Ministry of education of the Republic of Belarus

**Educational institution
"Sukhoi State Technical University of Gomel"**

Departament of "Marketing and sectoral economics"

MACROECONOMICS

**TEXTBOOK
for the same course
for full-time students of economic specialties**

Electronic analogue of the printed edition

Gomel 2020

Recommended for publication by the educational and methodological
council of the Faculty of Humanities and Economics of educational institution
"Sukhoi State Technical University of Gomel"
(protocol No. 7 dated 24.03.2020)

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　　　　In the textbook outlines the principles of methodology, issues of macroeconomic measurements, problems of economic growth, macroeconomic instability, macroeconomic proportions and some basic macroeconomic models.
　　　　The textbook may be recommended for students of economic specialties.

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INTRODUCTION

The purpose of teaching the course "Macroeconomics" is to study the laws of the functioning of the economy as a whole, to highlight alternative approaches to explaining economic phenomena, to form an economic way of thinking, to develop the ability to navigate the problems of the national and world economies.

Macroeconomics is a theoretical discipline with a practical orientation. This means that the results obtained by macroeconomics are used in the practice of public finance, in banking, and in investment analysis.

The course of lectures offered to the attention of students contains a systematic presentation of both general methodological issues and practice oriented ones. The textbook outlines the principles of methodology, issues of macroeconomic measurements, problems of economic growth, macroeconomic instability, macroeconomic proportions and some basic macroeconomic models.

The author expresses the hope that the knowledge gained in the course of studying the proposed material will allow one to learn how to assess the development trends of the national economy.

CHAPTER 1. AN INTRODUCTION
TO MACROECONOMICS

Terms and Concepts: subject of macroeconomics, the business cycle, recession, real *GDP* (Gross Domestic Product), nominal *GDP*, unemployment, inflation, macroeconomic model, aggregation, households, firms, government, foreign sector, modern economic growth, savings, investment, financial investment, economic investment, expectations, shocks, demand shocks, supply shocks, inventory, inflexible prices ("sticky prices"), flexible prices.

1.1. Subject of Macroeconomics

Macroeconomics is the science of the behavior of economic agents at the level of the national economy and its sectors. Macroeconomics explores the patterns and trends of the national economy as a whole, as well as methods for its regulation.

The **subject of macroeconomics** is the joint activity of all economic agents (households, firms, and the state) and the results of this activity.

The **object of macroeconomic analysis** is the global problems associated with the equilibrium and instability of national economies, such as inflation, unemployment, quality and sources of growth.

In order to understand how economies operate and how their performance might be improved, economists collect and analyze economic data. Macroeconomists tend to focus on just a few statistics when trying to assess the health and development of an economy. Chief among these are real GDP, unemployment, and inflation.

Real *GDP*, or real gross domestic product, measures the value of final goods and services produced within the borders of a given country during a given period of time, typically a year.

This statistic is very useful because it can tell us whether an economy's output is growing. For instance, if the real GDP in 2020 is larger than the real *GDP* in 2019, then we know that our country's output increased from 2019 to 2020. To get real *GDP*, government statisticians first

calculate nominal *GDP* using current prices during the year that they were produced.

But nominal *GDP* can increase from one year to the next even if there is no increase in output. Real *GDP* corrects for price changes. As a result, we can compare real *GDP* from one year to the next and really know if there is a change in output (rather than prices).

Because more output means greater consumption possibilities – including health care and safer roads – economists and policymakers are encouraging a large and growing real *GDP*.

Unemployment is the state a person is in if he or she cannot get a job but being willing to work and actively seeking work.

High rates of unemployment are undesirable because they indicate that a nation is not using a large fraction of its most important resource – the talents and skills of its people.

Unemployment is a waste because we must count as a loss all the goods and services those unemployed workers could have produced if they had been working. Researchers have also drawn links between higher rates of unemployment and major social problems like higher crime rates and greater political unrest as well as higher rates of depression and other illnesses among unemployed individuals.

Inflation is an increase in the overall level of prices.

If the economy is experiencing inflation, goods and services will cost more money at this year than it cost at last year.

This can be problematic for several reasons. First, if the people's income does not rise as fast as the prices of the goods and services, they will be able to buy less, and their standard of living will fall. Second, a surprise jump in inflation reduces the purchasing power of people's savings. People will be able to buy less on their savings.

Because these statistics are the standards by which economists keep track of long-run growth and short-run fluctuations, we will spend a substantial amount of time in the next few lessons examining:

✓ how these statistics are computed;

✓ how well they are able to reflect the well-being of actual people;

✓ how they vary both across countries and over time.

We will build upon them by considering macroeconomic models of both long-run growth and short-run fluctuations. These will help us understand how policymakers attempt to maximize growth while minimizing unemployment and inflation.

Macroeconomic models also include some responses at questions:

• Can governments promote long-run economic growth?

• Can governments reduce the recession by smoothing out short-run fluctuations?

• What government policy tools more effective at smoothing out short-run fluctuations than other tools?

• Is there a trade-off between unemployment and inflation?

• Does government policy work best when it is announced or when it is a surprise?

1.2. Macroeconomic Analysis Features

In order to identify the essence of macroeconomic processes and phenomena, as well as effectively manage the economy, there is a set of methods and tools with which macroeconomic studies are carried out:

✓ abstraction;

✓ use of models to study and explain economic processes and phenomena;

✓ combination of methods of deduction and induction;

✓ combination of normative and positive analysis;

✓ use of the principle "ceteris paribus" (everything else being equal);

✓ the assumption of the rational behavior of economic agents, etc.

To study macroeconomic processes, modeling of macroeconomic processes is used, that is, the construction of macroeconomic models. Macroeconomists abstract from many inconsequential economic phenomena and processes. The model reflects a certain relationship between macroeconomic variables, formulates a macroeconomic regularity.

The **macroeconomic model** in a simplified form represents the most important and the most significant features of the studied macroeconomic processes, formulates the most important relationships between them.

It should be noted that the macroeconomic model can be represented not only in mathematical form. *Models are formulated in different ways*: a mathematical description using equations, inequalities, a graphic image, a description using a table, verbal wording.

When constructing macroeconomic models, two types of variables (exogenous and endogenous) are distinguished and four types of functional dependencies are used (definitional, behavioral, technological, and institutional).

The study of economic dependencies and patterns at the level of the economy as a whole is possible only if we consider aggregates.

Aggregation is the union of individual elements into a single whole, into an aggregate. Aggregation is also based on abstraction. Aggregation allows you to identify macroeconomic agents, macroeconomic markets, macroeconomic relationships, and macroeconomic indicators.

Modern macroeconomic analysis recognizes the dynamism of economic systems and the uncertainty for economic agents of the future economy, therefore, the need to formulate some expectations. The problem of expectations was first put forward by the Swedish economist, laureate of the 1974 Nobel Prize in Economics Gunnar Myrdal (1898–1987). Myrdal's ideas laid the foundation for the Stockholm School of Macroeconomics.

The development of scientific ideas about expectations has led to the development of three basic concepts that describe the principles of forming expectations.

The concept of static expectations. Economic agents in the future expect what they have encountered in the past. For example, if last year prices rose by 5 % per year, then in the current year their growth will also be 5 %.

The concept of adaptive expectations. Economic entities adjust their expectations taking into account mistakes made in the past.

The concept of rational expectations. Forecasts of economic agents for the future are formed as the optimal result of processing all the information at their disposal, including on the current economic policy of the government.

1.3. Macroeconomic Agents Role

The aggregation method allows you to identify four macroeconomic agents: households, firms, government, and foreign sector.

Households are an independent, rationally operating macroeconomic agent whose goal of economic activity is maximizing utility and being the owner of economic resources and the seller of economic resources in the economy.

Households receive incomes, most of which they spend on consumption (consumer spending). The remaining part of household income is saved and therefore is the main saver or lender, that is, they provide an offer of credit in the economy.

Firms are an independent, rationally operating macroeconomic agent whose goal of economic activity is profit maximization. Firms are the buyers of economic resources by which the production process is ensured, and therefore firms are the main producer of goods and services in the economy.

The received revenue from the sale of manufactured goods and services, firms pay households in the form of factor income. To expand the production process, firms need investment goods (primarily equipment), so firms are investors, that is, buyers of investment goods and services. As a rule, firms use borrowed funds to finance their investment expenses, and then they are the main borrower in the economy, and demand credit.

Households and firms form the *private sector* of the economy.

Government is a set of state institutions and organizations that have the political and legal right to influence the course of economic processes and regulate the economy.

The **government** is an independent, rationally functioning macroeconomic agent whose main task is to eliminate market failures and maximize public welfare, and therefore acts as a producer of public goods and a buyer of goods and services for the public sector.

In addition, the government redistributes national income (through a system of taxes and transfers) and acts as a lender or borrower in the financial market. Government acts as a regulator of a market economy. It creates and the institutional basis for the economy (legislative framework, security system, insurance system, tax system, etc.), develops the "rules of the game"; provides and controls the money supply in the country, pursues macroeconomic policies.

Private and public sectors form a *closed economy*.

The **foreign sector** unites all other countries of the world and is an independent rationally macroeconomic agent that interacts with this country through international trade (export and import of goods and services), capital transfer (export and import of capital, that is, financial assets).

Adding a foreign sector to the study provides an *open economy*.

1.4. Actual Macroeconomic Problems

One of the macroeconomic problems is the problem of uneven economic development. Rapid and sustained economic growth is a modern phenomenon. Before the Industrial Revolution began in the late 1700s in England, standards of living showed no growth over hundreds or even thousands of years. The Industrial Revolution created not only factory production but also increases in research and development so that new and better technologies were constantly being invented. The output began to grow faster than the population. The living standards began to rise as the amount of output per person increased.

Under modern economic growth, the annual increase in output per person is often not large, perhaps 2 percent per year in countries such as England that were the first to industrialize. But it implies that the standards of living will double every 35 years. So if the average citizen of a country begins this year with an income of $ 10,000, in 35 years that person will have an income of $ 20,000.

The vast differences in living standards seen today between rich and poor countries are the result of the modern economic growth. The citizens of the richest nations today have material standards of living that are on average more than 50 times higher than citizens of the poorest nations.

Another problem is a compromise between current and future consumption. At the base of economic growth is the principle that in order to raise living standards over time, an economy must derive some fraction of its current output to increasing future output.

This process requires both savings and investment. *Savings* are generated when current consumption is less than current output (or when current spending is less than current income). *Investment* happens when resources are deposited to increasing future output. For instance by building a new research facility in which scientists invent the next generation automobiles or by constructing a modern, super-efficient factory.

When economists say "investment," they are implying the creation and expansion of business enterprises. Purely financial transactions such as swapping cash for a stock or a bond are not "investment." Only economists draw a distinction between "financial investment" and "economic investment."

The amount of economic investment (simply "investment") is limited by the amount of savings. The increased savings can only come at the price of reduced current consumption. That implies that individuals and society as a whole must make trade-offs between current and future consumption.

Macroeconomic problems include the functioning of financial institutions and their role in the modern economy. Households are the principal source of savings. But businesses are the main economic investors.

How do the savings generated by households get transferred to businesses? The answer is through banks and other financial institutions such as investment funds, pension funds, and insurance companies.

These institutions collect the savings of households, paying savers with interest and dividends. The banks and other financial institutions then lend the funds to businesses, which invest in equipment, factories, and other capital goods.

Macroeconomics derives considerable attention to money, banking, and financial institutions because a well financial system helps to promote economic growth and stability by encouraging savings.

Decisions about savings and investment are complicated by the fact that the future is uncertain. The macroeconomics must have account expectations about the future. *The task of macroeconomics is to study the impact of expectations on the economy*.

Expectations are important for *two reasons*. Firstly, expectations have a large effect on economic growth since increased pessimism will lead to less current investment and less future consumption. Secondly, the firms are often encountering with shocks – situations in which they were expecting one thing to happen but then something else happened.

Economies are exposed to both demand shocks and supply shocks.

Demand shocks are unexpected changes in the demand for goods and services. **Supply shocks** are unexpected changes in the supply of goods and services.

But why can't firms battle with demand shocks on their own? The answer to this question is that the prices of many goods and services are **inflexible** ("**sticky**") in the short run.

Because prices are inflexible, the economy is responding to demand shocks through changes in output and employment rather than through changes in prices.

If prices were flexible, there would be no short-run fluctuations: output would remain constant and unemployment levels would not change because firms would always need the same number of workers to produce the same amount of output. Many prices in the economy are inflexible and are not able to change rapidly. Manufacturing firms typically attempt to with unexpected changes in demand by maintaining an inventory.

