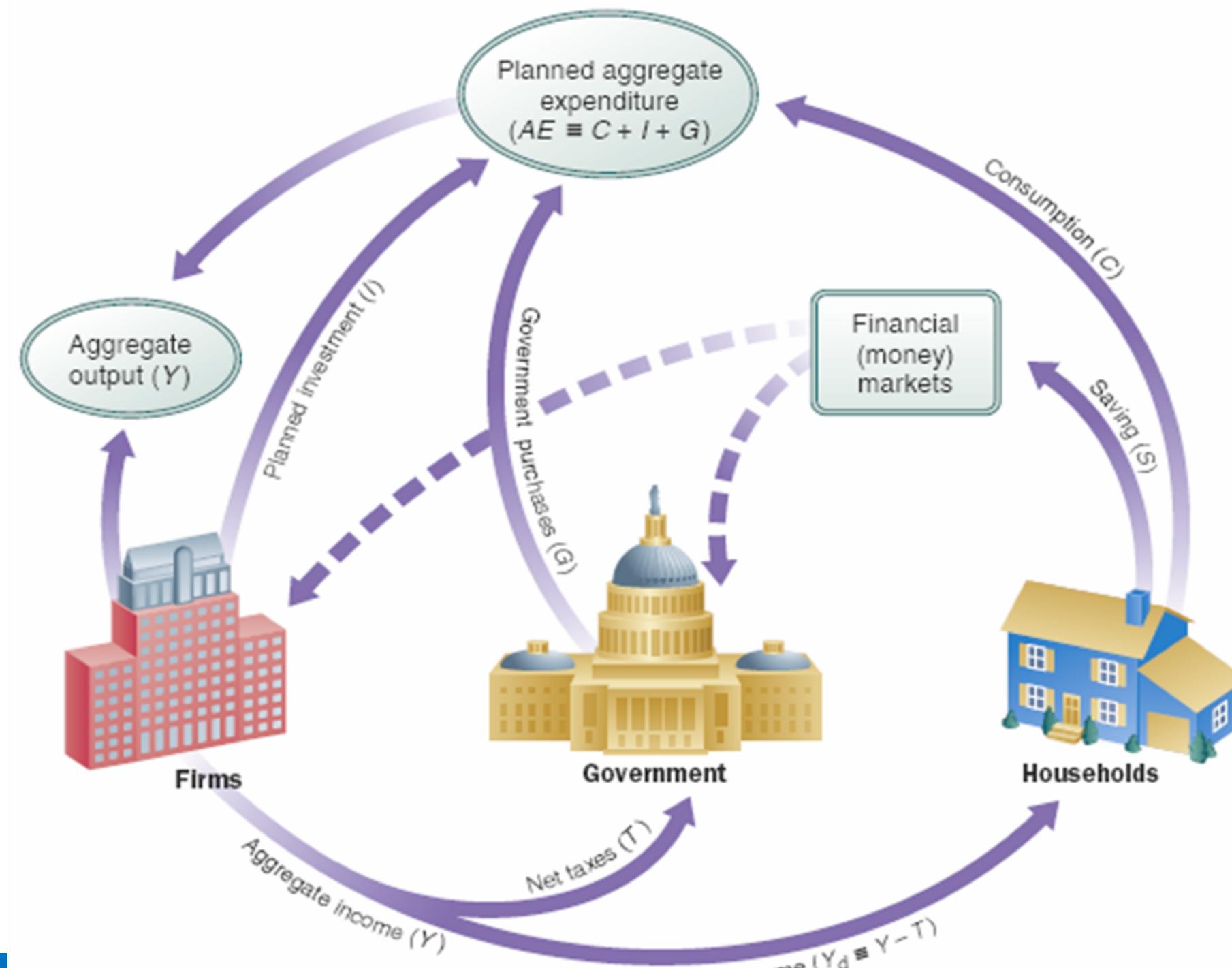
Government Purchases (G), Net Taxes (T), and Disposable Income (Y_d)

- **net taxes (T)** Taxes paid by firms and households to the government minus transfer payments made to households by the government.
- **disposable, or after-tax, income (Y_d)** Total income minus net taxes: $Y - T$.

disposable income \equiv total income – net taxes

$$Y_d \equiv Y - T$$

Adding Net Taxes (T) and Government Purchases (G) to the Circular Flow of Income



Government Purchases (G), Net Taxes (T), and Disposable Income (Y_d)

$$Y_{\textcolor{brown}{d}} \equiv C + S$$

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

$$Y \equiv C + S + T$$

$$AE \equiv C + I + G$$

Government Purchases (G), Net Taxes (T), and Disposable Income (Y_d)

- **budget deficit** The difference between what a government spends and what it collects in taxes in a given period: $G - T$.

$$\text{budget deficit} \equiv G - T$$

Government Purchases (G), Net Taxes (T), and Disposable Income (Y_d)

Adding Taxes to the Consumption Function

- To modify our aggregate consumption function to incorporate disposable income:

$$C = a + bY_d$$

Or:

$$C = a + b(Y - T)$$

- The consumption function now has consumption depending on disposable income instead of before-tax income.

Government Purchases (G), Net Taxes (T), and Disposable Income (Y_d)

Planned Investment

- The government can affect investment behaviour through its tax treatment of depreciation and other tax policies.
- Planned investment depends on the interest rate.

The Determination of Equilibrium Output (Income)

$$Y = AE$$

and:

$$AE \equiv C + I + G$$

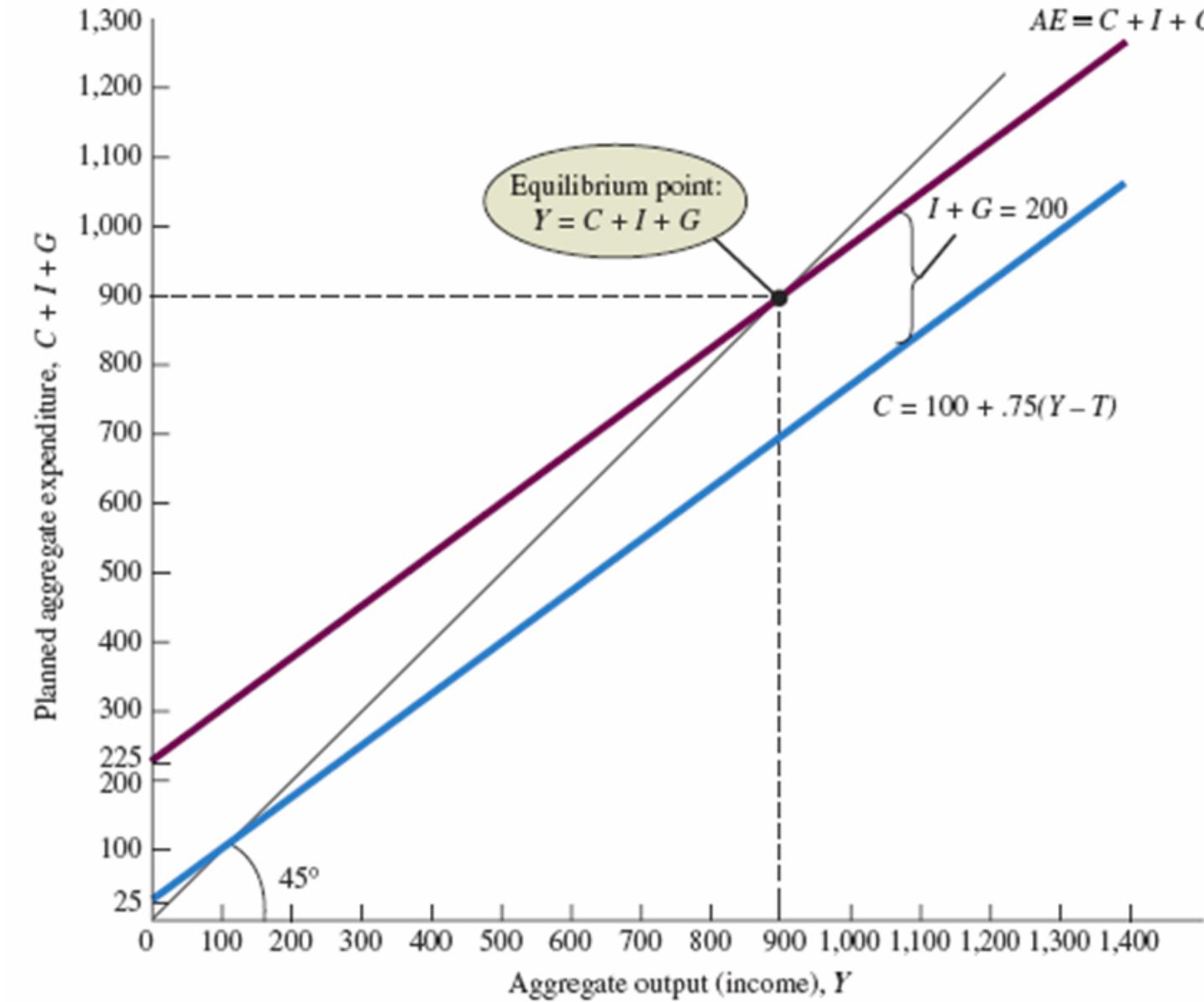
So, equilibrium is:

$$Y = C + I + G$$

Finding Equilibrium for $I = 100$, $G = 100$, and $T = 100$

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Output (Income) Y	Net Taxe s T	Disposable Income $Y_d \equiv Y - T$	Consumption Spending $C = 100 + .75 Y_d$	Saving $S = Y_d - C$	Planned Investment Spending I	Governm ent Purchases G	Planned Aggregat e Expendit ure $C + I + G$	Unplanned Inventory Change $Y - (C + I + G)$	Adjustme nt to Dis- equilibri um
300	100	200	250	-50	100	100	450	-150	Output ↑
500	100	400	400	0	100	100	600	-100	Output ↑
700	100	600	550	50	100	100	750	-50	Output ↑
900	100	800	700	100	100	100	900	0	Equilibr ium
1,100	100	1,000	850	150	100	100	1,050	+50	Output ↑
1,300	100	1,200	1,000	200	100	100	1,200	+100	Output ↑
1,500	100	1,400	1,150	250	100	100	1,350	+150	Output ↑

Finding Equilibrium Output/Income



Because G and I are both fixed at 100, the aggregate expenditure function is the new consumption function displaced upward by $I + G = 200$.

Equilibrium occurs at $Y = C + I + G = 900$.

The Determination of Equilibrium Output (Income)

The Saving/Investment Approach to Equilibrium

$$S + T = I + G$$

In equilibrium, $Y = AE$.

$$AE \equiv C + I + G \text{ and } Y \equiv C + S + T$$

So, at equilibrium:

$$C + S + T = C + I + G$$

$$S + T = I + G$$

Fiscal Policy at Work: Multiplier Effects

- At this point, we are assuming that the government controls G and T .
- We now review three multipliers:
 - Government spending multiplier
 - Tax multiplier
 - Balanced-budget multiplier

The Government Spending Multiplier

$$\text{government spending Multiplier} \equiv \frac{1}{MPS} \equiv \frac{1}{1 - MPC}$$

- **government spending multiplier** The ratio of the change in the equilibrium level of output to a change in government spending.

Finding Equilibrium after a Government Spending Increase of 50*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Output (Income) Y	Net Taxes T	Disposable Income $Y_d \equiv Y - T$	Consumption Spending $C = 100 + .75 Y_d$	Saving $S = Y_d - C$	Planned Investment I	Govern ment Purchas es G	Planned Aggregat e Expendit ure $C + I + G$	Unplanned Inventory Change $Y - (C + I + G)$	Adjustment to Dis- equilibrium
300	100	200	250	-50	100	150	500	-200	Output ↑
500	100	400	400	0	100	150	650	-150	Output ↑
700	100	600	550	50	100	150	800	-100	Output ↑
900	100	800	700	100	100	150	950	-50	Output ↑
1,100	100	1,000	850	150	100	150	1,100	0	Equilibrium
1,300	100	1,200	1,000	200	100	150	1,250	50	Output ↑

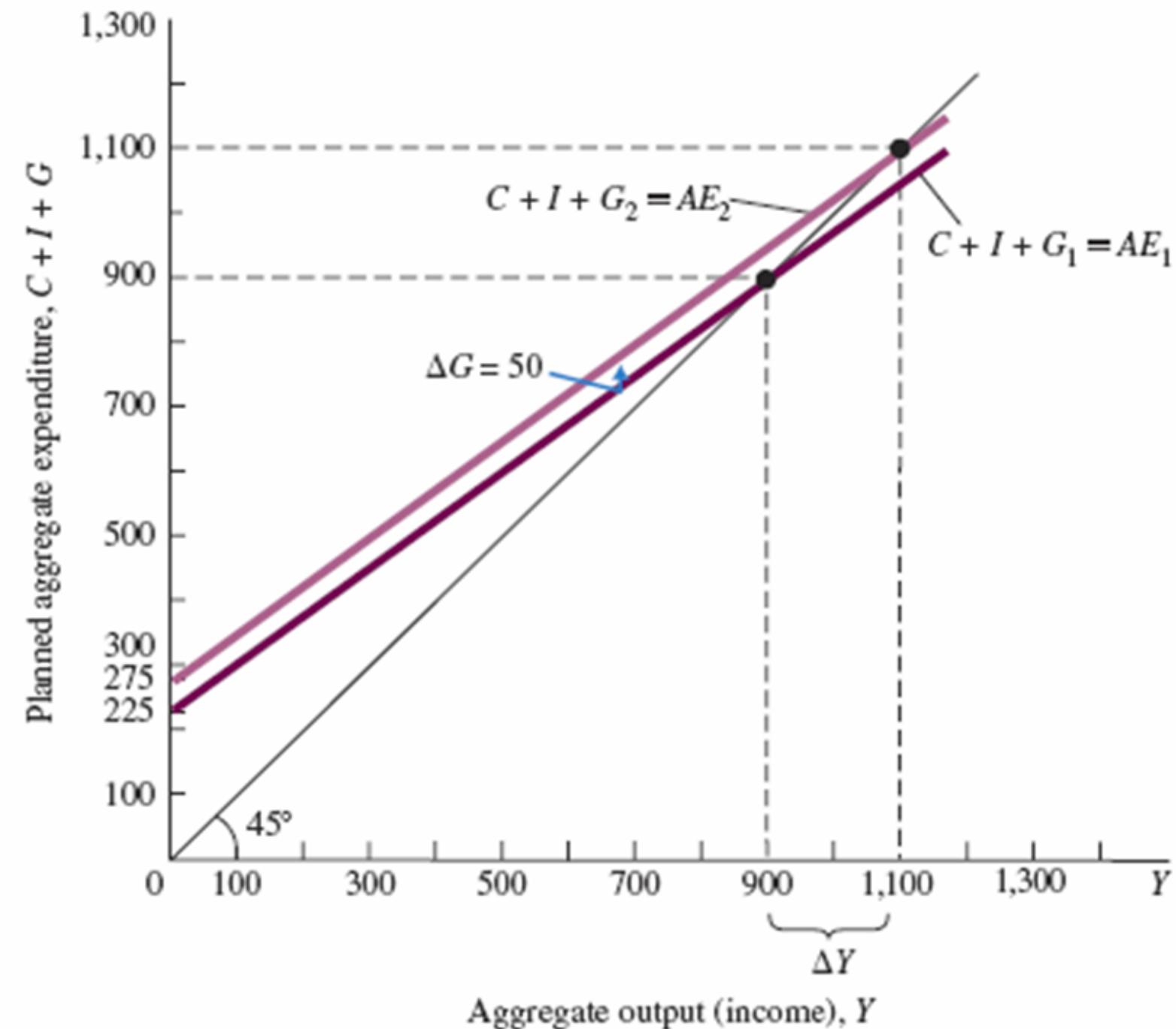
* G has increased from 100 in the previous Table to 150 here.

The Government Spending Multiplier

Increasing government spending by 50 shifts the AE function up by 50.

As Y rises in response, additional consumption is generated.

Overall, the equilibrium level of Y increases by 200, from 900 to 1,100.



The Tax Multiplier

- **tax multiplier** The ratio of change in the equilibrium level of output to a change in taxes.

$$\Delta Y = (\text{initial increase in aggregate expenditure}) \times \left(\frac{1}{MPS} \right)$$

$$\Delta Y = (-\Delta T \times MPC) \times \left(\frac{1}{MPS} \right) = -\Delta T \times \left(\frac{MPC}{MPS} \right)$$

$$\text{tax multiplier} \equiv -\left(\frac{MPC}{MPS} \right)$$

The Balanced-Budget Multiplier

- **balanced-budget multiplier** The ratio of change in the equilibrium level of output to a change in government spending where the change in government spending is balanced by a change in taxes so as not to create any deficit. The balanced-budget multiplier is equal to 1: The change in Y resulting from the change in G and the equal change in T is exactly the same size as the initial change in G or T .

balanced-budget multiplier $\equiv 1$

Finding Equilibrium after a Balanced-Budget Increase in G and T of 200 Each*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Output (Income) Y	Net Taxes T	Disposable Income $Y_d \equiv Y - T$	Consumpti on Spending $C = 100$ + .75 Y_d	Planned Investment I	Governme nt Purchases G	Planned Aggregate Expenditure $C + I + G$	Unplanned Inventory Change $Y - (C + I + G)$	Adjustment to Dis- equilibrium
500	300	200	250	100	300	650	-150	Output ↑
700	300	400	400	100	300	800	-100	Output ↑
900	300	600	550	100	300	950	-50	Output ↑
1,100	300	800	700	100	300	1,100	0	Equilibrium 0
1,300	300	1,000	850	100	300	1,250	+50	Output ↓
1,500	300	1,200	1,000	100	300	1,400	+100	Output ↓

* Both G and T have increased from 100 in Table 24.1 to 300 here.

Summary of Fiscal Policy Multipliers

	Policy Stimulus	Multiplier	Final Impact on Equilibrium Y
Government spending multiplier	Increase or decrease in the level of government purchases: ΔG	$\frac{1}{MPS}$	$\Delta G \times \frac{1}{MPS}$
Tax multiplier	Increase or decrease in the level of net taxes: ΔT	$\frac{-MPC}{MPS}$	$\Delta T \times \frac{-MPC}{MPS}$
Balanced-budget multiplier	Simultaneous balanced-budget increase or decrease in the level of government purchases and net taxes:	1	ΔG

The Balanced-Budget Multiplier

It refers to the change in equilibrium national income caused by an equal (that is balanced change) change in government expenditure and government tax revenue. Such a change leaves government budget deficit or surplus unaffected.

