Lecture 1. Introduction to Macroeconomics.

1. Economics - study of the economy and of the behavior of people in the economy - is traditionally divided into microeconomics and macroeconomics. The subject of **macroeconomics** is development of the economy as a whole. It presents a theory of cyclical fluctuations in the economy, tries to explain them and to find basic relationship of output, employment and inflation rate dynamics.

2. **Microeconomics** combines the consumer choice theory and the firm theory. It focuses on the mechanism of economic decisions of households and firms in a given economic environment and explains the way this environment is formed as a result of their joint efforts. The processes taking place on macro- and microlevels are closely connected, because general macroeconomic conditions (such as market interest rate, inflation and unemployment rates) influence savings, investment, consumer expenditure decisions of households and firms, which in their turn predetermine aggregate demand, its amount and composition.

Macroeconomic analysis, in contrast to microeconomic one uses **aggregate variables**, characterizing development of the economy as a whole: GNP(and not an individual firm output), average price level (and not specific prices), market interest rate (and not interest rates of certain banks), as well as rates of inflation, employment, unemployment and others. Real GNP growth rate, inflation and unemployment rates are basic macroeconomic indicators.

3. **Macroeconomic models** are among the main instrument of analysis and management of short- and long-run economic fluctuations, providing a set of directions how to solve economic growth, employment and inflation problems. They formally (either graphically, or algebraically) describe various phenomena or developments of the economy and this way reveal their interrelations.

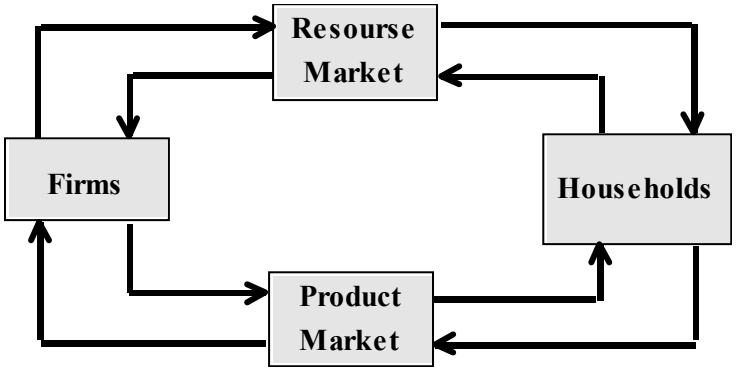
Macroeconomic models contain **endogenous variables**, being found in process of their solution, as well as exogenous ones, introduced from without a model. **Exogenous variables** used in the models, are usually those determined by government and central bank, such as government expenditures G, tax rates t, and money supply M_s. Employment, output, inflation and unemployment rates are as a rule endogenous variables. Using macroeconomic models provides a possibility to find an optimal combination of fiscal and monetary policies.

4. Macroeconomic analysis is based on a simple **circular flow model** (GNP, income and expenditures circular flow model). Its easiest form contains only two types of economic agents - households and firms, and supposes no government interference, as well as no transactions with the rest of the world.

According to the following scheme, an economy is a closed system, in which all kinds of economic agents' incomes appear to be expenditures of other economic agents.

Firms' expenditure on resources (or their costs) present at the same time flows households' incomes, such as labor income, rent and others. On the other hand, consumer expenditure flows form sales revenue (or income) of firms producing goods and services.

"Income-expenditure" and "resources-products" flows are realized simultaneously and are resumed endlessly. Total value of sales in the model necessarily equals total amount of households' incomes. Therefore, total value of output in **a closed economy** (i.e. that with no relations with the rest of the world) and with no government interference equals total value of households' income.



5. The model becomes more sophisticated if we introduce new economic agents in it, i.e. government and the rest of the world. Then there arise **leakages** of **savings, taxes and imports** from the "income-expenditure" flow, as well as additional **injections** of **investment, government expenditures and exports**. So, the equality seems inconsistent at the first sight. But in essence, basic interrelationship between households' expenditure decisions and firms' production decisions does not change in principle: transfers, subsidies, taxes only provide instruments to manage output, employment and inflation fluctuations for the government.

Accordingly, firms are forced to cut down output in response to the decisions of households to curtail expenditures, which in its turn, causes decrease in incomes. Output and employment are determined by the demand for goods, and aggregate demand is in its turn predetermined by the revenue of factors of production owners, depending on output and employment.

6. The circular flow model reveals the role of total demand in the performance of economy. It can maintain unimpeded real and monetary flows only if total expenditures of households, firms, government and the rest of the world equal total output. Reduced due to decreasing total expenditures aggregate demand induces lower output and employment, that causes further decrease in total income determining in its turn, aggregate demand. Therefore, aggregate demand adjustment appears to be a key issue of macroeconomic policy.

7. Different schools of macroeconomics suppose different ways of aggregate demand management. **Keynesians** argue for total expenditures stabilization through government expenditures, taxes and money supply variations. **Monetarists** consider money supply management to be a universal instrument of economy stabilization. **Neokeynesians** stress on influence economic agents' rational expectations by means of slow gradual changes in wages and prices. **Neo-classical model** of rational expectations supposes rapid adjustment of wages and prices to changes in market conjuncture.

Lecture 2. GDP and its Measurement.

1. Value of output characterize results of economic activity on the macro-level. It can be estimated either on national or on domestic base. To explain the difference between these two methods we introduce the concepts of resident and non-resident sectors.

Resident sector includes all the citizens of a country living in its territory or abroad or receiving compensation from the budget of the country. **Non-resident sector** includes all the people, either citizens or not, living and promoting economic activity in the territory of the country. It means, that economic activities of other countries citizens are to be taken into consideration here, but activities of the given country citizens excluded.

Accordingly, there are two main macroeconomic indicators - **Gross Domestic Product (GDP)** and **Gross National Product (GNP)**.

GDP measures the value of goods and services produced in the territory of a country, i.e. by the factors of production of a given economy, regardless of their owner. It includes the results of non-resident sector economic agents economic activities.

GNP measures the results of economic activity on the national basis, so it includes the value of all goods and services produced by the resident sector factors of production, i.e. owned by its citizens. Some share of GNP is produced abroad.

The difference between GDP and GNP equals the difference between resident and non-resident factor incomes.

GNP = GDP + net factor income from abroad.

Both GNP and GDP measure results of economic activities within a certain period - usually, a year. Goods and services in GNP and GDP are estimated by their market value.

2. GDP can be calculated by three main methods:

a) method of final utilization (the sum of expenditures);
b) production method (the sum of products);
c) distribution method (the sum of incomes).

3. **The method of final utilization** presents market value of all consumed by the economic agents goods and services. It is the sum of expenditures of households, firms, government and foreigners exporting from the country.

$$\boldsymbol{GDP = C + I + G + X_n}$$, where:

C - personal consumption expenditures, including those on durable goods, nondurable goods and on services and excluding dwelling expenditures;

I - investment expenditures. Only private investment expenditures are taken into consideration here, and government investments are accounted separately. They are formed by the following kinds of investment:

- investment in equipment and structures (residential as well as non-residential);
- investment in inventories: planned (i.e. those necessary to maintain normal production process) and additional ones (aimed to balance supply and demand);

- depreciation: capital consumption allowance (CCAl) and capital consumption adjustment (CCAdj). Including CCAdj means that gross and not net investment are accounted in GDP;

G - government consumption: government expenditures on goods (purchased by government) and services (compensation of government officials and financing public sector institutions). Government transfers do not contribute to the increase of output, and so they are not included here.

X_n - net exports - the difference between export and import values.

4. **GDP calculation by the production method** supposes summarizing value added by all the economic agents. Most produced in the economy goods and services are subject to further processing (they are intermediate goods), their value being included in the value of final goods, and there arises a possibility of double accounting. So, to get net results of economic activities one should not take into account the value of intermediate goods. Therefore only **value added** (the difference between final goods and intermediate goods value) is to be summed up when calculating GDP.

5. By **the distribution method**, all kinds of factor incomes and payments unconnected with income distribution are being summed up. They are wages, rent, interest payments, depreciation and indirect taxes (excise tax, value added tax, export and import duties, etc.).
The GDP measures the income of residents of the economy and non-residents, earned in domestic production, but it does not include income earned by residents on foreign ground.

6. Starting with GDP and subtracting the depreciation we obtain **net domestic product (NDP)**:

NDP = GDP - Depreciation

7. The next adjustment in the national income accounts is for indirect business taxes, such as sales taxes, excises, tariffs. This kind of taxes place a wedge between the price that consumers pay for a good and the price that firms receive. Once we subtract indirect business taxes from NNP, we obtain a measure called **national income** - a measure of how much everyone in the economy has earned. National income may be divided into five components, depending on the way the income is earned. The components of national income are:

- Compensation of employees: the wages and fringe benefits earned by workers.
- Proprietors' income: the income of noncorporate businesses, such as small farms, mom-and-pop stores, and law partnerships.
- Rental income: the profit that individuals earn as landlords, including the profit from imputed rent they "pay" to themselves.
- Corporate profits: the income of corporations after the payment to their workers and creditors.
- Net interest: the interest domestic businesses pay minus the interest they receive, plus interest earned from foreigners.

8. A series of adjustments takes us from national income to **personal income**. First, we reduce national income by the amount of corporate profits, social insurance contributions, and net interest. Second, we increase national income by the amount of dividends, government

transfers to individuals, and personal interest income (including the interest on the government debt).

9. If we subtract personal tax payments and certain nontax payments to the government, we obtain **disposable personal income.** Disposable personal income is the amount households have available to spend on consumption and saving.

10. **Consumption** is such a large and important component of GDP. Over the long run, consumption expenditures and GDP grow at about the same rate. Over the short-run business cycles, consumption expenditures fluctuate less than GDP, because consumption depends mainly on personal disposable income, and GDP is very different from the personal disposable income that is available to consumers for spending. The changes in two important parts of personal disposable income -taxes and transfers are sometimes called automatic stabilizers because of their stabilizing effect on disposable income: taxes fall during recessions, and transfers increase, therefore disposable income does not fall as much as GDP.

11. We know **the key national income accounts identity**: $Y = C + I + G + NX$. In macroeconomic analysis are used other important economic identities.

The Identity of Saving and Investment.

Saving (S) is defined as income minus consumption. Consider first a closed economy with no government and therefore no taxes. Then,

Spending on GDP = Consumption + Investment

Also, from definition of saving,

Income, or GDP measured through income = Saving + Consumption

Since spending on GDP equals national income, we know that

$$C + I = S + C, \text{ or}$$
$$I = S$$

This simple identity becomes more complicated for a closed economy with government and for an open economy interacting with other economies in the world.

12. **National saving** is divided into **private saving** (S_p), **government saving** (S_g) and **rest of the world saving** (S_r):

$$S = S_p + S_g + S_r$$

Private saving is the sum of income (Y), government transfers to the private sector (TR), interest on the government debt (N) minus taxes (T) and consumption (C):

$$S_p = (Y + TR + N - T) - C$$

Government saving equals:

$$S_g = (T - TR - N) - G$$

When government saving is positive it is called **budget surplus**. When government saving is negative it is called **budget deficit** (*BD*):

$$BD = -S_g$$

Rest of the world saving is equal to income that other countries receive from our imports minus spending on our exports:

$$S_r = M - X, \text{ or } S_r = - NX$$

The rest of the world saving is used either to buy financial assets in our country or to reduce foreign financial liabilities. Either is called a capital inflow.

13. It is important to note that these equations do not imply that saving equals investment for any of the sectors individually. However, for the three sectors (private, government and the rest of the world) as a whole, saving must equal investment. For example, the increase in investment can occur, despite the decline in private saving and government saving, because of the increase in capital inflow from abroad.

$$S_p + S_g + S_r = (Y + TR + N - T) - C + (T - TR - N) - G + (-NX)$$
$$S_p + S_g + S_r = Y - C - G - NX$$
$$S = I$$

14. The excess of saving over physical investment can be used to increase assets or reduce liabilities. Consider two types of financial assets: government bonds and government money (currency). Money and bonds are financial liabilities of the government and are financial assets of the private sector. Government saving can be used either to reduce the national debt or to reduce money.

$$S_g = -(\Delta M + \Delta B)$$

This equation is called **government budget identity**. The budget deficit must be financed by issuing money or by issuing bonds:

$$BD = -S_g, \text{ or } BD = \Delta M + \Delta B$$

If the private sector restricts itself to money and bonds, then the excess of private saving goes into either money or bonds.

$$S_p = I + \Delta M + \Delta B$$

If the rest of the world invests only in government bonds, then we have

$$S_r = \Delta B_r$$

By adding these three types of saving we find again that $S = I$, the saving equals investment identity for the economy as a whole.

15. As we have already mentioned all the GDP components are estimated by their market value reflecting not only changes in output but changes in prices as well. To get an idea of real tendencies in economic performance one should look not at **nominal** (calculated in current, i.e. last year prices) but at **real**, i.e. adjusted to inflation, GDP.

To find real GDP one should divide nominal GDP by a price index (GDP deflator). There are several kinds of them.

Paasche price index (implicit GDP deflator) is defined as:

$$\frac{\text{Current Price of Current Basket of Goods}}{\text{Base - Year Price of Current Basket of Goods}}$$

GDP Deflator (Paasche price index) = Nominal GDP / Real GDP

Laspeyres price index:

$$\frac{\text{Current Price of Base - Year Basket of Goods}}{\text{Base - Year Price of Base - Year Basket of Goods}}$$

Paasche index is based on a changing basket of goods, and Laspeyres one - on a fixed one. Laspeyres index overestimates the cost of inflation, because it neglects the fact that consumers will substitute away from goods that become relatively more expensive. Paasche index underestimates the cost of inflation because it neglects the fact that such substitution may make consumers worse off.

Consumer price index (CPI) - is a measure of the overall level of prices that shows the cost of a fixed basket of *consumer goods* relative to the cost of the same basket in a base year.

Lecture 3. Economic Growth.

The **Economic Growth** means the increase of the total real output (or income) during rather long periods. Such a process can be observed in most of national economies, and it should be distinguished from short-term output fluctuations caused by changes of the aggregate demand. The economic growth reflects the **long-term growth of aggregate supply.**

The economic growth means:

a) the increase of total real income of the nation;

b) the growth of real income per capita.

c) the growth of real income per worker.

In 1985-1995 the average annual rates of per capita income growth were in Japan 2.9%, in the United Kingdom 1.4%, in USA 1.3%, in France 1.5%. In the same time some other nations had essentially higher average annual growth rates of per capita income: in Korea and China it was 7,7% and 8.3%, in Thailand 8.4%, in Singapore 6.2%. At the same time in many countries in Africa, Latin America, Central and Eastern Europe growth rates of per capita income were negative: in Rwanda -5,4%, in Nicaragua -5,4%, in Bulgaria -2,6%, in Romania -3,8%, in Georgia -17,0%, in Azerbaijan -16,3%, in Armenia -15,1%, in Belarus -5,2% in Russian Federation -5,1%.

The question arises: *what factors determine the growth path of each country?* The theory of economic growth is devoted to find such a factors and the methods of calculation and analysis of each factor's contribution into the general figures of economic growth.

The following issues will be considered in this chapter:

- the measurement of economic growth;
- the factors of growth;
- the models of economic growth;
- the relations between economic growth, initial country conditions and macroeconomic policy.

The measurement of economic growth. For measurement of the national economy's growth the indicators of total output (income) can be used. Usually the general growth dynamics is being described by the value of the Gross Domestic Product (GDP), Gross National Product (GNP) or National Income. In the theory and models of economic growth no distinction is usually being made between these indicators which are described by the same category of "output" (or "income").

At the same time all these indicators have serious shortcomings. For instance GNP includes military expenditures overestimating prosperity, but does not include a number of services like housework or shadow economic activity which lead to the opposite effect. GNP does not also include (recently increasing) leisure time, average life expectancy and other statistical indicators, characterizing the living standards and also economic and political freedoms. Moreover, living standard of a person depends on his position in society which is determined by not average, but by median income.

The output (income) indicator Y is being usually divided in growth theory to the values of consumption and investment I: $Y = C + I$. The government expenditures and net exports are being also divided to the consumption and investment of the government and of the rest of the world. *The dynamics of indicator Y_t (t - time index) in absolute figures and per capita generally describes the process of growth.* Consumption C_t reflects the final objective of the economy - the living standards rising; the investment I_t serves to increase the potential of the economy and to implement the technical innovations. There is some **trade-off between consumption and investment** since an increase of the current consumption decreases the possibilities of economy's

potential growth and by this - the capacities of production and consumption in the future. This explains the fact that not too high growth rates in industrial countries mean that population prefers a happy life at present and don't wish higher growth rates.

Annual growth rate of output can be find as $Y_t = \frac{\Delta Y_t}{Y_{t-1}}$.

Determining per capita output as $y = \frac{GNP}{N}$ one can show that per capita growth rate will be equal to the GNP growth rate subtracting population growth rate.

$$\%\Delta y \equiv \frac{\Delta y}{y \Delta t} = \%\Delta GNP - \%\Delta N$$

Too high population growth rates can lead to decrease in living standards, even if positive economic growth exists. For instance, by the World Bank data in 1996-1997 the average rates of per capita income were negative and equal to -1.3% in Namibia, -1.4% in Cambodia and -1.1% in Haiti. Meanwhile growth rates of aggregate GDP were positive and equal to 1.2%, 1.0%, and 1.0% correspondingly.

As a measure of economic growth the growth rate of real income per worker is often used, which reflects more adequately changes in labor productivity. Taking into account the fact, that not the whole population is economically active and existence of unemployment we find that a country has a different position in the list of countries by this measure relative to its position by per capita income.

Annual Growth of Output (1960-85)

	per capita		per worker	
1	Botswana	6.70%	Botswana	7.60%
2	Taiwan	6.20%	Gabon	6.90%
3	Hong Kong	5.90%	Lesoto	5.70%
4	Singapore	5.90%	Taiwan	5.50%
5	S. Korea	5.70%	Japan	5.40%
6	Japan	5.50%	Egypt	5.30%
7	Malta	5.30%	S. Korea	5.00%
8	Lesoto	5.10%	Hong Kong	4.70%
9	Egypt	5.00%	Greece	4.70%
10	Cyprus	4.90%	Syria	4.60%

In the given table a number of countries having a high rank by one indicator are not in the first dozen by another one. We can define the growth rate of real income per worker in the same way as per capita income, introducing $\tilde{y} = GNP / L$, and replace N with $L = e \cdot LF = e \cdot p_r \cdot N$, where e - employment rate, LF - economically active population, and $p_r = LF/N$ - the level of economic activity (participation rate).

$$\%\Delta\tilde{y} \equiv \frac{\Delta\tilde{y}}{\tilde{y}\Delta t} = \%\Delta GNP - \%\Delta L = \%\Delta GNP - \%\Delta N - \%\Delta p_r - \%\Delta e$$

Comparing last two formulas we can conclude that growth rate per worker is less than per capita growth rate by the value of growth rate of participation rate and employment. This explains why countries with high per capita growth rates have low (or lower) growth rates per worker, if economic growth occurs due to the growth of labor force, due to increase in participation rate.

The Factors of Growth. The output (income) Y is connected in the growth theory with the quality and quantity of the used resources (or factors of production - capital K and labor L), and also with the technology. There are two general components of the growth's factors: the extensive one (connected with the increase of resources' inputs) and the intensive one (connected with the increase in their return). The latter is related not only to resources' productivity but to their effective allocation. The works of E.Denison give an approach of estimation the shares of factors' contribution into the growth rates of national income. In the 1929-1982 in USA these shares were:

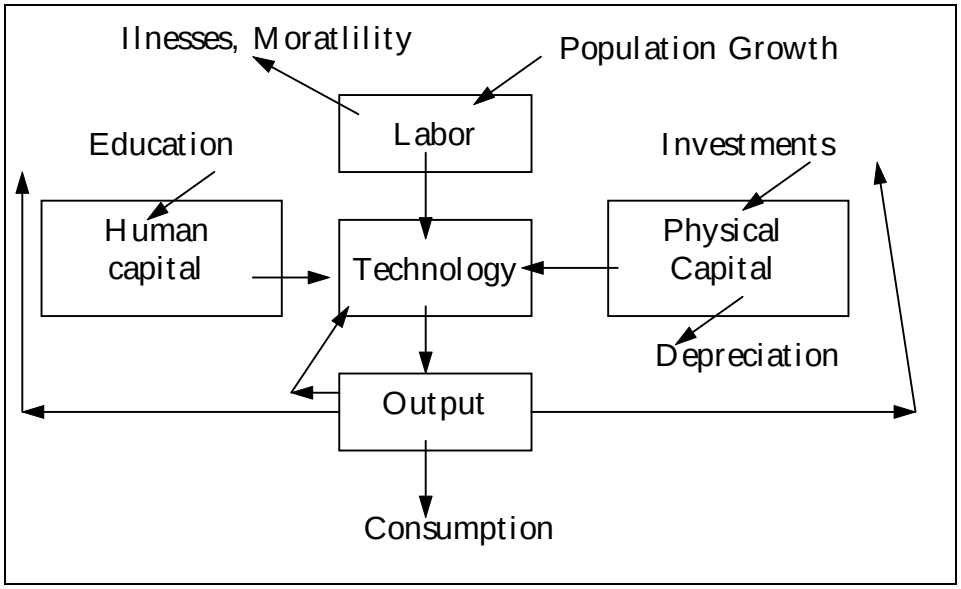
- increase in quantity of labor 32%;
- increase in quantity of capital 19%;
- technological advance 28%;
- education and training 14%;
- economies of scale 9%;
- improved resource allocation 8%;
- legal-human environment and other -9%.

The average growth rate in USA was in 1929-1982 2.9%. Thus, by E.Denison's estimate, about a half of economic growth in USA was attributable to the extensive factors (increases in the quantity of capital and labor), and another half - to intensive factors.

Some factors restrain the economic growth. These are: the constraints of aggregate demand, the resource and ecological constraints. If the USA economy would reach the potential level of output, then the average annual growth rate would be equal in 1929-1982 to about 3.2%. The permanent development of new technologies essentially softens the scarcity of energy, land, raw materials and other resources, but this scarcity restrains the economic growth. The necessity to spend much resources for environment protection, low resources' substitutability also restrict the economic growth.

The contribution of the growth factors can be calculated using the production functions estimation.

General Logic and Scheme of Macroeconomic Growth Models. The contribution of different factors to economic growth can be roughly shown in the diagram.



One often differ endogenous growth models (taking into account investment to human capital, research and technology) and exogenous ones (with exogenously given technology).

The Solow Model of Economic Growth.

The Solow Model takes into account substitution between capital and labor in the assumption of constant return to scale and introduces explicitly given technical progress:
- the model includes non-linear production function with the decreasing marginal productivity;
- the model describes the depreciation of capital;
- the model includes the variable of labor and its influence on output;
- the model describes some type of technical progress;
- the problem of consumption maximization on some set of steady trajectories is being formulated and solved.
- the production function has constant returns to scale.

These changes gave a possibility to describe successfully with the help of Solow Model empirical data on economic growth over period 1950-1970.

In the absence of technical progress the dynamics of capital accumulation in the Solow Model is very simple: Capital accumulates until increase in capital due to investment ($I = sY$) becomes equal to the decrease in capital due to depreciation and increase in number of workers, that is $(sY)/L = d \cdot K/L + n \cdot K/L$. When this condition is fulfilled (in the stationary state) growth rate of output coincides with the growth rate of each factors and combination of factors used in the production process remains constant.

Taking technical progress into account leads to the situation in which growth rate of output in the stationary state exceeds the growth rate of each factors on the value of technical progress (growth rate of the scale of economy when resources are fixed) and combination of factors used in the production process still remains constant.

It is easy to conclude that optimal value of the ratio of capital to output (K/L) will depend on the saving rate s. The higher is the saving rate the higher will be this ratio in the process of accumulation of capital. Optimal value of the saving rate can be found from the maximization of consumption (wealth). (**The Golden Rule of capital accumulation)**. According to it net (subtracting depreciation) marginal product of capital (MPK-d) is equal to the growth rate of output.

You can familiarize with this model in more details in the Appendix 1.

The **Solow model's disadvantages**:

- the model allows to find and analyze the steady states which can be reached in the long run. But the economic policy should provide the welfare in close future.
- the long-run equilibrium states are never been really reached since on the way to them some important parameters (which are considered as constant in the Solow model) change;
- the savings rate s is considered as constant in the model; its value is being set exogenously. The capital depreciation rate d, the population growth rate n and labor-augmenting technical progress rate g are also being exogenously set. More preferable would be the endogenous setting of these parameters in the model since they are linked with its other parameters and variables. For example, the additional investment in human capital accelerate the technical progress and hence the economic growth;
- the Cobb-Douglas production function describes very particular type of interaction of labor, capital and technical progress; their real interaction can be different. For instance, the elasticity of substitution in the Cobb-Douglas production function is supposed in advance to equal to one. If it is less than one, it reduces the rate of economic growth;

- the model does not include some real restrictions of economic growth: energetic, ecological and others;

- the model does not include some growth factors which can be influenced by economic and social policy and hence should be described endogenously in growth model (education, social stability, health care, military spending etc.).

The modern economic growth theory is devoted to correction of these disadvantages and restrictions of the Solow model. Modern models of economic growth are endogenous. They take into account investment to human capital, research and development and allow us to describe the dynamics of technology instead of considering it exogenously given. They also take into account with the help of discounting intertemporal flows of macroeconomic variables and as a rule maximize wealth instead of consumption. However formal description of such models is rather difficult and we'll not touch their theoretical background, but only empirical approach.

The Empirical Analysis of Growth Factors: Endogenous Growth.

The branch of the Growth Theory called the Theory of Endogenous Growth links the economic growth with all its quantitative and qualitative factors: resource, institutional, international and others. The examples of such factors are:

- the primary or secondary education enrollment characterizing the quality of labor resources;

- the share of military expenditures in GDP reflects the resources allocation structure;

- the alcohol per capita consumption reflects the working and social motivation;

- the number of armed conflicts reflects the social and political stability.

In the models of endogenous growth the factors of growth are being selected accordingly to their empirically (statistically) determined significance. Linear regression theory is usually used to construct such a models. Cross-sections data for different countries of the world is usually used as database. The researchers try to find explanatory factors of economic growth, constructing statistical indicators for them. For example, R.Levine and D.Renelt (1992), R.Barro and J.-W.Lee (1994) and others indicate the following growth factors and the direction of their influence on the per capita GDP growth rates (using the signs "+" or "-"):

- the initial level of per capita GDP (-); the lower this level is the more possibilities of growth using the technologies and organizational forms already existing in the world are available. It means the convergence of the income levels of most the nations;

- the average population growth rate (-); under the fast population growth the total income should be distributed among the growing number of people, and per capita income grows slower;

- the secondary education enrollment (+); this indicator characterizes implicitly the labor force quality because it reflects the level of education of the majority of workers and employees;

- the share of investment in GDP (+); it influences directly the capital accumulation and hence the growth of potential output;

- the life expectancy at birth (+); it reflects, together with the education, the quality of labor force;

- the share of government spending in GDP (excluding military and education expenditures) (-);

- the foreign trade and investment restrictions (-);

- the share of military spending in GDP; (+) under the share less than 9-10% and (-) under the higher shares;

- the different indicators of social and political instability (-);

- the inequality of income distribution (-).

The endogenous growth theory is developing mostly empirically now, but it needs the theoretical base with clear assumptions, structure and conclusions. The most possibly full, non-overlapping and significant set of factors explaining economic growth should be constructed.

Sources of growth. Contribution of the main factors to economic growth.

Empirical finding of contribution of the main factors (labor and (physical and human) capital) to economic growth can be done through the estimation of a simple linear regression equation $\%\Delta(Y/L)=\alpha\%\Delta(K/L)+\beta\%\Delta(H/L)+\gamma$
The results of the estimation over the last 30 years are given in the table below

Sources of Growth by Region (1960-92)				
Region		Contribution of		Factors'
	Output per Worker	Physical Capital	Education	Productivity
Industrial Countries	2.40%	1.00%	0.30%	1.00%
East Asia (excl. China)	4.10%	2.80%	0.50%	0.80%
China	4.00%	1.60%	0.50%	1.80%
South Asia	2.30%	1.30%	0.30%	0.70%
Africa	0.50%	1.00%	0.20%	-0.70%
Middle East	1.80%	1.80%	0.40%	-0.40%
Latin America	1.40%	1.00%	0.30%	0.10%

One can see from the table that contribution of extensive and intensive factors in the industrial countries are approximately equal in magnitude, but in the majority of other countries the main factor of economic growth is accumulation of capital that testifies its rather low level at present. Lessons from international experience (mainly East Asian countries) allow us to formulate policy recommendations for the long run economic growth.

- Stability
  - Macroeconomic and political stability.
  - Stability of financial system
  - Exchange rate stability.
- Effectiveness of Resource Allocation
  - Economic and politic freedom
  - Private Property Rights
  - Incentives for High-Income opportunities
  - Absence of Distortions
    - in relative prices,
    - in exchange rate
    - in trade policy
    - reasonable fiscal (tax) policy
    - in circulating information (free access)
  - Mobility of Resources and developed infrastructure and information-communication system, free access to financial resources
  - Distribution of growth benefits among broad groups of population
  - Agriculture reform and dynamically developing agriculture, using the modern technologies
  - Environment protection (ecology)
  - Integration into the world economy (developing export sector, attracting foreign capital and modern technologies, reasonable management of capital inflows and outflows)

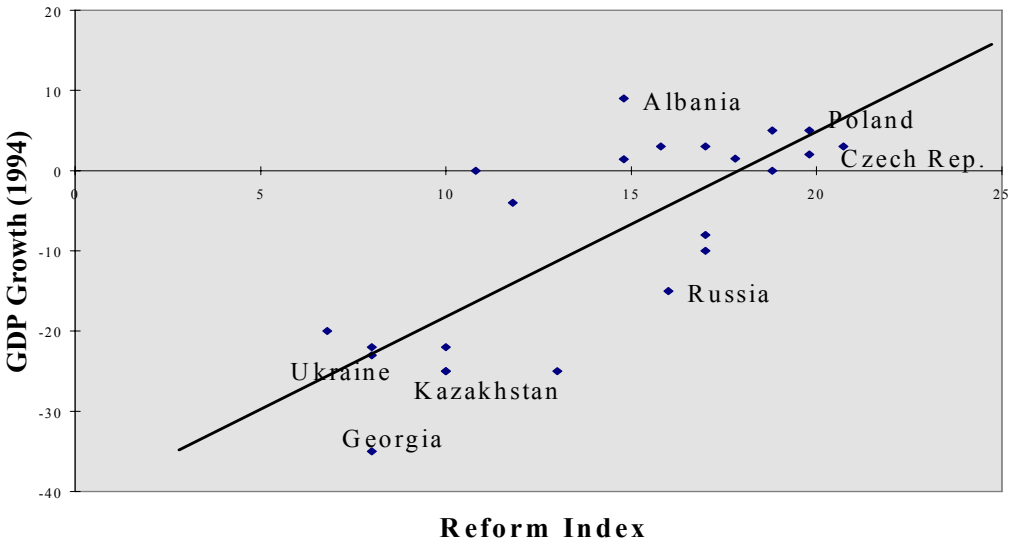
- priority of industries with high return on physical and human capital, effectiveness of foreign capital usage
- Accumulation of Capital
  - High rate of physical capital formation (high saving rates and investments following efficiency criteria and technological progress)
  - Accumulation of human capital
    - Expenditures on education, science, medicine (health)
    - A rapid diffusion of technologies internally developed or picked-up from abroad
- Other
  - Reasonable demographic policy

The Problems of Growth and Development in the New World Economy.

The economic growth is not only the increase of total output or income but also the improvement of some qualitative indicators. The concept "development" means the transition to new qualitative stages of social and economic state, to new types of growth. Although the internationalization of world economy is very high now, the lags in development stages between different groups of countries are still very large. These lags mean not only the large differences of per capita income, but also differences of economy's structure, resources' efficiency, social and institutional organization and behavior, existing of infrastructure, educational and health care systems as necessary framework of growth.

The poorest countries are kept in the "Poverty Trap": they do not have the necessary infrastructure and financial resources for growth, and they are poor because do not grow. The advanced countries have quite different problems of growth and development: their main objective is not the highest possible growth rate but stability and quality of growth. The last means efficient using and reproduction of main resources, environment protection and improvement, social development, research and technological development to create the necessary basis for further growth. In the same time each nation should try not to loose in international competition since it takes now new forms due to the last innovations in telecommunications and information technology.

The group of transitional economies has its own objectives in the field of growth and development. The main is the creation of necessary legal and regulatory framework for normal market economy functioning and growth. It means developing of banking system, privatization, restructuring of economy, etc. Creation of incentives to invest, to develop new technologies will allow the economy to grow.



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Appendix 1. The Solow Model of Economic Growth.

Solow growth model shows how the growth of output is affected by saving, population growth, and technical progress.

Our starting point is the production function:

$$Y=F(K,L)$$

From this equation, we see three possible sources of long-run output growth: the capital stock, labor employed, the production function (technical progress). Our analysis of economic growth focuses primarily on the determination of the capital stock. For the present, we suppose no technological progress and no population growth.

Suppose that the production function has constant returns to scale. This means that, for any positive z, $zF(K,L)=F(zK,zL)$. If $z=(1/L)$, $Y/L=F(K/L,1)$. That is, we can write the production in per capita terms and obtain a function of only one variable - the capital-labor ratio. Let $y=Y/L$ and $k=K/L$, and write this as

$$y=f(k)$$

(As an example, the Cobb-Douglas function $Y=K^{\alpha}\cdot L^{1-\alpha}$ becomes $y=k^{\alpha}$).

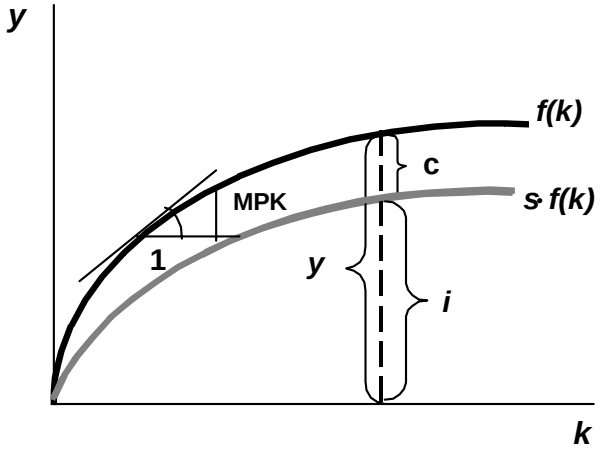


Figure 1

The slope of the production function is the marginal product of capital: of k increases by 1 unit, y increases by MPK units. The production function becomes flatter as k increases indicating diminishing marginal product.

The Solow model is based on equilibrium of aggregate demand and aggregate supply. The aggregate supply is based on the production function. The demand for goods in the Solow model comes from consumption and investment. For simplicity, we suppose that there is no government (G = T = 0). We write everything in per capita terms: c = C/L; i=I/L.

Output divided between consumption and investment (Fig.1)

$$y = c + i$$

We also have a simple consumption function, where s is the saving rate:

$$c = (1-s)y$$

Each year a fraction (1-s) of income is consumed, and a fraction s is saved.

Return to the national income accounts identity and substitute (1-s)y for c:

$$y=(1-s)y + i$$

Rearrange the terms to obtain

$$i=sy \text{ or } i = s\cdot f(k)$$

Since investment equal saving, the rate of saving s is also the fraction of output devoted to investment.

Investment adds to the stock of capital. The depreciation decreases the capital stock. We assume that a certain fraction d of the capital stock wears out each year. We call **d** the **depreciation rate**. Thus the amount of capital that depreciates each year is dk.

The overall change in the capital stock is the net effect of new investment and depreciation:

$$\Delta k=i-dk, \text{ or } \Delta k=s\cdot f(k)-dk$$

The economy will be in **steady state** if the capital stock is constant: $\Delta k=0$. In this case, the only investment being undertaken is replacement investment. The equilibrium condition is just

$$s\cdot f(k)=dk$$

This equation defines the steady-state value of k, which we call **k*.**

The **steady-state level of capital k*** is the level at which investment equals depreciation. (Fig.2).

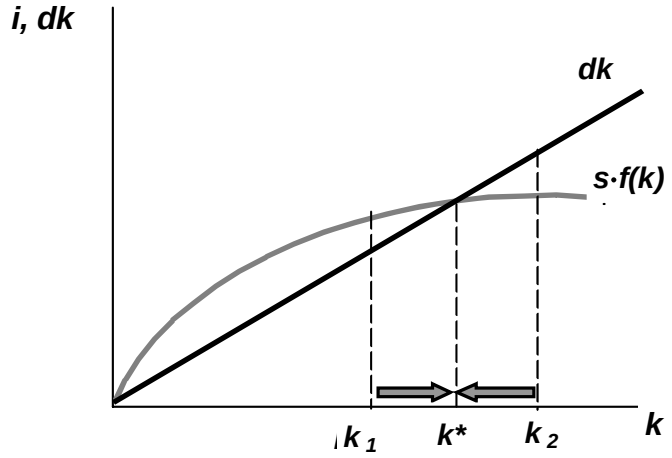


Figure 2

If $k_1<k^*$ investment exceeds depreciation, so the capital stock grows. Above k* investment is less than depreciation, so the capital stock decreases.

The steady state represents the long-run equilibrium of the economy. Regardless of the level of capital with which the economy begins, it eventually ends up in the steady state.

The Solow growth model shows that the saving rate is an important determinant of the steady-state capital stock and the level of output. A country with a higher saving rate invests more and so can sustain a higher capital stock, implying higher output in turn (Tab. 1).

Higher saving leads to faster growth, but only in the short run. An increase in the rate of saving raises growth until the economy reaches the new steady state.

Table 1

Country	*Gross domestic investment % of GDP 1997.*	*Gross domestic saving % of GDP 1997.*	*GNP per capita, 1997*	*GNP average annual growth % 1996-97*	*GNP per capita average annual growth % 1996-97*
Haiti	10	-4	380	1.0	-1.1
Burundi	7	3	207	0,7	-1,5
Senegal	19	13	540	5,4	2,5
USA	18	16	29080	3,8	2,8
Netherlands	20	26	25830	3,4	2,8
Austria	24	23	27920	0,8	0,7
Japan	30	30	38160	1,8	1,5
Peru	25	21	2610	7,3	5,4
Indonesia	31	31	1110	4,3	2,6
Malaysia	43	44	4530	7,5	4,8
Korea Rep.	35	34	10550	4,9	3,9
Hong Kong	34	31	25200	5,2	2,1
Singapore	37	51	32810	8,8	6,7
China	38	43	860	8,5	7,4
Poland	22	18	3590	6,8	6,7
Hungary	27	27	4510	4,7	5,1
Mongolia	22	18	390	3,3	1,5
Moldova	24	0	460	-0,3	0,0
Georgia	7	-4	860	13,2	13,1
Armenia	9	-29	560	8,6	8,2
Belarus	26	22	2150	11,1	11,4
Ukraine	20	16	1040	-3,2	-2,4
Usbekistan	19	19	1020	-	-
Kazakhstan	16	13	1350	1,7	2,4
Kurgys Republic	22	14	480	8,6	7,2
Russian Federation	22	25	2680	0,3	0,6

Source: World Development Indicators, 1999. The World Bank. P. 12-14, 220, 222.

The steady state with the highest possible level of consumption is known as the **Golden Rule level of capital accumulation**, and is denoted k**. (Fig.3)

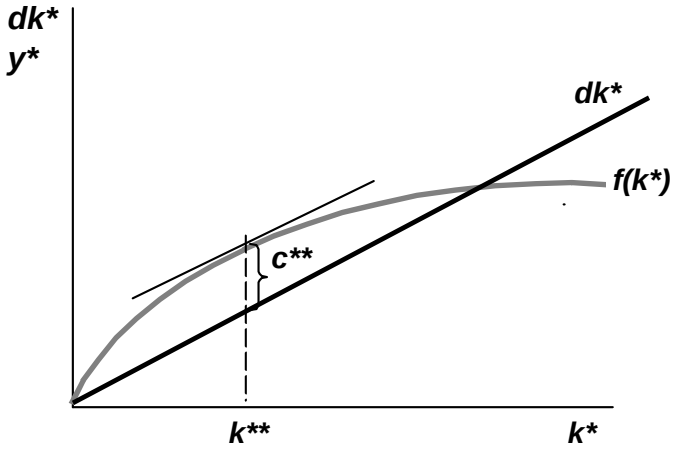


Figure 3

The economy's output is used for consumption or investment. In the steady-state investment equals depreciation. Therefore, steady-state consumption can be written as

$$c^*=y^*-i^*, \text{ or } c^*=f(k^*)-dk^*$$

The concrete steady state consumption c* corresponds to each definite saving rate s. The problem is: to find the steady state with maximum value of c*. The function $[f(k^*)-dk^*]$ should be maximized for the value of k*. The necessary condition of maximum: the derivatives equals zero; hence:

$$[f(k^*)]' = d \quad \text{or} \quad MPK = d$$

In the point k** the tangent line of production function graph is parallel to the straight line dk*, and consumption is at its greatest level.

If k*<k**, an increase in the capital stock increases output more, than depreciation, so that consumption rises (the production function is steeper than the dk* line, so the gap between these two curves grows as k* rises). A one unit increase in k raises output by the MPK and raises depreciation by d. If MPK>d, than increase in k will increase output by more than the required increase in depreciation, so consumption also increases.

If k*>k**, an increase in the capital stock reduces consumption, since the increase in output is smaller then increase in depreciation.

Suppose that policymakers decided that they would like to move the economy to the Golden Rule. There are two possibilities.

If the initial capital per labor efficiency unit k* is less than k** then after rising the savings rate till the Golden Rule level the economy will gradually get the maximum per unit consumption c**. But here c will at first decrease and then will gradually grow together with the growth of y and i. But if the level k* is greater than k** then the savings rate should be reduced to the Golden Rule level. The economy will also gradually get the per unit consumption level c**. In this case c will at first rise and exceed c** and then it will decrease till c**. The values of i (which grew at the initial moment) and y then also decrease till the Golden Rule level.

Thus the Solow model does not reflect the preferences of higher consumption in the close future, it considers only its maximum steady-state level in the long run.

Now consider population change as a possible explanation of sustained economic growth.

We assumed a **population growth rate** equal to **n**. The difference this makes to the

model is that the change in the capital stock becomes:

$$\Delta k=i-dk-nk,$$

since population growth decreases the amount of capital per worker, other things equal. To keep the capital-labor ratio constant, we not only need investment to replace depreciated capital, we also need investment with which to equip new workers; we need to supply the n new workers with k units of capital each. So the steady-state capital stock is now defined by

$$i= s\cdot f(k)=(n+d)k \text{ (Fig. 4)}$$

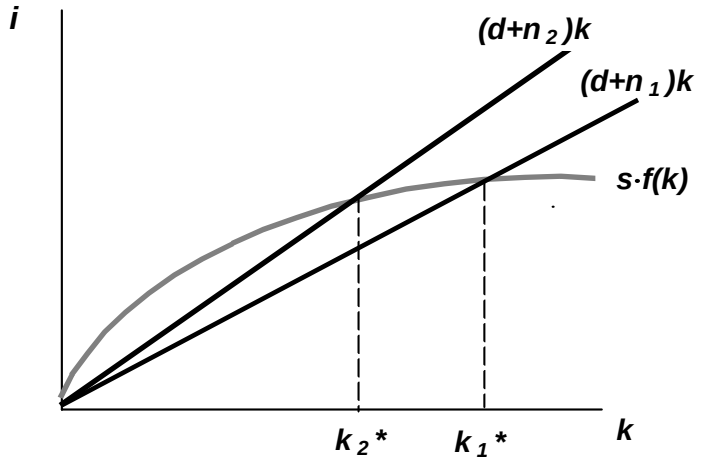


Figure 4

If population is growing at the rate n, total capital and total output are also growing at the rate n. (Recall that the production function is constant returns to scale). Hence, population growth cannot explain persistent growth in standards of living, because output per worker is constant in the steady state. But it can explain persistent growth in total output.

An increase in the rate of population growth reduces the steady-state level of capital per worker k* (and output per worker y*). (Fig. 4)Our conclusion for the Golden rule now becomes

$$MPK=d+n, \quad \text{or} \quad MPK-d=n$$

We now have an explanation of persistently rising output, but we have not yet explained rising living standards. To do so, we incorporate technical progress. The simplest form to analyze is **labor-augmenting technical progress**. The production function now can be written as

$$Y=F(K,L\cdot E),$$

Where **E** measure the **efficiency of labor**. The bigger E is the more output can be produced with a given amount of labor. The term (L·E) is the labor force measured in **efficiency units**. This new production function states, that total output Y depends on the number of units of capital K and on the number of **efficiency unit of labor** (L·E).

The simplest assumption about technological progress is that it causes the efficiency of labor E to grow at some constant rate g (labor-augmenting technical progress works as if we are getting more workers).

If L grows at the rate n and the efficiency of each unit of labor E grows at the rate g, then the number of efficiency units of labor (L·E) grows at the rate (n+g).

Now we analyze the economy in terms of quantities per efficiency unit of labor: k=K/L·E, y=Y/ L·E, and y=f(k). The analysis of technical progress is now exactly analogous to that of population growth. The economy will be in steady state with k constant when sf(k) = (d+n+g)k. The condition for maximum consumption per efficiency unit of labor is MPK =

d+n+g.

In steady state, output, capital, and consumption per worker are all growing at the rate g. The model can now explain rising living standards. According to the Solow model, technological progress is the only source of rising living standards over time (Table 2).

Table 2.

Pop. Growth = 0	Pop. growth = n	Pop. growth = n; tech. pr. =g
L is constant	L grows at rate n	L grows at rate n
		L·E grows at rate n+g
K is constant	K grows at rate n	K grows at rate n+g
k=K/L is constant	k=K/L is constant	k=K/ (L·E) is constant
		K/L grows at rate g
Y is constant	Y grows at rate n	Y grows at rate n+g
y=Y/L is constant	y=Y/L is constant	y=Y/ (L·E) is constant
		Y/L grows at rate g

Appendix 2.Accounting for the Sources of Economic Growth.

