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MACROECONOMICS

STUDY GUIDE

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The Study Guide is intended for the students of Economic Faculty and it is a methodological supplement to macroeconomics textbooks. In addition to the key terms and recommended literature Study Guide contains questions and quizzes that allow to test and improve students' knowledge. Problems with solution and for self-study are represented for each topic of the course that consolidates practical skills.

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CONTENTS

PREFACE

The Study Guide that in front of you is designed to help you further your knowledge in the field of macroeconomics after previous acquaintance with its principles in the introductory course to political economy and after receiving extensive training in microeconomics. As you know the subject of macroeconomics is economic system at the nationl level that is the national economy as a whole.

Studying the discipline will help you understand the relevance of macroeconomic issues. You will find out the importance of the System of National Accounts: GDP and how it is calculated as well as other macroeconimc indicators; the correlation between the unemployment and inflation rates and what policy choices are available in the short run; the relationship between goods market and financial market; and why national debt is so dangerous. As a matter of fact, macroeconomic models should be the basis for most fiscal and monetary policy decisions.

These and many other questions are addressed in the 15 chapters offered for your attention (consideration). The structure of the Study Guide meets government educational standards of "bachelor" qualification training, curriculum of the specialty and work program of the discipline.

This Study Guide is a methodological supplement designed to accompany use of other textbooks on macroeconomics. The Macroeconomics course is both theoretical and practical, so each Chapter includes summary of all the key terms, learning of which is necessary for understanding the theoretical principles. Good command of the key terms will also help students better comprehend the media coverage of current macroeconomic issues. Questions and quizzes to each chapter are designed to help students test their knowledge and understanding of the material. Problems section contains problems with and without solutions for practice. An important task of the teacher is to get students interested and motivate them to explore additional sources; a list of recommended literature is represented for this purpose.

The Study Guide can be used in preparation for the final exam as well.

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Chapter 1.
Macroeconomics as an Economic Science

The goal of the first chapter is to understand macroeconomics subject and its differences from microeconomics, to outline the range of issues that will be investigated. The knowledge from studying political economy, history of economic thought, microeconomics has to be used definitely.

1. The subject of macroeconomics and the history of its formation.
2. Macro-analysis methods.
3. Circuit of products, costs and incomes.
4. The role of macroeconomics in society life.

Key terms

Макроекономіка	Macroeconomics
Ринок товарів та послуг	Goods market
Ринки ресурсів	Resource markets
Фінансовий ринок	Financial market
Домогосподарства	Households
Фірми	Business firms
Держава	Government
Іноземний сектор	Foreign sector
Потік	Flow
Запас	Stock
Агрегування	Aggregation
Модель кругових потоків	Circular-flow model
Екзогенні величини	Exogenous variables
Ендогенні величини	Endogenous variables

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Questions

1. Describe the similarities and main differences between microeconomics and macroeconomics.
2. What macroeconomic indicators can be classified as exogenous and endogenous?
3. Can either positive or normative analysis be used in macroeconomics?

4. What arguments can be brought to demonstrate the importance of studying macroeconomics?
5. What macroeconomic issues are most relevant for Ukraine today?

Quiz

Select a single correct answer

1. Macroeconomic markets include:
   a) the world oil market;
   b) the world grain market;
   c) the world gold market;
   d) foreign exchange market;
   e) all answers are correct .

2. The subject of the macroeconomics is all given below except:
   a) the reasons of the national economy growth;
   b) the money supply impact on the price level ;
   c) analysis of the government economic policy effectiveness;
   d) the reasons of the budget deficit;
   e) all of the following is the subject of macroeconomics.

3. Macroeconomics differs from microeconomics by the following aspects:
   a) the theory of equilibrium;
   b) the theory of investment;
   c) the theory of inflation;
   d) the theory of labor demand and labor supply ;
   e) all of the answers are wrong.

4. Indicators of flow can include:
   a) unemployed (number of unemployed);
   b) the public debt;
   c) the national wealth;
   d) real estate;
   e) imports.

5. Which of the statements is invalid:
   a) *ex post* analysis is used to develop new macroeconomic concepts;
   b) the goal of *ex post* analysis is to identify cause-and effect relationships and lawsof macroeconomic processes;
   c) *ex ante* analysis is used in macroeconomics;
   d) *ex ante* analysis is a predictive modeling of economic processes;
   e) all of the statements are correct.

Chapter 2.
Macroeconomic Indicators in the System of National Product and Income Accounts

This chapter is the conventional introduction to the discipline, since it is the beginning of the macroeconomic theory (both chronologically and logically). Macroeconomic science was founded in the 1930s, it was the creation of System of National Product and Income Accounts. Knowledge of its indicators is extremely important for mastering the course of macroeconomics. Macroeconomic indicators of this chapter are discussed in all of the following chapters.

1. The value of macroeconomic indicators. System of National Product and Income Accounts.
2. Gross domestic product (GDP) and the ways of its calculation.
3. Essence and methods of other National-income accounting's indicators calculation.
4. The role of prices in macroeconomic indicators calculation. Nominal and real GDP. Price index, its types and role in the calculation of GDP.
5. The social welfare.
6. Underground sector of economy.

Key terms

Система національних рахунків (СНР)	System of National Product and Income Accounts
Національне рахівництво	National-income accounting
Повторний рахунок	Double counting
Додана вартість	Value-added (VA)
Кінцевий продукт	Final product
Особисті споживчі витрати	Personal consumption expenditures
Валові приватні внутрішні інвестиції	Gross private domestic investment
Відрахування на споживання капіталу, амортизація	Capital consumption allowances, depreciation

Державні закупівлі	Government purchases
Чистий експорт товарів і послуг	Net export of goods and services
Валовий внутрішній продукт (ВВП)	Gross domestic product (GDP)
Валовий національний доход (ВНД)	Gross national income (GNI)
Чисті факторні доходи іноземців	Net foreign factor income (NFFI)
Чистий внутрішній продукт	Net domestic product (NDP)
Національний доход	National income (NI)
Непрямі податки	Indirect business taxes (IT)
Особистий доход	Personal income (PI)
Трансферти	Transfer payment (Tr)
Особистий доход після сплати податків	Disposable income (DI)
Індекс споживчих цін	Consumer price index (CPI)
Дефлятор ВВП	GDP deflator
Індекс цін Леспейреса	Laspeyres price index
Індекс цін Пааше	Paasche price index
Номінальний і реальний ВВП	Nominal and real GDP
ВВП на душу населення	GDP per person (per capita)
Тіньова економіка	Underground sector of economy

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Questions

1. The theory claims that there is no differnce which way to calculate GDP: either by incomes or expenditures. However, every time when someone attempts to do it for some reason they get different values of GDP.Which method gives higher value of GDP and why?
2. Does GDP include: a) monthly remittances that student gets out of the house; b) the pension of a former teacher; c) income from the sale of alcohol and tobacco products; d) money that were received from the sale of the previous years' car; e) purchase of automobile company shares; f) rent for premises?
3. A citizen of Ukraine works temporarily in Italy. His income will be considered a part of which country's GDP and GNI?
4. Under what circumstances is real GDP greater than nominal? Can they be equal?

5. Why does GDP not measure the level of the country's welfare? Are there any benefits in GDP leading to a decline of welfare level with the growth of its production?

6. What is the difference between GDP and GNI? In what cases does it make sense to use each of them?

7. How will the GDP and GNI of Sweden, Ukraine and Mexico change if the Swedish fans drink tequila in a Kyiv restaurant?

Quiz

Select a single correct answer

1. All of the following operations are considered as investment in macroeconomics, except:

a) a new car factory construction;
b) purchase of a new cottage home by an automobile factory employee;
c) increase of automobile factory stocks of unsold goods;
d) purchase of automobile factory shares;
e) buying of a conveyor line for an automobile factory.

2. Which of the following is a part of the disposable income, but is not included in the calculation of GNI :

a) depreciation ;
b) corporations profit that is paid as dividends;
c) pensions of public servants;
d) wages;
e) indirect taxes.

3. If Ukrainian GDP exceeds its GNI, it means that:

a) foreigners produced more than Ukrainians abroad;
b) Ukrainians produced more abroad than foreigners in Ukraine;
c) real GDP exceeds the nominal GNI;
d) real GNI exceeds nominal GDP;
e) production of intermediate goods exceeds the final goods production.

4. If the GDP value exceeds the GNI by 25%, then the value of net foreign factor income:

a) is 1,25 times smaller than GDP;
b) is 2,25 times smaller than GDP;
c) is 3 times smaller than GDP;
d) is 4 times smaller than GDP;
e) is 5 times smaller than GDP.

5. Nominal GDP was 500 billion tugriks in 2010. If deflator rose by 7% over 3 years, and real GDP fell by 4 %, then the nominal GDP in 2013 was :
a) 446,4 bln., b) 511 bln., c) 513,6 bln., d) 555 bln., e) 556,4 bln.

Problems (with solutions)

1. Using (given) the available data calculate the following indicators: GDP, GNI, NDP, NNP, national income, personal income (by expenditure and income methods); disposable income; personal savings; government budget balance.

Indirect taxes	28
Government purchases of goods and services	72
Undistributed corporate profits	35
Foreign factor incomes of citizens abroad	33
Depreciation	45
Interest rate of government securities	31
Imports	25
Net private investment	49
Corporate income taxes	22
Wages	216
Profits from foreign factors in this country	19
Rent	21
Entrepreneurial (proprietors') income	47
Social security contributions	20
Interest rate	38
Dividends	36
Consumer expenditures	315
Exports	18
Personal taxes	17
Transfer payments	6

Solution

C = 315
I_g = 49 + 45
G = 72
NE = 18 – 25 = -7

GDP = 474

W = 216
R = 21
R = 38
p = 22 + 36 + 35 = 93
EI = 47

NI = 415
IT = 28

NNP = 443
D = 45

GNP = 488
NFFI = 19 – 33 = -14

GDP = 474

PI = 415 – 22 – 35 – 20 + 6 + 31 = 375;
PI = 216 – 20 + 21 + 38 + 36 + 47 + 6 + 31 = 375;
DI = 375 – 17 = 358;
S = 358 – 315 = 43.

Budget incomes = 17 + 20 + 35 + 28 = 100**;**
Budget expenditures = 72 + 6 +31 = 109**;**
Budget balance (deficit) = 9.

2. GDP of the country is 500 billion euros. Net foreign factor income is 5 billion euros, wage - 300 billion euros, interest of credits - 23 billion euros, corporate income tax - 19 billion euros, rent - 18 billion euros, interest of government securities – 6 billion euros, transfer payments - 16 billion euros, depreciation - 53 billion euros, dividends - 15 billion euros, indirect taxes - 20 billion euros, undistributed corporate profit - 12 billion euros. Determine incomes of proprietors (unincorporated businesses).

Solution

Entrepreneurial (proprietors') incomes are the part of national income:

$$NI = W + R + r + p + EI.$$

Therefore, at first we define the national income.

$$NI = GNI – D – IT = GDP – NFFI – D – IT.$$
$$NI = 500 – (-5) – 53 – 20 = 432.$$

Then, incomes of proprietors:

$$EI = NI – W - R - r – p:$$
$$EI = 432 – 300 – 18 – 23 – (19 + 15 + 12) = 45 \text{ (billion euros).}$$

(The rest of the data is not used).

3. Capitaniya country produces only three commodities: cakes, cinnamon, coca-cola. (Given) Using the data from the table, define nominal and real GDP in 2012 and 2013, Paasche, Laspeyres and Fisher price and volume indexes.

Good	**2012**		**2013**	
	P	**Q**	**P**	**Q**
Cakes	10	15	11	13
Cinnamon	2	23	3	24
Coca-cola	7	9	5	10

Solution

Good	**2012**		**2013**		**2012**		**2013**	
	$\mathbf{P_0}$	$\mathbf{Q_0}$	$\mathbf{P_1}$	$\mathbf{Q_1}$	$\mathbf{P_0\,Q_0}$	$\mathbf{P_1\,Q_0}$	$\mathbf{P_0\,Q_1}$	$\mathbf{P_1\,Q_1}$
Cakes	10	15	11	13	150	165	130	143
Cinnamon	2	23	3	24	46	69	48	72
Coca-cola	7	9	5	10	63	45	70	50
GDP					259	279	248	265
					nominal	real	real	nominal

Laspeyres price index:

$$I_L = \frac{\sum P_1 Q_0}{\sum P_0 Q_0} = \frac{279}{259} = 1{,}0772 \text{ (price level increased by 7,72\%)}$$

Paasche price index:

$$I_P = \frac{\sum P_1 Q_1}{\sum P_0 Q_1} = \frac{265}{248} = 1{,}0685 \text{ (price level increased by 6,85\%)}$$

Fisher price index:

$$I_F = \sqrt{I_L I_P} = \sqrt{1{,}0772 \cdot 1{,}0685} = 1{,}0728 \text{ (the average price level increased by 7,28\%)}$$

GDP growth can be determined by the volume indexes.

Laspeyres volume index:

$$I_L = \frac{\sum P_0 Q_1}{\sum P_0 Q_0} = \frac{248}{259} = 0{,}9575 \text{ (rate of decline is 4,25\%)}$$

Paasche volume index:

$$I_P = \frac{\sum P_1 Q_1}{\sum P_1 Q_0} = \frac{265}{279} = 0{,}9498 \text{ (rate of decline is 5,02\%).}$$

Fisher volume index:

$$I_F = \sqrt{I_L I_P} = \sqrt{0{,}9575 \cdot 0{,}9498} = 0{,}9536 \text{ (rate of real GDP decline - 4,64 \%).}$$

Thus, despite the growth of nominal GDP by 2,32%:

$$\text{index of nominal GDP change} = \frac{\sum P_1 Q_1}{\sum P_0 Q_0} = \frac{265}{259} = 1{,}0232;$$

real GDP declined by 4,64%.

4. The price level increased by 40% in the country during the year. Nominal GDP increased by 54%. Find the rate of real growth.

Solution

$$\text{Index of real GDP change} = \frac{Index \quad of \quad nominal \quad GDP \quad change}{Index \ price \ change} = \frac{1{,}54}{1{,}4} = 1{,}1.$$

Therefore, the rate of real growth is 10%.

5. GDP was 638 billion euros in 2007, and 605 billion euros in 2006. If real growth of economy was 3% for this year, in what way and how much did prices change?

Solution

Nominal GDP 2007 p. = $\sum P_1Q_1 = 638.$

Nominal GDP 2006 p. = $\sum P_0Q_0 = 605.$

Real growth helps identify real GDP in 2007 (in prices of 2006):

$$\sum P_0Q_1 = 605 \times 1{,}03 = 623{,}15.$$

Then, the price's change can be found with the help of

$$\text{GDP deflator} = I_P = \frac{\sum P_1Q_1}{\sum P_0Q_1} = \frac{638}{623{,}15} = 1{,}0238.$$

The price level increased by 2,4%.

Problems

1. Macroeconomic indicators of a country's economy are known and represented in the table. Calculate missing indicators.

Indicators	Variant 1	Variant 2	Variant 3	Variant 4
Personal consumption expenditures	195	318	580	729
Net private domestic investment	29	65	92	145
Depreciation	39		85	
Gross private domestic investment		106		224
Government purchases	37	93	134	
Exports	41	46	29	195
Imports	36	31	41	
Net export of goods and				-9

services				
Foreign factor payment	9	11	28	195
Foreign factor income	17	8	20	
Net foreign factor income				-12
Wages	132	226	420	
Rent	12	19	32	37
Interest rate	16	36	55	43
Corporate profits		141	148	
Corporate income taxes	23	51		108
Dividends	18		39	52
Undistributed corporate profits	33	48	36	80
Entrepreneurial (proprietors') income	19	39	78	64
Indirect business taxes	21	27	53	55
Social security contributions	15	24		61
Transfer payments	31	29	75	92
Government securities interest rate	25	12	46	71
Personal taxes	34	32	69	148
Gross domestic product				
Gross national income				
Net domestic product				
Net national product				
National income				
Personal income				
Disposable income				
Personal savings				37
Government budget balance			-11	

2. Using the available data, calculate such indicators: GDP, GNI, NDP, NNP, national income, personal income (by expenditure and income methods); disposable income; personal savings; government budget balance.

Table A

Interest on credit	29
Social security contributions	19
Gross private domestic investment	86
Foreign factor income	5
Wages	186
Corporate profits	74
Indirect business taxes	26
Foreign factor payment	15
Rent	17
Imports	20
Corporate income taxes	35
Exports	34
Government purchases	70
Net private domestic investment	54
Entrepreneurial (proprietors') income	41
Personal taxes	24
Transfer payments	23
Consumption	245
Dividends	17
Government securities interest rate	11

Table B

Government purchases	93
Government securities interest rate	13
Foreign factor payment	17
Personal taxes	48
Rent	13

Consumption	470
Depreciation	80
Dividends	28
Indirect business taxes	39
Transfer payments	51
Imports	47
Foreign factor income	10
Interest on capital	27
Corporate profits	101
Property income	25
Exports	42
Wages	397
Undistributed corporate profits	31
Net private domestic investment	51
Social security contributions	28

Table C

Undistributed corporate profits	53
Interest on credit	93
Imports	151
Property incomes	74
Personal consumption	1105
Net private domestic investment	84
Capital consumption costs	176
Government securities interest rate	26
Personal taxes	162
Dividends	60
Wages	942
Profits from domestic factors in other countries	142
Transfer payments	193
Rental payment	38
Indirect business taxes	121

Exports	128
Social security contributions	122
Government purchases	297
Profits from foreign factors in this country	153
Corporate income taxes	71

3. The country economy is characterized by such macroeconomic indicators.

Undistributed corporate profits	120
Social security contributions	60
Government budget balance	-96
Gross private investment	600
Government securities interest rate	50
Imports	200
Indirect taxes	70
Incomes that are earned by foreigners	190
Personal taxes	180
Consumer expenditures of households	800
Depreciation	150
Exports	300
Transfer payments	200
Incomes of citizens that were obtained abroad	110
The share of corporate incomes' tax in GDP	0,08

Define the value of GDP, national income, government purchases, personal income and savings.

4. Using the data define: a) the basic year; b) price level change from 1929 to 1933 and from 1933 to 1939 years; c) real GDP.

Year	**Nominal GDP**	**Deflator**	**Real GDP**
1929	104	121	
1933	56	91	
1939	91	100	

5. Country economy had such indicators:

Indicators	2011	2012
Interest on credit	6	8
Imports	17	13
Social security contributions	10	12
Wages in private sector	123	129
Dividends	14	16
Personal consumption	154	168
Capital assets consumption	31	34
Net private domestic investment	22	23
Rent	5	7
Undistributed corporate profits	16	18
Government purchases	49	46
Exports	11	15
Civil servants wages	19	20
Transfers	12	14

The physical volume of GDP increased by 3% in 2011.

- Define GDP in 2011 and 2012. What components do you consider?
- Define GDP deflator in 2012.

6. Nominal GDP is increasing from 215 to 258 billion dinars, and GDP deflator - from 125 to 150%. What will happen with the real GDP indicator?

7. The price level in the country increased by 60% and GDP at current prices increased by 75%. Find the economy growth rate.

8. GDP was 525 billion francs in 2012, and 580 billion francs in 2013. Define GDP deflator in 2013 given that the real GDP grew by 5%.

9. Busurmaniya produces only three products: beer, boxes and brushes. Using the table, define nominal and real GDP in 2010 and 2012, GDP growth rates, Paasche, Laspeyres and Fisher price indexes in 2012, given 2010 is the basic year. How has the general price level changed (by Fisher price index?)

Goods	2010		2012	
	P_0	Q_0	P_1	Q_1
Beer	5	15	6	10
Boxes	3	25	4	28
Brushes	20	9	16	12

10. Nominal GDP was 560 billion dollars in 2012. Nominal GDP is 545 billion dollars in 2013, and GDP deflator – 0,95. Define the rate of economic growth.