A Warning

- Although we have added government, the story told about the multiplier is still incomplete and oversimplified.
- We have been treating net taxes (T) as a lump-sum, fixed amount, whereas in practice, taxes depend on income.
- Appendix B to this chapter shows that the size of the multiplier is reduced when we make the more realistic assumption that taxes depend on income.

The Budget

- Fiscal policy is the manipulation of items in the national budget, so the national budget is relevant to our study of macroeconomics.
- **National budget** The budget of the government.
- The national budget is the product of a complex interplay of social, political, and economic forces.

Hypothetical Budget in 2014

- **Budget surplus (+) or deficit (-)** National government receipts minus expenditures.
- In 2014, the government had total receipts of GH¢3,300.8 billion.
- The government spent GH¢3883.1 billion in expenditures in 2014.

Government Receipts and Expenditures, 2014

	Amount (Billions, GH₵)	Percentage of Total (%)
Current receipts		
Personal income taxes	1,374.2	41.6
Excise taxes and customs duties	134.1	4.1
Corporate income taxes	497.3	15.1
Taxes from the rest of the world	18.9	0.6
Contributions for social security	1,149.4	34.8
Interest receipts and rents and royalties	78.1	2.4
Current transfer receipts from business and persons	68.5	2.1
Current surplus of government enterprises	<u>−19.7</u>	<u>−0.6</u>
Total	3,300.8	100.0
Current expenditures		
Consumption expenditures	965.2	24.9
Transfer payments to persons	1,863.4	48.0
Transfer payments to the rest of the world	55.3	1.4
Grants-in-aid to state and local governments	500.9	12.9
Interest payments	441.3	11.4
Subsidies	<u>56.9</u>	<u>1.5</u>
Total	3,883.1	100.0
Net government saving—surplus (+) or deficit (−) (total current receipts − total current expenditures)	−582.3	

ECONOMICS IN PRACTICE

In the wake of the 2007–08 financial crisis, a combination of factors led to a record high deficit of 7.5 percent of GDP for the entire OECD area in 2010 and a record high public debt-to-GDP ratio of 94 percent in 2014.

Governments are sometimes tempted to “cook the books” and use “creative accounting” to present official deficit figures. Certain types of transactions are not accounted for, but do have an impact on overall debt.

THINKING PRACTICALLY

1. governments sometimes have the incentive and the capacity to use “creative accounting”, what instruments do taxpayers and citizens have at their disposal to establish realistic estimates of government budgets?



The Government Debt

- **Government debt** The total amount owed by the government.
- **privately held government debt** The privately held (non-government-owned) debt of the Ghana government.

The Economy's Influence on the Government Budget

Automatic Stabilizers and Destabilizers

- **automatic stabilizers** Revenue and expenditure items in the government budget that automatically change with the state of the economy in such a way as to stabilize GDP.
- **automatic destabilizers** Revenue and expenditure items in the government budget that automatically change with the state of the economy in such a way as to destabilize GDP.
- **fiscal drag** The negative effect on the economy that occurs when average tax rates increase because taxpayers have moved into higher income brackets during an expansion.

The Economy's Influence on the Government Budget

Full-Employment Budget

- **full-employment budget** What the government budget would be if the economy were producing at the full-employment level of output.
- **structural deficit** The deficit that remains at full employment.
- **cyclical deficit** The deficit that occurs because of a downturn in the business cycle.

REVIEW TERMS AND CONCEPTS

Equations:

disposable income $Y_d \equiv Y - T$

$AE \equiv C + I + G$

government budget deficit $\equiv G - T$

equilibrium in an economy with a government: $Y = C + I + G$

saving/investment approach to equilibrium in an economy with a government: $S + T = I + G$

government spending Multiplier

$$\equiv \frac{1}{MPS} \equiv \frac{1}{1-MPC}$$

tax multiplier $\equiv -\left(\frac{MPC}{MPS}\right)$

balanced-budget multiplier $\equiv 1$

Deriving the Fiscal Policy Multipliers

The Government Spending and Tax Multiplier

Using our hypothetical consumption function : $C = a + b(Y - T)$

The equilibrium condition is :

$$Y = C + I + G$$

By substituting for C , we get :

$$Y = a + b(Y - T) + I + G$$

$$Y = a + bY - bT + I + G$$

Rearranging terms to yield :

$$Y - bY = a + I + G - bT$$

$$Y(1 - b) = a + I + G - bT$$

$$Y = \frac{1}{(1-b)} (a + I + G - bT)$$

The Balanced-Budget Multiplier

initial increase in spending:
-initial decrease in spending:
=net initial increase in spending

$$\frac{\Delta G}{\Delta C = \Delta T(MPC)}$$
$$\frac{\Delta G}{\Delta G - \Delta T(MPC)}$$

In a balanced-budget increase, $\Delta G = \Delta T$, so in the above equation for the net initial increase in spending, we can substitute ΔG for ΔT :

$$\Delta G - \Delta G (MPC) = \Delta G (1 - MPC)$$

The Balanced-Budget Multiplier

initial increase in spending:
-initial decrease in spending:
=net initial increase in spending

$$\frac{\Delta G}{\Delta C = \Delta T(MPC)}$$
$$\frac{\Delta G}{\Delta G - \Delta T(MPC)}$$

In a balanced-budget increase, $\Delta G = \Delta T$, so in the above equation for the net initial increase in spending, we can substitute ΔG for ΔT :

$$\Delta G - \Delta G (MPC) = \Delta G (1 - MPC)$$

The Balanced-Budget Multiplier

Because $MPS = (1 - MPC)$, the net initial increase in spending is:

$$\Delta G (MPS)$$

We can now apply the expenditure multiplier $\left(\frac{1}{MPS}\right)$ to this net initial increase in spending:

$$\Delta Y = \Delta G(MPS) \left(\frac{1}{MPS} \right) = \Delta G$$

Thus, the final total increase in the equilibrium level of Y is just equal to the initial balanced increase in G and T .

The Case in which Tax Revenues Depend on Income

The Tax Function

This graph shows net taxes (taxes minus transfer payments) as a function of aggregate income.

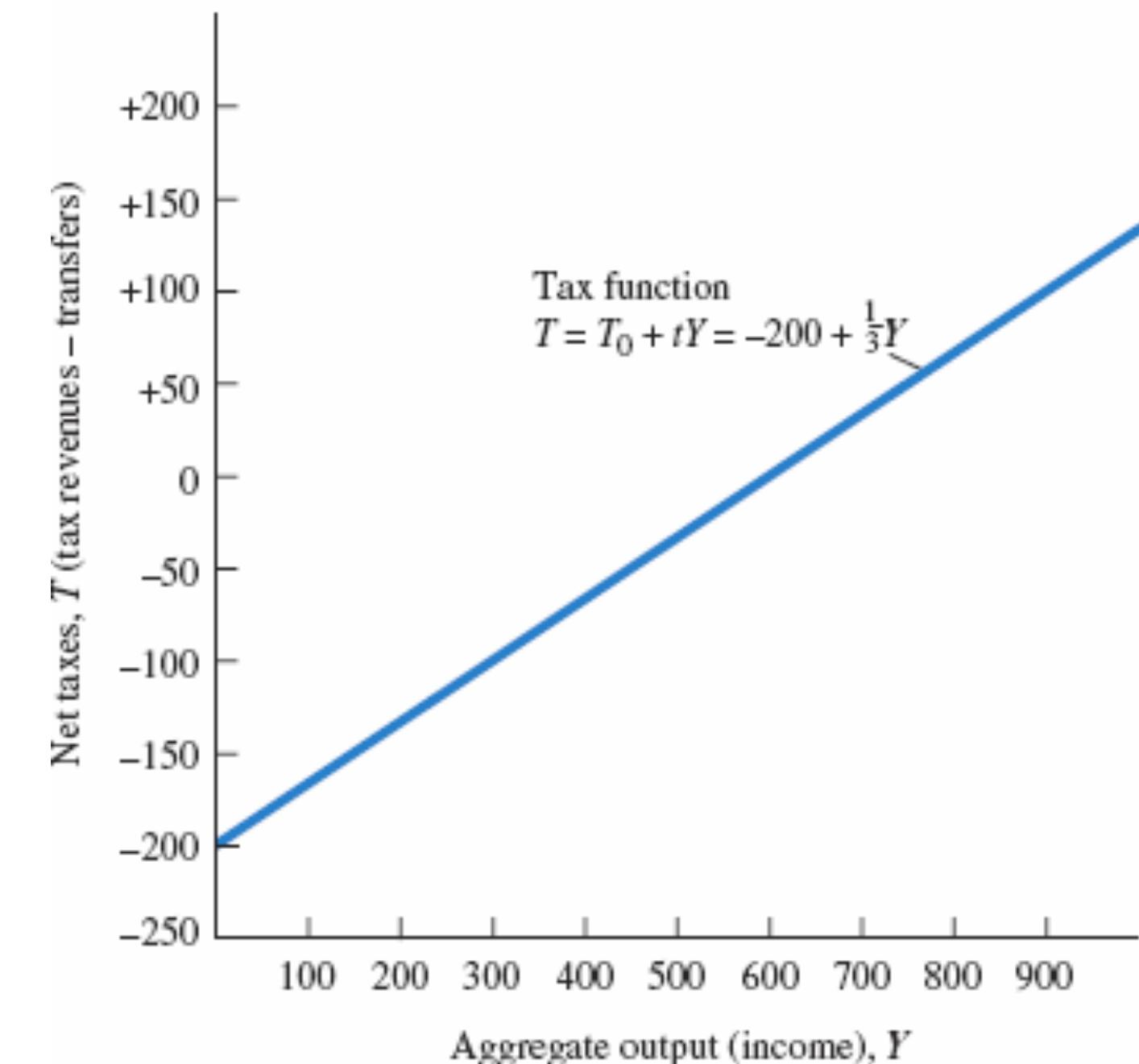
$$Y_d \equiv Y - T$$

$$Y_d \equiv Y - (-200 + 1/3Y)$$

$$Y_d \equiv Y + 200 - 1/3Y$$

$$C = 100 + 0.75Y_d$$

$$C \equiv 100 + 0.75(Y + 200 - 1/3Y)$$



The Government Spending and Tax Multipliers Algebraically

$$C = a + b(Y - T)$$

$$C = a + b(Y - T_0 - tY)$$

$$C = a + bY - bT_0 - btY$$

We know that $Y = C + I + G$. Through substitution we get:

$$Y = \underbrace{a + bY - bT_0 - btY}_C + I + G$$

Solving for Y :
$$Y = \frac{1}{1-b+bt} (a + I + G - bT_0)$$

The Government Spending and Tax Multipliers Algebraically

This means that a GH¢1 increase in G or I (holding a and T_0 constant) will increase the equilibrium level of Y by:

$$\frac{1}{1 - b + bt}$$

Holding a , I , and G constant, a fixed or lump-sum tax cut (a cut in T_0) will increase the equilibrium level of income by:

$$\frac{b}{1 - b + bt}$$

Different Tax Systems

When taxes are strictly lump sum ($T = 100$) and do not depend on income, the aggregate expenditure function is steeper than when taxes depend on income.

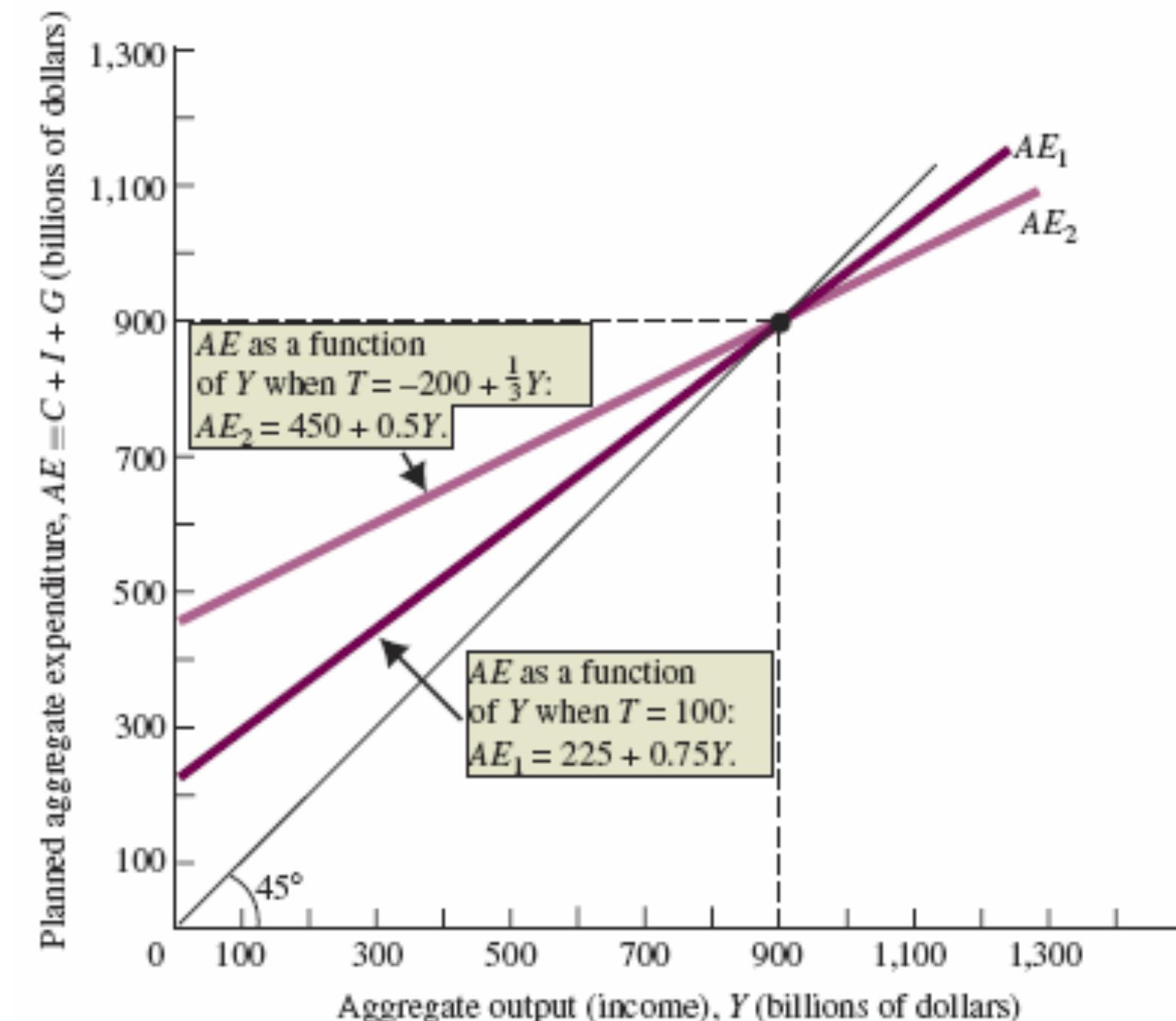
$$Y = C + I + G$$

$$Y = \underbrace{100 + 0.75(Y + 200 - 1/3Y)}_C + \underbrace{100}_I + \underbrace{100}_G$$

$$Y = 100 + .75Y + 150 - 25Y + 100 + 100$$

$$Y = 450 + .5Y$$

$$.5Y = 450$$



Private Saving

- **Private saving** equals private disposable income minus consumption expenditure
- Private disposable income:

$$Y_D = Y - T$$

where

$$Y = \text{GDP}$$

T = net taxes (i.e., taxes – government transfers – interest payments on debt)

Private Saving Cont'd

- Private saving:

$$S_P = Y - T - C$$

- where
 - C = consumption expenditure

Private Saving Cont'd

- Private saving rate is the proportion of private disposable income that is saved:

$$S_P / Y_D$$

Government Saving

- Government purchases consist of:
 - **government investment (I_G)**
 - **government consumption (C_G)**

$$G = C_G + I_G$$

Government Saving

- Government saving:

$$S_G = T - C_G$$

- For simplicity:

$$S_G = T - G$$

- Budget surplus occurs if $T > G$, and budget deficit (dissaving) occurs if $T < G$

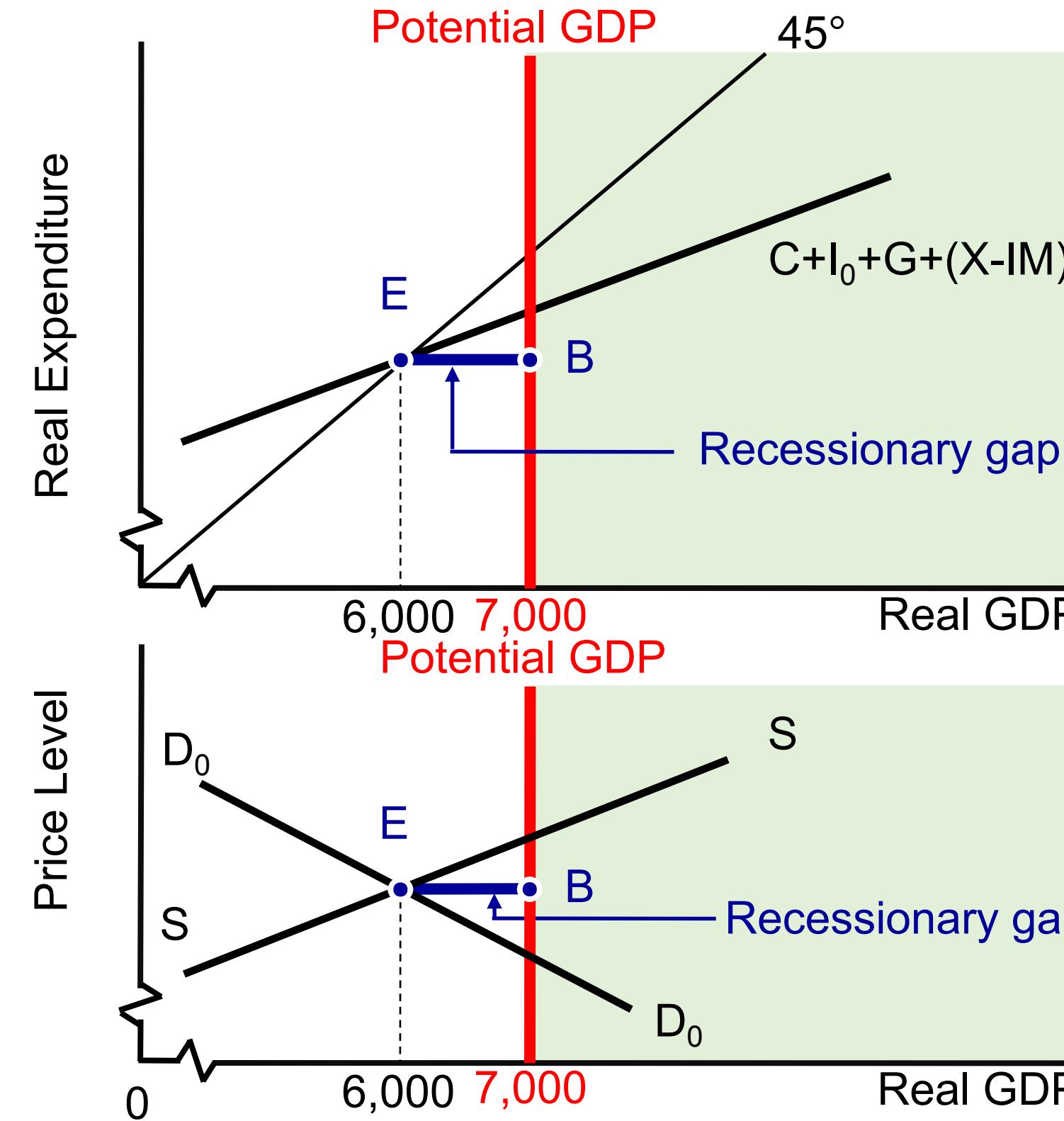
Policy and Practice: Government Policies to Stimulate Saving