An inventory is a store of output that has been produced but not yet sold. Inventories are useful because they can be allowed to grow or decline in periods when demand is unexpectedly low or high. Manufacturing firms can respond to unexpected changes in demand by adjusting inventory levels rather than output levels. But constantly rising inventories hurt firm profits and the management will want to reduce output if inventories rising week after week therefore to unexpectedly low demand.

What are the causes of short-term price stickiness?

1. One factor is that companies selling final goods and services know that consumers prefer stable, **predictable prices** that do not fluctuate rapidly with changes in demand.

2. Another factor that causes sticky prices has done with a situation as a "**price war**". This possibility is common among firms that only have one or two major rivals.

These considerations are very useful in categorizing and understanding the differences between the various macroeconomic models that we will be presenting in next lessons.

For instance, the aggregate expenditures model supposes perfectly inflexible prices (and wages) and thus is a model in which prices are not just sticky but completely stuck. By contrast, the aggregate demand – aggregate supply model allows for flexible prices (with or without flexible wages) and is therefore useful for understanding how the economy behaves over longer periods of time. The economic models, monetary and fiscal considerations, and stabilization policies are lie at the heart of macroeconomics.

1.5. Major Macroeconomic Schools

Depending on the understanding of the goals of macroeconomics, the ways and means of achieving them, modern schools of macroeconomics are formed:

1. Keynesians proceed from the fact that the market does not have sufficient ability to self-regulate and cannot provide full employment. Aggregate demand is crucial, the state, acting on aggregate demand, can provide full employment by pursuing an anti-inflationary policy.

2. Monetarists, led by M. Friedman, play a decisive role in the influence of the state on the economy in managing the money supply, on the basis that the supply of money should be equal to the demand for them. With the stability of the monetary system, the market mechanism will ensure the full and efficient use of resources.

3. The theory of the economy of supply (J. Muth, A. Laffer and others) assumes that the growth of aggregate supply causes an increase in income and aggregate demand. Therefore, a policy of stimulating demand creates inflation. To stimulate supply, it is mainly necessary to lower the marginal level of the tax rate (per producer).

4. The theory of rational expectations (a new classical school) (R. Lucas, N. Wallace and others) is considered as an active factor in the macroeconomics of agent expectations. These expectations can be adaptive, according to which, market agents rely in their decisions on events that took place in the past and are rational. In accordance with the latter, market agents have the opportunity to use all available information, understand how the economic system behaves and are able to make optimal de-

cisions. They can foresee the consequences of decisions made by the government and neutralize them if these decisions are contrary to their interests. It is assumed that if the agents are mistaken, they are able to adjust, taking into account experience, their assessments and behavior.

5. The new institutional theory (R. Coase, D. North, J. Buchanan and others) proceed from the fact that individual choice, as the basis for making decisions in the market, is made by individuals with incomplete information within the framework of existing institutions (rules restricting economic behavior agents). The set of fundamental social, political, legal rules form the institutional environment that determines the development of the economy. Crucial are property rights, transaction costs. A clear definition of property rights and their protection ensure the efficient distribution and use of resources without government intervention. In making political decisions, citizens make choices, primarily regarding the volume and structure of public goods. If volume of public goods is larger, then tax burden is greater. In the conditions of prevailing democracy, politicians have significant opportunities to manipulate the opinion of voters using pressure groups, lobbyism, political rents, etc. Conclusion: the larger the intervention in the economy, the more beneficial the minority; the more developed market competition, the more profitable for most voters.

6. Neoliberals (W. Eucken) distinguish two ideal types of economy – centrally managed and market. A centralized economy is notoriously inefficient, as the central regulatory body does not have reliable information and tools to influence the economy. A market economy generates a monopoly, excessive income differentiation, etc. Therefore, the state must protect competition by pursuing a "policy of competitive market order". In relation to countries with economies in transition, this means that the state must purposefully form a competitive economy, market infrastructure, while pursuing an effective social policy.

CHAPTER 2. MEASURING DOMESTIC OUTPUT AND NATIONAL INCOME

2.1. Gross Domestic Product.
2.2. The Expenditures Approach.
2.3. The Income Approach.
2.4. Other National Accounts.
2.5. Nominal GDP versus Real GDP.
2.6. Shortcomings of GDP.

Terms and Concepts: national income accounting, gross domestic product (*GDP*), intermediate goods, final goods, multiple counting, value added, expenditures approach, income approach, personal consumption expenditures (*C*), gross private domestic investment (*Ig*), net private domestic investment, government purchases (*G*), net exports (*Xn*), taxes on production and imports, national income, consumption of fixed capital, net domestic product (*NDP*), personal income (*PI*), disposable income (*DI*), nominal *GDP*, real *GDP*, price index.

2.1. Gross Domestic Product

The primary measure of the economy's performance is its annual total output of goods and services or aggregate output. There are several ways to measure aggregate output.

Gross domestic product (***GDP***) defines aggregate output as the money value of all final goods and services produced within the borders of a given country during a given period of time, typically a year.

GDP has several salient features.

1. *GDP* is a monetary measure. *GDP* measures the market value of annual output. We compare different goods and services produced in different years thanks to their relative worth or their expression in money.

Table 2.1

**Comparing heterogeneous outputs by using money prices
(hypothetical data)**

Year	Annual outputs	Market value
1	3 sofas and 2 computers	3 at $ 500 + 2 at $ 2000 = $ 5500
2	2 sofas and 3 computers	2 at $ 500 + 3 at $ 2000 = $ 7000

Comments (Table 2.1): society evaluates year 2's output more highly, therefore society is willing to pay more for the combination of goods produced in year 2 than of goods produced in year 1.

2. *GDP* is avoiding multiple counting. All goods and services produced in any given year must be accounted once, but more than once. Because most products go through a series of production stages before a market, some of their components are bought and sold many times. To avoid counting those components each time, *GDP* includes only the market value of final goods and ignores intermediate goods altogether, because the value of final goods already includes all the intermediate goods that were used in producing them.

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Final goods are consumption goods, capital goods, and services that are purchased by their final users, and not for resale or for further processing or manufacturing.

Intermediate goods are goods and services that are purchased for resale or for further processing or manufacturing.

Value added in a production process (hypothetical data)

Stage of production	Sales value of materials or product	Value added
Firm *A*, sheep ranch	$ 0 $ 120	$ 120 = $ 120 – 0
Firm *B*, wool processor (cloth)	$ 180	$ 60 = $ 180 – 120
Firm *C*, suit manufacturer	$ 220	$ 40 = $ 220 – 180
Firm *D*, clothing wholesaler (wholesaler trade)	$ 270	$ 50 = $ 270 – 220
Firm *E*, retail clothier	$ 350	$ 80 = $ 350 – 270
Total sales value	$ 1140	
Value added (total income)		$ 350

Comments (Table 2.2): how much of these amounts should we include in *GDP*? Just $ 350, is the value of the final product. The production and sale of the suit generated just $ 350, worth of output and income, not $ 1140 (amount of sales).

To avoid multiple counting, national income accountants are careful to calculate only the value added by each firm.

Value added is the market value of a firm's output less the value of the inputs (resources) the firm has bought from others.

3. *GDP* excludes nonproduction transactions. **Nonproduction transactions** are of two major types:

➢ purely financial transactions;

➢ secondhand sales.

Purely financial transactions include the following:

• public transfer payments. There are the social security payments (retirement benefits), welfare payments (payments guaranteeing standards of living). The basic characteristic of public transfer payments is that recipients contribute nothing to current production. Thus, to include them in *GDP* would be to overstate this year's production;

• private transfer payments. For example, the money those parents give children or the cash gifts given at Christmas time. It is simply the transfer of funds from one private individual for another;

• security transactions. The buying and selling of stocks and bonds is just a matter of swapping bits of paper, are also excluded from *GDP*. There transactions do not influence current production.

Secondhand sales contribute nothing to current production and for that reason are excluded from *GDP*.

4. Two ways of looking at *GDP*: spending and income. There are two general approaches to measuring *GDP* (Figure 2.1):

1. We can determine *GDP* by summing all expenditures on that output.

2. We can determine *GDP* by adding up all the components of income from the production of that output.

Expenditures		Incomes
Consumption expenditures by households		Wages
plus		plus
Investment expenditures by businesses		Rents
plus	*GDP*	plus
Government purchases of goods and services		Interest
plus		plus
Expenditures by foreigners		Profits
		plus
		Statistical adjustments

Figure 2.1. The expenditures and income approaches to *GDP*

2.2. The Expenditures Approach

To determine *GDP* using the expenditures approach, we add up all the spending on final goods and services that has taken place during the year:

➤ **Consumption expenditures by households are:**

✓ durable consumer goods (automobiles, refrigerators, computers);

✓ nondurable consumer goods (bread, milk, pencils, toothpaste);

✓ consumer expenditures for services (of lawyers, doctors, mechanics, barbers).

The accountants use the symbol *C* to designate this component of *GDP*.

➤ **Investment expenditures by businesses are:**

✓ final purchases of machinery, equipment, and tools by business enterprises;

✓ construction (residential construction, construction of new factories, warehouses, and stores);

✓ changes in inventories.

All new output that is not consumed is, by definition, **capital**.

Investment does not include:

• transfer of paper assets (stocks, bonds);

• resale of material assets (houses, jewelry, boats).

Gross private domestic investment includes:

• investment in replacement capital;

• investment in added capital.

Net private domestic investment includes only investment in added capital.

The amount of capital that is used up over the year is called **depreciation**:

$$Net\ investment = gross\ investment - depreciation. \qquad (2.1)$$

The accountants use the symbol I to designate this component of GDP. They add the subscript g or the subscript n (Ig – gross investment; In – net investment).

$$In = Ig - depreciation. \qquad (2.2)$$

➢ **Government purchases of goods and services are:**

✓ expenditures for goods and services that government consumes in providing public services;

✓ expenditures for public capital such as schools and highways, which have long lifetimes.

Government expenditures do not include government transfer.

The accountants use the symbol G to designate this component of GDP.

➢ **Expenditures by foreigners**: the foreign spending on our exports must be included in GDP (symbol X). But some of the expenditures are for imports – goods and services produced outside of the given country (symbol M). If we count in GDP only domestically goods and services, we must subtract the spending that goes to imports.

The correct formula for calculating gross domestic product:

$$GDP = C + Ig + G + X - M. \qquad (2.3)$$

Accountants simplify formula for GDP by defining **net exports** (symbol – Xn) to be equal to exports minus imports:

$$Net\ exports\ (Xn) = exports\ (X) - imports\ (M). \qquad (2.4)$$

Using definition of net exports, the formula for *GDP* simplifies to:

$$GDP = C + Ig + G + Xn. \tag{2.5}$$

2.3. The Income Approach

The expenditures are allocated as income to subjects responsible for producing the output.

The types of income of macroeconomic agents are as follows.

➢ **Wages**:

✓ wages and salaries;

✓ wage and salary supplements (payments into social insurance, into a private pension, health, welfare funds).

Wages make up the largest share of national income.

➢ **Rents**:

✓ monthly payments tenants make to landlords;

✓ lease payments corporations pay for the use of office space.

Rents consist of the income received by the households and businesses that supply property resources. The figure used in the national accounts is **net rent** – gross rental income minus depreciation of the rental property.

➢ **Interest**:

✓ money paid by private businesses to the suppliers of loans used to purchase capital;

✓ interest households receive on savings deposits;

✓ interest on certificates of deposit and on government and corporate bonds.

➢ **Profits**:

The "profits" is broken down into two accounts:

✓ proprietors' income, which consists of the net income of sole proprietorships, partnerships, and other unincorporated businesses;

✓ corporate profits.

National income accountants divided corporate profits into three categories:

• **Corporate income taxes.** These taxes are levied on corporations' profits. They flow to the government.

• **Dividends.** These are the part of after-tax profits that corporations pay out, or distribute, to their stockholders. They flow to the households.

• **Undistributed corporate profits**. Any after-tax profits that are not distributed to shareholders are saved. Corporations invest it later in new

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plants and equipment. Undistributed corporate profits are also called **retained earnings**.

➤ **Statistical adjustments:** statistical discrepancy was happen in national income accounting often thanks to incomplete information.

The income approach also accounts two components, which are not kinds of income: indirect taxes and depreciation allowance. **Indirect taxes**, which are included in the price of goods is the government revenue from taxes on production and imports. The **depreciation allowance** is a cost of production and it included in the gross value of output.

2.4. Other National Accounts

Several other national accounts provide additional useful information about the economy's performance. We can derive these accounts by making various adjustments to *GDP*.