The production function can be used in the analysis of factor's contribution into the total output' growth. Let the linear homogenous production function be Y=A·F(K,L). We suppose the constant returns to scale because otherwise it is difficult to separate the effects of technical progress and of the economy of scale. Supposing the constant returns to scale we actually consider the economy of scale as one of the technical progress' forms.

By the total differential formula, the change of output can be approximately written in the following way:

$$\Delta Y = F(K,L)\cdot\Delta A + MPK\cdot\Delta K + MPL\cdot\Delta L,$$

where $MPK=Y'_K$, $MPL=Y'_L$ are the marginal productivities of capital and labor respectively. Dividing the both sides of the equation by Y=A·F(K,L), we get:

$$\frac{\Delta Y}{Y} = \frac{\Delta A}{A} + \frac{MPK}{Y}\Delta K + \frac{MPL}{Y}\Delta L$$

This equation can be transformed by dividing and multiplying the second item on the right side by K and the third item by L:

$$\frac{\Delta Y}{Y} = \frac{\Delta A}{A} + \left(K\frac{MPK}{Y}\right)\frac{\Delta K}{K} + \left(L\frac{MPL}{Y}\right)\frac{\Delta L}{L}$$

The expressions in the brackets are the capital and labor elasticities of output.

Let w be the real wage and r be the real rental payment for unit of capital. In the market economy the marginal output of each factor should equal to the income of this factor's unit. It means that MPL·p=w; MPK·p=r where p is the price of unit of output. Hence, after multiplying the both parts of these equations by L/Y and K/Y respectively, we get:

$\left(\frac{L\cdot MPL}{Y}\right)\cdot p = \frac{wL}{Y}$; $\left(\frac{K\cdot MPK}{Y}\right)\cdot p = \frac{rK}{Y}$ or $e_L\cdot p = \frac{wL}{Y}$; $e_K\cdot p = \frac{rK}{Y}$. Here the values on the right side wL/Y and rK/Y are the labor's and capital's shares in the total income.

For linear homogenous function the Euler's theorem states that MPK·K+MPL·L=Y. Hence, dividing the both parts by Y we get: $e_K+e_L=1$. The factors shares' sum also equals 1, i.e. $\frac{wL}{Y}+\frac{rK}{Y}=1$. Hence p=1, and the factors' shares in income equal to the factors' elasticities of output.

Denoting the capital's share in income as θ, and the labor's share as (1-θ), we get:

$$\frac{\Delta Y}{Y} = \frac{\Delta A}{A} + \theta\times\frac{\Delta K}{K} + (1-\theta)\times\frac{\Delta L}{L}$$

On the left side there is the output growth rate, the items of the right side show respectively the contributions of technical progress and of the increases of capital and labor in this rate. The contributions of labor's and capital's increases equals respectively to the products of their growth rate and of their shares in the total income. The item (ΔA/A) is the rate of technical progress, or of total factors productivity growth.

Lecture 4. Measuring Unemployment and Inflation. Macroeconomic Instability

1. **Business cycle:** the economy-wide fluctuations in output, incomes, inflation, and employment. Although characterized by common phases - peak, recession, trough, recovery - business cycles vary greatly in duration and intensity.

Although the business cycle has been explained in terms of such ultimate causal factors as capital innovations, weakening of the multiplier effect, political events, and money creation, it is generally agreed that the level of total spending is the immediate determinant of national output and employment.

Recession and **recovery** are the main phases of the business cycle. In the **recession** output and employment both decline, but prices tend to be relatively inflexible in a downward direction. The price level is likely to fall only if the recession is severe and prolonged - that is, if a "depression" occurs.

In the **recovery** phase the economy's levels of output and employment expand toward full employment. As recovery intensifies, the price level may begin to rise prior to the realization of full employment and capacity production.

The physical volume of output - measured by real GDP - contracts in a recession and expands in a recovery. The percentage departure of GDP from potential is called $\text{the GDP gap} = \frac{Y - Y^*}{Y^*}$, where Y - real GDP, Y^* - potential GDP.

Employment moves closely with output. Recessions are periods of job loss, that is, rising unemployment.

Inflation generally increases before a recession and subsides in the wake of a recession.

Interest rates usually reach a peak just before a recession starts and than fall considerably during the recession.

All sectors of the economy are affected by the business cycle, but in varying ways and degrees. The cycle has greater output and employment ramifications in the capital goods and durable consumer goods industries than it does in non-durable goods industries. Over the cycle, price fluctuations are greater in competitive than in monopolistic industries.

2. Employment data are collected in a house-hold survey and in an establishment survey. Employment is closely related to output fluctuations. **The labour force** is defined as the number of persons 16 years of age or over who are either working or unemployed.

The unemployment rate is the percentage of the labour force that is unemployed.

There are millions of people who are not working but who are not counted as unemployed. They are considered out of the labour force because they are retired, in school, at home looking after their own children, sick or not looking for work for some other reasons. **The labour force participation rate** is the percentage of the working age population that is in the labour force.

The employment/population ratio is the percentage of the working-age population that is employed.

3. Economists distinguish between frictional, structural, and cyclical unemployment.

Frictional unemployment is the unemployment that results because it takes time for workers to search for the jobs that best suit their skills and tastes.

Structural unemployment caused by changes in the structure of demand for consumer

goods and in technology; workers, who are unemployed either because their skills are not demanded by employers or because they lack sufficient skills to obtain employment.

Cyclical unemployment caused by insufficient aggregate expenditures.

Natural rate of unemployment is the unemployment rate at which there is no cyclical unemployment. It's the sum of frictional and structural unemployment. The real level of national output which associated with the natural rate of unemployment is called the economy's **potential output.** The full employment unemployment rate, and the natural rate of unemployment, and the **non-accelerating-inflation rate of unemployment (NAIRU)** are synonyms which describe the steady-state rate of unemployment. This rate of unemployment is currently believed to be between 6 and 7 percent. The accurate measurement of unemployment is complicated by the existence of part time and discouraged workers.

4. Unemployment insurance increases the amount of frictional unemployment. The second reason for steady unemployment is **wage rigidity**.

Wait unemployment results when the real wage remains above the level that equilibrates labour supply and labour demand.

Minimum wage legislation is one cause of wage rigidity. Another cause is unions and the threat of unionization. Finally, a firm may find it profitable to keep its wage high despite an excess supply of labour.

5. The unemployment rates among demographic groups differ substantially. In particular, the unemployment rates for younger workers are much greater than for older workers.

The unemployment rate has gradually drifted upward over the past 40 years. Various explanations have been proposed, including the changing demographic composition of the labour force, the increase in the number of two-earner households, and an increase in sectoral shifts.

Table 1 illustrates this long run tendency of the unemployment rate in advanced economies.

Table 1. Advanced Economies: Unemployment Rate (percent).

Countries	1981-1990	1991-2000	1991	1992	1993	1994	1995	1996	1997	1998	1999[1)]	2000[1)]
1) Advanced economies	7,0	6,9	6,5	7,2	7,6	7,4	7,0	7,1	6,8	6,7	6,5	6,5
2) Major industrial countries	6,9	6,7	6,5	7,1	7,2	7,0	6,7	7,7	6,5	6,2	6,2	6,4
United States	7,1	5,6	6,9	7,5	6,9	6,1	5,6	5,4	4,9	4,5	4,3	4,5
Japan	2,5	3,4	2,1	2,2	2,5	2,9	3,1	3,3	3,4	4,1	5,0	5,8
Germany	7,3	8,2	5.5	6,6	7,9	8,4	8,2	8,9	9,9	9,4	9,1	8,6
France	9,3	11,4	9,4	10,3	11,6	12,3	11,7	12,4	12,5	11,6	11,3	10,7
Italy	10,1	11,3	10,9	10,7	10,1	11,1	11,6	11,6	11,7	11,8	11,7	11,4
United Kingdom	9,0	7,3	7,8	9,6	10,3	9,4	8,1	7,4	5,7	4,7	4,8	5,3
Canada	9,4	9,6	10,4	11,3	11,2	10,4	9,5	9,7	9,2	8,3	8,0	8,1
3) Other advanced economies[2)]	7,2	7,8	6,5	7,3	8,6	8,7	8,2	8,1	7,8	8,1	7,5	6,9

[1)] Estimations

[2)] This group includes Spain, the Netherlands, Belgium, Sweden, Austria, Denmark, Finland, Greece, Portugal, Ireland, Luxembourg, Switzerland, Norway, Israel, Iceland, Korea, Australia, Taiwan, Hong Kong, Singapore, and New Zealand.

Source:World Economic Outlook, October 1999, p.173.

Table 2 illustrates dynamics of the unemployment rate in some transitionary economies. In Russia, Ukraine and in some other countries of the Former Soviet Union the quality of the

unemployment statistics is imperfect. So the difference between official unemployment data and international unemployment definitions is highly essential.

Table 2. Unemployment Over the Transition.

Countries	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Bulgaria	..	1,5	6,7	13,2	15,7	14,1	11,1	12,5	13,7	12,2
Czech Republic	..	0,3	2,6	3,1	3,0	3,3	3,0	3,1	4,3	6,0
Hungary	0,4	0,8	4,1	10,2	11,5	10,3	9,9	9,2	7,7	7,0
Poland	..	3,4	9,7	13,6	14,9	16,0	14,9	13,2	10,3	10,4
Romania	..	..	3,0	8,4	10,4	10,9	10,4	9,0	..	..
Slovakia	..	0,6	6,6	11,4	2,7	14,4	13,7	12,6	12,9	14,0
Russia -official unemployment rate	..	..	0,1	0,8	1,0	1,7	2,8	3,6	..	2,4 [1)]
- unemployment rate according to International Labour Office (ILO) definition	..	..	..	..	5,6	7,5	8,9	9,6	..	11,5[1)]

[1)] September, 1998

Sources: IMF Staff Papers. Vol. 45, N2. June 1998, p. 273. IMF Economic Reviews, 1999, N1-2

The selection of countries in Table 2 was driven by the availability of comparable information on labour market institutions in International Labour Office (ILO). Official unemployment data in other countries of the Former Soviet Union show similar results, but it is difficult to find consistent time series on ILO unemployment estimates.

6. The unemployment rate is closely related to the deviations of real GDP from potential GDP. This relation is called **Okun's law**. Okun's law says that for each percentage point by which the unemployment rate is **above** the natural rate, real GDP is β percent **below** potential GDP:

$$\frac{Y - Y^*}{Y^*} = -\beta (u - u^*), \text{ where}$$

Y is real GDP,
Y^* is potential GDP,
u is the unemployment rate,
u^* is the natural rate of unemployment,
β is the sensitivity of GDP to the cyclical unemployment.

The other formula of Okun's law is:

Percent Change in Real GNP = 3% - 2 x Change in the Unemployment Rate

If the unemployment rate remains the same, real GDP grows by about 3 percent; this normal growth is due to population growth, capital accumulation, and technological progress. For every percentage point the unemployment rate rises, real GDP growth typically falls by 2 percent.

7. **Inflation** is an increase in the overall level of prices.

The rate of inflation is defined as the percentage rate of change in the general price level from one period to the next:

$\pi = \frac{p - p_{-1}}{p_{-1}}$, where π is the rate of inflation.

There are two approaches to measuring the general price level: constructing **price indexes** directly from data on the prices of thousands of goods and services, and calculating **deflators** by dividing a component of nominal GDP by the same component of real GDP.

If CPI is the base of calculations then the indicator of inflation rate looks as $\pi = \frac{CPI - CPI_{-1}}{CPI_{-1}}$, where CPI is Consumer Price Index.

Table 3 contains of annual percent changes of Consumer Prices in transitionary economies.

Таблица 3. Countries in Transition: Consumer Prices (Annual percent change)

Country	1997	1998	1999 [1)]	2000 [1)]
Countries in Transition	28	21	39	18
Albania	32	21	7	9
Belarus	64	73	320	250
Bosnia and Herzegovina	14	10	5	3
Bulgaria	1082	22	-1	4
Croatia	4	6	4	3
Czech Republic	8	11	3	5
Estonia	11	8	4	3
Hungary	18	14	9	8
Latvia	8	5	2	3
Lithuania	9	5	2	3
Macedonia	2	1	2	2
Moldova	12	8	28	6
Poland	15	12	7	5
Romania	155	59	40	17
Slovak Republic	6	7	9	7
Slovenia	8	8	5	5
Ukraine	16	11	26	15
Russia	15	28	88	23
Armenia	14	9	3	8
Azerbaijan	4	-1	-5	4
Georgia	7	4	22	5
Kazakhstan	17	7	7	11
Kyrgyz Republic	26	12	32	16
Mongolia	37	9	9	6
Tajikistan	88	43	15	7
Turkmenistan	84	17	27	54
Uzbekistan	71	29	28	22

[1)] Estimations

Source: World Economic Outlook, October 1999, p. 28.

8. There is essential difference between indicators π calculated on the base of CPI and on the base of GDP deflator (Paasche price index). Table 4 illustrates this difference in the case of Russia.

Table 4. Russia: Consumer Prices and GDP deflator (annual percentage changes)

Inflation rate (π)	1996	1997	1998	1999 [1)]
$\pi = \frac{CPI - CPI_{-1}}{CPI_{-1}}$	48	15	28	88
$\pi = \frac{P_{(GDP\ deflator)} - P_{-1(GDP\ deflator)}}{P_{-1(GDP\ deflator)}}$	43,9	16,6	11,4	74,9

[1)] Estimation
Source: IMF Economic Reviews, 1999, N2, p.179; World Economic Outlook, October 1999, p. 28.

9. **Demand-pull inflation** is the result of an increase in aggregate demand.

Cost-push inflation results from a decrease in aggregate supply (from higher wage rates and raw material prices) and which is accompanied by decreases in real output and employment (by increases in the unemployment rate).

Stagflation is inflation accompanied by stagnation in the rate of growth of output and a high unemployment rate in the economy; simultaneous increases in both the price level and the unemployment rate.

Wage-price inflationary spiral is increases in wage rates which bring about increases in prices which in turn result in further increases in wage rates and in prices.

10. Redistributive effects of inflation are quite different, depending upon whether or not it is expected. In the case of **anticipated inflation**, an income receiver may be able to take steps to avoid or lessen the adverse effects which inflation would otherwise have upon real income.

Inflation penalizes people who receive relatively fixed nominal incomes. It redistributes income away from fixed income receivers toward others in the economy. People living on flexible incomes may benefit from inflation. As prices rise, the real value, or purchasing power of savings will deteriorate.

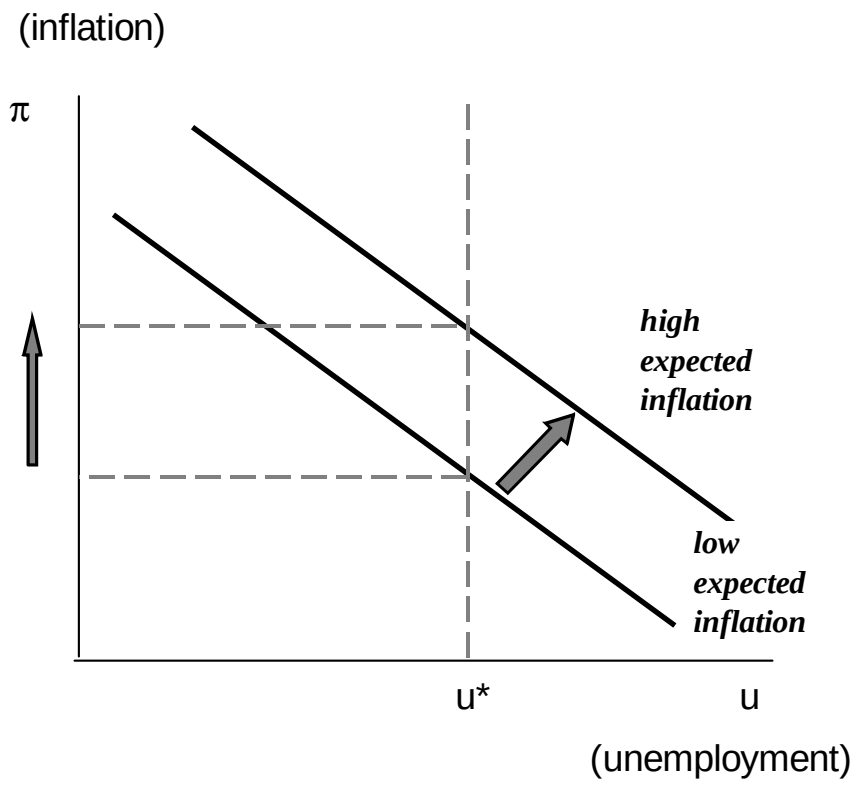
Unanticipated inflation tends to benefit debtors (borrowers) at the expense of creditors (lenders). Real interest rate is adjusted or "deflated" for the rate of inflation while the nominal interest rate is not.

Fisher equation - the equation stating that the nominal interest rate is the sum of the real interest rate and expected inflation:

$$i = r + \pi^e, \text{ where}$$

i is nominal interest rate,
r is real interest rate, and
π is expected inflation rate.

11. In the short run there is the trade off between inflation and unemployment implied by the **Phillips curve** equation.



At any point in time, the government can choose a combination of inflation and unemployment on the short run Phillips curve. The choice depends on expected inflation. The higher expected inflation is, the higher this curve is. In this case the tradeoff the government faces becomes worse: inflation is higher for any level of unemployment.

Lecture 5. Aggregate Demand and Aggregate Supply: Introduction to Economic Fluctuations

1. The key overall concepts in analyzing output, inflation, growth and the role of policy are aggregate demand and aggregate supply.

The level of output and the price level are determined by the interaction of aggregate demand and aggregate supply. Under some conditions, employment depends only on total spending, or aggregate demand. At other times, supply limitations are an important part of the policy problem and have to receive major attention. From the 1930s to the late 1960s, macroeconomics was very much demand-oriented. But in recent years the emphasis has shifted, and aggregate supply and supply-side economics have gained in importance.

2. **Aggregate demand** is the relationship between spending on goods and services and the level of price. Aggregate demand curve tells us the quantity of goods and services people will buy for any given level of prices.

The simplest theory of aggregate demand is based on the quantity equation.
Recall that

$$MV = PY.$$

We can also interpret it as a money demand equation of the form

$$\frac{M}{P} = kY \text{ , where } k = \frac{1}{V}.$$

This equation implies a negative relationship between output Y and price level P. Thus aggregate demand curve slopes downward: at higher price level, fewer goods are demanded. More detailed explanation for downward slope of aggregate demand curve is: the higher price level P, the lower the level of real balances $\frac{M}{P}$ (the aggregate demand curve is drawn for a given value of the money supply M and fixed velocity of money V), and therefore the lower the quantity of goods and services demanded Y.

3. Aggregate demand curve shifts if non-price level determinants of aggregate demand changes (money supply, velocity of money, government spending and taxes, expectations and other factors).

4. **Aggregate supply** gives a relationship between the general price level and the quantity of goods supplied. Non-price level determinants of aggregate supply are: changes in the size of the economy's labor force and its capital stock, productivity changes, changes in input prices, changes in taxes etc. All these changes shift the aggregate supply curve.

The relationship between the price level and the quantity of goods supplied depends crucially on the time horizon under consideration. We need to consider two cases: the long run, when all prices are flexible, and the short run, when some prices are sticky.

5. Since the **classical model** describes how economy behaves in the **long run** we derive the long run AS curve from the classical model. Classical economist supposed that market-oriented economy tended naturally to operate at a full-employment output level. They believed that prices and wages would always adjust quickly to clear markets and interest rate would always adjust to equate saving and investment.

According to the classical view the supply of goods in the long run depends upon the technology and the available stocks of capital and labor but does not depend upon the price level. This means that aggregate supply curve *AS* in the classical view is vertical at the full employment level of total output $\overline{Y}$ (*LRAS* - long run aggregate supply curve) because prices, wages, and interest rate always adjust quickly to maintain full employment in response to any change in aggregate demand. For example, if the *AD* curve shifts leftward from AD_1 to AD_2 the economy's equilibrium price level would fall from p_1 to p_2 while total output (real output) would remain at $\overline{Y}$ 3 (Figure 1).

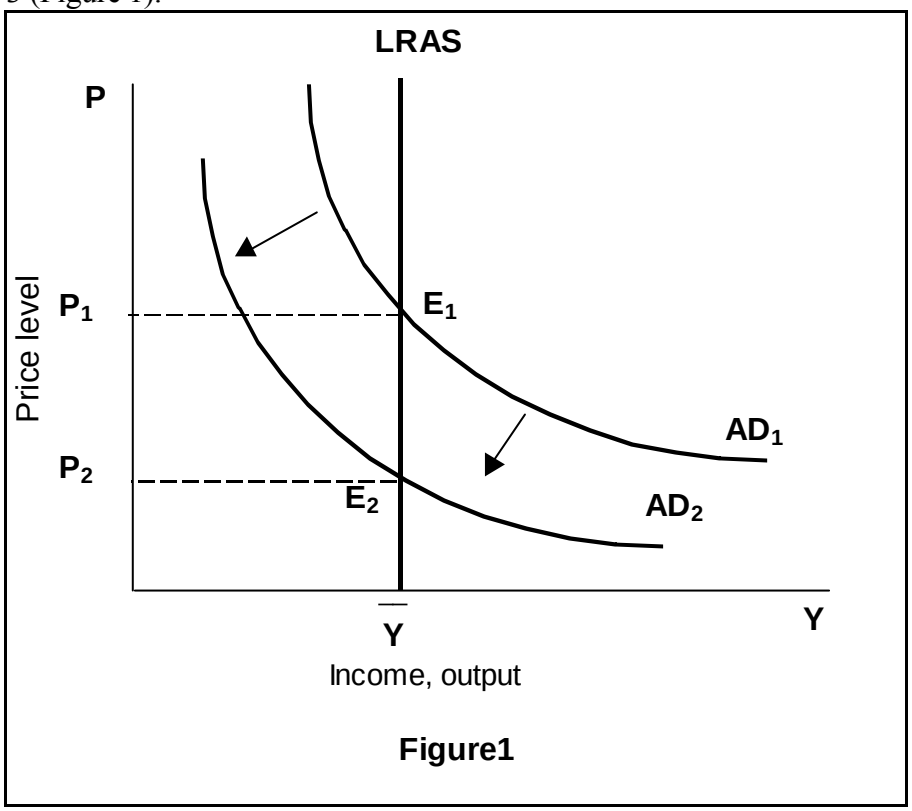


Figure1

Changes in available stocks of capital or labour and technology improves shifts *LRAS*' curve.

6. By contrast, the **Keynesian model** describes **short run** fluctuations. Keynesian analysis focuses on how the equilibrium level of total income, output and employment is determined in an economy that operates at less than full employment and where the price level is not fully flexible.

In the short run some **prices are sticky** and do not change in response to every change in demand. For example, change in aggregate demand does not immediately induce all employers to change the wages they pay, all mail-order firms to issue new catalogs, and all restaurants to print new menus. For some period of time prices are stuck at predetermined levels. It is during this time that sellers are waiting to see how demand conditions change before they adjust their prices again. At these prices firms are willing to sell as much as their customers are willing to buy. They hire just enough labour to produce the amount demanded.

In extreme case all prices are fixed in the short run. Therefore the short run aggregate supply curve *SRAS* in horizontal at the fixed price level (if wages are fixed but prices are more flexible, *SRAS* has upward slope). An increase in money wages or any other input price will cause an upward shift in *SRAS* curve. We say about adverse supply shock or price shock in such cases.

Shifts in the *AD* curve, such as from AD_1 to AD_2 cause total output and employment to

change (Figure 2). The equilibrium for the economy moves from point E_1 to point E_2 declining the total output (or sales), but not the price level as in the classical model. In sum the total output and employment vary directly with aggregate demand and are completely demand determined (we must remember that output level increase is limited by the natural or potential level).

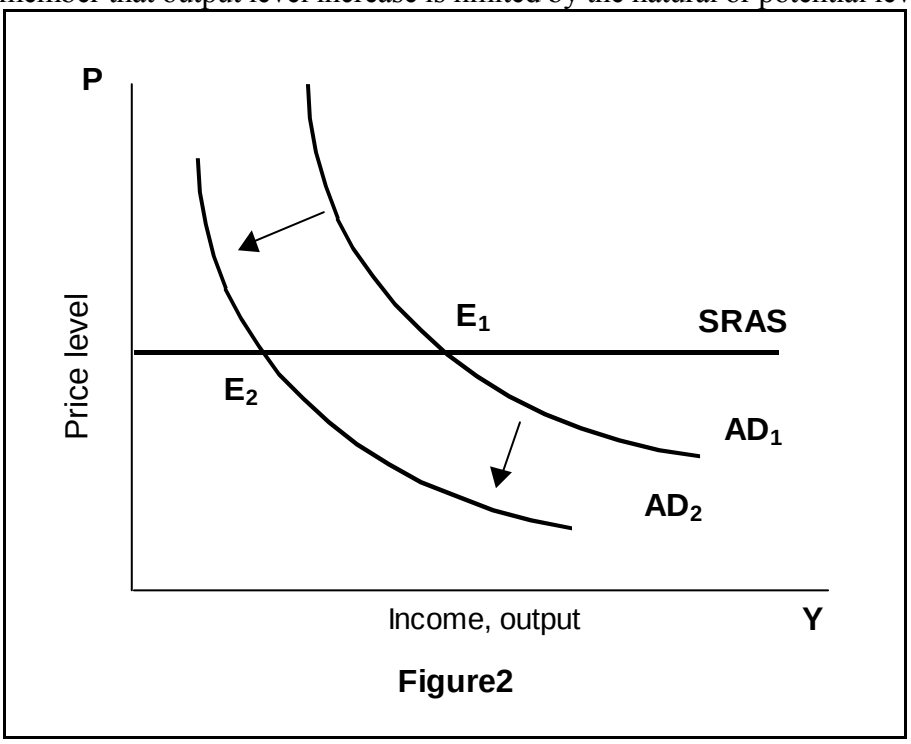


Figure2

7. Now we need to explain **how economy moves from short run equilibrium to the long run equilibrium**. Suppose that economy begins in long run equilibrium (point *A* in Figure 3). The Central Bank increases the money supply (we have positive aggregate demand curve shifts upward. In short run the increase in aggregate demand raises the output. At the old prices, firms sell more output. Economy moves from point *A* to point *B* (short run equilibrium), where output is above its natural-rate level (economic boom). Over time the high level of aggregate demand pulls up wages and prices. As the price level rises, the quantity of output demanded declines and the economy gradually moves downwards along the new aggregate demand curve AD_2 to the point *C*, which is the new long-run equilibrium. In new equilibrium output and employment are back to their natural-rate levels, but prices are higher than in the old long-run equilibrium (point *A*).

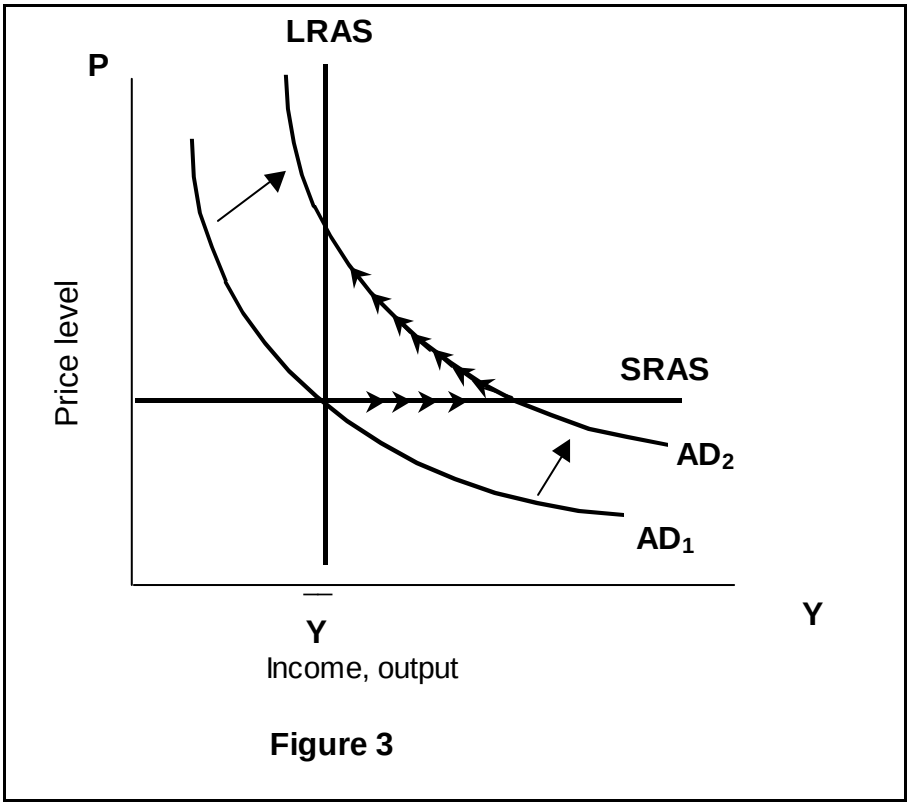


Figure 3

8. **Shocks** to aggregate demand and aggregate supply cause economic fluctuations. Since the Central Bank can shift the aggregate demand curve (as money supply changes), it can attempt to offset these shocks to maintain output and employment at the natural rate. For example, adverse supply shocks (increase in oil prices) have the effect of increasing the general price level (*SRAS* shifts upward). If aggregate demand curve is unchanged, then output falls. The Central Bank can take action to offset the recession, in particular, it can increase the money supply. But the consequence of this is a permanent increase in the price level. Such a response is known as an **accommodative** monetary **policy**.

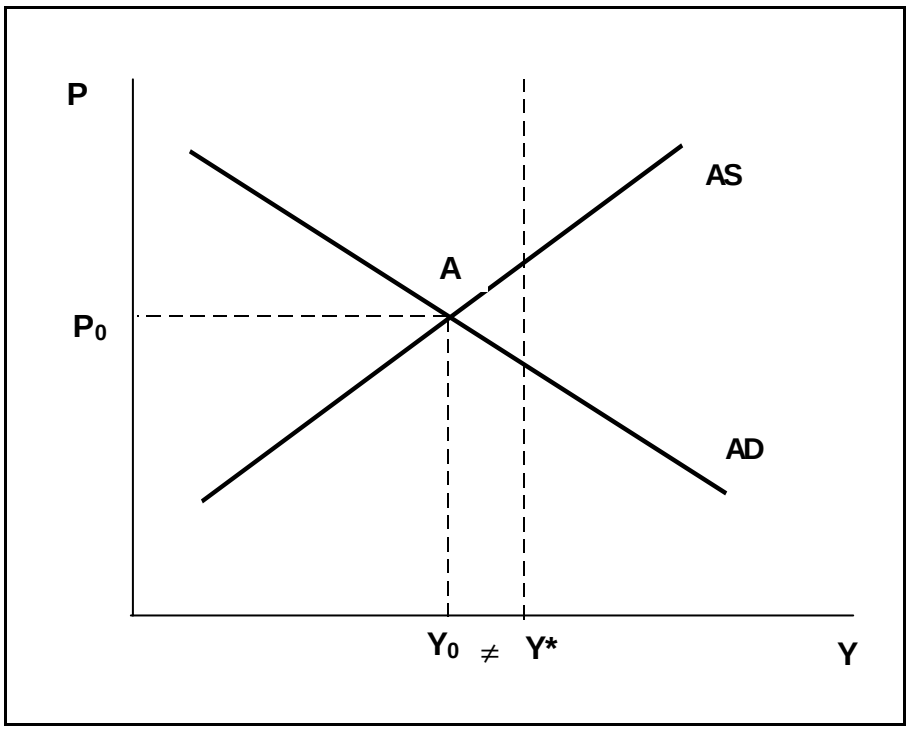
Lectures 6-7. Aggregate Demand: Income, Spending, and Equilibrium Output.

1. **The classical theory** was grounded on two basic notions:

First, it was argued that underspending - that is, a level of spending insufficient to purchase a full-employment output - was most unlikely to occur.

Second, even if a deficiency of total spending were to occur, price-wage (including interest-rate) adjustments would result quite quickly so as to ensure that the decline in total spending would not entail declines in real output, employment, and real incomes. The classical economists argued that **the money market** would guarantee an equality of saving and investment plans and therefore full employment. Anyone who was willing to work at the market-determined wage rate could readily find employment. So only "voluntary" unemployment was possible.

2. **Keynesians** reject the very mechanisms upon which the classical position is grounded - the interest rate and price-wage adjustments. The economy might come to rest - that is, reach an aggregate output equilibrium - with either considerable unemployment or substantial inflation. Full employment is more of an accident than a norm.



There is an equilibrium of aggregate demand and aggregate supply at point *A (AD = AS)*, but an equilibrium output $Y_0 < Y^*$.

3. Keynesians rejects the notion that the interest rate would equate saving and investment by pointing out that savers and investors are substantially different groups who make their saving and investment decisions for different reasons.

Saving decisions are motivated by diverse considerations:

1) some save in order to make large purchases;
2) households save to provide for the future retirement of the family breadwinner;
3) saving may be a precautionary measure - a means of protecting oneself against such unpredictable events as prolonged illness and unemployment;
4) saving may occur to provide for the future needs of individuals and their families, such as a college education for their children.

The motivations for investment spending are as follows:
1) the rate of profit which business firms expect to realize on the investment;
2) the interest rate - the cost of obtaining money capital with which to invest - is a consideration in formulating investment plans.

4. **The simplest consumption function** is

$$C = a + b\,(Y - T), \text{ where}$$

C is consumption spending,
a is an autonomous consumption,
b is the marginal propensity to consume,
Y is income, and
T is taxes.

Marginal propensity to consume (MPC) is a fraction of any change in disposable income which is spent for consumer goods. MPC is equal to the change in consumption divided by the change in disposable income.

$$MPC = \frac{\Delta C}{\Delta Y}, \text{ where}$$

MPC is marginal propensity to consume,
ΔC is the change in consumption, and
ΔY is the change in disposable income.

5. **The simplest saving function** is:

$$S = -a + (1 - b) \cdot (Y - T), \text{ where}$$

S is private saving,
$(1-b)$ is marginal propensity to save,
a is an autonomous consumption,
Y is income, and
T is taxes.

Marginal propensity to save (MPS) is a fraction of any change in disposable income which house-holds save. MPS is equal to change in saving divided by the change in disposable income.

$$MPS = \frac{\Delta S}{\Delta Y}, \text{ where}$$

MPC is marginal propensity to consume,
ΔS is the change in consumption, and
ΔY is the change in disposable income.

6. **The simplest investment function** is

$$I = e - dR, \text{ where}$$

I is investment spending,
e is autonomous investment,
R is the real interest rate,

d is interest-rate sensitivity of investment.

7. **Determinants of consumption and saving**:
   1) disposable income;
   2) wealth, which households have accumulated;
   3) price level;
   4) expectations;
   5) consumer indebtedness;
   6) taxation.

8. **Determinants of investments**:
   1) expected rate of net profit;
   2) the real interest rate;
   3) taxation (business taxes);
   4) technological changes;
   5) the stock of capital goods on hand;
   6) expectations;
   7) total income's fluctuations.

9. Saving and investment plans can be at odds and thereby can result in cyclical fluctuations in total output, total income, employment, and the price level. So **involuntary cyclical unemployment** is possible.

10. Activist government policies are required if we are to avoid the wastes of idle resources.
The main components of the aggregate demand are
1) consumption (*C*), and
2) investment (*I*).
The consumption and saving are relatively stable, but investment is unstable.
Types of investment:
   1) spending by firms on plant and equipment for use in business;
   2) inventory investment;
   3) residential investment.

The main factors which explain the instability of investment are as follows:
   1) durability of capital goods;
   2) irregularity of innovation;
   3) variability of expectations;
   4) cyclical fluctuations of GNP.

11. **Actual investment** consists of both **planned** and **unplanned investment** (unplanned changes in inventory investment). Unplanned investment functions as a balancing item which always equates the actual amounts saved and invested in any period of time.

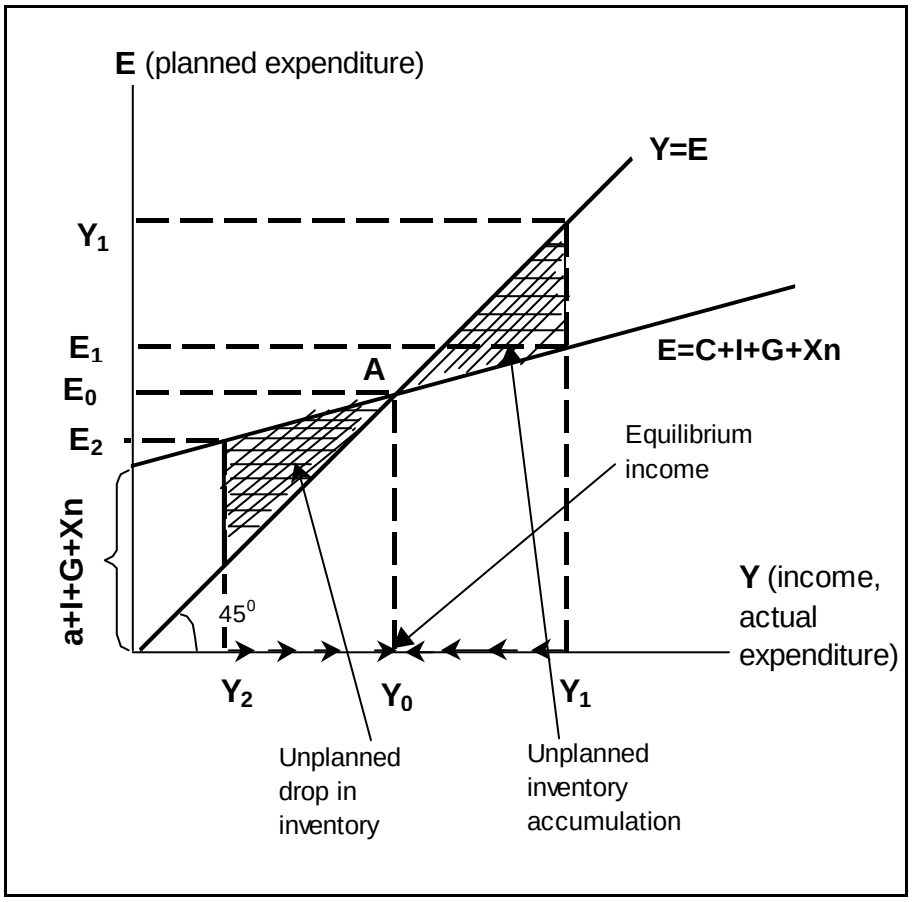
12. **Planned expenditure** is the amount households, firms, and government plan to spend on goods and services.

Actual expenditure differs from planned expenditure when firms are forced to make unplanned inventory investment - that is, when firms unexpectedly raise or lower their stock of inventories in response to unexpectedly low or high sales.

The aggregate expenditure schedule (or the planned expenditure schedule),

$$E = C + I + G + X_n,$$

is determined by adding a fixed amount of investment, government spending and net exports to the upsloping consumption schedule.

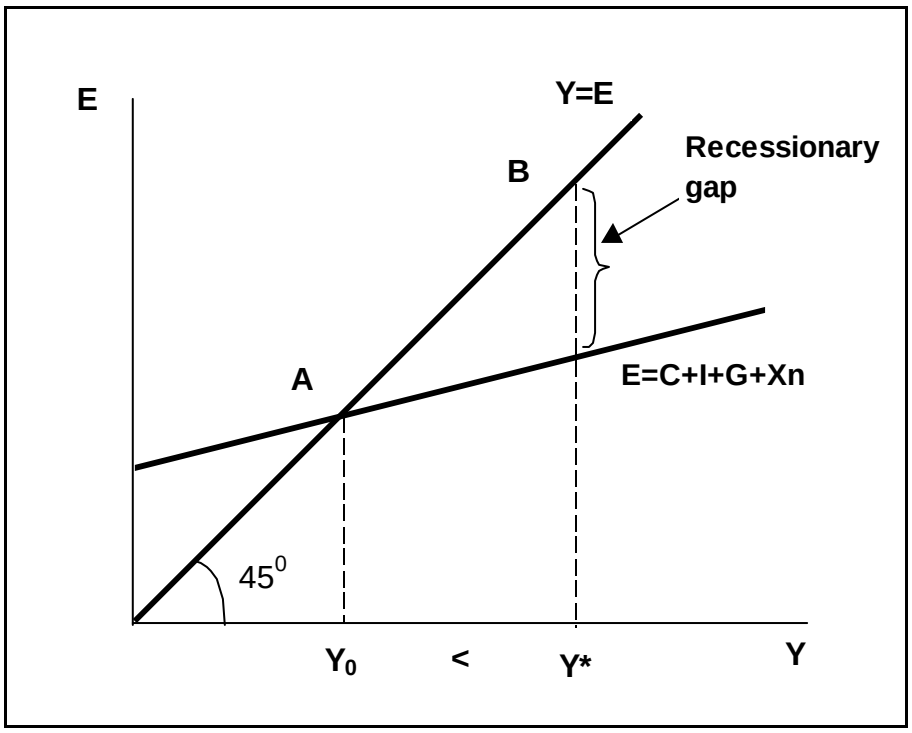


This diagram is the **Keynesian cross**. The 45-degree line plots the points where actual expenditure equals planned expenditure. The **macroeconomic equilibrium** is at point A, where the planned-expenditure function crosses the 45-degree line, and where income equals planned expenditure.

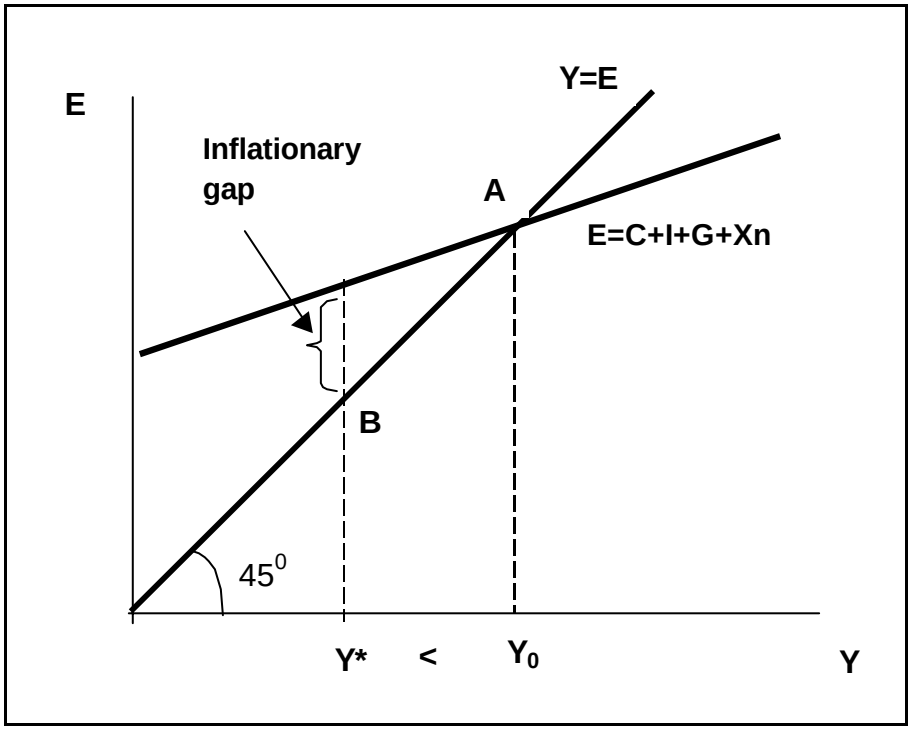
13. Adjustment to equilibrium takes the form of changes in inventory. If firms are producing at level $Y_1 > Y_0$, then planned expenditure E_1 falls short of production, so that firms accumulate inventories.

This inventory accumulation induces firms to reduce production. This process of unintended inventory accumulation and falling income continues until income falls to the equilibrium level. At the equilibrium, income equals planned expenditure and aggregate supply equals aggregate demand ($AD = AS$).

14. **Recessionary gap** is amount by which the aggregate demand (aggregate expenditure) must increase to increase the equilibrium GNP to the full-employment noninflationary level.



15. **Inflationary gap** is amount by which the aggregate Demand (aggregate expenditure) must decrease to decrease the equilibrium GNP to the full-employment noninflationary level.



16. **Paradox of thrift** - the attempt of society to save more results in the same amount of, or less, saving.

Unless offset by an increase in the planned investment, any attempt by households to save more will be frustrated by a multiple decline in the equilibrium GNP, which is caused by

the multiplier effect.