11. Nominal GDP is 1600 billion euros in 2013, GDP deflator – 1,1, and the rate of economic growth - 5%. Define nominal GDP in 2012.

12. Detine the amount of net exports, if consumption is 60% of GDP, transfers minus taxes are 5% of GDP and equal 25, investments - 20% of GDP, the budget deficit - 17% of GDP.

Chapter 3.
Labor Market. Unemployment

The macroeconomic model is based on the assumption that households, firms and government interact at three aggregate markets: the labor market, commodity market and capital market. Let's start with the labor market. It has extraordinary importance in terms of wages and employment determination. The chapter requires some knowledge of microeconomics. Obtained knowledge can be utilized in studying the subject "Labor Economics" in the future.

1. Labor market.
2. Definition and reasons of unemployment.
3. Types of unemployment. The natural rate of unemployment.
4. The economic and social costs of unemployment. Okun's law.

Key terms

Попит на працю	Demand for labor
Пропозиція праці	Supply of labor (Labor Supply)
Рівновага на ринку праці	Equilibrium at the labor market
Економічно активне населення	Economically active population (Labor force)
Інституціональне населення	Institutionalized population
Зайнятість	Employment
Безробіття	Unemployment
Рівень безробіття	Unemployment rate
Рівень участі в робочій силі	Labour force participation rate
Фрикційне безробіття	Frictional unemployment
Структурне безробіття	Structural unemployment
Циклічне безробіття	Cyclical unemployment
Сезонне безробіття	Seasonal unemployment
Приховане безробіття	Hidden unemployment
Змушене безробіття	Involuntary unemployment
Теорія стимулюючої заробітної платні	Efficiency-wage theory

Природний рівень безробіття	Natural rate of unemployment, NRU Non-accelerating-inflation rate of unemployment, NAIRU
Повна зайнятість	Full employment
Закон Оукена	Okun's law

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Questions

1. What is the difference between the demand for labor force and its supply?
2. What type of unemployment is "desirable" in some cases and why? Can we say that unemployment is necessary?
3. Determine the category (employed, unemployed, those who are not included in the labor force) of the following people:

• a housewife who devoted herself to family and upbringing of children.
• a singer who got sick with pneumonia.
• a teacher who couldn't work with children any longer because of his health condition.
• a financial analyst fired because of the wrong analysis.
• an actor earning additional income organizing private parties.
• a robber convicted to 3 years.

4. Define a kind of unemployment in the following situations:

• a graduate of university, who found that his education is outdated and useless.
• a copywriter fired because of the recession.
• a realtor who lost his jobs because of decreasing demand for real estate.
• an image-maker, who fired purposely to move to the capital.

5. How unemployment benefits can affect the value of the natural rate of unemployment?

Quiz

Select a single correct answer

1. If Ostap graduated from full-time department of the university, found a job, but did not start it, then the unemployment rate:

a) is reducing;
b) is increasing;
c) does not change;
d) cannot be determined for sure.

2. The natural rate of unemployment depends on:
   a) the value of unemployment benefits;
   b) the value of cyclical unemployment;
   c) the number of economically inactive population;
   d) the value of real GDP;
   e) no correct answer.

3. According to Okun's law:
   a) the natural rate of unemployment decreases at the phase of recession;
   b) there is a direct connection between potential GDP and the natural rate of unemployment;
   c) there is an inverse relationship between actual GDP and the level of cyclical unemployment;
   d) there is an inverse relationship between the Okun's coefficient and the unemployment rate.

4. There is full employment in economy if:
   a) all employable population is working;
   b) the actual unemployment rate is zero;
   c) employment service is not registered as unemployed;
   d) there are no vacancies;
   e) no correct answer.

5. If the number of employed is by 4 times more than the number of unemployed, then the unemployment rate is:
   a) 25 %; b) 20 %; c) 12,5%; d) 10%; e) 0,25%.

Problems (with solutions)

1. If the labor force is 100 mln. people, and the unemployment rate is 8 %, determine the number of employed.

Solution

The unemployment rate is defined as

$$u = \frac{Unemloyed}{\text{Re}al \quad labor \quad force} \times 100\% .$$

Therefore, the number of unemployed:

$$U = 100 \times 0{,}08 = 8.$$

And the number of employed:

$$100 - 8 = 92 \text{ (mln.persons)}.$$

2. The number of employed in the country is 63,7 mln., the number of unemployed is 6,3 mln. If the natural rate of unemployment is 6%, determine the number of cyclical unemployment.

Solution

The actual unemployment rate in the country:

$$u = \frac{6,3}{63,7 + 6,3} \times 100\% = 9\%.$$

The cyclical unemployment rate:

$$u_{cycl} = 9 - 6 = 3\%.$$

The number of cyclical unemployed:

$$70 \times 0,03 = 2,1 \text{ (mln.persons)}.$$

3. The unemployment rate in the country was 8%, while the natural rate was 6%. If potential GDP is 480 billion euros, determine the amount of actual GDP.

Solution

According to Okun's law the excess of the actual unemployment rate over the natural by 1% leads to lagging of actual GDP from potential by 2,5%. According to task condition, the actual unemployment rate exceeds the natural by

$$\Delta u = 8 - 6 = 2\%.$$

Then the actual GDP is lagging behind the potential by

$$2 \times 2,5 = 5\%.$$

and is determined by the proportion:

$$480 - 100\%$$
$$x - 95\%.$$
$$x = 480 \times 0,95 = 456 \text{ billion euros}.$$

4. The number of employed is 135 million people in the country, the number of frictional unemployment is 5 mln., structural is 4 mln., cyclical is 6 mln. If actual GDP is 460 million euros, and potential - 500 million euros, determine the Okun's coefficient.

Solution

The sum of frictional and structural unemployment is:

$$U_{fric} + U_{struct} = 5 + 4 = 9.$$

And the total number of unemployed is:

$$U = 5 + 4 + 6 = 15.$$

Taking into account that the number of labor force is:

$$135 + 15 = 150,$$

we can define the natural and actual unemployment rate:

$$u^* = \frac{9}{150} \times 100\% = 6\ \%.$$

$$u = \frac{15}{150} \times 100\% = 10\ \%.$$

Excess of actual unemployment rate over the natural is:

$$\Delta u = 10 - 6 = 4\ \%.$$

And the lagging of actual GDP from potential is:

$$\Delta Y = \frac{460}{500} \times 100\% = 92\ \%;\ 100 - 92 = 8\ \%.$$

Then from the ratio

$$4 \times \gamma = 8;$$

we will find Okun's coefficient:

$$\gamma = 2.$$

Problems

1. Fill the table.

Country	Employable population	Labour force			Labour force participation rate	Unemployment rate	Employment rate
		Employed	Unemployed	Total			
I	120	68	6				
II	85	43	3				
III	91	35	3				
IV	53	27	4				

2. Number of employed - 34 million people, number of unemployed is 3 million people. Calculate the unemployment rate. Later, 1 million people of 34 million employed . 0,2 million of officially registered as unemployed lost the hope of finding a job and stopped looking for it. Determine the current number of employed, unemployed, unemployment rate.

3. Find real GDP if labour force is 20 million people, employed are 18,5 million people, natural rate of unemployment is 5,5%, and GDP is 120 billion dinars in conditions of full employment.

4. The actual unemployment rate was 9,6%, the actual GDP - 2366 billion forints in 2013. Determine natural output, if the natural rate of unemployment is 6%.

5. The country had the following indicators of unemployment in 2012: frictional - 3%, structural - 2% cyclical - 4%. GDP was 3150 billion marks in 2012. If unemployment did not exceed the natural level what would the GDP the GDP be?

6. Natural rate of unemployment is 6%, the actual rate is 10,4%. If the volume of GDP was 1513 billion tugriks, in these these conditions what volume of GDP was lost due to excessive unemployment?

7. Potential GDP is 520 billion guilders, real GDP is 481 billion. Natural rate of unemployment is 5%. What is the actual level of unemployment in these conditions?

8. The actual unemployment rate is 9%. We know that potential GDP - is560 billion riyals, but the actual GDP lags behind from it by 49 billion. How much is the natural rate of unemployment in these conditions?

9. Define the potential labour force, labour force, actual unemployment, natural rate of unemployment, employment rate. What is the level of potential GDP, if the actual one is 480 billion crowns?

The population of the country	75 million

Children under 16 years	8 million
Inmates in correctional facilities	5 million
Patients of psychiatric clinics	2 million
Retirees	6 million
Homeless	3 million.
Housewives	7 million
Students	6,5 million
full-time	5,2 million
Those fired and not looking for a job	4 million
Employed, part-time and looking for a job	1 million
Those on the sick-list	1,7 million
Those fired because of recession	1,6 million
Those fired because of structural changes	0,9 million
Those fired on their own and looking for a job	1,2 million

10. Potential GDP was 840 billion francs, and the actual one was 882 billion francs. If the natural rate of unemployment was 6%, then what was the actual level of unemployment?

11. The labor force in the country is 270 million people. Functions of labor demand and supply are: $D_L = 550 – 3W$; $S_L = -150 + 4W$, where W - real wages. According to the neoclassical theory, identify voluntary and involuntary unemployment. The labor unions could increase the average nominal wages by 10% in the following year. If prices increased by 4,7% over the previous year, then define the appropriate number of unemployed. Represent the situation graphically.

12. The labor force in the country is 90 million people. The labor market is described by the following equations: $D_L = 355 – 5W$; $S_L = -140 + 4W$, where W - real wages. The demand for labor changed due to certain reasons, and as a result, the function of demand for labor became: $D_L = 310 – 5W$. Represent the situation at the labor market graphically. Determine the equilibrium level of real wages, employment, voluntary and involuntary unemployment before and after the change of labor demand. What reason could lead the function of the demand for labor to this change?

Chapter 4.
Goods Market. Aggregate Demand and Aggregate Supply

Central element of macroeconomics is a goods market. Concepts of "demand" and "supply" are the original staples of economic theory. This is true for macroeconomics as well. However, using the method of aggregation we should define such concepts as "aggregate demand" and "aggregate supply". They constitute the basic macroeconomic model that helps explore the market of goods and conditions of macroeconomic equilibrium.

1. Aggregate demand. Aggregate demand curve. Factors affecting the aggregate demand.
2. Aggregate supply. Aggregate supply curve. Factors affecting the aggregate supply.
3. Macroeconomic equilibrium.
4. Shocks of aggregate demand and aggregate supply.

Key terms

Сукупний попит	Aggregate demand, AD
Ефект ставки відсотка	Interest rate effect
Ефект багатства, або реальних касових залишків	Real money balances effect
Ефект зовнішньої торгівлі	Foreign trade (net export) effect
Сукупна пропозиція	Aggregate supply, AS
Коротко-, довгостроковий періоди	Short run and long run
Крива довгострокової сукупної пропозиції	Long-run aggregate supply curve, LRAS
Крива короткострокової сукупної пропозиції	Short-run aggregate supply curve, SRAS
Макроекономічна рівновага	(macro) Equilibrium
Фактичний рівноважний обсяг випуску	Actual output
Потенційний (природній) обсяг випуску	Natural output
Ефект “храповика”	Ratchet effect
Позитивний шок сукупного попиту	Positive demand shock

Негативний шок сукупного попиту	Negative demand shock
Позитивний шок сукупної пропозиції	Favourable supply shock
Негативний шок сукупної пропозиції (ціновий шок)	Adverse supply shock (price shock)

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Questions

1. How does the money supply, its velocity and inflationary processes, influence the aggregate demand?
2. How does the aggregate supply curve look like in the classical and Keynesian models? How does the classical model explain a simultaneous increase of GDP and price level?
3. What is the connection between the production possibilities curve and aggregate supply? What does the concept the "potential output" mean?
4. What does "equilibrium GDP mean?" What is the state of the economy?
5. What do supply "shocks" mean? Are these events short- or long-run? How do they affect the price level and output?

Quiz

Select a single correct answer

1. Which of the following events will not affect the long-run aggregate supply graph position:
   a) military operations in the country, and as a result, much of production capacity being destroyed;
   b) increase of oil prices;
   c) appearance of new technologies;
   d) reduction of the natural rate of unemployment as a result, of government employment policy.

2. Shift of the aggregate demand curve cannot be explained by:
   a) export growth;
   b) increase of the price level in the economy;
   c) increase of inflationary expectations;
   d) increase of military expenditures;
   e) a decrease of imports.

3. If increase of aggregate demand exceeds potential GDP growth in the economy that is growing, we can expect that:
   a) output will decrease;
   b) price level will increase;
   c) output will increase and price level will decrease;
   d) price level will increase in condition of permanent output;
   e) price level will not change.

4. The reason of the negative aggregate demand shock can be:
   a) tax reduction;
   b) reduction of labor productivity;
   c) reduction of the money supply;
   d) reduction of interest rate;
   e) no correct answer.

5. Which of the following cannot be attributed to supply shocks:
   a) sharp increase in prices of resources;
   b) increase of environmental protection costs;
   c) increase of velocity of money;
   d) natural disaster leading to the loss of a large part of resources.

Problems (with solutions)

1. How do the following factors affect aggregate demand and aggregate supply? How will the equilibrium price level and equilibrium real output change as a result of this (if all other conditions are equal)? Represent the situation graphically.
   1) The growth of the money supply.
   2) Crop failure due to severe drought.
   3) Growing pessimism among investors.
   4).Reducing of monopolization level on resource markets.

Solution

1). The growth of the money supply is a factor of aggregate demand. In condition of ceteris paribus, it will improve the solvency of the population, consumer spending and increase aggregate demand.

As a result of aggregate demand increase both the price level and real output can increase as well:

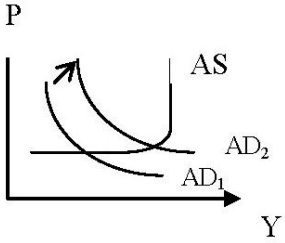


Fig. 4.1. Aggregate demand increase

If aggregate demand growth is only on a horizontal or only vertical segment of the aggregate supply curve, it changes only one parameter (price level or real output):

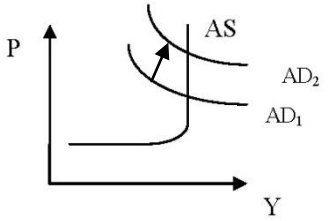


Fig. 4.2. Aggregate demand change on a vertical segment

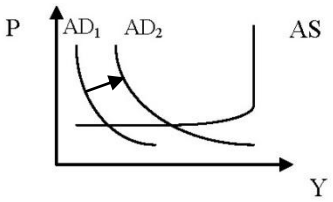


Fig. 4.3. Aggregate demand change on a horizontal segment

2) Crop failure due to severe drought will reduce aggregate supply. As a result, the price level should increase, and the real output drop.

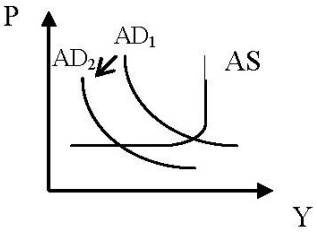


Fig. 4.4. Aggregate supply decrease

3). Growing pessimism among investors will reduce investment in economy and, consequently, reduce aggregate demand.

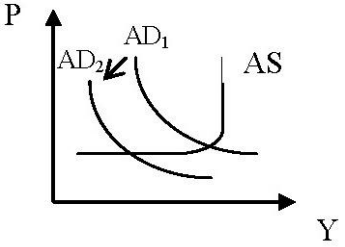


Fig. 4.5. Aggregate demand reduction

4). Reducing of monopolization level on resource markets should lead to decrease of price level for resources. This will affect the growth of aggregate supply. As a result, real GDP should increase and price level – decrease.

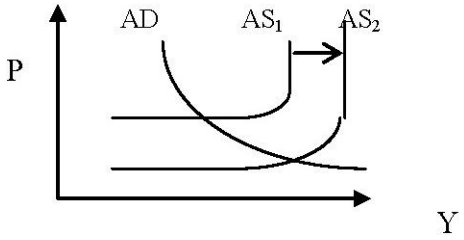


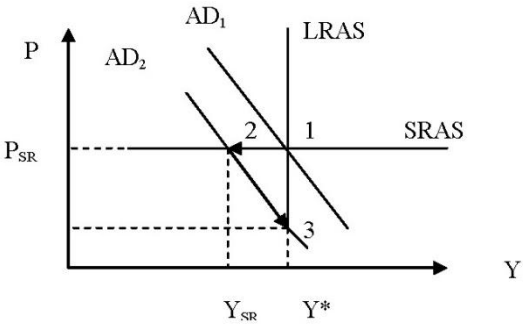
Fig. 4.6. Aggregate supply increase

2. Potential GDP is 3000 mln. euros and it displays the initial state of the economy. The aggregate demand curve equation had the original form: Y = 3300 - 250P, then due to the devaluation of the national currency it has acquired the form: Y = 3350 - 250P. Determine the equilibrium GDP and the price level in the short- and long-run. Show the situation graphically.

Solution

The initial state of equilibrium (1) is an intersection of LRAS and AD_1 graphs.

The devaluation of the national currency promotes exports and reduces imports, so net exports will increase, as a result, aggregate demand will increase as well (to AD_2). Prices on resources are unchanged in the short-run period; there is a great number of unemployed resources, so the change of aggregate demand will only increase the equilibrium volume of output (Y_{SR}), without changing the price level (2).



Equilibrium in position (2) is unstable. The demand for resources increases, so prices begin to rise as well. Profitability and volumes of production begin to decline in these conditions. Resources prices are increasing because the general price level increases. These processes bring the economy to position (3) which is a new long-run equilibrium coordinates Y* and P_{LR}.

The economy remains at the level of potential GDP in the long-run, so

$$Y_{LR} = Y^* = 3000 \text{ mln.euros.}$$

We can determine the price level in the short-run from position (1) – P_{SR}:

$$3300 - 250P = 3000;$$
$$250P = 300;$$
$$P_{SR} = 1,2.$$

Define the real output in the short run from position (2) - Y_{SR}:

$$Y_{SR} = 3350 - 250P = 3350 - 250 \times 1,2 = 3050.$$

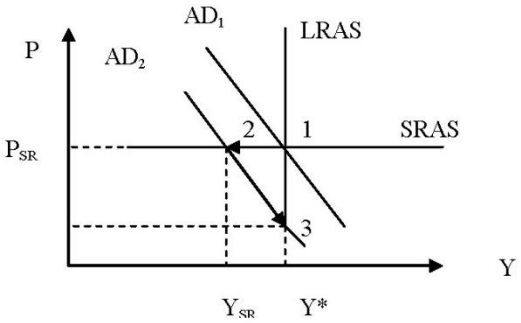
Finally, we can find the price level in the long-run from equilibrium (3) – P_{LR};

$$3350 - 250P = 3000;$$
$$250P = 350;$$
$$P_{LR} = 1,4.$$

3. Potential GDP is 5000 million dollars and displays the initial state of the economy. The aggregate demand curve equation had the original form: Y = 5600 - 400P. Aggregate demand has shifted in such a way that output changed at 4% in the short-run period because of a government funding reduction of social programs. Determine the equilibrium GDP and the price level in the short- and long-run periods, the new equation of aggregate demand. Show the situation graphically.

Solution

As a result of funding social programs reduction, we can expect a decrease of aggregate demand. It will lead to decrease of output level to the Y_{SR} level in the short-run (unstable equilibrium). Over time, the demand for resources will decrease and prices will drop. The output in these conditions will increase to previous levels Y*. Finally, the general price level is established at P_{LR} level.