1. Gross national product. We need to make an adjustment in "gross national product" versus "gross domestic product".

GNP includes the total income of citizens, whether it was earned in the given country or abroad. But *GDP* is a measure of domestic output – total output produced within abroad and regardless of the nationality of those who provide the resources.

So in moving from *GNP* to *GDP*, we must account the income citizens from supplying resources abroad and the income foreigners from supplying resources in the given country. That difference is called **net foreign factor income**:

$$GNP = GDP + net\ foreign\ factor\ income. \tag{2.6}$$

2. Net domestic product. We need to subtract consumption of fixed capital (or depreciation) from GDP. The result is a measure of **net domestic product** (*NDP*):

$$NDP = GDP - consumption\ of\ fixed\ capital\ (depreciation). \tag{2.7}$$

NDP is *GDP* adjusted for depreciation.

3. National income. As we noted, national income (*NI*) includes the total income of citizens, whether it was earned in the given country or abroad. It also includes government revenue from taxes on production and imports.

We must subtract the statistical discrepancy from *NDP* and add net foreign factor income.

We know, too, that we can calculate national income through the income approach by simply adding up employee compensation, rent, interest, proprietors' income, corporate profit, and taxes on production and imports.

4. Personal income. Personal income (*PI*) includes all income received, whether earned or unearned. In moving from national income to personal income, we must subtract the income that is earned but not received and add the income that is received but not earned.

Taxes on production and imports, Social security contributions, corporate income taxes, undistributed corporate profits are earned, but not received. Transfer payments such as Social Security payments, unemployment compensation payments, welfare payments, disability payments, payments to veterans, and private pension payments is received but not earned.

5. Disposable income. Disposable income *DI* is personal income less personal taxes. Personal taxes include:

✓ personal income taxes;

✓ personal property taxes;

✓ inheritance taxes.

Households are free to divide that income between consumption *C* and saving *S*:

$$DI = C + S. \tag{2.8}$$

The figure is performances the economy's four main sectors along with the flows of expenditures and allocations that determine *GDP*, *NDP*, *NI*, and *PI* (Figure 2.2).
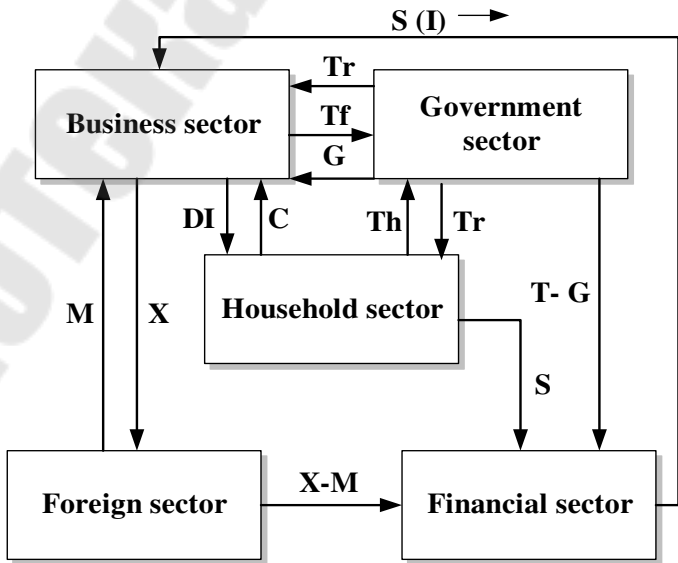

Figure 2.2. The circular flow

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Note the three domestic sectors of the economy:

➢ households;

➢ government;

➢ businesses.

The household sector has an inflow of disposable income and out-flows of consumption spending and saving. The government sector has an inflow of revenue from taxes and an outflow of government expenditures from purchases and transfers. The business sector has inflows of three major sources of funds for investment and an outflow of investment expenditures. The foreign sector (all other countries) has inflows of revenue from purchases foreign goods and an outflow of revenue from spending by foreigners on domestic exports.

2.5. Nominal *GDP* versus Real *GDP*

We use money or nominal values as a common denominator in order to sum heterogeneous output into a total. But that creates a problem: "How can we compare the market values of *GDP* from year to year if the value of money changes in response to inflation (rising prices) or deflation (falling prices)?"

The ways around this problem is:

• to deflate *GDP* when prices rise;

• to inflate *GDP* when prices fall.

A *GDP* based on the prices when the output was produced is called un-adjusted *GDP*, or **nominal *GDP***. A *GDP* that has been deflated or inflated to reflect changes in the price level is called adjusted *GDP*, or **real *GDP***.

We can use the overall price index in each year to adjust nominal *GDP* to real *GDP* for that year.

A **price index** is a measure of the price of a specified collection of goods and services, called a "market basket", in a given year as compared to the price of an identical collection of goods and services.

$$Price\ index\ in\ given\ year =$$

$$= \frac{price\ of\ market\ basket\ in\ specific\ year}{price\ of\ same\ market\ basket\ in\ base\ year} \times 100\,\%; \qquad (2.9)$$

$$Real\ GDP = \frac{nominal\ GDP}{price\ index\ (in\ hundredths)}. \qquad (2.10)$$

Real *GDP* discovers the market value of each year's output measured in dollars that have the same purchasing power as dollars had in the base year.

We can identify the price index for a given year by dividing the nominal GDP by the real *GDP* that year:

$$Price\ index\ (in\ hundredths) = \frac{nominal\ GDP}{real\ GDP}.$$ (2.11)

Note, that equation (2.11) is simply a rearrangement of equation (2.10).

2.6. Shortcomings of GDP

GDP has several shortcomings as a measure of total output and well-being (total utility):

1. Nonmarket activities. *GDP* understates a nation's total output because it does not count unpaid work. For example, the services of homemakers are never show up in *GDP* because the accountants get data on only money transactions.

2. Leisure. The increase in leisure time has a positive effect on overall well-being. But system of national income accounting understates well-being by ignoring leisure's value.

3. Improved product quality. The improvement for the entire range of goods and services does not get reflected in *GDP*. Obviously quality improvement has a great effect on economic well-being.

4. The underground economy. There are gamblers, smugglers, dealers of stolen goods, drug dealers. They have reasons to conceal their incomes. Most participants in the underground economy have legal employments but do not report their full incomes.

Underground economies vary in size worldwide. Three factors that help explain the variation are:

✓ the extent and complexity of regulation;
✓ the type and degree of taxation;
✓ the effectiveness of law enforcement.

5. GDP and the environment. The growth of *GDP* is accompanied by dirty air, polluted water, toxic waste, noise. The social costs of the negative by-products reduce our economic well-being. When money is spent to clean up pollution, those expenditures are added to the *GDP*.

6. Composition and distribution of output. The composition of output is important for well-being. But *GDP* does not tell us whether produced mix of goods and services is enriching or detrimental to society.

GDP doesn't show about the way output is distributed. Does 90 percent of the output go to 10 percent of the households, for example, or is the output more evenly distributed?

7. Noneconomic sources of well-being. The connection between *GDP* and well-being is problematic for following reason. Just as a household's income does not measure its total happiness, a nation's *GDP* does not measure its total well-being.

CHAPTER 3. ECONOMIC GROWTH

3.1. Concept and Measurement of Economic Growth. Modern Economic Growth.

3.2. Institutional Structures that Promote Growth.

3.3. Ingredients of Growth.

3.4. Growth and Production Possibilities.

3.5. Factors of Labor Productivity Growth.

3.6. Arguments for and Against Economic Growth.

Terms and Concepts: economic growth, real *GDP* per capita, rule of 70, modern economic growth, leader countries, follower countries, supply factors, demand factor, efficiency factor, labor productivity, labor-force participation rate, growth accounting, infrastructure, human capital, economies of scale, information technology, start-up firms, increasing returns, network effects, learning by doing.

3.1. Concept and Measurement of Economic Growth. Modern Economic Growth

Economists define and measure economic growth as:

• An increase in real GDP occurring over some time period.

• An increase in real GDP per capita occurring over some time period.

With either definition, economic growth is calculated as a percentage rate of growth per quarter (3-month period) or per year.

Growth is a widely held economic goal. The expansion of total output relative to population results in rising real wages and incomes and thus higher standards of living. A growing economy, unlike a static economy, can consume more today and increasing its capacity to produce more in the future.

Why do economists pay so much attention to small changes in the rate of economic growth? Because those changes really matter! The mathematical approximation called **the rule of 70** tells us that we can find the number of years it will take for some measure to double:

Approximate number of years required to double real GDP =

$$= \frac{70}{annual\ percentage\ rate}. \qquad (3.1)$$

We now live in an era of new inventions and new technologies drive continual economic growth and ongoing increases in living standards.

But it wasn't always like this. Sustainable economic growth is a historically recent phenomenon that started with the Industrial Revolution of the late 1700s. Before the Industrial Revolution, living standards were basically flat over long periods of time so that, for instance, Greek peasants living in the year 300 B.C. had about the same material standard of living as Greek peasants living in the year A.D. 1500.

Economic historians date the start of the Industrial Revolution to the year 1776, when the Scottish inventor James Watt perfected steam machine. The new industrial factories mass-produced goods for the first time. The nearly all manufacturing shifted from produced by hand to mass – produced in factories. The products of factories could be sold to distant consumers at low cost. The result was a increase in long-distance trade and a major population shift as people left farms to go work in the towns.

Steam power would later be replaced by electric power and many more inventions would follow the steam machine.

Modern economic growth has spread only slowly from its British birthplace. It first advanced to France, Germany, and other parts of Western Europe in the early 1800s, the United States, Canada, and Australia by the mid 1800s, Japan – in the 1870s, Asia, Central and South America – in 1900s, Africa – the last few decades.

The huge discrepancy in living standards have caused by the fact that different countries started modern economic growth at different times.

Income levels around the world were very similar in 1820. But they are now very different at certain areas. Because Western Europe and the United States started experiencing modern economic growth earlier than other areas, they have now ended up vastly richer than other areas.

For instance, per capita *GDP* in the United States in 2018 was $ 53500 while it was only $ 1,720 in Africa. Thus, because modern economic growth has occurred for nearly two centuries in the United States

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compared to a few decades in Africa, average living standards in the United States in 2018 were nearly 30 times higher than those in Africa.

However, people can adopt technology more quickly than they can invent it. The richest countries today must invent new technology to get even richer. Because inventing new technology is slow and costly, real *GDP* per capita in the richest leader countries typically grows by an average annual rate of just 2 or 3 percent per year.

Poorer countries can jump directly to the most modern, most highly productive technology. The result is that, it is possible for poorer countries to experience extremely rapid increases in living standards.

Table 3.1

Per Capita *GDP* Growth: World and Major Regions, 1500–2001
(annual average compound growth rates)

	1500–1820	1820–1870	1870–1913	1913–1950	1950–1973	1973–2001
Western Europe	0.14	0.98	1.33	0.76	4.05	1.88
W. Offshoots*	0.34	1.41	1.81	1.56	2.45	1.84
Japan	0.09	0.19	1.48	0.88	8.06	1.84
West	**0.14**	**1.06**	**1.57**	**1.17**	**3.72**	**1.95**
Asia (ex Japan)	0.00	–0.10	0.42	–0.10	2.91	3.55
Latin America	0.16	–0.03	1.82	1.43	2.58	0.91
E. Europe & USSR	0.10	0.63	1.18	1.40	3.49	–0.05
Africa	0.00	0.35	0.57	0.92	2.00	0.19
Rest	**0.02**	**0.06**	**0.82**	**0.65**	**2.83**	**1.75**
World	**0.05**	**0.54**	**1.30**	**0.88**	**2.92**	**1.41**

*Canada, USA, Australia & New Zealand.

Source: Maddison, A. Measuring and Interpreting World Economic Performance 1500–2001 / A. Maddison // Review of Income and Wealth. – March 2005. – Vol. 51. – P. 1–35. – Available at SSRN: https://ssrn.com/abstract=679133.

Comments: Table 3.1 shows both how the growth rates of leader countries are constrained by the rate of technological progress as well as how certain countries have been able to catch up by adopting more advanced technologies and growing rapidly. Table 3.1 shows real *GDP* per capita since 1500. You can see that the growth rates in the catching-up countries (follower countries) are higher.

3.2. Institutional Structures that Promote Growth

Economic historians have identified several institutional structures that promote and sustain modern economic growth.

Some structures increase the savings and investment that are needed to fund the infrastructure of modern economies. Other institutional structures promote the development of new technologies.

These growth-promoting institutional structures include:

• **Strong property rights**. People will not invest if they believe that thieves, bandits, or government will steal their investments or their expected returns.