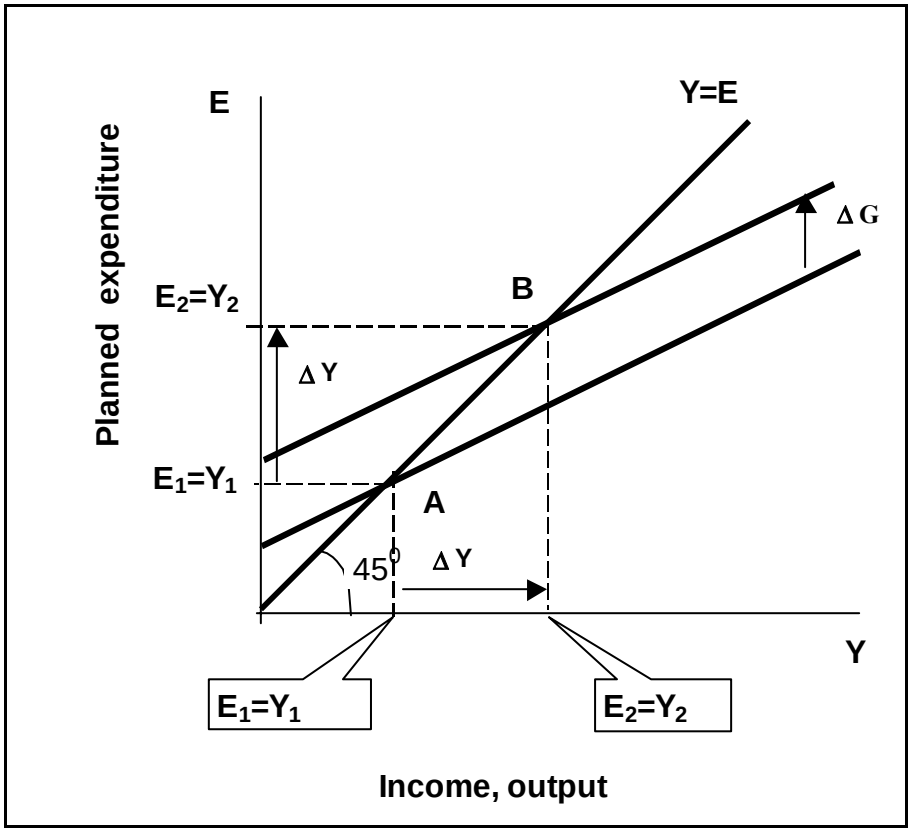
17. **Multiplier of the autonomous expenditure** is the ratio of the change in the Equilibrium GNP to the change in investment or to the change in any other component of the autonomous expenditure.

$$M = \frac{\Delta Y}{\Delta A}, \text{ where}$$

M is multiplier of the autonomous expenditure,
ΔY is the change in the equilibrium GNP, and
ΔA is the change in the autonomous expenditure.

18. An increase in government purchases of ΔG raises planned expenditure by that amount for any given level of income. The equilibrium moves from point A to point B, and income rises from Y_1 to Y_2.

The increase in income (ΔY) exceeds the increase in government purchases (ΔG): $\Delta Y = \Delta G \cdot m_g$, where m_g is the **government-purchases multiplier**.



19. The multiplier process begins when the government expenditure rises by ΔG, which implies that income raises by ΔG as well. This increase in income in turn raises consumption by MPC×ΔG, where MPC = b. This increase in consumption raises expenditure and income once again. This second increase in income of $b \cdot \Delta G$ again rises consumption, this time by $b^2 \cdot \Delta G$, which again raises expenditure and income, and so on. The total effect on income is:

Initial Change in Government purchases = ΔG;
First Change in Consumption = $\Delta G \cdot b$;
Second Change in Consumption = $\Delta G \cdot b^2$;

.....

$\Delta Y = \Delta G(1 + b + b^2 + ...)$

The government-purchases multiplier is $\frac{\Delta Y}{\Delta G} = \frac{1}{1 - b}$..

This elementary model is called **the simple Keynesian multiplier**.

20. The levels of the government-purchases multiplier and the equilibrium income can be found algebraically from the system of equations:

$$\begin{cases} Y = C + I + G \_ \textit{the income identity} \\ C = a + bY \_ \textit{the consumption function.} \end{cases}$$

Substitute the consumption function into the income identity. The result is:

$$Y = a + bY + I + G \Rightarrow Y - bY = a + I + G \Rightarrow Y(1 - b) = a + I + G$$

$$Y = \frac{1}{1 - b} \cdot (a + I + G), \text{ where}$$

($a + I + G$) is the autonomous spending, and $\frac{1}{1 - b}$ is **the spending multiplier**; it tells us how much income rises in response to a one-dollar increase in autonomous consumption a, or in private investment I, or in government purchases G. The main determinant of the multiplier is ***b* = marginal propensity to consume (MPC)**.

21. If we take the marginal tax rate t into account then the model of multiplier becomes more complicated:

$$\begin{cases} Y = C + I + G \\ C = a + b(1 - t)Y \end{cases} \_ Y = \frac{1}{1 - b(1 - t)} \cdot (a + I + G),$$

where the spending multiplier is $\frac{1}{1 - b(1 - t)}$.

22. On the other hand, the model of multiplier becomes more complicated if we take into account the **net export function**

$$X_n = g - m' \cdot Y, \text{ where}$$

X_n is net exports;
g is the autonomous net exports;
m' is the marginal propensity to import;
Y is income.

Marginal propensity to import is a fraction of any change in income which is spent for import goods; it is equal to the change in imports divided by the change in income:

$$m' = \frac{\Delta M}{\Delta Y}, \textit{where}$$

ΔM is the change in imports;
ΔY is the change in income.

In the open economy the levels of the government-purchases multiplier and the equilibrium income can be found from the system of equations:

$$\begin{cases} Y = C + I + G + Xn \text{ - the income identity} \\ C = a + b(1 - t)Y \text{ - the consumption function} \\ Xn = g - m'Y \text{ - the net export function} \end{cases}$$

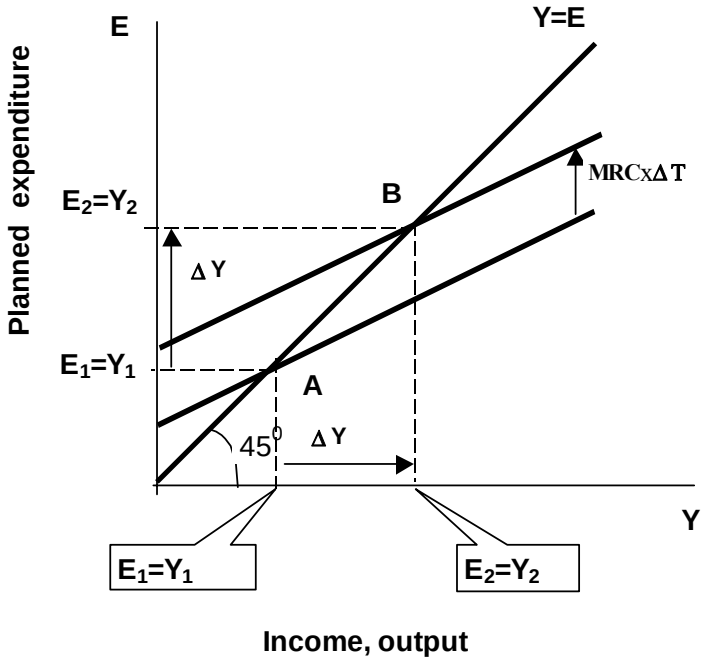
$$Y = \frac{1}{1 - b(1 - t) + m'} \cdot (a + I + G + g),$$

where $\frac{1}{1 - b(1 - t) + m'}$ is the spending multiplier.

23. A decrease in taxes of ΔT raises disposable income $Y_d = Y - T$ by ΔT and, therefore, consumption by $b \cdot \Delta T$. For any given level of income Y, planned expenditure is now higher. Thus, the planned-expenditure curve shifts upward by $b \cdot \Delta T$. the equilibrium moves from point A to point B, and income rises from Y_1 to Y_2.

Just as the increase in government purchases has a multiplied effect on income, so does a decrease in taxes. The overall effect on income of the change in taxes is

$$\Delta Y = \Delta T \cdot \left(- \frac{b}{1 - b} \right), \text{ where } \frac{\Delta Y}{\Delta T} = - \frac{b}{1 - b} \text{ is the } \textbf{tax multiplier}.$$



24. The complete **tax function** is $T = T_a + t \cdot Y$, where T_a stands for autonomous taxes, and t is the marginal tax rate.

Substitute the tax function into the consumption function $C = a + b(Y - T)$. The result is

$$C = a + b[Y - (T_a + t \cdot Y)].$$

In this case the equilibrium income model is

$$Y = \frac{1}{1 - b(1 - t) + m'} \cdot (a + I + G + g) - \frac{b}{1 - b(1 - t) + m'} \cdot T a \cdot$$

The overall effect of the changes in government spending and in taxes is

$$\Delta Y = \Delta G \cdot \frac{1}{1 - b(1 - t) + m'} - \Delta T a \cdot \frac{b}{1 - b(1 - t) + m'}$$

25. If government spending *G* and taxation *T* are each increased by a particular amount, the equilibrium level of national output will rise by that same amount. That is, **the balanced-budget multiplier** is 1.

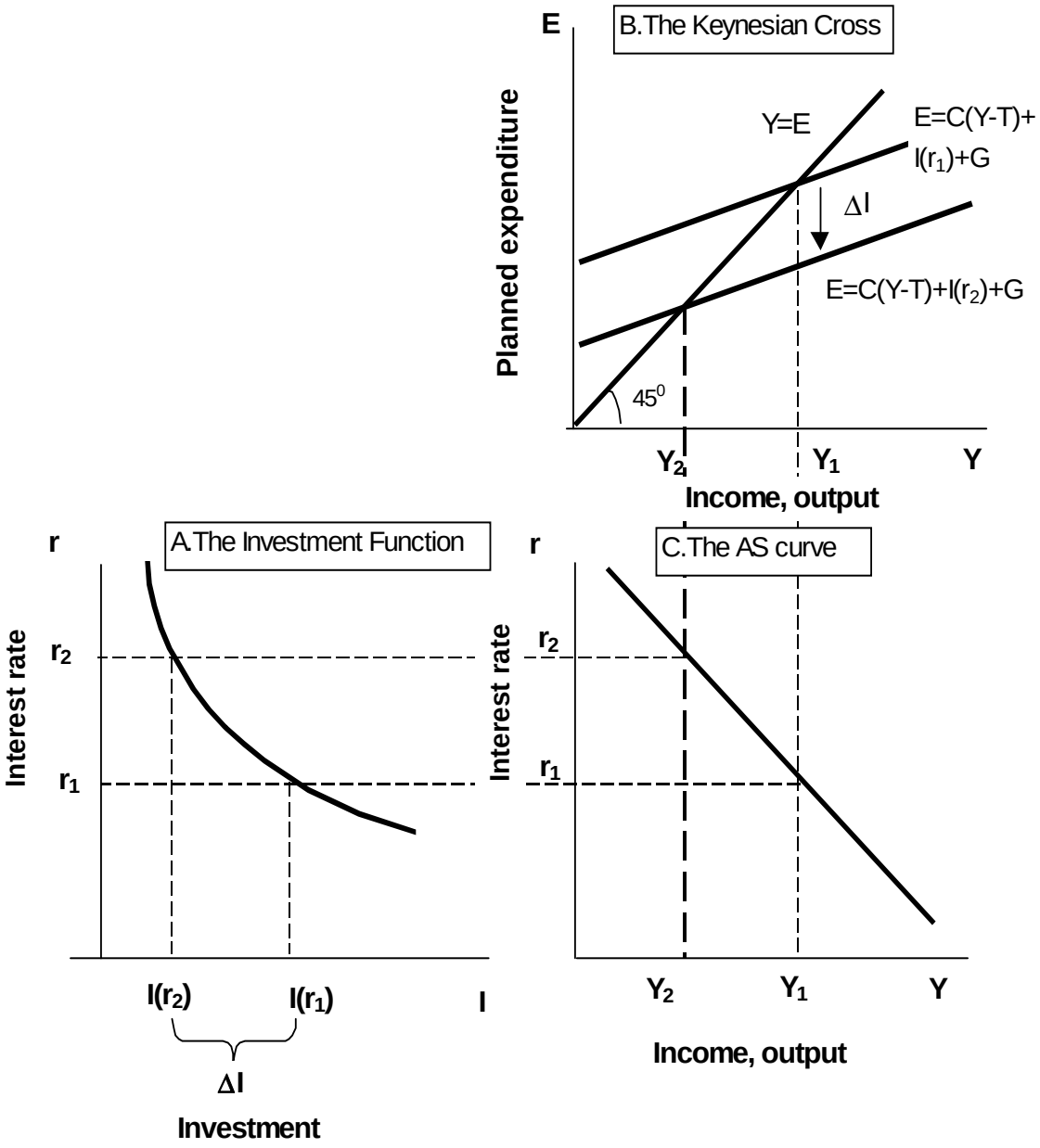
26. **The *IS* curve** shows all the combinations of the interest rate *R* and income *Y* that satisfy the income identity, the consumption function, the investment function and the net export function. The *IS* curve is the set of points for which spending balance occurs. Higher levels of the interest rate are associated with lower levels of GNP along the *IS* curve. So the *IS* curve is the negative relationship between the interest rate and the level of income that arises in the market for goods and services.

Panel A shows the investment function: as increase in the interest rate from R_1 to R_2 reduces planned investment from $I(R_1)$ to $I(R_2)$.

Panel B shows the Keynesian Cross: a decrease in planned investment reduces income from Y_1 to Y_2.

Panel C shows the *IS* curve summarizing the relationship between the interest rate and income: the higher the interest rate, the lower the level of income.

Graphical derivation of the IS curve from the Keynesian cross.


B.The Keynesian Cross
E
Planned expenditure
Y=E
E=C(Y-T)+
I(r1)+G
ΔI
E=C(Y-T)+I(r2)+G
45⁰
Y2
Y1
Y
Income, output
A.The Investment Function
r
r2
r1
Interest rate
I(r2)
I(r1)
I
ΔI
Investment
C.The AS curve
r
r2
r1
Interest rate
Y2
Y1
Y
Income, output

Lecture 8. Aggregate Demand: Money and Interest. Money Market Equilibrium.

1. **Money** is the stock of assets used for transactions. **Functions of money** are: medium of exchange, store of value and unit of account. **Liquidity** is one of the main characteristics of money. It means that money can be readily convertible into any goods and services or can be used directly, instantly and without restrictions to make payments.

2. The quantity of money available is called **the money supply**. In many countries control of money supply is delegated to an independent institution called the Central Bank. The control of the money supply by the Central Bank is known as **monetary policy**.

There are many different assets that have some money-like characteristics, such as currency, checking accounts, saving accounts, time deposits and other assets. Some of these serve principally as a means of payment, others serve principally as a store of value; most fulfill both functions to different degrees. Thus it is impossible to give a single precise measure of the amount of money in the economy; there are many different measures.

First, and most obviously, we have currency - bills and coins. But the term money typically reports to a monetary aggregate that is broader than currency. The standard definition, called **M1**, attempts to classify as money the assets that serve regularly as media of exchange. M1 includes currency, demand deposits, traveler's checks, and other checkable deposits.

If we add less liquid deposits to M1, we get **M2** - the sum of M1 and overnight repurchase agreements, Eurodollars, money market deposit accounts, money market mutual fund shares, and savings and small time deposits.

M3 includes M2 and large time deposits and term repurchase agreements.

Monetary aggregate **L** includes M3 and savings bonds, short-term Treasury securities, commercial paper and other liquid assets. This classification of monetary aggregates is used by Federal Reserve Board in the U.S.

3. We begin our analysis of money demand with a simple theory, known as the **quantity theory**, which assumes that the demand for money is proportional to income (or quantity of transactions). This link is expressed by the **quantity equation**:

$MV = PY$, where

M - is a quantity of money;

V - is a velocity of money (the rate at which money circulates in the economy or the number of times a dollar bill changes hands in a given period of time); Y - amount of output;

P - is the price of one unit of output.

If we suppose that Y is real GNP, and P is the GNP deflator, then PY is the nominal GNP.

The quantity equation becomes a theory of the demand for money by supposing that money demand is proportional to output, which means, in essence, that we are assuming that the velocity of money is constant. But our assumption is only approximate. For example, the introduction of the automatic teller machine raises the rate at which money circulates in the economy, which implies greater velocity V. Yet economists have found that the assumption of constant velocity provides a good approximation in many situations. The quantity equation therefore can be seen as a theory of nominal GNP:

$$M\overline{V} = PY$$

where bar over V means that velocity is fixed.

4. The change in the quantity of money (M) must cause a proportionate change in nominal GNP (PY). That is, the quantity of money determines the nominal value of output PY.

But we already know that the growth of output depends on exogenous factors such as population growth and technical progress. We can take the growth of output to be a constant. Suppose at last that the percentage change in the quantity of money is under the control of the Central Bank. Thus, the quantity theory of money states that the Central Bank, which controls the money supply, has the ultimate control over the rate of inflation (the change in the price level).

If changes in the money stock lead only to changes in the price level, with no real variables (real output) changing, we say about **neutrality of money**.

The strict quantity theory asserts that the prices move in proportion to the nominal money stock. **Modern monetarists** such as Milton Friedman make an important distinction between the short- and long-run effects of changes in money. They argue that in the long run money is neutral. Changes in the money stock, after they have worked their way through the economy, have no real effects and only change prices. But in the short run, they argue, monetary policy and changes in the money stock can and do have important real effects. For example, reduction un the money stock does in practice first reduce the level of output, and only later have an effect on prices.

5. The quantity equation can be written in percentage-change form:

% Change in M + % Change in V = % Change in P + % Change in Y.

6. We consider **the money demand in real terms** $\left(\frac{M}{P}\right)$ to eliminate inflation influence. The money demand function is an equation that shows what determines the quantity of real money balances people wish to hold

$$\left(\frac{M}{P}\right)^D = kY,$$

where k is constant and equals $\frac{1}{V}$. This equation is equivalent to the quantity equation if we suppose that the demand for real balances $\left(\frac{M}{P}\right)^D$ equals the supply $\frac{M}{P}$. Therefore

$$\frac{M}{P} = kY,$$

which can be written as $MV = PY$, where $V = \frac{1}{k}$.

Thus the quantitative theory of money states that the **demand for real money balances** is proportional to real GNP.

Keynes' theory of liquidity preference postulates that the quantity of real money balances demanded depends on the **interest rate**. The interest rate is the **opportunity cost of holding money**: it is what you forgo by holding money, which does not bear interest, instead of interest-

bearing bank deposits or bonds. The price of holding money affects the quantity of real balances demanded. When the interest rate rises, people want to hold less of their wealth in the form of money.

7. We can write the demand for real money balances as

$$\left(\frac{M}{P}\right)^D = \underset{-}{L}(\underset{+}{i}, Y),$$

where i - the nominal interest rate, Y - real income. If we suppose that money demand function is linear, then

$$\left(\frac{M}{P}\right)^D = kY - hi,$$

parameters k and h reflect the sensitivity of the demand for real balances to the level of income and the interest rate, respectively.

The demand function for real balances is a decreasing function of the interest rate. An increase in income shifts to the right the demand curve by $(k \cdot \Delta Y)$.

8. The money demand depends upon **the nominal rate of interest**. The link between the nominal interest rate, **real interest rate** and inflation rate is known as **Fisher equation**:

$$i = r + \pi^e, \text{ where}$$

r - real interest rate, π^e - expected inflation. The **Fisher effect** says that the nominal interest rate moves one-for-one with expected inflation.

9. The Keynes' theory of money demand - **theory of liquidity preference** - includes three motives for holding money:

- **the transactions motive**, which is the demand for money arising from the use of money in making regular payments;
- **the precautionary motive**, which is the demand for money to meet unforeseen contingencies; and
- **the speculative motive**, which arises from uncertainties about the money value of other assets that an individual can hold. This motive is based on the inverse relationship between the interest rate and prices of bonds.

10. Empirical estimation of the demand for money can be based on statistical relationships with GNP, inflation, interest rate and other variables, using historical data. But if there is substantial structural changes in the economy, including a reform of the financial system, the past relationships may prove of limited value in predicting future developments.

A more judgmental approach would be to assess the demand for money on the basis of the likely movement of the ratio of money to nominal GNP (or the velocity of money, which is the inverse of this ratio).

11. The definition of **the money supply** that we generally use in macroeconomics is

$$M^S = C + D$$

Money (M^S - supply of money) may be defined as the sum of currency outside banks (C), and demand deposits held with the monetary institutions by the rest of the economy other than the

central government (*D*).

Modern banking system is called fractional-reserve banking. Banks hold only a fraction of their deposits as reserves and loan out of rest.

12. The system of fractional-reserve banking is able to create money, because each dollar of reserves generates many dollars of demand deposits. Suppose that First Bank receives $1000 in deposits. The reserve-deposit ratio - the fraction of deposits dept in reserve - is 20 percent. Therefore, First Bank deeps $200 in reserve and lends out the remaining $800. The money supply has now increased, since there is still $1000 worth of deposits and there is now an additional $800 of currency back in the hands of the public (borrowers). The money supply now equals $1800. The process does not stop here. If the $800 is in turn deposited back in another bank, then process of money creation continues. Second Bank will hold 20 percent ($160) as reserves, and loan out the remained 80 percent ($640). The money supply increases further. It will equal $1800 + $640 = $2440. We can follow this process through. Letting *rr* denote the reserve-deposit ratio - in our example, *rr* = 0,2 - the amount that the original $1000 creates is:

Original Deposit = $1000
First Bank Lending = $(1 - rr) \times \$1000$
Second Bank Lending = $(1 - rr)^2 \times \$1000$
Third Bank Lending = $(1 - rr)^3 \times \$1000$

Total Money Supply $= [1 + (1 - rr) + (1 - rr)^2 + (1 - rr)^3 + ...] \times \$1000 =$
$= (1/rr) \times \$1000$

Thus, each $1 of reserves generates $(1/*rr*) of money. In our example, *rr* = 0,2, so the original $1000 generates $5000 of money.
The banking system's ability to create money constitutes the primary difference between banks and other financial institutions.

13.We assumed for simplicity earlier that the public deposited all the currency into the banking system. But more complicated money supply model has some new variables. Currency held outside the banks and bank reserves (holdings of currency and deposits with the monetary authorities) together are referred to as **monetary base** (***MB***), or **high-powered money**, or **reserve money**. Currency represents a direct component of the money supply, while the availability of bank reserves affect the ability of deposit money banks to create deposits.

$$MB = C + R$$

Recall that

$$M^s = C + D$$

Defining the **money multiplier** (***m***) as the ratio of money to monetary base

$$M^s = m \cdot MB$$

The money multiplier can equally be defined in terms of the ratios of currency and reserves to deposit:

$$m = \frac{M^S}{MB} = \frac{C + D}{C + R}$$

Dividing the right hand side of equation by deposits, we obtain

$$m = \frac{cr + 1}{cr + rr}, \text{ where}$$

cr - is the ratio of currency to deposits (*cr = C/D*),
rr - is the ratio of reserves to deposits (*rr = R/D*).

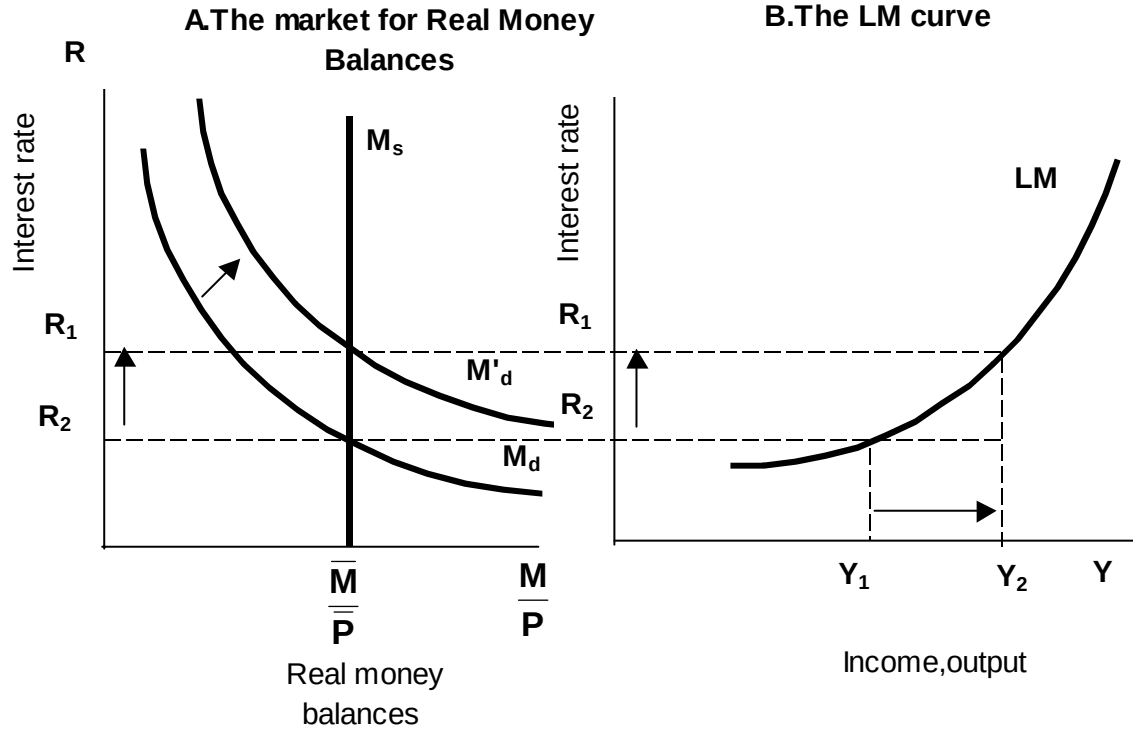
The currency-deposit ratio and **the reserve-deposit ratio** describe the behavior of the public and of banks, respectively.

The money supply depends on the factors affecting the money multiplier and the monetary base. The money supply is proportional to the monetary base. The money multiplier shows how each dollar of the monetary base is multiplied up to give a large value for the money supply. Increases in the reserve-deposit ratio and the currency-deposit ratio both decrease the money multiplier.

$$M^S = MB \frac{cr + 1}{cr + rr}$$

14. **The *LM* curve** shows all combinations of the interest rate *R* and income *Y* that satisfy the money demand relationship for a fixed level of the money supply and for a predetermined value of the price level. Higher levels of the interest rate are associated with higher levels of GNP along the *LM* curve. So the *LM* curve is the positive relationship between the interest rate and the level of income (while holding the price level fixed) that arises in the market for real money balances.

Graphical derivation of the LM curve.



Panel A shows the market for real balances: an increase in income from Y_1 raises the demand for money and thus the interest rate from R_1 to R_2. **Panel B** shows the *LM* curve summarizing this relationship between the interest rate and income: the higher the level of income, the higher the interest rate.

Lecture 9. The *IS/LM* Model. Fiscal and Monetary Policy in the *IS-LM* Model.

1. **The *IS/LM* model** is a model of aggregate demand that shows what determines aggregate income for a given price level by analyzing the interaction between the goods market and the money market.

2. **The main equations of the *IS/LM* model:**

1) $Y = C + I + G + X_n$ - income identity.
2) $C = a + b(Y - T)$ - consumption function, where $T = Ta + tY$.
3) $I = e - dR$ - investment function.
4) $X_n = g - m' \cdot Y - n \cdot R$ - net export function.
5) $\frac{M}{P} = k \bullet Y - h \bullet R -$ - money demand.

The endogenous variables: Y (income), C (consumption), I (investment), X_n (net exports), R (interest rate).

The exogenous variables: G (government spending), M_s (money supply), t (tax rate).

The empirical coefficients ($a, b, e, d, g, m', n, k, h$) are positive and relatively stable.

The price level *P* is fixed (predetermined) in the short run, when actual GNP is not equal to potential GNP ($Y \neq Y^*$). Since P is fixed, in the short run the nominal and real values of other variables are the same.

In the long run the price level *P* is flexible. And actual GNP Y is equal to potential GNP Y^*. In this case the money supply M_s is considered as nominal variable, and the other variables as real ones.

3. **The IS curve equation for R**:

$$R = \frac{a + e + g}{d + n} - \frac{1 - b(1 - t) + m'}{d + n} \bullet Y + \frac{1}{d + n} \bullet G - \frac{b}{d + n} \bullet Ta \text{ , where } T = T_a + Y.$$

The IS curve equation for Y:

$$Y = \frac{a + e + g}{1 - b(1 - t) + m'} + \frac{1}{1 - b(1 - t) + m'} \bullet G - \frac{b}{1 - b(1 - t) + m'} Ta - \frac{d + n}{1 - b(1 - t) + m'} \bullet R,$$

where $T = T_a + t \cdot Y$.

The coefficient $\frac{1 - b(1 - t) + m'}{d + n}$ is the **slope** of the *IS* curve. The algebraic formula shows that the slope of the *IS* curve is small - which means that the *IS* curve is fairly flat - if investment is very responsive to the interest rate, that is, if coefficient ***d*** is large.

Similarly, the *IS* curve will be flat if net exports are highly sensitive to the interest rate, that is, if the coefficient ***n*** is large.

The *IS* curve will be flat if the marginal propensity to consume ***b*** is large, that is, if the tax rate ***t*** is small, or if the marginal propensity to import ***m'*** is small.

An increase in government spending G or a decrease in taxes T shift the *IS* curve to the right. Changes in the tax rate t are accompanied by changes of the *IS* curve slope.

4. **The *LM* curve equation for *R***:

$$R = \frac{k}{h} \bullet Y - \frac{1}{h} \bullet \frac{M}{P}$$

The *LM* curve equation for *Y*:

$$Y = \frac{1}{k} \bullet \frac{M}{P} + \frac{h}{k} \bullet R$$

The slope of the *LM* curve is $\frac{k}{h}$. The slope of the *LM* curve $\frac{k}{h}$ is small - meaning that the *LM* curve is fairly flat - if the sensitivity of money demand to the interest rate is large, that is, if the coefficient ***h*** is large.

LM curve is also flat if the sensitivity of money demand to income, ***k***, is small.

An increase in the money supply *M* or a decrease in the price level *P* shift the *LM* curve to the right.

5. The values of the interest rate and income predicted by the macro level occur at the intersection of the *IS* curve and the *LM* curve. For these values, all five relationships of the model are satisfied. This is the only combination of *Y* and *R* that satisfies both spending balance and money market equilibrium.

To solve the model algebraically, we can use the expression for the interest rate on the right-hand side of the *IS* curve-equation for *R* to replace the interest rate in the *LM* curve-equation for *R*. The result is:

$$Y = h \bullet \frac{a + e + g + G - b \bullet Ta}{k(d + n) + h[1 - b(1 - t) + m']} + \frac{d + n}{k(d + n) + h[1 - b(1 - t) + m']} \bullet \frac{M}{P}$$

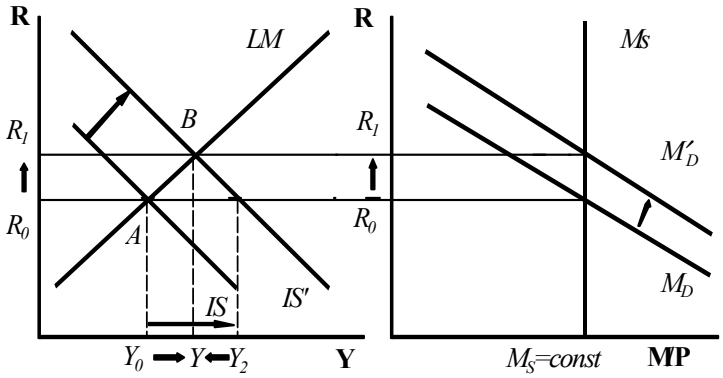
where $T = T_a + t \cdot Y$.

If the price level *P* is fixed (predetermined) in the short run the formula gives us the unique value of *Y*.

6. An increase in government spending *G* and a decrease in taxes *T* are accompanied by the crowding-out effect.

$$G \uparrow (\text{или } T \downarrow) \Rightarrow Y \uparrow \Rightarrow C \uparrow \Rightarrow Y \uparrow \Rightarrow M_D \uparrow \Rightarrow R \uparrow \Rightarrow \underbrace{I \downarrow, X_n \downarrow}_{\text{the crowding - out effect}} \Rightarrow Y \downarrow$$

An increase in government spending *G* (or a decrease in taxes *T*) lead to the increase of income *Y*. An increase in income *Y* leads to the increase in consumption *C*, which is accompanied by the **multiplier effect.** An increase in income *Y* raises the demand for money *M* and thus the interest rate *R*. An increase in the interest rate reduces investment *I* and net exports X_n. At the same time the reduction of the net exports is connected with the increase of income *Y* which is accompanied by an increase of imports. As a result the increase of employment and income caused by expansionary fiscal policy is partly eliminated by the **crowding-out effect** (the replacement of some amounts of investment *I* and net exports X_n by government spending *G*).

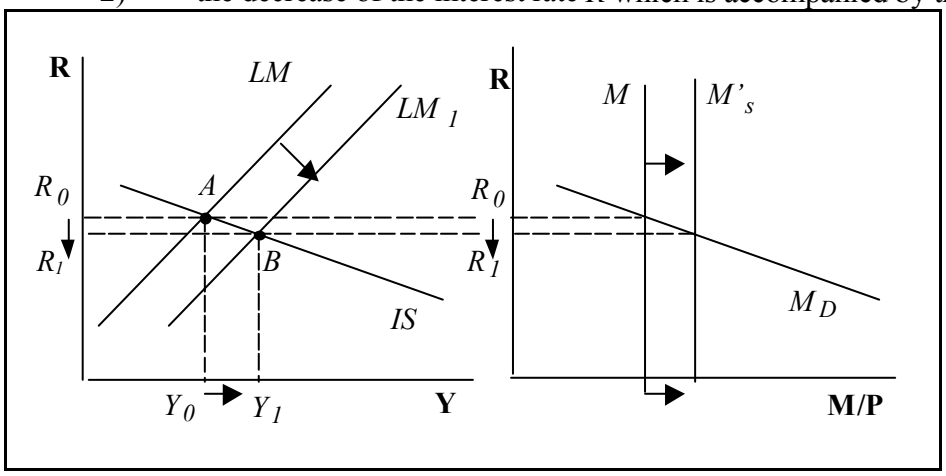


If there would be no crowding-out of investment and net exports then the increase of income Y due to government spending (or to tax cuts) would be equal to (Y_0Y_2), but its real increase is only (Y_0Y).

7. An increase in money supply M_s raises employment and income without crowding-out effect but exerts contradictory influence on the net exports.

An increase in money supply M_s is accompanied by a decrease of the interest rate R which promotes investment's growth. As a result income Y increases. An increase of income raises consumption C. The net exports X_n is under the influence of two factors:

1) the increase of income Y which is accompanied by a decrease of the net exports, and
2) the decrease of the interest rate R which is accompanied by the increase of X_n.



$M_s \uparrow \Rightarrow R \downarrow \Rightarrow I \uparrow \Rightarrow Y \uparrow \Rightarrow Y_d \uparrow \Rightarrow C \uparrow, X_n?$

$?X_n = g - m\underline{Y\uparrow} - n\underline{\cdot R\downarrow}.$

8. Two important issues must be faced indetermining the relative effectiveness of monetary and fiscal policy:

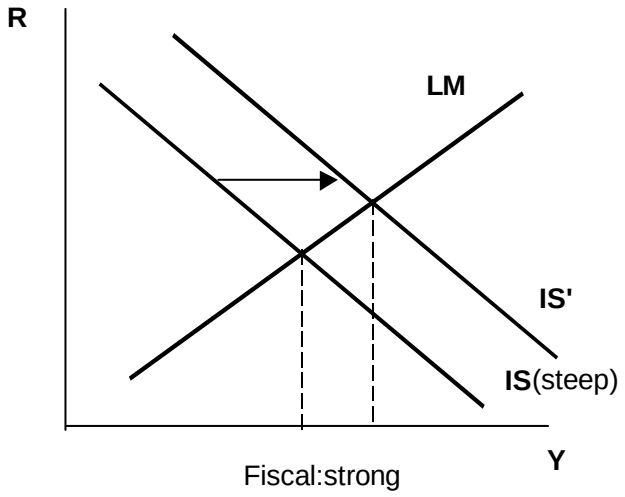
a) the sensitivity of investment demand and net export to interest rates;
b) the sensitivity of money demand to interest rates.

9. **The relative effectiveness of expansionary fiscal policy** is determined by the crowding-out effect.

Expansionary fiscal policy is relatively strong if the crowding-out effect is smaller than the increase of income.

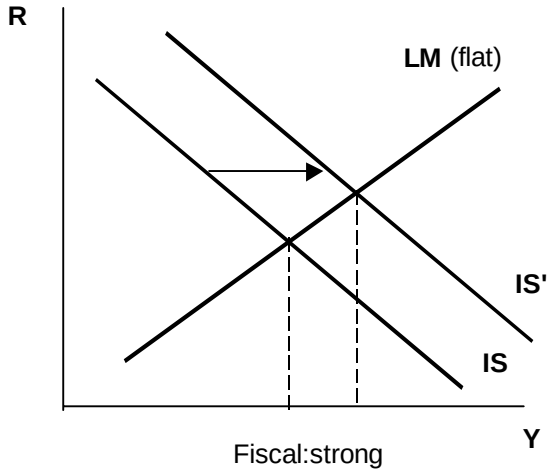
The crowding-out effect is relatively small in two cases:

1) if the increase of interest rates has a small effect on investment and net exports. In other words the fall in investment and net exports will be small if the **sensitivity** of investment demand ***d*** and net exports ***n*** to the interest rate is vary **small**. In this case the ***IS*** **curve is steep**.



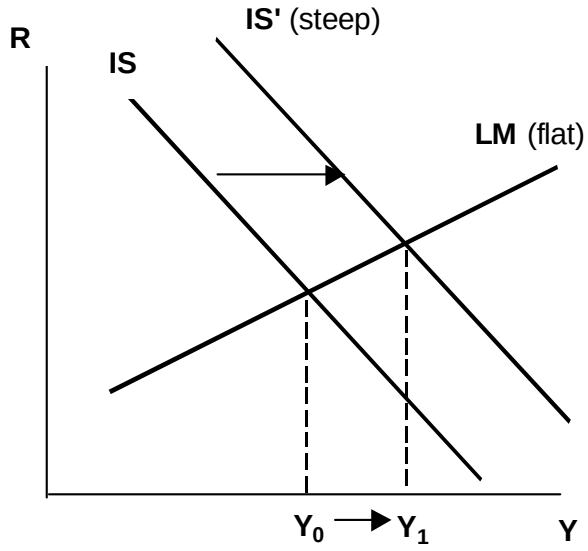
The sensitivity of investment and net exports to the interest rate is small.

2) If the **sensitivity of money demand** to the interest rate is **very large.** Then the increase in money demand that arises as a result of the increased government expenditures will cause a small rise in the interest rate. In this case the ***LM*** **curve is flat**.



The sensitivity of money demand to the interest rate is large.

Expansionary fiscal policy is strongest if the IS curve is steep and the LM curve is flat simultaneously. In this case the crowding-out effect is very small because the interest rates don't rise by much, and have a small effect on investment and net exports.

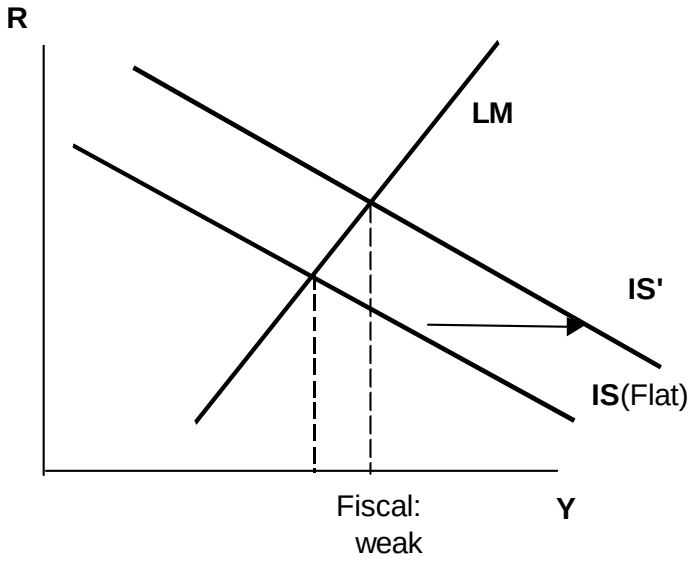


The sensitivity of investment and net exports to the interest rate is small, and the sensitivity of money demand to the interest rate is large simultaneously. The increase of income *Y* is equal to (Y_0Y_1).

10. **Expansionary fiscal policy is relatively weak** if the crowding-out effect is larger than the increase of income.

The crowding-out effect is relatively **large** in two cases:

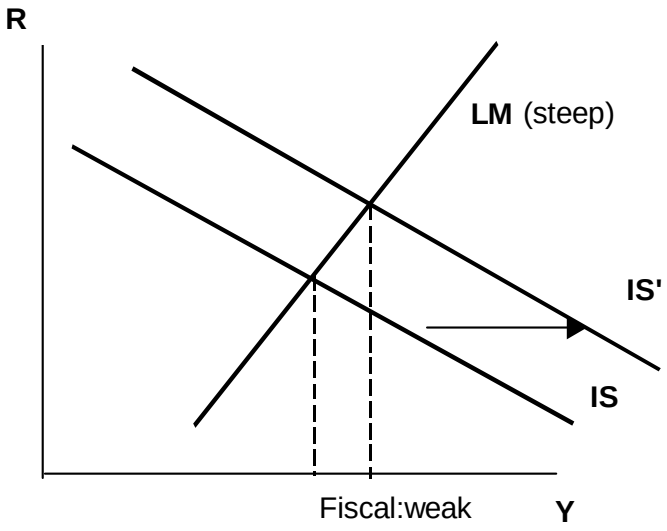
1) if the sensitivity of investment demand and net exports to the interest rate is **very large.** In this case the coefficients ***d*** and ***n*** are large, and so the **IS curve is relatively flat**.



The increase of income is small because a rise in interest rates reduces investment and

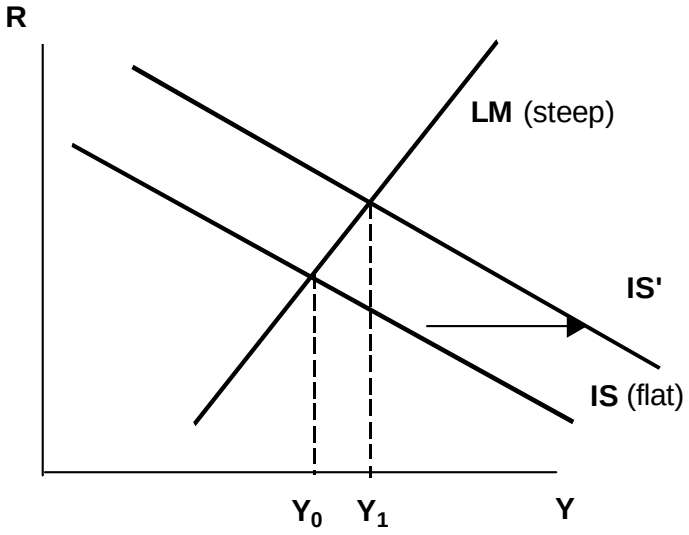
net exports by a considerable amount.

2) If the sensitivity of money demand to the interest rate is **very small**. In this case the coefficient ***h*** is small, and so the ***LM*** **curve is relatively steep.**



The increase of income is small because the increase in money demand that arises as a result of expansionary fiscal policy causes a big rise in the interest rate.

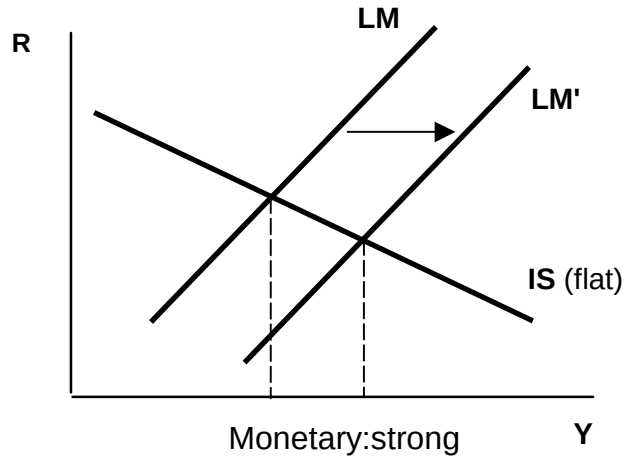
Expansionary fiscal policy is weakest if the *IS* curve is flat and the *LM* curve is steep simultaneously. In this case the crowding-out effect is very large because the interest rates rise by much and have a large effect on investment and net exports.



The increase of income (Y_0Y_1) is very small because a rise of interest rates is very large and the coefficients ***d*** and ***n*** are considerable.

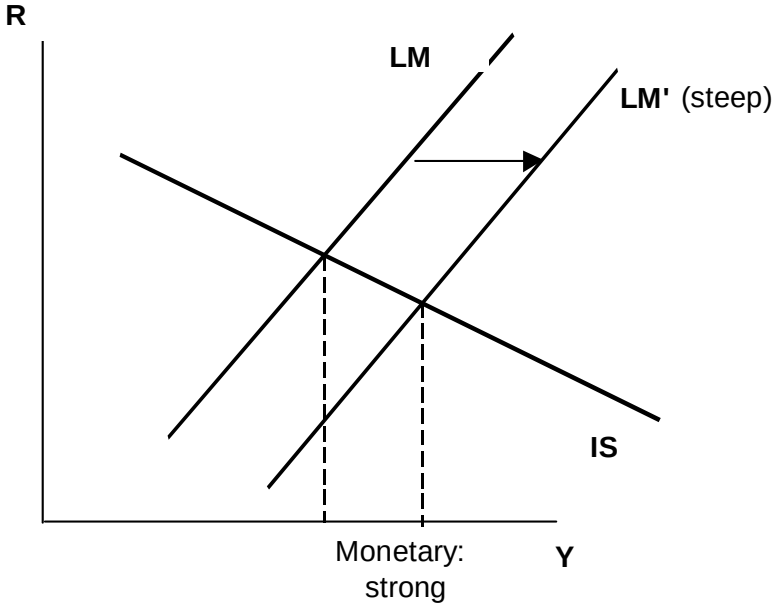
11. **An expansionary monetary policy** will have a relatively **strong** effect on income if the drop in interest rates that occurs when the money supply is increased is large or has big influence on investment and net exports. This occurs under two circumstances.

1) If the sensitivity of investment demand and net exports to interest rates is **very large**. In this case the ***IS*** **curve is relatively flat**.



The increase of income is large because investment is stimulated much by the decline in interest rates.

