MACROECONOMICS

FINAL EXAM STUDY COMPANION FOR

60A203
Spring 2018-19

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Book: Gregory N. Mankiw: Macroeconomics
(7th Ed., 2010, Worth Publishers, ISBN: 978-1-4292-1887-0)

Methodological expert: Edit GYÁFRÁS

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Preface

My aim with this study guide is to make preparation for the final exam easier for the students. All the necessary knowledge they need to successfully finish their macroeconomics course is in the book, in the lecture slides or have been told during lectures. Here they can get a little more proficient with the types of questions that are going to be asked during the final exam.
Firstly, you will find the definitions for every topic. These definitions mostly come from the book, but I have slightly modified some of them. Definitions are either in the list because they are very important concepts in macroeconomics that you should definitely know, or if they are not so important by themselves, will be often used later. Within the individual topics definitions come in the order they appear in that specific topic, but in the end of this book you will find an index of them all. The definitions I give are not the only possibly good definitions of the concepts listed, students can come up with their own variations, but I am going to decide in the end whether it is a correct definition or not.
Secondly, you will find true or false questions followed by single choice questions. Statements that are partly true are actually false "A bear is a carnivore mammal that can fly" is obviously false, although the first half of the sentence is true. For the single choice there is only one totally correct answer, though more of them can partially be right.
After the questions for every topic you will find the solutions to the questions and also detailed explanation supplementing the solutions. Also you will find a detailed definition list, where the basic definition is accompanied by some further explanation to make the definition easier to understand and memorize. You will not need to give these explanations in the exam.
You will find essay questions too, where you will have to provide a longer answer than a definition, with your own words, as in real life this the way you will have to demonstrate your macroeconomic understanding.
I recommend that once you feel fully prepared for the final exam, sit down with the sample test at the end of this study guide, set your timer to 55 minutes (that is how much time you will have at the real test) and try to solve it as well as you can. Only check the answers after the 55 minutes are up to see how well you are doing under a time constraint.

This course contributes to the professional training of the students in the following ways:

a) regarding the knowledge of the student:
- has a firm grasp on the essential concepts, facts and theories of macroeconomics. The student is familiar with the macroeconomic actors, their individual behaviour and their interconnectedness;
- is aware of the connection of other professional fields to the field of macroeconomic decisions (engineering, law, environmental protection, accounting, market research etc.);
- is familiar with digital and other office appliances designed to aid economic processes and the effective operation of economic organisations;
- Has mastered the professional and effective usage of written and oral communication along with the presentation of data using charts and graphs;
- Has a good command of the basic linguistic terms used in macroeconomics in English.

b) regarding the competencies of the student:
- is familiar with and able to apply the concepts of optimizing and equilibrium in reasoning about, predicting and organizing economic activity;
- can uncover facts and basic connections, can arrange and analyse data systematically, can draw conclusions and make critical observations along with preparatory suggestions using the theories and methods learned.
- The student can make informed decisions in connection with routine and partially unfamiliar issues applying the economic way of thinking;

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- Follows and understands international and world economy events along with the changes in the relevant economic policies and laws and their effect at the national level. The student considers the above when conducting analyses, making suggestions and proposing decisions;
- Is capable of assessing the complex consequences of economic processes and organisational events on consumer and producer decisions;
- Can present conceptually and theoretically professional suggestions and opinions well both in written and oral form in English;
- Is an intermediate user of professional vocabulary in English.

c) regarding the attitude of the student:

- Is open to new information, new professional knowledge and new methodologies;
- Is sensitive to the changes occurring to the wider economic and social circumstances of his/her job, workplace or enterprise. The student tries to follow and understand these changes within the framework learned;

d) regarding autonomy and responsibility, the student

- Takes responsibility for his/her analyses, conclusions and decisions;
- Organises, leads and assesses economic activities in a firm or an economic institution.