- Governments stimulate saving through:
 - Tax consumption (e.g., **value-add tax**—tax paid by a producer on the difference between what it receives from the sales minus the costs)
 - Provide Tax incentives for saving
 - Increase return on saving
 - Reduce budget deficits

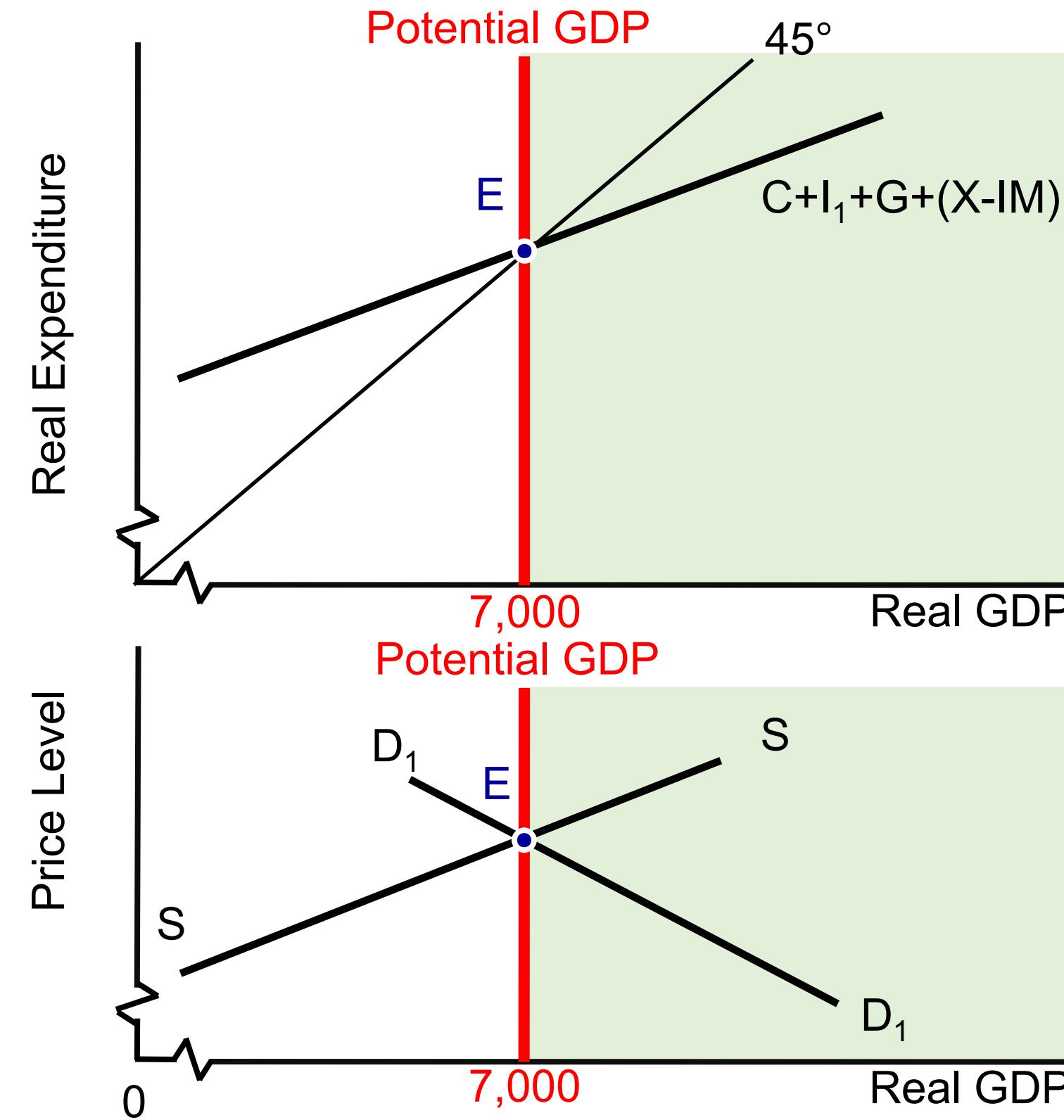
Recessionary and Inflationary Gaps

- Does equilibrium occur before or above potential GDP?
- Inflationary gap
 - Amount by which the equilibrium level of real GDP falls short of potential GDP
 - Excess aggregate demand
- Recessionary gap
 - Amount by which equilibrium real GDP exceeds the full-employment level of GDP
 - Weak aggregate demand

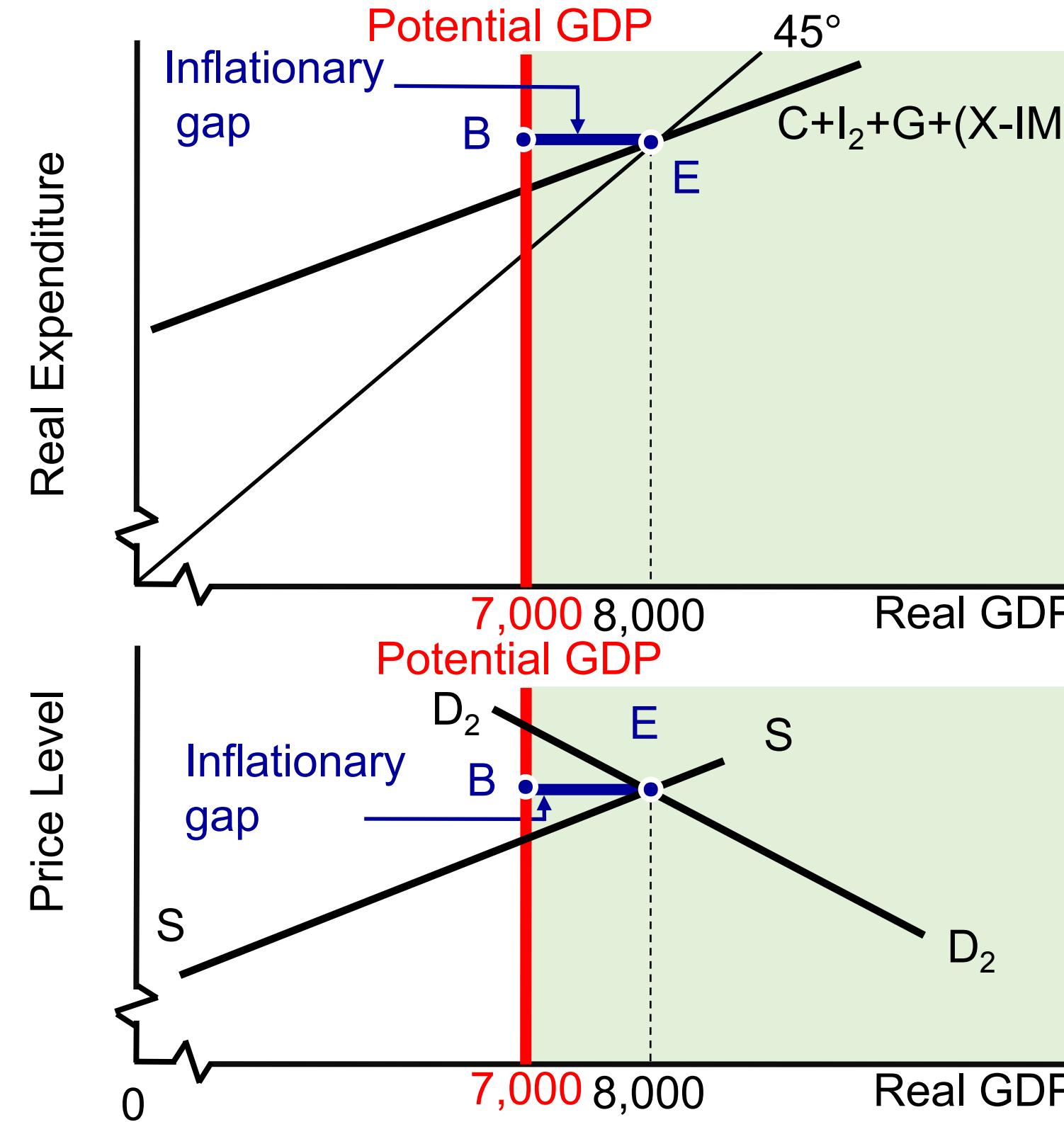
Recessionary and Inflationary Gaps



Recessionary and Inflationary Gaps



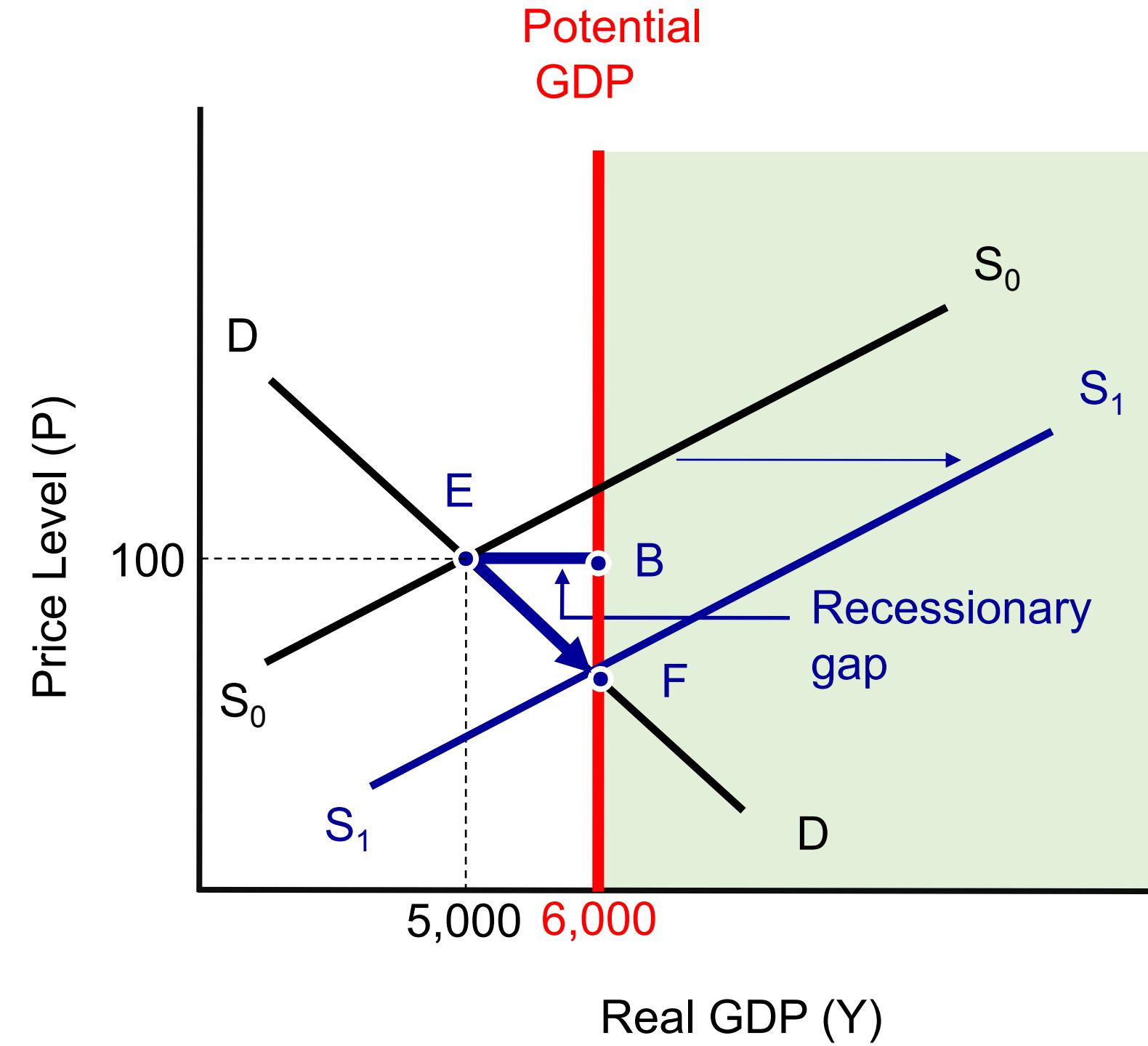
Recessionary and Inflationary Gaps



Adjusting to a Recessionary Gap

- Deflation or Unemployment?
- What happens when there is a recessionary gap?
 - Equilibrium real GDP less than potential GDP
 - Cyclical unemployment
 - If unemployment persistent, wages may fall
 - Aggregate supply increases: shifts outward (right)
 - Price level falls and real GDP increases

The Elimination of a Recessionary Gap



Adjusting to a Recessionary Gap

- Deflation reduces the recessionary gap, bring economy back to potential
- Important catch?
 - This process could take a long time
 - No cases of deflation since WWII in U.S.
 - Japan for last 20 years

Adjusting to a Recessionary Gap

- Why nominal wages and prices won't fall (easily)
- Institutional factors
 - Minimum wage, unions, regulations
- Psychological resistance to wage reduction
- Less severe business cycles
 - Wait out the bad times rather than accept lower wages
- Firms do not want to lose best employees

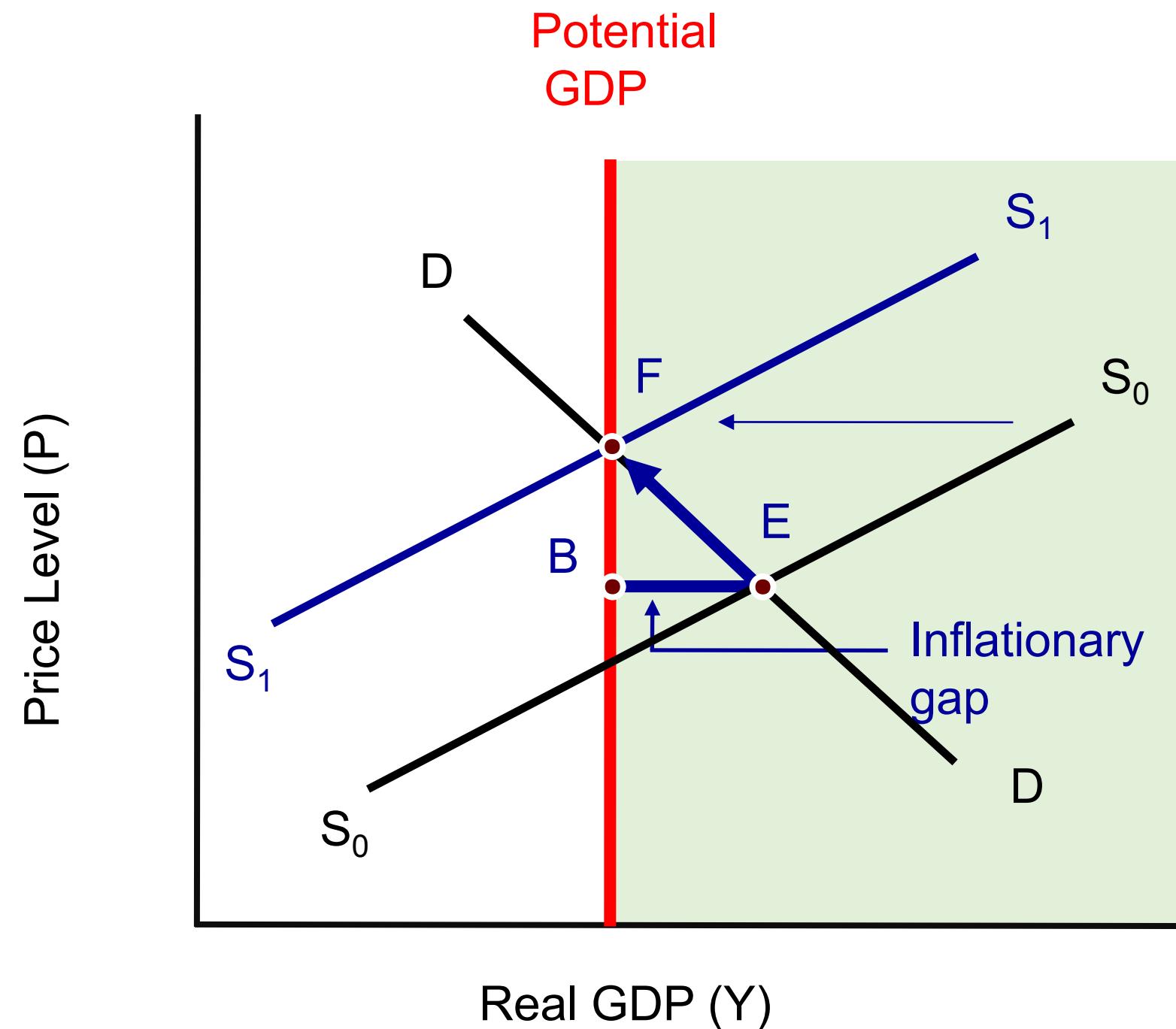
Adjusting to a Recessionary Gap

- Implications of wage and price rigidity?
 - With low aggregate demand, economy can get stuck in recessionary gap for long period
- What about the self-correcting mechanism?
 - The way money wages react to either a recessionary gap or an inflationary gap (effects AS)
 - Problem is that the economy will *eventually* recover
 - Political implications

Adjusting to an Inflationary Gap

- How does economy recover when there is an inflationary gap?
 - Equilibrium real GDP exceeds potential
 - Labour in great demand, so firms start increasing wages
 - Higher wages increase costs, so aggregate supply shifts left
 - Economy returns to potential at a higher price level

The Elimination of an Inflationary Gap



Adjusting to an Inflationary Gap

- Some lessons about inflation in the real world
 - Inflation can result when there is too much aggregate demand relative to potential GDP
 - Inflation can also result as the economy adjusts (AS falls)
- Stagflation
 - Inflation that occurs while the economy is growing slowly or having a recession
 - Normal after excessive aggregate demand

Adjusting to an Inflationary Gap

- What can we conclude from discussion of recessionary and inflationary gaps?
 - A self-correction mechanism tends to eliminate either gap
 - Process works slowly and unevenly
 - Positive effects on either inflation or unemployment may be offset by opposing forces
 - Therefore, mechanism not always reliable

MONEY AND BANKING

Preview

- To understand the meaning of money and how it is measured
- To understand the money creation process
- To examine the link between money, inflation, and the interest rate
- To understand the costs of inflation for households and businesses

What Is Money?