Thus, the economy remains at the level of potential GDP in the long-run, so

$$Y_{LR} = Y^* = 5000 \text{ mln.dollars.}$$

Output changed by 4% in the short-run, according to the premises of the problem, that is

$$Y_{SR} = 5000 \times 0{,}96 = 4800 \text{ mln.dollars.}$$

The price level in this period can be found from the position (1):

$$5600 - 400P = 5000;$$
$$400P = 600;$$
$$P_{SR} = 1{,}5.$$

The aggregate demand schedule shifts parallelly, so AD_2 function has the same slope:

$$Y = x - 400P.$$

Substituting the coordinates of the point (2), we can determine the equation AD_2:

$$4800 = x - 400 \times 1{,}5;$$
$$x = 5400.$$
$$Y = 5400 - 400P.$$

Knowing the equation AD_2, you can find the price level in the long-run (position 3):

$$5400 - 400P = 5000;$$
$$400P = 400;$$
$$P_{LR} = 1.$$

Problems

1. What factors can lead to a shift of the aggregate supply curve which will result in both decrase in real output and inflation? What actions should the government take if it tries to make aggregate demand increase total production? What will happen with the price level?
2. What actions should the government take if it tries to make aggregate demand stop inflation? What will happen with aggregate output?
3. What impact will the following factors have on aggregate demand and aggregate supply? How will the equilibrium price level and equilibrium real national output change as a result (ceteris paribus)? Show the situation graphically.

- Increase of land prices.
- Increase of fertility level.
- Large grain purchases of foreign country.
- The final dissolution of OPEC.
- Sharp decline in national income of those countries that are major trading partners.
- The discovery of natural gas rich deposits.
- Reducing the amount of imported goods purchases.
- Reducing the proportion of the labor force united in labor unions.
- Increase of immigration into the country.
- Increase of productivity.
- Increase of unemployment.
- Increase of wages by 10%.
- Increase of environmental protection requirements.

4. Build the model "aggregate demand - aggregate supply" by given data.

The amount of aggregate production, which are in demand, billion dollars.	Price level	The volume of domestic production (output), which is offered for sale, billion dollars.
400	100	200
400	100	300
300	200	400
200	300	400

- What will be the equilibrium price level and equilibrium output?

- What changes in production or consumption can lead to equilibrium with price level of 100, 200?
- Does equilibrium real output coincide with potential? Determine the unemployment level in the country, if the natural rate is 6%.

5. Aggregate demand and aggregate supply are characterized by the following data:

Real national output, which is in demand, billion euros	Price level	Real national output, which is offered for sale, billion euros
400	100	100
350	150	200
300	200	300
250	250	400
200	300	400

Draw graphs of aggregate demand and aggregate supply. What will be the equilibrium price level and equilibrium real national output? Do the equilibrium real output and the potential output match?

6. Aggregate demand and aggregate supply are characterized by the following data:

Real national output, which is in demand, billion euros	Price level	Real national output, which is offered for sale, billion euros
450	100	200
450	100	350
400	150	400
350	200	450
300	250	
250	300	

Draw graphs of aggregate demand and aggregate supply. Determine the equilibrium price level and the equilibrium real national output. Equilibrium output was generated in conditions of significant production recession. Cyclical unemployment was 8%. What would be the domestic production, if unemployment does not exceed the natural rate? Draw the graph.

7. The aggregate demand curve equation had the form: Y = 4500 - 300P, then it took the next form since the investment demand increased: Y = 4650 - 300P. Potential GDP is 4050 million francs and displayes the

initial state of the economy. Determine the equilibrium GDP and the price level in the short and long run. Showthe situation graphically.

8. The aggregate demand curve equation had the form: Y = 2450 - 300P, but it changed because of government expenditures reduction: Y = 2360 - 300P. The economy was initially able to make full use of resources with the equilibrium GDP in 2000 million marks. Show graphically and calculate the equilibrium GDP and the price level in the short and long run.

9. The economy was initially able to make full use of resources with the equilibrium GDP in 3130 million dinars. The aggregate demand curve equation had the form: Y = 3650 - 400P. The aggregate demand curve shifted in such a way that GDP fell by 80 million dinars because of personal taxes increase. Show graphically the equilibrium in the short and long run and determine the coordinates of equilibrium points.

10. The economy was initially able to make full use of resources with potential GDP in 2500 million rupees. The aggregate demand curve equation had the form: Y = 2625 - 125P. The reduction of household's propensity to save has shifted the aggregate demand curve in such a way that short-term GDP changed at 1%. Display graphically the equilibrium, determine the equilibrium GDP and the price level in the short and longrun. How will the new aggregate demand curve equation look like? How much will prices rise?

11. Macroeconomic equilibrium is established at the level of potential GDP. Velocity of money is 4. Money supply decreases from 750 to 600 billion pounds because of erroneous policies of the Central Bank, whereupon GDP decreased to 2000 billion pounds. Write the the aggregate demand curve equation before and after the money supply change. What kind of GDP will the economy move toin the long-run? Draw the graph.

12. Potential GDP was 1670 million guilders. The aggregate demand equation had the form: Y = 1820 - 125P. The economy was initially able to make full use of resources, but there was the supply shock because of a large earthquake and the price level changed by 5%. Determine the coordinates of short equilibrium that is established in the economy. Draw a graph.

13. Long-run aggregate supply curve has the form Y = 4800, short-run aggregate supply curve is horizontal. Aggregate demand curve is determined by the money supply, which is 3000 million escudos and the velocity of money that is equal to 2. The price level increased by 20% due to the rise of oil prices. Draw the graph. Determine the equilibrium GDP, which is established in the short run. How much should the money supply increase to make the economy return to the initial level of GDP?

Chapter 5.
Money Market and Inflation

The money market is an interaction between the banking system that forms money supply, and the rest of economy which forms the demand for it.

Inflation has the direct relevance to the problem of money as one of the demonstrations of the macroeconomic instability.

1. Money, its functions.
2. Money demand and money supply. Equilibrium on the money market.
3. The essence, measurement and types of inflation.
4. Causes of inflation. Demand-pull inflation and cost-push inflation.
5. Socio-economic consequences of inflation. Stagflation and the Phillips curve.

Key terms

Функції грошей	Functions of money
Міра вартості	Standard of value, unit of account
Засіб обігу	Medium of exchange
Засіб нагромадження	Store of value
Ліквідність	Liquidity
Пропозиція грошей	Money supply
Грошові агрегати M_1, M_2, M_3, L	Measures of the money supply (monetary aggregate) M_1, M_2, M_3, L
Грошова база	Monetary base
Гроші високої ефективності	High-powered money
Майже гроші	Near-money
Перевага ліквідності	Liquidity preference
Трансакційний мотив	Transaction motive
Мотив перестороги	Precautionary motive
Спекулятивний мотив	Speculative motive
Попит на гроші для укладання угод	Transactions demand for money
Попит на гроші з боку активів	Asset demand for money

Інфляція пропозиції	Cost-push inflation
Витрати стоптаних черевиків	Shoeleather cost
Витрати меню	Menu cost
Спіраль «зарплатня - ціни»	Wage-price spiral
Крива Філіпса	Phillps curve
Стагфляція	Stagflation
Ефект Танзі-Олівера	Tanzi-Olivera effect
Індекс злиденності	Misery index

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Questions

1. What is the connection between the monetary aggregates level of liquidity and profitability?
2. What does it mean "inflation is primarily a "belief in inflation"?
3. Can we consider inflation as a form of taxation?
4. Economy is hit by an unexpected ten percent inflation. Determine the impact on real incomes of:

• pensioner;
• worker of machine building plant, union member;
• farmer who has debt;
• doctor who has a private practice.

5. Try to predict the impact of the following inflation factors on the inflation in Ukraine:

• increase in prices of energy resources;
• high yield;
• reduction of production;
• inflation expectations;
• devaluation of hryvnia.

Quiz

Select a single correct answer

1. Which of the statements is incorrect:
   a) M_3 liquidity is smaller than M_2 liquidity;
   b) M_2 consists of elements with liquidity of 100 %;
   c) M_2 profitability is less than M_1 profitability;
   d) M_1 includes elements with zero profitability;
   e) No correct answer.

2. If money turnover is four times per year, then the amount of money in circulation is:
   a) equal to real GDP;
   b) equal to nominal GDP;

c) 4 times bigger than the nominal GDP;
d) 25% of nominal GDP;
e) 2.5 times smaller than the nominal GDP.

3. Everything is leading to inflation in conditions of full employment, except:
a) increase of the money supply;
b) increase of the budget deficit, that is financed by the Central Bank ;
c) labor productivity growth in agriculture;
d) wage growth that exceeds the increase of labor productivity;
e) no correct answer.

4. If the inflation rate is 150 %, it means that the price level has increased by:
a) 15%;
b) 1,5 times;
c) 2 times;
d) 2,5 times;
e) 3,5 times.

5. If inflation was 200 % during the year, and nominal incomes have doubled, then real incomes for the year:
a) have not changed;
b) have decreased by 1,5 times;
c) have decreased by 2 times;
d) have decreased by 4 times;
e) all of the answers are wrong.

Problems (with solutions)

1. Define such indicators: M_0, M1, M_2, M_3, L. Define the "monetary base".

Treasury bonds	3,1 bln. forints
Check deposits	55,2 bln. forints
Small time deposits	44,7 bln. forints
USD	3,6 bln. dollars
Change coins	2,3 bln. forints
Large time deposits	5,1 bln. forints
Reserves of the Central Bank	9,8 bln. forints

Savings deposits	30,9 bln. forints
Ancient gold coins	1,7 bln. forints
Traveler's checks	14,3 bln. forints
Euro	1,5 bln. euros
Banknotes of the Central Bank	8,9 bln. forints

Solution

M_1 includes money as a medium of circulation - cash, check deposits, traveler's checks:

$$M_1 = 8,9 + 2,3 + 55,2 + 14,3 = 80,7 \text{ bln. forints}$$

$M_2 = M_1$ + savings deposits + small time deposits:

$$M_2 = 80,7 + 30,9 + 44,7 = 156,3 \text{ bln. forints.}$$

$M_3 = M_2$ + large time deposits:

$$M_3 = 156,3 + 5,1 = 161,4 \text{ bln. forints}$$

L = M_3 + treasury bonds:

$$L = 161,4 + 3,1 = 164,5 \text{ bln. forints.}$$

Monetary base - is the amount of cash and bank reserves:

$$MB = 8,9 + 2,3 + 9,8 = 21,0 \text{ bln. forints.}$$

2. How did the money supply change if real GDP rose from 400 to 420 billion dinars, the velocity of money declined by 1%, and the price level rose by 3% in the economy?

Solution

According to Fisher's equation:

$$M \cdot V = P \cdot Y.$$

Real GDP rose by $\frac{420 - 400}{400} \cdot 100\% = 5\%$.

So:

$$M = \frac{P \cdot Y}{V} = \frac{1,03 \cdot 1,05}{0,99} = 1,0924.$$

Money supply rose by 9,24%.

3. Real GDP is 800 million marks. Inflation rate was 2.5%. Velocity of money is 5 turnovers per year. Asset demand for money is:

Interest rate	20	18	16	14	12
Asset demand for money, mln. marks	80	90	120	140	180

If the equilibrium interest rate is 14, which should be money supply to make equilibrium at money market?

Solution

Transactions demand for money is determined from Fisher's equation:

$$D_{m1} = \frac{P \cdot Y}{V} = \frac{1{,}025 \cdot 800}{5} = 164 \text{ mln. marks.}$$

Asset demand for money (according to data from the table):

$$D_{m2} = 140 \text{ mln. marks.}$$

Therefore the total demand for money:

$$D_m = D_{m1} + D_{m2} = 164 + 140 = 304 \text{ mln. marks.}$$

Accordingly, the money supply must be 304 mln. marks.

4. A market basket consists of two groups of products: food and industrial. The share of food - 40%, and industrial products - 60%. Food products prices have increased by 20% over the past year, while industrial products prices decreased by 5%. Determine the inflation rate for the year.

Solution

It is necessary to find the weighted average to determine the rate of price's increase (to consider the proportion of the market basket components):

$$CPI = 1{,}2 \cdot 0{,}4 + 0{,}95 \cdot 0{,}6 = 1{,}05.$$

Thus, inflation rate was 5%.

5. A loan is offered and you can pay less than 5% per annum. Nominal interest rate is 75%, but the expected inflation rate is 67%. Is it worth taking the credit?

Solution

It is necessary to determine the real interest rate for the answer. It is known that

$$\mathrm{Re}\,al \quad value = \frac{No\,\mathrm{min}\,al \quad value}{\mathrm{Pr}\,ice \quad index}.$$

Or:

$$1 + r = \frac{1+i}{1+\pi}.$$

So,

$$1 + r = \frac{1+0{,}75}{1+0{,}67} = \frac{1{,}075}{1{,}067} = 1{,}048.$$

Thus, the real interest rate is 4.8% <5%. Therefore it is worth taking out this loan.

6. Bank wants to give a loan and earn 10% on it. Expected inflation rate is 50%. What should the nominal interest rate be?

Solution

$$No\,\mathrm{min}\,al \quad value = \mathrm{Re}\,al \quad value \times \mathrm{Pr}\,ice \quad index$$

Or:

$$1 + i = (1 + r)\,(1 + \pi).$$

So,

$$1 + i = (1 + 0{,}1)\,(1 + 0{,}5) = 1{,}1 \cdot 1{,}5 = 1{,}65.$$

It should be (nominally) 65%.

Problems

1. Define such indicators: M_0, M1, M_2, M_3, L. Define the "monetary base".

Treasury bonds	9,1 bln. forints
Check deposits	165,8 bln. forints
Small time deposits	135,6 bln. forints
USD	9,6 bln. dollars
Change coins	7,0 bln. forints
Large time deposits	14,3 bln. forints
Reserves of the Central Bank	28,1 bln. forints
Savings deposits	93,2 bln. forints
Ancient gold coins	4,9 bln. forints
Traveler's checks	12,9 bln. forints
Euro	4,5 bln. euros
Banknotes of the Central Bank	24,7 bln. forints

2. How did the money supply change if real GDP had risen from 520 to 572 billion dinars, the velocity of money circulation slowed down by 2%, and the price level in the economy had risen by 9%?

3. Transactions demand for money is 12% of nominal GDP, money supply is 500 million marks. Asset demand for money is the following:

Interest rate	20	18	16	14	12
Asset demand for money, mln. marks	80	90	120	140	180

Find the equilibrium interest rate, if nominal GDP is 3000 million marks. How will it change if the money supply is decreasing by 20 billion marks? Show graphically.

4. Define the inflation rate of each country using the information:

Countries	**Growth of money supply, %**	**Real economic growth, %**	**Growth of money velocity, %**
I	10	3	0
II	2	4	-1
III	20	-2	1

5. Consumer basket consists of two products: food and clothing. The share of food - 60%, and clothing - 40%. Food prices rose by 20%, while prices for clothing decreased by 5%. Determine the inflation rate for the year.

6. The share of consumer goods and services is 80% of GDP and their prices increased by 12% for the year. Investment products and services have 20% of GDP, and have risen by an average of 10%. Money velocity slowed by 3%. How did the money supply change in case economic growth was 7%?

7. Consumer basket consists only of two products:

Goods	Quantity	Price
Bread	5 kg	3
Wine	2 bottles	40

We know that wine rose by 10% for a year. Determine the inflation rate.

8. Prices rose by 20% in the first year, and they fell by 20% in the next year. Define the inflation rate for two years?

9. Consumer price level rose by 69% for two years. Determine the average annual inflation rate.

10. There is hyperinflation in the country - 50% per month. What will be the annual percentage of inflation rate?

11. Prices rose by 6% in January, in February – by 2%, in March – by 4%. How cheaper has the Australian dollar become during three months?

12. Determine the inflation rate if the price index of last year was 112%, and this year is 125%.

13. January 1, 1997 the family bought an apartment for 10 thousand hryvnias, and January 1, 2001 sold for 18 thousand hryvnias. Evaluate this deal, if you know that the annual inflation rates in Ukraine were in 1997 - 10,1%, 1998 - 20%, 1999 – 19,2%, 2000 – 25,8%; 2001 – 6,1%.

14. The loan of 100 thousand escudos was given out. The creditor predicts that there is no inflation and hopes to get 105 thousand escudos. But inflation is 8% per year. What is the real value of the amount that will be refunded, including interest? Who will win in this case and who will have losses?

15. The Bank offers consumer credits at 50%. Inflation rate is expected to reach 45%. Should I take the loan if incomes allow paying the actual interest not exceeding 5%?

16. You want to lend your money and get 10% return on it. Expected inflation rate - 60%. What is the nominal rate of interest you should charge?

17. The bank provides credits at a rate of 120%, but actually plans to get 8% return on the credit. What inflation rate does it expect?

18. You are planning that the inflation rate will be 50%. You lent money, planning to get 5% return. But in fact, the inflation rate was 55%. Estimate your loss due to unexpected inflation.

19. You lent one thousand dollars for a year, planning to earn 20% and expecting inflation rate of 20%. But in fact, inflation was 30%. Determine the actual amount of money that you will be returned.

20. You took a credit of one thousand dollars for a year under 40%, expecting that the inflation rate would be 45%. But in fact, the inflation rate was 35%. Estimate the profitability of the deal.

21. Data for two years is shown in the table:

Years	Nominal interest rate	Inflation rate
I	15,5	7
II	18,2	9,5

How has the real interest rate changed?

Chapter 6.
Consumption, Savings and Investment

Keynes's theory remains the core of macroeconomics, despite the existing alternative concepts. The macroeconomics as a science began with John Keynes. All the following economic schools are related to this theory in some way (either agreeing with it, or criticizing).

Since Keynesian theory considers the economy from a point of view of the aggregate demand ("demand-side economics"), so its most important components are analyzed in this topic - consumption and investment.

1. Classical and Keynesian economic models.
2. Consumption and savings of households.
3. Private investment and investment factors.

Key terms

Функція споживання	Consumption function
Функція заощадження Автономне споживання	Saving function Autonomous consumption
Середня схильність до споживання	Average propensity to consume, APC
Середня схильність до заощадження	Average propensity to save, APS
Гранична схильність до споживання	Marginal propensity to consume, MPC
Гранична схильність до заощадження	Marginal propensity to save, MPS
“Кейнсіанський хрест”	“Keynesian cross”
Пороговий доход Гіпотеза життєвого циклу Гіпотеза постійного доходу	Break-even income Life-cycle hypothesis Permanent income hypothesis
Функція інвестицій	Investment function
Очікуєма норма чистого прибутку	Expected rate of return
Автономні інвестиції	Autonomous investment
Індуковані інвестиції	Induced investment
Гранична схильність до інвестування	Marginal propensity to invest, MPI

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Questions

1. Why did Keynes call his macroeconomic theory as a general theory? How does it opposes classical macroeconomic theory?
2. Describe the main differences between classical and Keynesian approaches to the problem of macroeconomic equilibrium.
3. Which of the following theses would you qualify for the views of a) the classics; b) Keynesians; c) to any of them:
   - savings is a function of income;
   - savings – is a function of interest rate;
   - investments is a function of income;
   - investments is a function of interest rate;
   - prices and nominal wages are flexible;
   - prices and nominal wages are inflexible;
   - savings and investment carry out different economic persons;
   - savings and investments carry out the same economic persons.
4. In which coordinate system is "Keynesian Cross" drawn? Why is it built around a bisector?
5. What relatioship exists between consumption and savings graphs (relationships between slopes and construction)?
6. What are the main factors of investments instability.

Quiz

Select a single correct answer

1. In the conditions of disposable income growth in Keynesian consumption function :
   a) the marginal propensity to save increases;
   b) the marginal propensity to save reduces;
   c) the average propensity to save increases;
   d) the average propensity to save decreases;
   e) the average and marginal propensity to save are unchanged.

2. If the income after tax returns increased from 1,500 UAH to 1,700 UAH, savings level rose from 110 UAH to 150 UAH, then the marginal propensity to consume is:
   a) 0,2; b) 0,4; c) 0,6; d) 0,8; e) 0,88.

3. Which of the following describes a direct relation?
   a) relation between savings and price index;

b) relation between the marginal propensity to consume and marginal propensity to save;

c) relation between consumer spending and the level of interest rate;

d) relation between the level of savings and the level of interest rate.

4. Based on the theory of permanent income, which of the following will cause the greatest increase of current consumption:

a) winning 1 thousand UAH in a lottery;

b) receiving 1 thousand UAH inheritance;

c) receiving assistance of 1 thousand UAH;

d) increasing the salary of 1 thousand UAH;

e) the repayment of the debt of 1 thousand UAH.