• **Patents and copyrights**. Before patents and copyrights were first used, inventors and authors usually saw their ideas stolen before they could profit from them. Patents and copyrights give a strong financial incentive to invent and create.

• **Efficient financial institutions.** Banks as well as stock and bond markets are needed to channel the savings generated by households toward the businesses.

• **Literacy and widespread education.** Without highly educated inventors, new technologies do not get developed. And without a highly educated work-force, it is impossible to implement those technologies and put them to productive use.

• **Free trade.** Free trade promotes allowing countries to specialize and produce most efficiently. Free trade promotes the rapid spread of new ideas and innovations.

• **A competitive market system.** Under a market system, prices and profits serve as the signals that tell firms what to make and how much of it to make. Firms have rights to produce what they believe consumers will demand.

Several other difficult-to-measure factors also influence a nation's capacity for economic growth. For example:

1) overall social-cultural-political environment;

2) stable political system characterized by democratic principles, internal order, the right of property ownership;

3) nation's social philosophy for wealth creation as a desirable goal;

4) positive attitude toward work and risk taking.

3.3. Ingredients of Growth

There are six factors that directly affect the rate of economic growth. These six "ingredients" of economic growth can be grouped into four supply factors, one demand factor, and one efficiency factor.

Four of the ingredients of economic growth relate to the physical ability of the economy to expand. They are:
• Increases in the quantity and quality of natural resources.
• Increases in the quantity and quality of human resources.
• Increases in the supply (or stock) of capital goods.
• Improvements in technology.

These *supply factors* – changes in the physical and technical agents of production – enable an economy to expand its potential *GDP*.

The fifth ingredient of economic growth is the *demand factor*. To achieve the higher production level, households, businesses, and government must purchase the economy's expanding output of goods and services.

The sixth ingredient of economic growth is the *efficiency factor*. The economy must use its resources in the least costly way (**productive efficiency**) to produce the specific mix of goods and services that maximizes people's well-being (**allocative efficiency**).

The supply, demand, and efficiency factors in economic growth are related. Unemployment caused by insufficient total spending (the demand factor) may lower the rate of new capital accumulation (a supply factor) and delay expenditures on research (also a supply factor). Conversely, low spending on investment (a supply factor) may cause insufficient spending (the demand factor) and unemployment. The inefficiency in the use of resources (the efficiency factor) may translate into higher costs of goods and services and thus lower profits, may slow innovation and reduce the accumulation of capital (supply factors).

Economic growth is a dynamic process in which the supply, demand, and efficiency factors all interact.

3.4. Growth and Production Possibilities

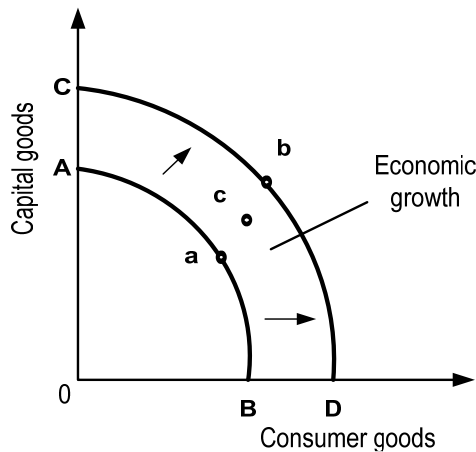Recall that a curve like *AB* in Figure 3.1 is a production possibilities curve.

Figure 3.1. Economic growth and the production
possibilities curve

Comments: economic growth is made possible by the four supply factors that shift the production possibilities curve outward, as from *AB* to *CD*. Economic growth is realized when the demand factor and the efficiency factor move the economy from point *a* to point *b*.

PPC (**production possibilities curve**) indicates the various maximum combinations of products an economy can produce with its fixed quantity and quality of natural, human, and capital resources and its stock of technological knowledge.

The discussions of economic growth focus primarily on supply factors. Society can increase its real output and income in two fundamental ways:
• by increasing its inputs of resources;
• by raising the productivity of those inputs.

Figure 3.2 concentrates on the input of labor and may be for discussing the role of supply factors in growth.
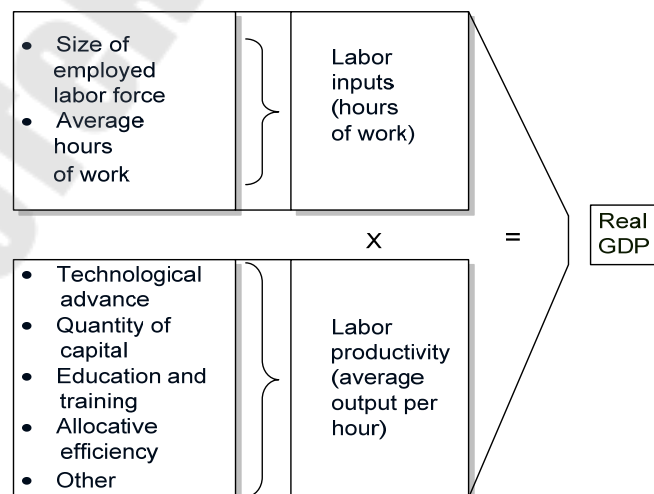
Figure 3.2. The supply determinants of real output

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Comments: Eal GDP is viewed as the product of the quantity of labor inputs (measured in hours of work) multiplied by labor productivity (measured as real output per hour of work):

$$Real\ GDP = hours\ of\ work \times labor\ productivity. \qquad (3.2)$$

The **hours of labor** input depend on the:

1. labor-force size. **Labor-force size** depends on the:

✓ size of the working-age population;

✓ labor-force participation rate – the percentage of the working age population actually in the labor force.

2. length of the average workweek. The length of the average work-week is deferred by legal and institutional considerations and by collective agreements between unions and employers.

The **labor productivity** is determined by technological progress, mainly. Productivity of labor rise when the education, and motivation of workers improve; when production is better organized and managed; and when labor is reallocated from less-efficient industries to more-efficient industries.

3.5. Factors of labor productivity growth

Accounting for economic growth groups factors of labor productivity into two main categories:

• increases in hours of work;

• increases in labor productivity.

The growth of labor productivity gust is more important to economic growth.

There are **five factors** that, together, to explain changes in productivity growth rates:

✓ technological advance;

✓ the amount of capital each worker has to work with;

✓ education and training;

✓ economies of scale;

✓ resource allocation.

Technological Advance. The largest contributor to productivity growth is technological advance, which account for about 40 percent of productivity growth. As economist Paul Romer stated, "Human history teaches us that economic growth springs from better recipes, not just from more cooking". Technological advance and investment are closely related,

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since technological advance usually promotes investment in new machinery and equipment.

Quantity of Capital. The increased capital explains about 30 percent of productivity growth. More and better plant and equipment make workers more productive. Although some capital substitutes for labor, most capital is complementary to labor – it makes labor more productive. A key determinant of labor productivity is the *amount of capital goods available per worker*.

Education and Training. Education and training contribute to a worker's stock of **human capital** – the knowledge and skills that make a worker productive. Investment in human capital includes not only formal education but also **on-the-job training**. An estimated 15 percent of productivity growth derives from investments in people's education and skills.

Economies of Scale and Resource Allocation. Economies of scale and improved resource allocation are together they explain about 15 percent of productivity growth.. Reductions in per-unit production costs that result from increases in output levels are called **economies of scale**. The firms are increase output levels and thereby achieve production advantages associated with greater size. Because they are able use larger, more productive equipment and employ methods of manufacturing and delivery that increase productivity.

Improved resource allocation means that workers have moved from low-productivity employment to high-productivity employment. Historically, many workers have shifted from agriculture, where labor productivity is low, to manufacturing, where it is quite high. More recently, labor has shifted from some manufacturing industries to higher-productivity industries such as computer software, business consulting, and pharmaceuticals. The result has been higher overall labor productivity and real *GDP*.

3.6. Arguments for and against economic growth

Economists usually take for granted that economic growth is desirable and sustainable. But not everyone agrees.

The growth results pollution, global warming and other environmental problems. The more rapid our growth and the higher our standard of living, the more waste the environment must absorb. There are little compelling facts that economic growth has solved sociological problems such as poverty, homelessness, and discrimination.

High-growth economies are high-stress economies, which may impair our physical and mental health.

Critics of high rates of growth doubt that they are sustainable. The planet Earth has finite amounts of natural resources available, and they are being consumed at alarming rates. In this view, slower economic growth that is environmentally sustainable is preferable to faster growth.

The primary protection of growth is that it is the way to the greater material wealth and higher living standards desired by the vast majority of people. Rising output and incomes allow people to buy more education, travel, more medical care, more services, and more numerous products. Economic growth may be the only realistic way to reduce poverty. New machinery is usually less dangerous than the machinery it replaces.

The high standard of living that growth provides given us more time for reflection. Increases in economic growth need not mean increases in pollution. The correcting of problem of environmental pollution involves regulatory legislation, specific taxes or market-based incentives to remedy misuse of the environment.

Is growth sustainable? Yes, say the proponents of growth. If we were depleting natural resources faster than their discovery, we would see the prices of those resources rise. That has not been the case for most natural resources; in fact, the prices of most of them have declined. And if one natural resource becomes too expensive, another resource will be substituted for it. Moreover, economic growth has to do with the application of human knowledge and information, not natural resources. In this view, economic growth is limited only by human imagination.

CHAPTER 4. BUSINESS CYCLES, UNEMPLOYMENT, AND INFLATION

4.1. The Business Cycle.
4.2. Unemployment: Measurement and Types.
4.3. Economic and Social Costs of Unemployment.
4.4. Meaning, Measurement and Types of Inflation.
4.5. Redistribution Effects of Inflation.
4.6. The Effect of Inflation on Output.

Terms and Concepts: business cycles, peak, recession, trough, expansion, labor force, unemployment rate, discouraged workers, frictional unemployment, structural unemployment, cyclical unemployment, full-employment, rate of unemployment, natural rate of unemployment (*NRU*), potential output, *GDP* gap, Okun's law, inflation, Consumer Price

Index (*CPI*), demand-pull inflation, cost-push inflation, per-unit production costs, nominal income, real income, unanticipated inflation, anticipated inflation, cost-of-living adjustments (*COLAs*), real interest rate nominal interest rate, deflation, hyperinflation.

4.1. The Business Cycle

The long-run trend of the economy is the economic growth. But growth has been interrupted by periods of economic instability associated with business cycles. Figure 4.1 shows the four phases of the business cycle.
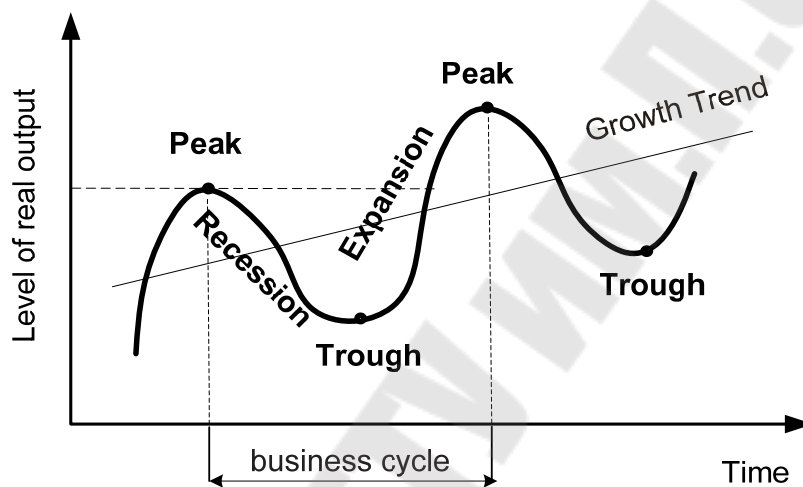

Figure 4.1. The business cycle

Comments: economists distinguish four phases of the business cycle; the duration, intensity and strength of each phase may vary.

The business activity has a temporary maximum at a **peak**. Here the economy is near or at full employment and the level of real output is at or very close to the economy's capacity. The price level is rise during this phase.

A recession is a period of decline in total output, income, and employment. This decline, which lasts 6 months or more, is marked contraction of business activity in many sectors of the economy. Along with declines in real GDP, significant increases in unemployment occur.

In the **trough phase** of the recession or **depression**, output and employment at their lowest levels. The trough phase may be short-lived or quite long.

A **recovery and expansion** are usually followed after recession. This a period in which real *GDP*, income, and employment rise. At some point, the economy again has full employment. If spending expands more rapidly

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than does production capacity, prices of goods and services will rise. In other words, inflation will occur.

Why does output move up and down and not just staying on the smooth growth trend line? Economists have come up with several theories. These theories are founded on the idea that fluctuations are driven by shocks – unexpected events that individuals and firms may have trouble adjusting to.