Money is one of the most important inventions of mankind.

- Economists consider ***money*** to be any asset that people are generally willing to accept in exchange for goods and services, or for payment of debts. Money is the most liquid asset.
- A **liquid asset** is an asset that can easily be exchanged for goods and services.
- **Asset:** Anything of value owned by a person or a firm.
- When people talk about money, they usually refer to **currency**
- Money is not the same as:
 - **Wealth:** the total collection of property that serves as a store of value
 - **Income:** a *flow* of earnings per unit of time (money is a *stock*)

WHAT IS MONEY?

➤ Credit Cards

A credit card is not money because it does not make a payment.

When you use your credit card, you create a debt (the outstanding balance on your card account), which you eventually pay off with money.

➤ Debit Cards

A debit card is not money. It is like an electronic check.

It is an electronic equivalent of a paper check.

WHAT IS MONEY?

➤ E-Checks

An e-check is not money.

It is an electronic equivalent of a paper check.

■ An Embryonic New Money: E-Cash



Works like money and when it becomes widely acceptable, it will be money.

Functions of Money?

Money fulfills four primary functions:

- ***Medium of exchange.*** Money is acceptable to a wide variety of parties as a form of payment for goods and services.
- ***Unit of account.*** Money allows a way of measuring value in a standard manner.
- ***Store of value.*** Money allows people to defer consumption till a later date by storing value. Other assets can do this too, but money does it particularly well because it is *liquid*, easily exchanged for goods.
- ***Standard of deferred payment.*** Money facilitates exchanges *across time* when we anticipate that its value in the future will be predictable.

Functions of Money

Question: What function(s) does each item fulfill?

Item	Function			
	Medium of Exchange	Store of Value	Unit of Account	Account
Sea shell				
Gold coin				
Cow				
Ghana Cedi				
Bitcoin				

Functions of Money

Answer:

Item	Function		
	Medium of Exchange	Store of Value	Unit of Account
Sea shell	YES	NO	YES
Gold coin	YES	YES	YES
Cow	YES	YES	NO
Ghana Cedi	YES	YES	YES
Bitcoin	YES	YES	YES

Barter and the invention of money

- Suppose you were living before the invention of money.
- If you wanted to trade, you would have to *barter*, trading goods and services directly for other goods and services.
- Trades would require a *double coincidence of wants*.
- Barter became cumbersome and time consuming as society grew larger and larger
- New and efficient form of money was desired which came to be known as **commodity money**

Barter and the invention of money

Why the Barter System Collapsed

1. Double Coincidence of Wants

Exchange was impossible if interests of parties did not coincide

2. Indivisibility

Difficulty in breaking commodities into smaller bits/units without losing value.

E.g. if you have 2 bags of maize going for a goat, it implies that in a situation where only a bag of maize is available, the only way exchange can take place is to divide the goat into two. By doing so, the goat would lose its life.

Barter and the invention of money

Why the Barter System Collapsed Cont'd

3. Cumbersome/Time-consuming

People having to carry their wares to and fro looking for people who were interested in their wares and who also had what they needed.

4. Universal Swap Rate

Determining the value of goods in terms of others was problematic. E.g. How many cattle could pay for a daughter's bride price?

Commodity Money

commodity money—a physical commodity that is valued in its own right and also used as a means of payment.

or

goods used as money that also have value independent of their use as money—like animal skins or precious metals.

Commodities that have served as money since the inception of the world economy:

- **Muskrat Pelts**-Upper Canada
- **Cowries**-India
- **Whales teeth**-Fiji
- **Beads made from shells**-North America
- **Cakes of Salt**-Ethiopia & Tibet
- **Big stone wheels**- residents on the island of Yap

Commodity Money Cont'd

- Cigarettes- used by prisoners of war in a POW camp during World War II
- Most common commodity money have been coins made from metals such as gold, silver and copper.
- First known coins made in Lydia, a Greek city state at the beginning of the 17th century.
- The new developments in money largely addressed the problems associated with the barter system, but there were fundamental flaws
 1. Constant temptation to cheat on the value of money. These were in 2 forms:
 - a. ***Clipping***. Done by reducing the size of the coins by an imperceptible amount thereby lowering its metallic content.
 - b. ***Debasement***. Creating a coin that has a lower silver or gold content (the balance being made up of some cheap metal)

Commodity Money Cont'd

- Debasement led to a phenomenon known as **Gresham's Law**: the law was stated as “Bad money drives away good money”
 - **Sir Thomas Gresham** (English financial expert in the 16th century) saw that people tend to trade away inferior and hoard the best
2. Problem of **opportunity cost**. Gold or silver that was used as money had alternative uses.
- a. They could be used for jewelry or ornament
 - b. the opportunity cost creates incentives to find alternatives to the commodity itself for use in the exchange process.

One of such alternative was the paper claim commodity money

Paper Money

- The public began depositing their gold with goldsmiths for safekeeping since goldsmiths had secured safes.
- Goldsmiths issued depositors with receipts promising to handover the gold on demand.
- However, deposits by some tended to offset withdrawals by others, the amount of idle cash, or gold, in the vault changed little over time.
- Goldsmiths found that they could earn interest by lending from this pool of idle cash.

Paper Money

- depositors soon grew tired of visiting the goldsmith every time they needed money, they began instructing the goldsmith to pay someone from their account.
- The total claims against the goldsmith consisted of claims by people who had deposited their money plus claims by borrowers for whom the goldsmith had created deposits.
- Because these claims exceeded the value of gold on reserve, this was the beginning of a **fractional reserve banking** system, a system in which bank reserves amounted to just a fraction of total deposits.

Paper Money

- Another way a bank could create money was by issuing bank notes.
- **Bank notes** were pieces of paper promising the bearer specific amounts of gold or silver when the notes were presented to the issuing bank for redemption
- Bank notes that exchange for a specific commodity, such as gold, were called **representative money**.
- The amount of paper money issued by a bank depended on that bank's estimate of the share of notes that would be redeemed.

Paper Money

- The higher the redemption rate, the fewer notes could be issued based on a given amount of reserves.
- Initially, these promises to pay were issued by private individuals or banks, but over time, governments took a larger role in printing and circulating notes.
- Once paper money became widely accepted, it was perhaps inevitable that governments would begin issuing **fiat money**, which derives its status as money from the power of the state, or by *fiat*
- Fiat money is money because the government says so
- The word *fiat* is from the Latin and means “so be it.”

Paper Money

- Fiat money is not redeemable for anything other than more fiat money;
- it is not backed by something of intrinsic value. It is mere *Paper Money*
- Fiat money is declared **legal tender** by the government, meaning that you have made a valid and legal offer of payment of your debt when you pay with such money
- *Gradually, people came to accept fiat money because they believed that others would accept it as well.*
- The currency issued in Ghana and throughout most of the world is fiat money.

Fiat money—advantages and disadvantages

- Fiat money has the advantage that governments do not have to be willing to exchange it for gold or some other commodity on demand.
- This makes central banks more flexible in creating money.
- However it also creates a potential problem: fiat money is only acceptable as long as *households and firms have confidence that if they accept paper dollars in exchange for goods and services, the dollars will not lose much value during the time they hold them.*
- If people stop “believing” in the fiat money, it will cease to be useful.

BASIC CONCEPTS

- **Bitcoins.** are a new form of e-money, owned not by a government or firm, but a product of a decentralized system of linked computers.
 - Bitcoins can be traded for other currencies on web sites.
 - Some web sites accept Bitcoins as a form of payment.
- *Fiat money.* refers to any money, such as paper currency, that is authorized by a central bank or governmental body, and that does not have to be exchanged by the central bank for gold or some other commodity money.
- **Gold standard.** A monetary system in which gold backs up paper money.

BASIC CONCEPTS

- **Liquidity.** Ease with which an asset can be converted into the economy's medium of exchange
- ***Fiduciary Money.*** It is paper money that is not backed by gold or silver. It sets the limits of notes, which can be issued by a central bank at any given point in time.
- ***Near Money.*** It is an asset which can be converted into money. It serves as a store of value but it is not a means of exchange for example shares bonds etc.
- ***Money Substitute.*** It is anything that does not serve as a store of value but serve as a temporary means of exchange, for example a credit card gives the holder a time to purchase goods and services without cash.

Properties of the Ideal Money

➤ **Durable**

Maintain its quality for long periods of time

➤ **Portable**

Easily carried

➤ **Divisible**

Easily divisible into smaller units

Properties of the Ideal Money

➤ Uniform quality

If money is not of uniform quality, people trade away inferior money and hoard the best, so money in circulation is of poor quality

➤ Low opportunity cost

Money shouldn't tie up valuable resources

➤ Maintain a relatively stable value over time

Avoid erratic fluctuations

Six Properties of Ideal Money

Quality	Rationale	Good Examples	Bad Examples
1. Durable	Money should not wear out quickly	Paper money; coins; sea shells	Strawberries; seafood
2. Portable	Money should be easy to carry, even relatively large sums	Diamonds; paper money	Lead bars; corn
3. Divisible	Market exchange is easier if denominations support a range of possible prices	Honey; paper money and coins	Cattle; diamonds
4. Uniform Quality	If money is not of uniform quality, people will hoard the best and spend the rest, reducing the quality in circulation	Salt bricks; paper money; coins	Diamonds
5. Low Opportunity Cost	The fewer resources tied up in creating money, the more available for other uses	Iron coins; paper money	Gold coins; diamonds; corn
6. Stable Value	People are more willing to accept and hold money if they believe it will keep its value over time	Anything whose supply can be limited by the issuing authority, such as paper money	Farm crops

Components of Money

- M_0 = Currency with public (narrow definition of money)
- M_1 = The sum of currency in the hands of the public, demand deposits, other checkable deposits, and traveler's checks. It is a stock measure—it is measured at a point in time
- M_2 = M_1 plus other assets, including deposits in savings and loans accounts and money market mutual funds.
- Beyond M_2 = One of the very broad definitions of money includes the amount of available credit on credit cards (your charge limit minus what you have charged but not paid) as part of the money supply.

Components of Money

- There are no rules for deciding what is and is not money.
- This poses problems for economists and those in charge of economic policy.
- However, *for our purposes, “money” will always refer to transactions money, or M_1 .*

BANKING

- **The Central Bank**

It is the bank at the apex of the banking system of a country. It is an institution designed to oversee or supervise the banking system and regulate the quantity of money in the economy. E.g. Bank of Ghana

BANKING

What constitutes a bank?

A Bank is any institution that performs the essential functions of:

- Accepting deposits
- Offering draft (check writing privileges) and
- Make loans

Apart from the central bank of a nation, all other institutions that perform these functions are technically referred to as commercial banks.

A **commercial bank** is thus, any bank that accepts deposit and transacts business (including creating credit) with the aim of making profit.

The Central Bank

- It is the Bank at the apex of the banking system of a country
- It is designed to oversee or supervise the banking system and regulate the quantity of money in the economy
- It is normally referred to as the government's bank because of its involvement in controlling economic activities through the monetary system
- The primary aim of a Central Bank is not profit maximisation
- The Central Bank of Ghana is known as the Bank of Ghana (BoG)

BANKING

• Functions of the Central Bank

1. Supervision of the financial system
2. Issues and withdraws notes and coins
3. Government's Bank
4. Management and administration of national debt
5. Implementation of Monetary Policy
6. Acts As Government's Monetary Agent Abroad
7. Acting As The Banker's Bank
8. Lender of Last Resort
9. Manages the Exchange Rate Policy
10. Research Work

BANKING

Commercial Banks

any bank that accepts deposit and transacts business (including creating credit) with the aim of making profit

Functions of Commercial Banks

1. Accepting Deposits
2. Lending Money to Their Customers
 - a. Offer Overdraft Facility
 - b. Advancing Loans to Customers
 - c. Discounting Bills of Exchange

BANKING

Functions of Commercial Banks Cont'd

3. Act as Agents to Their Customers
4. Foreign Trade Financiers
5. Store of Valuables for Their Customers
6. Acts as Agents to their Customers
7. Foreign Trade and Currency Transfer
8. Provision of Safe custody for Customers' Valuables
9. Investing in the Economy
10. Acts as Trustees and Executors of Wills
11. Payment of Wages on Behalf of their Customers and the Government
12. Business and Investment Advice

MONEY/CREDIT CREATION

A Bank's Balance Sheet: Where the Money Comes from and Where It Goes

- **Balance sheet.** An account statement for a bank that shows the sources of its funds (liabilities) as well as the uses of its funds (assets).
- **Liabilities.** The sources of funds for a bank, including deposits and owners' equity.
- **Assets.** The uses of the funds of a bank, including loans and reserves
- **Owners' equity.** The funds provided to a bank by its owners.

MONEY/CREDIT CREATION

- **Reserves.** The portion of banks' deposits set aside in either vault cash or as deposits at the Central Bank.
- **Required reserves.** The specific fraction of their deposits that banks are required by law to hold as reserves.
- **Excess reserves.** Any additional reserves that a bank holds above required reserves.
- **Reserve ratio.** The ratio of reserves to deposits.
- **Money multiplier.** The ratio of the increase in total checking account deposits to an initial cash deposit.

MONEY/CREDIT CREATION

- Commercial banks create money out of a system called **fractional-reserve banking**.
- **Fractional-reserve banking** is a banking system in which banks hold only a fraction of deposits as reserves
- To explain this concept let us make the following assumptions:
 1. There is only one commercial bank in the economy with other branches.
 2. Highly Monetized Economy: This simply means that citizens have confidence in the nation's money and the banking system. People keep current accounts with the banks and have confidence that prompt payment will be effected on demand.

MONEY/CREDIT CREATION

► Assumptions Cont'd

3. No Cash Drain in The System: Money's withdrawn from the banks returns to the banking system. Money recycles only within the monopoly bank.
4. The people in the economy use only cheques in transacting business.
5. The **reserve ratio or cash ratio** – the fraction of total deposits that the bank holds as reserves – is 10%.
6. Constant Cash Ratio: We assume that the cash ratio does not vary in the process of deposit creation.
7. All residents have account in the bank.
8. The aim of the bank is profit maximization.
9. The only investment opportunity is the giving out of loans.

MONEY/CREDIT CREATION

DEPOSIT CREATION PROCESS

Assume that somebody deposits GH¢1000.00 with the bank

- The balance sheet of the bank before and after granting the loan will look like as shown

The Balance sheet of Bank A before granting loans

Assets GH¢		Liabilities GH¢
Cash	1,000	Deposits 1,000
Total	1,000	1,000

MONEY/CREDIT CREATION

- If the bank keeps only a fraction of the deposit against possible withdrawal and lends out the rest, then its balance sheet will be as shown

The Balance sheet of Bank A after granting loans

Assets GH₵		Liabilities GH₵
Reserves	100	Deposits 1,000
Loans	900	
Total	1,000	1,000

- The bank has GH₵ 1,000.00 in liabilities because it will have to pay its customers anytime they call for money. However, it has two kinds of assets: It has GH₵ 100.00 of reserves in its vault, and it has loans of GH₵ 900.00

MONEY/CREDIT CREATION

- The loans are liabilities of the people taking out the loans, but assets of the bank making the loans, because the borrowers will later repay the bank.
- In total, the bank's assets equal its liabilities.
- Before the bank makes any loans, the money supply is the GH¢ 1,000 of deposits in the bank.
- money supply increases when the bank makes these loans
- when banks hold only a fraction of deposits in reserve, they create money.
- The creation of money does not stop with the first borrower..

MONEY/CREDIT CREATION

Suppose the first borrower buys something worth GH¢900.00 (using a cheque) from someone, who also pays the amount into his account in the same bank

- The bank keeps assets of GH¢90 in reserve and makes GH¢810 in loans as shown
- the bank creates an additional GH¢810 of money

The Balance sheet of Bank B after granting loans

Assets GH¢		Liabilities GH¢
Reserves	90	Deposits 900
Loans	810	
Total	900	900

MONEY/CREDIT CREATION

- The process goes on and on. Each time that money is deposited and a bank loan is made, more money is created.
- How much money is eventually created in this economy? Let us add up:

Original deposit = GH₵1000

Bank A lending = GH₵900 [= 0.9 * 1000]

Bank B lending = GH₵810 [= 0.9 * 900]

Bank C lending = GH₵729 [= 0.9 * 810]

•

•

•

Total money supply = GH₵10,000

MONEY/CREDIT CREATION

PERIOD	CUSTOMER	P.C.C	C.R	E.R.
1	A	1000	100	900
2	B	900	90	810
3	C	810	81	729
4	D	729	72.9	656.1
.	E	656.1	65.6	590.5
.
.
.
.	.	0	0	0
TOTAL		10,000	1000	9000

MONEY/CREDIT CREATION

- Even though this process of money creation can continue forever, it does not create an infinite amount of money
- If you add the infinite sequence of numbers in the foregoing example, you find that the GH₵1,000 of reserves generate GH₵10,000 of money.
- *Minimum Required* $\frac{\text{Reserve}}{\text{Cash}} \text{reserve} = \frac{10}{100} \times 1000 = 100$
- Therefore, Excess reserve = GH₵1000 - GH₵100 = GH₵900

The Money Multiplier

An increase in bank reserves leads to a greater than one-for-one increase in the money supply.