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Topic 1: The Data of Macroeconomics (Chapter2)

Topic overview

The first macro topic is about the very subject of macroeconomics: it gives you methods with which the performance of an economy may be assessed. We are going to talk about indicators here that let you measure how well a certain economy is doing in different respects. The three main fields we are going to look at are: how much the economy is producing, how high are the prices in an economy and what is the employment situation.
With all of these questions that we will analyze one by one in later chapters we want to do several things. First of all, we have to find a way to measure these (production, prices, employment), next we will want to understand what influences these indicators, and once we have all these we will be able to understand why they evolved in the past the way they did. This way we will be able to predict what effect any specific occurrence within the economy would likely have on the three indicators.
In this first topic we are concerned with measuring. Measuring production (or output) and the prices at the macro level will turn out to be a trickier task than one would think at first. The main problem is that economies produce a multitude of diverse products and services, but we want to have just one single measure to tell how much is being produced and how high the prices are. The solution to this problem is aggregating, which will be either to take a weighted sum or a weighted average. The biggest problem in connection with employment is categorization: who should we count as employed or unemployed?
All the indicators we study in this topic are internationally standardized indicators, so they will let you make comparisons, either between countries at one point in time, or for one country between different points in time.

Learning outcomes

- *Students should become familiar with the main questions of macroeconomics*
- *Students should become able to understand aggregating and think in terms of groups of actors and groups of products/services*
- *Students should know the main indicators used to describe an economy*
- *Students will be aware of the methodological weaknesses of the indicators introduced and will be able to treat them accordingly*
- *Students will realize the mechanism and significance of the macro circular flow*

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Definitions

Gross Domestic Product (GDP): the market value of all final goods and services produced within an economy in a given year. It is also the sum of all value added produced at various stages of the production chain.

Intermediate goods: goods produced by one firm and sold to another as an input for further production. Their value do not enter into the GDP.

Real variables: Real variables measure things (GDP, wages, money stock etc.) valued at constant prices. To get a real variable, the appropriate nominal or current variable has to be divided by the level of prices.

Net Exports: also called Balance of Trade. It is the value of goods and services sold to other countries minus the value of goods and services bought from foreign country producers.

Depreciation of capital: the amount of the economy's stock of plants, equipment and residential structures wearing out during a year.

Consumer Price Index (CPI): It is the price of a basket of goods and services a typical consumer purchases relative to the price of the same basket in some base year.

Unemployed: a person who does not have an employment, is available for work and has tried to find work during the four weeks prior to the time of the survey.

True or False questions

A11. $S = ((Y - T) - C) + (G - T)$.
A12. $Y = C + S + T$.
A13. The value of intermediate products is not included in the GDP.
A14. The GDP does not contain the value of all goods produced in a country.
A15. GNI is necessarily greater than GDP.
A16. If more people go abroad to work, the source country's GNI will not change, but the GDP will go down.
A17. If a given year' nominal GDP is higher than real GDP, this indicates that the prices have gone up.
A18. If prices in a country increase in a given year, then real GDP is going to be higher than nominal GDP.
A19. Real is always nominal divided by the price level.
A110. If *nominal* (wage, interest etc.) does not change but the price level increases, then *real* (wage, interest etc.) must decrease.
A111. When the consumers price index (CPI) goes up, the GDP deflator must also increase.
A112. If more transfer income flows into a country than out of it in a given year, GNI is necessarily greater than GDP.

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Simple choice questions

B11. The most widely used indicator of a country's economic potential is
a) inflation
b) GDP/capita
c) GNI
d) Potential income

B12. When a French company operating in Hungary transfers home its profits, the Hungarian …… decreases.
a) GO
b) GDP
c) GNI
d) CPI

B13. Which of the following is NOT a macroeconomic problem?
a) The market form on a given product's market
b) The aggregated production of firms in a country
c) The average level of consumers' prices
d) Budget deficit of the government

B14. Which of the following is not a macroeconomic problem?
a) The level of production in a country
b) The utility a consumer gains from consumption
c) What share of the income is saved within the whole economy
d) The average level of the price of a group of commodities

B15. In case of an open economy, which of the following represents an income outflow for the foreign sector?
a) Our country's exports and the foreign saving
b) Our country's imports
c) Consumption, taxes and savings
d) Consumption, investment, government spending and our country's exports

B16. If the nominal GDP is greater than the real GDP for a certain year, then this is a sign for ….
a) unemployment
b) economic growth
c) budget deficit
d) inflation

B17. When there is inflation from one year to the next in a country, then
a) the later year's nominal GDP must be higher than the earlier year's
b) the later year's real GDP must be higher than that year's nominal GDP
c) the CPI is higher than 100
d) the GDP deflator is positive

B18. In the circular flow model, if the government saving is negative, then
a) $T - G > S_{Government}$
b) $Y < C + I + G$
c) X > IM
d) $I < S_{Households} + S_{Companies} + S_{Foreign}$

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B19. What phase comes after depression in an economic cycle?
a) recession
b) revival
c) recovery
d) expansion