5. Based on the following data, it can be concluded that the consumption function corresponds to:

Disposable income	350	360	370	380
Consumption	315	323	331	339

it can be concluded that the consumption function corresponds to:

a) Keynesian concept of consumer choice;

b) the concept of permanent income;

c) the concept of life cycle;

d) the neoclassical concept of consumer choice.

Problems (with solutions)

1. Consumption function is: $C = 30 + 0{,}8 \cdot DI$. If the break-even income equals 200, what is the amount of savings?

Solution

Define the amount of consumption in condition of a given income:

$$C = 30 + 0{,}8 \cdot DI = 30 + 0{,}8 \cdot 200 = 190.$$

The amount of savings is found as the difference:

$$S = DI - C = 200 - 190 = 10.$$

2. Write the equation of consumption and savings functions with a given data.

Profit	0	100	200	300	400
Consumption	80	140	200	260	320

Solution

Consumption function has the form:

$$C = C_0 + MPC \cdot DI .$$

C_0 – autonomous consumption, in condition of profit absence it is equal (according to data of the table) 80.

MPC – average propensity to consume,

$$\text{MPC} = \frac{\Delta C}{\Delta DI} = \frac{60}{100} = 0{,}6.$$

Thus,

$$C = 80 + 0{,}6 \cdot DI .$$

As far as savings functions is

$$S = -C_0 + MPS \cdot DI ,$$

$$S = -80 + 0{,}4 \cdot DI$$

3. Marginal propensity to save is 0.25. Determine the amount of autonomous consumption, if break-even income is 400 billion euros. Present a graph of consumption function.

Solution

Consumption function has a form:

$$C = C_0 + MPC \cdot DI .$$

Break-even income is fully spent on consumption, so:

$$C = DI = 400.$$

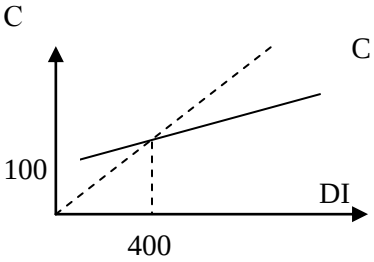
Or:

$$400 = C_0 + 0{,}75 \cdot 400 ;$$

$$C_0 = 400\text{-}300 = 100.$$

Consumption function:

$$C = 100 + 0{,}75DI.$$



4. The consumer price index was 109,2% in 2011, and 120,7%. in 2012. Entrepreneur plans to buy equipment that is worth 5,000 dollars that has to bring income of 5,225 dollars. Is it worth it if the nominal interest rate is 15% in the economy?

Solution

It is necessary to compare the rate of return with the real interest rate to answer the question. The rate that is given in condition (17%) is nominal. Find inflation rate to define the real rate.

$$\pi = \frac{CPI_n - CPI_{n-1}}{CPI_{n-1}} \times 100\%.$$

$$\pi = \frac{120,7 - 109,2}{109,2} \times 100\% = 10,53\%.$$

Define the real interest rate:

$$1 + r = \frac{1 + 0,15}{1 + 0,1053} = \frac{1,15}{1,1053} = 1,04.$$

Therefore, the real interest rate

$$r = 4\%.$$

Find the rate of return:

$$p' = \frac{5225 - 5000}{5000} \times 100\% = 4,5\%$$

As far as the rate of return exceeds the real interest rate (4,5%> 4%), there is a point to purchase the equipment

5. Possible investment projects are presented in the table:

Variants	A	B	C	D
The value of the investment project, mln. hrn	100	70	50	30
The expected investment rate of return, %	10	8	6	12

Nominal interest rate is 17%. Define the volume of investment demand, if the inflation rate is expected at the level of 8%.

Solution

Entrepreneurs will make those investment projects that have higher expected rate of return of investment than the real interest rate. The real interest rate in our case is :

$$1 + r = \frac{1{,}17}{1{,}03} = 1{,}083;$$
$$r = 8{,}3\%.$$

Therefore, entrepreneurs carry out only 2 projects out of 4, such as projects A and D. Total investment demand will be:

$$I = 100+30= 130 \text{ mln. hrn}$$

Problems

1. Personal income was 120 billion pesos in 2012, savings were 25 billion pesos, taxes - 20 billion pesos. Personal income became 140 billion pesos in 2013, savings - 27 billion pesos, taxes - 30 billion pesos. Find the average and marginal propensity to consume (consumption) and save.

2. Consumption function is: C = 50 + 0,75 DI. Calculate the consumption and savings according to corresponding values of income, the average propensity to consume and save. Draw graphics of consumption and savings.

Income	Consumption	Savings	APC	APS
0				
100				
200				
300				
400				

500					

3. Consumption function is: C = 150 + 0,6 DI. Disposable income in the previous year - 600 billion rupees, this year - 650 billion rupees. Find the average and marginal propensity to consume (consumption) and save.

4. Consumption function is: C = 100 + 0,8 DI. What will saving function look like? What will be the volume of savings if disposable income of households is 700 billion tenge?

5. Write equations of consumption and saving functions. Draw functions graphically.

Income	0	100	200	300	400	500
Consumption	90	160	230	300	370	440

6. Consumption function is:

Income	600	700	800	900
Consumption	570	645	720	795

Define the algebraic form (view) of consumption and saving functions. In what income conditions do savings equal zero?

7. Consumption function is: C = 40 + 0,8 DI. If income is 400 florins, tax rate 25%, and the value of transfers is 15 florins, what is the amount of savings?

8. Marginal propensity to save is 0.2. Determine the amount of autonomous consumption, if break-even income is 520 billion kronor. Draw the graph of the consumption function. What will happen with the graph if the marginal propensity to save rises to 0.25?

9. The consumption dependence on income is described by the following parameters: break-even income is 500 billion pesetas, autonomous consumption is 200 billion pesetas. Disposable income was 800 billion pesetas in 2012. Define:

- the marginal propensity to consume and savings;
- level of consumption and savings;
- the average propensity to consume and savings.

10. Suppose that consumer is planning to live another 40 years, 20 years of them he is planning to work. Write a consumption function using the F. Modigliani model. Determine the volume of consumption, if the value of household wealth is 50 thousand tugriks, and the amount of income after taxes equals 1,5 thousand tugriks.

11. Life of the consumer has two periods – adulthood and old age. Income of the first period is 2 thousand riyals, the second - 1 thousand riyals. Marginal propensity to consume is 0,8. Determine the volume of

consumption in both periods (interest rate is 5 %), and the intertemporal budget constraint of the consumer using the I.Fisher model.

12. The price index was 114 % in 2003, and 127 % - in 2004. Entrepreneur plans to buy equipment is worth 3000 dollars that have to bring income of 3165 dollars. Will it be reasonable for him given the nominal interest rate is 17 % in the economy?

13. Data of possible investment projects are established in the table. Determine the value of investment demand, if interest rate is a) 20 %; b) 17%.

	A	**B**	**C**	**D**	**E**	**F**	**G**
Value of investment projects, mln. forints	6	8	9	11	12	14	15
The expected rate of return, %	25	31	19	17	26	13	8

14. Data of possible investment projects are established in the table.

	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Value of investment projects, mln. forints	5,6	10,2	2,3	7,1	4,4	3,5	6,8	8,0
The expected annual income on 1 thousand invested forints	178	77	289	125	212	256	152	104

Determine the value of investment demand if the interest rate is set at 16%, given:

a) there is no inflation;

b) annual inflation rate is 7% and introduced a tax on profits - 20% of annual income.

Chapter 7.
Macroeconomic Equilibrium

Before turning to the central problems of macroeconomics – analysis of cyclical fluctuations and countercyclical governmental policy – we should consider a simplified version of the Keynesian model of macroeconomic equilibrium. This version of the model is a model of closed private economy. Later we will add more complexity by adding government and foreign sectors.

1. Aggregate expenditures and equilibrium GDP.
2. Fiscal Multiplier.
3. The paradox of thrift.
4. Recessionary and inflationary gaps.

Key terms

Сукупні витрати	Aggregate expenditures, AE
"Сукупні видатки – обсяг національного виробництва	"Aggregate expenditures – domestic output"
"Вилучення - ін'єкції"	"Leakages- injections"
Рівноважний ВВП	Equilibrium GDP
Мультиплікатор	Multiplier
Парадокс ощадливості	Paradox of thrift
Інфляційний розрив	Inflationary gap
Рецесійний розрив	Recessionary gap

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Questions

1. Why does equilibrium savings equal investment demand?
2. How does multiplier effect behave at different segments of the aggregate supply curve: a) the horizontal segment; b) the intermediate segment; c) the vertical segment?
3. Can we consider a person's saving as harmful and person's consumption as helpful for the economy according to the paradox of thrift?
4. Why does the paradox of thrift happens in when there is underemployment in the economy? What will happen if population begins to save during an inflationary gap?
5. Economists say that the measurement of the difference between the actual and the potential GDP is more of an art than science. What does it mean?

Quiz

Select a single correct answer

1. The factor that does not affect the value of the multiplier in the Keynesian model of macroeconomic equilibrium is:
   a) marginal propensity to save;
   b) level of tax rate;
   c) marginal propensity to import;
   d) autonomous consumption;
   e) no correct answer.

2. Expansion of production is possible when:
   a) net investment equals depreciation;
   b) multiplier is 1;
   c) actual savings exceed actual investment;
   d) gross investment equals depreciation;
   e) no correct answer.

3. The price level increase in the "aggregate demand - aggregate supply" model:
   a) does not affect the multiplier effect;
   b) causes a reduction of the multiplier effect on income ;
   c) causes the increase of multiplier effect on income ;
   d) causes the increase of the marginal propensity to consume.

4. The negative value of the cyclical unemployment rate indicates the presence of a(n):
   a) recessionary gap;
   b) deflationary gap;
   c) inflationary gap;
   d) involuntary unemployment;
   e) natural rate of unemployment.

5. The paradox of thrift is observed in a situation of a(n):
   a) part-time employment;
   b) full employment;
   c) the growth of public debt;
   d) increase of inflation level;
   e) no correct answer.

Problems (with solutions)

1. Consumption function is C = 110 + 0,8 Y. The volume of investment is 240 billion dinars. Find the equilibrium volume of domestic production.

Solution

Macroeconomic equilibrium condition:

$$Y = C + I.$$

That is:

$$Y = 110 + 0{,}8Y + 240;$$
$$0{,}2\ Y = 350;$$
$$Y = 1750.$$

Or according to condition:

$$S = I.$$
$$0{,}2Y - 110 = 240;$$
$$0{,}2\ Y = 350;$$
$$Y = 1750.$$

2. Marginal propensity to consume is 0,8. If investment increases by 50 billion yuan, by how much will the equilibrium output increase?

Solution

As a result of the multiplier effect, equilibrium output will increase by more than 50 billion yuan.

$$\Delta Y = \Delta I \cdot m_I .$$

$$m_I = \frac{1}{1 - MPC} = \frac{1}{1 - 0{,}8} = 5.$$

$$\Delta Y = 50 \cdot 5 = 250.$$

3. Assume that consumption function is given by C = 30 + 0,75 Y, and investment function has the form: I = 200 - 1100 r. The equilibrium level of GDP is 700 billion francs. What is the equilibrium interest rate?

Solution

Using the equilibrium condition

$$Y = C + I,$$

plug in expressions for consumption and investment functions, equilibrium GDP and solve for the equilibrium interest rate:

$$700 = 30 + 0{,}75 \times 700 + 200 - 1100\ r;$$
$$1100\ r = 55;$$
$$r = 0{,}05 = 5\%.$$

The equilibrium interest rate is 5%.

4. Consumption function is given by C = 60 + 0,6 Y. The volume of investment is 150 billion guldens regardless of income level. If the potential level of GDP is 550 billion guldens then what kind of GDP gap appears in the economy and what does it equal to?

Solution

Equilibrium GDP can be found from a macroeconomic identity:

$$Y = C + I.$$
$$Y = 60 + 0{,}6Y + 150;$$
$$0{,}4Y = 210;$$
$$Y = 525.$$

Since 525 < 550 ($Y < Y^*$), there is a recessionary gap. Considering the multiplier value ($m_I = \frac{1}{1 - MPC} = \frac{1}{1 - 0{,}6} = 2{,}5$), the gap equals to:

$$Gap_r = \frac{Y^* - Y}{m_I} = \frac{550 - 525}{2{,}5} = 10.$$

Problems

1. Saving function has the form S = 0,25 Y - 30. Volume of investment is 170 billion dinars. Find the equilibrium volume of domestic output.

2. Consumption function is C = 100 + 0,7 Y, planned investment is 350 billion franks. Determine the equilibrium output. If the actual output is 1000 billion franks, what unplanned actions will occur regarding investment?
3. Consumption function is C = 60 + 0,75 Y. Planned investment are 240 billion marks. There was an increase in the marginal propensity to save, and as a result the consumption function has changed to C = 60 + 0,6 Y. What has happened with the equilibrium level of output? What has happened with the equilibrium level of savings? Show changes in equilibrium output graphically using savings and investments functions.
4. Marginal propensity to consume is 0,6. Investment rose by 20 billion yuans from its original equilibrium value. By how much the equilibrium output increase? What part of this increase will be attributed to the increase in consumption?
5. Consumption function is C = 30 + 0,75 Y. By how much should investment increase for domestic output to increase by 12 billion marks?
6. The volume of GDP is 900 billion tugriks at full employment level. Consumption is 41 billion tugriks and the marginal propensity to save is 0,2. The amount of planned investment is 129 billion tugriks. Assume that there is no government intervention into the economy. Find equilibrium GDP. What volume of additional investment is needed to make equilibrium GDP coincident with its potential level?
7. Investment multiplier is 2,5. The volume of investment is 28 billion riyals. The break-even income is 10 billion riyals. Determine the equilibrium level of output. Depict the situation graphically.
8. The equilibrium level of GDP is 850 billion escudos. Consumption function is: C = 20 + 0,7Y, investment function has the form: I = 250 - 150 r. Calculate the value of the equilibrium interest rate.
9. The volume of investment in the economy is 105 billion euros independently of income level. Consumption function is: C = 65 + 0,6 Y. If potential GDP is 450 billion euros, what kind of gap will occur and what will its value be?
10. Consumption function is C = 20 + 0,7 Y. The volume of investment is 40 billion guilders independently of income level. If potential GDP is 180 billion guilders, then what kind of gap will occur and what will its value be?
11. Consumption function is: C = 15 + 0,75 Y. The volume of investment is 75 billion francs. According to the official employment statistics there is a frictional unemployment of 3%, structural unemployment of 2% and cyclical unemployment of 4%. Determine the kind of gap and its value.

12. Consumption function is: C = 40 + 0,75 DI. Investment function has the form: I = 20 + 0,2Y. Fill in the table below. Determine the equilibrium output and what happens with actual output.

Y = DI	**C**	**S**	**I**	**AE = C+ I**	**I ≷ S**	**Output: increase/decrease/ equilibrium**
800						
900						
1000						
1100						
1200						
1300						
1400						
1500						

Chapter 8.
Economic Dynamics

The problem of market economy cyclicity was discussed in political economy course (we should start with the review of this topic). But macroeconomic analysis of economic cycles should be deeper and more detailed, using the categories of aggregate demand, aggregate supply with the next analysis of such categories as unemployment and inflation.

The topic is devoted to economic growth. It is rather complex and certainly timely. Recently, this section of macroeconomics has been developing so rapidly that there is a reason to talk about its future selection as an independent discipline.

1. Essence and types and measurement of economic dynamics.
2. Cycling as a form of economic development.
3. Economic growth: preconditions, characteristic features, indicators.
4. Post-Keynesian models of economic growth. The model of R. Harrod - E. Domar.
5. Neoclassical model of R. Solow.

Key terms

Економічний (діловий) цикл	Business cycle
Фази циклу	Phases of the business cycle
Підйом	Expansion
Пожвавлення	Recovery
Пік (бум)	Peak (boom)
Дно	Trough
Скорочення	Reduction
Спад	Recession (slump)
Депресія	Depression
Перегріта економіка	Overheated economy
Випереджаючі показники (індикатори)	Leading indicators
Запізнілі	Lagging
Відповідні	Coincident

Великі цикли (довгі хвилі Кондратьєва)	Long waves
Короткі (малі) цикли (цикли Кітчина)	Kitchin cycles
Середні цикли (цикли Жугляра)	Juglar cycles
Економічне зростання	Economic growth
Виробнича функція	Production function
Виробнича функція Кобба-Дугласа	Cobb-Douglas production function
Моделі зростання	Growth models
Модель зростання Солоу	Solow growth model
«Золоте правило» заощадження	“Golden rule” of savings
Залишок Солоу	Solow residual

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Questions

1. What is a business cycle? What role do aggregate demand and aggregate supply play in it? What component of aggregate demand is most susceptible to vibrations?
2. Which branches of industrial production are susceptible to the strongest vibrations throughout the economic cycle? What kind of production is susceptible to the strongest vibrations and why:
   • production of cigarettes;
   • food production;
   • steel production;
   • provision of services?
3. What is the result of the growth costs in conditions of full use of resources?
4. What will happen with the price level and real output when the economy begins to slump? When does the economy come out of recession? Give a comment.
5. Which of the following parameters reflects the dynamics of economic growth most accurately:
   • change of GDP;
   • change of NDP ;
   • change of national income;
   • growth of capital productivity;
   • increase of exports;
   • change of investments?
6. According to the R. Harrod, economic growth model, G_w - a guaranteed growth rate, and G_n - a natural growth rate are caused by population growth, proper supply of labor force and the technical conditions

of production. If the natural growth rate assumes full employment of all resources, what happens in the economy, if 1) $G_w < G_n$; 2) $G_w > G_n$?

7. If the norm of capital depreciation (ceteris paribus) decreases, how does it affect the level of sustainable development of capital endowment? Show your answer on the graph using R. Solow model.

Quiz

Select a single correct answer

1. The economy is characterized by the following indicators:

Years	Inflation rate	Unemployment rate
2010	10%	6%
2011	7%	8%
2012	4%	9%

Part of the cycle that characterizes the economy in these years is:
a) expansion;
b) peak (boom);
c) recession;
d) stagflation;
e) no correct answer.

2. What indicator of the following can be attributed to pro-cyclical:
a) exports of minerals;
b) stocks of raw materials;
c) level of prices for basic goods;
d) amount of government expenditures;
e) no correct answer.

3. What indicator of the following can be attributed to leading indicators:
a) the level of producer prices;
b) the number of new building projects;
c) the interst of rate;
d) the volume of households consumption;
e) no correct answer.

4. Which of the statements most accurately reflects the concept of the natural rate of growth, according to R.Harrod model:

a) the rate that is necessary to maintain the dynamic equilibrium of the economic system based on growth of human resources and science and technical progress;
b) the rate that is reached by full employment;
c) the constant growth rate, which ensures full use of existing resources;
d) coincidence of the guaranteed rate with the actual growth tempo ;
e) no correct answer.

5. The value of sustainable level of capital endowment in the R.Solou model depends on:
a) the rate of change of capital stock;
b) the amount of involved capital;
c) the volume of consumption;
d) the propensity to save;
e) the propensity to invest.

Problems (with solutions)

1. The production function has the form: $Y=AK^{0,4}L^{0,6}$. Parameter A rose by 2% per year, the number of employed increased by 3%, capital grew by 5% during the same time. By how many percent did the real output increase?

Solution

Use the tempo record of production function. Given the conditions, it will look like:

$$y = a + \alpha k + \beta l,$$

$$y = 2 + 0,4*5 + 0,6*3 = 5,8.$$

The output will increase by 5,8%.

2. Production function, that takes into account the impact of technological progress on economic growth, has the form $Y=K^{0,25}L^{0,75}e^{n}$. Economic growth rate was 6,5%, the growth rate of capital 3%, the growth rate of employed 2,5%. Define the growth rate of technical progress.