Economists call the relationship between the final change in deposits and the change in reserves that caused this change the money multiplier.

money multiplier The multiple by which deposits can increase for every Ghana cedi increase in reserves; equal to 1 divided by the required reserve ratio.

$$\text{money multiplier} \equiv \frac{1}{\text{required reserve ratio}}$$

In Ghana, the required reserve ratio varies depending on the size of the bank and the type of deposit.

MONEY/CREDIT CREATION

- For large banks and for checking deposits, the ratio is currently 10 percent, which makes the potential money multiplier $1/.10 = 10$.
- This means that an increase in reserves of GH₵1 could cause an increase in deposits of GH₵10 if there were no leakage out of the system. From the above, we observe that:
- change in stock of money(ΔM) = $ER \times RM \Rightarrow 900 \times 10 = \text{GH₵9,000}$
- change in the total deposit(ΔD) = $RM \times \text{Initial Deposit} = 10 \times 1,000 = \text{GH₵10,000}$
- In sum the ability of the commercial bank to create deposit depends on
 - 1.The size of their total reserves and
 - 2.The cash ratio / Excess reserve

Factors that Determine the Money Supply

- Changes in the nonborrowed monetary base
 - *The money supply is positively related to the non-borrowed monetary base MB_n*
- Changes in borrowed reserves from the BoG
 - *The money supply is positively related to the level of borrowed reserves, BR , from the BoG*

Factors that Determine the Money Supply (cont'd)

- Changes in the required reserves ratio
 - *The money supply is negatively related to the required reserve ratio*
 rr
- Changes in currency holdings
 - *The money supply is negatively related to currency holdings*
- Changes in excess reserves
 - *The money supply is negatively related to the amount of excess reserves*

The Money Multiplier

- Define money as currency plus checkable deposits: M1
- The **money multiplier** (m) tells us how much the money supply (M) changes for a given change in the monetary base (MB):

$$M = m \times MB$$

Deriving the Money Multiplier

- Assume that the desired holdings of currency (C) and excess reserves (ER) grow proportionally with checkable deposits (D), then:

$$c = \{C/D\} = \text{currency ratio}$$

$$e = \{ER/D\} = \text{excess reserves ratio}$$

Deriving the Money Multiplier (cont'd)

The total amount of reserves (R) equals the sum of required reserves (RR) and excess reserves (ER).

$$R = RR + ER$$

The total amount of required reserves equals the required reserve ratio times the amount of checkable deposits

$$RR = rr \times D$$

Substituting for RR in the first equation

$$R = (rr \times D) + ER$$

The BoG sets rr to less than 1

G

Deriving the Money Multiplier (cont'd)

- Because the monetary base MB equals currency (C) plus reserves (R):

$$MB = R + C = (rr \times D) + ER + C$$

- This equation reveals the amount of the monetary base needed to support the existing amounts of checkable deposits, currency and excess reserves.

Deriving the Money Multiplier (cont'd)

$$c = \{C / D\} \Rightarrow C = c \times D$$

$$e = \{ER / D\} \Rightarrow ER = e \times D$$

Substituting in the previous equation:

$$MB = (rr \times D) + (e \times D) + (c \times D) = (r + e + c) \times D$$

Divide both sides by the term in parentheses:

$$D = \frac{1}{r + e + c} \times MB$$

Because $M = D + C$ and $C = c \times D$:

$$M = D + (c \times D) = (1 + c) \times D$$

Substituting again:

$$M = \frac{1 + c}{r + e + c} \times MB$$

The money multiplier is therefore:

$$m = \frac{1 + c}{r + e + c}$$

Intuition Behind the Money Multiplier

- What is the value of the money multiplier given the following information?

rr = required reserve ratio = 0.10

C = currency in circulation = \$400 billion

D = checkable deposits = \$800 billion

ER = excess reserves = \$0.8 billion

M = money supply ($M1$) = $C + D$ = \$1,200 billion

Intuition Behind the Money Multiplier (cont'd)

$$c = \frac{\$400 \text{ billion}}{\$800 \text{ billion}} = 0.5$$

$$e = \frac{\$0.8 \text{ billion}}{\$800 \text{ billion}} = 0.001$$

$$m = \frac{1 + 0.5}{0.1 + 0.001 + 0.5} = \frac{1.5}{0.601} = 2.5$$

- The money multiplier is less than the multiple deposit expansion of 10 in the simple model.
- *Although there is multiple expansion of deposits, there is no such expansion for currency*

Money Supply Response to Changes in the Factors

- Because the monetary base (MB) is the sum of nonborrowed base (MB_n) and borrowed reserves (BR):

$$MB = MB_n + BR$$

- *A rise in MB_n or BR raises the money supply by m*

Money Supply Response to Changes in the Factors (cont'd)

- If rr increases from 10% to 15%, then m falls to:

$$m = \frac{1 + 0.5}{0.15 + 0.001 + 0.5} = \frac{1.5}{0.651} = 2.3$$

- If c rises from 0.5 to 0.75, then m falls to:

$$m = \frac{1 + 0.75}{0.1 + 0.001 + 0.75} = \frac{1.75}{0.851} = 2.06$$

- If e rises from 0.001 to 0.005, then m falls to:

$$m = \frac{1 + 0.5}{0.1 + 0.005 + 0.5} = \frac{1.5}{0.605} = 2.48$$

Factors affecting the Deposit Creation Process

1. People looking for alternative sources of funds other than from the bank
2. The demand for cash by clients may be hampered by stringent requirements
3. The cash deposit made at the commercial banks
4. Instrument of Monetary Policy
5. Leakages in The Circulation Process
6. The Degree of Monetisation in The Economy

TOOLS OF MONETARY CONTROL

1. Open-Market Operations (OMO)

- The purchase and sale by the BoG of government securities in the open market; a tool used to expand or contract the amount of reserves in the system and thus the money supply.
- When the BoG purchases a security, it pays for it by writing a check that, when cleared, *expands* the quantity of reserves in the system, increasing the money supply. When the BoG sells a bond, private citizens or institutions pay for it with their bank deposits, which *reduces* the quantity of reserves in the system.

2. Reserve Requirements

The Central Bank influences the money supply with reserve requirements, which are regulations on the minimum amount of reserves that banks must hold against deposits.

TOOLS OF MONETARY CONTROL

3. The Discount Rate

This is the interest rate on loans that the central bank makes to the banks. The central bank can alter the money supply by changing the discount rate.

4. Moral Suasion

Moral suasion as the name implies is just an appeal from the central bank to the commercial banks to, for example, reduce money creation when there is inflation. It is not binding on the banks

5. Special Deposits

the central bank just asks the banks to deposit more of the excess cash with it so as to reduce their ability to create more credit. This normally happens when there is too much money in circulation that is causing inflation.

TOOLS OF MONETARY CONTROL

6. Directives / Selective Credit Control

With this policy, the central bank directs the banks as to how much credit they are to give to the various sectors of the economy

Quantity Theory of Money

- The *quantity theory of money* is the product of the **classical economists**, also known as **classicals**, who assumed that wages and prices were completely flexible
- American economist Irving Fisher gave a clear exposition of this theory in his influential book, *The Purchasing Power of Money*, published in 1911

Velocity of Money and the Equation of Exchange

- The link between the total quantity of money (M) and the total amount of spending on goods and services produced ($P \times Y$) is the velocity of money (V):

$$V = \frac{P \times Y}{M}$$

Velocity of Money and the Equation of Exchange

- The **equation of exchange** relates nominal income to the quantity of money and velocity:

$$M \times V = P \times Y$$

Velocity of Money and the Equation of Exchange

- The **demand for money** (M^d) is the quantity of money that people want to hold
- M^d can be obtained from dividing the equation of exchange by V :

$$M = \frac{1}{V} \times PY$$

Velocity of Money and the Equation of Exchange

- Assuming V is constant, the demand for *real money balances*:

$$\frac{M^d}{P} = k \times Y$$

where $k=1/V$

From the Equation of Exchange to the Quantity Theory of Money

- According to Fisher, V is fairly constant at \bar{V} in the short run
- This transforms the equation of exchange into the **quantity theory of money**—nominal income is determined solely by movements in the quantity of money:

$$P \times Y = M \times \bar{V}$$

The Classical Dichotomy

- Classical economists viewed wages and prices as flexible, so that prices of goods and service and factor prices would fully adjust to the level that equates the supply and demand for a particular good or service in the long run
- **Classical dichotomy:**
 - In the long run there is a complete separation between the real side of the economy and the nominal side
 - The amounts of goods and services produced in an economy in the long run is not affected by the price level

Quantity Theory and the Price Level

- Assuming that Y is fixed at \bar{Y} so that the price level in the quantity theory of money becomes:

$$P = \frac{M \times \bar{V}}{\bar{Y}}$$

- This implies that, in the long run, *changes in the quantity of money lead to proportional changes in the price level*
- This view is also known as the **neutrality of money**—the money supply has no impact on real variables

Quantity Theory and Inflation

- A theory of inflation can be obtained by rewriting the equation of exchange as:

$$\% \Delta M + \% \Delta V = \% \Delta P + \% \Delta Y$$

- If V is constant, the inflation rate (π) becomes:

$$\pi = \% \Delta P = \% \Delta M - \% \Delta Y$$

- *The quantity theory of inflation indicates that the inflation rate equals the growth rate of the money supply minus the growth rate of aggregate output*

Keynesian Theories of Money Demand

Three motives behind the demand for money in Keynes' liquidity preference theory:

1. Transactions motive

- People hold money to carry out everyday transactions
- Affected by payment technology (e.g., credit cards)

2. Precautionary motive

- Money holding as a cushion against unexpected needs
- Proportional to income, Y

3. Speculative motive

- Money as a store of wealth
- As the interest rate i rises, the opportunity cost of money rises (it is more costly to hold money relative to bonds) and the quantity of money demanded falls

Putting the Three Motives Together

- Keynes' liquidity preference function that combines the 3 motives together:

$$\frac{M^d}{P} = L(i, Y)$$

— +

- An important implication is that velocity, V , is not a constant but will fluctuate with changes in interest rates. This is because $P/M^d = 1/L(i, Y)$, so that (assuming $M^d = M$):

$$V = \frac{PY}{M} = \frac{Y}{L(i, Y)}$$

Other Factors That Affect the Demand for Money

- Risk
 - When the stock market becomes more volatile, the demand for money, which is perceived as less risky, increases
 - An increase in the variability of the real return on money reduces its money as people shift into alternative assets as **inflation hedges**
- Liquidity of other assets
 - The development of new liquid assets, e.g., money market mutual funds, reduces the relative liquidity of money, so that the demand for money falls

FACTORS THAT DETERMINE THE DEMAND FOR MONEY

FACTORS THAT DETERMINE THE DEMAND FOR MONEY

Variable	Change in Variable	Money Demand Response	Reason
Interest rates	↑	↓	Opportunity cost of money rises
Income	↑	↑	Higher transactions
Payment technology	↑	↓	Less need for money in transactions
Wealth	↑	↑	More resources to put into money
Risk of other assets	↑	↑	Money relatively less risky and so more desirable
Inflation risk	↑	↓	Money relatively more risky and so less desirable
Liquidity of other assets	↑	↓	Money relatively less liquid and so less desirable

The Money Market and Interest Rates

- The **liquidity preference framework** determines the equilibrium nominal interest rate by equating the supply of and demand for money
- John Maynard Keynes developed a theory of money demand that he described as *liquidity preference theory*
- **Real money balances**—the quantity of money in real terms—reflect how much money people want to hold (demand)

Liquidity Preference and the Demand for Money

- According to Keynes, the demand for money can be expressed in the form of the **liquidity preference function**:

$$M^d / P = L(i, Y)$$

- +

where

i = nominal interest rate

Y = nominal income

- Why are real money balances negatively related to i ?
 - i represents the opportunity cost of holding money

Liquidity Preference and the Demand for Money (cont'd)

- Why are real money balances positively related to Y ?
 - As income rises, households and firms conduct more transactions and so keep more money on hand to make purchases
 - Higher incomes make households and firms wealthier, and the wealthy tend to hold larger quantities of all financial assets, including money

Demand Curve for Money

- In short-run analysis, prices are assumed to be sticky so the price level is fixed at \bar{P}
- All else being equal, lower real interest rates mean the opportunity cost of holding money falls, so that firms and households desire to higher quantities of real money balances
- As a result, the demand curve for money slopes downward

Supply Curve for Money

- The Central Bank fixes the money supply by open market operations
- When the Central Bank buys (sells) government securities in open market operations, it increases (decreases) deposits at banks, so that bank **reserves** and liquidity in the banking system increase (decrease)

Supply Curve for Money

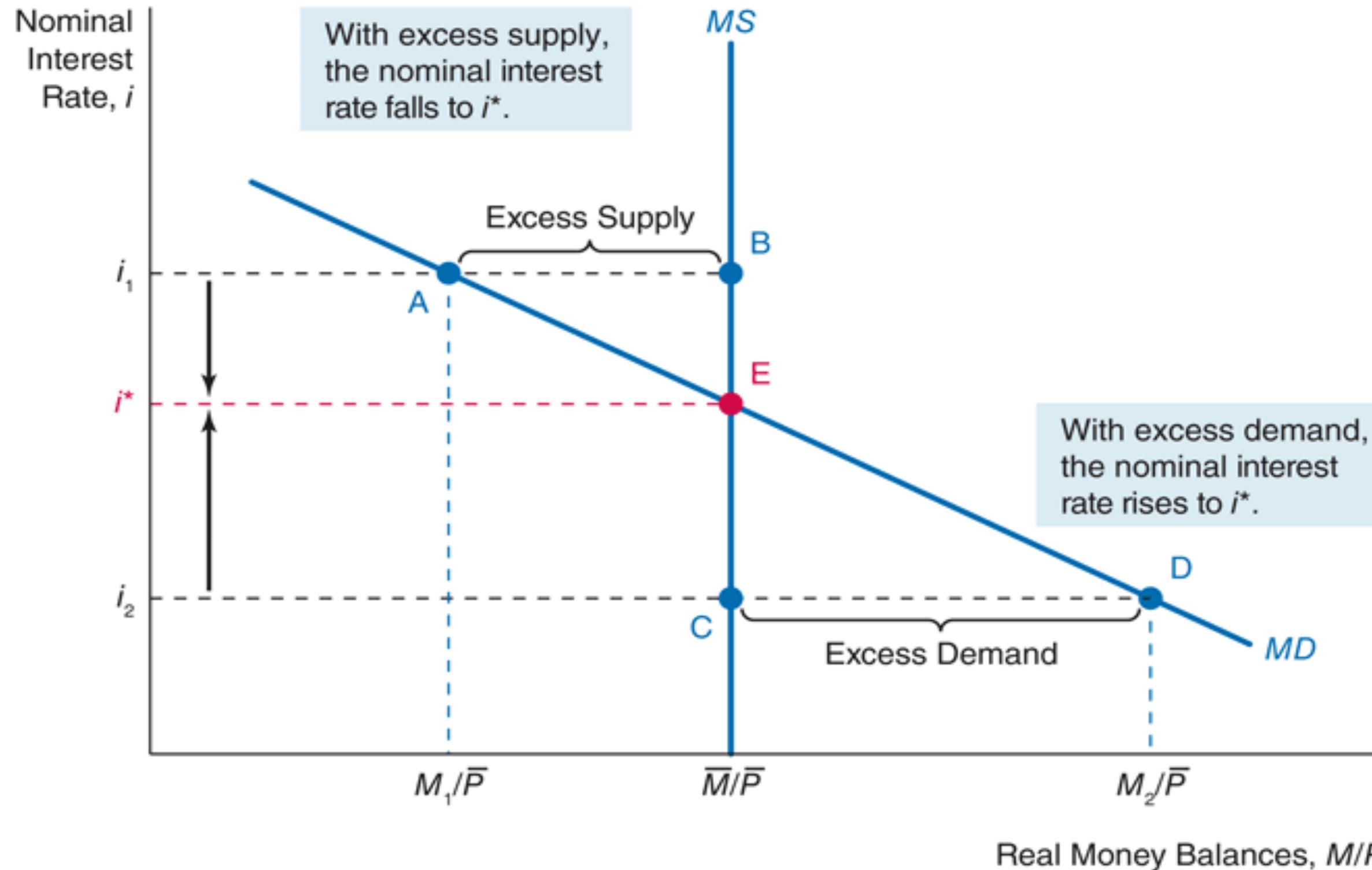
- *An open market purchase leads to an increase in liquidity and the money supply*
- *An open market sale of government securities leads to a decrease in liquidity and a decrease in the money supply*

Supply Curve for Money (cont'd)

- The supply curve for money (MS) shows the quantity of real money balances supplied at each price level
- The line MS is a vertical line because:
 - The money supply is fixed by the Central Bank at \bar{M}
 - The price level in the short run is fixed at \bar{P}
 - Thus, the quantity of real money balances supplied is

$$M^s / P = \bar{M} / \bar{P}$$

Equilibrium in the Money Market



Equilibrium in the Money Market

- Equilibrium in the money market occurs when the quantity of real money balances demanded equals the quantity of real money balances supplied:

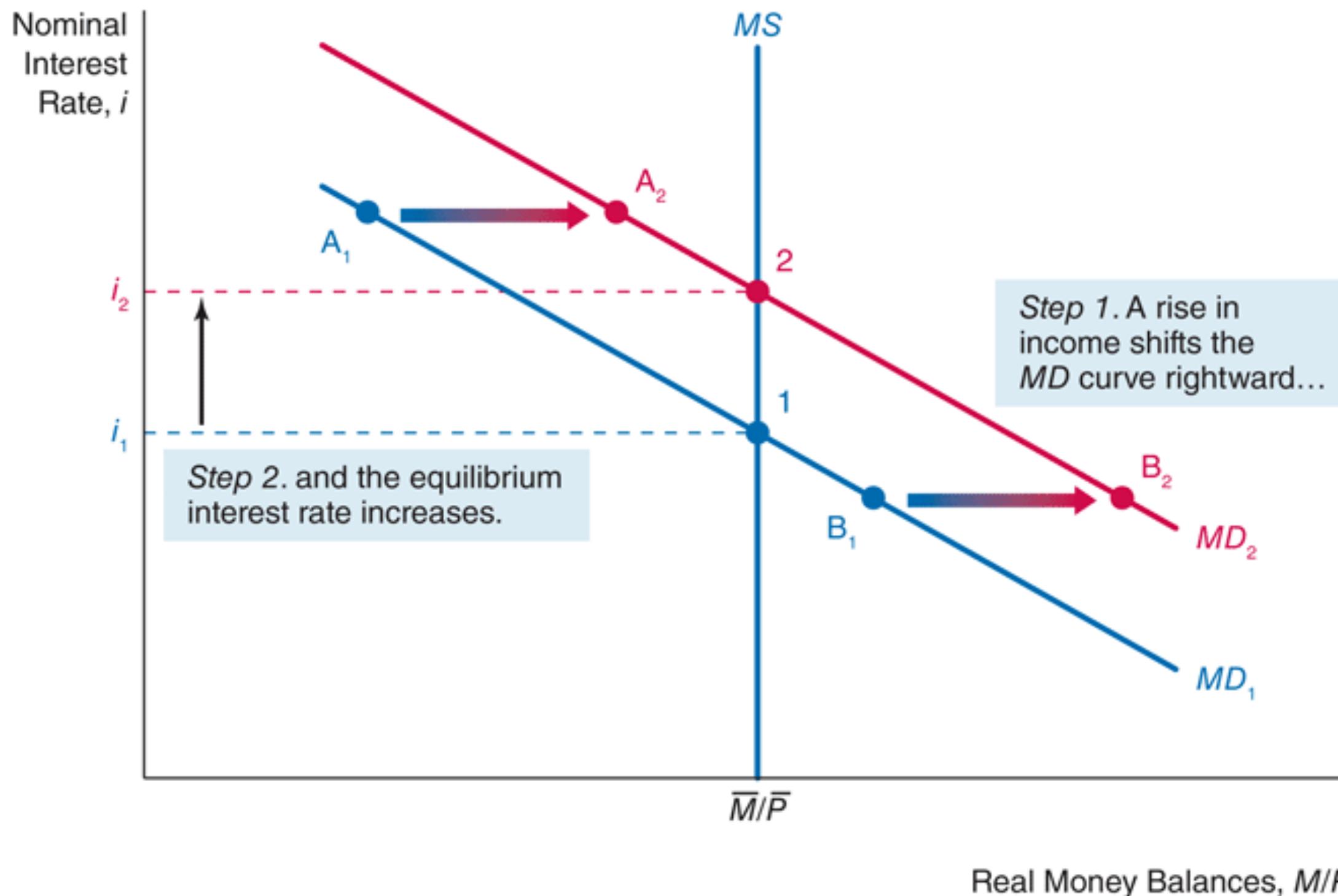
$$\frac{M^d}{P} = \frac{M^s}{P}$$

- Graphically, equilibrium occurs where MD and MS curves intersect at i^*
- An excess supply (demand) of money results in a decrease (an increase) in i

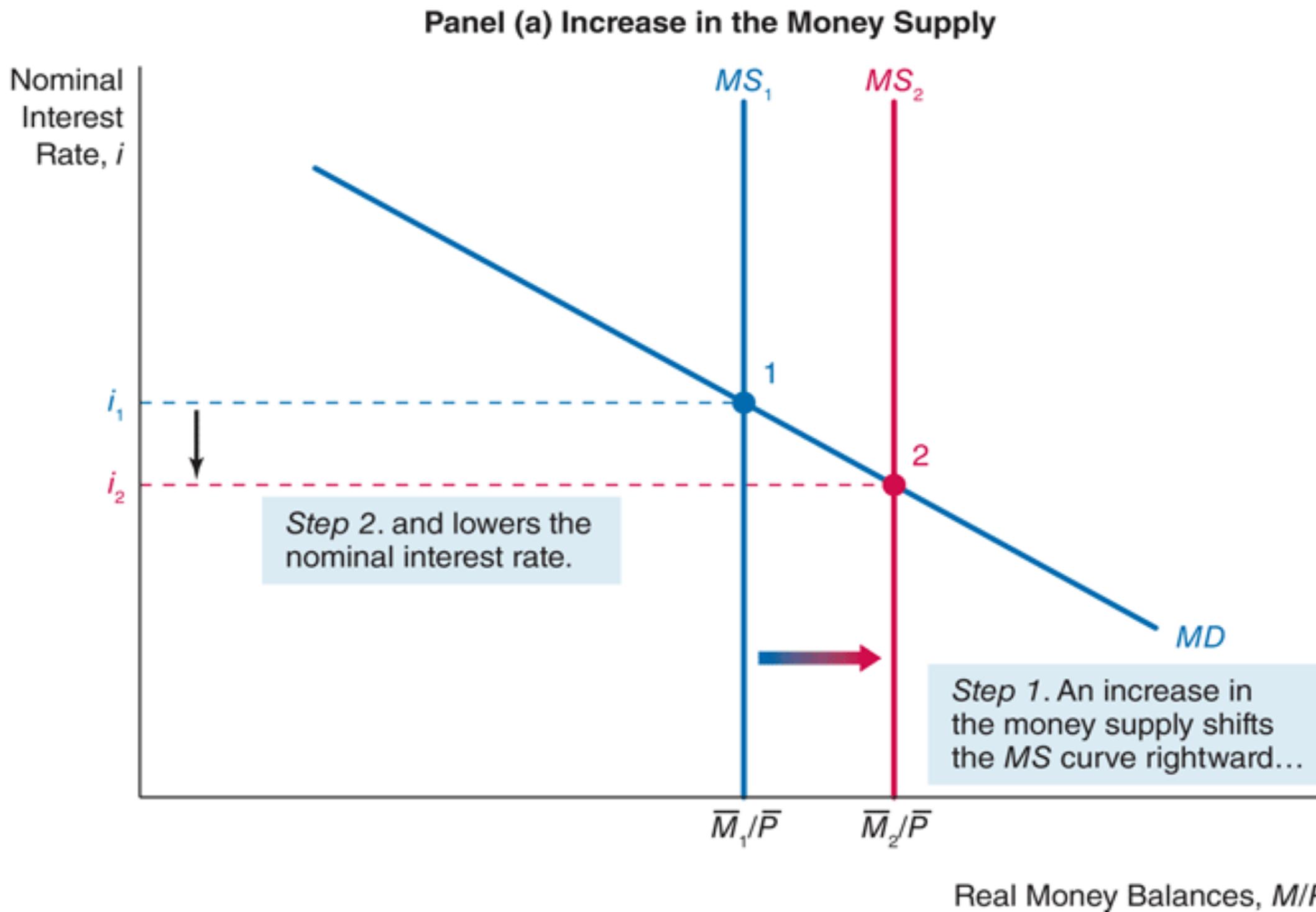
Changes in the Equilibrium Interest Rate

- A shift in the MD (or MS) curve occurs when the quantity demanded (or supplied) changes at each given interest rate in response to a change in some other factor besides the interest rate
- Examples of factors that shifts the MD or MS :
 - When income rises, MD shifts to the right and so interest rates will rise
 - When the money supply increases, MS shifts to the right and so interest rates will decline
 - When the price level rises, MS shifts to the right and so interest rates will rise

Response to Shift in the Demand Curve from a Rise in Income

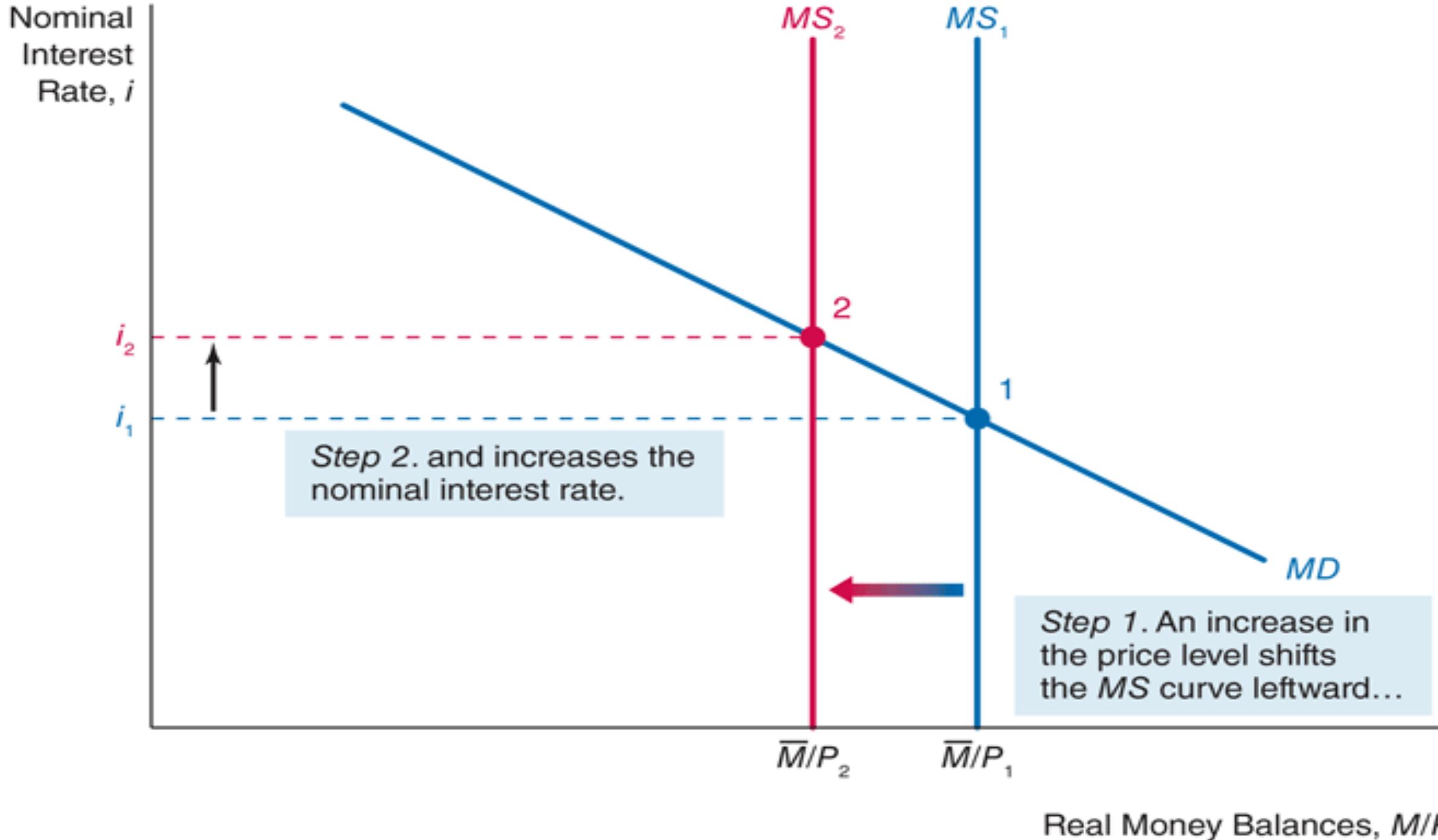


Response to Shifts in the Supply Curve (a)



Response to Shifts in the Supply Curve (b)

Panel (b) Increase in the Price Level



INFLATION AND UNEMPLOYMENT

Inflation: Its Measure and Sources

➤ Inflation

persistent and appreciable increase in the general price level of goods and services and factors of production

or

Sustained increase in economy's average price level

➤ Annual inflation rate

Percentage increase in the average price level from one year to the next

Inflation: Its Measure and Sources

- **Deflation**

Sustained decrease in price level

- **Disinflation**

Reduction in the rate of inflation

Types of Inflation

1. SUPPRESSED INFLATION

It occurs when tough price and wage controls are introduced to prevent or restrain the price level from rising. This does not eliminate the underlying inflationary pressures.

2. CREEPING INFLATION

It is experienced when the inflationary rate is fairly stable from year to year, averaging less than 5 per cent, with the price level gradually creeping upwards

Types of Inflation

3. STRATO-INFLATION

the inflation rate ranges from about 10 per cent to several hundred per cent without ever completely spiraling into a hyper-inflation

4. HYPER-INFLATION / GALLOPING INFLATION

When the inflation rate accelerates to several hundred to many thousands per cent per day then, we have hyperinflation. The famous German inflation of 1923 was a hyperinflation, in which the inflation rate accelerated to several hundred per cent per day

Types of Inflation

5. STAGFLATION

Stagflation or slumpflation combine stagnation in output and economic activity with price inflation.

6. BOTTLENECK INFLATION

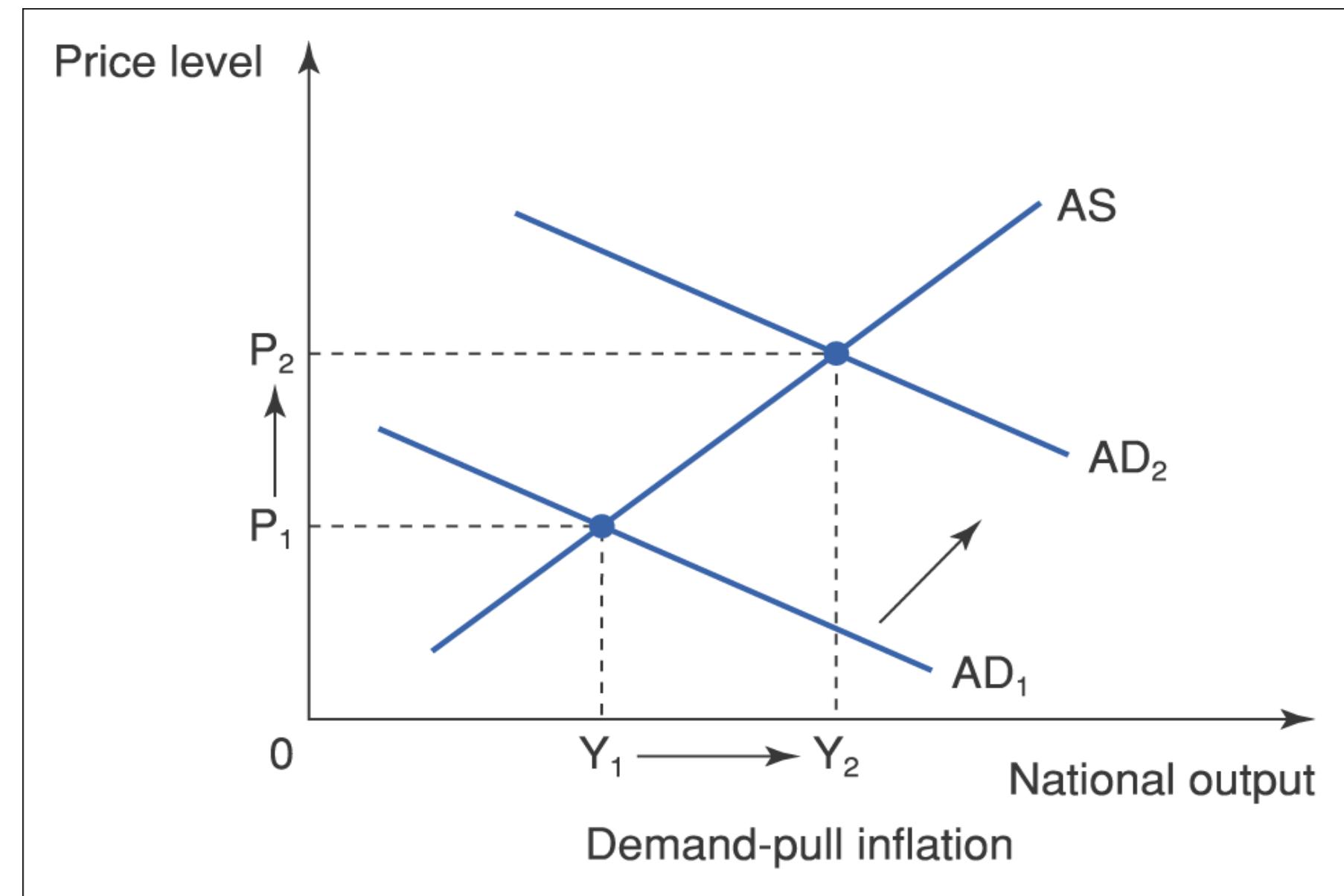
Inflation that arises due to supply bottlenecks

Two Sources of Inflation

Demand-pull inflation

- This is seen as being caused mainly by an increase in the components of aggregate demand (i.e. C or I or G or X).
- A rise in any of these components will, other things equal, shift the aggregate demand curve upwards and to the right.
- The increase in AD may be caused by an increase in consumer expenditure (not associated with an increase in income), government expenditure, investment by firms or foreigners' demand for domestic goods and services

Demand-pull inflation



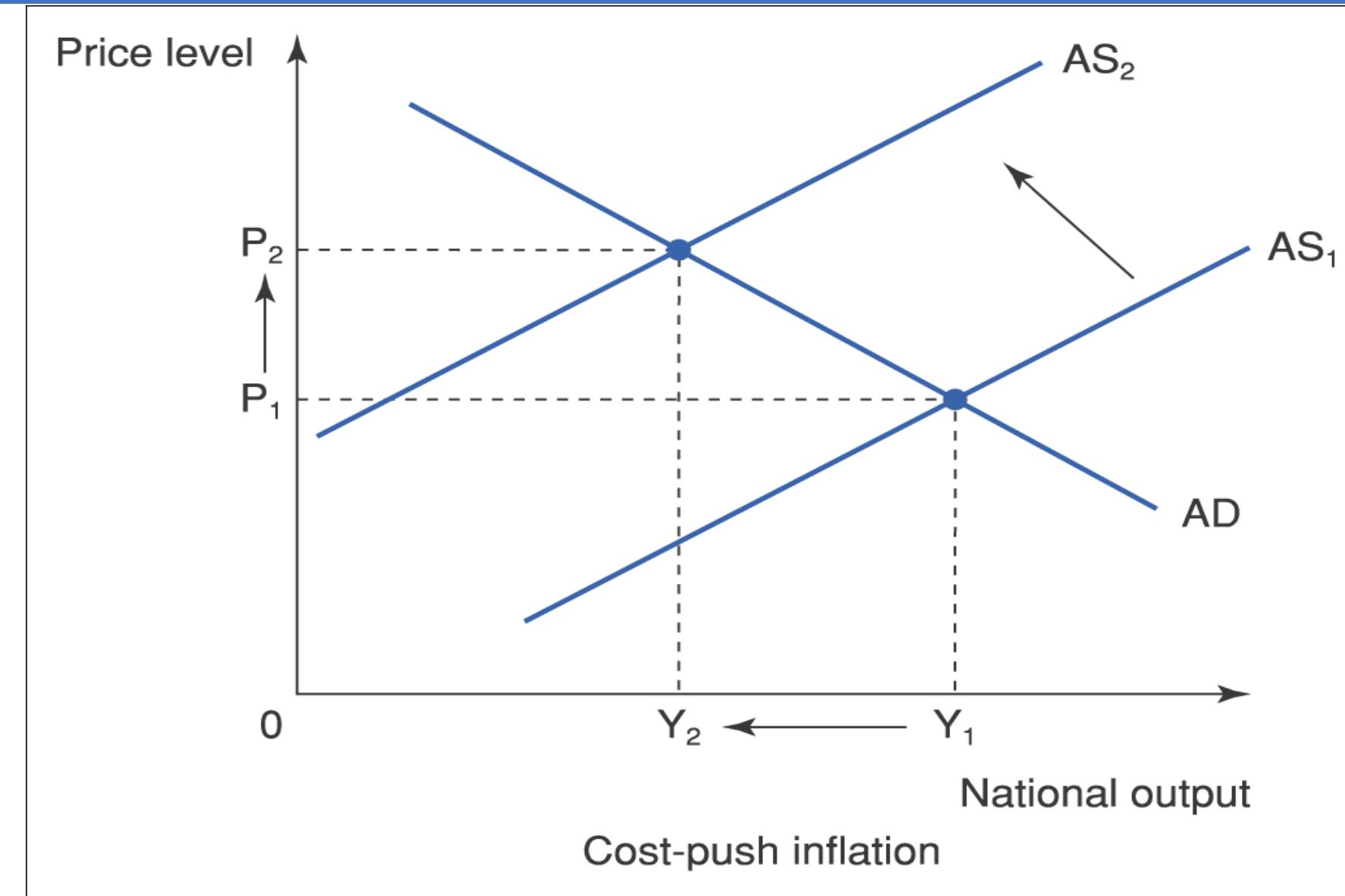
Demand-pull inflation can be caused by an increase in aggregate demand (AD). This can be illustrated by a shift in AD from AD_1 to AD_2 and the resulting increase in the price level from P_1 to P_2 .