B110. What do we call the income flow that goes from the Government sector to the Firm sector?
a) Tax
b) Transfer
c) Government purchases
d) Saving

Solutions

A11. False
A12. True
A13. True
A14. True
A15. False
A16. True
A17. True
A18. False
A19. True
A110. True
A111. False
A112. False

B11. B
B12. C
B13. A
B14. B
B15. A
B16. D
B17. C
B18. D
B19. C
B110. B

Explanation to the solutions of true or false questions

A11. $S = ((Y - T) - C) + (G - T)$.
FALSE. The first part on the right hand side is private saving (which is disposable income less consumption). The second part looks like public or government saving, but that would be T – G, what is left of the tax revenues after paying the government expenditures. The one here in the second bracket is actually $-S_G$.

A12. $Y = C + S + T$.
TRUE. The right hand side shows how the income can be spent. The logic would rather say a different order: first you pay taxes, and then what is left you can freely spend on consumption and the rest will be saved.

A13. The value of intermediate products is not included in the GDP.
TRUE. The goods produced by the Firm sector can either be for final or for further use. Intermediate products are the latter. They are not part of the GDP or Y, because their value is not an income inflow to the Firm sector. One firm pays to another firm.

A14. The GDP does not contain the value of all goods produced in a country.
TRUE. Same as the previous. The GDP definition says it is the value of all final goods and services, meaning that the value of goods that are not for final use are not included.

A15. GNI is necessarily greater than GDP.
FALSE. GNI is GDP plus factor income inflow minus factor

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income outflow. If more factor incomes (wages, profits, interest) flow in than out, GNI will be greater, but if more factor incomes flow out, then GDP will be greater. The opposite of the statement would also be false.

A16. If more people go abroad to work, the source country's GNI will not change, but the GDP will go down.

TRUE. GNI accounts for factor incomes generated by citizens of a country, wherever the income is generated, so this will not change. GDP accounts for factor income generated within a country. If citizens leave the country, the income they make no longer counts into the GDP.

A17. If a given year' nominal GDP is higher than real GDP, this indicates that the prices have gone up.

TRUE. Nominal and real GDP is the value of the same quantity of goods just calculated with different prices. If $\sum p_{current} \cdot q_{current} > \sum p_{base} \cdot q_{current}$ *that means that price in general have gone up from the base year to the current year. This still does not mean, that all prices increased or all prices increased to the same degree!*

A18. If prices in a country increase in a given year, then real GDP is going to be higher than nominal GDP.

FALSE. Real GDP is the value of the current year's production at a base year's price, and nominal GDP is the value of the same production at the current year's price. If the former is greater than the latter, than base year prices must on average be greater than current year prices.

A19. Real GDP is always nominal GDP divided by the price level.

TRUE. Whenever we calculate real something from its nominal, we divide, deflate, by the price level. The only case when this seems to be false is the Fisher equation (nominal interest rate equals real interest rate plus rate of inflation), but we said it is only an approximate form.

A110. If *nominal* (wage, interest etc.) does not change but the price level increases, then *real* (wage, interest etc.) must decrease.

TRUE. Take the case of wages: real wage equals nominal wage over the price level. If we fix the numerator and the denominator increases, the result will be smaller. This one works with the Fisher equation too.

A111. When the consumers price index (CPI) goes up, the GDP deflator must also increase.

FALSE. These two are measures of prices but are covering the prices of different sets of products and are also weighted differently. They do generally move together, but theoretically it is possible that one of them increases and the other one decreases.

A112. If more transfer income flows into a country than out of it in a given year, GNI is necessarily greater than GDP.

FALSE. Transfer income flows make the difference between national (like GNI) and national disposable (like GNDI) indicators. The relationship between GDP and GNI depends on how much factor incomes flow in and out of the country.

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Explanation to the solution of single choice questions

B11. The most widely used indicator of a country's economic potential is

Economic potential refers to the capacity of the country to produce goods and services. Think about what measure could be used to make international comparisons.

a) Inflation.

This measures the level of prices, and does not tell much about how much a country can produce.

b) GDP/capita.

GDP is about production, and to make it internationally comparable we scale it down to one citizen.

c) GNI.

It is in connection with production too, but not within a country, but of a certain nation.

d) Potential income.

Is used in our model, but in reality it would be something very difficult to determine with any accuracy.

B12. When a French company operating in Hungary transfers home its profits, the Hungarian …… decreases.