Solution

The share of technical progress in economic growth is defined as:

$$n = y - \alpha k - \beta l;$$

$$n = 6,5 – 0,25 * 3 – 0,75 * 2,5 = 3,875 (\%)$$

3. Production function is $Y=K^{1/2}L^{1/2}$. Savings rate is 0,2, depreciation rate – 0,1. What value of K has to have the economy for its sustainable development, according to the R. Solou model?

Solution

Given the constant level of capital endowment (k*), investments are equal to depreciation:

$$i = \delta k,$$

Or

$$sf(k) = \delta k;$$

$$\frac{k^*}{f(k^*)} = \frac{s}{\delta}.$$

Production function can be written as:

$$y = f(k).$$

$$y = \frac{K^{1/2}L^{1/2}}{L} = \frac{K^{1/2}}{L^{1/2}} = k^{1/2} = \sqrt{k}\ .$$

Substituting into equation:

$$\frac{k^*}{\sqrt{k^*}} = \frac{0,2}{0,1} = 2;$$

$$k^* = 4.$$

4. Production function has the form $Y=10K^{1/4}L^{3/4}$. The lifetime of capital is 20 years. Define sustainable stock of capital per worker, which corresponds to the "golden rule".

Solution

"Golden rule" determines the level of capital endowment k** that provides maximum consumption per capita:

$$MPK = \delta.$$

$$MPK = y'.$$

Define the function y:

$$y = \frac{Y}{L} = \frac{12{,}8K^{1/4}L^{3/4}}{L} = 12{,}8k^{1/4}.$$

Find the derivative:

$$MPK = y' = 12{,}8 * 1/4 \ k^{-3/4} = 3{,}2 \ k^{-3/4}.$$

If the lifetime is 20 years, then 1/25 part leaves every year, that is δ = 0,05. Equate:

$$3{,}2 \ k^{-3/4} = 0{,}05;$$

$$\frac{3{,}2}{k^{3/4}} = 0{,}05;$$

$$k^{3/4} = 64;$$

$$k^{1/4} = 4;$$

$$k^{**} = 256.$$

Problems

1. The share of consumption in national income of the country is 80 %. Capital intensity is 5. Calculate the growth rate of investment that is necessary for balanced economic growth using the formula of the equilibrium economic growth by Y.Domar.

2. Rate of savings in national income of the country is 20 %. Accelerator is 2. If during of the time period t0 YD = YS = 140 billion dollars, then what should be the equilibrium growth rate of Y, the amount of YD and YS at time period t1? What will be the demand for investment in this period? Use the R.Harrod model of economic growth for calculation.

3. The share of capital in income is 0,4; and the share of labor equals 0,6. Capital increases by 6%, labor supply decreases by 2%. What will happen with output?

4. Production function $Y=AK^{0,3}L^{0,7}$. "A" parameter rose by 4% per year, the number of employed increased by 6%, capital grew by 3% over the same time. How many percent does the real output increase by?

5. Production function, which takes into account the impact of technological progress on economic growth, has the form $Y=K^{\alpha}L^{\beta}E^{n}$. The growth rate of national income per year amounted to 3,87% , the growth

rate of capital 3%, growth rate of employed 1,5% , the share of labor and capital in national income is equal to 0,75 and 0,25 accordingly. Define the growth rate of technical progress.

6. Production function $Y=K^{1/2}L^{1/2}$. Savings rate is 0,4, depreciation rate – 0,1 . At what value of "K", according to the R.Solou model, will the economy be in a steady position?

7. Production function has the form $Y=K^{1/2}L^{1/2}$. If the depreciation rate is 5%, then 20% of output is saved annually given the absence of technological progress and population growth. Determine the level of income and consumption per worker, that corresponds to the sustainable level of capital stock.

8. The table contains data about the state of economy for 4 years. Which of these years was the equilibrium state achieved according to the "golden rule"?

	Years	**Savings rate**	**Capital stock per worker**	**Production volume per worker**	**Consumption per worker**	**Marginal product of capital**
	I	0,2	4,0	2,0	1,6	0,250
	II	0,4	16,0	4,0	2,4	0,125
	III	0,5	25,0	5,0	2,5	0,100
	IV	0,6	36,0	6,0	2,4	0,083

9. Production function has the form $Y=10K^{1/4}L^{3/4}$. The service life of capital is 50 years old. Identify sustainable capital stock per worker, which corresponds to the "golden rule".

10. Production function has the form $Y = K^{1/2}L^{1/2}$. Household had 15 hours of labor and 540 hours of capital at time period t_0. Marginal propensity to save is 0,5. The growth rate of labor resources amounted to 2% over the period that is being considered. Determine the equilibrium growth rate according to the Solow model. What is the rate of increase in the time period t_1?

Chapter 9.
The Government in the System of Macroeconomic Policy. Fiscal Policy

One of the main features of Keynesian theory is the recognition of the governments' stabilizing role in the economy primarily because of countercyclical policy. Government purchases are the part of aggregate demand, so after analyzing the first two components - consumer spending and investment – it is appropriate to consider the third important component – government spending. The art of fiscal policy is in the manipulation of government expenditures and taxes.

1. Government budget: concept and budget components.
2. Aggregate demand as an object of government regulation.
3. Fiscal policy during the economic cycle.
4. Automatic stabilizers.
5. Budget deficit. Public debt.

Key terms

Теорема Хаавельмо	Haavelmo theorem
Дискреційна фіскальна політика	Discretionary fiscal policy
Стимулююча фіскальна політика	Expansionary fiscal policy
Стримуюча фіскальна політика	Contractionary fiscal policy
Затримка розпізнавання	Recognition lag
Автоматичні (вбудовані) стабілізатори	Automatic (built-in) stabilizers
Дефіцит бюджету	Budget deficit
Профіцит, позитивне сальдо бюджету	Budget surplus
Фактичний бюджет	Actual budget
Структурний бюджет	Structural budget
Циклічний бюджет	Cyclical budget
Щорічно збалансований бюджет	Annually balanced budget

Циклічно збалансований бюджет	Cyclically balanced budget
Функціональні фінанси	Functional finance
Секвестрування видатків	Expenditure sequestering
Державний борг	Public debt (PD)
Внутрішній державний борг	Internal debt
Зовнішній державний борг	External debt
Подвійний дефіцит	Twin deficits

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Questions

1. What has a larger effect on the aggregate demand during the discretionary fiscal policy: the change of government spendings or taxes? Why?
2. If the government wants to reduce taxes to stimulate the economy during a recession, does it matter what kind of taxes have to be reduced (individual income taxes or business taxes)?
3. How will the GDP change if the government increases taxes and government purchases at by the same amount?
4. Is there a relationship between the budget deficit, the cash money supply and inflation? Are they always interrelated?
5. Is it possibile to use fiscal policy as a stabilizing factor under the following budgetary policies: a) required annual balanced budget, b) balanced budget during economic cycle, c) fiscal policy that aims at stabilization the economy as a whole, not only the budget.

Quiz

Select a single correct answer

1. Reduction of taxes will lead to the following:
   a) increase of aggregate income and output;
   b) the marginal propensity to consume does not change;
   c) decreases the difference between national income and disposable income;
   d) the aggregate demand curve shifts to the right;
   e) all answers are correct.

2. If the marginal propensity to consume exceeds the marginal propensity to save, then the tax multiplier is:
   a) greater than 2;
   b) greater than 1;
   c) greater than 0;
   d) less than -1;
   e) less than -2.

3. Assume that the economy is in equilibrium with full employment. Assume that marginal propensity to consume is 0,8. If the government plans to increase military spending by 15 billion euros as a result of the aggravation of a military conflict. To avoid inflation, the government should:

a) reduce taxes by 15 billion euros;
b) reduce taxes by 18,75 billion euros;
c) reduce taxes by 75 billion euros;
d) increase taxes by 18,75 billion euros;
e) increase taxes by 25 billion euros.

4. Consumption function in the economy can be described by the following consutmption function: C = 185 + 0,75 (Y-T). If government purchases and taxes would increase simultaneously by 70 million drachmas, then the equilibrium income will:

a) remain unchanged;
b) increase by 280 million drachmas;
c) increase by 70 million drachmas;
d) decrease by 70 million drachmas;
e) decrease by 210 million drachmas.

5. The state budget deficit is divided into structural and cyclical to:

a) identify the role of government expenditures in the economic restructuring;
b) separate government expenditures of debt service from other expenditures;
c) identify the impact of fiscal policy on balancing the state budget;
d) to separate the growth of state debt to central bank from its debts in private sector;
e) identify the role of fiscal policy in repaying public debt.

Problems (with solutions)

1. Assume that the consumption function is given by C = 150 + 0,8 Y. Investment is 380 billion rials and volume of government purchases is 290 billion rials. Find the equilibrium GDP.

Solution

Since there are government purchases in the given economy we use the three-sectoral economic model. The macroeconomic identity has the form:

$$Y = C + S + G.$$

Plugging in the parameters of the model gives:

$$Y = 150 + 0{,}8Y + 380 + 290;$$

$$0{,}2Y = 820;$$

$$Y = 4100.$$

2. The level of GDP under full employment is 660 billion manats. The savings function is given by S = 0,25 Y - 40, investment equals 75 billion manats, and government spending is 55 billion manats. Find the GDP gap. Determine its type?

Solution

To find the equilibrium GDP use the macroeconomic identity:

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

$$Y = 40 + 0{,}75Y + 75 + 55;$$

$$0{,}25Y = 170;$$

$$Y = 680.$$

Since 680> 660 (Y>Y*) we can conclude that there is an inflationary gap. Its value is:

$$Gap_i = \frac{Y^* - Y}{m_I} = \frac{660 - 680}{4} = (-)5.$$

3. Actual unemployment rate is 7% and natural unemployment rate is 5%. The volume of potential GDP is 500 billion tenge. Marginal propensity to consume is 0,6. What kind of policy should the government undertake to stabilize the economy? Find the needed change in government spending.

Solution

There is an excessive (cyclical) unemployment in the economy, so the government should pursue expansionary fiscal policy, and one of its measures is increase of government purchases. We need find the gap between actual and potential GDP to determine the additional volume of government purchases needed. Using Okun's law the cyclical unemployment is:

$$\Delta u = 7 - 5 = 2\%.$$

GDP gap is:

$$2 \times 2{,}5 = 5\%.$$

and the value of gap is:

$$500 - 100\%$$

$$\Delta Y - 5\%.$$

$$\Delta Y = 500 \times 0{,}05 = 25.$$

For GDP to increase by 25 we should increase government purchases by a lower amount due to the multiplier effect:

$$m_G = \frac{1}{1 - MPC} = \frac{1}{1 - 0{,}6} = 2{,}5.$$

$$\Delta G = \frac{25}{2{,}5} = 10.$$

4. Marginal propensity to consume is 0,8. Actual GDP is 330 billion won. Trying to stabilize the economy, the government increases government purchases by 10 billion won and reduces taxes by 5 billion won. Find the potential GDP that has been achieved as a result of such government actions.

Solution

The value of fiscal multiplier for government spending and taxes respectively can be found using the following formulas:

$$m_G = \frac{1}{1 - MPC} = \frac{1}{1 - 0{,}8} = 5.$$

$$m_T = \frac{MPC}{1 - MPC} = \frac{0{,}8}{1 - 0{,}8} = 4.$$

Changes in government purchases and taxes will result in the following changes in GDP:

$$\Delta Y = \Delta G \cdot m_G = 10 \cdot 5 = 50$$

$$\Delta Y = \Delta T \cdot m_T = 5 \cdot 4 = 20.$$

Thus potential GDP is:

$$Y^* = 330 + 50 + 20 = 400 \text{ (bln. won)}.$$

5. Consumption is 80 billion forints, the marginal propensity to save is 0,3; tax rate is 20%, the amount of transfers is 10 billion forints, the amount of private investment is 290 billion forints, and government purchases are 228 billion forints. Determine the equilibrium GDP.

Solution

Write the consumption function including taxes and transfers:

$$C = C_0 + MPC\,(Y - tY + Tr) = 80 + 0{,}7(Y - 0{,}2Y + 10) =$$
$$= 80 + 0{,}7\,(0{,}8Y + 10) = 80 + 0{,}56Y + 7 = 87 + 0{,}56Y.$$

Based on macroeconomic identity:

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

$$Y = 87 + 0{,}56Y + 290 + 228;$$

$$0{,}44Y = 605;$$

$$Y = 1375 \text{ (bln. forints)}.$$

Problems

1. Actual unemployment rate in the country is 10% and natural rate is 6%. The amount of potential GDP is 1800 billion tenge. Marginal propensity to consume is 0,75. What kind of policy should the government undertake to stabilize the economy? Find the change in government purchases?
2. The level of GDP under the conditions of full employment is 800 billion manats. Actual savings function: S = 0,25 Y - 60, investments equal to 45 billion manats, government expenditures is 80 billion manats. Determine the type of GDP gap and its value?
3. Saving function is given by S = 0,2Y - 100. Investment amounts to 200 billion rupees, government expenditures are 150 billion rupees. The level of GDP under the conditions of full employment is 2000 rupees. Determine the type of GDP gap and its value?

4. If government increases expenditures by 50 billion euros, then it can increase GDP by 200 billion. What is the marginal propensity to consume?

5. Saving function has the form: S = -106 + 0,4 (Y-T). Taxes are reducing by 0,2 billion. How will the equilibrium level of income and the amount of consumption change?

6. GDP was 1400 billion tenge in 2012 and private investment was 120 billion tenge. The same indicators were respectively 1450 billion tenge and 140 billion tenge in 2013. Write the consumption function, if taxes are not charged, and government purchases are constant and equal to 95 billion tenge.

7. Actual GDP is 2000 million riyals and equilibrium GDP is 2400 million riyals. Marginal propensity to save is 0,2. What fiscal policy can provide the macroeconomic equilibrium of the economic system?

8. Marginal propensity to consume is 0,8. Actual GDP is 3220 billion won. The government increases the purchases by 40 billion won and reduces taxes by 20 billion won trying to stabilize the economy. Determine the value of potential GDP.

9. Marginal propensity to consume is 0,75. The government plans to increase government expenditures by 100 billion yuans, but it does not change the equilibrium level of GDP. Explain how this is possible.

10. Consumption function is C = 35 + 0,75 DI. How will the equilibrium output change after the increase of individual income taxes by the amount of 23 billion escudos?

11. Consumption function is C = 70 + 0,6 DI. The government decided to make purchases of military equipment in the amount of 15 billion pounds and finances this purchase by increasing taxes. How much should budget revenues grow to leave the equilibrium output unchanged?

12. Household consumption is determined by the function: C = 50 + 0,75 DI, investment equals 100 billion dollars, government expenditures on goods is 90 billion dollars, transfer payments from the budget are 40 billion dollars, and the tax rate of personal income is 20%. Find the equilibrium value of GDP and determine the state of the budget.

13. The model of the economy is characterized by the following data: autonomous consumption is 70 billion marks, the marginal propensity to save is 0,2; investment is 120 billion marks, government purchases of goods and services is 150 billion marks, transfer payments are 85 billion marks and tax rate is 25%. Determine the equilibrium volume of production and the state of the budget. What changes will occur if the tax rate is reduced to 20 %, the volume of government purchases is increased to 165 billion marks, and private investment is raised to 129 billion marks as a result of interest rate reduction?

14. There is a recessionary gap in the economy and equilibrium GDP is 10 million francs short of potential GDP. The behavior of economic agents in this economy can be characterized by the following equations: C = 140 + 0,6 (Y-T); I = 0,1 Y + 56 ; G = 0,1 Y. The amount of taxes equals 80 million francs. How should it be changed to achieve the level of potential GDP?

15. Tax revenues are 120 billion pesos, the volume of government purchases is 450 billion pesos, and transfers are 80 billion pesos. If the aggregate budget deficit is 510 billion pesos what is are the costs of servicing the public debt?

16. Tax budget revenues can be represented by the following equation: T = 0,3 Y, and transfer payments can be represented by Tr = 0,2Y. Government purchases are 500 billion dirhams. Public debt in the country is accumulated in amount of 1000 billion dirhams. Interest rate is 12%. Actual GDP is 4300 billion dirhams, and potential GDP is 4500 billion dirhams. Determine: a) the balance of the state budget, b) structural deficit, c) cyclical deficit, d) the primary deficit.

17. Consider an economy that is characterized by the following equations:

C = 100 + 0,8 DI; DI = Y - T; I = 60 + 0,1 Y; T = 250; G = 200.

- Create a table with the following columns (for 1000 <Y < 2000): taxes, disposable income, consumption expenditures, savings, investment, government expenditures, and aggregate expenditures.
- Find the equilibrium GDP.
- Identify the new equilibrium GDP if government expenditures increased to 300 (*ceteris paribus*).
- Identify the new equilibrium GDP if taxes are increased to 300 (*ceteris paribus*).
- Identify the new equilibrium GDP if both taxes are increased to 300 and government expenditures increased to 300 (*ceteris paribus*).
- Assume that GDP in conditions of full employment is 1500. What kind of gap occurs in this case between aggregate expenditures and the full employment GDP? Find the size of the gap.
- Assume that full employment GDP is 1800. What kind of gap occurs in this case between aggregate expenditures and the GDP and what is its size?
- What kind of tax policy (for constant investment and government expenditures) should the government pursue to ensure full employment in the economy?

Chapter 10.
Credit System. Monetary Policy

The chapter discusses possibilities of government to pursue a monetary policy. You need to use materials from chapter 5 as which contains information about money market. Monetary policy will be considered in combination with fiscal policy in the next chapter.

1. Credit system. The structure of the modern credit system.
2. Commercial bank in the credit system. Money multiplier.
3. Monetary regulation of the economy.

Key terms

Термінові внески	Time deposits
Внески до запитання	Demand deposits
ФРС	Federal Reserve system
Норма резерву	Reserve ratio, rr
Обов'язкові резерви	Required reserves, RR
Надлишкові резерви	Excess reserves, ER
Грошовий мультиплікатор Операції на відкритому ринку Облікова ставка	Money multiplier Open market operations Discount rate
Грошово-кредитна політика	Monetary policy
Механізм грошової трансмісії Політика дорогих грошей Політика дешевих грошей	Money transmission mechanism Tight money policy Easy money policy

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Questions

1. Assume that you need to choose a bank to make a deposit. What are the main criteria affecting your choice?
2. According to John Keynes "if you owe your bank 100 dollars, then it is your problem, but if you owe your bank 1 million dollars, then it is the banks' problem". Comment on this statement.
3. Assume the following information about an economy:

• inflation characterized by a high level;

• the economic recession and increase of unemployment;

• stagflation.

What measures should be taken by Central Bank to stabilize the economic situation in the country in these cases?

4. What determines what instruments of monetary policy to apply?

5. Are the consequences of monetary policy different in the short and the long run?

6. Why do Central banks use open market operations as the main tool of monetary policy, rather than changes in the required reserves ratio or discount rate?

Quiz

Select a single correct answer

1. If the Central bank sells government securities to commercial banks, then:
   a) public debt is increasing;
   b) interest rate is reducing;
   c) credits of commercial banks are increasing;
   d) excess reserves of commercial banks are reducing;
   e) no correct answer.

2. If people wish to keep their money in cash, then in commercial banks:
   a) the opportunity of unemployment reduction will increase;
   b) the opportunity of aggregate supply reduction will increase;
   c) the opportunity of reduce aggregate supply reduction will decrease;
   d) the ability to provide credits will increase;
   e) the ability to provide credits will reduce.

3. The equilibrium interest rate may remain unchanged if:
   a) speculative demand for money in condition of real GDP growth increase ;
   b) slowing the velocity of money is accompanied by a decrease in the discount rate;
   c) the Central Bank increases the required reserves ratio in condition of inflation;
   d) simultaneously with the monetary base growth the discount rate decrease;
   e) in condition of deflation Central bank sells government securities to commercial banks.