Two Sources of Inflation

Cost-push inflation

- This is seen as being caused mainly by an increase in the costs of production, which occurs independently of the level of aggregate demand.
- Firms then pass on these higher costs to consumers in the form of higher prices.
- Profit margins are reduced for many firms, some of which exit the market.
- Aggregate supply therefore shifts upwards and to the left, with less output supplied at any given price.

Cost-push inflation



Cost-push inflation occurs when there is an increase in the cost of production not associated with AD. If a firm's costs increase they will react by increasing their prices and reducing production. This is represented by a shift to the left in the AS curve and results in an increase in the price level, P₁ to P₂, and a reduction in the real national income from Y₁ to Y₂.

The Costs of Inflation

- Inflation fallacy
 - “Inflation robs people of the purchasing power of his hard-earned dollars”
- When prices rise
 - Buyers pay more
 - Sellers get more
- Inflation does not in itself reduce people's real purchasing power

The Costs of Inflation

Shoe-leather costs

- arise from an increase in the velocity of circulation of money and an increase in the amount of running around that people do to try to avoid incurring losses from the falling value of money
 - Resources wasted when inflation encourages people to reduce their money holdings
 - Can be substantial

Menu costs

- The costs associated with changing prices and printing new price lists when there is inflation
- Inflation – increases menu costs that firms must bear

Relative-Price Variability

- Market economies
 - Relative prices allocate scarce resources
 - Consumers compare quality and prices of various goods and services
 - Determine allocation of scarce factors of production
 - Inflation distorts relative prices
 - Consumer decisions are distorted
 - Markets are less able to allocate resources to their best use

Inflation-Induced Tax Distortions

- Taxes distort incentives
 - Many taxes: more problematic in the presence of inflation
- Tax treatment of capital gains
 - Capital gains are profits
 - Sell an asset for more than its purchase price
 - Inflation discourages saving
 - Exaggerates the size of capital gains
 - Increases the tax burden

Inflation-Induced Tax Distortions

- **Tax treatment of interest income**
 - Nominal interest earned on savings
 - Treated as income
 - Even though part of the nominal interest rate compensates for inflation
- **Higher inflation**
 - Tends to discourage people from saving

How Inflation Raises the Tax Burden on Saving

	Economy A (price stability)	Economy B (inflation)
Real interest rate	4%	4%
Inflation rate	0	8
Nominal interest rate (real interest rate + inflation rate)	4	12
Reduced interest due to 25 percent tax ($0.25 \times$ nominal interest rate)	1	3
After-tax nominal interest rate ($0.75 \times$ nominal interest rate)	3	9
After-tax real interest rate (after-tax nominal interest rate minus inflation rate)	3	1

In the presence of zero inflation, a 25 percent tax on interest income reduces the real interest rate from 4 percent to 3 percent. In the presence of 8 percent inflation, the same tax reduces the real interest rate from 4 percent to 1 percent.

The Inflation Tax

- The inflation tax
 - Revenue the government raises by creating (printing) money
 - Tax on everyone who holds money
 - When the government prints money
 - The price level rises
 - And the Ghana cedis in your wallet are less valuable

Confusion and Inconvenience

- **Money**
 - Yardstick with which we measure economic transactions
- **The BoG's job**
 - Ensure the reliability of money
- **When the BoG increases money supply**
 - Creates inflation
 - Erodes the real value of the unit of account

Arbitrary Redistributions of Wealth

- **Unexpected inflation**
 - Redistributions wealth among the population
 - Not by merit
 - Not by need
 - Redistribute wealth among debtors and creditors
- **Inflation: volatile and uncertain**
 - When the average rate of inflation is high

Deflation May Be Worse

- Small and predictable amount of deflation
 - May be desirable
- The Friedman rule: moderate deflation will
 - Lower the nominal interest rate
 - Reduce the cost of holding money
 - Shoe-leather costs of holding money - minimized by a nominal interest rate close to zero
 - Deflation equal to the real interest rate

Deflation May Be Worse

- Costs of deflation
 - Menu costs
 - Relative-price variability
 - If not steady and predictable
 - Redistribution of wealth toward creditors and away from debtors
 - Arises because of broader macroeconomic difficulties
 - Symptom of deeper economic problems

Why is Inflation so Unpopular?

- Pay higher prices
 - Inflation = Penalty
- Receive higher receipts
 - Higher income; ‘well-deserved’ reward
- Fixed nominal income
 - Unadjusted for inflation
- Social Security
 - Adjusted for inflation (COLA)

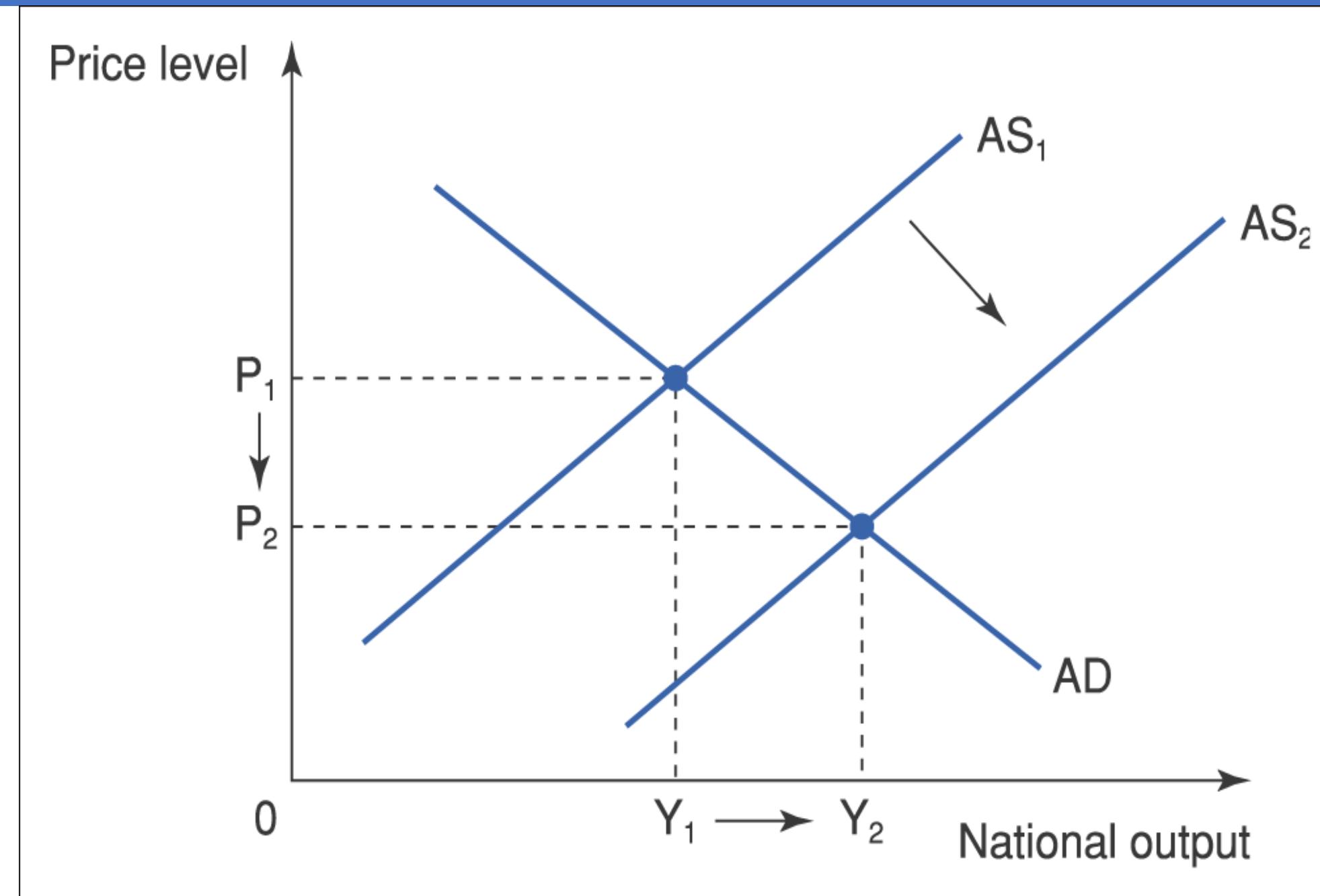
Counter-inflationary policies

- *Fiscal policy*: cutting government spending (G) and/or raising tax revenue (T).
- *Monetary Policy* : cutting money supply and /or raising interest rate.
- *Prices and incomes policies*: freezing or capping price rises in product markets and income rises in the labour market.
- *Supply-side policies*: increasing productivity and output from any given set of resources.

Supply-side policies

- Productivity might be increased (and the aggregate supply curve shifted downwards and to the right) by any or all of the following:
 - Extra incentives to invest
 - Deregulation/privatisation
 - Trade union reform
 - Extra support for training/education
 - Extra incentives to work and take risks (e.g. via income tax system)
 - Etc.

Supply-side policies



The effect of supply-side policies in shifting the aggregate supply curve downwards and to the right, raising equilibrium national income and reducing the average price level

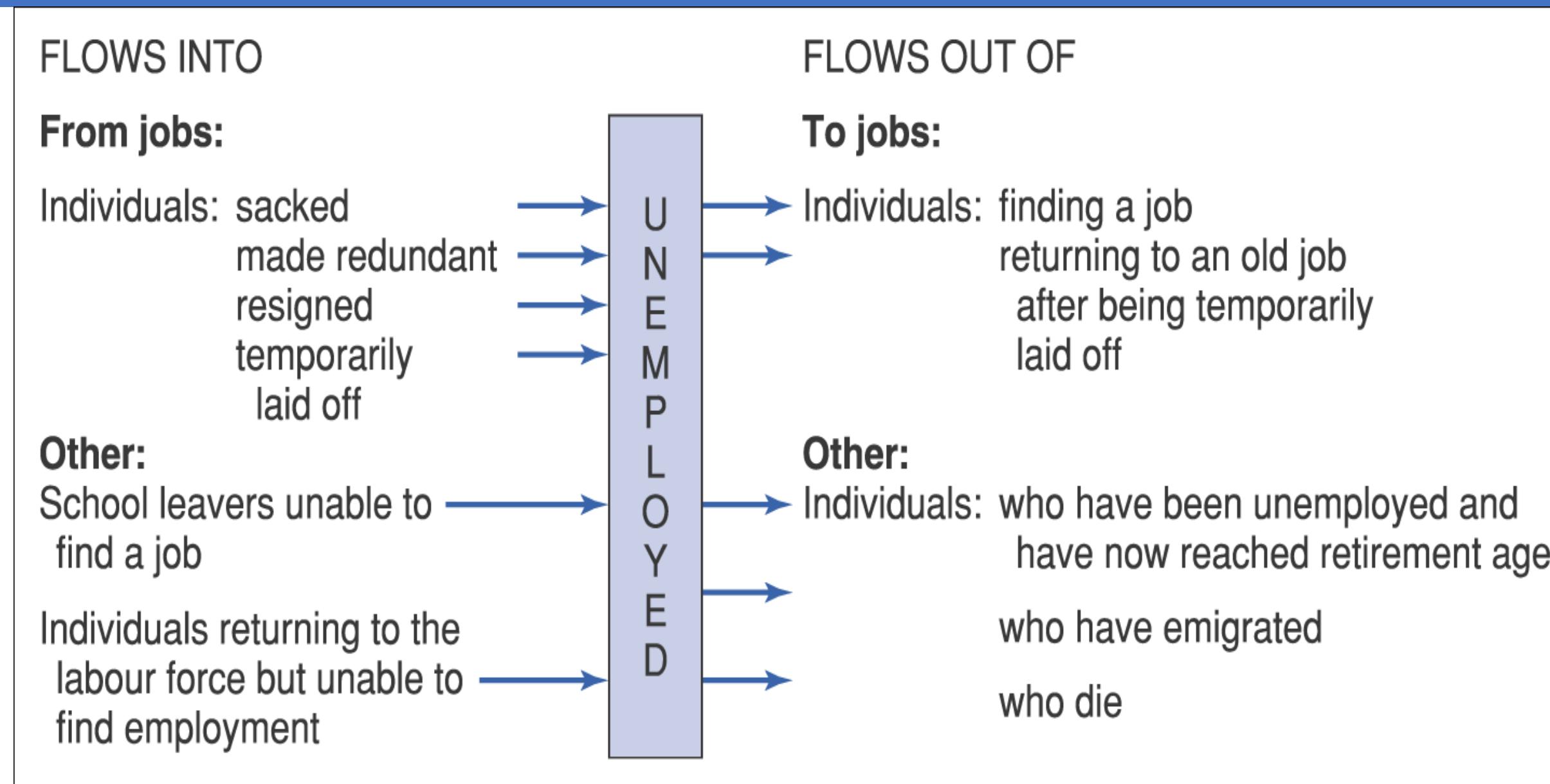
Unemployment – definitions

- Survey method: ILO defines the unemployed as people out of work, who want a job, have actively looked for a job over the previous 4 weeks and who can start work within the next 2 weeks.
- Surveys are undertaken to measure unemployment using this method.

Unemployment – definitions (Continued)

- Claimant count method: uses administrative records to measure unemployment, not surveys.
- **Unemployment** is defined as those out of work but who are capable and available for work and actively seeking work in the week in which they make the claim.
- The administrative records are used to measure unemployment using this method.

Nature of unemployment



Unemployment can essentially be viewed as a *stock concept*. In other words, it can only be measured at a point in time. From the stock of unemployed there are inflows and outflows. As illustrated in the figure, individuals, for example, may be sacked, made redundant, or in fact resign. If they have no immediate job to go to then they will represent an inflow into the unemployed total. As regards the outflow from the stock individuals may, for example, find employment or emigrate.

Unemployment – types

- Frictional/search
- Structural
- Technological
- Cyclical
- Demand deficient
- Real wage
- Natural rate

Frictional/search unemployment

- Results from workers who are between jobs.
- Will always exist, but it might be reduced.
- Remedies proposed include:
 - Improved information
 - Reduction in unemployment related benefits.

Structural unemployment

- Results from changes in the pattern of demand and/or methods of production.
- As a result workers may have the wrong skills or be in the wrong location.

Remedies proposed include:

- Retraining those made redundant
- Relocation of workers.

Technological & Cyclical Unemployment

Technological unemployment: new methods (technologies) for producing goods and services may mean less workers needed per unit of output, e.g. robotics in car assembly lines.