A French company is French by nationality but operates geographically within the Hungarian borders.

a) GO

This is the value of all goods and services produced within a country, in Hungary. If the French company is bringing away profits, that profit is still generated in Hungary.

b) GDP

This is all the incomes generated in Hungary. Again, the main point is, that is it generated in the country.

c) GNI

This is the measure of national performance. Because the French company's income is generated inside the country, it counts into the GDP, but since it is generated by non-nationals, the GNI will be smaller than the GDP.

d) CPI

This is a measure of prices, not of production, you can rule this one out immediately.

B13. Which of the following is NOT a macroeconomic problem?

Macroeconomics is studying the performance of national economies using aggregated indicators. Microeconomics studies the actions of individual actors (firms, consumers). So if you find which one of the following is a microeconomic problem, you are done.

a) The market form on a given product's market.

In micro we were studying market forms for specific markets. In macro, we don't even make a distinction between different goods and services.

b) The aggregated production of firms in a country.

The key word is aggregated here. So it is not only about one firm's production of one product, but of the total production of all firms. This is a macro problem.

c) The average level of consumers' prices.

Now the key word is average. In micro we were looking at the individual prices of different

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goods, but now we take an average of all the prices of the goods in a country. This is again a macro problem.

d) Budget deficit of the government.
In microeconomics we did not even mention the government. Except maybe when we looked at what happens if the government fixes the price of a good. In macroeconomics it is an autonomous player with incomes, expenditures and saving.

B14. Which of the following is not a macroeconomic problem?
See previous question. Think about which can be a micro topic, or which one cannot be interpreted at a national or country level.

a) The level of production in a country.
This one explicitly says 'at a country level'. Looking at production at the firm level, or even at a market level would be a micro problem.

b) The utility a consumer gains from consumption.
This one says 'a consumer', so at an individual level. Utility for all consumers of a given product would be somewhere between micro and macro, but in micro we were looking at consumers' surplus as a measure for that. At the country level, however, I have no idea how utility could be aggregated.

c) What share of the income is saved within the whole economy.
Again you see: 'the whole economy'. The share mentioned here will most likely be a kind of average share: how much is income, how much is shared altogether, the ratio of the two is this savings rate.

d) The average level of the price of a group of commodities.
Not the price of one commodity, but the average price of more than one commodities. We have seen in macroeconomics the GDP deflator and the CPI talking about this.

B15. In case of an open economy, which of the following represents an income outflow for the foreign sector?
In the circular flow model every sector has income inflows and income outflows. The function of the foreign sector in this model is only to trade goods and services with our country and place their savings.

a) Our country's exports and the foreign saving.
When we export, we sell to the foreign sector, income flows from them to us. Their saving will also come to our financial market in this model to finance investments.

b) Our country's imports.
We import, we pay. The foreign sector sells us the goods, so they get income.

c) Consumption, taxes and savings.
These are the income outflows of the household sector.

d) Consumption, investment, government spending and our country's exports
These are from the goods market, and are income inflows.

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B16. If the nominal GDP is greater than the real GDP for a certain year, then this is a sign for ….

By definition, nominal GDP is the value of the final goods and services produced at current prices and real GDP is the value of the same final goods and services at a base year's prices.

a) unemployment

Unemployment is an important macroeconomic question. Seeing how GDP changes from year to year could indicate something about how unemployment changes but not two output figures for the same year.

b) economic growth

Economic growth could be calculated from two different year's GDP figures using the same prices (so either from two nominal or two real GDP figures).

c) budget deficit

It is the magnitude of the negative government saving, so T – G.

d) inflation

Is the change in the average level of prices. The nominal and real GDP figures value the same set of goods at different prices. If nominal is greater, than current prices, on average are greater than base year prices. Not necessarily all of them, but on average.

B17. When there is inflation from one year to the next in a country, then

By definition inflation means an increase in the prices from one year to the next. The question is about how to measure or detect it.

a) the later year's nominal GDP must be higher than the earlier year's.

This is just a simple nominal GDP increase. Production at current prices is higher, but we cannot know if it is higher because we are producing more and sell at the same price, or because we produce the same amount and sell at a higher price, or some combination of the two.

b) the later year's real GDP must be higher than that year's nominal GDP.

Real GDP and nominal GDP help us differentiate between the effects of producing more and selling at a higher price. Real GDP is current year's production at previous year's prices. So if this is higher than current year's production at current year's prices, this is an indicator that prices have gone down, so there is deflation.

c) the CPI is higher than 100.