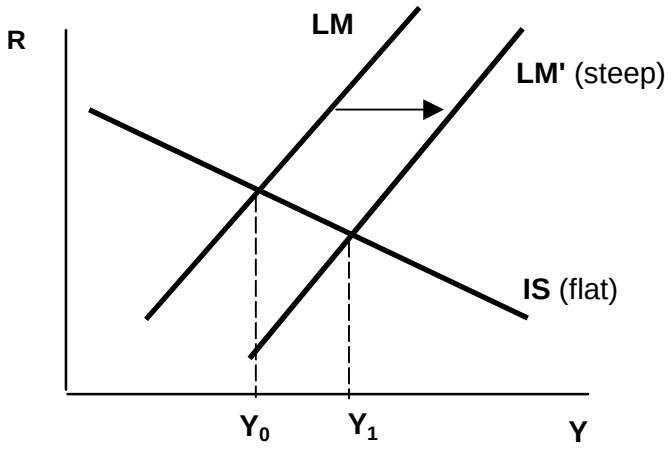
2) If the sensitivity of money demand to interest rates is **very small**. Then the increase in the money supply causes much of a drop in interest rates. In this case the ***LM*** **curve is steep**.



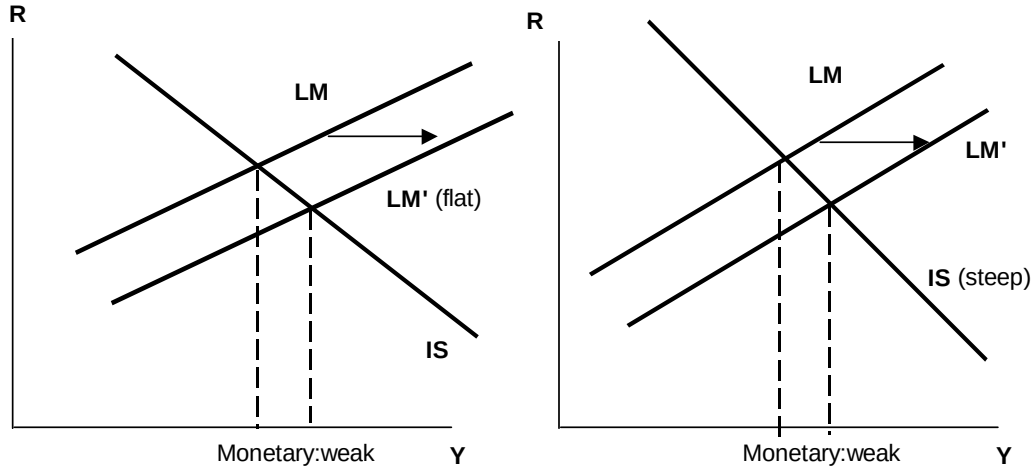
The sensitivity of money demand to the interest rates is small, so the decrease of the

interest rates is large and a rise of income is considerable.

Expansionary monetary policy is strongest if the *IS* curve is flat and the *LM* curve is steep simultaneously. In this case the decrease of the interest rates is large, and the coefficients ***d*** and ***n*** are considerable. So an increase of income (Y_0Y_1) is large.



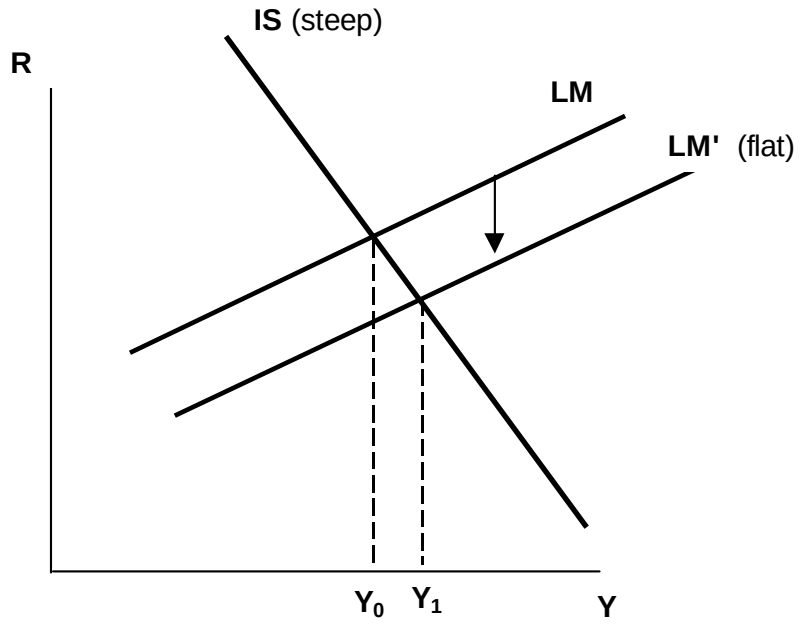
12. **Expansionary monetary policy is relatively weak** if the sensitivity of money demand to interest rates is large, and if the sensitivity of investment and net exports to interest rates is small.



The increase of income is small because a small drop in interest rates is sufficient to bring money demand up to the higher money supply. So an increase of investment and net exports is not large.

The coefficients ***d*** and ***n*** are very small and so the decrease of interest rates is accompanied by small increase of investment demand and net exports. As a result the total increase of income *Y* is small.

The expansionary monetary policy is the weakest if the *IS* curve is steep and the *LM* curve is flat simultaneously. In this case a decrease of the *R* is small and the reaction of investments and net exports is weak. So the total increase of income (Y_0Y_1) is not large.

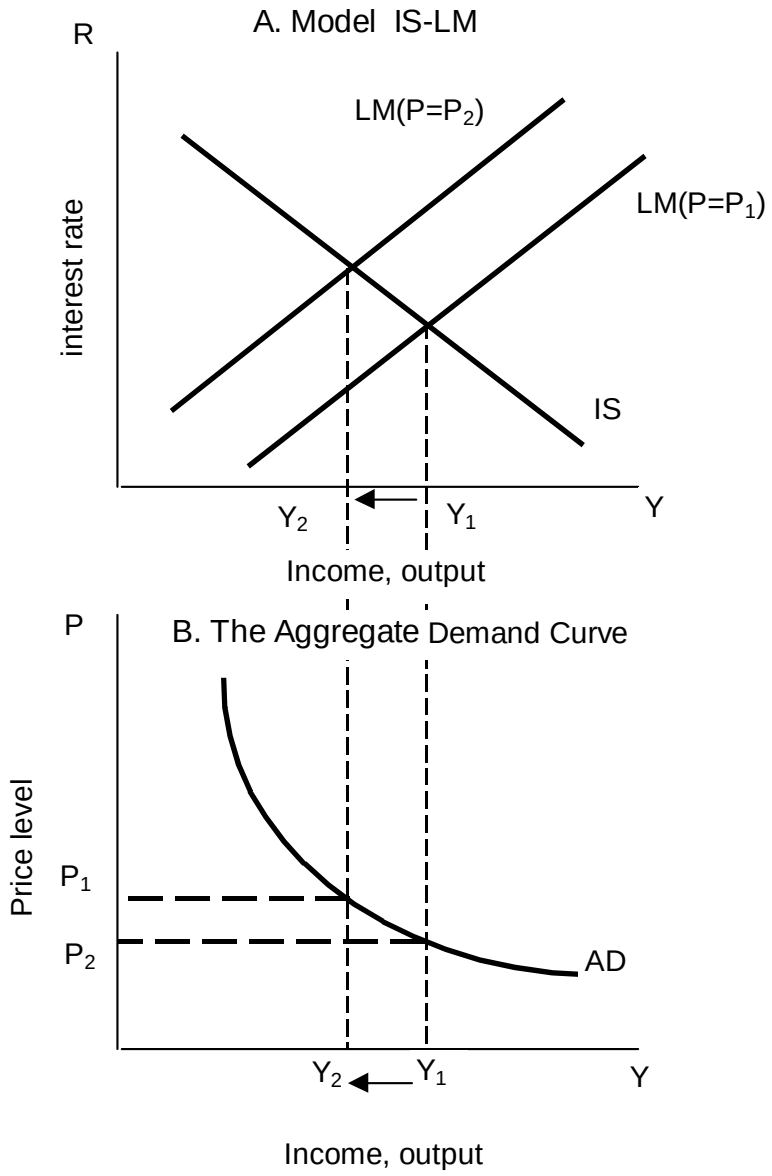


13. If the price level *P* can change then the formula of equilibrium GNP (see point 3) describes the Aggregate Demand function (*AD*). The aggregate demand function can be written as

$$Y = \alpha + \beta \bullet G - \gamma \bullet Ta + \theta \bullet \frac{M}{P}$$, where α, β, γ and θ are combined coefficients.

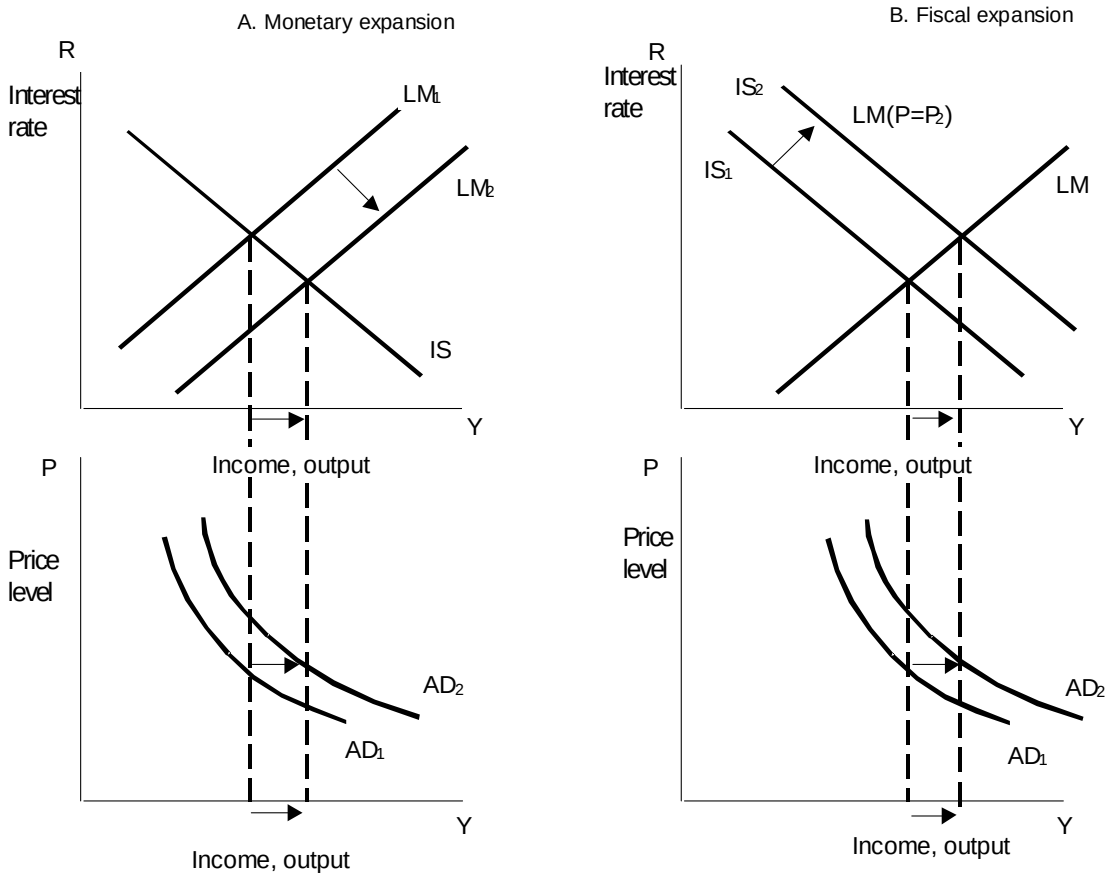
This equation expresses the aggregate demand curve algebraically. It says that income depends on fiscal policy, *G* and *T*, monetary policy *M*, and the price level *P*. The *AD* curve graphs this equation for different values of *Y* and *P* and for fixed values of *G*, *T*, and M_s.

Graphical derivation of the AD curve with the IS-LM model

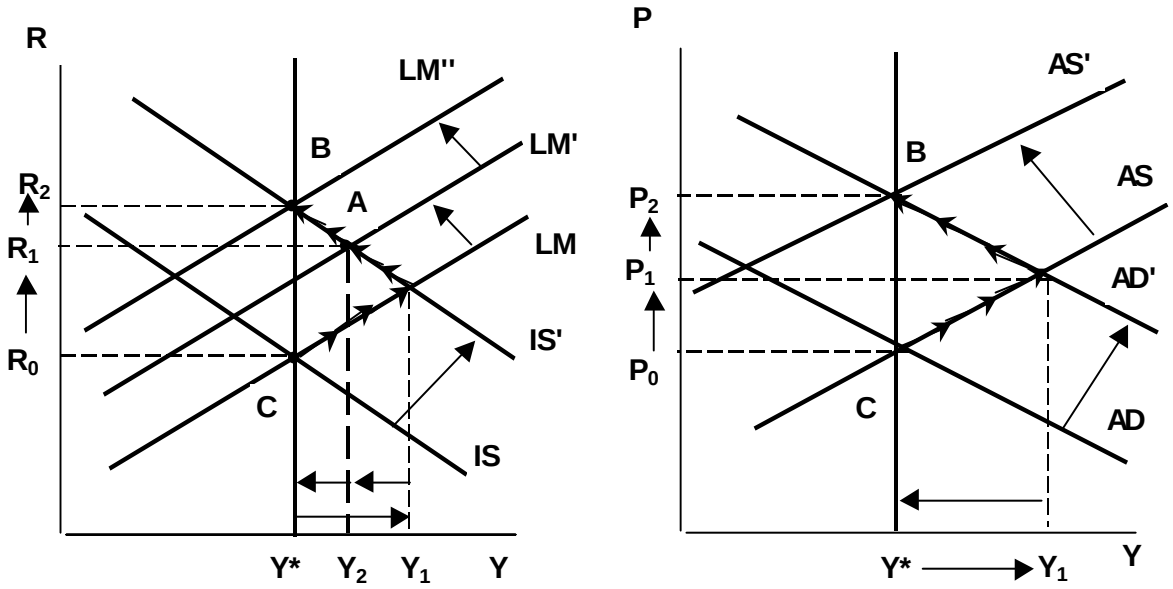


An increase in the price level from P_1 to P_2 shifts the *LM* curve to the left. This raises interest rates *R* and reduces output from Y_1 to Y_2. The resulting negative relationship between the price level and GNP is summarized in the *AD* curve.

14. An increase in government spending, or a decrease in taxes, or an increase in the money supply shifts the aggregate demand curve to the right.



15. Fiscal expansion with flexible prices.



The initial equilibrium is at point *C*.

If government spending *G* increases (or taxes *T* decreases) the *IS* curve shifts to the right. At the same time the *AD* curve shifts to the right which is accompanied by the **demand-pull inflation.** The price level *P* rises from P_0 to P_1. This causes reduction of the real money supply and the *LM* curve shifts to the left. **The short-run equilibrium** is at point *A*.

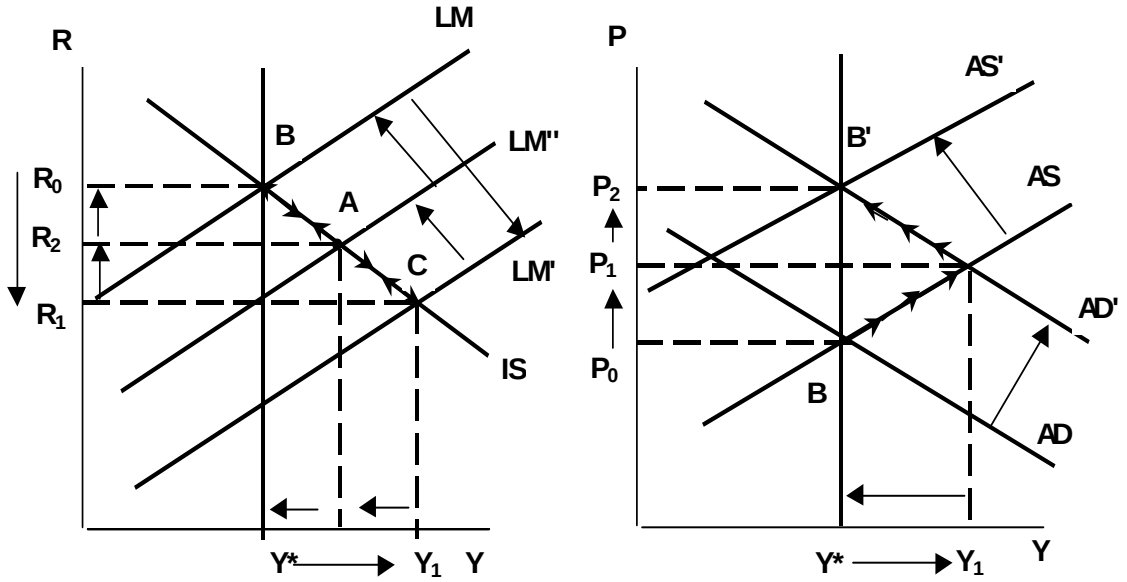
Gradually nominal wages increase. This raises per unit production costs and reduces firm's revenues. Gradually firms begin to reduce their output and the *AS* curve slowly shifts to the left. The price level *P* rises from P_1 to P_2 (**cost-push inflation**). The *LM´* curve shifts to the left.

Because of permanent reduction of the real money supply $\left(\frac{M}{P}\right)$ the interest rate *R* raises from R_0 to

R_2.

The long-run equilibrium is at point *B*, where income *Y* is equal to potential GNP, consumption *C* is not changed, investment *I* is fallen, interest rate *R* is increased and the price level *P* is raised.

16. Monetary expansion with flexible prices.



The initial equilibrium is at point *B*.

If the money supply M_s grows the *LM* curve shifts to the right. At the same time the *AD* curve shifts to the right which is accompanied by the **demand-pull inflation**. The price level *P* rises from P_0 to P_1. This relatively reduces the real money supply $\left(\frac{M}{P}\right)$ and the *LM′* curve partly returns to the left. **The short-run equilibrium** is at point *A*.

Later **the cost-push inflation** (see point 13) causes reduction of the aggregate supply. The *AS* curve shifts to the left. The price level raises from P_1 to P_2. The *LM″* curve returns to its initial level *LM* due to the permanent reduction of the real money supply $\left(\frac{M}{P}\right)$.

The long-run equilibrium is at point *B*, where income *Y* is equal to potential GNP, consumption *C*, investment *I* and the interest rates *R* are not changed and the price level *P* is raised in the same proportion as money supply M_s.

Lecture 10. Fiscal Policy Instruments

1. The Keynesian Cross shows how equilibrium income Y is determined for given levels of planned investment I and fiscal policy G and T. We can use this model to show how equilibrium income changes when one of these exogenous variables changes.

Fiscal policy assumes changes in government spending G and tax collections T for the purpose of achieving a full-employment and noninflationary national output.

2. A change in government spending has a more powerful effect upon aggregate expenditures than does a tax change of the same size. Government spending has a **direct** impact upon aggregate expenditures. But a change in taxes affects aggregate expenditures **indirectly** by changing disposable income and thereby changing consumption. Therefore the government purchases multiplier is always larger than the tax multiplier.

Those "liberal" economists, who think that the public sector needs to be enlarged, can recommend that aggregate expenditures should be expanded during recessions by increasing government purchases and that aggregate expenditures should be constrained during inflationary periods by increasing taxes. Conversely, "conservative" economists, who contend that the public sector is overly large and inefficient, can advocate that aggregate expenditures be increased during recessions by cutting taxes and that aggregate expenditures be reduced during inflation by cutting government spending.

3. **Discretionary fiscal policy** assumes deliberate changes in taxes (tax rates) and government spending (spending for goods and services and transfer payment programs) by Parliament for the purpose of achieving a full-employment noninflationary GDP and economic growth.

Nondiscretionary fiscal policy assumes the increases (decreases) in **Net taxes** which occur without parliamental action when the GNP rises (falls) and which tend to stabilize the economy.

Net taxes are the taxes collected by government less government transfer payments.

4. When recession exists, an **expansionary fiscal policy** is in order. If the budget is balanced at the outset, discretionary fiscal expansion should move in the direction of a government **budget deficit** during a recession or depression.

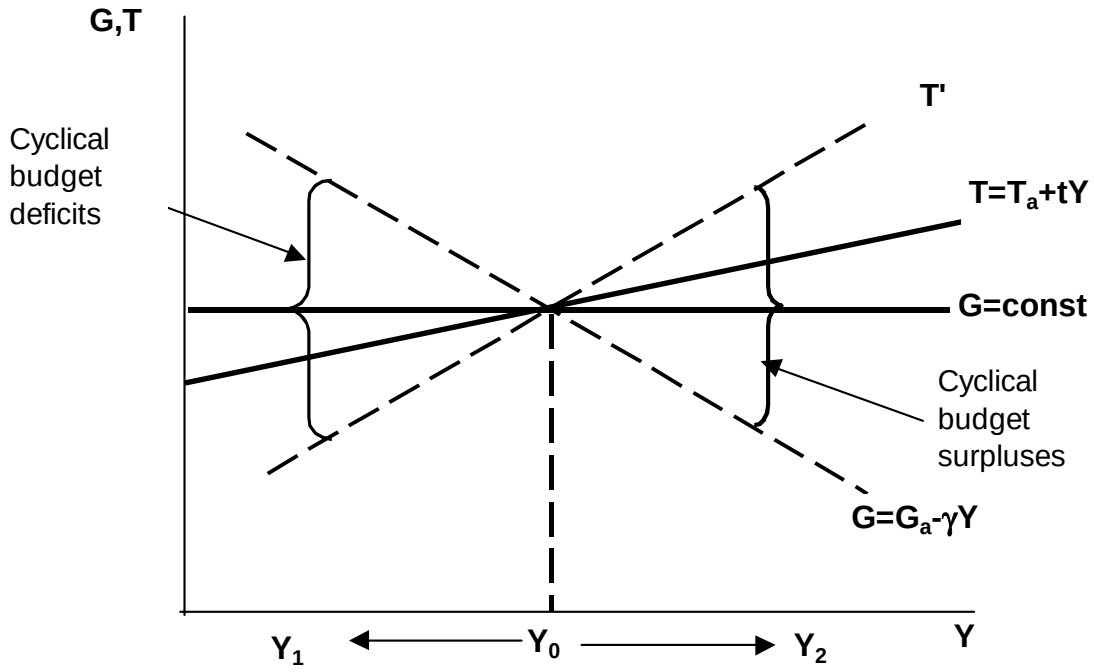
Conversely, when demand-pull inflation stalks the land, a restrictive or **contractionary fiscal policy** is appropriate. Contractionary fiscal policy should move toward a **surplus** in the government's budget when the economy is faced with the problem of controlling inflation.

To some degree appropriate changes in the relative levels of government expenditures and taxes occur automatically. This so-called automatic or **built-in stability** is a base of non-discretionary fiscal policy.

A built-in stabilizer is anything which tends to increase the government's deficit (or reduce its surplus) during a recession and to increase its surplus (or reduce its deficit) during inflation without requiring explicit action by policy makers. If tax revenues vary directly with GDP, then the deficits which will tend to occur automatically during recession will help alleviate that recession. Conversely, the surpluses which tend to occur automatically during expansion will assist in offsetting possible inflation.

During prosperity $Y_2 > Y_0$, tax revenues **automatically** increase, and transfer payments **automatically** decrease. As a result **cyclical** budget surplus arises and restrain inflationary expansion of the economy.

Conversely, during recession $Y_1 < Y_0$, tax revenues **automatically** decline, and transfer payments **automatically** increase. As a result **cyclical** budget deficit arises and maintain the level of aggregate expenditures.



5. It is clear from the Figure that the size of the cyclical budget deficits or surpluses and therefore built-in stability depends upon the responsiveness of changes in taxes *T* and in government spending G to changes in GDP (Y). If tax revenues T and government spending G change sharply as GDP changes, the slope of lines T and G in the Figure will be steep and the vertical distances between T and G (cyclical deficits or surpluses) will be large. Alternatively, if tax revenues T and government spending G change very little when GDP changes, the slope will be gentle and built-in stability will be low.

The Federal governments "indexing" of the personal income tax and lowering of the marginal tax rates in the 1980s flattened the slope of T in the Figure. Hence, changes in GDP do not produce as large automatic changes in tax revenue as previously and the economy's degree of built-in stability is less than it once was. It is estimated that in the United States the built-in stabilizers are currently strong enough to reduce fluctuations in national income by roughly one-third.

6. The built-in stabilizers are not capable of correcting an undesirable change in the equilibrium GDP. All that the stabilizers do is reduce the magnitude or severity of economic fluctuations.

Built-in stability makes it hazardous to use the **actual budget surplus or deficit** in any given year as an index of the government's fiscal stance. The cyclical deficit is clearly not the result of positive fiscal actions by the government; rather it is the by-product of fiscal inaction as the economy slides into recession.

We cannot say anything very meaningful about the government's fiscal posture — whether

Government was appropriately manipulating taxes and expenditures — by looking at the historical record of budgetary deficits or surpluses. The actual budget surplus or deficit reflects not only possible discretionary decisions about spending and taxes, but also the level of equilibrium GDP. Hence, given that tax revenues (T) and government spending (G) vary with GDP, the fundamental problem of comparing deficits or surpluses in year 1 and year 2 is that the level of GDP may be vastly different in each of the two years.

Economists have resolved this problem through the notion of full-employment budget. The **full-employment budget** indicates what the Federal budgetary surplus or deficit would be if the economy were to operate at full-employment throughout the year. So the **structural budget deficit (or surplus)** is the difference between G (or T) and T (or G) at the level of potential GDP. The cyclical deficit can be estimated as a difference between actual budget deficit and the structural deficit.

Table 1 illustrates the changes in dynamics of actual and structural budget deficits in the groups of "Major Industrial Countries" and "Other Industrial Countries".

Table 1.
Industrial Countries: General Government Fiscal Balances (in percent of GDP)

	1980 - 1989	1990	1991	1992	1993	1994	1995	1996	1997	2001
1. Major Industrial Countries *										
- actual balance	-3,0	-2,1	-2,7	-3,8	-4,3	-3,5	-3,3	-2,9	-2,3	-1,5
*-GDP gap***	-0,4	2,7	0,5	-0,4	-1,8	-1,2	-1,4	-1,4	-1,1	0,2
*-structural balance****	-2,8	-3,3	-3,0	-3,5	-3,3	-2,7	-2,5	-2,1	-1,6	-1,5
2. Other Industrial Countries **										
- actual balance	-4,1	-2,5	-3,8	-4,7	-6,0	-5,1	-4,4	-2,9	-2,0	-1,6
*-GDP gap***	-0,6	2,5	1,1	-0,1	-2,3	-1,6	-1,2	-1,2	-1,1	-0,1
*-structural balance****	-3,8	-4,3	-4,8	-4,7	-4,3	-3,8	-3,5	-2,1	-1,4	-1,5

*This group includes USA, Japan, Germany, France, Italy, United Kingdom, and Canada.

**The output gap is actual less potential GDP, as a percent of potential GDP $(\frac{Y - Y^*}{Y^*})$.

***Structural balances are expressed as a percent of potential GDP.

****For 1980-89, includes Spain, the Netherlands, Belgium, Sweden, Austria, Denmark, Ireland, Australia, and New Zealand; for years thereafter also includes Finland, Greece, Norway, and Portugal.

Source: World Economic Outlook, October 1996, p.p. 22-23.

The calculations of NAIRU and the level of potential GDP in transitionary economies are more complicated than in industrial countries. So fiscal strategies in transitionary economies are usually based on the estimations of actual budget deficits (see Table 2).

Table 2.
Transitionary Economies: General Government Fiscal Balances (in percent of GDP).

Countries	1992	1993	1994	1995	1996	1997	1998
Albania	-20,0	-16,0	-7,0	-10,3	-11,7	-12,6	-10,4
Armenia	-37,6	-56,0	-16,4	-11,1	-9,3	-6,7	..
Azerbaijan Republic	3,5	-15,3	-11,4	-4,3	-2,8	-1,7	-4,2
Belarus	-2,8	-4,2	-2,6	-1,9	-1,6	-1,2	..
Bulgaria	-5,2	-15,7	-5,8	-6,3	-12,7	-2,5	0,9
Croatia	-4,0	-0,7	1,5	0,9	-0,5	-1,4	..
Czech Republic	-2,1	1,4	-1,2	0,2	-0,4	-1,4	-1,4
Estonia	-0,3	-1,1	1,3	-0,5	-1,5	1,8	-0,3
Georgia	-34,5	-26,2	-16,5	-5,3	-4,5	-5,0	..
Hungary	-7,6	-8,9	-8,6	-6,2	-3,1	-4,9	-4,6
Kazakstan	-7,3	-1,2	-7,1	-3,2	-5,3	-7,0	-8,0
Kyrgyz Republic	-17,6	-13,5	-7,7	-17,3	-9,5	-9,0	-8,8
Latvia	-0,8	0,6	-4,0	-3,9	-1,7	0,1	-0,8

Lithuania	0,5	-4,9	-4,8	-4,5	-4,5	-1,8	-5,8
Macedonia	-9,6	-13,6	-3,2	-1,3	-0,4	-0,3	..
Moldova	-23,9	-7,4	-9,1	-5,8	-6,6	-6,8	-3,0
Mongolia	-6,0	-14,6	-10,3	-6,4	-9,0	-9,0	..
Poland	-8,0	-4,0	-3,2	-3,2	-3,6	-3,3	-3,0
Romania	-4,6	-0,1	-1,8	-2,6	-3,9	-4,5	..
Russia*	-18,4	-7,6	-10,4	-5,8	-9,5	-7,5	..
Slovak Republic	-11,9	-7,1	-1,3	0,4	-1,3	-5,2	-6,0
Slovenia	0,2	0,3	-0,2	-0,5	-0,2	-1,7	-1,4
Tajikistan	-31,2	-23,6	-10,5	-11,2	-5,8	-3,4	..
Turkmenistan	13,3	-0,4	-1,4	-1,6	-0,8	0,0	..
Ukraine	-24,0	-10,3	-8,7	-4,9	-3,2	-5,6	-2,7
Uzbekistan	-12,2	-17,5	-6,1	-4,1	-7,3	-2,8	..

*Consolidated Budget Balance of Russian Federation. Federal Budget Deficit in 1996 was equal to 8,4 % of GDP, in 1997 – 7,1 %, in 1998 – 5,9%, in 1999 – 5,1% of GDP.

Sources: World Economic Outlook, May 1996, p.78; October 1996, p.29; May 1998, p. 98; IMF Economic Reviews, 1999, N 1-2.

Table 3 illustrates the dynamics of average actual budget deficit in transitionary economies.

Table 3.
Countries in Transition: General Government Fiscal Balance (in percent of GDP)

	1991	1992	1993	1994	1995	1996	1997	1998	1999[1)]	2000[1)]
General government fiscal balance	-9,6	-14,1	-6,7	-7,0	-4,4	-5,5	-5,0	-4,8	-3,6	-2.5

[1)]Estimations

Source: World Economic Outlook, October 1999, p. 188.

7. The impounding of a budgetary surplus is more contractionary than the use of the surplus to retire public debt.

Given the size of a deficit, its expansionary effect upon the economy will depend upon the method by which it is financed.

The government can finance the deficit in two ways. First, it can it can borrow from the public (debt financing). Second, it can simply print money (monetization of the deficit).

If the government goes into the money market and borrows, it will be competing with private business borrowers for funds. This added demand for funds will drive the equilibrium interest rate upward. Investment spending and net exports spending are inversely related to the interest rate. Hence, government borrowing will tend to increase the interest rate and thereby **"crowd out"** some private investment spending, net exports spending and interest-sensitive consumer spending. The **crowding-out effect** weakens or cancels the stimulus of the fiscal policy.

The revenue raised through the printing of money is called **seigniorage**. When the government prints money to finance expenditure, it increases the money supply. The increase in the money supply leads to inflation. Therefore, printing money to raise revenue is like imposing an **inflation tax**. Inflation is a tax on holding money.

In the long run the government can raise its revenues through **structural tax reform**, which includes the reduction of **tax rates** and expansion of the **tax base**.

Lectures 11-12. Banking System and Monetary Policy.

1. **Monetary system** consists of monetary (making money) and non-monetary financial institutions. Monetary financial institutions constitute the banking system of country. Typical **banking system** is represented by institutions of two levels: monetary authorities (normally country central bank) and commercial (deposit) banks - banking financial intermediators.

2. **Central bank** issues national currency, holds country reserves in gold and foreign currency, reserves funds and monitors commercial banks activities, carries out monetary policy. Central bank functions as an interbanking clearing center and as a Central Government bank. If some of these functions are performed by other governmental bodies (e.g. by Treasury), their accounts are considered to be central bank ones. Central bank acts as a lender of the last resort in reference to commercial banks.

3. **Commercial banks** perform two basic functions: reception of deposits and allocation of credits. By means of these operations commercial banks create money, which distinguishes them from non-monetary financial institutions (except monetary authorities), that is institutions having substantial liabilities in the form of deposits. The latter can be used for conducting payments in the form of cheques or in any other one.

4. We can classify targets and instruments of monetary policy.

Ultimate targets:
a) economic growth;
b) full employment;
c) price stability.

Intermediate targets:
a) money stock;
b) interest rate.

Instruments:
a) credit ceilings; direct control on interest rates;
b) reserve requirements;
c) open market operations;
d) refinance and credit policies.

A broad distinction may be made between **direct (a)** and **indirect (b,c,d) instruments** of monetary control. Effective utilization of indirect instruments is closely linked to the development of money market. Indirect instruments of monetary control may both be facilitated by, and help foster, money market development.

5. The **money supply process** can be defined in terms of two factors:
   - The initial **creation** of reserve money, or **monetary base**, which is achieved by increasing the liabilities of central bank to the public and the banking system.
   - A secondary **expansion of the money supply by the deposit money banks**. This is achieved through the "multiplication" of the resources deposited with these banks, whereby part of the credit provided with these resources, when spent by the borrower, returns to the banks as new deposits which can be lent out again.

Monetary policy instruments work through their impact on either the money multiplier or reserve money.

6. The Central Bank controls the money supply only indirectly. There are three instruments of monetary policy:

- **The discount rate** - is the interest rate that the Central Bank charges when it makes loans to banks. Banks borrow from the Central Bank when they have insufficient reserves on hand to meet reserve requirements. Increases in the discount rate make banks more reluctant to borrow from the Central Bank, and so reduce the monetary base (because borrowed reserves are part of the monetary base) and vice versa. One of the traditional functions of the Central Bank is to provide loans to troubled banks (Central Bank as a "lender of last resort"). Changes in the discount rate indicate movements in the Central Bank's monetary policy.
- **Reserve requirements** are set by the Central Bank as minimum reserve-deposit ratios. An increase in reserve requirements raises the reserve-deposit ratio and thus lowers the money multiplier and the money supply.
- **Open-market operations** - the purchases and sales of government bonds by the Central Bank. These operations change the monetary base and thereby change the money supply. When the Central Bank buys bonds from public (or from commercial banks) the money it pays for the bonds increase the monetary base and thereby increase the money supply, and vice versa.

The Central Bank does not have complete control over the money supply. For example, banks may choose to hold **excess reserves** - that is, reserves above the reserve requirement. The higher the amount of excess reserves, the higher the reserve-deposit ratio, and the lower the money multiplier and money supply. The Central Bank cannot precisely control the amount banks borrow from the discount window. The less banks borrow, the smaller the monetary base and the smaller the money supply. The currency-deposit ratio depends on preferences of public.

7. Now consider **the money market model**. Recall that the quantity of real balances demanded is a function of the interest rate: *L(r)*. The demand curve of real money balances slopes downward because higher interest rates reduce the quantity of real balances demanded. The supply curve of real balances is vertical ($\overline{M} / \overline{P}$) because we assume that money supply is fixed by the Central Bank and does not depend on the interest rate (Figure 1).

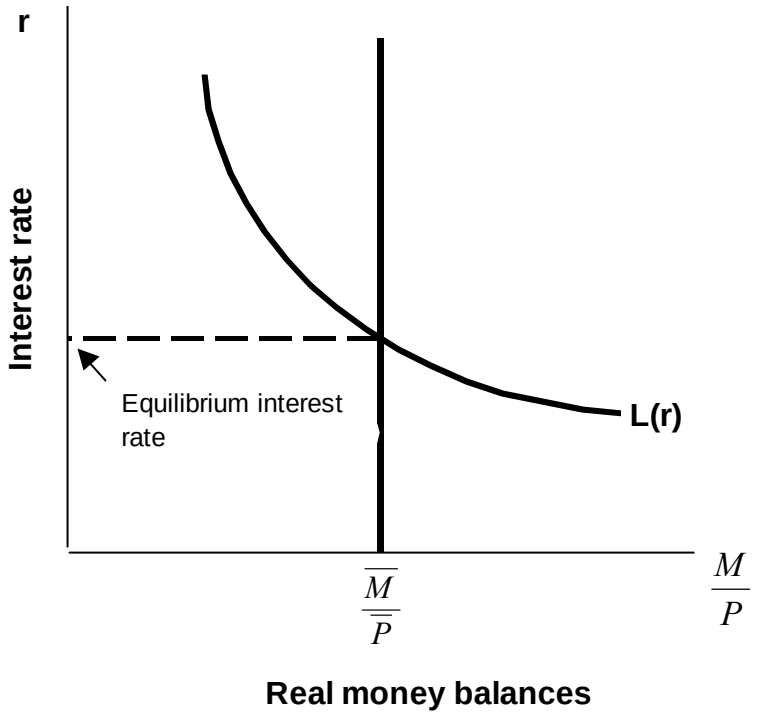


Figure 1

For simplicity we suppose that inflation is zero (price level is fixed), thus the nominal interest rate equals the real interest rate.

The supply and demand for money determine **the equilibrium interest rate**. The adjustment of the

interest rate to the equilibrium of money supply and demand occurs because people try to adjust their portfolios of assets if the interest rate is not at the equilibrium level. If the interest rate is too high, the quantity of real balances supplied exceeds the quantity demanded. Individuals holding the excess supply of money try to convert some of their non-interest-bearing money into interest-bearing bank deposits or bonds. Banks and bonds issuers respond to this excess supply of money by lowering the interest rates they offer.

The changes in the income and in the money supply, change the equilibrium interest rate. For example, the increase in income raises the demand for money (money demand curve shifts upward) and thus the interest rate (Figure 2) from r_1 to r_2.

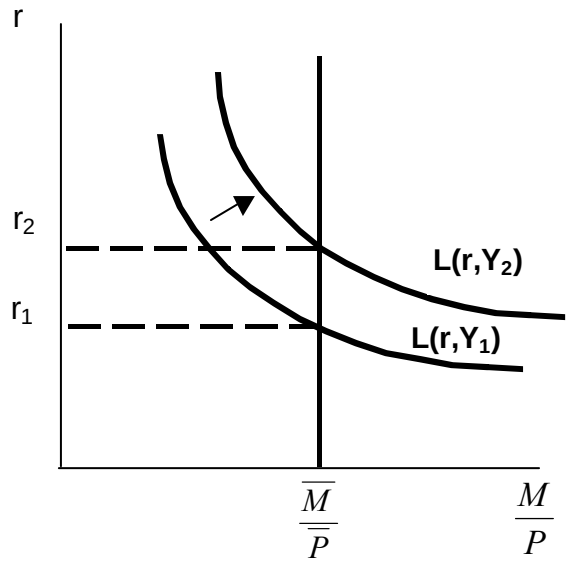


Figure 2

The reduction in the money supply from M_1 to M_2 raises the equilibrium interest rate from r_1 to r_2 (Figure 3).

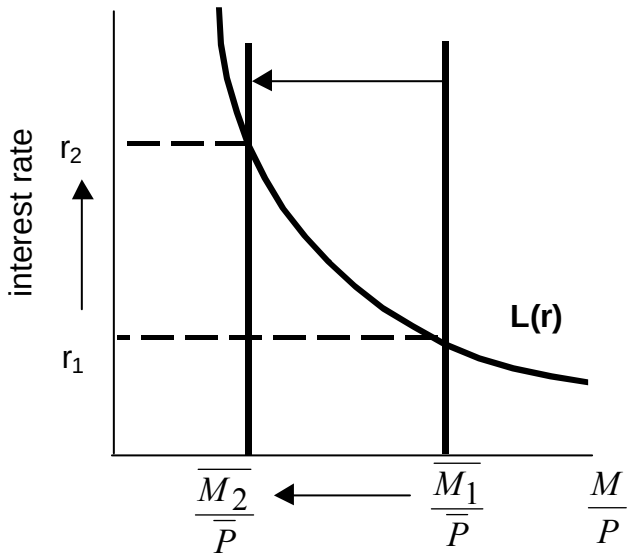
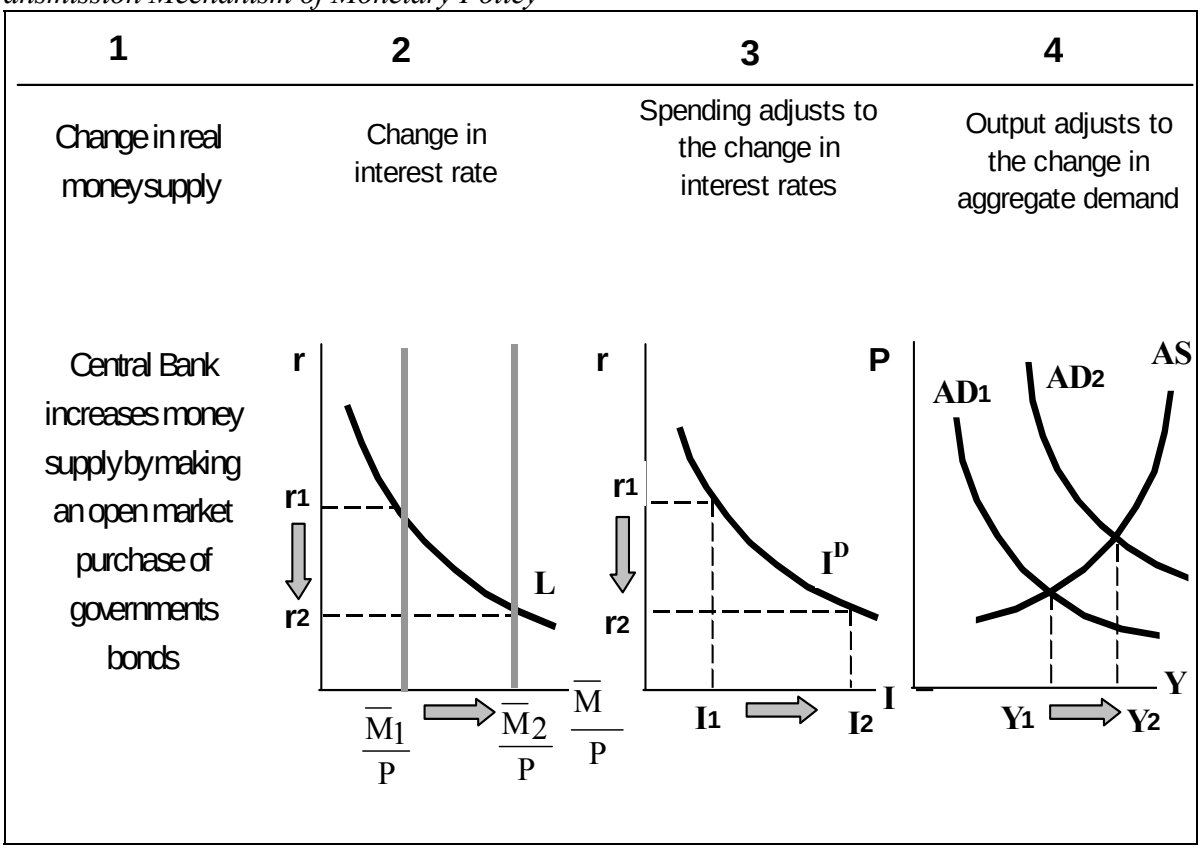


Figure 3

8. The more realistic money market model assumes that the slope of money supply curve depends on the monetary policy of the Central Bank.

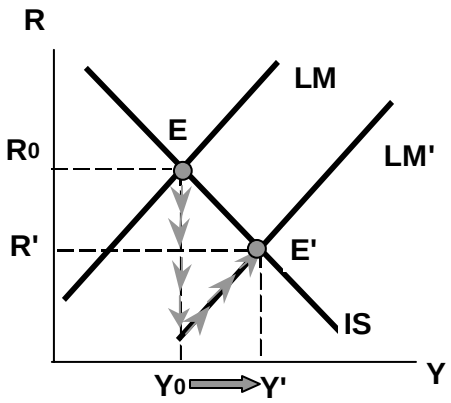
9. Monetary policy has a long **outside lag**, because its complicated transmission mechanism. Monetary policy affects the economy in the first instance by changing the interest rate, and then by affecting aggregate demand. An increase in the money supply reduces the interest rate and increases investment spending and aggregate demand, thus increasing equilibrium output.

The Transmission Mechanism of Monetary Policy



But if change in money supply does not lead to significant changes in interest rates or if spending does not respond to changes in interest rates, the link between money supply and output does not exist.

The stages of the transmission process may be shown graphically by IS-LM model. Increase in the real money stock shifts the LM schedule to the right, and interest rate declines between points E and E_1. The lower interest rates stimulates investment, and spending and income rise until a new equilibrium is reached at point E'. Thus a rise in the real money stock raises equilibrium income and lowers equilibrium interest rates.



The evidence suggests that the peak effect of monetary policy on GNP occurs after a lag between one or two years.

10. The monetary policy is closed closely connected with **the fiscal policy** and **external policies**.

The main sphere of interaction between monetary and fiscal policies relates to the financing of the budget deficit. The government can finance its budget deficit in two ways. It can either sell bonds or "print money" (to monetize deficit). The Central Bank monetizes deficit whenever it purchases a part of the debt sold by the Treasury to finance the deficit. But it typically faces a dilemma in deciding whether to monetize or not. If it does not finance the deficit, the fiscal expansion, not being accompanied by accommodating monetary policy, raises interest rates and thus crowds out private expenditure. The Central Bank can prevent crowding out by buying securities, thereby increasing the money supply and hence allowing an expansion in income without a rise in interest rates. But such a policy of monetization runs a risk. If the economy is near full employment, the monetization tends to feed inflation. But certainly in a deep recession there is no reason to shy away from accommodating a fiscal expansion with higher money growth.