4. If the Central bank conducts open market operations, then, the value of will change:
   a) money multiplier;

b) monetary base;
c) money multiplier and monetary base;
d) demand for money ;
e) no correct answer.

5. Which of the following combinations of fiscal and monetary policy will contribute to the GDP growing:
a) reduction of government purchases and discount rate ;
b) increase of government purchases and purchase of securities;
c) increase of tax rate and selling of securities;
d) increase of tax rate and required reserves ratio reduction;
e) increase of transfers and growth of discount rate.

Problems (with solutions)

1. Commercial Bank engages deposits at 10% per annum and provides loans at 15%. Reserve ratio is 20%. Deposit amount is 120 million hryvnias. Calculate the profit of the bank if all excess reserves were lent.

Solution

A profit of a commercial bank is defined as the difference between its incomes and expenditures. Expenditures of the bank is the amount of interest rates that has to be paid by investors. In our case:

$$\text{Expenditures} = 120 \text{ mln.} \times 0{,}1 = 12 \text{ mln.hrn.}$$

Incomes of the bank are the interests that were received from borrowers. The bank can give credits in the amount of excess reserves. Therefore:

$$\text{Required reserves (RR)} = 120 \times 0{,}2 = 24 \text{ mln.hrn.}$$

The bank can provide loans amounting to:

$$120 - 24 = 96 \text{ mln.hrn.}$$

Therefore, its incomes amount:

$$96 \times 0{,}15 = 14{,}4 \text{ mln.hrn.}$$

$$\text{Income of bank} = 14{,}4 - 12 = 2{,}4 \text{ mln.hrn.}$$

2. Balance sheet of a commercial bank on certain date includes the following items (million escudos):

Equity capital	58
Credits that were given by bank	38
Securities	52
Deposits	100
Reserves at Central Bank	53
Cash	15

1) Make a nominal balance sheet of a commercial bank.

2) Reserve ratio that was set by the Central Bank is 20%. Bank decided to give credits of the maximum possible amount (cash is not taken into account). What is that amount? Make a new balance sheet of the bank.

3) Clients of Bank increased demand accounts by 50 million escudos and brought money in cash. How will the balance sheet of the bank change?

4) What amount of money can bank give as a credit and create the entire banking system in this case?

Solution

1) Balance sheet:

Assets (mln. escudos)		**Liabilities (mln. escudos)**	
Reserves at CB	53	Deposits	100
Credits	38		
Securities	52	Equity capital	58
Cash	15		

2) Required reserves (RR) = 100 * 20 % = 20

Actual reserves 53
- Required reserves 20
Excess reserves 33 (bank can provide loans for such sum).

3) Bank balance sheet after money introduction:

Assets (mln. escudos)		**Liabilities (mln. escudos)**	
Reserves at CB	53	Deposits	150
Credits	38		
Securities	52	Equity capital	58
Cash	65		

4) Required reserves (RR) = 150 * 20 % = 30

Actual reserves	53
- Required reserves	30
Excess reserves	23

The whole credit system can provide more loans, taking into account the money multiplier.

$$mm = \frac{1}{rr} = \frac{1}{0,2} = 5.$$

23*5 = 115 (mln. escudos)

3. Commercial Bank has 180 thousand dollars as reserves and 750 thousand dollars as current accounts. Required reserve ratio is 20%. Customers investing in bank 20 thousand dollars, that are replenished reserves. How did excess reserves of the bank change?

Solution

Before contributions that were made:

Required reserves (RR) = 750 * 20 % = 150

Actual reserves	180
- Required reserves	150
Excess reserves	30

After contributions:
Required reserves = 770 * 20 % = 154

Actual reserves	200
- Required reserves	154
Excess reserves	46

4. The Central Bank buys securities from commercial banks amount to 14 billion euros. How could the price level change in the country, if commercial banks fully use their credit facilities? Required reserves ratio is 16%. Real GDP fell by 4%, the velocity of money did not changed. There was 1,75 trillion euros in circulation before this event.

Solution

The Central Bank increases the reserves of commercial banks to 150 billion euros when it was buying securities. Excess reserves appear which can be used to provide loans. As a result, the money supply will increase:

$$\Delta S_m = 14 \times \frac{1}{0{,}16} = 87{,}5 \text{ bln.euros.}$$

Given the previous amount of money, we can conclude that the money supply increased by:

$$\frac{87{,}5}{1750} \times 100\% = 5\%$$

Define the possible prices increase using the Fisher's equation:

$$M \cdot V = P \cdot Y.$$

$$P = \frac{M \cdot V}{Y} = \frac{1{,}05 \cdot 1}{0{,}96} = 1{,}09375.$$

Therefore, price level can increase by 9,4%.

Problems

1. Make a nominal balance sheet of commercial bank. Can you be sure of faithfulness of executed task?

	Mln. dollars
Cash	23
Payment and other customer accounts	196
Reserves at the Central Bank	38
Equity capital of Bank	200
Deposits of companies and organizations	165
Credits given to companies and organizations	214
Credits given to other banks	78
Credits in other banks	95
Government securities	133
Building, equipment	112

Other creditors	32
Other debtors	90

2. Balance sheet of commercial banks is represented in the table.

(Thousand euros)

Assets		**Liabilities**	
Reserves	50	Deposits	120
Credits	70		
Total	120	Total	120

- If the required reserve ratio is 20%, then can the bank provide credits?
- Clients of Bank will withdraw 30 thousand euros from accounts next month. How will the balance sheet of the bank change?

3. Balance sheet of commercial bank to certain date includes the following items (million escudos):

Equity capital	250
Credits that were given by bank	150
Securities	200
Deposits	400
Reserves at Central Bank	100
Cash desk	200

- Make a nominal balance sheet of commercial bank.
- Reserve ratio that was set by the Central Bank is 20%. Bank decided to give credits of the maximum possible amount (cash is not taken into account). What is that amount? Make a new balance sheet of the bank.
- Given that the previous item credits were completely spent by households and consumers. Make a new balance sheet.
- Clients of Bank increased demand accounts by 50 million escudos and brought money in cash. How will the balance sheet of the bank change?
- The Central Bank reduced the reserve ratio to 10%. What will the maximum possible amount for bank credits be, which can be provided? How will the new balance sheet of the bank look like?
- What amount of money can create the entire banking system in this case?

4. Commercial Bank has 50 thousand dollars of reserves and 250 thousand dollars on current accounts. Reserve ratio is 20%. Clients invest 10 thousand dollars in bank, that fill reserves. How many excess reserves are in bank now?

5. Required reserves ratio is 20%, and their total amount is 260 billion tugriks. Deposits of commercial banks as a whole exceed cash by 4 times. Define the money supply.

6. The total amount of deposits in the credit system is 600 billion pesos, while the volume of provided credits is 490 billion pesos. If excess reserves in this condition are 20 billion pesos, then what is the required reserves ratio?

7. Required reserves ratio is 15%, the excess reserves are 5% from deposits. If the total value of reserves is 70 billion euros, then what is the volume of deposits?

8. The monetary base is 60 billion forints. Required reserves ratio is 20%, and the ratio of cash / deposits is 0,1. Determine the volume of deposits.

9. Required reserves ratio is 10% , the ratio of cash / deposits is 0,2. The Central bank plans to increase the money supply at 560 million rials through open market operations. How can this be achieved?

10. Government produced bonds of 100 billion guilders to finance public debt. The Central bank bought a quarter of these bonds. How will the money supply change in the economy as a result of this, if the required reserves ratio is 15%, and the ratio of cash / deposits – 0,1?

11. Required reserves ratio is 20 %, the excess reserves are not available in the credit system, GDP is 2500 billion dinars in conditions of full employment.

Bln. dinars

S_m	D_m	r (%)	I	S	GDP
500	800	5	900	400	700
500	700	6	800	500	1100
500	600	7	700	600	1500
500	500	8	600	700	1900
500	400	9	500	600	2300

Define:

- the equilibrium level of interest rate;
- the marginal propensity to save;
- the equilibrium level of GDP;
- income multiplier;
- the state of the economy;
- money multiplier;
- the total volume of sales or purchases of government bonds by commercial banks, which is required to achieve the GDP level, that corresponds to full employment.

Chapter 11.
IS – LM model as the Theory of Aggregate Demand in a Closed Economy

Keynesian theory was discussed in detail in previous chapters. First we considered the simplest model of private closed economy. Then we introduced government sector into the model which can stabilize the economy with tools of fiscal and monetary policy. IS-LM model is more complex and realistic than previous models we considered.

1. IS-LM model as a representation of the Keynesian model of macroeconomic equilibrium.
2. Equilibrium in the product market. IS curve.
3. Equilibrium in the money market. LM curve.
4. IS-LM model in the short-run.
5. Fiscal and monetary policy in the IS - LM model.

Key terms

Модель IS-LM	IS-LM model
IS крива	IS curve
LM крива	LM curve
Ефект витіснення	Crowding-out effect
Ліквідна пастка	Liquidity trap
Інвестиційна пастка	Investment trap
Зовнішній лаг	Outside lag
Внутрішній лаг	Inside lag

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Questions

1. Using the AD-AS model, Keynesian cross, and IS-LM model show graphically the effect of following:
   • expansionary fiscal policy;
   • discretionary fiscal policy;
   • easy money policy;
   • tight money policy.
2. What is the economic meaning of the slopes of IS and LM curves?
3. The Central Bank increased the money supply in circulation and the government raised the tax rate. What does the model predict about the change in the interest rate?

4. If the Central Bank reduces the money supply while the government reduces government spending, what consequences can be expected?

5. Interest rate remained unchanged as income increased as a result of fiscal and monetary policy. What changes in tax rate and money supply have led to these results?

Quiz

Select a single correct answer

1. IS curve:
   a) reflects the functional dependence of income on interest rate;
   b) reflects the functional dependence of interest rate on income;
   c) reflects the dependence of the interest rate on equilibrium GDP;
   d) reflects the dependence of the real GDP on equilibrium interest rate;
   e) show the change in interest rate for a given change in income to maintain equilibrium in the product market .

2. In the state of liquidity trap:
   a) there is no equilibrium at financial markets;
   b) amount of investment is insignificant due to the high interest rate;
   c) investment growth does not lead to an increase of aggregate demand;
   d) increase in securities rate can be expected;
   e) no correct answer.

3. In the IS-LM model the effect of the increase in government purchases that are financed by money emission are reflected as follows:
   a) IS curve shifts to the right, and the LM curve – to the left;
   b) IS curve shifts to the left, and the LM curve – to the right;
   c) IS curve shifts to the right, and the LM curve does not change;
   d) IS and LM curves shift to the left;
   e) IS and LM curves shift to the right.

4. Assume that real GDP has not changed, but the interest rate has increased as a result of simultaneous change in transfers and discount rate in the economy that is described by the IS-LM model. It can be assumed that:
   a) the volume of transfers increased and the discount rate decreased;
   b) the amount of transfers decreased and the discount rate increased;
   c) the amount of transfer payments and the discount rate decreased;
   d) the amount of transfer payments and the discount rate increased;
   e) the amount of transfer has not changed, and the discount rate decreased.

5. If the government increases government purchases and taxes by the same amount ($\Delta G = \Delta T$), then IS curve in the IS-LM model:

a) moves to the right by an ΔG amount, multiplied by the multiplier of government purchases;

b) moves to the left by an ΔT amount, multiplied by the tax multiplier;

c) moves to the right by an $\Delta G + \Delta T$ amount, multiplied by the multiplier of government purchases;

d) moves to the right by an $\Delta G = \Delta T$ amount;

e) does not change its position.

Problems (with solutions)

1. The equilibrium is established in both product and money markets. Fill in the following table reflecting changes as a result of the following events:

- Business taxes are increasing.
- The precautionary demand for money is increasing.

Event	**Which market will be affected**	**Which function is affected by the change and in which way**	**How does the event affecsts IS-LM model**

Solution

Event	**Which market will be affected**	**Which function is affected by the change and in which way**	**How does the event affecsts IS-LM model**
T ↑	Product	I ↓	IS ← (Y↓; r↓)
D_{m3} ↑	Money	D_m ↑	LM ← (Y↓; r↑)

2. Consumption function is given by C = 40 + 0,8 Y and investment function is given by I = 30 - 100 r. The money demand function is given by Dm = 0,5 Y - 75 r. Money supply is 136. Find the equilibrium in this IS-LM model.

Solution

IS equation:

$$Y = C + I;$$

$$Y = 40 + 0,8Y + 30 – 100\ r;$$

$$0,2Y = 70 – 100\ r;$$

$$Y = 350 – 500\ r.$$

LM equation:

$$D_m = S_m;$$

$$0,5Y – 75\ r = 136;$$

$$0,5Y = 136 + 75\ r;$$

$$Y = 272 + 150\ r.$$

General macroeconomic equilibrium:

$$350 – 500r = 272 + 150\ r;$$

$$650\ r = 78;$$

$$r = 0,12\ (12\%).$$

$$Y = 350 – 500 * 0,12 = 290.$$

$$Y = 272 + 150 * 0,12 = 290.$$

3. Consider an economy for which consumption function is described by C = 120 + 0,7 DI, investment function is I = 85 - 140 r, government spending - 81, exports – 93, and import function is Imp = 0,125 Y + 100 r. The transactions demand for money is D_{m1} = 0,8 Y, the asset demand for money is D_{m2} = 100 - 80 r. Money supply is 612. The tax rate is 25%, the amount of transfers is 50. Find the equations for IS and LM curves and determine the equilibrium level of interest rate and output.

Solution

IS equation:

$$Y = C + I + G + NE;$$

$$C = 120 + 0,7(Y - 0,25Y + 50) = 120 + 0,525Y + 35 = 155 + 0,525Y.$$

$$NE = Exp - Imp = 93 - 0,125Y - 100\ r.$$

$$Y = 155 + 0,525Y + 85 - 140\ r + 81 + 93 - 0,125Y - 100\ r;$$

$$0,6Y = 414 - 240\ r;$$

$$(IS)\ Y = 690 - 400\ r.$$

LM equation:

$$D_{m1} + D_{m2} = S_m;$$

$$0,8Y + 100 - 80\ r = 612;$$

$$0,8Y = 512 + 80\ r;$$

$$(LM)\ Y = 640 + 100\ r.$$

General macroeconomic equilibrium:

$$690 - 400\ r = 640 + 100\ r;$$

$$500\ r = 50;$$

$$r = 0,1\ (10\%).$$

$$Y = 690 - 400 * 0,1 = 650.$$

$$Y = 640 + 100 * 0,1 = 650.$$

Problems

1. There is economy equilibrium in product and money markets. The following table shows the consequences of such events.

Event	Which market will be affected	Graph of a which function will be affected and in which way	What will happen with the IS and LM curves	Direction of Change in Y	Direction of Change in r

- Business taxes are increasing.
- The volume of government purchases increases.
- The precautionary demand for money increases.
- The sensitivity of demand for money to the dynamics of the market interest rate decreases.

2. Which policy - fiscal or monetary - would you recommend to maintain the equilibrium level of GDP, under each of the following conditions:

- Households expect an increase in their incomes.
- Firms expect an increase in business taxes.
- Demand for money becomes more sensitive to changes in income.
- There is a massive introduction of credit cards to make purchases of goods and services.

3. There is only transactions demand for money in the economy Dm = 0,45 Y. Money supply is 90. Draw a graph of the LM curve for this economy. Is the economy in equilibrium? Is it advised to conduct fiscal policy in this case?

4. Draw the the graph of the IS curve for this economy, if the consumption function is C = 150 + 0,75 Y, and autonomous investment is 100. Is this economy in equilibrium?

5. When the interest rate decreased to 2% a so-called liquidity trap appeared. IS curve has the form: Y = 150 - 10 r. What consequences can be expected if: a) the money supply will increase by 20, b) government expenditures will increase by 20?

6. There are 66 currency units of money supply in circulation. The demand for money is determined by the equation Dm = 0,4 Y - 150 r. Consumption function is: C = 50 + 0,75 DI. The tax rate is 20%. Investment function has the form I = 39 - 120 r. Government purchases are 35, exports are 20, import function is Imp = 0,05 Y + 60 r. Derive the IS and LM equations and conditions of simultaneous equilibrium in product and money markets.

7. Consumption function is C = 95 + 0,7 DI, investment function is I = 44 - 112 r, government purchases are 80, exports are 70, import function is given by Imp = 0,1 Y + 90 r. Money demand function is given by Dm = 0,5 Y - 250 r and the money supply is 219. The tax rate is 15%, the amount of transfers is 20. Derive the equations of the IS and LM curves, and find the equilibrium levels of interest and output.

8. Consumption function is C = 70 + 0,8 DI, tax rate is 20%, the amount of transfers is 45. Investment function is I = 200 - 360 r, the volume of government purchases is 180. The function of the transactions demand for money is given by Dm1 = 0,4 Y, the asset demand for money is Dm2 =

500 - 600 r. The volume of money supply is 800. Define the state of budget in condition of simultaneous equilibrium in product and money markets.

9. Consumption function is C = 160 + 0,75 Y, investment is I = 240 - 5000 r, government purchases are 320. The function of the transactions demand for money is Dm1 = 0,5 Y, the asset demand for money is Dm2 = 900 - 7500 r. What is the money supply, if effective demand is 880? How is the money supply distributed between the transactions demand for money and the asset demand for money?

10. The economy is characterized by the following functions: C = 318 + 0,75 (Y - T); I = 331 - 1000r; Dm = (Y - 2000r) P. If the amount of taxes is 120, the value of government purchases is 316, money supply is 6400 and the price level P = 2 , determine the parameters of simultaneous equilibrium on the product and money markets. How would it change if price level increases to 2,5?

11. In a pure market economy without government intervention the consumption function is given by C = 40 + 0,75 Y, investment function is I = 35 - 250 r, and the demand for money is Dm = 0,7 Y - 50 r. The volume of money supply is 300. Derive the aggregate demand equation.

12. In a hypothetical economy savings function is S = - 40 + 0,2 Y and investment is I = 250 - 60 r. There are 360 monetary units in circulation and velocity is 5. Asset demand for money fuction is Dm2 = 170 - 10 r. What is the price level that provides simultaneous equilibrium in the product and the money markets if the value of effective demand is 250?

Chapter 12.
Foreign Sector of the Economy

It is well known that the main macroeconomic goals are economic growth, full employment, price stability and foreign economic equilibrium (the so-called "magic quadrangle"). It is logical that the equilibrium in the foreign market should complement internal macroeconomic equilibrium. Relevance of the problems associated with foreign economic policy, increased due to the current trends of globalization.

1. Theories of international trade.
2. Trade policy, net exports and GDP.
3. Macroeconomic equilibrium in an open economy

Key terms

Абсолютна перевага	Absolute advantage
Порівняльна перевага	Comparative advantage
Теорема Хекшера-Оліна	Hecksher-Ohlin theorem
Парадокс Леонтьєва	Leontief paradox
Виграш від торгівлі	Gains from trade
Теорема Рибчинського	Rybczynsky theorem
«Голландська хвороба»	Dutch disease
Протекціонізм	Protectionism
Митний тариф	Customs tariff
Квота	Quota
Гранична схильність до імпорту	Marginal propensity to import – MPM
Функція імпорту	Imports function
Чистий експорт	Net exports
Мала відкрита економіка	Small open-economy
Велика відкрита економіка	Large open-economy

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Questions

1. What explains the strengthening of production internationalization in current conditions?
2. If the volume of import is increasing what will happen with net exports, aggregate demand and national income (ceteris paribus)?

3. Try and remember the effect of foreign trade. What changes of aggregate demand can be expected with an increase of the price level in the country?

4. Do you agree that the best support of domestic producers is the support of internal and external consumption?

5. Can the country's economic recession affect the economies of its trading partners?

Quiz

Select a single correct answer

1. Which of the following positions reveal the meaning of Rybchynskiy theorem:

a) countries export goods that are manufactured using excessive resources, and import goods that are produced using scarce resources;

b) if a country is case relatively abundant in capital it should import capital-intensive and exports labor-intensive goods;

c) established terms of trade under free trade lead to increasing of compensation of factor that is used intensively in the production of goods with the increasing price and decreasing of compensation of factor that is used intensively in the production of goods with the falling price;

d) in condition of constant prices and the availability of only two sectors in the economy, the supply growth of one of the factors lead to an even greater percentage increase of the production in such sector where this factor is used intensively, while there is an absolute reduction of production rates in another sector .