Cyclical unemployment

the extra unemployment that occurs during periods of recession

- Fluctuates with the business cycle
 - Increases during recessions
 - Decreases during expansions

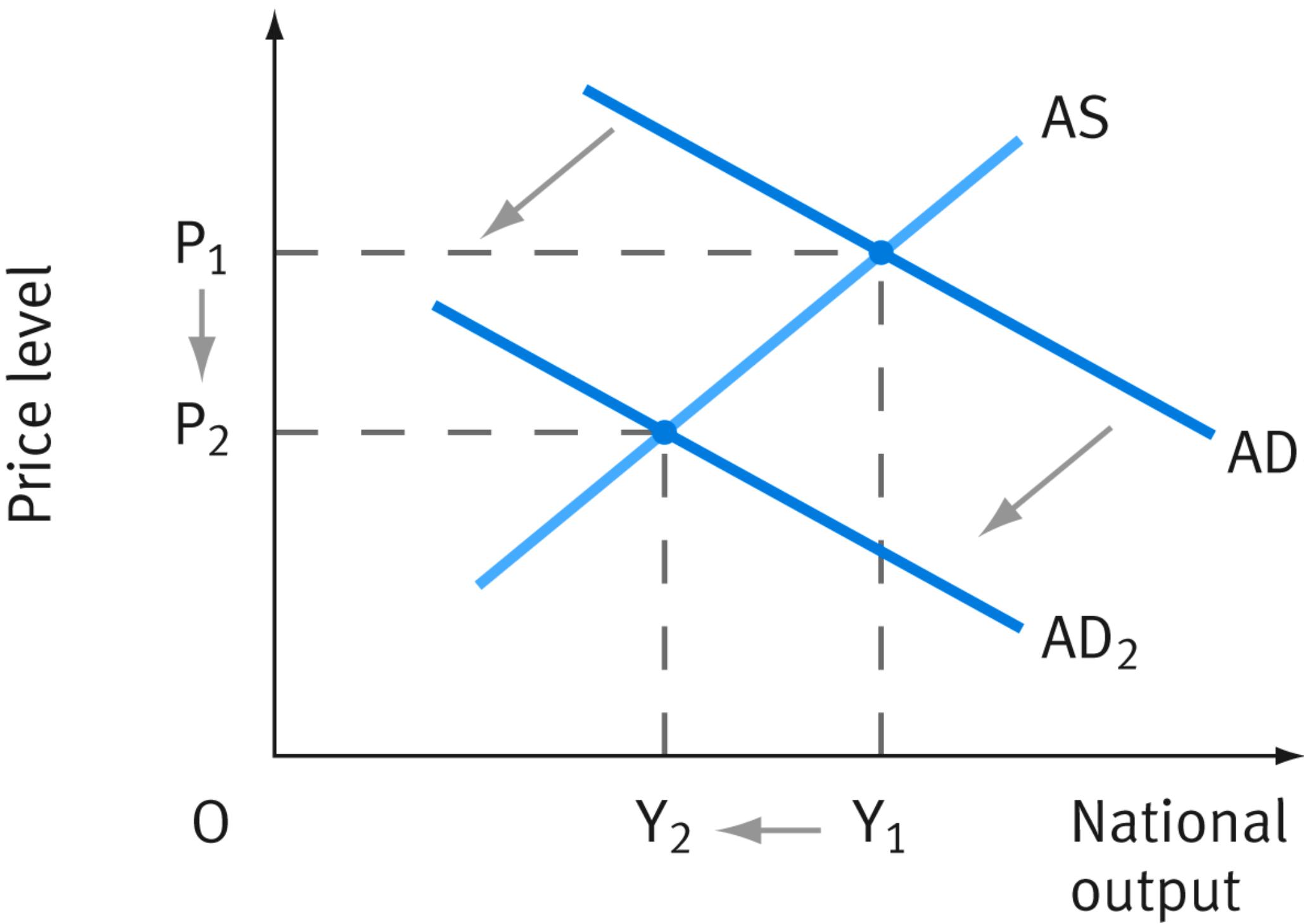
Demand deficient (Keynesian) unemployment

Results from aggregate demand falling short of the level required for ‘full employment’ (which in practice may be 3% unemployment).

Remedies:

- Expansionary fiscal policy: raising G and/or lowering T
- Expansionary monetary policy: raising money supply and/or lowering interest rates.

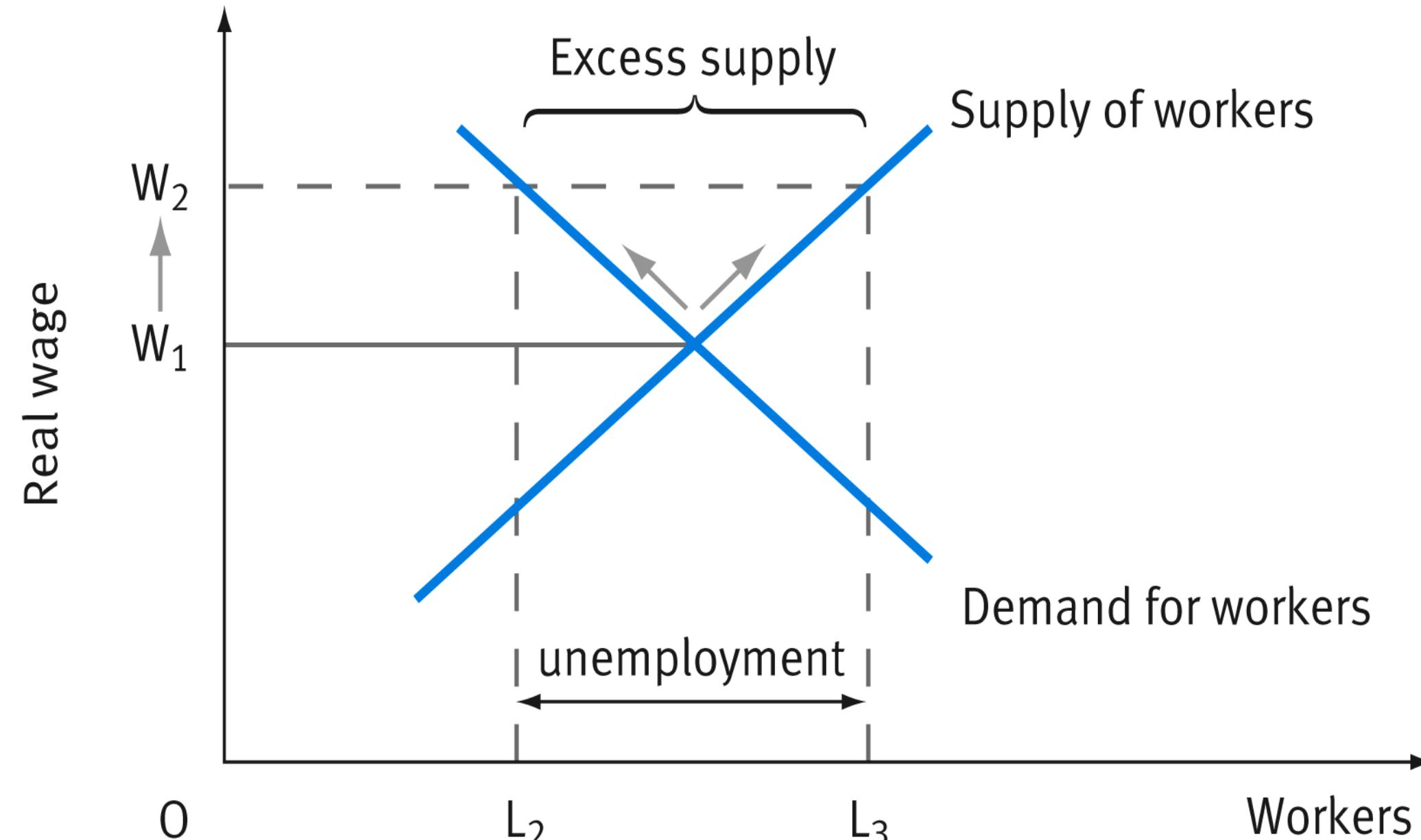
Demand deficient unemployment (Continued)



Real wage unemployment

- Results from real wages being above the level at which labour demand would match labour supply.
- Real wages seen as too high for ‘full employment’.
- Sometimes referred to as ‘classical unemployment’.

Real wage unemployment (Continued)



Real wage ('classical') unemployment

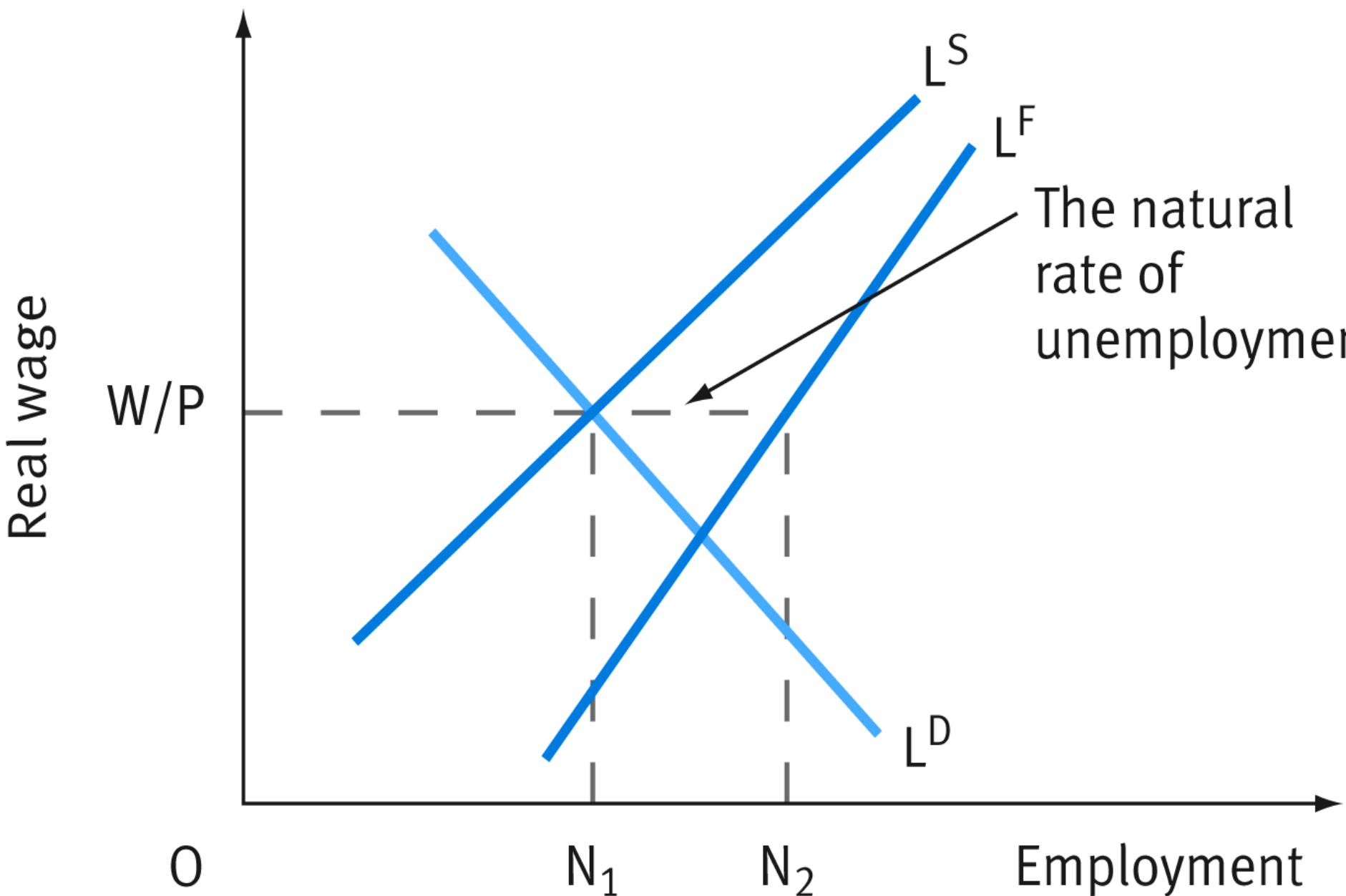
Natural rate of unemployment

- Natural Rate of Unemployment (NRU) has been defined as the (voluntary) unemployment which still exists even if the real wage is at the equilibrium level which ‘clears’ the market.
- NRU is sometimes defined as the rate of unemployment at which there is no excess demand or deficiency of demand for labour.

Natural rate of unemployment (Continued)

- NRU is also sometimes defined as that part of the labour force unwilling or unable to accept a job offer at the equilibrium real wage.
- *Labour supply*: all those workers willing and able to accept jobs at a given real wage.
- *Labour force*: all those workers who consider themselves to be looking for jobs at a given real wage.

Natural rate of unemployment (NRU) (Continued)



Finding the natural rate of unemployment (NRU)

Seasonal, Casual & Residual Unemployment

- **Seasonal Unemployment** occurs mainly with activities that are seasonally bound. For example, farming and fishing, that is, activities that are affected by weather conditions.
- **Casual Unemployment** is a special case of frictional unemployment, which occurs when workers are laid off on very short-term basis in trades such as tourism, agriculture, catering and building.
- **Residual Unemployment** unemployed workers who suffer from mental and or physical disabilities, which may limit the number of job opportunities available to them

Measuring Unemployment

employed Any person 16 years old or older (1) who works for pay, either for someone else or in his or her own business for 1 or more hours per week, (2) who works without pay for 15 or more hours per week in a family enterprise, or (3) who has a job but has been temporarily absent with or without pay.

unemployed A person 16 years old or older who is not working, is available for work, and has made specific efforts to find work during the previous 4 weeks

Measuring Unemployment

not in the labour force A person who is not looking for work because he or she does not want a job or has given up looking.

labour force The number of people employed plus the number of unemployed.

labour force = employed + unemployed

population = labour force + not in labour force

Measuring Unemployment

- **unemployment rate.** The ratio of the number of people unemployed to the total number of people in the labour force.

$$\text{Unemployment Rate} = \frac{\text{Unemployed}}{\text{Employed} + \text{Unemployed}} \times 100$$

$$\text{Labour Force Participation Rate} = \frac{\text{Labour Force}}{\text{Population}} \times 100$$

- **labour force participation rate** The ratio of the labour force to the total population 16 years old or older.

Measuring Unemployment

- **Employment rate.** The ratio of the number of people employed to the total number of people in the labour force.

$$Employment\ Rate = \frac{Employed}{Employed + Unemployed} \times 100$$

- **discouraged-worker effect.** The decline in the measured unemployment rate that results when people who want to work but cannot find jobs grow discouraged and stop looking, thus dropping out of the ranks of the unemployed and the labour force.

Measuring Unemployment

Full employment. The level of unemployment that occurs when the unemployment rate is at the natural rate.

Underemployment. constitutes the section of the labour force seeking for full-time paid employment but unfortunately, the structure of the employment permit them to work for only part-time or are employed below capacity.

Effects/Costs Unemployment

- **Loss in output from idle resources**
 - Workers lose income
 - Society pays for unemployment benefits and makes up lost tax revenue
- **Personal or psychological cost to workers and their families**

Especially important for those with long spells of unemployment

Effects/Costs Unemployment

- **There are some offsetting factors**
 - Unemployment leads to increased job search and acquiring new skills, which may lead to increased future output
 - Unemployed workers have increased leisure time, though most wouldn't feel that the increased leisure compensated them for being unemployed

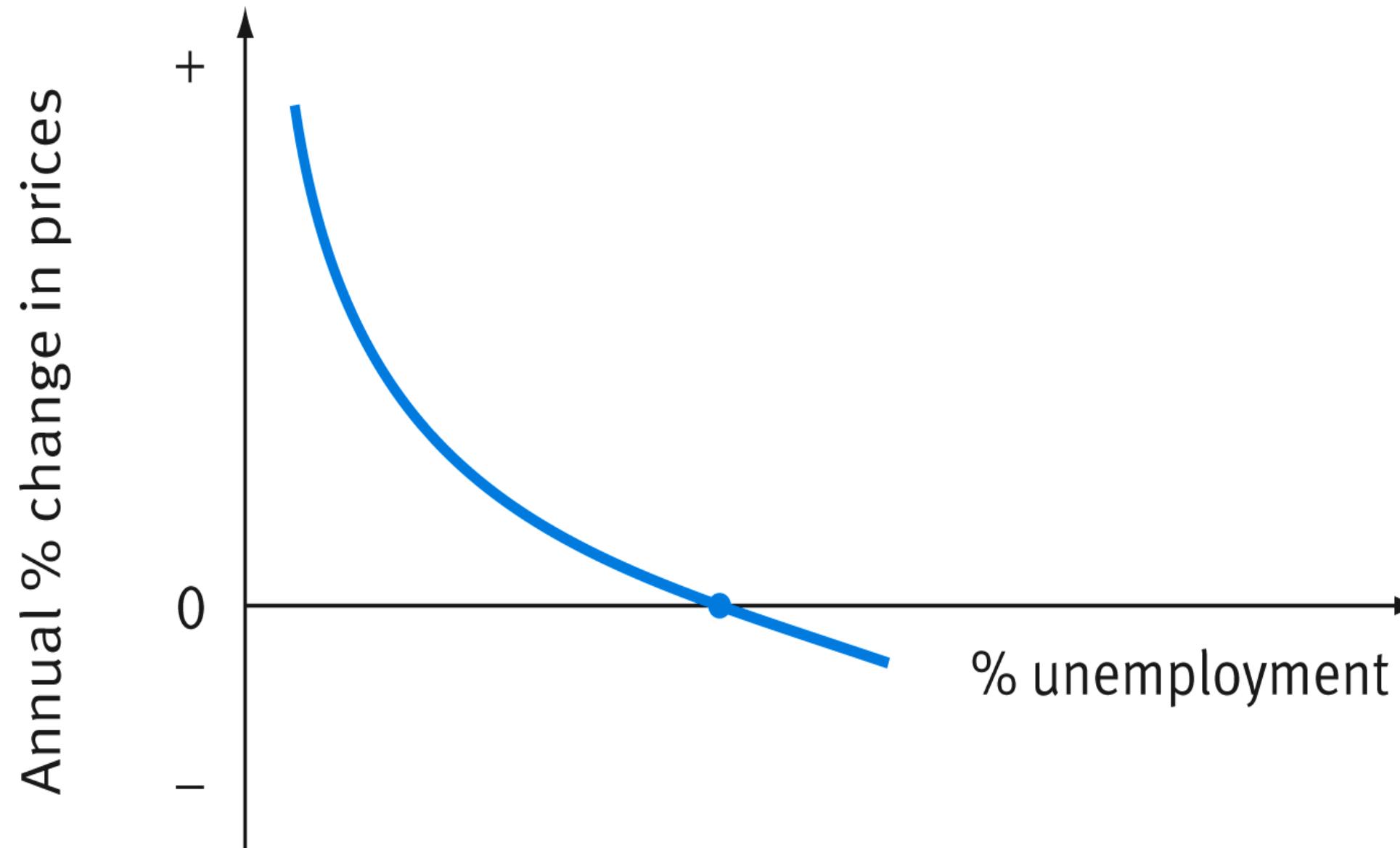
CURES FOR UNEMPLOYMENT

- 1. Demand-management / demand side policies.** The principal policy instruments are government expenditure, taxation and the stock of money in circulation. If unemployment is caused by a general deficiency of aggregate demand, then it may be appropriate to increase aggregate demand
- 2. Supply-Side Policies.** Supply-side policies are intended to increase the economy's potential rate of output by increasing the supply of factor inputs, such as labour inputs and capital inputs, and by increasing productivity

The Phillips Curve

- The Phillips curve shows the negative relationship between unemployment and inflation
- Named after the New Zealand economist A.W. Phillips for his empirical paper (1958) on the relationship between unemployment and wage growth in the United Kingdom
- The Phillips curve seemed to fit the data in the 1960s very well

Phillips curve (Continued)



Phillips curve suggesting that higher levels of demand (lower % unemployment) results in higher rates of wage and price inflation.

Phillips curve (Continued)

- Phillips curve is often associated with demand increase as the major source of inflation.
- Higher aggregate demand, lower level of unemployment and greater the rate of (wage and price) inflation.
- However, the empirical linkage between the level of unemployment and the rate of inflation seemed to break down from the late 1960s onwards.