11. The Central Bank sometimes buys or sells foreign currencies in an attempt to affect exchange rates. These purchases or sales of foreign exchange — foreign exchange market intervention — affect the monetary base. Note from the balance sheet that if the Central Bank buys foreign exchange, there is a corresponding increase in monetary base, as the Central Bank pays with its own liabilities for the foreign exchange that is purchases. Thus, foreign exchange market operations affect the monetary base. The Central Bank attempts to offset this effect through sterilized intervention. In the case of sterilized intervention the Central Bank, say, buys foreign exchange, issuing domestic money. But then the increase in the monetary base and money stock is reversed by an open market sale of securities. Thus, the home money supply is kept unchanged.

Lecture 13. Aggregate Supply and the Interaction between Inflation and Unemployment.

1. The theory of aggregate supply is one of the least settled areas in macroeconomics. Modern macroeconomics treats *IS-LM* as only part of the explanation of short-run fluctuations: *IS* is a theory of aggregate demand, which must be combined with aggregate supply to obtain a complete picture of the economy. We used the *IS-LM* model to show how changes in monetary and fiscal policy and exogenous shocks to the money and goods markets shift the aggregate demand curve. When we add the aggregate supply curve to our analysis, we can see how these shifts in aggregate demand affect the quantity of output and the level of prices. To understand fluctuations in output and in the price level, we must understand what determines the position and slope of the aggregate supply curve.

Recall that aggregate supply curve behaves very differently in the short run than in the long run. In the long run prices are flexible and the aggregate supply curve is vertical. It is the classical aggregate supply curve. It would apply in an economy, in which employment and output are always at the full-employment level. Shifts in the aggregate demand curve affect the price level but do not affect aggregate output. In the short run prices are sticky and the aggregate supply curve is not vertical (in the extreme case the Keynesian supply curve is horizontal). Shifts in aggregate demand do lead to fluctuations in aggregate output.

2. There is no consensus among macroeconomists as to what constitutes the best model of aggregate supply. There is a variety of models of aggregate supply, but the basic phenomenon that has to be explained - the apparent slow adjustment of output to changes in demand - is widely agreed upon. All modern models, however different their starting points, tend to reach a similar result, that in the short run the aggregate supply curve is positively sloped, but in the long run it is vertical.

The basic short-run aggregate supply equation is

$$Y = \mathrm{Y} + \alpha(P - P^e) \ (\alpha > 0), \text{ where}$$

Y is output,

Y is the natural output,

P is the price, and

P^e is the expected price level.

This equation states that output deviates from its natural rate when the price level deviates from the price level that people anticipate. The parameter α indicates how responsive output is to unexpected changes in the price level; $^1/_\alpha$ is the slope of the aggregate supply curve. The position of the aggregate supply curve depends upon P^e. The *SRAS* curve intersects the *LRAS* curve at a price level equal to P^e, so a higher value of P^e shifts the aggregate supply curve upward (Figure 1).

3. Most of the aggregate supply models are based on price/wage stickiness and information imperfectness in the goods and labour markets. Several explanations have been offered for the basic fact that the labour market does not adjust quickly to shifts in aggregate demand: the imperfect information market clearing approach; coordination problems; efficiency wages and costs of price changes; and contracts and long-term relationships between firms and workers. All tend to point in the same direction, a positively sloped short-run supply curve and a vertical long-run supply curve.

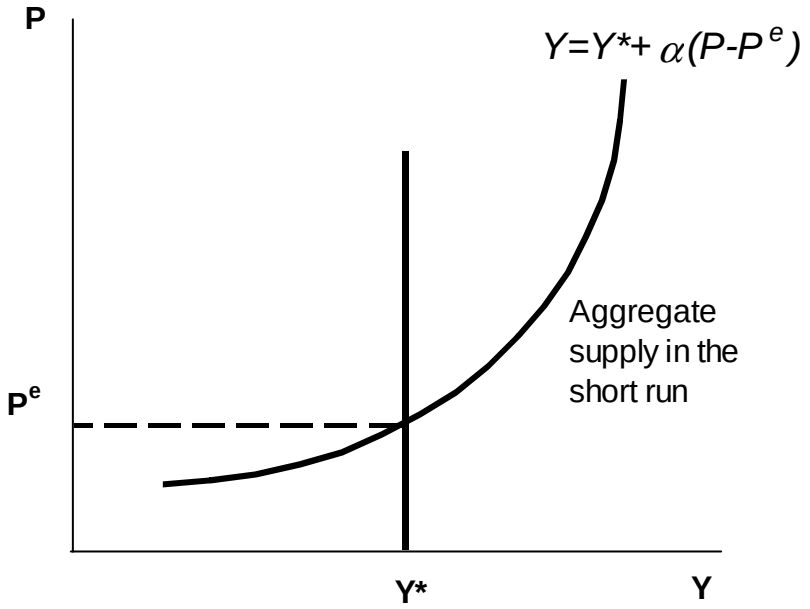


Figure 1

4. In the 1960s Milton Friedman and Edmund Phelps developed models in which, when nominal wages go up because price have risen, workers mistakenly believe, their real wage has risen and are willing to work more. Thus, in the short-run, until workers realize that the higher nominal wage is merely a result of a higher price level, an increase in the nominal wage is associated with a higher level of output and less unemployment. In these models the slow adjustment of wages arises from workers' slow reactions to or imperfect information about changes in prices.

5. Another application of positively sloped short-run supply curve is based on the fact that producers may be unable to distinguish perfectly between shocks to their own price and shocks to the general price level. When prices exceed expected prices, suppliers infer that the relative prices of the goods they produce have risen, which induces them to raise their output.

6. Robert Lucas examined data for many different countries and found that the slope of the aggregate supply curve should depend on the variability of aggregate demand. Lucas noted that changes in aggregate demand have the biggest effect on output in those countries where aggregate demand and prices are most stable. The aggregate supply curve in this case is relatively flat.

Comparisons of different countries support that in countries with low average inflation the short-run aggregate supply curve is relatively flat: fluctuations in aggregate demand have large effects on output and are slowly reflected in prices. When inflation is higher, the costs of fixing nominal prices in advance will be greater, so individual firms' prices will tend to be more flexible. The aggregate supply curve will be steeper.

7. In 1958, the economist A.W.Phillips noted that there was an inverse relationship between the inflation rate and unemployment rate. This relationship became known as the **Phillips curve** and specified as follows:

$$\pi = \pi^e - \beta(u - u^*) + \varepsilon,$$

where π is inflation, π^e is expected inflation, u^* is the natural rate of unemployment, u is unemployment, ε is supply shock.

The Phillips curve and the aggregate supply curve express essentially the same relationship. We can derive the Phillips curve from the aggregate supply equation (using Okun's law) and replacing price level with inflation). The Phillips curve is merely a convenient way to express and analyze aggregate supply.

8. To make the Phillips curve useful for analyzing the choices facing policymakers, we need to say what determines **expected inflation**. One possibility is that people form their expectations of inflation based on

recently observed inflation. This is known as **adaptive expectations**. For example, $\pi^e = \pi_{-1}$, where π_{-1} is last year inflation, then

$$\pi = \pi_{-1} - \beta(u - u^*) + \varepsilon.$$

The first term in this equation, π_{-1}, implies that inflation is inevitable. That is, if unemployment is at its natural rate and if there are no supply shocks, prices will continue to rise at the prevailing rate of inflation. Thus inertia arises because past inflation influences expectations of future inflation and because these expectations influence the wages and prices that people set.

Another possibility is that people base their forecasts on all available information and come up with the best possible prediction. This is known as **rational expectations**.

The second and third terms in the Phillips curve show the two forces that can change the rate of inflation: the deviation of unemployment from its natural rate (demand-pull inflation) and supply shocks (cost-pull inflation).

The Phillips curve shifts upward or downward if expected inflation changes.

9. **The policymakers can manipulate aggregate demand to choose a combination of inflation and unemployment in the short run**. For example, by using expansionary monetary and fiscal policies policymakers could increase inflation and decrease unemployment in the short run. Such a policy would work by increasing prices above their expected level.

The expansion of aggregate demand may temporarily increase profits and therefore output and unemployment (from point *A* to *B*). But point *B* is not a stable equilibrium position according to the **adaptive expectations** theory. Workers will recognize that their real wages have fallen. They will demand and receive nominal wage increases, reducing profits and thereby negating the short-run stimulus to production and employment (from *B* to *C*). Consequently, the short-run Phillips curve shifts upward. The new Fillips Curve will exist at the higher expected rate of inflation (Figure 2).

10. **The rational expectation theory** contends that business and workers generally understand how the economy functions and effectively use available information to protect their own self-interests. They understand how government policies will affect the economy and anticipate these impacts in their own decision making. When government invokes expansionary policies, workers anticipate inflation and incorporate this expected inflation into their nominal wage demands. In this case even the temporary increases in profits, output, an employment will not occur. The movement will be directly from *A* to *C* in Figure 2.

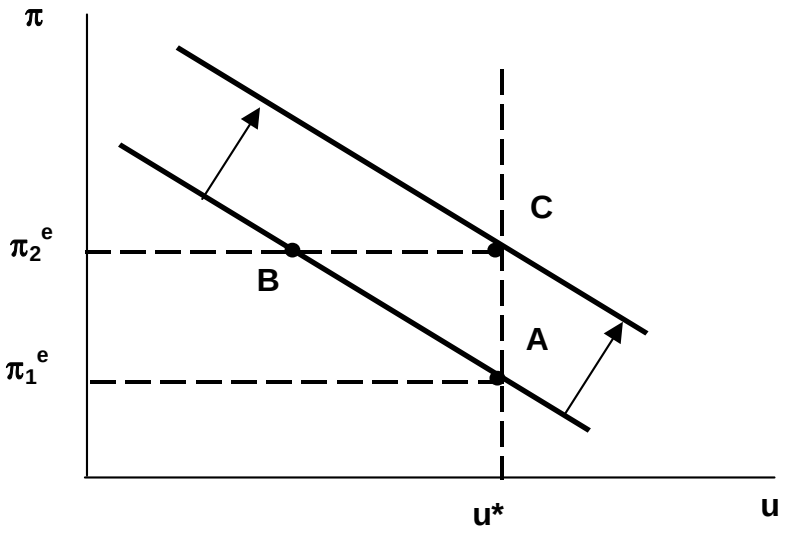


Figure 2

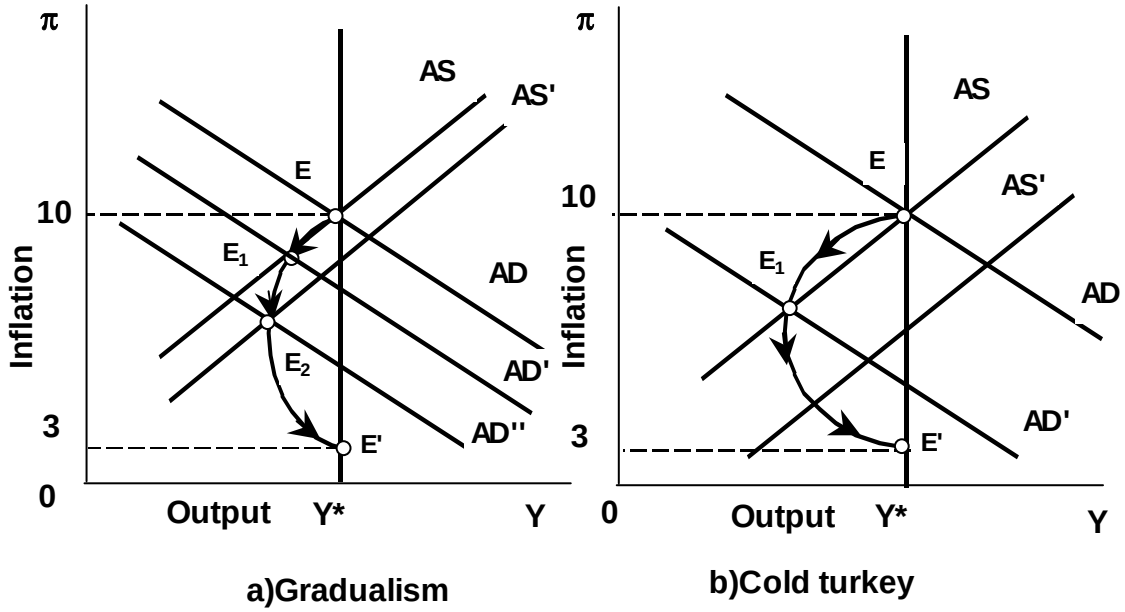
11. Because people adjust their expectations of inflation over time, this tradeoff between inflation and unemployment holds only in the short run. The policymaker cannot keep inflation above expected inflation rate forever: expectations eventually adopt to whatever inflation rate the policymaker chooses. In the **long run** unemployment returns to its natural rate, and there is **no tradeoff between inflation and unemployment** (Figure 2).

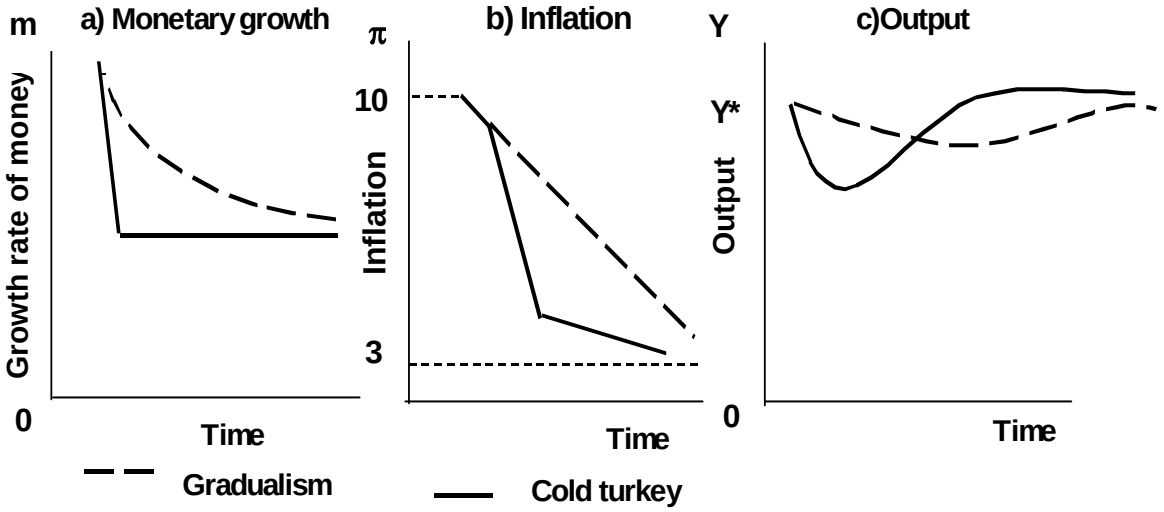
12. If policymakers wish to decrease inflation, we know from the long-run analysis that they must decrease the growth rate of the money supply. In the short run such a monetary contraction will cause a recession. The percentage of a year's GNP necessary to reduce inflation by 1 percentage point is called the **sacrifice ratio**. Accordingly to the theory of rational expectations, under a credible policy, the cost of reducing inflation may be much lower than estimates of the sacrifice ratio suggest.

13. The basic method of desinflation is to reduce the growth rate of aggregate demand, that can be done by cutting back on money growth and, in the short run, by using fiscal policy. But there are alternative strategies for desinflation. A policy of **gradualism** attempts a slow and steady return to low inflation. It produces much less unemployment buy also much less rapid reduction in the inflation rate. The **cold turkey** strategy tries to cut the inflation rate fast. It cuts the growth rate of money sharply, producing much lower inflation at the cost of a massive but shorter recession.

14. Supply-side economists assert that demand-side policies are ineffective and does not come to cope with stagflation. Changes in aggregate supply (shifts in the long-run *AS* curve) are the "active" force in determining both the levels of inflation and unemployment. Supply-side policies of employment and training programs, procompetition policies, tax reforms.

Based upon **the Laffer Curve**, supply-side adherents advocate tax cuts because lower tax rates will stimulate incentives to work, save and invest, and innovate, thereby triggering a substantial expansion of national output and income. This enlarged tax base will sustain tax revenues even though tax rates are lower. Second, tax base will increase because tax avoidance and evasion decline.




m
a) Monetary growth
Growth rate of money
0
Time
Gradualism
π
b) Inflation
10
Inflation
3
Time
Cold turkey
Y
c)Output
Y*
Output
0
Time

Lecture 14. Macroeconomic Policy Issues.

1. Keynesians and monetarists have substantially different views as to the inherent stability of the economy. They also have important ideological differences, particularly with respect to the role of the government.

2. **The Keynesian view** is that the market system is largely noncompetitive and is therefore permissive of macroeconomic instability. Keynesians argue that the economy experiences frequent shocks to aggregate demand and aggregate supply. Unless policy-makers use fiscal and monetary policy to stabilize the economy, these shocks will lead to unnecessary and inefficient fluctuations in output, unemployment, and inflation. An activist stabilization policy, centered upon fiscal policy, is registered to remedy this shortcoming.

The monetarist view is that markets are highly competitive and conductive to macroeconomic stability. Monetarists blame bad economic practices for large and inefficient fluctuations we have sometimes experienced. They argue that the economic policy should not try to "finetune" the economy. Instead, economic policymakers should recognize their limitations and be satisfied if they do no harm.

3. To **keynesians** the basic determinant of real output, employment, and the price level is the level of aggregate expenditures. Hence, their basic equation is

$$Y = C + I + G + X_n.$$

The components of aggregate expenditures are determined by a wide variety of factors which, for the most part, are unrelated to the supply of money.

Monetarism focuses upon the equation of exchange:

$$MV = PV.$$

The left side of the equation, MV, represents the total amount spent by purchasers of output, while the right side, PY, represents the total amount received by the sellers of that output. Because MV is the total amount spent on final goods in one year, it's necessary equal to nominal GNP. In short, MV is the monetarist counterpart of $C + I + G + X_n$. In a very real sense, the two approaches are two ways of looking at the same thing.

4. **The Keynesian position** is that because a) government spending is a component of aggregate expenditures and b) tax changes have direct and dependable effects upon consumption and investment, fiscal policy is a powerful stabilization tool.

Monetarists argue that fiscal policy is weak and uncertain in its effects. In particular, unless financed by an increase in the money supply, deficit spending will raise the interest rate and thereby crowd out private investment spending.

5. **Keynesians** argue that monetary policy entails a lengthy transmission mechanism, involving monetary policy decisions, bank reserves, the interest rate, investment, and finally the nominal GNP. Uncertainties at each step in the mechanism limit the effectiveness of monetary policy. Money matters, but its manipulations through monetary policy is not as powerful a stabilization device as is fiscal policy.

Monetarists believe that the relative stability of $\boldsymbol{V}$ indicates a rather dependable link between the money supply and the nominal GNP.

The rational expectations theory (RET) is a version of the **"new" classical economics.** According to the RET, policy is ineffective, not because of policy errors, but because of the reaction of the public to the expected effects of these policies. The monetarists are saying that discretionary policy doesn't work because the monetary authorities do not have enough information about the economy. RET supporters claim that discretionary policy is ineffective because the public has considerable knowledge concerning policy decisions and their impacts. The monetarists base their argument on "ignorance"; RET bases its conclusion on "knowledge".

6. The main difficulties for choice in macroeconomic policy:
   1) lags in the implementation;
   2) imperfect economic information;
   3) instability of economic expectations;
   4) contradictory interpretations of economic history.

7. Monetary and fiscal policy influence the economy only after substantial lags, and the lags vary in length. These long and variable lags make attempts to stabilize the economy more difficult.

The **inside lag** is the time between a shock to the economy and the policy action responding to that shock. This lag arises because it takes time for policymakers both to recognize that a shock has occurred and to put appropriate policies into effect. **Fiscal policy** has a long inside lag, because changes in spending or taxes require the approval of the president and of the parliament.

The **outside lag** is the time between a policy action and its influence on the economy. This lag arises because policies do not immediately influence spending, income, and employment. **Monetary policy** has a long outside lag because it works through interest rates, which in turn influence investment.

8. A fundamental difficulty with good policymaking is that it depends upon the ability to forecast future economic events. The large-scale **macroeconomic models** help predict the behavior of key economic variables, such as output, unemployment rate, inflation rate, and so on. But many events that have a significant effect on the economy are inherently unpredictable.

The **index of leading indicators** provides some information of the future performance of the economy. This is a set of 11 data series that have historically been a good guide to future economic behavior.

9. Expectations play a crucial role in the economy because they influence the behavior of consumers, investors, and other economic actors. People's expectations depend on many things, including the economic policies being pursued by the government. Estimating the effect of a policy change on the economy therefore requires knowing how people's expectations will respond to the policy change.

The economist **Robert Lucas** has criticized the use of the traditional economic and econometric models for the evaluation of economic policy. Lucas argues, it is misleading to use standard models for policy evaluation unless we take account of the effects of policies of expectations.

Another implication of the Lucas critique is that we need to be careful to recognize that some of the basic equations of the models might also change when policy changes. These changes make attempts to stabilize the economy more difficult.

Lucas critique: the argument that traditional policy analysis doesn't adequately take into account the impact of policy changes on people's expectations.

10. One way to help decide if policy should be active or passive is to try to determine whether stabilization policies were successfully pursued in the past. Macroeconomists often look to historical data to answer this question.

Any judgement about whether government policy should play an active role in the economy must rely largely on how one evaluates the historical record. One's view of stabilization policy should be influenced by whether policy has historically been stabilizing or destabilizing.

But the historical record permits more than one interpretation. Disagreements over history arise because it is not easy to identify the sources of economic fluctuations. So history doesn't settle the debate over stabilization policy.

11. Even if economists agreed upon the desirability of active stabilization policies, they would probably still disagree about exactly how policy should be conducted. One possibility is **discretionary policy**, whereby policymakers respond to changing economic circumstances. Another possibility is a **policy rule**, whereby policymakers commit themselves in advance to follow a particular policy.

There are a number of reasons for favouring policy rules. Sometimes the governments use macroeconomic policy to help their reelection chances. Under these circumstances, simple fixed rules may do the least harm. In addition, a fixed policy rule may be more **credible**, and so ultimately better. Moreover, a risk of incompetence in macroeconomic policy decreases under policy rules.

12. **Rules for fiscal policy:**
    1) annually balanced budget;
    2) cyclically balanced budget;
    3) functionally balanced budget.

13. Most economists oppose a strict rule requiring the government to balance its budget annually. Three considerations lead them to believe that a budget deficit or surplus is sometimes appropriate:
    1) A budget deficit or surplus can help stabilize the economy. A balanced-budget amendment would eliminate the automatic stabilizers and so exacerbate economic fluctuations.
    2) A budget deficit or surplus can be used to minimize the distortion of incentives caused by the tax system.
    3) A budget deficit can be used to shift a tax burden from current to future generations.

14. Various **rules for monetary policy** have been proposed. Perhaps the simplest and the most famous is the view, that the **growth rate of the money supply** should be kept **constant**.

The second possible policy rule is a **nominal GNP target**.
The third possible policy rule is an **interest rate target**.
The government can put its aggregate demand policy into effect with either monetary or fiscal policy.

Lectures 15-16. The Theory of International Trade

1. Why do nations trade? What is the basis for trade between nations? **International trade** is a means by which nations can specialize, increase the productivity of their resources, and thereby realize a larger total output than otherwise.

Two points should be taken into account. **First**, the distribution of economic resources - natural, human, and capital goods - among the nations of the world is quite uneven. **Second**, the efficient production of various goods requires different technologies or combinations of resources. It is important to emphasize that the economic efficiency with which nations can produce various goods can and does change over time.

2. International trade is more complicated than trade within a nation because of:
   a) political factors,
   b) different national currencies, and
   c) impediments to the movement of labor and capital across national borders.

3. **The case of absolute advantage**. One country is said to have an absolute advantage over another in the production of a particular good if it can produce that good using smaller quantities of resources than can the other country - for example good Y in the country A and good X in the country B (Figures 1 and 2). The relative prices of the two goods are determined by relative costs (1Y = 0.5X in the country A and 1Y = 2.5X in the country B). If there is no trade between nations, the maximum volumes of consumption in both countries are showed by the production-possibilities curves - the bold lines in Figures 1 and 2 (to facilitate our analysis we assume that opportunity costs stay constant).

But as long as prices differ in two countries (by more than any cost of transportation between the countries), there is a way to profit by trading. When trade between nations is opened, the directions of trade are determined by differences in the opportunity costs. Country A will export good Y and import good X, and country B will export good X and import good Y. Both countries gain:
   1) from changes in consumption structure and
   2) from specialization in their production.

The new international price ratio must lie somewhere between the no-trade price ratios in the two countries (0.5X < 1Y < 2.5X). If international price ratio is for example 1X = 1Y, then the maximum volumes of consumption may by showed by the trade lines (dotted lines in Figures 1 and 2). As a result both countries can reach the level of consumption unachievable without trade (for example, point A' for the country A and point B' for the country B).

4. **The case of comparative advantage**. Countries gain from trade whether or not they have any absolute advantage. One country is said to have **a comparative advantage** over another in the production of a particular good relative to other goods it can produce if it produces that good least inefficiently as compared with the other country. A nation gains from trade exporting the goods or services in which it has its greatest comparative advantage in productivity and importing those in which it has the least comparative advantage. Total output will be greatest when each good is produced by the nation which has the lower opportunity cost.

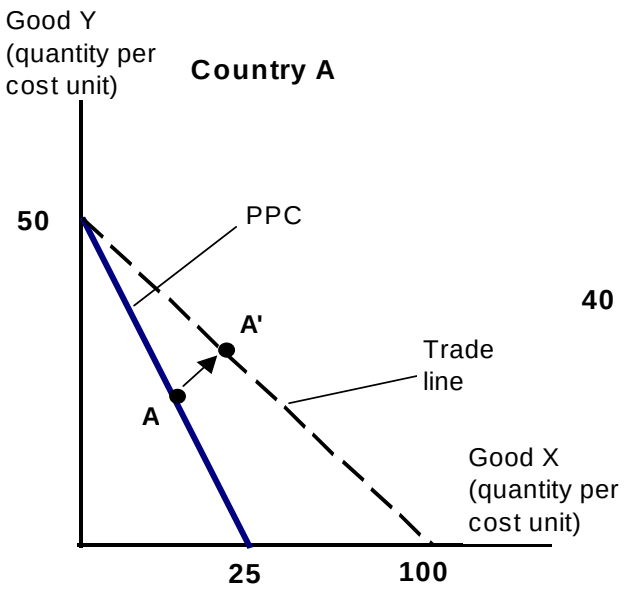


Figure 1

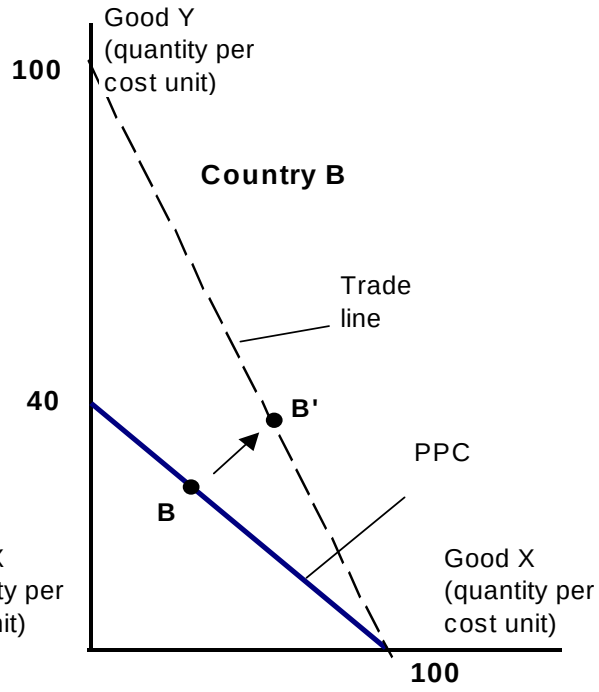


Figure 2

Comparing the absolute-advantage and comparative-advantage cases reveals a startling fact: the two cases show the gains from trade in exactly the same way (Figures 3 and 4). What matters is that before trade the two countries had different price ratios. It didn't matter why they differed. The gains from trade, and the direction of trade, arose from differences in the opportunity costs of each final good (the difference in the slopes of the production-possibilities curves).

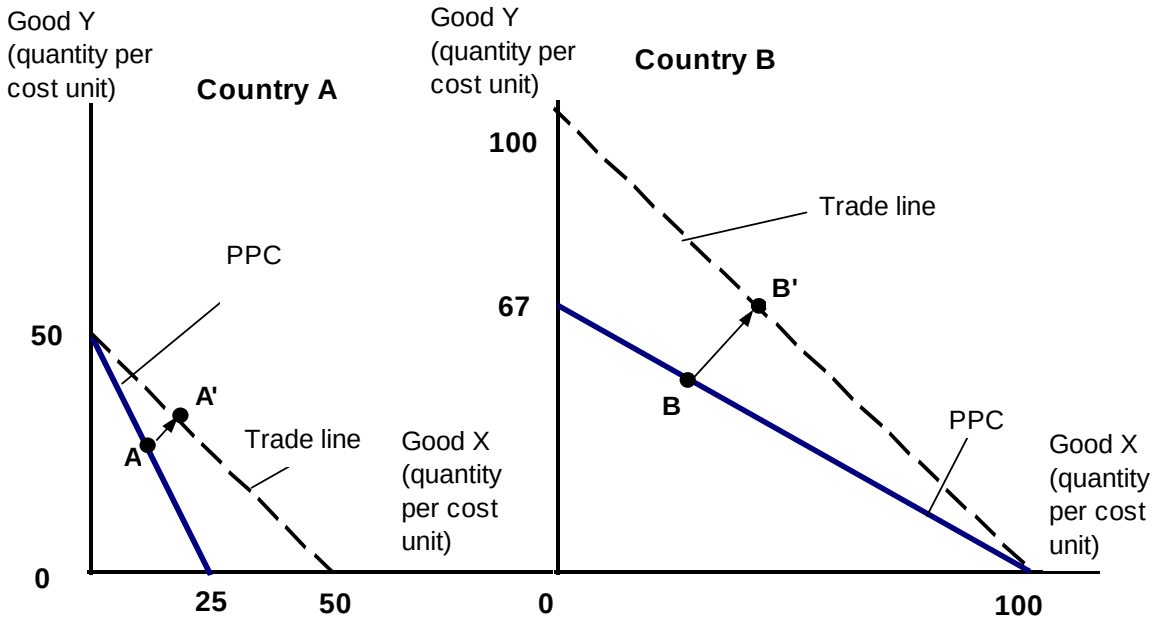


Figure 3

Figure 4

5. Under conditions of **increasing opportunity costs**, trade has the same basic effects as when constant costs were assumed. Both countries still stand to gain from trade in the aggregate, and both tend to respond to trade opportunities by specializing more on producing their comparative-advantage products. But under conditions of increasing costs (1) countries tend to specialize incompletely, and (2) marginal costs are bid into equality between countries.

Suppose, as in our previous constant-cost illustration, that countries A and B are at positions on their production-possibilities curves where their cost ratios are initially 1Y = 0.5X and 1Y = 2.5X respectively. But now resources are not longer perfectly shiftable between alternative uses, as the constant-cost assumption implied. That's why as country A begins to specialize in good Y and expands its production, its 1Y = 0.5X

cost ratio will *fall*; that is, it will have to sacrifice more than 0.5 units of X to get 1 additional unit of Y. Similarly, country B expands production of good X. But as it does, it will find that its 1Y = 2.5X cost ratio begins to *rise*.

Hence, a point will be reached at which the cost ratios are equal in the two nations. At this point the underlying basis for further specialization and trade - differing cost ratios - has disappeared, and further specialization is therefore uneconomic.

6. International differences in comparative advantages and in the shape of production-possibility curves stem largely from the facts, that

1) different goods use the factors of production in different ratios and
2) nations differ in their relative factor endowments.

Building on these two facts, **the Heckscher-Ohlin theory** of trade patterns predicts the nations will tend to export the goods requiring for their production much of abundant factors of production and little of scarce factors in exchange for gods that call for factors in the opposite proportions. Thus indirectly, factors in abundant supply are exported and factors in scanty supply are imported.

The Heckscher-Ohlin theory explains some trade patterns quite well. Countries tend to export goods that intensively use their relatively abundant factors. However the industrial countries are becoming more similar in their factor endowments. Meanwhile, international trade has been slowly drifting toward trade among similar countries and toward trade in similar goods rather than trade between very different industrial sectors.

7. The opening of international trade brings **a net gain to consumers**. This results from reduction in prices. The net consumers' gain equals areas $a + b + d$ (Figure 5).

It turns out that what consumers of the importable good gain from opening trade is clearly greater in value than what the import-competing **producers lose**. Area a is a loss of producer surplus.

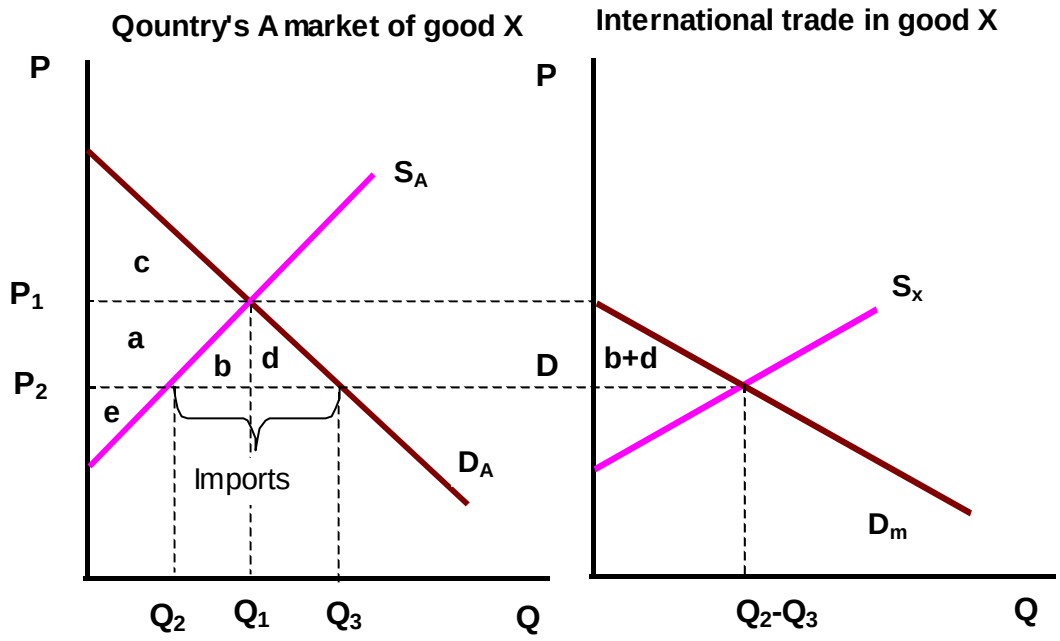


Figure 5

The net national gains from trade (areas $b + d$) equal a simple measurable function of the volume of trade created and the change in prices caused by trade.

The gains from opening trade are divided internationally in direct proportion to the price changes that trade brings to the two sides: it depends only on whose prices changed more since the gains of both sides are tied to the same quantity of trade. If a country A's
price ratio changes x percent and the price in the country B changes y percent, then

$$\frac{Country's\ A\ gains}{Country's\ B\ gains} = \frac{x}{y}$$

8. **The terms of trade** is the price of country's exports divided by the price of its imports, or P_x/P_m. The terms of trade determine how the increase in world output due to specialization is shared by the trading nations. Generally, a rise in the terms of trade increases a country's welfare, while a decline in the terms of trade reduces its welfare. The change in the terms of trade can be used as a measure of changes in competitiveness of the national economy.

Another measure of competitiveness are **"unit labor costs"**. It can be expressed as the ratio of labor-related expenses (measured in dollars) to the productivity of labor (the latter term is defined as the number of units of output produced *per* employee).

Domestic resource cost is the opportunity cost of using a factor of production to produce one unit of output, divided by the international value added by producing that unit.

9. Comparative advantage in the modern world is dynamic and leadership is increasingly shared among many industrial countries with similar incomes and similar factor endowments. The similarity of the industrial economies would suggest that there is less reason for trade among them. But the trade has not declined as a share of world product. A greater and greater share of world trade consists of **intra-industry trade**.

Economies of scale and imperfect competition help to explain the rise of modern intra-industry trade.

Trade need not be the result of comparative advantage. Instead, it can result from **increasing returns** or **economies of scale** - that is, from a tendency of costs to be lower with larger output. Economies of scale give countries an incentive to specialize and trade even in the absence of differences between countries in their resources or technology.

Economies of scale normally lead to a breakdown of perfect competition, so that trade in the presence of economies of scale must be analyzed using models of **imperfect (monopolistic) competition**. In monopolistic competition, equilibrium is affected by the size of the market: a large market will support a larger number of firms, each producing at larger scale and thus at lower average cost, than a small market.

International trade allows creation of an integrated market that is larger than any one country's market, and thus makes it possible simultaneously to offer consumers a greater variety of products and lower prices.

In the monopolistic competition model, trade may be divided into two kinds. Two-way trade in differentiated products within an industry is called **intra-industry trade**; trade that exchanges the products of one industry for the products of another is called **inter-industry trade**. Intra-industry trade reflects economies of scale, inter-industry trade reflects comparative advantage.

10. International trade is almost sure to divide society into **gainers-from-trade** and **losers-from-trade** because changes in relative commodity prices are likely to raise the rewards of some factors of production at the expense of others.

Short-run effects on prices and outputs. Any move toward freer trade makes different nations' price ratios converge. The structure of output will change and the trade will expand until the price difference is gone.

Factor demand change. Shifts in output mean shifts in the demand for factors of production. The expanding sectors will try to use more resources, and the contracting sectors will lay off workers, use less capital and rent less land. As a result, for the short run gains and losses divide by output sector: all groups tied to rising sectors gain and all groups tied to declining sectors lose.

The Stolper-Samuelson theorem: opening trade and raising the relative price of the exportable good bring clear income gains to the factor of production used intensively in the exportable industry; they also bring clear income losses to the factor used intensively in the import-competing industry.

Lectures 17-18. Trade Policy.

1. **Trade policy** - tariffs, export subsidies, import quotas, and other means a government may employ to reduce imports and expand exports.

The most widely used trade barrier is the **tariff** - a tax imposed on an imported good. Protective tariffs increase the domestic prices of imported goods.

Domestic price of imported good = World price + (World price x Tariff rate)

Tariff

2. **The effect of a tariff.**

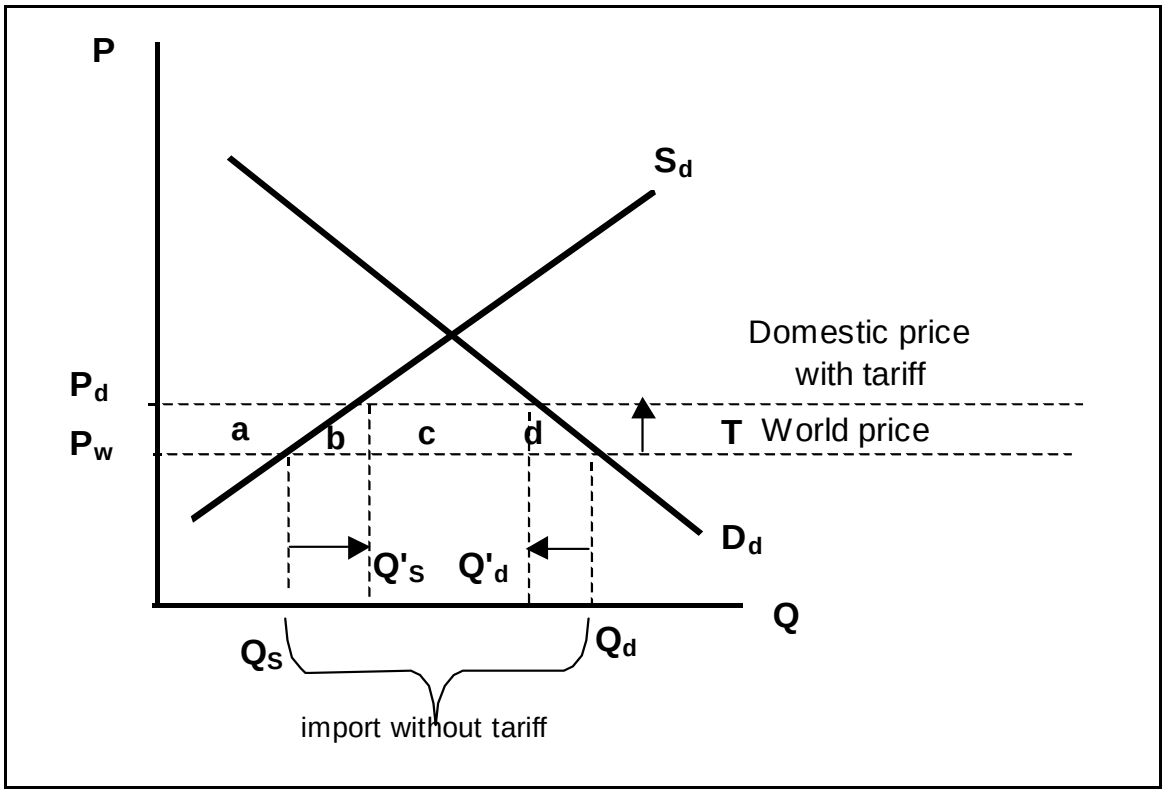


Figure 1

When the tariff is imposed, imports reduce till $Q_s'Q_d'$, domestic output increases from Q_s to Q_s', and domestic consumption decreases from Q_d to Q_d'(Figure 1).

Consumers are clearly injured by the tariff, because the tariff makes them pay more on the domestic product as well as on imports. The net loss to consumers from the tariff is areas $a + b + c + d$. Domestic producers, however, enjoy higher prices and enlarged sales. Producers' gain from tariff is area a.

As long as the tariff is not so high as to prohibit all imports, it also brings revenue to the government (area c). This gain could take any of several forms. It could become extra government spending on socially worthwhile projects or it could be matched by an equal cut in some other tax, such as the income tax and so on.

A tariff leads to deadweight losses that are net social costs: overproduction by domestic firms whose marginal cost exceeds the world price, and underconsumption by consumers whose marginal benefit exceeds the world price. The net national loss from the tariff is areas $b + d$.

3. Net national loss from tariffs is not likely to be great. The range of welfare gains from freer trade is between -1 percent of GNP and +10 percent of GNP. The largest gains came when the barriers were (1) high and (2) to be removed completely.

A tariff on imports clearly lowers national well-being. It costs consumers more than it benefits producers and the government, which collects the tariff revenue. The tariff thus redistributes income from consumers of the imported product toward others in society.

4. The strongest arguments for protection are the infant-industry and military self-sufficiency arguments. Other arguments for tariffs (increase domestic employment, diversification for stability, etc.) are usually second-best solutions. A production subsidy or consumption tax would achieve the objective at lower social cost. In case of the production subsidies consumers do not lose the additional area *d* (Figure 2).

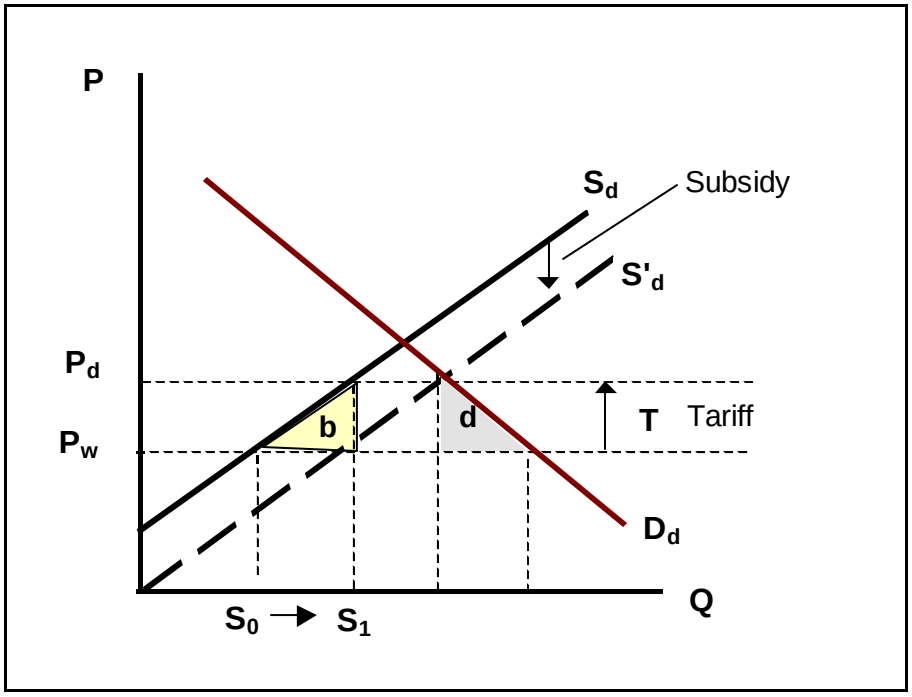


Figure 2

5. Tariffs are not the only form of trade policy. The most prevalent nontariff trade barrier is the **import quota**, a limit on the total quantity of imports allowed into a country each year. The government gives out a limited number of licenses to import items legally and prohibits importing without a license. The government can auction off import licenses, they can also be allocated on the basis of fixed favoritism to some firms, or of the resource-using application procedures, when people compete for licenses in a nonprice way.

As long as the quantity of licensed imports is less than the quantity that people would want to import without the quota, the quota not only cuts the quantity imported but also drives the domestic price of the good up above the world price. In this respect, it is similar to the import tariff.