Recall from the first topic that short-run price stickiness is a major factor preventing the economy from rapidly adjusting to shocks.

1. One group of the economists stresses **supply shocks** caused by innovations such as the railroad, the automobile, microchips, and the Internet.

They believe that major inventions have a large impact on investment spending and consumption spending – and therefore on output, employment, and the price level.

2. Another school of thought sees **shocks to productivity** as the major cause of business cycles.

When productivity unexpectedly increases, the economy booms; when productivity unexpectedly falls, the economy goes into a recession.

3. Others view the business cycle as a **purely monetary phenomenon**.

They say that when a country's central bank shocks the economy by creating more money than people were expecting, an inflationary boom occurs. By contrast, printing less money than people were expecting, a decline in output and employment and in the price level are occur.

4. And, finally, **unexpected political events** like wars or terrorist attacks also constitute major economic shocks to which the economy must adjust.

Most economists agree that the immediate cause of the large majority of cyclical changes in the levels of real output and employment is *unexpected changes in the level of total spending*.

Although the business cycle is felt everywhere in the economy, it affects different segments in different ways and to different degrees. Firms and industries producing capital goods (for example, housing, commercial buildings, heavy equipment, and farm implements) and consumer durables (for example, automobiles, personal computers, and refrigerators) are affected most by the business cycle.

Within limits, firms can postpone the purchase of capital goods. In good times, capital goods are usually replaced on time (before they depreciate completely). But when recession strikes, firms patch up their old equipment and make do. As a result, investment in capital goods declines.

When recession occurs and households must cut their budgets, purchases of these goods are often deferred.

In contrast, service industries and industries that produce nondurable consumer goods are isolated from the effects of recession. People find it difficult to cut back on needed medical services, for example. The purchases of many nondurable goods such as food and clothing are not easy to postpone.

4.2. Unemployment: Measurement and Types

The Special Bureaus of Labor Statistics at advanced countries conducts a nationwide random survey of households each month to determine who is employed and who is not employed.

In a series of questions, it asks which members of the household are working, unemployed and looking for work, not looking for work, and so on. From the answers, it determines an unemployment rate for the entire nation.

The total population is divided into three groups:

1) one group is made up of people under 16 years of age and people who are institutionalized, for example, in mental hospitals or correctional institutions. Such people are not considered potential members of the labor force;

2) a second group, labeled "Not in labor force", is composed of adults who are potential workers but are not employed and are not seeking work. For example, they are homemakers, full-time students, or retirees;

3) the third group is the labor force, which usually accounted for about 50 percent of the total population. The labor force consists of people who are able and willing to work.

The **labor force** consists of persons 16 years of age or older who are not in institutions and who are *1* employed or *2* unemployed but seeking employment.

The unemployment rate is the percentage of the labor force unemployed:

$$Unemployment\ rate = \frac{unemployed}{labor\ force} \times 100\ \%. \qquad (4.1)$$

There are three types of unemployment: frictional, structural and cyclical:

• **Frictional Unemployment.** At any given time some workers are "between jobs". Some of them will be moving voluntarily from one job to

another. Others will have been fired and will be seeking reemployment. Still others will have been fired off temporarily because of seasonal demand. In addition to those between jobs, many young workers will be seeking for their first jobs.

Frictional unemployment is desirable. Many workers who are voluntarily between jobs are moving from low-paying, low-productivity jobs to higher-paying, higher-productivity positions. That means greater income for the workers, a better allocation of labor resources, and a larger real *GDP* for the economy.

• **Structural Unemployment.** Changes over time in consumer demand and in technology vary the "structure" of the total demand for labor, both occupationally and geographically.

Occupationally, the demand for certain skills (for example, working on farms) may decline or even vanish. The demand for other skills (for example, designing software) will intensify. Workers are structurally unemployed until they adapt or develop skills that employers want.

Geographically, the demand for labor also changes over time. An example: the movement of jobs from inner-city factories to suburban industrial parks.

• **Cyclical Unemployment.** Unemployment that is caused by a decline in total spending is called cyclical unemployment and typically begins in the recession phase of the business cycle.

As the demand for goods and services decreases, employment falls and unemployment rises. Cyclical unemployment results from insufficient demand for goods and services. Cyclical unemployment is a very serious problem when it occurs.

Because frictional and structural unemployment is largely unavoidable in a dynamic economy, full employment is something less than 100 percent employment of the labor force. Economists say that the economy is "*fully employed*" when it is experiencing only frictional and structural unemployment. That is, full employment occurs when there is no cyclical unemployment. Economists call the unemployment rate that is consistent with full employment as the **natural rate of unemployment** (*NRU*).

Note that a fully employed economy does not mean zero unemployment. Also, the *NRU* can vary over time. In the 1980s, the *NRU* was about 6 percent. Today, it is 4 to 5 percent.

4.3. Economic and Social Costs of Unemployment

Unemployment that is excessive involves great economic and social costs. The basic economic cost of unemployment is forgone output.

If unemployment above the natural rate that means that society is operating at some point inside its production possibilities curve. Economists call this a *GDP* gap – the difference between actual and potential *GDP*. That is:

$$GDP\ gap = actual\ GDP - potential\ GDP. \qquad (4.2)$$

The GDP gap can be either *negative* (actual GDP < potential GDP) or *positive* (actual GDP > potential GDP).

In the case of unemployment above the natural rate, it is negative because actual GDP falls short of potential GDP. Potential GDP is determined by assuming that the natural rate of unemployment prevails.

Macroeconomist Arthur Melvin Okun was the first to quantify the relationship between the unemployment rate and the GDP gap. **Okun's law** indicates that for every 1 percentage point by which the actual unemployment rate exceeds the natural rate, a negative GDP gap of about 2 percent occurs.

With this information, we can calculate the absolute loss of output associated with any above-natural unemployment rate.

By observing the large variance in unemployment rates for the different groups, we can tell follows:

• Occupation. Workers in lower-skilled occupations (for example, laborers) have higher unemployment rates than workers in higher-skilled occupations (for example, professionals). Moreover, lower-skilled workers usually have the brunt of recessions. Businesses generally retain most of their higher-skilled workers, in whom they have invested the expense of training.

• Age. Teenagers have much higher unemployment rates than adults. Teenagers have lower skill levels.

• Education. Less-educated workers, on average, have higher unemployment rates than workers with more education.

• Duration. The number of persons unemployed for long periods – 15 weeks or more – as a percentage of the labor force is much lower than the overall unemployment rate.

Severe cyclical unemployment is a *social catastrophe*. Unemployment means idleness. And idleness means loss of skills, loss of self respect, family disintegration, and sociopolitical unrest.

History demonstrates that severe unemployment can lead to rapid social and political change. Witness Hitler's rise to power against a background of unemployment in Germany. At the individual level increases in suicide, murders, fatal heart attacks and mental illness to high unemployment.

Unemployment rates differ greatly among nations at any given time. One reason is that nations have different natural rates of unemployment. Another is that nations may be in different phases of their business cycles.

4.4. Meaning, Measurement and Types of Inflation

Inflation is a rise in the general level of prices.

When inflation occurs, each dollar of income will buy fewer goods and services than before. Inflation reduces the "**purchasing power**" of money. But inflation does not mean that all prices are rising. Even during periods of rapid inflation, some prices may be relatively constant and others may even fall.

The main measure of inflation is the **Consumer Price Index** (*CPI*).

The government uses this index to report inflation rates each month and each year. It also uses the *CPI* to adjust Social Security benefits and income tax brackets for inflation.

The *CPI* reports the price of a "**market basket**" of some 300 consumer goods and services that are purchased by a typical urban consumer.

The *GDP* **price index** is a much broader measure of inflation since it includes not only consumer goods and services but also capital goods, goods and services purchased by government, and goods and services that enter world trade.

The *CPI* for any particular year is found as follows:

$$CPI = \frac{price\ of\ market\ basket\ in\ specific\ year}{price\ of\ same\ market\ basket\ in\ base\ year} \times 100\ \%. \quad (4.3)$$

The **rate of inflation** is equal to the percentage growth of *CPI* from one year to the next.

CPI of a given year minus *CPI* of the previous year and divided by *CPI* of the previous year:

$$Rate\ of\ inflation = \frac{CPI_{x+1} - CPI_x}{CPI_x} \times 100\ \%. \quad (4.4)$$

Some nations have had double-digit or even higher annual rates of inflation in recent years. In 1997, for example, the annual inflation rate in Portugal was 36 percent. For 2008, Zimbabwe's inflation rate was 100,000 percentю For 2011, Belarus's inflation rate was 108 percent. In 2019 the annual inflation rate in Venezuela is 10 000000 percent.

Nearly all prices in the economy are set by supply and demand:

• **Demand-Pull Inflation.** Usually, increases in the price level are caused by an excess of total spending beyond the economy's capacity to produce. Where inflation is rapid and sustained, the cause is an overissuance of money by the central bank. So the excess demand bids up the prices of the limited output, producing demand-pull inflation. The essence of this type of inflation is "too much spending chasing too few goods":

• **Cost-Push Inflation.** Inflation also may arise on the supply, or cost, side of the economy. The theory of cost-push inflation explains rising prices by factors that raise per-unit production costs at each level of spending. A per-unit production cost is the average cost of a particular level of output. This average cost is found by dividing the total cost of all resource by the amount of output produced. That is:

$$Per-unit\ production\ cost = \frac{total\ input\ cost}{units\ of\ output}. \qquad (4.5)$$

Rising per-unit production costs squeeze profits and reduce the amount of output firms are willing to supply at the existing price level. As a result, the economy's supply of goods and services declines and the price level rises.

In this scenario, costs are pushing the price level upward, where as in demand-pull inflation demand is pulling it upward.

The major source of cost-push inflation has been so-called supply shocks. Specifically, a sudden increase in the costs of raw materials or energy inputs drives up per-unit production costs and thus product prices. The increasing prices of imported oil in 1973–1974 and again in 1979–1980 are good illustrations. It arisen cost-push inflation.

4.5. Redistribution Effects of Inflation

Inflation redistributes real income. Who gets hurt? Who benefits?

Before we can answer, we need some terminology. There is a difference between money (or nominal) income and real income.

Nominal income is the number of money received as wages, rent, interest, or profits.

Real income is a measure of the amount of goods and services nominal income can buy; it is the purchasing power of nominal income, or income adjusted for inflation. That is:

$$Real\ income = \frac{nominal\ income}{price\ index\ (in\ hundredths)}. \qquad (4.6)$$

When inflation occurs, not everyone's nominal income rises at the same pace as the price level. There in lays the potential for redistribution of real income from some to others. The following approximation tells us how much real income will change:

$$Percentage\ change\ in\ real\ income\ =$$

$$= percentage\ change\ in\ nominal\ income\ -$$

$$= percentage\ change\ in\ price\ level. \qquad (4.7)$$

The redistribution effects of inflation depend about it is expected or not expected. With the ability to plan ahead, people are able to avoid or lessen the redistribution effects associated with inflation.

Who Is Hurt by Inflation?

• **Fixed-Income Receivers.** People whose incomes are fixed see their real incomes fall when inflation occurs. For example, retires or public sector workers are more affected by inflation than others, because they get fixed incomes. Similarly, landlords who receive lease payments of fixed amounts will be hurt by inflation as they receive money of declining value over time.

• **Savers.** Unanticipated inflation hurts savers. As prices rise, the real value, or purchasing power, of an accumulation of savings is decliners. The value of savings will still decline if the rate of inflation exceeds the rate of interest.

• **Creditors.** Unanticipated inflation harms creditors (lenders). Suppose Bank lends man $ 1000, to be repaid in 2 years. If in that time the price level doubles, the $ 1000 will have only half the purchasing power of the $1000 he borrowed. The owners of Bank suffer a loss of real income.

Who Is Unaffected or Helped by Inflation?

• **Flexible-Income Receivers.** For example, individuals who derive their incomes from Social Security are unaffected by inflation because Social Security payments are indexed to the *CPI*. Same if product prices rise faster than resource prices, business revenues will increase more rapidly than costs.

• **Debtors.** Unanticipated inflation benefits debtors (borrowers). Debtor borrows "dear" money but, because of inflation, pays back the principal and interest with "cheap" money whose purchasing power has been eroded by inflation. Real income is redistributed away from the owners of bank toward borrowers. The inflation reduces the real burden of the public debt to the government too.

The redistribution effects of inflation are less severe or are eliminated altogether if people anticipate inflation and can adjust their nominal incomes. For example, the labor unions may to claim labor contracts with cost-of-living adjustment.