2. If persons' decisions about savings and investments in the country are not reflected on the value of world interest rates, then, the economy of the country is:

a) small-open economy ;

b) large-open economy ;

c) economy with undeveloped financial markets;

d) economy of absolute mobility of capital;

e) no correct answer.

3. If the volume of imports increases, then, in the country (ceteris paribus):

a) aggregate demand increases;

b) national income increases;

c) net exports increases;

d) aggregate demand decreases;

e) national income reduces.

4. The policy of protectionism with high tariffs on imports contributes to:
   a) increase of state budget revenues in the long-run;
   b) reduction of state budget revenues in the short-term;
   c) employment level growth of the national economy in the short-run;
   d) reduction of unemployment abroad;
   e) increase of the marginal propensity to consume.

5. If imports of goods and services in the country exceed exports, the public debt of this country:
   a) can both increase and decrease;
   b) must increase;
   c) must decrease;
   d) does not change.

Problems (with solutions)

1. The same product is manufactured in countries A and B. Demand function for goods in the country A has the form: $Q_A^D = 80 - 20P$. Supply function in the country A: $Q_A^S = -70 + 40P$. Functions of demand and supply in the country B have forms correspondently: $Q_B^D = 60 - 10P$ та $Q_B^S = 30 + 20P$. Identify the world price and volumes of sales in conditions of free trade between countries.

Solutions

Define prices and volumes of sales within each country. In country A:

$$Q_A^D = Q_A^S;$$

$$80 - 20P = -70 + 40P;$$

$$60P = 150;$$

$$P_A = 2{,}5.\ Q_A = 30.$$

In country B:

$$60 - 10P = 30 + 20P;$$

$$30P = 30:$$

$$P_B = 1;\ Q_B = 40.$$

The world price is set in conditions of free trade.

$$Q_A^D + Q_B^D = Q_A^S + Q_B^S ;$$

$$80 – 20P + 60 – 10P = -70 + 40P + 30 + 20P;$$

$$90P = 180;$$

$$P = 2.$$

If the price is set at the world level, then there is deficit in the country A and surplus of products in the country B. Define the deficit in the country A:

Therefore, the country A will import goods.

$$Q^D = 60 - 10\times2 = 40;$$

$$Q^S = -70 + 40\times2 = 10;$$

$$Q^D - Q^S = 40 – 10 = 30.$$

And the country B will export this volume:

$$Q^D = 80 - 20\times2 = 40;$$

$$Q^S = 30 + 20\times2 = 70;$$

$$Q^S – Q^D = 70 – 40 = -30.$$

2. Marginal propensity to consume is 0,75, the marginal propensity to import is 0,11. The tax rate on personal incomes -is 20%. Determine the value of multipliers of a closed and open economy.

Solution

We use formulas to determine the value of multipliers:

$$m_G = \frac{1}{1 - MPC(1-t)},$$

$$m_{imp} = \frac{1}{1 - MPC(1-t) + MPM}.$$

$$m_G = \frac{1}{1-0,75(1-0,2)} = 2,5.$$

$$m_{imp} = \frac{1}{1-0,75(1-0,2)+0,11} = 1,96 .$$

3. The economy has the following characteristics: marginal propensity to consume is 0.8, the tax rate on personal incomes is 25%, the marginal propensity to import is 0.15. If the government purchases of goods and services increase by 50 million dollars, then, what is the loss of GDP increasing due to the impact of imports?

Solution

The multiplier impact has to be considered for answering. The value of the government purchases multiplier is:

$$m_G = \frac{1}{1-MPC(1-t)} = \frac{1}{1-0,8(1-0,25)} = 2,5.$$

so GDP growth without imports will be:

$$\Delta Y_1 = \Delta G \times m_G = 50 \times 2,5 = 125 \text{ mln.dol.}$$

But GDP growth given the imports is determined given the multiplier of the open economy:

$$\Delta Y_2 = \Delta Imp \times m_{imp} = 50 \times \frac{1}{1-0,8(1-0,25)+0,15} = 90,9 \text{ mln.dol.}$$

Thus, the loss of GDP growth due to the impact of import is:

$$\Delta Y = \Delta Y_1 - \Delta Y_2 = 125 - 90,9 = 34,1 \text{ mln.dol.}$$

4. The economy has the following characteristics: the marginal propensity to save is 0,25; autonomous consumption is 310 million pesos, the tax rate on personal income is 20%, the volume of private investments is 840 million pesos, government purchases of goods and services is 780 million pesos, the amount of exports – is 560 million pesos, an autonomous import is 150 million pesos, the marginal propensity to import is 0,12. Determine the equilibrium GDP, budget balance and the trade balance.

Solution

We use the macroeconomic identity for the four-sector economy to determine the equilibrium GDP:

$$C + I_g + G + NE.$$

At first, we identify function of consumption and net exports:

$$C = C_0 + MPC * (Y - tY) = 310 + 0{,}75(Y - 0{,}2Y) = 310 + 0{,}6Y.$$

$$NE = Exp - Imp = 560 - (150 + 0{,}12Y) = 410 - 0{,}12Y.$$

Then, we identify the macroeconomic identity:

$$Y = 310 + 0{,}6Y + 840 + 780 + 410 - 0{,}12Y;$$

$$0{,}52Y = 2340;$$

$$Y = 4500 \text{ (mln. pesos)}.$$

Income	Expenditures
900	780

Surplus = 120

Export	Import
560	150 + 540 = 690

Deficit = 130

Problems

1. The demand function for a certain product in a country A has a following form : $Q_A^D = 100 - 10P$. A supply function in the country A is: $Q_A^S = -50 + 20P$. Functions of supply and demand in the country B are: $Q_B^D = 50 - 5P$ and $Q_B^S = 20 + 10P$. What will the price and volume of product sales be on the world market with the establishing of trade relations between the countries A and B provided that the product is present in the export / import of only those countries.
2. The country exports goods at a world market price, that is 60 drachmas per unit. Supply and demand curves of the product in the country is given by : $Q^D = 400 - 5P$ and $Q^S = -50 + 5P$. Determine exports before and after the introduction of export duties of 10 drachmas per unit of product.
3. Functions of supply and demand for a certain product inside the country are given by: $Q^D = 100 - P$ and $Q^S = -5 + 0{,}5P$. The world price of

goods is 50. Government introduces import duty of 10 lei per unit of product. Determine the volume of imports before and after the introduction of fees, incomes (or losses) of the government from its introduction.

4. Marginal propensity to consume is 0,8, the marginal propensity to import is 0,1. The tax rate on personal incomes is 25%. If the government increases its expenditures by 50 million euros, how much will imports increase by?

5. Disposable income is 0,9 of GDP and the marginal propensity to import is 0,12 of GDP , the marginal propensity to consume is 0,8 of disposable income. Determine the value of multipliers of closed and open economies.

6. The economy is characterized by the following: the marginal propensity to save is 0.25 , the tax rate is 20 % and the marginal propensity to import is 0,13. If exports increased by 15 million forints in such conditions, and imports increased by 17 million forints, then, how would the GDP change?

7. Government purchases multiplier is 4. Net exports are 5 billion francs, private investment is 70 billion francs, government purchases is 60 billion francs. The break-even income is 120 billion francs. Determine the equilibrium output.

8. Autonomous consumption is 65 million pesos, the marginal propensity to consume is 0,8. The tax rate on personal incomes is 20%. Government expenditures equal to 255 million pesos. Investment is 316 million pesos, exports are 148 million pesos, the import is 0,2 of GDP. Determine the equilibrium GDP, the state budget, the trade balance.

9. The economy has the following characteristics: exports equal to 250 million pounds, an autonomous imports – to 70 million pounds, autonomous consumption – to 130 million pounds, the marginal propensity to save – to 0,2, the marginal propensity to import to 0,1, the volume of domestic private investment – is 300 million pounds, the volume of government purchases is 240 million pounds, the tax rate on personal incomes is 25 %, the value of transfers is 90 million pounds. Determine the equilibrium output, balance of the state budget and trade balance.

10. The economy has the following characteristics: the marginal propensity to save is 0,4; autonomous consumption is 350 million lari, the tax rate on personal incomes is 15%; the volume of private investments is 680 million lari, government purchases of goods and services are 544 million lari; exports are 396 million lari, autonomous import is 230 million lari, the marginal propensity to import is 0,11. Determine the equilibrium GDP, deficit of budget, trade balance. How would indicators change if the government increased the tax rate to 20%, while reducing government purchases to 505 million lari?

Chapter 13.
Balance of Payments and Exchange Rate

Previous chapter introduced the analysis of an open economy. This chapter continues by considering the balance of payments, its macroeconomic meaning and structure and systems of exchange rates.

1. The balance of payments and its macroeconomic meaning.
2. Balance of Payments. The structure and regulation.
3. Exchange rate and currency policy.
4. Relationship between the exchange rate and balance of payments.

Key terms

Платіжний баланс	Balance of payments – BP
Торгівельний баланс	Trade balance – TB
Рахунок поточних операцій	Current account
Рахунок операцій з капіталом та фінансових операцій	Capital and financial account
Приплив та відплив капіталів	Capital inflows and outflows
Чисті іноземні інвестиції	Foreign investments – FI
Валютний курс	Exchange rate – ER
Фіксований валютний курс	Pegged/fixed exchange rate
Прив'язка курсу національної валюти до однієї з іноземних	Single currency peg
Прив'язка курсу національної валюти до валютного композиту	Currency composite peg
Валютне правління	Currency board
Плаваючий (або гнучкий) валютний курс	Floating/flexible exchange rate
Незалежно плаваючий валютний курс	Independently floating exchange rate
Корегований валютний курс	Adjusted exchange rate

Керований плаваючий валютний курс	Managed floating exchange rate
Чисте плавання	Clean floating
Брудне плавання	“Dirty” floating
Валютний коридор	Exchange rate band
Повзуча фіксація	Crawling peg

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Questions

1. How will the following events impact Ukrainian balance of payments:
• Indian firm buys Ukrainian metal;
• Ukrainian tourists go to celebrate the New Year to Zakopane;
• Ukraine provides humanitarian assistance to countries that were affected by a tsunami;
• a citizen of Ukraine buys shares of "Norylsknykel";
• Russian firm buys controlling stake in a shipbuilding plant.
2. If inflation rates in the U.S. is higher than in the eurozone countries, what changes in the euro exchange rate against the dollar exchange rate can be expected?
3. We can assume that Dominican peso exchange rate against other currencies is flexible. How will the following events affect the peso's exchange rate:
• increasing the flow of tourists to the Dominican Republic;
• increasing domestic inflation rate;
• economy of the Dominican Republic is declining because of a tropical storm;
• increasing interest rate in the local banks;
• an expected increase of the dollar's exchange rate relative to the peso in the near future.
4. How can the reducing of the budget deficit reduce the deficit of the balance of payments?
5. Economists expect the devaluation of the Turkish lira. What consequences for Ukrainian economy can be expected in this case?
6. If Ukrainians start spending more to buy German cars, Italian shoes and French perfumes how will the exchange rate of hryvnia respond?
7. The country has high rates of economic growth for a long time. How will this affect these indicators of economic activity:
• exports;
• imports;
• state of trade balance;
• demand for foreign currency;
• supply of foreign currency.

Quiz

Select a single correct answer

1. Imports of capital is carried out:
a) through the purchase of financial assets of a country by foreigners;
b) by obtaining foreign credits;

c) in the form of current accounts opened by foreigners;
d) all answers are correct;
e) all answers are wrong.

2. Which of the following actions increases the supply of foreign currency relative to domestic currency:
a) import of goods;
b) import of services;
c) export of goods;
d) export of capital;
e) no correct answer.

3. The deficit of balance of payments:
a) increases money supply in the country;
b) reduces money supply in the country;
c) does not affect money supply in the country;
d) does not change the monetary base;
e) no correct answer.

4. Suppose that inflation rate is increasing in the country, while the nominal exchange rate and the price level remain unchanged in the partner-country. What will happen with the real exchange rate and net exports?
a) real exchange rate will fall, net exports will rise;
b) the real exchange rate and net exports will fall;
c) the real exchange rate will increase net exports fall;
d) the real exchange rate and net exports will rise;
e) the real exchange rate will fall, net exports will not change.

5. If the net trade balance is positive, and the state budget has a deficit, then:
a) private savings exceed domestic investment;
b) private savings are less than domestic investment ;
c) private savings match the domestic investments if the value of the budget deficit is equal to the net trade balance;
d) not enough information .

Problems (with solutions)

1. The volume of investment is 430 million marks, savings of households is 570 million marks. If the deficit of trade balance is 150 million marks determine the government budget balance.

Solution

We use the current account balance equation:

$$NE = S_N - I = (S_P + S_G) - I.$$

Hence

$$S_G = NE + I - S_P.$$

$$S_G = -150 + 430 - 570 = -290.$$

The deficit of government budget is 290 (mln. marks).

2. The economy is characterized by the following data:

• exports of goods is 735 million tugriks;

• imports of goods is 798 million tugriks;

• citizens receive incomes in the form of interest paymens on their foreign investment in the amount of 69 million tugriks;

• interest payments to foreign investors are 27 million tugriks;

• spending of the country's residents on foreign tourism are 36 million tugriks;

• incomes of the country from the tourism are 31 million tugriks;

• unilateral (one-way) transfer payments of the country make are 52 million tugriks;

• inflow of capital into the country is 161 million tugriks;

• outflow of capital from the country is 83 million tugriks.

Using these data, calculate the current account balance, capital flow account and the country's balance of payments.

Solution

Current account balance =
= (Exports of goods + export of tourism services +
+ factor incomes from abroad) –
(imports of goods + import of tourism services + interest payments to foreign investors + unilateral (one-way) transfer payments) =
= (735 + 31 + 69) – (798 + 36 + 27 + 52) = -78 (mln. tugriks).

Balance of capital account = capital inflows – capital outflows =
= 161 – 83 = 78 (mln. tugriks).

Net balance of payments =
= Balance of current account + Balance of capital account =
= -78 + 78 = 0.

3. Ukraine has introduced a fixed exchange rate: 1 USD = 8 UAH. The demand for is represented in the table below:

Dollar exchange rate in hryvnias	7,9	7,95	8,0	8,05	8,1
The volume of daily demand (mln. dol)	80	75	70	65	60

If the dollars supply in the foreign exchange market is 65 million dollars, then what should the National Bank of Ukraine do?

Solution

In conditions of exchange rate 1 USD = 8 UAH the demand exceeds supply (70> 65), so the NBU has to sell 5 million dollars to maintain the rate announced fixed exchange rate.

4. The value of the market basket in country A was 245 escudos in country B was 72 rials in the base year. If the inflation rate was 12% in the country how did the nominal exchange rate of escudo has changed relatively to rial according to purchasing power parity?

Solution

The nominal exchange rate was:

$$E_n \frac{escudo}{rial} = \frac{C_f}{C_d} = \frac{245}{72} = 3{,}4 \frac{escudo}{rial}.$$

The market basket is not available for the previous amount of rials because of price increasing in country B. The market basket is unchanged and costs 245 escudos in country A, and it is now more expensive in country B:

$$E_n \frac{escudo}{rial} = \frac{245}{72 \cdot 1{,}12} = 3{,}0 \frac{escudo}{rial}.$$

Exchange rate of rial fell, and exchange rate of escudo increased.

5. Hryvnia's exchange rate to the U.S. dollar amounted to 5,05 UAH / USD at the beginning of 2008. The price level rose by 2,9% in the U.S. in 2008, and in Ukraine it rose by 22,3%. Determine what hryvnia's nominal exchange rate to the U.S. dollar had to be at the end of 2008 in order for that the real exchange rate remained unchanged?

Solution

We take the rate of 5,05 UAH / USD as a real and determine the nominal exchange rate based on the given information:

$$E_n = 5{,}05 \times \frac{1{,}223}{1{,}029} = 6{,}00 \text{ UAH / USD.}$$

Note: real exchange rate was 7,7 UAH / USD in the end of 2008, so there was a devaluation.

Problems

1. The volume of investment is 1650 million marks, household savings is 1525 million marks. If surplus of budget is 325 million marks then what is the volume of net exports in the country?
2. Consumption function is C = 120 + 0,75DI, the investment function is I = 350 - 1000r. If consumption expenditures equal to 930 million manats, the real interest rate is 12%, and the tax revenues exceed government spending by 60 million manats, and export is 43 million mantas, determine the volume of import.
3. The volume of investment is 70 million tugriks in the economy. Disposable income of households is 2900 million, the amount of consumer expenditures is 2300 mln. Determine the value of government expenditures if the trade deficit is 30 million tugriks and taxes are 250 million.
4. Economy is represented by the following data:

Indicators	Bln. forints
Personal savings	65
Imports	38
Net domestic investment	30
Taxes	74
Government credits with the Central bank	23
Exports	31

Determine the amount of depreciation.

5. Fill in the table:

Y	C	I	G	NE	T	S_P	S_G	S_N	S_N - I
7000	4500	1000	1400		1300				
7000	4700	1100	1300		1400				
7000	4800	1050	1150		1150				

6. The economy is characterized by the following data:

• export of goods is 32151 thousand tugriks;

• import of goods is 33013 thousand tugriks;

• citizens' income in the form of interest on foreign investment is 5589 thousand tugriks;

• interest payments to foreign investors are 3187 thousand tugriks;

• costs of the country's residents on foreign tourism are 3590 thousand tugriks;

• incomes of the country from the tourism are 3704 thousand tugriks;

• unilateral (one-way) transfer payments of the country make 4662 thousand tugriks;

• inflow of capital into the country is 9351 thousand tugriks;

• outflow of capital from the country is 6343 thousand tugriks.

Using these data, calculate the **balance of current account, capital flow account and the country's balance of payments.**

7. The economy has the following characteristics:

• import of goods is 6148 thousand tugriks;

• citizens' expenditures on foreign direct investments are 1980 thousand tugriks;

• citizens' incomes from foreign investments are 1138 thousand tugriks;

• exports of goods is 5460 thousand tugriks;

• expenditures of foreign tourists in the country are 516 thousand tugriks;

• portfolio investments of foreigners in the country are 1230 thousand tugriks;

• citizens expenditures for tourist travels are 328 thousand tugriks;

• incomes of foreign investors in the country are 1655 thousand tugriks;

• portfolio investments of citizens abroad are 2017 thousand tugriks;

• money transfers of citizens abroad are 118 thousand tugriks;

• expenditures of foreigners on acquisition of domestic businesses are 2890 thousand tugriks.

Using these data, calculate the **balance of current account, capital flow account and the country's balance of payments.**

8. The country has the following balance of payments characteristics: current account balance is -210 million francs, net capital account equals to 170 million francs, the balance of the article "errors and omissions" is 14 million francs. By how much should reserve assets be reduced to balance the balance of payments?

9. The nominal exchange rate is 6 yuan per $ 1. At the same time a TV costs $ 600 in the U.S.A and 1200 yuan in China. Calculate the real exchange rate of the yuan against the dollar.

10. The value of the market basket was 1750 florins in the country A and 410 dinars in the country B in the base year. If the inflation rate respectively was 15% and 2% in the reporting year, then determine the florin's exchange rate relatively to dinar's exchange rate according to purchasing power parity.

11. The inflation rate is 7% and the interest rate is 12% in country A. Inflation rate is 4% in country B. What should be the interest rate be such that is no capital movement between the countries?

12. Growth of money supply is 7% for the year in country A, and 9% in country B. The annual rate of output growth in these countries is 3% and 4% respectively. Determine the ratio of currencies of these countries (*ceteris paribus*).