There are several reasons why governments have often chosen to use quotas rather than tariffs as a way of limiting imports:

- quotas ensure that the quantity of imports is strictly limited, thus facilitating the planning of the balance of payments;
- quotas give government officials greater administrative flexibility and power.

The welfare effects of the quota are equivalent to those of a tariff under competitive conditions. The net national loss is again areas *b* and *d* (Figure 3). The import quota turns out to cost the nation more than the equivalent tariff if the quota creates a domestic monopoly.

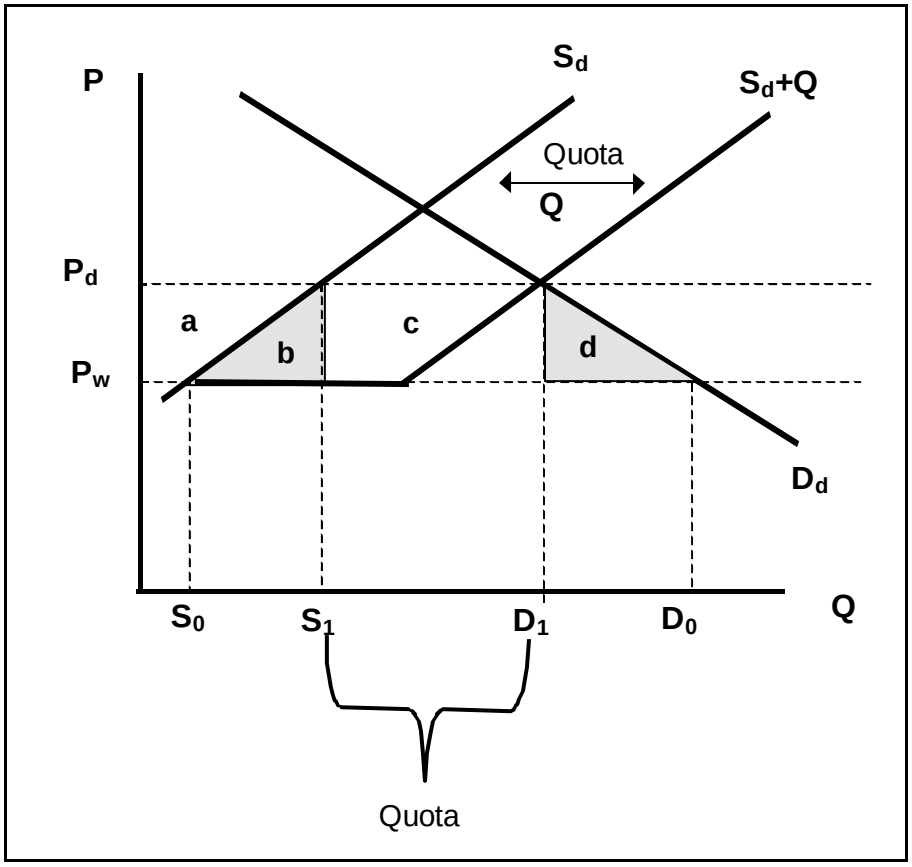


Figure 3

6. The analysis of **export quotas (voluntary export restraints)** and **export duties** should be a mirror image of the analysis of import barriers. An export duty hurts exporting producers more than it helps consumers or gives revenue to the government, leaving a net cost to the nation, if the nation faces a fixed world price for its exports.

Voluntary Export Restraints (VERs) mean that foreign exporters administer their own quota system limiting sales to a particular importing country. The effects of VERs on the importing country are more negative than even import quotas. Instead of collecting either tariffs or quota-license auction revenues, the government lets the foreign suppliers pocket the full markup of prices in this country over world prices.

7. Countries also use **export subsidies**. This can vary from cheap credit to exemption from certain domestic taxes. GATT proscribes export subsidies as "unfair competition", and allows importing countries to retaliate with protectionist "countervailing duties". By causing excessive trade, export subsidies bring losses to the country making the subsidy and to the world. A countervailing import duty against subsidized exports brings a loss to the country levying it but brings gains to the world by offsetting the export subsidy.

8. **Non-tariff barriers** are administrative regulations that discriminate against foreign goods and in favor of home goods (specific standards, sanitary restrictions, etc.).

9. History records many attempts at international **cartels**, or international agreements to restrict selling competition. A cartel is an agreement among exporters to control production and to get better prices. The most successful exercise of cartel power in history is the victory of OPEC in late 1973.

If international cartels are able to act like unified monopolists, they can reap large gains at the expense of buying countries and world efficiency. Their ability to do so is proportional to the inelasticity of world demand for their exports. This dependence of buying countries on a cartel's exports can, in turn, be linked to four factors:

- the elasticity of world demand for the cartel's product;
- the elasticity of competing supply;
- the cartel's share of the world market;
- the share of cartel's sales, consisting of sales by small cartel members, who are likely to feel a strong incentive to behave competitively despite their cartel membership.

These factors work increasingly against the cartel over time.

10. **Dumping** is international price discrimination in which an exporting firm sells at a lower price in a foreign market than it charges in other (usually its home-country) markets. Dumping occurs when firms have greater monopoly power in one national market, usually their home country, than in others. Under pressure from import-competing firms, the government of importing countries have often levied antidumping tariffs when given evidence that the foreign supplier is dumping. A small antidumping tariff can bring national gains, but a large tariff is bad for the nation because it will cause an increase in the price level and restrict the force of competition.

11. Some import barriers are meant to discriminate. They tax goods, services or assets from some countries more than those from other countries. This is the case of **a customs union**, in which member countries adopt a uniform external tariff and remove all tariffs and quotas on trade among themselves. The national and world gains from a customs union are tied to trade creation (the volume of new trade created by forming the trade block), and their losses are tied to trade diversion (the volume of trade diverted from lower-cost outside suppliers to higher-cost partner-country suppliers).

There are three tendencies that make for greater gains from a custom union:

a) the more elastic the import demand, the greater the gains;

b) the greater the difference between the home-country and partner-country costs, the greater the gains;

c) the smaller the difference between the partner-country and outside-world costs, the greater the gains.

12. Another form of trade discrimination is **economic sanctions**, such as a **trade embargo**. Figure 4 imagines effects of an embargo for embargoing countries and the target country (on the graph: S_w - world export supply before embargo; S_n - export supply from non-embargo countries; *F* - free-trade equilibrium; *E* - the embargo equilibrium). Moving from free trade to an embargo means: embargoing countries lose area *a*; the target country loses areas *(b + c)*; other countries gain area *b*; world as a whole loses areas *(a + c)*.

Success of such economic warfare is more likely when the countries imposing embargo have high trade elasticities, meaning that they can easily do without the extra trade. Success is also more likely when the target country has low trade elasticities, meaning that it cannot easily do without trading with the embargoing countries. Embargoes are typically imposed by large trading countries on smaller ones, and success is more likely the quicker and more extreme the sanctions.

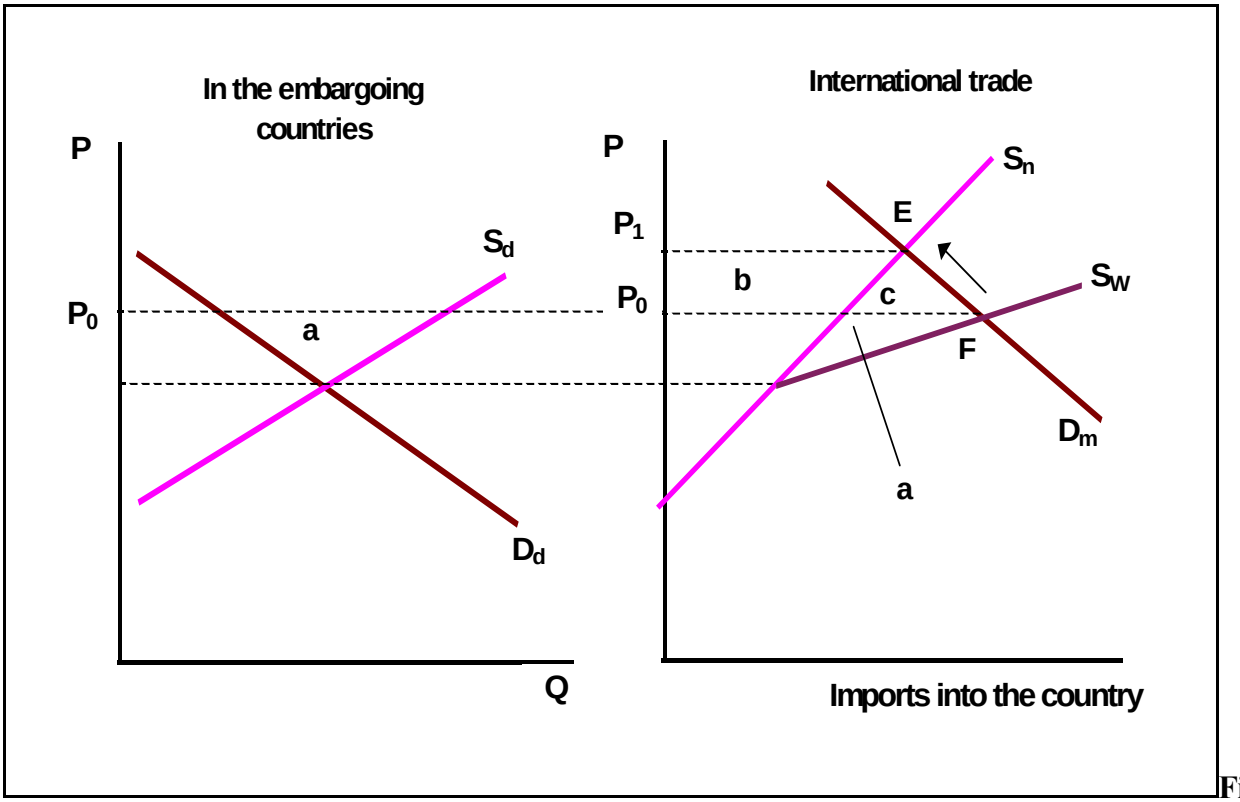


Figure 4

13. Tariffs have fallen substantially in the industrial countries since the Second World War. At the start of the 1980s tariff levels throughout the world economy were probably as low as they had ever been. Economic integration is an important means of liberalizing trade. But in recent years there has been a resurgence of protectionist pressures (especially quotas and voluntary export restraints).

Lecture 19. Balance of Payments.

1. **Balance of payments** is a balance sheet of all the transactions between households, firms and government of a given country and the rest of the world for a certain accounting period. All the transactions between a given country and the rest of the world include current transactions and capital ones. So balance of payments consists of three parts:

1) **current account**;
2) **capital account**;
3) **change in official reserves**.

BALANCE OF PAYMENTS' COMPOSITION

I. Current account	
1. Merchandise exports	2. Merchandise imports
Balance of trade	
3. Exports of services	4. Imports of services
5. Net investment income	
6. Net transfers	
Current account balance (CAB)	
II. Capital account	
7. Capital inflows	8. Capital outflows
Capital account balance	
Current and capital account balance (overall balance)	
III. Change in official reserves	

2. **Current account** includes exports of goods and services with a **plus** sign, imports of goods and services with a **minus** sign, net investment income and net transfers. **Trade balance** refers to the difference between a country's merchandise exports and merchandise imports.

Merchandise exports (and other export-type transactions) are **credits** in that they create or earn supplies of foreign exchange. Conversely, **merchandise imports** (and other import-type transactions) are **debits** in that they use up foreign exchange.

Net investment income represents the excess of interest and dividend payments which foreigners have paid us for the services of our exported capital over what we paid in interest and dividends for foreign capital invested in our country.

Net transfers include foreign aid, pensions paid to our citizens living abroad, and remittances of immigrants to relatives abroad.

3. When a nation incurs a deficit in its current account, this means that its expenditures for imports exceed the income received from its exports. The nation can finance its deficit by borrowing from abroad (that is, by going into debt) or by selling off some of assets as reflected in the capital account. These transactions lead to a decrease of the **net foreign assets (NFA).**

Net foreign assets (NFA) is the foreign assets which are in national ownership minus domestic assets which are in foreign ownership.

4. The **capital account** reflects capital flows involving the purchase or sale of real and financial assets.

Sales of real and financial assets generate supplies of foreign currencies in national banks. Conversely, purchases of foreign assets use up supplies of foreign currencies. So the capital account balance shows net flows of foreign currencies.

5. The current and capital accounts are interrelated; they are essentially reflections of one another. That is,

$$Y=C+I+G+X_n$$

$$\Downarrow$$

$$Y-C-G=C+I+G+X_n-(C+G)$$

$$\Downarrow$$

$S_n = I+X_n$, where S_n is national saving

$$\Downarrow$$

$$(I-S)+X_n=0$$

I - S is the excess of domestic investment over domestic saving. ***I - S* reflects the capital account balance.**

***X_n* reflects the current account balance**. The current account is the net amount we are currently receiving from abroad in exchange for our net exports of goods and services (including the net amount received for the use of our factors of production).

6. The national income accounts identity says that the capital account and the current account balance. That is,

$$X_n = -(I - S) = S - I.$$

A nation's **current account deficit** will be financed essentially by a **net capital inflow** in its capital account.

$$S - I < 0 \quad S < I \Rightarrow \textit{capital inflow} \Rightarrow X_n < 0$$

If our investment exceeds our saving, the extra investment must be financed from abroad. Foreigners must be lending to us. These foreign loans enable us to import more goods and services that we export - that is, X_n is negative ($X_n < 0$).

Conversely, if our saving exceeds our investment, the saving that does not get invested domestically is used to make loans to foreigners. They require these loans because we are providing them with more goods and services than they are providing us - that is, X_n is positive ($X_n > 0$). So a nation's **current account surplus** would be accompanied by a **net capital outflow** in its capital account. The excess earnings from its current account surplus will be used to purchase the real assets of, and to make loans to, other nations of the world.

$$S - I > 0 \quad S > I \Rightarrow \textit{capital outflow} \Rightarrow X_n > 0$$

7. The central banks of the various nations hold quantities of foreign currencies called **official reserves** which are drawn upon to settle any net differences in current and capital account balances.

A balance of payments deficit is financed by drawing down official reserves. In this case the supply of foreign exchange in the market increases although our stocks of foreign currencies reduce. This is a credit or "export-type" transaction which is designated with **plus** sign. Conversely, a balance of payments surplus results in an increase in official reserves. This would show as a minus item in the balance of payments; it is a

debit or "import-type" transaction because it represents a use of foreign exchange.

The three components of the balance of payments statement - the current account, the capital account, and the official reserves account - must sum to zero.

8. The desirability of a balance of payments deficit or surplus depends upon
   1) the events causing them, and
   2) their persistence through time.

Any nation's official reserves are limited. Therefore, persistent or long-term payments deficits, which must be financed by drawing down those reserves, would ultimately cause reserves to be depleted. In this case that nation would have to undertake specific policies to correct its balance of payments. These policies might entail painful macroeconomic adjustments, the use of trade barriers and similar restrictions, or changing the exchange rate.

9. The current and the capital accounts, and the overall balance depend on saving's and investment's determinants such as fiscal policy and the world real interest rate.

National saving depends on fiscal policy (*G* and *T*). **Expansionary fiscal policy at home reduces national saving**. This leads to a capital-account surplus and a current-account deficit.

Contractionary fiscal policy at home raises national saving. This is accompanied by a capital-account deficit and current-account surplus.

An increase in the world interest rate leads to a capital-account deficit and a current-account surplus in the small open economy. **A decrease in the world interest rate** leads to the opposite results.

10. **Crisis of the balance of payments** occurs when any nation has put off for a long time the specific policies to correct its balance of payments. As the nation's official reserves are exhausted the painful macroeconomic adjustment is the only way of settlement of the crisis.

Lecture 20. Exchange Rate.

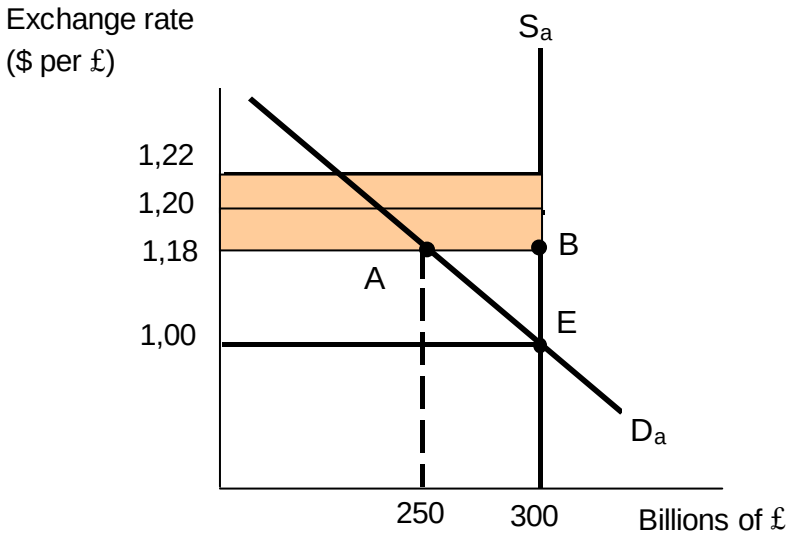
1. The **nominal exchange rate** is the relative price of the currency of two countries. When people refer to "the exchange rate" between two countries, they usually mean the **nominal** exchange rate.

2. A nation's exports create a foreign demand for national currency, and the satisfaction of this demand generates a supply of foreign monies held by national banks and available to national buyers.

Conversely, a nation's imports simultaneously create a domestic demand for foreign exchange and make a supply of national currency available to foreigners. The fulfillment of this demand reduces the supplies of foreign monies held by national banks. Generally speaking, a nation's exports earn the foreign currencies needed to pay for its imports.

3. The exchange rate is determined by supply and demand in ways affected by exchange-rate institutions. Under the **freely flexible exchange-rate system**, without government intervention, changes in price clear the market. Under the **fixed-rate system** officials buy and sell a currency so as to keep its exchange rate within an officially stipulated band. When the currency's value lies at the bottom of its official band, officials must buy it by selling other currencies or gold. When the currency's value presses against the top of its official price range, officials must sell it in exchange for gold or other currencies.

The market for pounds



In the figure sterling has weakened so that its equilibrium rate of 1.00 $/£ is below officially declared "par value" of $1.20. Officials have announced that they will support the pound at 2 percents below par, or about $1.18, and the dollar at 2 percents above par, or about $1.22. They are forced to make good on this pledge by holding 50 billion pounds instead of dollars, filling the gap *AB*. Only in this way can they bring the total demand for pounds, private plus official, up to the 300 billion of sterling money in existence.

4. The **real exchange rate** tells us the rate at which we can trade the goods of one country for the goods of another.

Let $\boldsymbol{E_N}$ be the nominal exchange rate, $\boldsymbol{P_d}$ be the price level in our country (measured in our currency), and $\boldsymbol{P_f}$ be the price level in other country (measured in foreign currency). Then the real exchange rate ***RER*** is:

$$\underbrace{RER}_{\substack{Real\\ Exchange\\ Rate}} = \underbrace{E_N}_{\substack{Nominal\\ Echange\\ Rate}} \times \underbrace{\frac{P_d}{P_f}}_{\substack{Ratio\ of\\ Price\\ Levels}}$$

The real exchange rate is the relative price of the goods of two countries. *RER* can be bilateral or effective.

The lower the real exchange rate, the less expensive are domestic goods relative to foreign goods, and

thus the greater are our net exports.

There are some different but related concepts of *RER* measurement.

The real exchange rate may be defined as relative price of tradables with respect to nontradables.

$$RER = \frac{PT}{P_N \cdot E_N},$$

where P_T - price of tradable goods;

P_N - price of nontradable goods.

The most important property of the *RER* is that it is a good proxy of a country's international competitiveness. A decline in the *RER*, or a real exchange rate appreciation, reflects an increase in the domestic cost of producing tradable goods.

In some cases *RER* is defined as relative unit labor costs.

$$RER = \frac{W^*}{W \cdot E_N},$$

where E_N - nominal exchange rate; W - domestic unit labor costs; W^*- foreign unit labor costs.

An increase in the *RER* reflects a decrease in the domestic cost of producing tradable goods and improvement of the competitiveness.

5. The exchange rate between one foreign currency and other currencies can be related to just the ***M***, the ***K***, and the ***Y***:

$$r = \left(\frac{M}{Mf}\right) \cdot \left(\frac{Yf}{Y}\right) \cdot \left(\frac{Kf}{K}\right)$$

The equation predicts that a foreign nation will have a rising currency (*r* up) if it has some combinations of slower money-supply growth $\left(\frac{M}{Mf} up\right)$, faster growth in real output $\left(\frac{Yf}{Y} up\right)$, or a rise in the ratio $\left(\frac{Kf}{K}\right)$. The ***k*** depends on home and foreign interest rates (i,i_f), expected inflation rates at home (π_e) and abroad (π_{ef}), and the home country's trade balance (*TB*).

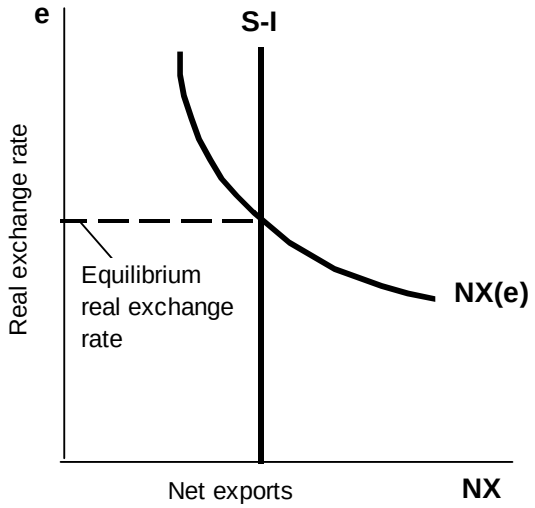
The price of a foreign currency, ***r***, should be raised by:

- a rise in the home country's money supply (*M*);
- a drop in the foreign country's money supply (M_f);
- a rise in the foreign country's real income (Y_f);
- a drop in home country's real income (*Y*);
- a rise in the foreign country's interest rate (i_f);
- a drop in the home country's interest rate (i);
- a rise in the home country's expected inflation rate (π_e);
- a drop in the foreign country's expected inflation rate (π_{ef});
- a drop in the home country's trade balance (*TB*).

6. **The purchasing-power-parity (PPP) theory** predicts that in the long run international competition will tend to equalize the home and foreign prices of any traded good or service. Countries with relatively high inflation tend to have depreciating currencies, and countries with relatively low inflation tend to have appreciating currencies, because $P_d = r \cdot P_f$ overall, where ***r*** is again the price of the foreign currency in the units of domestic currency, P_d is domestic price level, and P_f is the foreign price level.

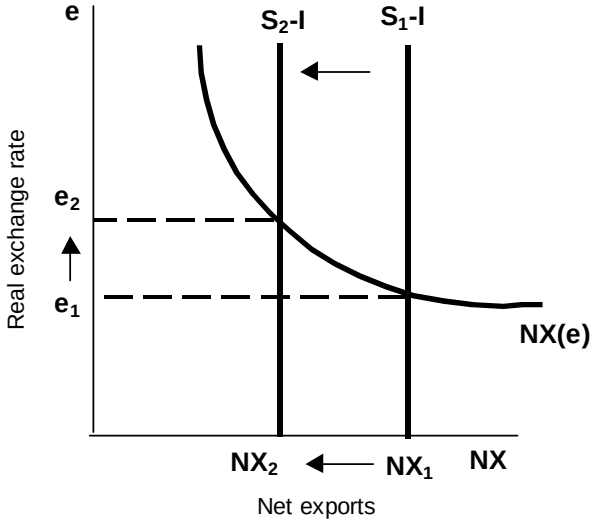
The PPP theory works tolerable well for periods of, say, a decade or more under normal rates of price change.

7. **Equilibrium real exchange rate determinants.**



The equilibrium real exchange rate is determined by the crossing of the vertical line representing saving minus investment and the downward-sloping net-exports schedule. At this intersection, the supply of domestic currency available for foreign lending balances the demand for it by foreigners buying our net exports. In other words at the equilibrium real exchange rate, the supply of domestic currency for capital-account transactions balances the demand for it for current-account transactions.

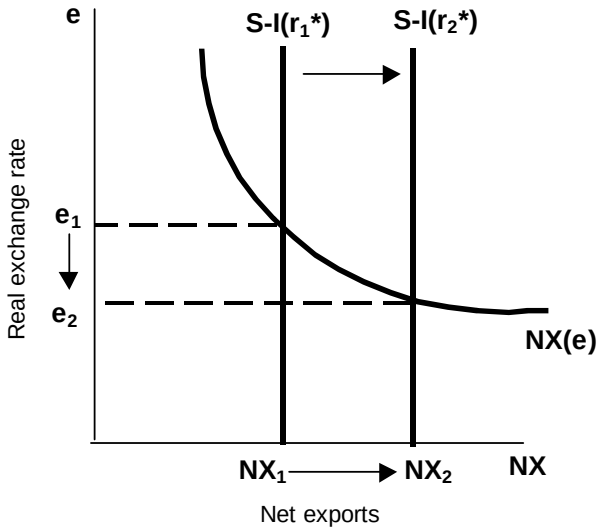
8. Expansionary fiscal policy at home reduces the supply of domestic currency and raises the equilibrium real exchange rate.



If the government increases purchases or cuts taxes national saving reduces. This reduction in saving shifts the vertical (*S* - *I*) line to the left, lowering the supply of domestic currency to be invested abroad. The lower supply causes the equilibrium real exchange rate to rise. So domestic goods become more expensive relative to foreign goods, which causes exports to fall and imports to rise. This pushes the current account toward deficit.

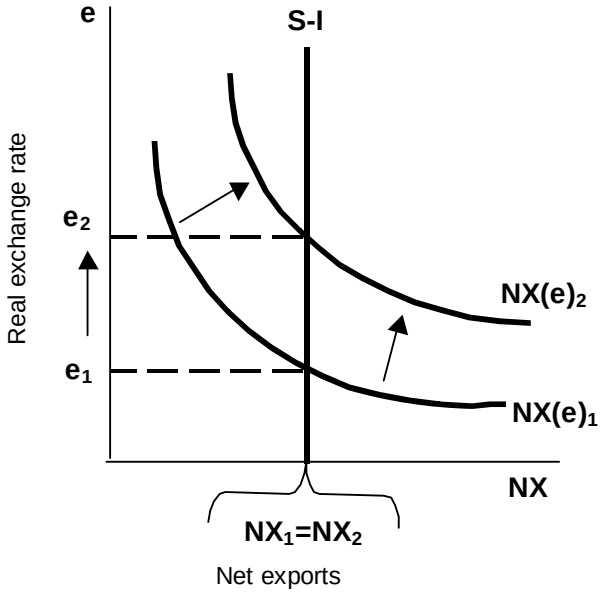
When the investment tax credit makes investing in the given country more attractive, it also shifts the vertical (*S* - *I*) line to the left, although national saving doesn't change. The equilibrium real exchange rate rises. That is, the increase in investment demand pushes the current account toward deficit.

9. Expansionary fiscal policy abroad reduces world saving, raises the world interest rate, and therefore reduces investment in the small open economy.



This policy shifts the vertical (*S - I*) line to the right, raising the supply of domestic currency to be invested abroad. The equilibrium real exchange rate falls. Domestic goods become less expensive relative to foreign goods, and the net exports increases.

10. A protectionist trade policy raises the demand for net exports from $NX(\varepsilon_1)$ to $NX(\varepsilon_2)$.



The equilibrium real exchange rate increases. Domestic goods become more expensive relative to foreign goods, which causes the net exports to fall. So protectionist policies do not alter the capital account or the current account. However, protectionist policies raises the equilibrium real exchange rate and absolutely reduces the amount of foreign trade. In the new equilibrium (point *B*) we export and import less than at point *A*, although the net exports doesn't change.

11. Maintenance of fixed exchange rates requires adequate reserves to accommodate periodic payments deficits. If reserves are inadequate, nations must invoke protectionist trade policies, engage in exchange controls, or endure undesirable domestic macroeconomic adjustments.

12. As a rule, floating exchange-rate system is unsteady in the short run but flexible in the long run. Conversely, fixed exchange-rate system is strong in the short run but weak in the long run. Neither system provides full employment and price stability.

Lecture 21. Internal and External Balance.

I. SOME BASIC RELATIONSHIPS IN THE OPEN ECONOMY.

A. National Income and Product Accounts.

National Income Identity.

In the national income identity states that in a closed economy the value of output produced is equal to the disposition of output in terms of consumption *(C)*, investment *(I)*, and government absorption of goods (*G*). In **the open economy** *C*, *I*, and *G* are the spending on **all** goods, not only domestically produced goods. Accordingly, we are obliged to change the identity by subtracting the import component from $C + I + G$ to arrive at the absorption of domestic goods by domestic residents. There is also an additional source of demand for domestic output - exports. Exports have to be added as a source of demand. Hence we have

$$Y = C + I + G + (X - M) \qquad (1.1)$$

$$(X - M) = NX = \textit{net exports}$$

The identity states that income is equal to aggregate spending by domestic residents $(C + I + G)$ plus net exports.

If *Y* is GDP, then net exports *(NX)* include goods and nonfactor services. If *Y* is GNP, *NX* include goods, nonfactor services and net factor receipts from abroad *(YF)* so that it is equal to the balance on goods and services in term of the balance of payments accounts.

$$GNP = Y = C + I + G + (X - M + YF) \qquad (1.2)$$

If the value of net transfer payments from abroad *(TRF)* is added to both side of the identity (1.2), one obtains gross national disposable income *(GNDI)*, which is the total income available to residents for consumption and saving.

$$GNDI = C + I + G + (X - M + YF + TRF) \qquad (1.3)$$

where $(X - M + YF + TRF)$ is equal to the current account of the balance of payments.

Two Views of the External Balance.

We can present the national income identity in terms of sectoral balances.

$$Y - (C + I + G) = NX \qquad (1.4)$$

In this presentation *NX* appears as identically equal to the excess of national income over aggregate spending by domestic residents, including the government. Positive net exports imply that spending falls short of income, whereas an excess of imports over exports implies that spending exceeds income. This statement suggests that external balance problems must have a macroeconomic aspect and that their cure must include means whereby the balance between income and spending can be restored.

If we subtract and add net taxes *T* (taxes less domestic transfers) in the right-hand side of the identity 1.3, we obtain

$$GNDI = C + I + G + T - T + (X - M + YF + TRF)$$

Using the definition of private saving $S = GNDI - C - T$, the definition of the government budget surplus $BS = T-G$ and the current account $NX = X - M + YF + TRF$, we arrive at our central identity:

$$NX = (S - I) + (T - G) \qquad (1.5)$$

The current account balance *(NX)* is seen to be equal to the difference between private sector saving *(S)* and private sector investment *(I)* plus the budget surplus. An external surplus requires either the private sector saves more than it invests or that the government collects more in net taxes that it spends. In this perspective a deficit on current account implies insufficient saving relative to investment and government spending.

B. Balance of Payments Accounts.

A nation's balance of payments accounts is the statistical report of all economic transactions taking place between its residents and the rest of the world. The balance of payments includes three balances: the current account *(NX)*, the capital account *(KA)* and the official settlements balance *(ΔR)*. The sum of *NX* and *KA* is generally meant by the overall balance of payments *(BP)*

$$BP = NX + KA$$

If on current and capital account there is a net purchase of foreign goods, services and assets, the exchange authorities must finance the unbalance through use of exchange reserves - the central bank's holding of foreign currency - or through official borrowing abroad.

$$NX + KA = \Delta R \qquad (2.1)$$

The balance of payments including official settlements thus sums to zero.

Since the current account balance *(NX)* is equal to the sum of financing items, it follows that

$$NX = \Delta R - \Delta KA = \Delta NFA \qquad (2.2)$$

ΔR - change in net foreign-exchange reserves;
ΔKA - change in net foreign liabilities;
ΔNFA - the rate of increase of net claims on the rest of the world.
NX indicates the rate at which the economy in the aggregate is adding to its net external assets.

If we spend less than our income, we are building up claims on the rest of the world. The current account surplus equals the increase in net foreign-exchange reserves plus the rate of capital outflow.

Rearranging the accounting identity 1.5, we have:

$$(S - I) + (T - G) = \Delta NFA \qquad (2.3)$$

Suppose, that saving equals investment for the private sector. The budget surplus is externally financed through an increase in net claims on the rest of the world. This increase in claims takes the form of reduction in the external public debt, or in the form of increase in foreign-exchange reserves.

C. Monetary accounts.

The change in net official reserves of monetary authorities (of the Central Bank) is linked to domestic monetary and credit magnitudes through the balance sheet of the Central Bank. Using the balance sheet identity, we have:

$$\Delta R + \Delta DC = \Delta MB$$

ΔR - the change in the Central Bank's net foreign-exchange reserves;
ΔDC - the change in loans to government and to commercial banks;
ΔMB - the change in monetary base, or in high-powered money.

When a country runs a balance of payments deficit, its Central Bank is necessarily buying its own currency and selling foreign-exchange reserves. If it takes no other action, then the monetary base is decreasing.

In the balance of payments accounts, a country's overall balance of payments *(BP)* is the same thing as the rate of change of the Central Bank's foreign-exchange reserves.

$$BP = \Delta R$$

If reserves fall by ΔR because of the balance of payments deficit and domestic credit *(DC)* is unchanged then the monetary base *(MB)* falls by the same amount. There is one way to frustrate this automatic adjustment process - **sterilization**. If the Central Bank offsets changes in foreign-exchange reserves by changes in domestic credit, *MB* can be held constant even in the face of changes in reserves. This means that in a deficit country the Central Bank will sell foreign exchange, thereby reducing domestic *MB*. The next step is to have an expansionary open market operations or an increase in domestic credit that restores the money stock to its initial level. This sterilization policy predominates in countries that pursue interest rate or money stock-oriented monetary policy.

II. INTERNAL AND EXTERNAL BALANCE.

Assume that the government authorities have two policy goals. First, they want to attain **internal balance**: output equal to full-employment, or potential output. Second, they want to attain **external balance**: net exports equal to zero.

We will use a model to show the most effective ways for government policy makers to combine the tools at their disposal to achieve their policy goals. It is the model for a **small open economy**. Small open economy assumption supposes, that developments in the rest of the world have important implications for the domestic economy, any impact of the domestic economy on the rest of the world can be safely ignored. It means also that the world interest rate i^* determines the interest rate in this economy. That is, the economy is sufficiently small that it can borrow or lend as much as it wants in world financial markets **without affecting the world interest rate**.

We know that other factors being equal an increase in government expenditure (*G*) causes an increase in income (*Y*) and imports (*M*) simultaneously. At the same time the lower the real exchange rate (*RER*), the greater are net exports *NX* and the larger is income *Y*. Take $i = i^*$, and Y^* as given, price level *P*, P^* - const. Then:

$$IB: \quad Y = C(\overset{+}{Y}) + I(i) + G + NX(\underset{-}{RER}, \underset{-}{Y}, \overset{+}{Y^*}) \quad or \quad Y = Y(\underset{-}{RER}, \overset{+}{G})$$

$$EB: \quad NX = X(\underset{-}{RER}, \overset{+}{Y^*}) - M(\underset{+}{RER}, \overset{+}{Y}) \quad or \quad NX = NX(\underset{-}{RER}, \overset{-}{G})$$

In our case there are two types of exogenous policy changes: exchange rate policy (such as devaluation) and government expenditure-reducing (or increasing) policy. Government fiscal expansion raises output but worsen *NX*. A depreciation of the exchange rate (or devaluation) also raises output, but improves *NX*. Both policies must be used together to attain balance in both sectors.

Figures 1 and 2 represent the internal balance schedule (*IB*) that holds for a given level of income and the external balance schedule (*EB*) that holds for a given level of *NX*:

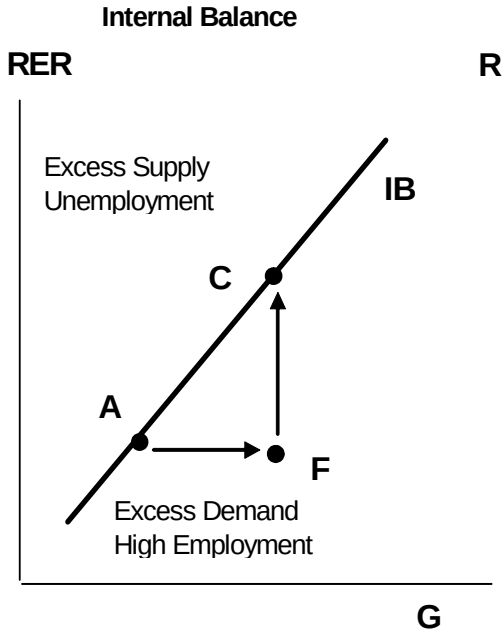


Figure 1

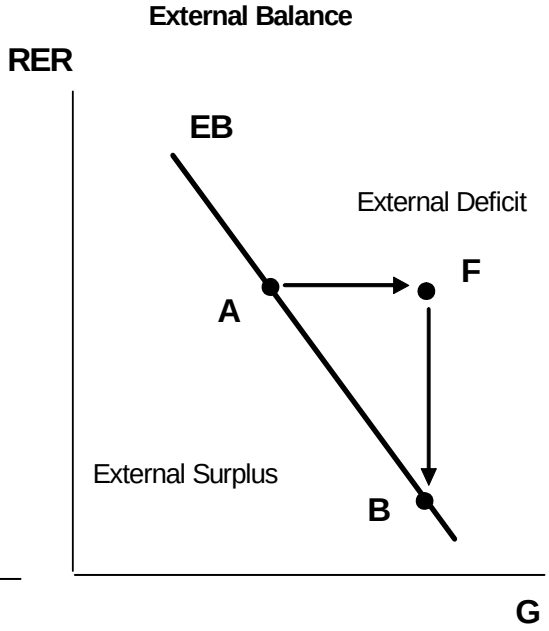


Figure 2

The Figure 3 shows *IB* and *EB* schedules together, in a graph known as the **Swan Diagram**.

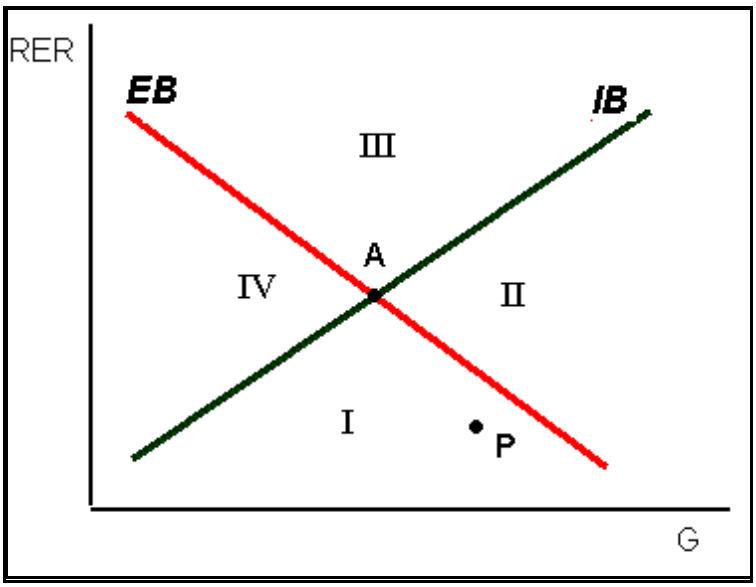


Figure 3

There are four zones in this graph. **Zone I** indicates a current account surplus and excess demand; **zone II** - a current account deficit and excess demand; **zone III** - a current account deficit and unemployment;; **zone IV** - a current account surplus and unemployment. There is only one point of full equilibrium, *A*. Both tools are needed to attain it (e.g. from point *P*). Which agency, the Central Bank that sets *RER* (devaluation or revaluation) or the Ministry of Finance that sets *G*, should be responsible for external balance, and which for internal balance? This question is known as **the "assignment problem"**. The selection of the assignment rule should be based on the relative slopes of the schedules.

One possible rule is that the Central Bank sets the exchange rate *(RER)*, so as to attain external balance, and the Ministry of Finance sets spending, *G*, so as to attain internal balance. This rule works if *NX* is relatively responsive to *RER* and output is relatively responsive to *G* (Figure 4). The other possible rule is that the Central Bank sets the exchange rate *(e)*, so as to attain internal balance, and the Ministry of Finance sets *G*, so as to attain external balance. This rule works if output is relatively unresponsive to *G* (Figure 5).

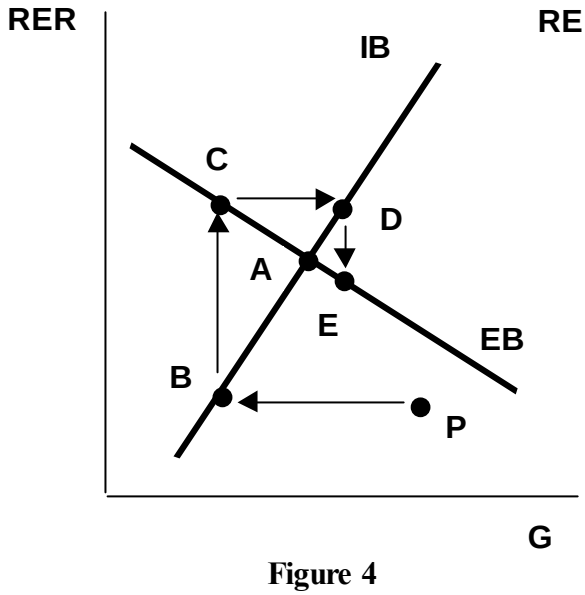


Figure 4

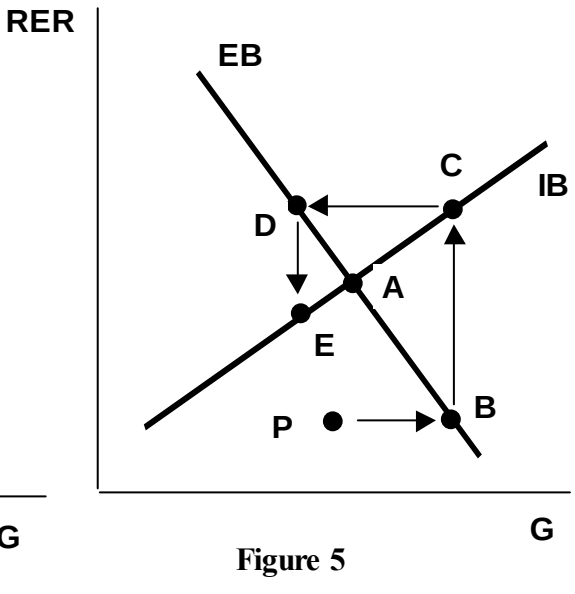


Figure 5

The Swan diagram can be used to analyze how to attain the internal and external balances when exchange rate is one of the instruments of macroeconomic policy (the exchange rate is not fixed). We'll use other model in order to describe how the economy can attain internal balance (output equal to full-employment) and external balance (overall balance of payments equal to zero, for example) simultaneously in case of international capital movements under **fixed exchange rates**. To attain two policy targets two independent policy instruments are used: government spending (*G*), the instrument of fiscal policy, and the interest rate (*i*), the instrument of monetary policy. Figure (6) shows the two policy instruments directly on the axes.

Figures 6 and 7 will be used to derive the combinations of the two policy instruments consistent with the targets. Assume that internal balance and external balance both hold at the starting point, *A*.

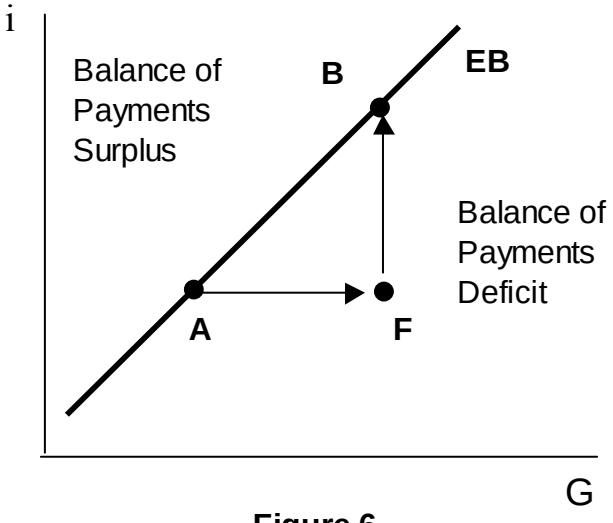


Figure 6

Consider first external balance (Figure 6). An increase in *G*, a rightward movement from point *A*, raises income and, as a result raises imports and worsens the current account. At point *F* the overall balance of payments runs a deficit. If overall balance of payments is to be maintained, the government must generate an improvement of the capital account. It can do this by following a contractionary monetary policy. If the interest rate rises far enough the increased capital inflow will be sufficient to offset the worsened current account and the overall balance of payments will be restored to zero. Thus, the *EB* schedule slopes up.

Now consider internal balance (Figure 7). The *IB* schedule shows internal balance. It also slopes up, because an increase in G would cause excess demand for goods at *B* (which is inflationary), requiring that the

monetary authority raise *i* to eliminate the excess demand at *C*.

The slope of *EB* curve depends on the degree of capital mobility. But the *EB* curve can not be any steeper than the *IB* curve. To see this, consider the movement from point *A* to point *C*, a simultaneous fiscal expansion and monetary contraction calculated to leave income unchanged at the full-employment level. Point *C* is a point of balance of payments surplus. There is no reason for current account to change, as level *G* is the same at both points *C* and C_1 unchanged, but because *i* is higher, there is a capital inflow that puts the balance of payments in surplus. Only points above and to the left of the *EB* schedule are points of surplus.