Similarly, if inflation is anticipated, the redistribution of income from lender to borrower may be changed. The lender can charge an **inflation premium** – that is, by raising the interest rate by the amount of the anticipated inflation.

Financial institutions have also developed variable interest rate mortgages to protect themselves from the effects of inflation.

The **real interest rate** is the percentage increase in purchasing power that the borrower pays the lender.

The **nominal interest rate** is the percentage increase in money that the borrower pays the lender, including that resulting from the built-in expectation of inflation.

In equation form:

$$Nominal\ interest\ rate = real\ interest\ rate +$$

$$+ inflation\ premium\,(the\ expected\ rate\ of\ inflation). \qquad (4.8)$$

4.6. The Effect of Inflation on Output

The unexpected rises in key resource prices such as oil can sufficiently drive up overall production costs and to cause cost-push inflation. The firms respond by producing less output, and unemployment goes up. Cost-push inflation reduces real output.

In addition, demand-pull inflation diverts time and money to protect against it. Businesses have the cost of changing thousands of prices on their shelves and in their computers simply to reflect inflation. Households and businesses must spend considerable time obtaining the information they need to distinguish between real and nominal values such as prices, wages, and interest rates. People try to limit the amount of money they hold in their checking accounts. But cash and checks are needed in even greater amounts to buy the higher-priced goods and services. So more

phone calls, or Internet visits to financial institutions are required to transfer funds to checking accounts. Without inflation, these uses of resources, time would not be needed, and they could be diverted toward producing more valuable goods and services.

All economists agree that **hyperinflation**, which is extraordinarily rapid inflation, can have a devastating impact on real output and employment. As prices shoot up sharply and unevenly during hyperinflation, people begin to anticipate even more rapid inflation and normal economic relationships are break upped. Business owners do not know what to charge for their products. Consumers do not know what to pay. Money becomes worthless and does not its job as a medium of exchange.

Examples of hyperinflation are Germany after the First World War and Japan after the Second World War. Such dramatic hyperinflations are always the result of imprudent expansions of the money supply by government.

CHAPTER 5. BASIC MACROECONOMIC RELATIONSHIPS

5.1. The income-consumption and income-saving relationships.
5.1.1. The consumption schedule and saving schedule.
5.1.2. Average and marginal propensities.
5.1.3. Nonincome determinants of consumption and saving.
5.2. The interest-rate-investment relationship.
5.3. The multiplier effect.

Terms and Concepts: 45° line (bisector), consumption schedule, saving schedule, break-even income, average propensity to consume (*APC*), average propensity to save (*APS*), marginal propensity to consume (*MPC*), marginal propensity to save (*MPS*), wealth effect, expected rate of return, investment demand curve, multiplier

5.1. The income-consumption and income-saving relationships

5.1.1. The consumption schedule and saving schedule

The relationship between income and consumption is one of the base relationships in macroeconomics. In examining that relationship, we are also exploring the relationship between income and saving.

The economists define **personal saving** as "not spending" or as "that part of disposable (after-tax) income not consumed."

Saving *S* equals disposable income *D* minus consumption *C*:

$$S = DI - C. \tag{5.1}$$

Many factors determine a nation's levels of consumption and saving, but the most significant is disposable income.

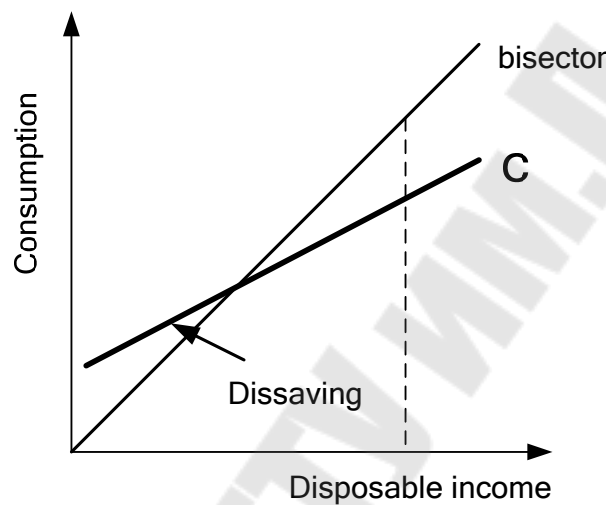**Consumption schedule** (or "consumption function") reflects the direct consumption – disposable income relationship.

Figure 5.1. Consumption schedule

Comments (Figure 5.1): the line *C* shows that consumption is directly (positively) related to disposable income; moreover, households spend most of their income.

At each point on the 45° line (bisector), consumption would equal disposable income, or *C = DI*. Distance between bisector and axes measures disposable income. Distance between consumption line and axes measures amount of consumption *C*. Distance between bisector line and the consumption line represents the amount of saving *S* in that year.

The vertical distance between the bisector and the line *C* is increases as you move to the right. Saving varies directly with the level of disposable income.

Intermediate conclusion:

1) households increase their spending as their disposable income rises;

2) households spend a larger proportion of a small disposable income, than of a large disposable income.

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It is easy to derive a **saving schedule** (or "**saving function**"). Because saving equals disposable income less consumption ($S = DI − C$), we need only subtract consumption from disposable income to find the amount saved.
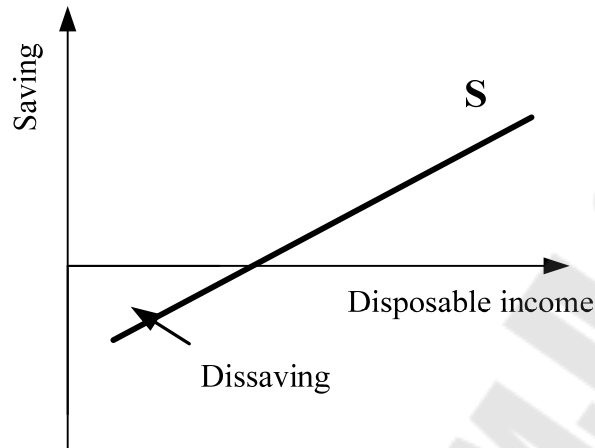
Figure 5.2. Saving schedule

Comments: the graph S shows that there is a direct relationship between saving and DI, but that saving is a smaller proportion of a small DI than of a large DI. If households consume a smaller and smaller proportion of DI as DI increases, then they must be saving a larger and larger proportion.

Graphically, **dissaving** is shown as the (Figure 5.1) vertical distance of the consumption schedule above the bisector line or as the (Figure 5.2) vertical distance of the saving schedule below the horizontal axis.

5.1.2. Average and marginal propensities

The fraction, or percentage, of total income that is consumed is the **average propensity to consume** (*APS*).

The fraction of total income that is saved is the **average propensity to save** (*APS*). That is:

$$APC = \frac{consumption}{income}; \qquad (5.2)$$

$$APS = \frac{saving}{income}. \qquad (5.3)$$

Note that the *APC* falls and the *APS* rises when *DI* increases.

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Because disposable income is either consumed or saved, mathematically, $APC + APS = 1$ at any level of disposable income:

$$APC + APS = 1. \tag{5.4}$$

There are large differences in average propensities to consume APC among nations. The United States, Canada and the United Kingdom, in particular, have higher APC, and lower APS, than other advanced economies.

The **marginal propensity to consume** (**MPC**) (Figure 5.3, *a*) is the ratio of a change in consumption to a change in income that caused the consumption change:

$$MPC = \frac{change\ in\ consumption}{change\ in\ income}. \tag{5.5}$$

Similarly, the **marginal propensity to save** (**MPS**) (Figure 5.3, *b*) is the ratio of a change in saving to the change in income that caused the saving change:

$$MPS = \frac{change\ in\ saving}{change\ in\ income}. \tag{5.6}$$

The sum of the *MPC* (Figure 5.3) and the *MPS* for any change in disposable income must always be 1:

$$MPC + MPS = 1. \tag{5.7}$$

The *MPC* is the numerical value of the slope of the consumption schedule ($\Delta C/\Delta DI$), and the MPS is the numerical value of the slope of the saving schedule ($\Delta S/\Delta DI$).
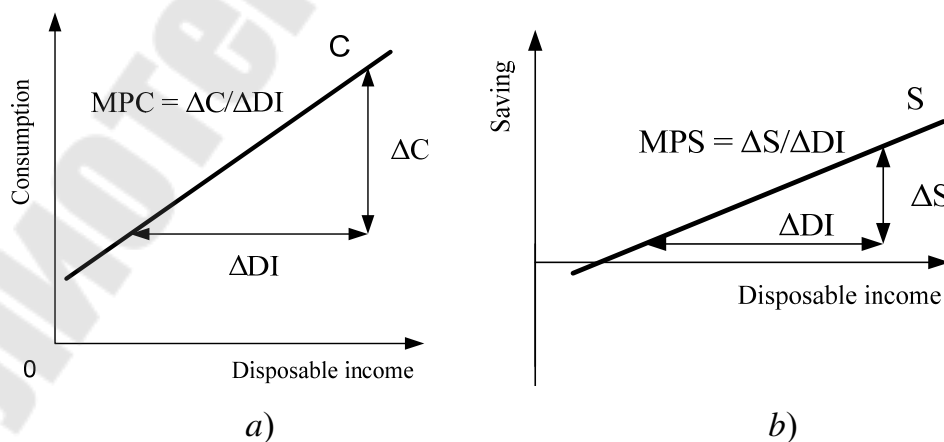
Figure 5.3. The marginal propensity to consume (*a*)
and the marginal propensity to save (*b*)

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Note the slope of any line is the ratio of the vertical change to the horizontal change in moving from one point to another on that line.

5.1.3. Nonincome determinants of consumption and saving

The amount of disposable income is the basic determinant of the amounts households will consume and save. But certain determinants might prompt households to consume more or less at each possible level of income and thereby change the locations of the consumption and saving schedules.

Those other determinants are: wealth, borrowing, expectations, interest rates.

A household's wealth is the money amount of the assets that it owns minus the money amount of its liabilities (all the debt that it owes). The larger stock of wealth is the larger present and future consumption possibilities.

Household borrowing also affects consumption. When a household borrows, it can increase current consumption. But there is "no free lunch". If borrowing increased same thing debt (liabilities) increases, which reduces household wealth and future consumption possibilities.

Household expectations about future prices and income may affect current spending and saving. For example, expectations of rising prices tomorrow may trigger more spending and less saving today.

When **real interest rates** (those adjusted for inflation) fall, households borrow more, consume more, and save less.

Changes in wealth, expectations, interest rates, and household debt will shift the consumption schedule in one direction and the saving schedule in the opposite direction. If households decide to consume more at each possible level of real GDP, they must save less, and vice versa.

5.2. The interest-rate-investment relationship

In our consideration of major macro relationships, we turn to the relationship between the **real interest rate** and **investment**.

Recall that investment consists of expenditures on new plants, capital equipment, machinery, inventories, and so on.

The investment decision is a marginal-benefit – marginal-cost decision: The **marginal benefit** from investment is the expected rate of return. The **marginal cost** is the interest rate that must be paid for borrowed funds. Businesses will invest in all projects for which the expected rate of return exceeds the interest rate.

Expected returns (**profits**) and the **interest rate** are the two basic determinants of investment spending. Businesses buy capital goods only when they think such purchases will be profitable.
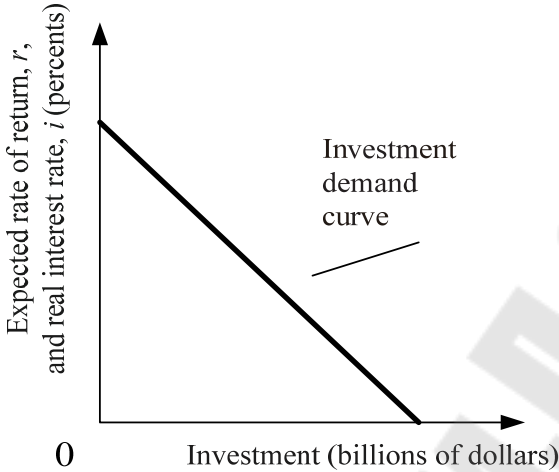

Figure 5.4. The investment demand curve

Comments (Figure 5.4): the vertical axis shows the various possible real interest rates and the horizontal axis shows the corresponding quantities of investment demanded. The inverse relationship between the interest rate (price) and money quantity of investment demanded conforms to the law of demand. The curve slopes downward, reflecting an inverse relationship between the real interest rate and the quantity of investment demanded.