Chapter 14.
The Mundell-Fleming Model: Theory of Aggregate Demand for an Open Economy

We finish our consideration of an open economy issues with the analysis of the simultaneous domestic and foreign market equilibrium model. This chapter will introduce the modifications to the IS-LM model by adding the BP curve that reflects the equilibrium of balance of payments.

1. Foreign sector equilibrium. BP curve.
2. Macroeconomic policy in an open economy with a pegged (fixed) exchange rate.
3. Macroeconomic policy in an open economy with a floating (flexible) exchange rate.

Key terms

Внутрішня рівновага	Internal balance
Зовнішня рівновага	External balance
Модель IS-LM-BP	IS-LM-BP model
Крива BP	BP curve
Повна немобільність капіталу	Capital immobility
Низька мобільність капіталу	Low capital mobility
Висока мобільність капіталу	High capital mobility
Повна мобільність капіталу	Perfect capital mobility
Проблема розподілу ролей	Assignment problem

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Questions

1. What does the slope of BP in the IS-LM-BP model mean?
2. Do fiscal and monetary policy have a direct effect on the BP curve? Change of which parameters can lead to a shift of the BP curve?
3. What kind of exchange rate – fixed or flexible – is preferred macroeconomic policy effectiveness point of veiw?
4. If the economy is in a state of internal and external equilibrium in case of a floating exchange rate and low mobility of capital what consequences will an increase in government purchases have?

5. What is the difference between profits multiplication processes in small and large open economies?

6. How will a decrease of the national currency exchange rate in a small open economy affect its balance of payments?

Quiz

Select a single correct answer

1. In case of the national currency devaluation:
   a) IS shifts to the right, and BP - left;
   b) IS shifts to the left, and BP - right;
   c) IS and BP both shift to the right;
   d) IS and BP both shift to the left;
   e) IS does not change its position, and BP shifts to the right.

2. In case of a floating exchange rate sales of government securities by the Central bank will lead to:
   a) the reduction of national currency nominal exchange rate against foreign currencies;
   b) the increase of national currency nominal exchange rate against foreign currencies;
   c) the maintenance of national currency nominal exchange rate against foreign currencies;
   d) there is no relationship between this measure of the Central Bank and the national currency nominal exchange rate against foreign currencies.

3. In case of the low capital mobility and a fixed exchange rate in a small open economy there is internal and external balance. If the government increases taxes then in the short run you can expect:
   a) deficit of current account and surplus of capital account;
   b) surplus of current account and deficit of capital account;
   c) deficit of current account and capital account;
   d) surplus of current account and capital account.

4. In case of the floating exchange rate unemployment rate can be reduced by:
   a) reduction of taxes;
   b) increase of government purchases;
   c) increase of transfers;
   d) increase of the discount rate;
   e) reduction of required reserves ratio.

5. An economy is in a state of internal and external equilibria. Assuming floating exchange rate and a high capital mobility the reduction of the discount rate would lead to:

a) an increase of the exchange rate and interest rate;
b) reduction of exchange rate and interest rate;
c) increase of the exchange rate and reduction of interest rate;
d) reduction of exchange rate and increase of interest rate;
e) no correct answer.

Problems (with solutions)

1. Household demand for domestic goods is given by the function C = 36 + 0,7 DI, and the import function is given by Imp = 0,14 Y + 970r. Investment function has the form I = 48 - 1500r. Government purchases are equal to the amount of tax on personal incomes (tax rate is 20%). Exports are 87. How does the IS function look like in cases of closed and open economy? Show the changes graphically.

Solution

IS function reflects the equilibrium on products market. In conditions of the closed economy it is derived from a macroeconomic identity:

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

$$Y = 36 + 0,7 \times 0,8Y + 48 – 1500r + 0,2Y;$$

$$0,24Y = 84 – 1500r;$$

$$Y = 350 – 6250r \ (IS_1).$$

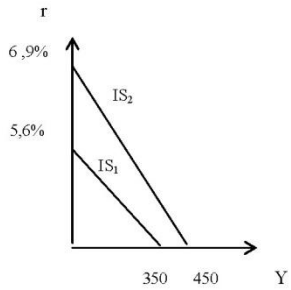
We use the identity for four-sector economy in an open economy:

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

$$Y = 36 + 0,56Y + 48 – 1500r + 0,2Y + 87 – 0,14Y – 970r;$$

$$0,38Y = 171 – 2470r;$$

$$Y = 450 – 6500r \ (IS_2).$$



Changes that are determined by the inclusion of net exports to aggregate expenditures are reflected in the fact that the IS curve in an open economy (IS_2) compared with graph IS in a closed economy (IS_1) moves to the right because of exports, but will have more steep slope because of imports.

2. In case of a perfect capital mobility in a small open economy, the consumption function has the form: C = 70 + 0,9 DI and tax rate is 20%. Investment function is I = 88 - 55 r, government expenditures are 20. The volume of exports is 31, import function Imp = 0,1 Y + 40 r. The function of the transactions demand for money Dm1 = 0,5 Y, the asset demand for money Dm2 = 200 - 175 r. Money supply is 460. Will there be the capital inflow into the economy if the world interest rate is 5%?

Solution

The capital inflow into the economy will occur if the domestic real interest rate is higher than the world's one. The value of domestic interest rate is set at the level of simultaneous equilibrium of product and money markets.

Determine the equilibrium conditions. Find the IS and LM equations.

IS equation:

$$Y = C + I + G + NE;$$

$$Y = 70 + 0,9 \times 0,8Y + 88 – 55\ r + 20 + 31 – 0,1Y – 40r;$$

$$Y = 209 + 0,62Y – 95\ r;$$

$$0,38Y = 209 – 95r;$$

$$Y = 550 – 250\ r.$$

LM equation:

$$D_m = S_m;$$

$$0,5Y + 200 – 175\ r = 460;$$

$$0,5Y = 260 + 175\ r;$$

$$Y = 520 + 350\ r.$$

Total macroeconomic equilibrium:

$$550 – 250r = 520 + 350\ r;$$

$$600\ r = 30;$$

$$r = 0,05\ (5\%).$$

Therefore, the domestic interest rate is equal to the world's one, so there will be no capital inflow into the economy.

3. Households' demand for domestic goods is determined by the formula C = 11 + 0,8 Y, and for the import goods by Imp = 0,11 Y + 36r. Investment function is I = 16 - 150r, and the amount of government spending is 7. Exports are 28. The net capital exports function is NKE = 14 - 170r. The function of the transactions demand for money is Dm1 = 0,4 Y, and the asset demand for money is Dm2 = 155,2 - 140r. There are 220 (money units) in circulation. Determine the balance of payments in conditions of the goods and money markets equilibrium.

Solution

Define the parameters of internal equilibrium. To do this first find equations of IS and LM.

IS equation:

$$Y = C + I + G + NE;$$

$$Y = 11 + 0,8Y + 16 – 150\ r + 7 + 28 – 0,11Y – 36r;$$

$$0,31Y = 62 – 186r;$$

$$Y = 200 – 600\ r.$$

LM equation:

$$Dm = Sm;$$

$$0,4Y + 155,2 – 140\ r = 220;$$
$$0,4Y = 64,8 + 140\ r;$$

$$Y = 162 + 350\ r.$$

Total macroeconomic equilibrium:

$$200 – 600r = 162 + 350 r;$$

$$950 r = 38;$$

$$r = 0,04 (4\%);$$

$$Y = 200 - 600 \times 0,04 = 176.$$

Find the components of the balance of payments:

$$NE = 28 – 0,11 \times 176 - 36 \times 0,04 = 7,2.$$

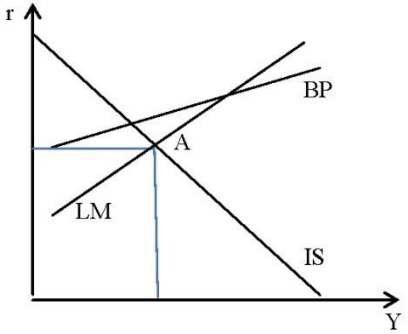
$$NKE = 14 – 170 \times 0,04 = 7,2.$$

Thus, the internal equilibrium is accompanied by the external equilibrium.

4. The internal quilibrium was established in the small country with an open economy and the high mobility of capital, but there is a balance of payments deficit. Depict the situation graphically and suggest measures of stabilization to achieve the simultaneous internal and external equilibria in case of fixed and floating exchange rates.

Solution

The initial economic situation of the country can be represented by point A on the graph.



The existence of unemployment is the problem of the country, so it is necessary to carry out an expansionary policy.

The monetary policy is ineffective in condition of the fixed exchange rate, and therefore the fiscal policy should be preferred. The interest rate will increase with the increase in government purchases (IS shifts right), that would contribute to capital inflow in case of high capital mobility and eliminate balance of payments deficit. The growth of foreign exchange reserves will increase the amount of money in a country that is stimulating the economy too.

The fiscal policy is ineffective in case of the floating exchange rates. High capital mobility only increases the impact of monetary policy. The interest rate will reduce during the easy money policy (LM shift right), thus, the capital outflow and the balance of payments deficit will increase. Thereby national currency is devalued, which promotes the growth of net exports (IS and BP shift right), increasing of GDP and reduction of unemployment.

5. Assume fixed exchange rate and fixed prices. The demand of households give by C = 9 + 0,8 DI, tax rate - 18.75%. Investment demand of businessmen is represented by the function I = 20 - 200r. The volume of government purchases is 16 and the volume of exports is 27. Import function has the form Imp = 0,1 Y + 160r. There are 54 money units in circulation. The transactions demand for money is 0,6 Y, the asset demand for money: 42 - 360 r. Function of net capital exports looks like: NKE = 35 - 320r.

1) Find the parameters of internal and external equilibria.

2) Government conducts expansionary fiscal policy, reducing the tax rate to 15% and increasing government purchases by 1,5 monetary units. How much should the money supply change to restore macroeconomic equilibrium?

Solution

Find IS, LM and BP equations.

IS equation:

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

$$C = 9 + 0{,}8\,(1 - 0{,}1875)Y = 10 + 0{,}65Y.$$

$$Y = 9 + 0{,}65Y + 20 - 200\,r + 16 + 27 - 0{,}1Y - 160r;$$
$$0{,}45Y = 72 - 360r;$$

$$Y = 160 - 800\,r.$$

LM equation:

$$Dm = Sm;$$

$$0,6Y + 42 – 360\ r = 54;$$

$$0,6Y = 12 + 360\ r;$$

$$Y = 20 + 600\ r.$$

BP equation:

$$NE = NKE;$$

$$27 – 0,1Y – 160r = 35 - 320r;$$

$$0,1Y = 160r - 8;$$

$$Y = 1600r - 80;$$

Find the parameters of internal equilibrium:

$$160 – 800r = 20 + 600\ r;$$

$$1400\ r = 140;$$

$$r = 0,1\ (10\%);$$

$$Y = 160 - 800 \times 0,1 = 80.$$

Check the status of the balance of payments:

$$NE = 27 – 0,1 \times 80 - 160 \times 0,1 = 3.$$

$$NKE = 35 – 320 \times 0,1 = 3.$$

Thus, we have a general equilibrium, the point of equilibrium is the point of IS, LM and BP graphs intersection.

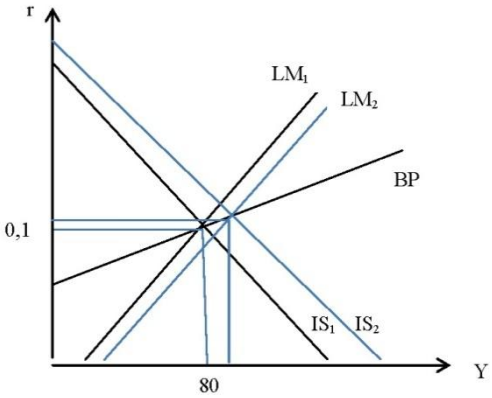
The IS equation has changed as a result of an expansionary fiscal policy, its graph moves to the right (IS_2):

$$C = 9 + 0,8\ (1 – 0,15)Y = 10 + 0,68Y.$$

$$Y = 9 + 0,68Y + 20 – 200\ r + 17,5 + 27 – 0,1Y – 160r;$$

$$0,42Y = 73,5 – 360r;$$

$$Y = 175 – 857\ r.$$



Find the coordinates of the IS_2 and LM_1 intersection point.

$$175 – 857\ r = 20 + 600\ r;$$

$$1457r = 155;$$

$$r = 0{,}1064\ (10{,}64\%);$$

$$Y = 83{,}8.$$

This point is above the BP graph, that is indicating a balance of payments surplus:

$$NE = 27 – 0{,}1 \times 83{,}8 - 160 \times 0{,}1064 = 1{,}596.$$

$$NKE = 35 – 320 \times 0{,}1064 = 0{,}952.$$

The LM graph moves to the right until it intersects with BP and IS_2 because of the growth of the money supply. Determine the coordinates of the point from equality IS_2 = BP:

$$175 – 857\ r = 1600r - 80;$$

$$2457r = 255;$$

$$r = 0{,}1038;$$

$$Y = 86.$$

For equilibrium in the money market money supply at this point must be equal:

$$Sm = 0,6 \times 86 + 42 – 360 \times 0,1038 = 56,2.$$

Thus, to restore the equilibriumthe money supply should be increased to

$$\Delta S = 56,2 – 54 = 2,2 \text{ monetary units.}$$

Problems

1. Find the direction of change in GDP, interest rates and foreign currency reserves for a small open economy with absolute capital mobility and a fixed exchange rate in condition of the discount rate reduction using the Mundell-Fleming model. Show graphically.
2. The government reduces taxes on personal incomes in a small open economy with high capital mobility and a floating exchange rate. Find the direction of change in GDP, interest rates and currency exchange rates based on the Mundell-Fleming model. Show graphically.
3. Analyze how GDP, interest rate, net exports and the exchange rate will change in a small open economy with low capital mobility and a floating exchange rate using the Mundell-Fleming model, if the government carries out protectionist policiy restricting imports. Show graphically.
4. The economy operates under the condition of absolute capital mobility and a fixed exchange rate. Analyze the effects of the following changes using the IS-LM-BP model:
   - government purchases are increasing;
   - demand for imported goods is increasing;
   - Central Bank reduces discount rate.
5. In the country with low capital mobility and a fixed exchange rate GDP level is lower than potential and there is balance of payments surplus. Show the described economy graphically, and discuss the possible policy measures that will allow the economy to come to a state of internal and external equilibria under the conditions of full employment. Consider the case of a floating exchange rate.
6. A small open economy is characterized by the following functional relationships. Household consumption function has the form C = 43 + 0,8 Y; investment function is I = 27 - 70r; import function is Imp = 0,1 Y + 50 r. Government purchases are 35 and the volume of exports is 51. There are 720 monetary units in circulation. The transactions demand for money is represented by function: Dm1 = 0,6 Y, and the asset demand for money:

Dm2 = 420 - 60r. If the world interest rate is 2 % , then whether there would be capital inflows into the economy in case of absolute mobility of capital and fixed price level?

7. Assume an economy with fixed prices and fixed exchange rate. Household demand is represented by the following consumption function C = 27 + 0,75 DI and tax rate is 20%. Investment demand of enterprises is represented by the following function: I = 25 - 600r. The volume of government purchases is 19, the volume of exports is 33. Import function has the form Imp = 0,12 Y + 440r. The transactions demand for money is 0,4 Y, the asset demand for money is 512 - 1000 r. There are 520 monetary units in circulation. Function of net capital exports looks like : NKE = 27 - 650r. Find the internal and external equilibrium.

8. Functioning of an open economy with a floating exchange rate is described by the following equations: consumption function: C = 205 + 0,8 DI, investment function: I = 276 - 180r; import function: Imp = 0,1 Y + 210E; function of net capital exports: NKE = 60 - 300r. transactions demand for money: Dm1 = 0,4 Y; asset demand for money: Dm2 = 300 - 400r. The tax rate on household incomes is 25 %. The export volume is 565 , the volume of government purchases is 303, the money supply is set at 1100. Find the internal and external equilibria.

Chatper 15.
Alternative Macroeconomic Concepts

The content and features of Keynesian theory are better understood when they are compared with alternative modern theories. Most of them can be attributed to the neo-conservative models of government regulation. The most famous of them are monetarism, theory of rational expectations and supply-side economics. They are united under the idea of minimizing government intervention in the economy. However Keynesianism continues to develop within the neo-Keynesian theory. This theme illustrates the fact that macroeconomics cannot be reduced to only the Keynesian theory today – it is the variety of views on major economic issues.

1. Monetarism as the neo-conservative model of government regulation.
2. The theory of rational expectations.
3. The supply-side economics.

Key terms

Монетаризм	Monetarism
Монетарне правило	Monetary rule
Теорія раціональних очікувань (ТРО)	Theory of rational expectations
Економіка пропозиції	Supply-side economics
Крива Лаффера	Laffer curve

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Questions

1. Which of the following statements belong to the adherents of Keynesianism and which belong to the neoclassical school adherents and followers of monetarism?

• prices and wages are flexible;

• savings are determined by the level of aggregate income;

• prices and wages are inflexible in the short-run;

• equilibrium in the economy is possible in the case of part-time employment;

• the demand for money depends on income level;

• changes in the money supply can predict impact on nominal GDP;

• in the case of the relatively steep investment demand curve monetary policy is ineffective;

• fluctuations of the aggregate expenditures influence primarily output and employment rather than price level.

2. What was the reason for gradual replacement of the Keynesian model neoconservative models? Why is the impact on the total level of income and employment most important in one case, and the stability of the purchasing power of the currency and exchange rate in the other case?

3. Explain the fundamental difference between monetarist and Keynesian approaches to the use of monetary policy in case of economic recession.

4. Draw a graph of aggregate demand and aggregate supply under the assumptions of each of the following: a) Keynesian theory; b) the monetarist theory; c) the theory of rational expectations; d) the supply-side economics theory.

5. How can rational expectations interfere with the fiscal policy?

6. Why do Keynesians focuse on aggregate demand and monetarists – on aggregate supply when choosing variables of stabilizing policy?

7. Why do proponents of supply-side economics prefer lower taxes and Keynesians advocate increase in government purchases?

Quiz

Select a single correct answer

1. According to the concept of adaptive expectations what is the feature of the relationship between inflation and unemployment :

a) the direct relationship in the long-run;

b) the direct relationship in the short-run;

c) inflation acceleration when unemployment rate is lower than natural rate;

d) sustainable growth of employment due to lower inflation rate;

e) no correct answer.

2. According to the concept of rational expectations:

a) Phillips curve in the long run is absolutely inelastic, and in the short run it has a negative slope;

b) Phillips curves in the long and short run are absolutely inelastic and intersect at the level of full employment;

c) Phillips curves in long and short-run are absolutely inelastic, while it corresponds to the level of full employment in long-run, and in short-run does not;

d) Phillips curve does not exist, so there is no problem of choice between inflation and unemployment in the long run;

e) no correct answer.

3. According to the monetarist interpretation of the Phillips curve, the government's measures of stimulating aggregate demand to reduce unemployment will lead:

a) to an increase of employment rate and prices in the long-run;
b) to an increase of the price level in the short-run in case of constant level of employment;
c) to an increase of the price level in the long-run in case of moving to the natural rate of unemployment;
d) a permanent increase of inflation rate;
e) no correct answer.

4. Stabilisation policy in a closed economy according to the supporters of the Theory of rational expectations requires:

a) a balanced budget within the business cycle;
b) conducting a price policy;
c) conducting an income policy;
d) strict adherence to the monetary rule;
e) encouraging private investment.

5. Which of the following statements can be attributed to members of monetarism:

a) monetary policy is practically ineffective in case of downward sloping demand curve for money;
b) changes in the money supply have an impact on nominal GDP ;
c) under the conditions of a relatively steep investment demand curve, monetary policy is ineffective;
d) fluctuations of aggregate expenditures affect primarily output and employment, rather than the price level;
e) no correct answer.

NOTES

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MACROECONOMICS

STUDY GUIDE

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