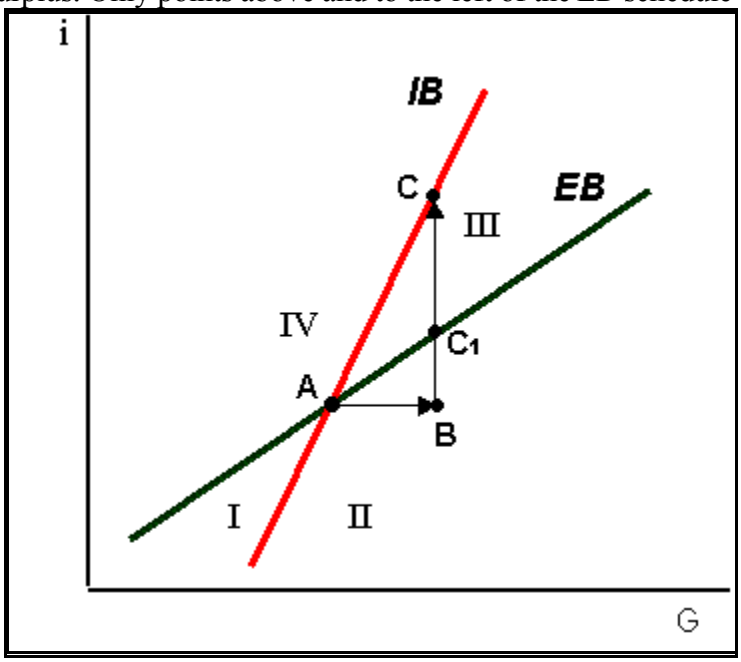


Figure 7

Figure 7 is divided into four zones. In zone I - there are unemployment and balance of payments deficit, in zone II - excess demand and balance of payments deficit, in zone III -excess demand and balance of payments surplus, in zone IV - unemployment and balance of payments surplus. There is only one point of full equilibrium, *A*. Both policy tools are needed to attain it.

If for example the economy is at point *A* in zone II, where there are a deficit of the balance of payments and inflationary pressure, it is necessary to reduce *G* and to increase *i* (Figure 8).

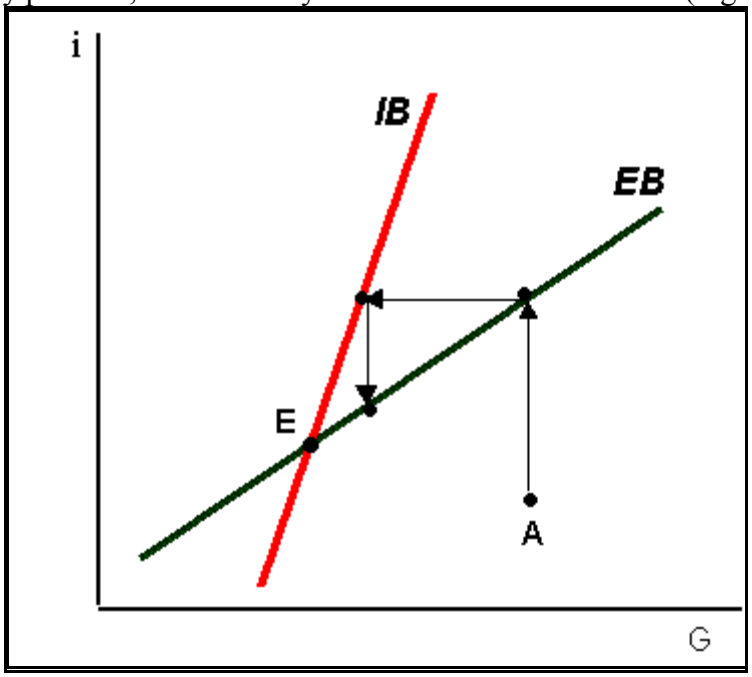


Figure 8

The two agencies, the Central Bank and the Ministry of Finance posses the tools of monetary policy and fiscal policy. The external and internal balance can be reached if policy-makers act independently and without direct coordination. However, just what responsibility goes to which authority turns out to be important. In this case the Central Bank must pursue external balance. The Ministry of Finance is responsible for internal balance. Clearly, their separate actions are pulling the economy toward internal and external balance at point *E*. This policy assignment appears to work (Figure 8).

Suppose, that the policy-makers had made the alternative assignment, telling the Central Bank to look after internal balance and the Ministry of Finance to mind external balance. This policy assignment doesn't work (Figure 9).

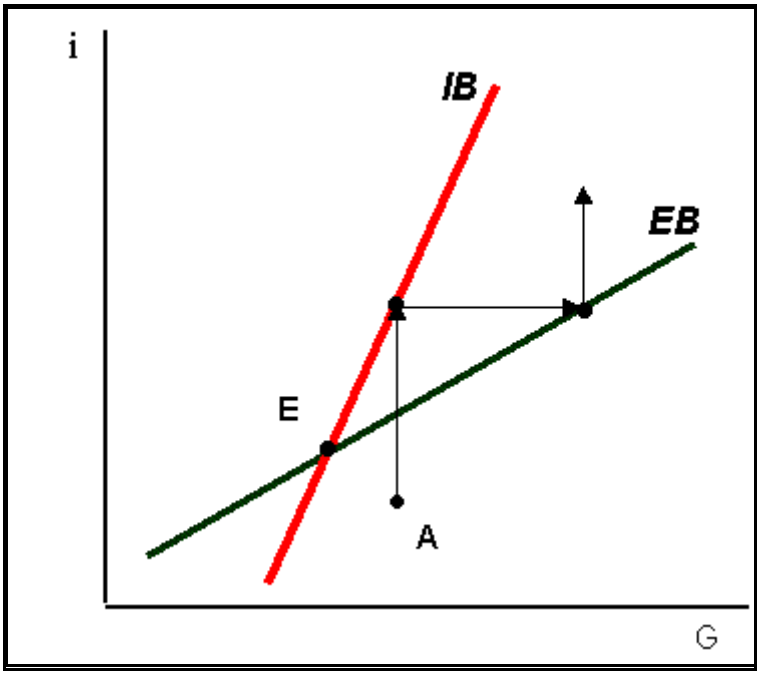


Figure 9

The right assignment is determined by a rule of comparative advantage: give each target to the authority whose instrument has the relatively greater influence on it. Monetary policy's comparative advantage under a fixed exchange rate lies in pursuing external balance.

III. THE IS-LM MODEL IN THE OPEN ECONOMY.

We assume a small open economy, where $i = i^*$ and the fixed price level P. The differential between the domestic (i) and foreign (i^*) rate is the only determinant of the net capital inflow or outflow. The net capital account balance is represented by KA thus

$$KA = \overline{KA} + k\,(i - i^*)$$

To the extent that the domestic interest rate, i, rises above the foreign rate i^*, foreign investors will find domestic assets more attractive than their own and will seek to acquire them, while domestic residents will be less eager to buy foreign assets, and may even borrow abroad at the lower foreign interest rate.

The *IS* curve is the relationship between output Y and the interest rate, i, that gives equilibrium in the good market.

$$IS: \quad Y = C\,(Y - T) + I\,(i) + G + NX\,(Y, RER)$$

The *IS* curve slopes downward because an increase in *i* reduces investment in plant and equipment and in turn (through the multiplier effect) leads to a lower level of output throughout the economy. The exogenous variables are exogenous components of spending and net taxes. A change in any of these variables shifts the *IS* curve. It is also necessary to take into account the source of shifts in the *IS* curve, such as an exogenous increase in demand for domestic goods coming from foreign residents when there is an increase in net exports *(NX)*. The same occurs if there is a change in exchange rate.

The *LM* curve is the relationship between income, *Y*, and the interest rate, *i*, that gives equilibrium in the money market.

$$LM: \quad \frac{M}{P} = L(i, Y)$$

The *LM* curve slopes upward because *i* and *Y* have opposite effects on money demand. An increase in *Y* raises the demand for money because people undertake more transactions. If there is no accommodating increase in the money supply, then the interest rate will be driven up, thus reducing the demand for money back to its original level.
A change in the nominal money supply shifts the *LM* curve.

The third line (the *BP* curve) represents combinations of income *Y* and the interest rate, *i* that would give an overall balance of payments equal to zero:

$$BP = NX + KA = 0$$

The *BP* includes both the current account, *NX*, which depends negatively on income and positively on the exchange rate, and the capital account, *KA*, which depends positively on the interest differential $(i - i^*)$.

$$BP: \quad BP = NX + KA = 0$$

$$BP = \overline{X} - \overline{M} - mY + \overline{KA} + k(i - i^*) = 0$$

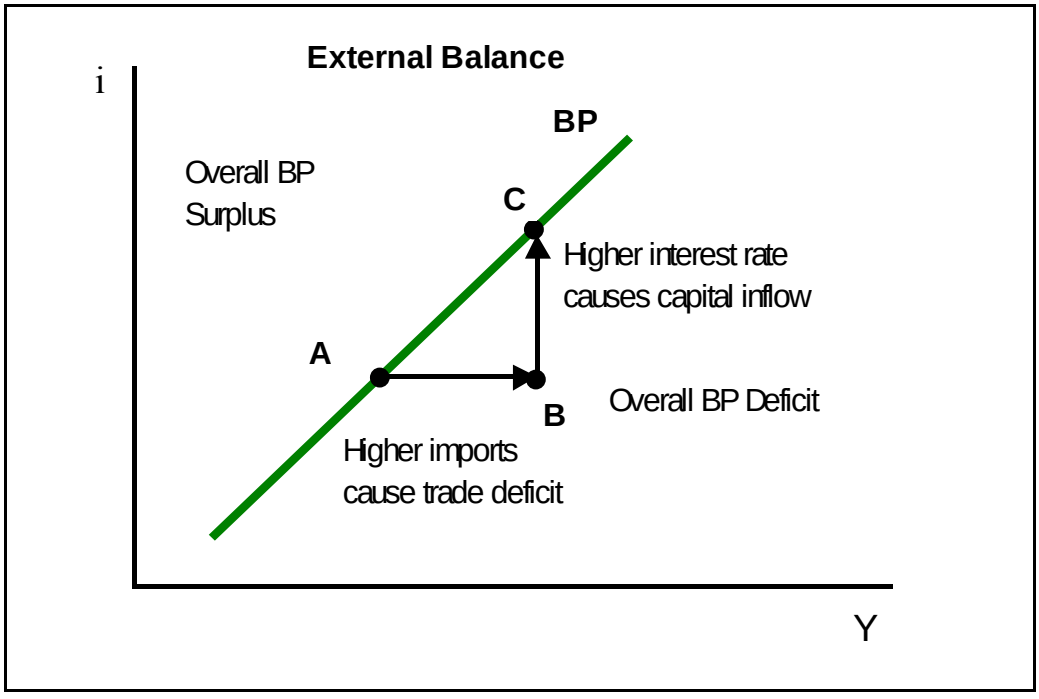


Figure 10

The *BP* curve slopes upward because an increase in income *Y* raises imports and causes a current account deficit (negative *NX*). It thus requires an increase in the interest rate, *i*, to attract a capital inflow (to finance the negative *NX*) if the overall balance of payments (*NX* plus *KA*) is to remain at zero.

A change in *RER* or anything else that exogenously changes *NX* still shifts the *BP* curve.

The economy is always at the intersection of the *IS* and *LM* curve, under the assumption that there is always equilibrium in the goods and asset markets. The following discussion will assume that the starting point just happens to be a point where the balance of payments equals zero so that all three curves intersect simultaneously. The slope of the *BP* curve in the *IS-LM-BP* model depends on the degree of capital mobility.

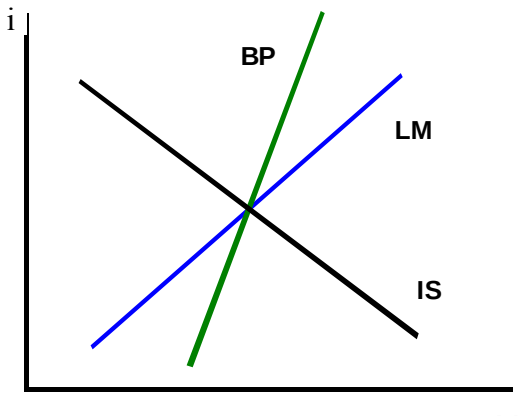


Figure 11. Low capital mobility

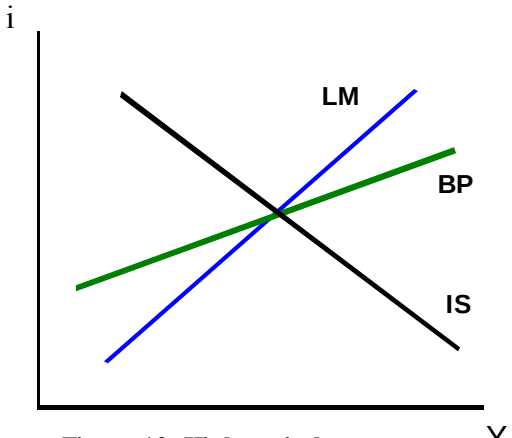


Figure 12. High capital mobility

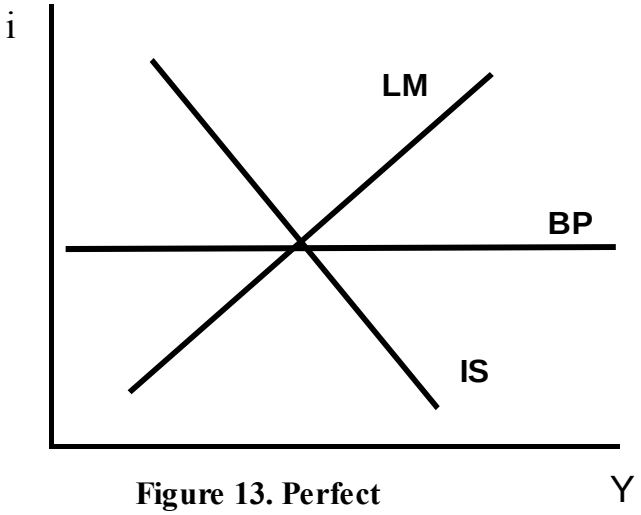


Figure 13. Perfect capital mobility

In case of **low capital mobility** (Figure 7) the *BP* curve relatively steep (steeper than the *LM* curve) and *k* is small. The smaller is *k* the longer is the increase in the interest rate necessary to attract a given required capital inflow.

In case of **high capital mobility** (Figure 8) the *BP* curve is relatively flat (flatter than the *LM* curve), *k* is large. The larger is *k*, the smaller is the increase in the interest rate necessary to attract a given required capital inflow.

In case of **perfect capital mobility** (Figure 9) the *BP*-curve is horizontal, and *k* = infinity. This logical progression - from low capital mobility, to high and finally perfect capital mobility -mirrors the historical evolution of the international financial system, as the process of innovation and liberalization have gradually diminished the barriers between countries.

The *IS-LM-BP* model can be used for analysis of fiscal and monetary policies under different exchange rate regimes.

Lectures 22-23. Macroeconomic Policies in the Open Economy.

International capital mobility has important implications for the operation of macroeconomic policy. For example, the most dramatic shift of the 1980s in the economic interaction of the industrialized countries, the emergence of enormous trade deficits in the United States, was not primarily caused by changes in trade policy or competitiveness. Rather, it had its origin in the international flow of capital to the United States. This flow of capital, in turn, was caused primarily by fiscal and monetary policies enacted in Washington, D.C.

International capital flows in reality depend on many factors. Perhaps the most important are the rates of return that various countries are offering on their assets. We will simplify, and assume that the rates of return on all assets offered by a given country, other than money, move together sufficiently closely within the country that they can be represented by single nominal interest rate, i. In other words, we aggregate together bonds, stocks, and other nonmonetary assets. It is further assumed here that the differential between the domestic and foreign interest rate is the only determinant of the net capital inflow or outflow.

First we consider **a regime of fixed exchange rates**. Then we consider **a floating exchange rate regime**. At every stage, the discussion explores not just what difference it makes to have *some* degree of capital mobility ($k>0$), but also the different implications of **low (imperfect)** versus **high and perfect capital mobility.**

The economy is always at the intersection of the *IS* and *LM* curves, under the assumption that there is always equilibrium in the goods and money markets (the case of **internal balance**). The demand for goods equals the output of goods supplied, and the demand for money equals the supply of money. There is not necessarily any reason to be also on the *BP* curve (the case of **external balance**). If the balance of payments is nonzero, the point of intersection of *IS* and *LM* curves will be off the *BP* curve. The following discussion will assume that *the starting point* just happens to be a point where the balance of payments equals zero, so that all three curves intersect simultaneously.

The model *IS-LM-BP* will now be used to examine the effects, first, of a fiscal expansion, and, second, of a monetary expansion.

I. INTERNAL AND EXTERNAL BALANCE WITH FIXED EXCHANGE RATES.

A. The Case of Low Capital Mobility.

Fiscal Policy.

Consider the case of an increase in government expenditure, beginning as in the case of low capital mobility (Figure 1). The *IS* curve shifts to the right to IS_2, with the new intersection at point *B*. Income, Y, increases to Y_2, and the higher transaction demand for money drives up the interest rate to i_2.

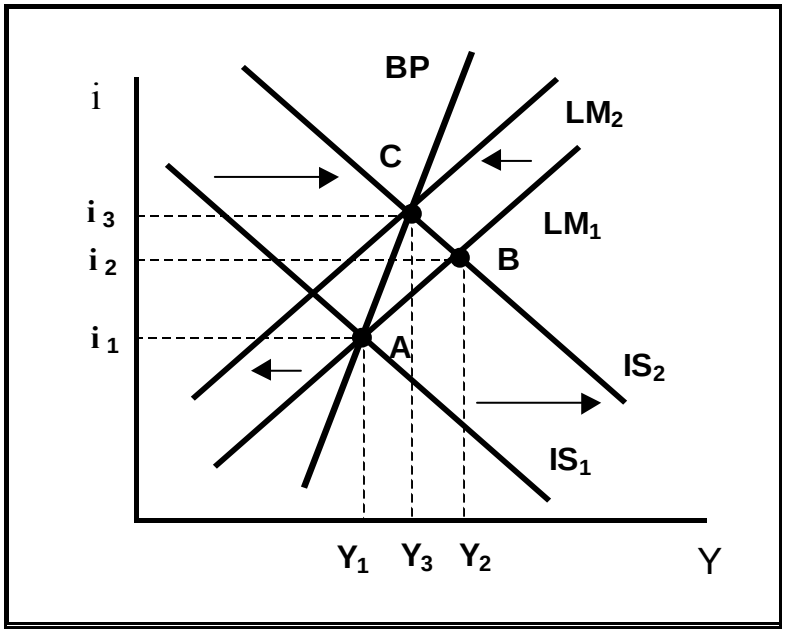


Figure 1

In the case of no capital mobility, the only effect of fiscal expansion on external balance came via imports and the trade deficit. Consequently, the balance of payments went into deficit.

But now, when we include the capital account, the higher interest rate attracts a capital inflow into the country, which works to improve the overall balance of payments. On the other hand, the higher level of income still draws in more imports and worsens the trade balance, which works to worsen the balance of payments. Which effect dominates? It depends on the degree of capital mobility. In the given case when capital flows are not very sensitive to interest rates, the improvement in the capital account will be small and the overall balance of payments deficit, due to large trade deficit, will dominate.

This case is shown in Figure 1. The upward-sloping *BP* curve as relatively steep -steeper than the *LM* curve. This is the case of low capital mobility. The new *IS-LM* intersection at point *B* occurs to the right of, or below, the *BP* curve. Any point to the right of or below the *BP* curve is a point of deficit: either the level of income, and, therefore, imports, is too high for balance of payments equilibrium, or the level of the interest rate, and, therefore, the capital inflow, is too low. Thus, the fiscal expansion in Figure 1 gives a balance of payments deficit, but the capital inflow does partially offset the trade deficit.

When a fiscal expansion results in a balance of payments deficit, the exchange rate tends to depreciate. The money supply will gradually decrease over time if the Central bank supports the fixed exchange rate and does not sterilize the reserve outflow. The declining money supply will shift the *LM* curve leftward and the interest rate will rise. We now move up the IS_2 curve in a sequence of *IS-LM* intersections, with interest-sensitive expenditures declining. As expenditure declines, imports decrease, and the trade balance improves. This process continues until the economy has returned to a zero balance of payments (point *C*). Only then there is both internal and external balance.

Thus on fixed exchange rate regime the fiscal expansion is offset to a great extent by the outflow of money and the increase of the level of output is relatively small - from Y_1 to Y_3. despite the fact that income is higher at *C*, the overall balance of payments is zero: the higher interest rate attracts a capital inflow sufficient to finance the higher imports that result from the higher level of income.

Monetary Policy.

The results of the expansionary monetary policy under low capital mobility are shown in Figure 2. From the initial equilibrium, a monetary expansion shifts the *LM* curve to the right to LM_2. The interest rate,

i, falls, stimulating spending, thus raising income, *Y*, at the new point of internal balance *B*. Higher income means higher imports and a trade deficit. However, the presence of international capital mobility has implications for the balance of payments. This time there is a capital outflow, resulting from the fact that the interest rate has fallen from i_1 to i_2. Because the capital account moves in the same direction as the trade balance, the overall balance of payments is in deficit.

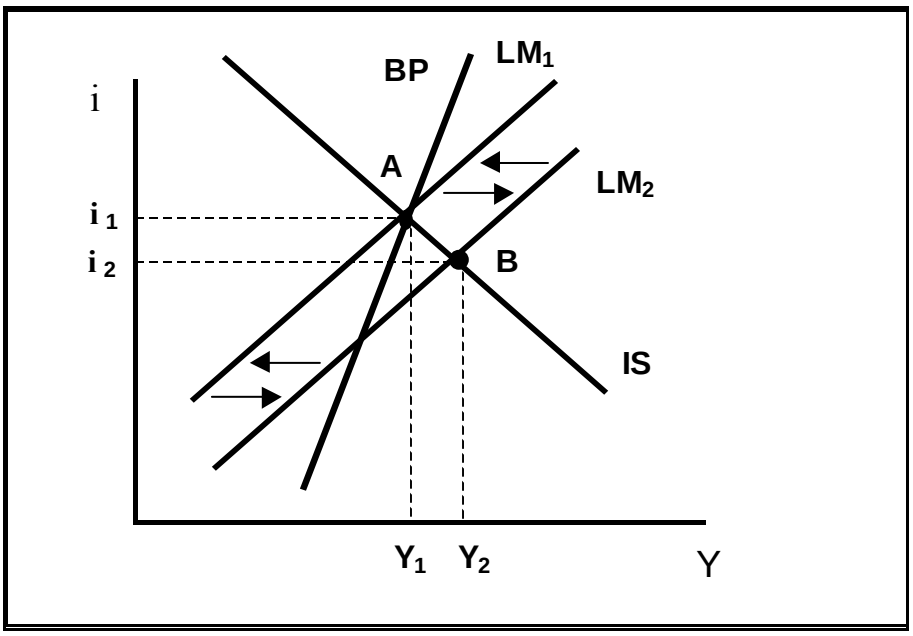


Figure 2

If a country is running a balance of payments deficit and supports the fixed exchange rate, it is losing foreign exchange reserves continuously over time. Because it only has a certain level of reserves, it cannot continue to maintain the money supply at the LM_2 level indefinitely, or its reserves will run out. Eventually it must adjust. There is the possibility of automatic adjustment of the money supply through the balance of payments deficit, if the Central bank does not sterilize reserve outflows.

In this case when fixed exchange rate is maintained, the money supply is decreasing, which means that the *LM* curve is shifting back to the left to its initial position LM_1 over time. As the money supply falls, the interest rate rises, discouraging business investment and other interest-sensitive components of spending.

This process continues as long as the balance of payments is still in deficit. In the long run, the economy is back where it started. The entire increase in the money supply, due to the expansionary monetary policy, has flowed out through the balance of payments, leaving no permanent effect on income.

Another way to adjust is to let the exchange rate change. A deliberate devaluation would stimulate net exports and shift the *BP* curve to the right.

B. The Case of High Capital Mobility.

Fiscal Policy.

In Figure 3 the *BP* curve is relatively flat (flatter than the *LM* curve). This is the case of high capital mobility.

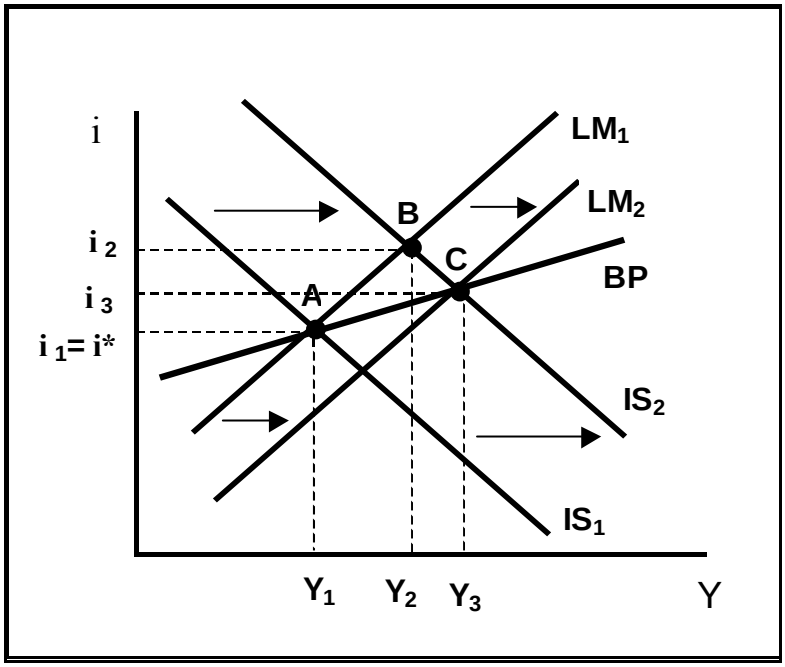


Figure 3

The fiscal expansion again produces the same increases in *Y* and *i*, just as in the case of low capital mobility. Now, however, the new intersection of the *IS* and *LM* curves occurs at a point, *B*, to the left of, or above, the *BP* curve. Thus, the overall balance of payments is in surplus. The increase in *i* attracts a capital inflow more than sufficient to finance the higher imports resulting from the increase in *Y*. In this case the exchange rate tends to appreciate. Under fixed exchange rates, the Central bank is accumulating foreign exchange reserves, not losing them, as with a lower degree of capital mobility.

If the Central bank opts not to sterilize, but rather allows the total money supply to increase over time, then the *LM* curve will shift to the right to LM_2. From point *B*, the economy moves to the right along the IS_2 curve, with the higher money supply driving down the interest rate to the world level of i^* and stimulating spending. The new equilibrium occurs at *C*, where the capital inflow is no more than needed to finance the trade deficit.

Unlike the case with low capital mobility, the level of income is considerably higher than it was before the fiscal expansion. Income is much higher at point *C* than at *A*. With high capital mobility, the effect of the fiscal expansion on income is supplemented by an increase in the money supply.

Monetary Policy.

Figure 4 illustrates the case of a monetary expansion under high capital mobility. From the initial equilibrium, a monetary expansion shifts the *LM* curve rightward to LM_2. The interest rate, *i*, falls, stimulating spending, thus raising income, *Y*. Higher income means higher imports and a trade deficit. Just as in the case of low capital mobility there is a capital outflow, resulting from the fact that the interest rate has fallen from i_1 to i_2. Because the capital account moves in the same direction, as the trade balance, the overall balance of payments is in deficit.

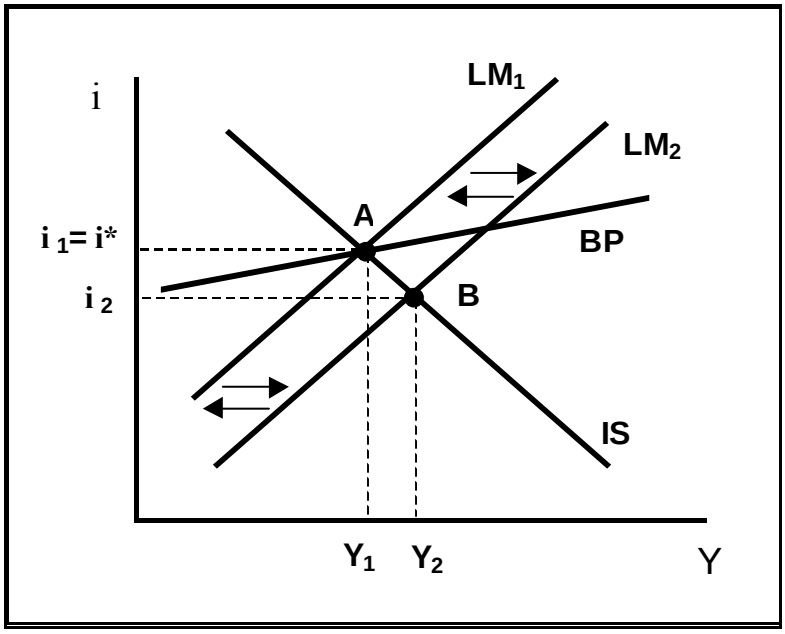


Figure 4

If a country is running a balance of payments deficit, its exchange rate tends to depreciate. To maintain the fixed exchange rate, the Central bank must intervene at the foreign exchange market purchasing the domestic currency. The reduction in the money supply immediately shifts the *LM* curve back to the left until it returns to the original LM_1 curve.

The effects of monetary expansion under high capital mobility, illustrated in Figure 4, are the same as in the case of low capital mobility. What difference does the higher degree of capital mobility make? Because the capital outflow is greater for the same differential in interest rates, the rate of reserve loss is even greater in Figure 4 than in Figure 2, and so the return to the long-run equilibrium will be that much faster.

C. The Case of Perfect Capital Mobility.

Recall that the slope of the *BP* curve is *m/k*. As *k* goes to infinity, the slope goes to zero. In other words, the *BP* curve is horizontal. The horizontal line is drawn at the level of the interest rate, *i*, that is equal to the world rate, i^*. If *i* were to rise above i^*, even for just an instant, the differential would immediately attract a very large capital inflow. All foreign investors would want to acquire the better-paying assets in the home country rather than those in their own country, while domestic residents would seek to borrow at the cheaper rate abroad. Such capital flows will arbitrage away the interest differential, that is, will keep it from opening up to begin with. Thus, another way of saying that *k* is infinite is to say that $i - i^*$ is always zero.

Fiscal Policy.

In Figure 5 the *BP* curve is flat (horizontal). This is the case of perfect capital mobility.

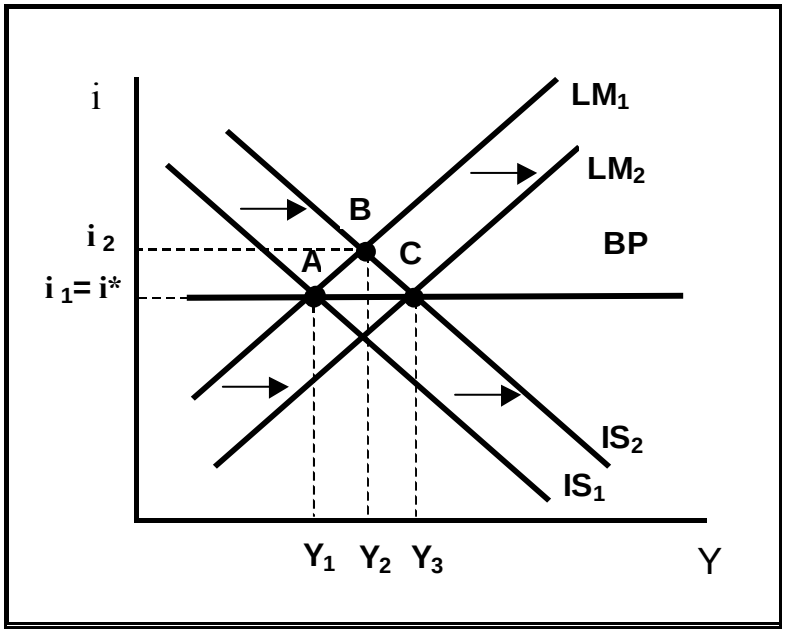


Figure 5

A fiscal expansion shifts the *IS* curve to the right to IS_2. The increase in the demand for money drives up the interest rate to i_2, attracting a large capital inflow. More precisely, *if* the economy could remain at *B*, then the higher interest rate *would* attract a capital inflow, and the Central bank would have to make the usual decision under fixed rates whether to sterilize it. The potential inflow, however, is so large that the Central bank has no option. There is no limit to the quantity of foreign exchange it would have to buy up in return for domestic currency, until it had exhausted its holdings of domestic assets.

If the Central bank does not wish to abandon the fixed exchange rate target, it must allow the increase in the money supply. The increase in the money supply will shift the *LM* curve to the right, to LM_2. The shift must be great enough that the intersection with the new IS_2 curve, at point *C*, is on the *BP* line. Only then will the interest rate, *i*, be back at the level i^*, as it must if the capital inflow is not to be infinite.

Income is much higher at point *C* than at *A*. As we have already seen, with high capital mobility, the effect of the fiscal expansion on income is supplemented by an increase in the money supply in the long run. With perfect capital mobility, the effect is even stronger in that (1) the money flows in instantaneously, whether the Central bank attempts to sterilize it or not, and (2) the increase in the money supply is greater.

Monetary Policy.

We now consider a monetary expansion. In Figure 6, the increase in the money supply shifts the *LM* curve rightward to LM_2, and drives down the interest rate. The lower interest rate at point *B* gives rise to a capital outflow. More precisely, the interest rate *would fall* if the economy could remain at point *B*.

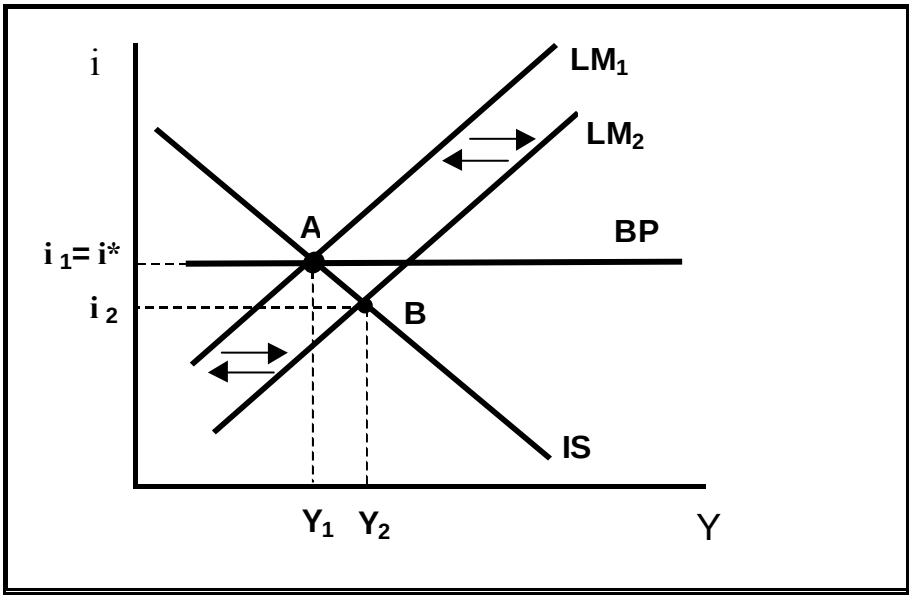


Figure 6

If the Central bank tries to maintain both its exchange rate target and its new money supply target, it will rapidly exhaust its entire stock of foreign exchange reserves, financing the balance of payments deficit. If it chooses to stay with the fixed exchange rate, it will be forced to give up its money supply target and allow the outflow of reserves through the capital account to reduce the money supply. The reduction in the money supply immediately shifts the LM_2 curve back to the left until it returns to the original *LM* curve. Only when the money supply is back to its pre-expansion level at point *A* will the interest rate have returned to the world level; only then will domestic investors stop pumping capital out of the country. As a result the monetary expansion have no effect on income at all.

Thus, under fixed exchange rates, any increase in the money supply eventually flows back out through the balance of payments, when the Central bank decides to give up the attempt to sterilize the outflow, with the process proceeding more rapidly the higher the degree of capital mobility. In the case of perfect capital mobility, the Central bank could not sterilize the outflow, even if it wanted to, and even in the short run. Point *B* is purely a hypothetical location.

Even though Figure 6 looks precisely the same after the monetary expansion as before, there is one detail that has changed. Recall that the total money supply is given by international reserves plus domestic credit. When the Central bank increased the money supply, it did so by increasing the supply of domestic credit. When the money flowed back out, it was international reserves that were lost. Thus, the *composition* of the monetary base has been permanently altered, as between domestic credit and international reserves.

II. INTERNAL AND EXTERNAL BALANCE WITH FLEXIBLE EXCHANGE RATES.

It has already been pointed out that equilibrium under fixed exchange rates often entails a balance of payments surplus or deficit, but that such disequilibria will eventually have to be corrected by a deliberate change in government policy. In particular, if a country is running a balance of payments deficit, the Central bank is losing reserves and will eventually have to allow the money supply to fall if it wishes to remain on a fixed exchange rate.

The alternative possibility is that, instead of abandoning the money supply that it had previously set, the Central bank abandons the exchange rate. In other words, the Central bank can allow the currency to depreciate until the balance of payments deficit is eliminated. This will happen automatically if the country is on a floating exchange rate regime to begin with.

When the exchange rate is floating and the central bank does not intervene, the overall balance of payments, *BP*, is always zero.

$$BP = NX + KA = X - M - mY + KA + k(i - i^*) = 0$$

In algebraic terms, this equation must hold continuously. In terms of the graphical apparatus the economy must always be on the *BP* schedule. If a shock threatens to cause a move off it, the exchange rate will adjust automatically to shift the *BP* curve to the point of internal equilibrium. As was already seen, a devaluation, because it stimulates net exports, shifts the *BP* curve to the right, and a revaluation of the currency shifts it to the left. Under floating rates, when the economy is at a position that threatens to lie off the *BP* curve, the currency will instantly depreciate or appreciate to the degree necessary to shift the curve to that position.

Recall that although the balance of payments is always zero, this does not mean that the trade balance is necessarily zero. At any point in the upper part of the *BP* curve (above the line $i = i^*$), the interest rate is attracting a capital inflow that is financing a trade deficit. In the lower part of the *BP* curve, there is a capital outflow offsetting a trade surplus.

A. The Case of Low Capital Mobility.

Fiscal Policy.

We will now consider a fiscal expansion, such as an increase in government expenditures or a cut in taxes. We saw in Figure 7 that when the fiscal expansion shifts the *IS* curve to IS_2 and raises income to Y_2, the higher level of imports produces a trade balance deficit. This is point *B* in Figure 7. A situation that under fixed exchange rates produces a balance of payments deficit, under floating exchange rates automatically produces a depreciation of the currency. The depreciation stimulates the net exports, which we know causes both the *BP* curve and the *IS* curve to shift to the right (to BP_2 and IS_3). We also know that depreciation shifts the *BP* curve to the right faster than the *IS* curve.

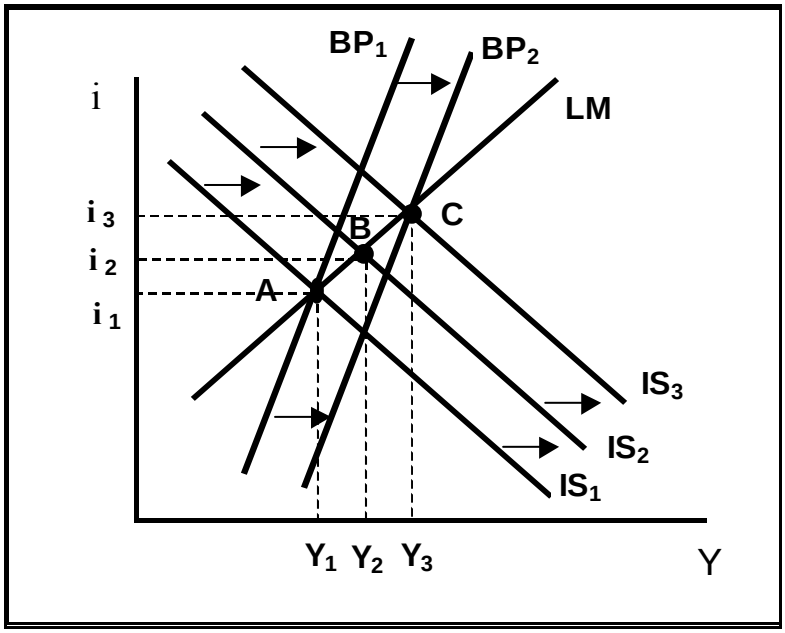


Figure 7

What changes with the introduction of capital mobility? As Figure 7 showed, the higher interest rate (i_2) now attracts a capital inflow. There is an improvement in the capital account that partially offsets the deterioration in the trade balance. But since the degree of capital mobility is relatively low, the net effect is still to worsen the overall balance of payments. At the same time the capital inflow means that the potential

balance of payments deficit resulting from a fiscal expansion is smaller, and so the size of the needed depreciation of the currency is smaller too.

Eventually the depreciation will have shifted the *BP* curve sufficiently far to the right that it will catch up with the *IS-LM* intersection. Then all three curves will intersect at the same place, point *C* in Figure 7. Only there will the balance of payments be zero, as it must be under floating exchange rate.

Generally, because of the additional stimulus from depreciation, the fiscal expansion raises income by more under floating than fixed exchange rates.

Monetary Policy.

We will now consider the effects of a monetary expansion under floating exchange rates (Figure 8).

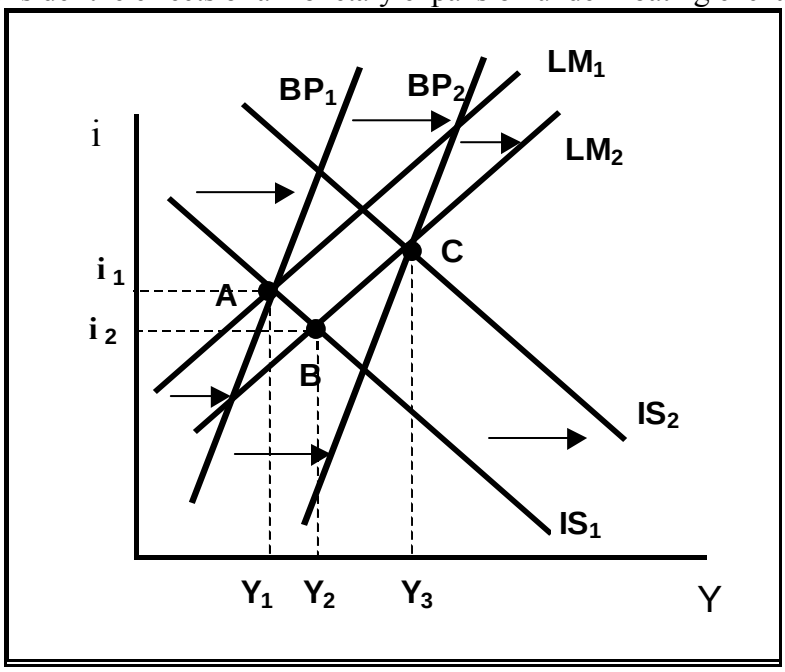


Figure 8

An increase in the money supply shifts the *LM* curve to the right to LM_2. The higher level of income Y_2 leads to a trade deficit. Simultaneously the capital outflow arises in response to the fall of the domestic interest rate below the world level. As a result the overall balance of payments is in large deficit.

In the case of floating rates, the currency must depreciate to eliminate the deficit. The depreciation stimulates net exports and leads to further increase in output. It thus shifts the *BP* curve and *IS* curve to the right, until all three curves intersect at the same point *C*.

The "bottom line" is that capital mobility enhances the effectiveness of monetary policy. In addition to the usual route of stimulating investment and other components of domestic demand via lower interest rates, the expansion also stimulates foreign demand via a lower value for the currency.

B. The Case of High Capital Mobility.

Fiscal Policy.

With higher degrees of capital mobility comes the loss of most of additional stimulus from floating rates (Figure 9). Fiscal expansion (the shift of the *IS* curve to IS_2) leads to the increase of the interest rate to i_2. Thus, under conditions of high capital mobility, the improvement of the capital account is more than

enough to offset the deterioration of the trade balance, resulting from the increase of *Y*.

The overall balance of payments actually went into surplus (Point *B* lies above the *BP* curve). This means that under floating exchange rates, the currency will appreciate to clear the balance of payments, not depreciate.

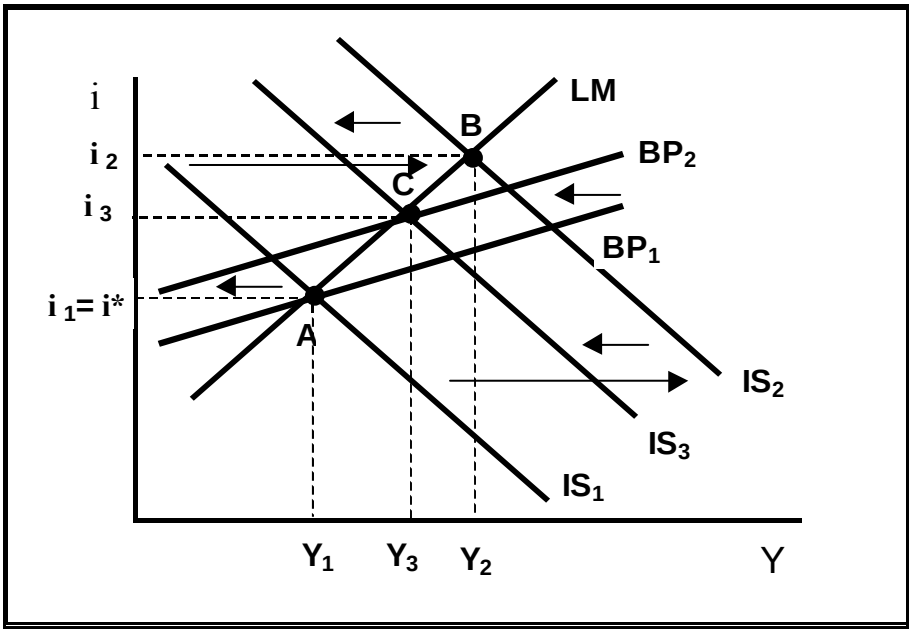


Figure 9

The effect is to discourage net exports rather than to encourage them. The *IS* and *BP* curves shift to the left. The curves keep shifting until the *BP* schedule catches up with the *IS-LM* intersection and all three curves meet at the same point. Internal and external balances restore at point *C*. The fiscal expansion still increases income but not considerably.