When other things change, the investment demand curve shifts.
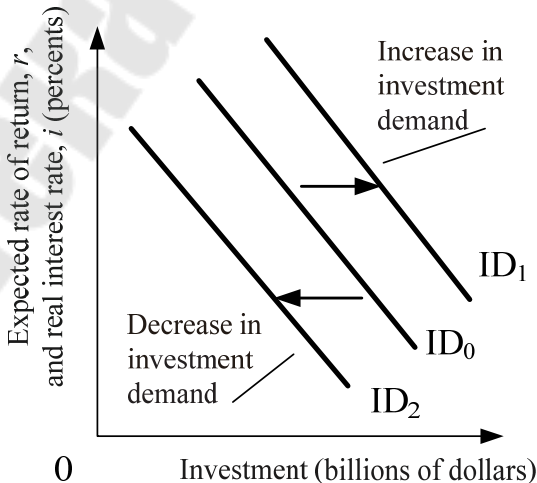
Figure 5.5. Shifts of the investment demand curve

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Comments (Figure 5.5): increases in investment demand are shown as rightward shifts of the investment demand curve. Decreases in investment demand are shown as leftward shifts of the investment demand curve.

The **non-interest-rate determinants** of investment demand are:

✓ **Acquisition, Maintenance, and Operating Costs**. The initial costs of capital goods, and the estimated costs of operating and maintaining those goods, affect the expected rate of return on investment. Higher electricity costs associated with operating tools and machinery shifts the investment demand curve to the left. Lower costs, in contrast, shift it to the right.

✓ **Business Taxes**. An increase in business taxes lowers the expected profitability of investments and shifts the investment demand curve to the left; a reduction of business taxes shifts it to the right.

✓ **Technological Change**. **Technological progress** – the development of new products, improvements in existing products, and the creation of new machinery and production processes – stimulates investment. The development of a more efficient machine, for example, lowers production costs or improves product quality and increases the expected rate of return from investing in the machine. A technological progress shifts the investment demand curve to the right.

✓ **Stock of Capital Goods on Hand**. The stock of capital goods on hand, relative to output and sales, influences investment decisions by firms. Firms with excess production capacity have little incentive to invest in new capital. The investment demand curve shifts leftward.

✓ **Expectations**. Investment depends on the firm's expectations of future sales, future operating costs, and future profitability of the product. These expectations are based on forecasts of future business conditions: changes in the domestic political climate, international relations, population growth, and consumer tastes.

5.3. The multiplier effect

Higher spending leads to higher *GDP*; less spending leads to lower GDP. But a change in spending, for example, investment, changes output and income by more than the initial change in investment spending.

That surprising result is called the **multiplier effect**: a change in a component of total spending leads to a larger change in *GDP*. The multiplier determines how much larger that change will be:

$$Multiplier = \frac{change\ in\ real\ GDP}{initial\ change\ in\ spending}. \qquad (5.8)$$

By rearranging this equation, we can also say that:

$$Change\ in\ GDP = multiplier \times initial\ change\ in\ spending. \qquad (5.9)$$

Note these three points about the multiplier:

• The "initial change in spending" is usually associated with investment spending because of investment's volatility. But changes in consumption, net exports, and government purchases also lead to the multiplier effect.

• The "initial change in spending" associated with investment spending results as the results from a change in the real interest rate and/or a shift of the investment demand curve.

• The multiplier works in both directions. An increase in initial spending will create a multiple increase in *GDP*, while a decrease in spending will create a multiple decrease in *GDP*.

The multiplier effect follows from two facts.

First, the economy supports repetitive, continuous flows of expenditures and income. Which dollars spent by Smith are received as income by Chin and then spent by Chin and received as income by Gonzales, and so on.

Second, any change in income will change consumption and saving in the same direction as the change in income. Initial changes in spending produce changes in output and income.

The fractions of an increase in income consumed (*MPC*) and saved (*MPS*) determine the size of the multiplier. The *MPC* and the multiplier are directly related and the MPS and the multiplier are inversely related.

The formulas are as shown in the next two equations:

$$Multiplier = \frac{1}{1 - MPC}. \qquad (5.10)$$

Recall that *MPC* + *MPS* = 1. Therefore *MPS* = 1 − *MPC*, which means we can also write the multiplier formula as:

$$Multiplier = \frac{1}{MPS}. \qquad (5.11)$$

This latter formula is a quick way to determine the multiplier.

CHAPTER 6. THE AGGREGATE EXPENDITURES MODEL

Terms and Concepts: planned investment, investment schedule, aggregate expenditures schedule, equilibrium GDP, leakage, injection, unplanned changes in inventories, net exports, lump-sum tax, recessionary expenditure gap, inflationary expenditure gap.

6.1. Simplifications in the Aggregate Expenditures Model. Investment Schedule

The aggregate expenditures model is described in 1936 in the writings of British economist John Maynard Keynes. The basic idea of the **aggregate expenditures model** – also known as the "**Keynesian cross**" **model** – is that the amount of goods and services produced and therefore the level of employment depend directly on the level of aggregate expenditures (total spending). Businesses will produce only a level of output that they think they can profitably sell. When aggregate expenditures fall, total output and employment decrease; when aggregate expenditures rise, total output and employment increase.

The simplifications, which include in the aggregate expenditures model reflect the economic conditions that were during the Great Depression (1929–1933):

a) prices are fixed (prices can't change at all; nobody buys anything);

b) the firstly looking a private closed economy (without international trade or government);

c) real *GDP* equals disposable income (no taxes);

d) the excess production capacity and unemployed labor so that an increase in aggregate expenditures will increase real output and employment but not raise the price level.

In the private closed economy, the two components of aggregate expenditures are consumption *C* and gross investment *Ig*.

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Since the consumption schedule has been studied previously, there is no need to repeat that analysis here. But we need to construct an investment schedule showing the *amounts planned investment* – at each possible level of *GDP*.

We will assume that this planned investment is independent of the level of current disposable income or real output.
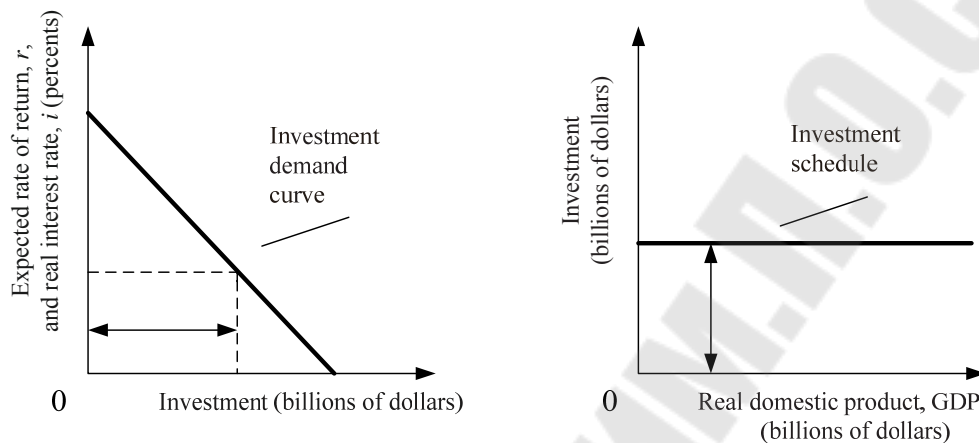

Figure 6.1. The investment demand curve and the investment schedule:
a – investment demand curve; *b* – investment schedule

Comments (Figure 6.1):

a – the level of investment spending is determined by the real interest rate;

b – the investment schedule *Ig* relates the amount of investment determined in *a* to the various levels of *GDP* in the private closed economy.

You should not confuse this investment schedule *Ig* with the investment demand curve *ID*. The investment schedule shows the amount of investment forthcoming at each level of *GDP*.

6.2. Equilibrium *GDP*: *C + Ig = GDP*. Features of Equilibrium *GDP*

Now let's combine the consumption schedule and the investment schedule to explain the equilibrium levels of output, income, and employment in the private closed economy.

The **equilibrium output** is that output whose production creates total spending just sufficient to purchase that output.

The **equilibrium level of *GDP*** is the level at which the total quantity of goods produced (*GDP*) equals the total quantity of goods purchased (*C* + *Ig*).

At levels of *GDP* less than equilibrium, spending exceeds GDP. Buyers would be taking goods off the shelves faster than firms could produce them. The unplanned changes in inventories are decline. Businesses will increase production and employment. At all levels of *GDP* greater than equilibrium, expenditures are insufficient. Enterprises will reduce production and employment.
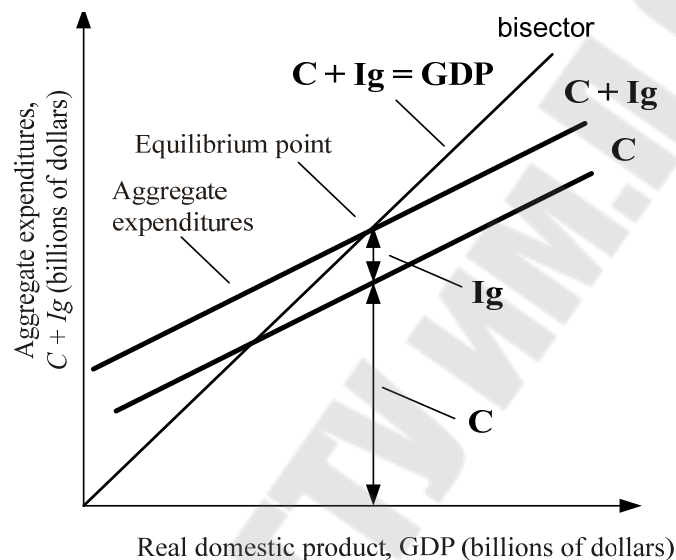
Figure 6.2. Equilibrium *GDP*

Comments (Figure 6.2): the aggregate expenditures schedule (*C* + *Ig*) is determined by adding the investment schedule *Ig* to the consumption schedule *C*. Since that investment is correspond to each level of *GDP*, the vertical distances between *C* and *C* + *Ig* do not change. Equilibrium *GDP* is determined where the aggregate expenditures schedule intersects the bisector line.

There are two more characteristics of equilibrium *GDP*:
• Saving and planned investment are equal.
• There are no unplanned changes in inventories.

Saving is a **leakage** or **withdrawal** of spending from the flow of income and expenditures. Saving is causes that consumption to be less than total output or *GDP*. Saving is causes for a decline in total output.

The firms do not planned to sell their entire output to consumers. Some of that output will be capital goods sold to other businesses. Invest-

ment – the purchases of capital goods – is an **injection** of spending into the flow of income and expenditures.

Investment is a potential replacement for the leakage of saving.

Only where $S = Ig$ – where the leakage of saving is compensated by the injection of investment – will aggregate expenditures ($C + Ig$) equal real output *GDP*.

That $C + Ig = $ **GDP** defines the equilibrium *GDP*.

The firms may decide to increase or decrease their inventories. But there are no unplanned changes in inventories at equilibrium GDP. Equilibrium occurs only when planned investment and saving are equal.

6.3. Changes in Equilibrium *GDP* and the Multiplier. Adding International Trade

In the private closed economy, the equilibrium *GDP* will change in response to changes in the investment schedule or the consumption schedule.
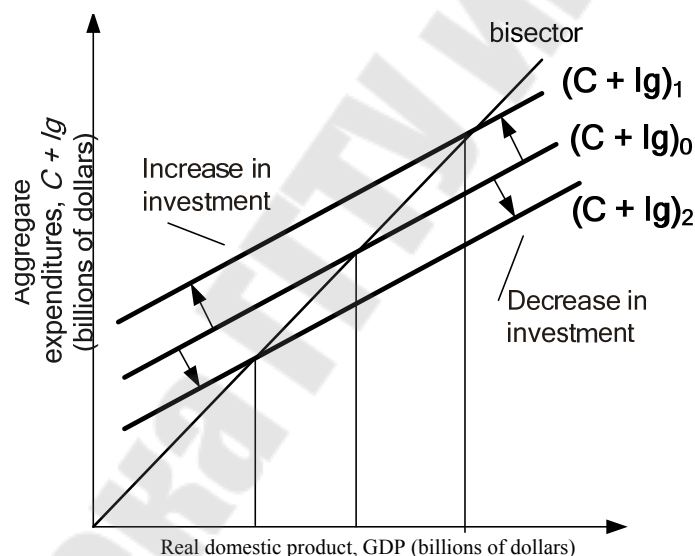
Figure 6.3. Changes in the equilibrium *GDP* cased by shifts in the aggregate expenditures schedule and investment schedule

Comments (Figure 6.3): an upward shift of the aggregate expenditures schedule from $(C + Ig)_0$ to $(C + Ig)_1$ will increase the equilibrium *GDP*. Conversely, a downward shift from $(C + Ig)_0$ to $(C + Ig)_2$ will lower the equilibrium *GDP*. The change in investment spending leads to change in output and income. The extent of the changes in equilibrium *GDP* will depend on the size of the multiplier. The multiplier is equal to $1/MPS$.