Monetary Policy.

The effects of a monetary expansion under high capital mobility will now be considered (Figure 10).

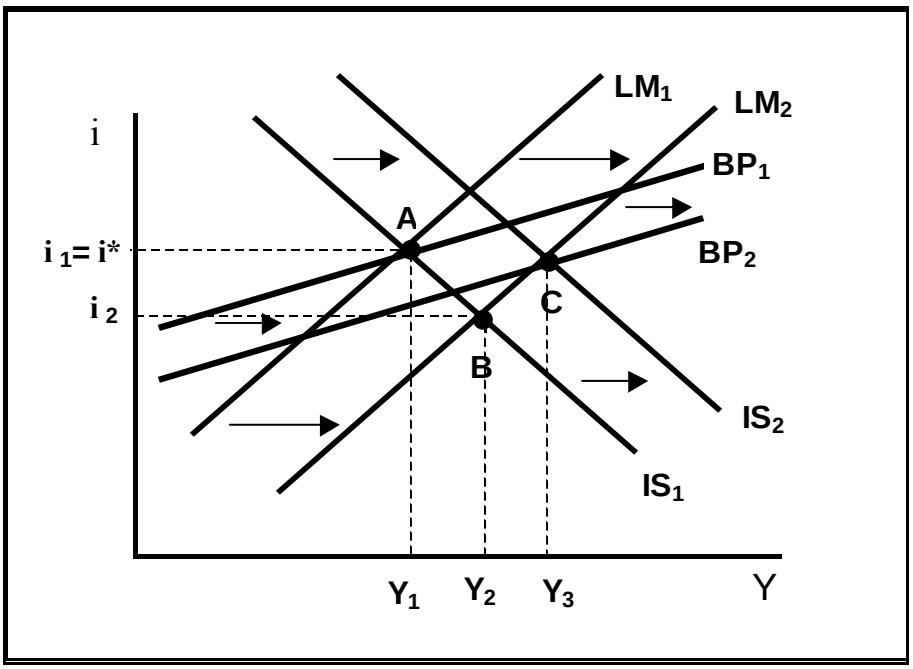


Figure 10

Just as in the case of low capital mobility, an increase in the money supply shifts the *LM* curve to the right (to LM_2). The interest rate (*i*) falls and the income (*Y*) rises. But in response to the same decline in the interest rate there is an even greater capital outflow and consequently a greater deficit of the overall balance of payments. Thus, the depreciation of the currency and the further stimulus to net exports and, therefore, to income at *B*, are even greater than in the case of lower capital mobility. The *IS* curve and *BP* curve shift to the right, until all three curves intersect at the same point. The internal and external balance restore at point *C*. The income increases considerably as a result of both the increase in the money supply and the exchange rate depreciation.

C. The Case of Perfect Capital Mobility.

Fiscal Policy.

Figure 11 illustrates the fiscal expansion.

The *IS* curve shifts rightward to IS_2. The capital inflow that would be attracted by the higher interest rate at point *B* is infinite. Yet under floating rates, the currency instantly appreciates, reducing net exports and shifting the *IS* curve back to the left. This is the same thing that happened with less-than-perfect capital mobility in Figure 9, but now the potential capital inflow and the appreciation of the currency are so large that the *IS* curve shifts all the way back to the starting point at *A*. This must be the case, so that the domestic interest rate does not exceed the world rate. It also means that there is no effect on income at all; fiscal policy loses all power under floating exchange rates. This is the ultimate extrapolation of the general rule that under floating rates, the higher capital mobility, the lower the effectiveness of fiscal policy.

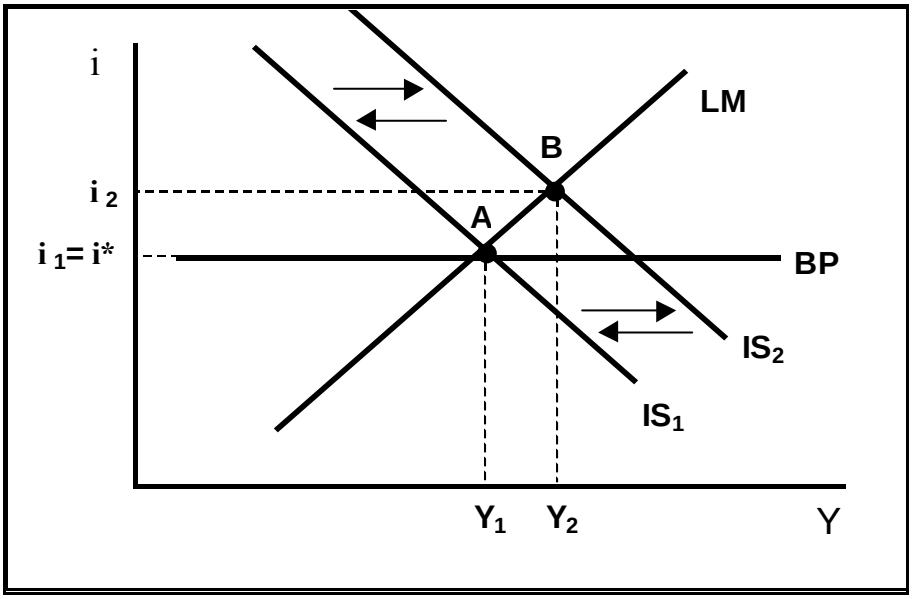


Figure 11

Even though Figure 11 looks the same after the fiscal expansion as before it, it is not true that nothing at all has changed. The currency has appreciated in the meantime, which means that if the trade account was originally in balance, then it is now in deficit. Thus, even though total GNP has not changed, *the composition* of GNP has. The share going to net exports is smaller. The share going to government expenditure is larger - or, if the fiscal expansion took the form of a tax cut that increased households' disposable income, then it is the share of GNP going to consumption that is larger. There is no crowding out of investment, because the interest rate has not risen.

The finding that under a regime of floating exchange rates capital mobility reduces the effectiveness

of fiscal policy is exactly the opposite of the case under a regime of fixed exchange rates.

Monetary Policy.

Finally, consider a monetary expansion under floating exchange rates (Figure 12). When the *LM* curve shifts to LM_2, the interest rate declines and there is a capital outflow, resulting from the fact that *i* has fallen below the word interest rate i^*. Higher income means higher imports and a trade deficit. Because the trade balance moves in the same direction as the capital account, the overall balance of payments is in large deficit.

At the same time the currency depreciates, stimulating net exports, shifting the *IS* curve to the right to IS_2, and adding to the expansion of income. This is also what happened with less-than-perfect capital mobility, but now the shift continues until the economy moves all the way to the original interest rate at point *C*. The effect of the monetary expansion on income is not only greater than it was under fixed exchange rates, it is also greater than it was under lesser degrees of capital mobility.

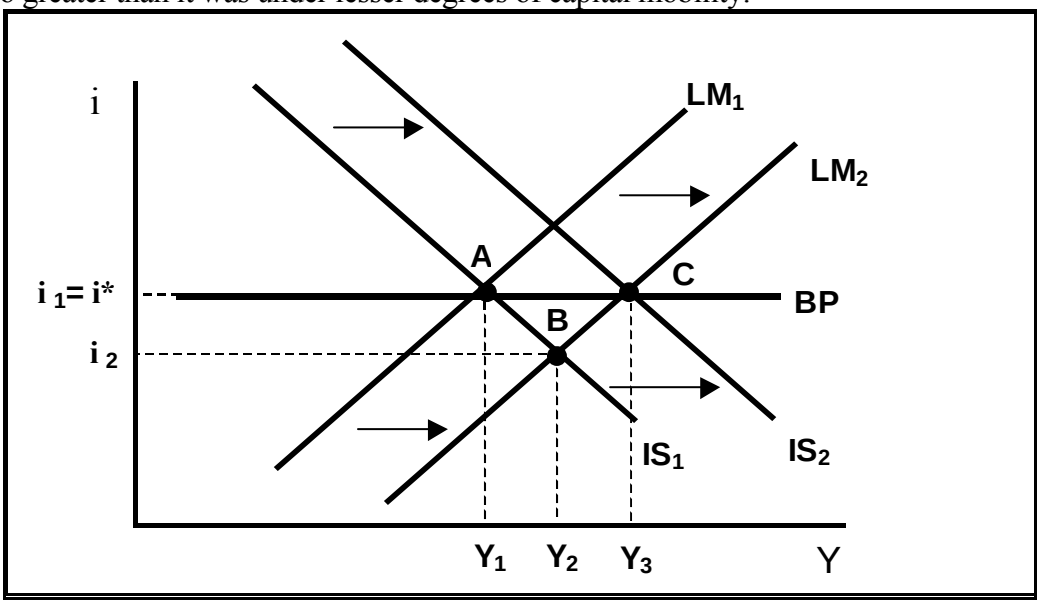


Figure 12

Thus, monetary policy reaches its peak effectiveness under floating rates and perfect capital mobility.

Besides the magnitude of the increase in income, a further important result of perfect capital mobility is that the monetary expansion operates *entirely* via the international sector, that is, by depreciating the currency and stimulating net exports. *None* of the expansion comes from the usual domestic route, that is, by reducing the interest rate and stimulating investment.

III. A COMPARISON OF MACROECONOMIC POLICIES UNDER FIXED AND FLEXIBLE EXCHANGE RATES.

Which case - perfect or imperfect capital mobility, fixed or flexible exchange rates -is most realistic in practice? Clearly, almost all countries have at least some degree of capital mobility. Still, many countries have lagged behind in liberalizing their financial markets, including many of industrial countries. Between them are the United Kingdom and Japan, but none of these countries is on fixed exchange rates. The continental European countries do maintain relatively fixed exchange rates against each other as part of the European Monetary System (EMS), and most of these countries reduced considerably the restrictions on capital movement.

Completely fixed exchange rates are most common in small less developed countries (LDCs). However, small countries usually have a high marginal propensity to import, so that a fiscal expansion leads to a large trade deficit (especially if the government spends the money on military equipment or large investment projects that are very import-intensive).

Most LDCs naturally have less-developed financial markets. As a result, interest rates may not be free to rise in response to a fiscal expansion, or, even if interest rates do rise above the level in the rest of the world, the degree of capital mobility is likely to be low enough that the overall balance of payments worsens rather than improves.

Let us reflect on the main lessons of the analysis of macroeconomic policy in an open economy. Tables summarize the outcome of a monetary expansion and fiscal expansion on the equilibrium levels of output, interest rate, exchange rate, as well as net exports and foreign-exchange reserves.

Notice that in each case it is necessary to be precise about the exchange-rate regime and the degree of capital mobility under which the economy operates. To arrive at meaningful conclusions, it is also crucial to specify the shape of the aggregate supply curve. We assume that the economy is characterized in the short run by Keynesian conditions, so that aggregate supply curve is horizontal.

Effects of Monetary and Fiscal Policy
in a Country with Low Capital Mobility

Effect on:	Fiscal Expansion		Monetary Expansion	
	Fixed *E*	Flexible *E*	Fixed *E*	Flexible *E*
Output (*Y*)	+	++	0	++
Interest Rate (*i*)	++	++	0	±
Exchange Rate (*E*)	0	-	0	-
Net Exports (*NX*)	-	+	0	+
Foreign-Exchange Reserves (ΔR)	-	0	-	0

Effects of Monetary and Fiscal Policy
in a Country with High Capital Mobility

Effect on:	Fiscal Expansion		Monetary Expansion	
	Fixed *E*	Flexible *E*	Fixed *E*	Flexible *E*
Output (*Y*)	++	+	0	++
Interest Rate (*i*)	+	+	0	±
Exchange Rate (*E*)	0	+	0	-
Net Exports (*NX*)	-	-	0	±
Foreign-Exchange Reserves (ΔR)	+	0	-	0

Effects of Monetary and Fiscal Policy

in a Country with Perfect Capital Mobility

Effect on:	Fiscal Expansion		Monetary Expansion	
	Fixed *E*	Flexible *E*	Fixed *E*	Flexible *E*
Output (*Y*)	+++	0	0	+++
Interest Rate (*i*)	0	0	0	0
Exchange Rate (*E*)	0	+	0	-
Net Exports (*NX*)	-	-	0	±
Foreign-Exchange Reserves (ΔR)	+	0	-	0

One of main results is that under **flexible exchange rate regime** the effectiveness of monetary policy at changing output is enhanced the greater the degree of capital mobility. Notice that this is just the opposite of the result obtained from the monetary approach to the balance of payments under **fixed exchange rates**.

When the Central bank chooses to keep the exchange rate fixed, high capital mobility means that any given expansion in domestic credit simply flows out through the balance of payments that much faster. When the country chooses to keep the money supply fixed and instead to let the exchange rate adjust, high capital mobility means that any given expansion has an extra impact via the exchange rate depreciation. This is one reason that a country where the financial markets become more developed and more integrated into world markets may opt to switch from a fixed exchange rate regime to a floating rate, assuming that it wishes to be able to pursue an independent monetary policy.

Under **perfect capital mobility** the results for monetary policy are also just the opposite of the results for fiscal policy. The key to the differences is the reaction of the interest rate. A monetary expansion operates by *lowering* the interest rate, causing capital *to flow out* of the country. This effect subtracts from the income expansion in the case of fixed rates but enhances it when the exchange rate is allowed to change. A fiscal expansion, on the other hand, operates by *raising* the interest rate, and attracting *a capital inflow*. Thus, the effects are the opposite of those achieved with monetary policy: they add to the income expansion in the case of fixed rates and subtract from it in the case of floating rates.

In a regime of **fixed exchange rates**, fiscal policy reaches its peak effectiveness under **perfect capital mobility**, but monetary policy loses all effectiveness *regardless* of the degree of capital mobility. In both cases, the key to the conclusion is that potentially infinite capital flows prevent the interest rate from deviating from the world level. In both cases, the *IS* curve alone determines the level of income; attempts to shift the *LM* curve by increasing domestic credit have no effect because the money simply flows out of the country as fast as it is created.

On the contrary, under **floating exchange rates** and **perfect capital mobility** fiscal policy loses all power, and it is monetary policy that reaches its peak effectiveness. Floating rates allow the country to recapture its monetary independence despite perfect capital mobility. The *LM* curve will shift when the Central bank deliberately decides to change monetary policy, and *only when* it deliberately decides to do so.

Lecture 24. Budget Deficit and Government Debt Management.

1. **Public (government, national) debt** - the total amount owed by the Federal government (to the owners of government securities) and equal to the sum of its past Budget deficits (less its budget surpluses).

Internally held public debt - public debt owed to (the government securities owned by) citizens, national firms, and national institutions.

External debt - public debt owed to foreign citizens, firms, and institutions.

Private debt - the total amount owed by the private sector to the owners of private securities.

2. The debt - both public and private - plays a positive role in the Circular-Flow Model. As income expands, so does saving. This expanding volume of saving must be obtained and spent by consumers, business, or government. The process by which saving is transferred to spenders is **debt creation**. If households and businesses are not willing to borrow and thereby to increase private debt sufficiently fast to absorb the growing volume of saving, an increase in public debt must absorb the remainder or the economy will falter from full employment.

3. The government budget deficit should accurately reflect the change in the government's overall indebtedness. The government's indebtedness should be measured in real terms, not in nominal terms. The measured deficit should equal the change in the government's real debt, not the change in its nominal debt. The budget deficit as commonly measured, however, does not correct for inflation.

$$\begin{matrix} Real \\ Budget \\ Deficit \end{matrix} = \begin{matrix} Nominal \\ Budget \\ Deficit \end{matrix} - \begin{matrix} Stock\ of \\ Government \\ Debt \end{matrix} \times \begin{matrix} Inflation \\ Rate \end{matrix}.$$

The deficit is government expenditure minus government revenue. Part of expenditure is the interest paid on the government debt. Expenditure should include only the **real** interest paid on the debt $\boldsymbol{R_r \cdot D}$, not the **nominal** interest paid $\boldsymbol{R_n \cdot D}$, where D is the stock of government debt, R_r is the real interest rate, and R_n is the nominal interest rate. Because the difference between the nominal interest rate R_n and the real interest rate R_r is the inflation rate π, the budget deficit is overstated by $\boldsymbol{\pi \cdot D}$.

This correction for inflation can be large, especially when inflation is high. The situation is possible when though nominal government debt is rising, real government debt is falling. The correction for inflation can often change one's evaluation of fiscal policy.

4. A bald statement of the **absolute size of the debt** glosses over the fact that the wealth and productive ability of our economy have also increased tremendously over the years. A wealthy nation has greater ability to incur and carry a large public debt than does a poor nation. So it's more realistic to measure changes in the public debt **in relation to** changes in the economy's **GNP** and **Exports**.

Debt ratios offer various measures of the Cost of, or capacity for, servicing debt. **The main debt indicators are:**

1) **ratio of debt to GNP** (debt-income ratio);
2) **debt-service ratio** (total debt service to exports of goods and services);
3) **ratio of debt service to GNP**;
4) **ratio of debt to exports** of goods and services.

5. **The main causes of steady budget deficits and an increase of public debt are**:

1) wartime finance;
2) recessions and the "built-in stabilizers" of the economy;
3) tax cuts (without adjustment of the government spending);
4) growing influence of the political business cycle.

6. **The determinants of the debt-income ratio are**:
   1) real interest rate;
   2) growth rate of real GNP;
   3) primary (or noninterest) budget surplus measured as a fraction of GNP.

7. **The ratio of debt to GNP** falls when the debt grows less rapidly than nominal income.
   1) The lower the interest rate and the higher the growth rate of output, the more likely the debt-income ratio is to be falling.
   2) A large noninterest (or primary) budget surplus tends to make the debt-income ratio fall.

In the 1950s and in the 1960s the real interest rate was practically zero, output grew steadily, and the noninterest budget was in surplus or near balance. In these circumstances the debt-income ratio fell. In a period of slow growth and high real interest rates, deficits therefore translate into a rapidly rising debt-income ratio. That was, indeed, the case in the 1980s.

8. **The ratio of the interest payments to GNP** reflects the level of taxation which is required to service the public debt:

$$\frac{N}{GNP} \leq \frac{T}{GNP},$$

where N is the sum of the interest payments on the public debt, and T is the sum of tax revenues. A tax increase is an option which government has for gaining sufficient revenue to pay interest and principal on the public debt.

9. Annual interest payments on the public debt must be paid out of tax revenues. These added taxes may tend to dampen incentives to bear risk, to innovate, to invest, and to work. In this indirect way, the existence of a large public debt can impair economic growth.

10. **The debt financing of the budget deficit** will increase interest rates and thereby reduce investment spending. Private goods may be either consumer or investment goods. If the increase in government goods entails a reduction in the production of capital goods, then the present generation's level of consumption (standard of living) will be unimpaired. However, the future generations will inherit a smaller stock of capital goods and therefore will realize lower income levels than otherwise. If the increase in government spending is essentially **consumption-type outlays** (such as subsidies for school lunches and so on) then this effect is especially strong.

11. Like private expenditures on machinery and equipment, **public investments** increase the economy's future productive capacity. If the government spending is primarily **investment-type outlays**, for example, for the construction of highways, harbors, or if they are "human capital" investments in education and health, then the capital stock of future generations need not be diminished. But rather its composition is changed so there is more public capital and less private capital.

12. **The crowding-out effect** suggests that, given the location of the investment-demand curve, an increase in the interest rate caused by the debt financing of the budget deficit will reduce private investment spending. However, if the economy is initially in a recession, the increase in government spending will stimulate it via the multiplier effect, thereby improving business profit expectations and causing a rightward shift of investment demand. This shift may offset the crowding-out effect wholly or in part.

13. During much of the early 1980s expansionary deficit fiscal policy was accompanied by a tight money policy, that is, a policy which restricted growth of the money supply to combat inflation. This particular policy-mix is especially conductive to high interest rates. Debt financing of the budget deficit increases the demand for money at the time when the monetary authorities are restricting its supply.

14. **High interest rates** on government and private securities make financial investment more attractive for foreigners. The resulting inflow of foreign funds represents an increase in **the external debt**. Paying interest upon and retiring debts to foreigners entail a reduction in future national output.

15. In order to purchase high-yielding securities, foreigners must first buy national currency with their own currencies. This increases the worldwide demand for national currency and increases its **exchange rate**. This rise in the exchange rate will tend to depress national exports and increase imports, giving rise to **an "unfavorable" balance of trade**. The decline in net exports has had a contractionary effect upon the economy: unemployment will rise in exporting industries and in import-competing industries. So the primary expansionary impact of a deficit might be softened by both the **crowding-out effect** and the negative **net export effect**.

16. The inflow of foreign capital does argument domestic funds and thereby helps to keep domestic interest rates lower than would otherwise be the case. So the inflow of foreign capital tends to diminish the size of the crowding-out effect.

17. **The unfavorable trade imbalance** means that we are not exporting enough goods to pay for our imports. The difference has been paid for in four ways:

1) We have borrowed heavily from people and institutions in foreign lands (including IMF and the World Bank).
2) Considerable amounts of domestic assets have been sold to foreign investors.
3) Direct investments suggest inflow of foreign currency in order to organize new productive capacities.
4) We have used our official reserves in part. This is accompanied by the decrease of the net foreign assets.

18. **The debt crisis** had its origins in the substantial rise in the external liabilities of the developing countries during the second half of the 1970s and early 1980s.

The development of this situation into an external debt crisis was due to:

1) a drastic deterioration in external economic environment in the form of higher interest rates, lower commodity prices, and severe recession in the industrialized economies;
2) economic mismanagement and policy errors in debtor countries. The exchange rates of national currencies were overstated and exchange speculations were in practice;
3) excessive lending by commercial banks to some countries, with little regard to country risk limits. Commercial bank financing turned negative from 1985, contributing to a large resource transfer from the indebted countries.

Difficulties of many countries stemmed, in part, from the failure of external borrowing to be put to uses that yielded adequate return. Even in some cases where funds were invested wisely ex ante, unforeseen adverse movements in interest rates and the terms of trade made the export rate of return inadequate. In these circumstances, many of the heavily indebted countries accumulated large external debts, but did not generate sufficient capacity to service them.

19. **Debt rescheduling** (or **debt restructuring**) suggests essential changes in terms of borrowing in situations in which a debtor country is not fully performing on its external obligations.

20. **Debt reduction mechanisms**:

1) **Buy-backs**
   Debt buy-backs permit countries to repurchase their debt at a discount for cash.
2) **Swaps**
   Debt-equity schemes allow foreign banks to swap their loan claims for an equity investment, while foreign nonbanks may purchase loan claims at a discount in the secondary market to finance direct investment or purchases of domestic financial assets.
3) **Exchanges**
   Debt exchanges involve the exchange of existing debt instruments for new debt instruments denominated in domestic or foreign currency. The terms of the two claims will normally differ substantially. For example, the face value may remain unchanged while the contractual

interest rate on the new claim is lower than the old claim.

21. A major development over the past three years has been the progressive adaptation of policies by official creditors (**Paris Club**) to the chronic and deep-rooted problems of the heavily indebted countries with high levels of official debt. For low-income countries most significant has been the adoption of the "Toronto terms" in June 1988. These initiatives provided for the first time a menu of options, including:

1) the partial cancellation of debt service;
2) extensions of maturities, and
3) interest rate concessions.

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Lecture 25. National Economy as Whole. Interrelations among Macroeconomic Accounts. (Introduction to Financial Programming)

I. Nature of Financial Programming

A financial program is a comprehensive set of policy measures designed to achieve a given level of economic performance. More often, however, the policies are designed to eliminate disequilibrium between aggregate domestic demand and supply which typically manifests itself in balance of payments problems, rising inflation, and low output growth.

The term "financial program" emphasizes the importance of monetary, fiscal and exchange rate policies in controlling domestic demand and correcting balance of payments disequilibria.

Emphasis on the financial aspects of adjustment is based on the assumption that there is a relatively stable relationship between financial variables (such as money and domestic credit) and nonfinancial variables (such as real national income and prices), and that the monetary authorities can control some of the financial variables so as to affect the real side of the economy. It also reflects the observation that in many cases inappropriate financial policies have been a major cause of external disequilibria and other problems of economic performance.

In addition - as a practical consideration - financial data to monitor the implementation of such policies are typically available on a more timely basis than other economic data. However, financial programs also incorporate the effects of other policy instruments, most prominently those aimed at increasing aggregate supply.

Where macroeconomic imbalances exist, some form of correction (*or adjustment*) will ultimately be necessary in order to bring claims on resources in line with those available. The distinguishing feature of a financial program is that it seeks to achieve an *orderly adjustment*, through the early adoption of corrective policy measures, and through the provision of appropriate amounts of external financing. This should minimize losses in output and employment during the adjustment period while eventually leading to a balance of payments position that is sustainable.

A financial program needs to be set in a *forward looking time framework*. Medium-term scenarios have generally considered a time horizon of at least five years. Typically, programs for the forthcoming year are worked our in considerable detail because of the more imminent need to formulate a comprehensive package of policy measures and the more readily available and reliable information. Forecasts of the more distant years are less detailed, often focusing on the broad implications for external adjustment, and are by their nature less certain.

II. Building Blocks of Financial Programs

- Program objectives
- Policy measures
- Forecasting (consistent program projections)

Objectives: economic growth, lower inflation, sustainable balance of payments and others.
Example of macroeconomic objectives:

- increase real output by 3 percent;
- reduce inflation to 1,5 percent per month by the end of the program period;
- increase net international reserves by US$ 1 billion.

Policy measures:

- fiscal policy;
- monetary and interest rote policy;
- exchange rate policy;
- trade and other external policies;
- structural policies
    - ~ public enterprise reform;
    - ~ financial sector reform;
    - ~ price liberalization or adjustment;
    - ~ labor market policies;
    - ~ policies to increase capacity output;

~ other measures.
- incomes policies.

Examples of policies and instruments:

a. Fiscal policy: taxes, current expenditures, investment outlays
issue of bonds, floating debt.
b. Monetary policy: interest rotes, Central bank credit and rediscount, legal reserve requirements, capital/assets rations, credit controls, open market operations.
c. External policy: restrictions, tariffs, exchange rote, expert rebates, external debt.

In preparing a financial program, some constraints, or "rules of the game", must be recognized:

A. Objectives must be clearly spelled out, and the entire package of measures included in the program must be geared to achieving those objectives.

B. Unless the authorities are convinced of the need to take some adjustment measures, no program will be successful.

C. There is a close relationship among different financial and economic variables, which creates a "ripple effect". Thus, whenever one variable is affected, there are repercussions somewhere else. For instance, if the government should grant a subsidy to a particular sector, other sectors must pay for it. If the government should increase taxes, there will be an impact on economic activity. If consumption is rising faster than domestic production, there will be an impact on inflation or on the balance of payment, or both.

D. Measures do not necessarily an immediate impact; the economy does not necessarily react immediately to stimuli or decisions. For example, if a new investment law is being approved, new investment will be made with a certain delay, and the impact in terms of additional production will no be seen right away. If interest rates are increased on both credit and deposits, banks may delay paying higher interest rates on deposits until the higher interest rates on their loans become effective on a reasonable portion of their portfolio.

E. Calculations must be revised early on and constantly, as reality may evolve differently than assumed. For example, if to reduce the government deficit to a desired level government revenues must increase by 15 percent, and revenues are increasing by only 10 percent, compensatory action must immediately be taken; otherwise, the objective of reducing the budget deficit will not be achieved.

III. Interrelations Among Macroeconomic Accounts

An integrate system of macroeconomic accounts, covering national income and expenditure, as well as financial flows and associated stocks, is essential in the construction of financial programs. These accounts provide the information needed to assess the performance of the economy and the need for policy adjustment. They also provide a framework for the model of macroeconomic performance that gives the logical structure to any macroeconomic program. Finally, the accounts provide consistency checks for forecasts and policy packages. The accounting relationships highlight the fact that any sector's spending beyond its income must be financed by the savings of other sectors, and that such excess spending by an entire economy is possible only when financed from external sources.

1. Common features of macroeconomic statistics

Macroeconomic statistics are the basic information used to appraise and forecast economic performance. Such statistics can be classified into four distinct, but related, categories: the national income and product accounts, the balance of the various categories of macroeconomic statistics highlight particular aspects of the economy, they should, in principle, use broadly the same basic concepts so as to form an interconnected system that is internally consistent.

The macroeconomic accounts represent a summary of *economic transactions*.
An economic transaction take place when ownership of a real unit to another. In most cases, economic transactions

involve exchanges: goods and services may be exchanged for financial assets or financial assets may be exchanged against other financial assets (e.g., a security may be sold for money). In some cases, goods and services or financial assets are transferred without an exchange taking place (they are also treated as having two sides: the movement of goods, services or financial assets on the one hand and an unrequited transfer on the other).

The two sides of each transaction are referred to as *flows*, in the sense that they measure activity per unit of time (this contrasts with the concept of *stock* which measures the amount outstanding of a given aggregate at any point in time). These flows are normally classified as either *nonfinancial* (real) of *financial*. *Nonfinancial* flows refer to transactions that occur in the process of producing or acquiring goods and services, i.e., flows of goods, services, income and unrequited transfers. *Financial flows* include changes in financial assets and liabilities.

Real and financial flows taken together record all incomes and expenditures of an economic entity (households, enterprises, or government). For any given entity or sector[1], the balance of nonfinancial transactions (the difference between sectoral saving and investment) should, apart from statistical errors, be equal to the change in its financial assets and liabilities vis-a-vis the other domestic sectors and the rest of the world, e.g., a family's excess of expenditure over its income must equal its dissaving or borrowing, or if a surplus, must equal its saving or lending.

With respect to the *timing* of transactions, in the national income accounts and balance of payments the convention is to record them when an obligation is incurred (typically when legal ownership of assets changes) rather than when it is settled, or on what is referred to as an *accrual* basic. Government finance statistics, on the other hand, are generally recorded on a *cash* basis. Since monetary statistics are derived from balance sheets which are constructed in accordance with the rules of business accounting, they are also, in principle, on an accrual basis. They would, for instance, record liabilities before they are settled. However, since most transactions of banks are carried our immediately in cash this distinction is in general of little practical importance.

2. National income and product accounts

The starting point for the national and product accounts is the identity between output produced and the disposition of that output. The supply of goods and services in a given year may be viewed as the sum of domestically produced output and imports. The disposition of this supply is composed of aggregate expenditures by domestic residents on consumption and investment, plus the exports purchased by foreigners. In symbols:

$$\mathbf{Y + IM = C + I + X} \qquad \mathbf{(1)}$$

where:

Y - a measures of domestic output;
IM - imports;
C - consumption expenditure of households, enterprises and government;
I - gross investment expenditure of households, enterprises and government (including inventory changes);
X - exports.

Rearranging the above accounting identity, one obtains:

$$\mathbf{Y = C + I + (X - IM)} \qquad \mathbf{(2)}$$

Output, Y, can be defined in several ways. The difference between GDP (*Gross domestic product*) and GNP (*Gross national product*) is called *net factor income from abroad* (YF). GNP is defined as GDP plus payments from abroad to residents fro services of factors of production owned by residents but located outside the reporting country, less payments to foreigners for services of factor of production they own and that are located in the home country.

The definition of output that is selected influences what is included in X and IM in equation (2). If Y is GDP, then exports and imports will include goods and nonfactor services. Adding net factor income from abroad, YF, to equation (2) we obtain GNP, i.e.,

[1] For purposes of financial programming it is useful to divide an economy into sectors and record the transactions taking place among them. The four sectors usually distinguished are the private nonfinancial sector, the government sector, the banking sector, and the foreign sector (all transactions of nonresidents with residents).

$$\mathbf{GNP = Y + YF = C + I + (X - IM + YF)} \qquad \mathbf{(3)}$$

There is one other measure of output that may be useful, which is called *gross national disposable income* (GNDI). To derive this, the value of net transfer payments from abroad, TRF, is added to equation (3) to yield:

$$\mathbf{GDNI = Y + YF + TRF = C + I + (X - IM + YF + TRF)} \qquad \mathbf{(4)}$$

The term in brackets on the right-hand side of equation (4) now includes exports and imports of goods and all services and net foreign transfers. This sum is equal to a broad definition of the *external current account of the balance of payments*, CAB. The three definitions of output and the corresponding concepts of external balance are shown in Box 1.

Box 1

National Income and Product Accounts and the Current Account in the Balance of Payments

National Account Concept	Current Account Definition
Gross domestic product	Exports and imports of goods and nonfactor services
Gross national product	Exports and imports of goods and services
National disposable income	Exports and imports of goods and services, and unrequited transfers

Equations (2), (3), and (4) demonstrate that, whatever the definition of output that is used, any external imbalance must be reflected in a domestic imbalance in which residents' expenditure on domestic and foreign goods and services - the sum of consumption and investment expenditure, which is often called *absorption* - either exceeds or falls short of domestic output.

Rearranging equation (4):

$$\mathbf{GNDI - A = X - IM + YF + TRF = CAB} \qquad \mathbf{(5)}$$

where:

A = residents' expenditure on domestic and foreign goods and services (absorption), i.e., **C + I**

Alternatively, the domestic imbalance can be rewritten in terms of an imbalance between saving and investment.

Given the definition of GNDI, gross saving, S, can be defined as that part of GNDI not consumed:

$$\mathbf{S = GDI - C} \qquad \mathbf{(6)}$$

Substituting equation (6) into (4):

$$\mathbf{S - I = X - IM + YF + TRF = CAB} \qquad \mathbf{(7)}$$

Equation (7) indicates that to the extent that investment exceeds saving, it will be reflected in an external current account deficit. It should be emphasized that equations (5) and (7) are identities.

It is useful to rewrite equation (7) in terms of the contributions of the different sectors of the economy to total saving. The conventional approach is to distinguish the government's position from that of the rest of the

economy: the intention here is to separate the net saving of the government, which broadly speaking are under the authorities' control, and the net saving of the private sector which the authorities can influence only indirectly through various policy measures. Sectorizing equation (7):

$$(S_p - I_p) + (S_g - I_g) = X - IM + YF + TRF = CAB \qquad (8)$$

where:

S_p, I_p - gross saving and gross investment of the private sector;
S_g, I_g - gross saving and gross investment of government.

In this case, a deficit in the external current account implies that either private saving is less than private investment or government saving is less than government investment or both. The current account balance with the sign changed can be viewed as the amount of "foreign saving", used to finance a domestic saving-investment gap.

3. Balance of payments

The *balance of payments* comprises the external *current account balance*, i.e., a record of transactions of residents with foreigners in goods, services and unrequited transfers, and the *capital account balance*, which provides summary statistics on the change in the net foreign asset position of domestic residents arising from transactions such as external borrowing or repayments, foreign direct investment, and short term capital movements.

The balance of payments recording system takes the form of a double-entry accounting system, in which each transaction is reflected in both a credit and a debit entry. Credit entries are used for (i) real resource flows denoting exports; and (ii) financial flows reflecting either a reduction in the economy's foreign assets or an increase in its foreign liabilities. Obversely, the compiling economy records debit entries for (i) real resource flows denoting imports, and (ii) financial items reflecting either an increase in assets or a decrease in liabilities. For example, an export transaction in which the foreign exchange receipts are deposited abroad would be recorded as:

- exports of goods: credit;
- short-term capital: debit.

Following the convention that credits are indicated by a positive sign and debits by a negative sign, and given that each transaction in principle involves a credit and debit entry in the same amount, the sum of all entries should be zero (deficiencies in coverage necessitate the insertion of balancing item - *net errors and emissions)*.

A surplus or deficit in the balance of payments involves summing up a subgroup of external transactions and distinguishing the transactions within this group *("above the line")* from items outside it *("below the line").* But where should we draw the line? The standard practice is to place below the line only the changes in short-term assets and liabilities of the monetary authorities, i.e., *the change in net official international reserves*.[2] However, if the net foreign position of commercial banks and other economic units is sizable and under the effective control of the authorities, it can be argued that their foreign position should also be placed below the line in the definition of the overall balance[3].

The balance of payments identity can be written as:

$$\Delta R = CAB + \Delta FI \qquad (9)$$

where:

ΔR - the change in net official international reserves of the monetary authorities;

ΔFI - the change in net foreign indebtedness of domestic residents other than what is classified as official reserves.

[2] Certain medium - and long-term borrowing of the monetary authorities, notably loans from international organizations that are used for balance of payments support, are classified below the line with other short-term liabilities.

[3] We must remember, that the balance of payments shows changes in reserves - a flow figure - while the monetary survey shows the stock of net foreign assets.

Equation (9) highlights the way in which the balance of payments acts as a constraint to resource use in the economy. Specifically, a current account deficit - which equation (5) showed was equal to an excess of absorption over income - can be sustained only as long as capital inflows persist and/or net official international reserves are not depleted.

CAB = GDI - A

$$\Rightarrow \quad \textbf{GNDI - A} = \Delta\textbf{R} - \Delta\textbf{FI}$$

CAB = ΔR - ΔFI

4. Fiscal accounts

The government sector is generally defined to encompass the authorities that are engaged in the pursuit of public purposes by providing nonmarket services and effecting income transfers financed by levies on other sectors in the economy. These function are performed by all entities of the general government sector, which mainly comprise: (1) the central government; (2) state governments; and (3) local governments. Social security funds and departmental enterprises are also included in the definition of the general government. Government-owned or controlled financial institutions are classified as public financial institutions, rather than as part of general government.

In market economies, nonfinancial public enterprises that produce and sell goods and services are excluded from the government sector but included in the definition of the public sector.

The operations of government influence the income growth, inflation, and balance of payments.

The sum of all kinds of budgetary receipts must by definition equal the sum of all kinds of expenditures. Consequently, as with the balance of payments, the concept of budget balance involves separating out for analytical purposes a subset of total budgetary transactions. Box 2 provides a summary of the main aggregates that enter a budget statement.

Box 2

Summary of Government Finances

Receipts	Expenditure
A. Current Revenue B. Capital Revenue C. Grants G. Financing Foreign Domestic	D. Current Expenditure E. Capital Expenditure F. Net Lending
A + B + C + G = D + E + F	

An overall surplus or deficit is normally defined as the difference between total revenue and grants (A + B + C) and total expenditure and net lending (D + E + F). Inasmuch as taxes and other government revenues absorb purchasing power of the private (nongovernment) sector and government expenditure increases aggregate demand, an overall deficit may be indicative of an expansionary fiscal stance. Similarly, an overall surplus may indicate a contractionary impact.

The difference between current revenue and current expenditure is a measure of government sector saving. A high level of government saving is sometimes interpreted as representing a contribution to development inasmuch as it allows a substantial amount of capital formation to be financed.

Government transactions as recorded in the different categories of the national accounts can be linked directly to the fiscal accounts. For example, *government consumption* can be derived from the fiscal accounts by totaling current expenditure on goods and services, including wages and salaries. This balance may, however, differ from government consumption in the national accounts (for example, the national accounts are on an accrual basis while the fiscal accounts are on a cash basis).

Government capital formation in the national accounts definition is equal to the acquisition by the government of new and existing fixed capital assets less sales of assets plus purchases of stocks. The definition of real capital formation in the fiscal accounts would differ from that in the national accounts to the extent of any sale of assets, e.g., through privatization of state enterprises. These would be reflected as capital revenue in the fiscal accounts.

The impact of given overall surplus or deficit on aggregate demand depends on the way the balance is financed. Financing covers all transactions involving holdings of currency, deposits, government liabilities, and any financial assets held by the government for the purpose of liquidity rather than public policy. Transactions in claims on others undertaken for public policy purposes are normally classified as net lending and are included above the line.

External financing is defined on a net basis. For example it would include disbursements by nonresidents of new loans after deducting amortization payments on outstanding debt. Each external financing transaction of the government would have a corresponding entry in the capital account of the balance of payments.

Domestic sources of financing are normally divided into two parts: *bank* and *nonbank borrowing*. Bank borrowing can be obtained from the monetary survey. Bank borrowing is defined to be equal to the change in banking system credit extended to the government, less any change in government deposits. Nonbank borrowing consists of other forms of domestic financing such as the sale of government debt instruments (bonds, treasury bills, etc.) to the nonbank sector of the economy. Information on such borrowing is obtained from government sources.

There is a simple accounting relationship between budgetary and external current account balances (recall equation 8).

$$\mathbf{(S_p - I_p) + (S_g - I_g) = X - IM + YF + TRF = CAB}$$

Let government saving be defined,

$$\mathbf{S_g = T - C_g,}$$

where:

T - taxes, paid to government;
$\mathbf{C_g}$ **-** consumption spending by government.

Let $\mathbf{G = I_g + C_g}$, then equation (8) can be rewritten,

$\mathbf{(S_p - I_p) + (T - C_g - I_g) = CAB}$ or alternatively,

$\mathbf{(S_p - I_p) + (T - G) = CAB,}$ **or** $\mathbf{(I_p - S_p) + (G - T) = - CAB}$

This equation shows the external current account balance as the counterpart of the domestic private sector's investment-saving balance and the overall budget deficit.

Reduction of fiscal deficits represents an important target of adjustment programs. Emphasis is also given to the financing of deficits, with limitations on government borrowing from the banking system and ceilings on commercial external borrowing by the government sector. Adjustment program have, in recent years, given increasing attention to the supply-side effects of fiscal measures. This requires more detailed emphasis on the structure of taxation and expenditure priorities.

5. Monetary accounts and the other macroeconomic accounts

Monetary statistics are consolidated at the different levels: the assets and liabilities of the monetary authorities, the assets and liabilities of commercial banks, and, finally, the *monetary survey*. The letter is a summary presentation of the consolidated balance sheets of the entire banking system, netting out all inter-bank transactions[4].

The monetary survey highlights that the liabilities of the banking system to the private sector and state enterprises - i.e., the money supply. consisting of currency in circulation, deposits, and other instruments issued by the banking system - are the counterpart of the sum of net foreign assets (value in local currency) and net domestic credit extended by the banking system:

[4] See lecture "Banking system and monetary policy".

M = NFA + DC **(10)**

where:

M - liabilities of the banking system (money supply);
NFA - net foreign assets of the banking system, including net official international reserves, R;
DC - net domestic credit extended by the banking system, including other items (net).

For each foreign asset transaction of the banking system, there should be a counterpart entry in the balance of payments, reflected either in the overall balance or above the line in the capital account. Specifically, the change in net foreign assets of the banking system should be equal to (1) the change in net official international reserves as reflected in the overall balance; and (2) the change in net foreign assets of the banking system not included in the definition of official reserves, as reflected in the capital account.

The monetary survey indicates that changes in the money stock reflect movements in net foreign assets or domestic credit. Countries undertaking adjustment programs may be expected to have a target for the balance of payments and are not indifferent to the combination of external and domestic factors affecting the money stock. In open economy operating under a fixed exchange rate the money supply is an endogenous variable influenced by surpluses and deficits in the balance of payments. For these reasons adjustment program usually adopt domestic credit as an intermediate target rather than the money supply.

Linkage of monetary instruments with balance of payments, growth and inflation targets might involve the following steps:

- prediction of the demand for money that is consistent with growth and inflation targets;

- establishment of a target for net foreign assets that is consistent with the balance of payments forecast;

- determination of a ceiling for domestic credit that is consistent with the predicted demand for money and balance of payments (NFA) objectives;

- consideration of the appropriate allocation of credit to the government given the total credit ceiling and the requirements of the private sector; and

- setting values for monetary instruments that are consist with the desired level of domestic credit and the money stock.

6. The flow of funds

It is possible to combine the accounts of the major sectors of an economy into a single table that shows the "balance of payments" for each sector, and how that balance is financed by borrowing and lending flows among sectors and with foreign countries. The table, called the "flow of funds" illustrates the nature of the financial linkages among the sectors of the economy.

Table: Schematic Flow of Funds

	Private Sector	Central Government	Banking System	Foreign Countries *)
	(S_p-I_p)	(S_g-I_g)		(-CAB)
Nonfinancial transactions balances (sectoral balances)	*	*		*
Financial balances	*		*	
Money and quasi-money	*		*	
Bank credit to private sector		*	*	

Bank credit to government			*	*
Net foreign assets		*		*
Foreign borrowing by government	*			*
Foreign borrowing by private sector				
Government domestic nonbank borrowing	*	*		

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*) The external sector of the reporting country, with sign reversed (deficit, +).

Each sector's balance on nonfinancial transactions - which is determined as the difference between sectoral saving and investment - should, in principle, be equal to the change in its financial assets and liabilities vis-a-vis the other domestic sectors and the rest of the world.

In constructing a flow of funds table the following conventions are usually followed: (1) the nonfinancial balance of banking system is assumed to be zero; nonfinancial transactions by this sector are implicitly included in the private sector; (2) a deficit in external sector has a plus sign, and surplus a negative sign; (3) for the financial flows (all figures below the first row), an increase in the asset take a negative sign (a "use of funds"), an increase in liabilities a positive sign (a "source of funds") and the other way around for decreases.

Entries in the first row the nonfinancial transactions balances, correspond to the components of following equation:

$$(S_p - I_p) + (T - G) - CAB = 0$$

The rows of the flow of funds table below the first row show the principal financial instruments used for intersectoral financing. Asterisks indicate the possible entries.

For example, an increase in the stock of money, which is a liability of the banking sector and an asset of the private sector, would be recorded twice in row 1, in columns 1 and 3. The increase in money stock would appear as a negative entry in column 1 and a positive entry in column 3.

The sum of all rows and columns should equal zero.

IV. Steps in economic forecasting

Preparation of a financial program requires an assessment of economic problems and the quantification of a coordinated set of policy instruments to achieve a given outcome. It requires completion of the major sector accounts to provide an internally consistent, and feasible, scenario of developments that could result from adopting a given package of policy measures. Given the linkages among the accounts, an iterative, rather than sequential, procedure is likely to be required to ensure a consistent program.

Steps in economic forecasting:

- evaluate economic problems;
- set preliminary targets;
- develop a policy program;
- prepare sectoral forecasts.

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