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Further we move from a closed economy to an **open economy** that incorporates exports X and imports M. We will be look the **net exports** (exports minus imports), which may be positive or negative.

Although, given country's goods and services produced for export are sent abroad, foreign spending on those goods and services increases production and creates jobs and incomes in this country. We must therefore include exports as a component of aggregate expenditures. To avoid overstating the value of domestic production, we must subtract the amount spent on imported goods, because such spending generates production and income abroad.

In short, for a private closed economy, aggregate expenditures are $C + Ig$. But for an open economy, aggregate expenditures are $C + Ig + (X - M)$, or, $\boldsymbol{C + Ig + Xn}$.
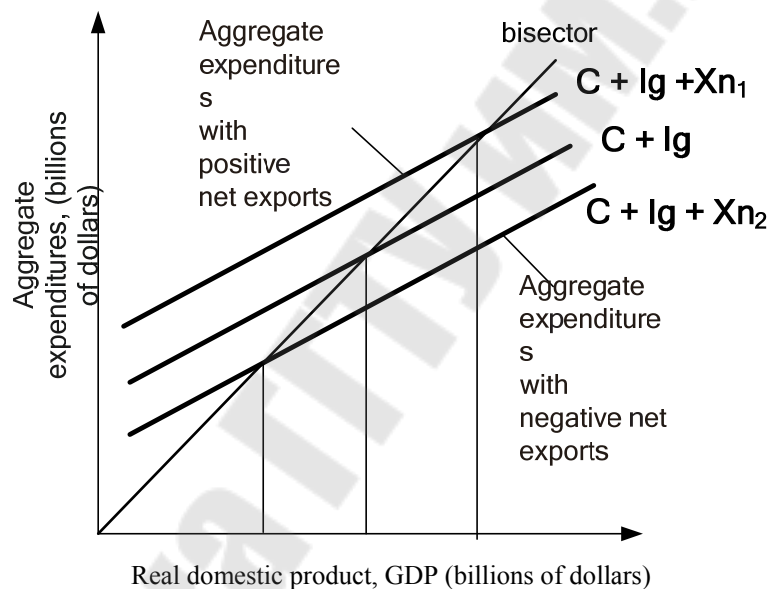
a)
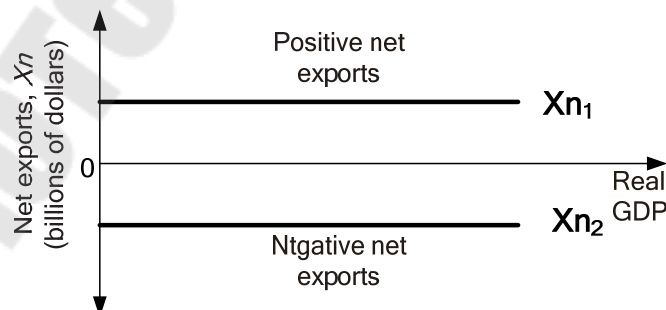
b)

Figure 6.4. Net exports and equilibrium *GDP*:
a – aggregate expenditures schedule; *b* – net export schedule, *Xn*

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Comments (Figure 6.4):

b – figure represents the two net export schedules. Schedule Xn_1 is above the horizontal axis and shows positive net exports at all levels of *GDP*. Schedule Xn_2, which is below the horizontal axis, shows negative net exports at all levels of *GDP*.

a – positive net exports elevate the aggregate expenditures schedule from the closed-economy level of *C + Ig* to the open-economy level of *C + Ig + Xn₁*. International trade increases equilibrium GDP in the private open economy.

Negative net exports lower the aggregate expenditures schedule from the closed-economy level of *C + Ig* to the open-economy level of $C + Ig + Xn_2$. International trade decreases equilibrium *GDP* in the private open economy.

6.4. Adding the Public Sector

We move from a private open economy to an **economy with a public sector** ("mixed economy"). This means adding *government purchases* and *taxes* to the full aggregate expenditures model.

For simplicity, we will assume that government purchases and fixed amount of taxes are independent of the level of GDP.

The addition of government purchases to private spending (***C + Ig + Xn***) gives higher level of aggregate expenditures (***C + Ig + Xn + G***).

Note that government spending is depending to the multiplier.

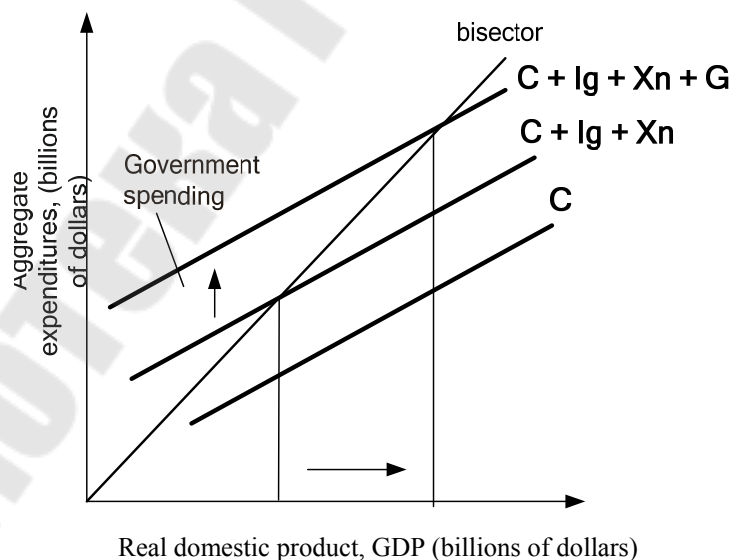Real domestic product, GDP (billions of dollars)

Figure 6.5. Government spending and equilibrium *GDP*

Comments (Figure 6.5): the addition of government expenditures raises the aggregate expenditures ($C + Ig + Xn + G$) schedule and increases the equilibrium level of *GDP*. If government purchases were to decline the equilibrium *GDP* would fall.

The government not only spends but also **collects taxes**. Suppose it is a *lump-sum tax*, which is a tax of a constant amount. Disposable (after-tax) income is lower than *GDP*. Because households use disposable income both to consume and to save, the tax lowers both consumption and saving.
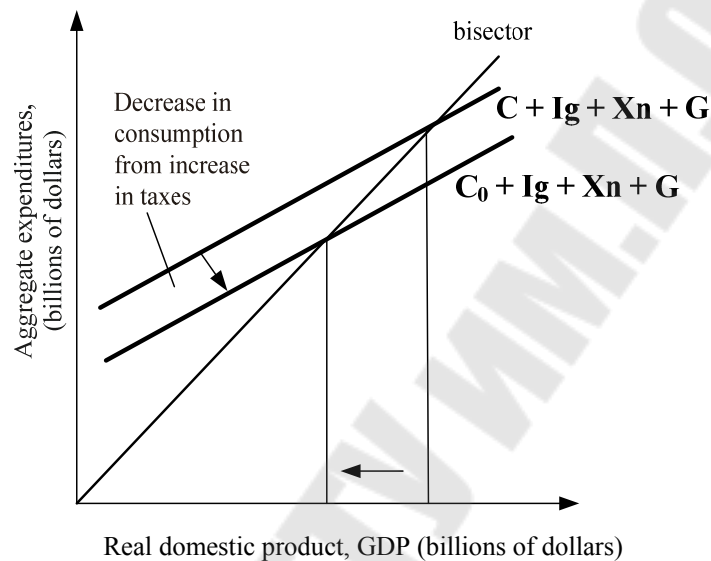
Figure 6.6. Taxes and equilibrium *GDP*

Comments (Figure 6.6): the increase in taxes shows up as decline in the aggregate expenditures ($C + Ig + Xn + G$) schedule. This decline in the schedule results solely from a decline in the consumption *C* component of aggregate expenditures. The equilibrium *GDP* falls because of this tax-caused drop in consumption. Decrease in existing taxes will raise the aggregate expenditures schedule as a result of an increase in consumption at all *GDP* levels.

Notice that equal changes in *G* and *T* do not have equivalent impacts on *GDP*. In both cases, the effect of the multiplier acts, but the tax multiplier is less than the multiplier of government spending.

At the equilibrium *GDP*, the sum of the leakages equals the sum of injections. In symbols:

$$Sa + M + T = Ig + X + G, \qquad (6.1)$$

Sa – after tax saving; *M* – imports; *T* – taxes; *X* – exports; *G* – government purchases; *Ig* – investment.

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If there is savings, then there is investment. If there is import, then there is export. If there are taxes, then there are government purchases.

6.5. Recessionary and Inflationary Expenditure Gaps

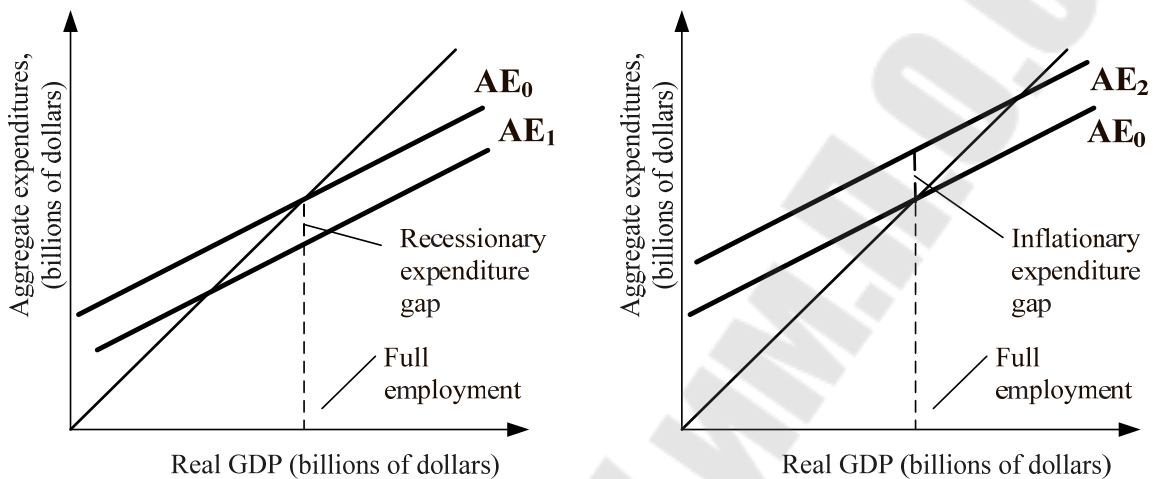The equilibrium and full-employment *GDP*s may not coincide.

Figure 6.7. Recessionary and inflationary expenditure gaps:
a – recessionary expenditure gap; *b* – inflationary expenditure gap

Comment (Figure 6.7):

a – a **recessionary expenditure gap** is the amount by which aggregate expenditures at the equilibrium *GDP* fall short of those needed to obtain the full-employment *GDP*. The aggregate expenditures curve would have to shift upward to realize equilibrium at the full-employment *GDP*. Graphically, the recessionary expenditure gap is the vertical distance (measured at the full-employment *GDP*) by which the actual aggregate expenditures schedule AE_1 lies below the hypothetical full-employment aggregate expenditures schedule AE_0.

b – an **inflationary expenditure gap** is the amount by which aggregate expenditures at the equilibrium *GDP* exceed those sufficient to obtain the full-employment *GDP*. This is shown by the vertical distance between the actual aggregate expenditures schedule AE_2 and the hypothetical schedule AE_0, which would be just sufficient to achieve the full-employment *GDP*. Thus, the inflationary expenditure gap is the amount by which the aggregate expenditures schedule would have to shift downward to realize equilibrium at the full-employment *GDP*.

British economist John Maynard Keynes (1883–1946) pointed to two different policies that a government gets full employment. The first is to increase government spending. The second is to lower taxes. Both work by increasing aggregate expenditures.

For example, the decrease in taxes will leave consumers with higher after-tax income. That will lead to higher consumption expenditures and an increase in equilibrium real *GDP*.

Classical macroeconomists denied that the level of spending in an economy could be low for the purchase of the entire output. Demand must be the same as supply! The Great Depression of the 1930s called into question the theory that supply creates its own demand (Say's law). In 1936 Keynes explained why cyclical unemployment could occur in a market economy. In his General Theory of Employment, Interest, and Money, Keynes attacked the foundations of classical theory and developed the ideas the aggregate expenditures model. Keynes argued that government should play an active role in stabilization of economy.

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Educational edition

MACROECONOMICS

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Compiled by **Bondareva** Anna Mihailovna

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