CPI is the price of a consumption basket relative to an earlier price of the same basket, expressed in percentages. A CPI of 100 means no change in the prices, and CPIs above 100 mean an inflation. Generally the rate of inflation is the change of the CPI.

d) the GDP deflator is positive.

GDP deflator is the ratio of the nominal GDP to the real GDP and is also an indicator of price changes. When there is inflation, prices are increasing, so production at last year's prices is smaller, than the same production at current prices, and the GDP deflator is above 1. In case of deflation it is between 0 and 1. It is always positive, since at national level neither negative nominal GDP, nor negative real GDP is meaningful or imaginable.

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B18.In the circular flow model, if the government saving is negative, then

Government or public saving is defined as $S_{Government} = T - G$. The question is what happens if this is smaller than 0.

a) $T - G > S_{Government}$

From the definition, the two sides always have to be equal. This is the income equation for the government sector.

b) $Y < C + I + G$

This is the income equation of the goods market for a closed economy. No matter how we are changing T and G, and thus also S_G, the two sides will always be equal.

c) X > IM

We did not talk much about open economies, but this is the situation of exports being more than imports, so the country makes a balance of trade surplus. This again has nothing to do with budget deficit, except that we could say that in the short run model economic policy interventions that tend to worsen the budget balance tend to improve the foreign trade balance.

d) $I < S_{Household} + S_{Companies} + S_{Foreign}$

If there is budget deficit, then the government is not providing funds (savings) to finance investments, instead it requires funds (from the savings of other economic actors) to finance its excessive spending. The income equation for the financial market is $I = S_H + S_C + S_F + S_G$. If the last element is negative and we take that away, the right hand side increases above the left hand side.

B19. What phase comes after depression in an economic cycle?

In an economic cycle the phases follow each other in a certain order, and we can learn which is preceded and followed by which.

a) recession

Recession comes after the peak, before the depression.

b) revival

There is no such phase in the economic cycle.

c) recovery

This is the phase that comes after recession, and follows after the lower turning point or the bottom of the cycle.

d) expansion

Expansion is a kind of extended recovery, comes after it and leads to the upper turning point or peak of the economic cycle, and is followed by the recession.

B110. What do we call the income flow that goes from the Government sector to the Firm sector?

The circular flow model is about identifying what incomes are flowing between the different sectors. All income flows are income outflows for one sector (or market) and an income inflow for another.

a) Tax

Taxes are incomes flowing from either the household or the firms towards government.

b) Transfer

Transfers are paid by the government either to the household (eg. unemployment benefit) or the firm sector (eg. subsidies).

c) Government purchases

This income flow is from the government, but is flowing to the goods market.

d) Saving

Savings are outflows for each of the sectors and flow towards the capital market.

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Detailed definitions with page references

Gross Domestic Product (GDP): the market value of all final goods and services produced within an economy in a given year. It is also the sum of all value added produced at various stages of the production chain.

> *"value" means the unit of measurement is money (Ft, $, etc.). Adding "final" is important as GDP excludes intermediate goods that are produced and used, but used for further production. What counts is the value above intermediate goods, that is, final use or value added.* (p.21, p.22)

Intermediate goods: goods produced by one firm and sold to another as an input for further production. Their value do not enter into the GDP.

> *Intermediate goods are not final uses, are used for producing either further intermediate goods or final goods. If we counted their value in the GDP, we would do multiple counting. Also, since the revenue they mean to the firm selling it means a simultaneous and identical cost to the firm buying it, the company sector as a whole gets no net additional income.* (p.22)

Real variables: Real variables measure things (GDP, wages, money stock etc.) valued at constant prices. To get a real variable, the appropriate nominal or current variable has to be divided by the level of prices.

> *Real variables account for the change in the value of money. If the GDP, wages or the money stock increases in monetary terms (Ft, $ etc.) say by 5%, but the value of the money decreases by 5% too, then the purchasing power does not change, "in reality" nothing changes, the real variable is the same.* (p.26)

Net Exports: also called Balance of Trade. It is the value of goods and services sold to other countries minus the value of goods and services bought from foreign country producers.

> *Net exports are negative when the value of goods and services we import exceeds the value of our export. In this case more income flows out of the country for buying foreign goods and services than flows in the country from selling goods and services to foreign countries. This is balance of trade deficit.* (p.27)

Depreciation of capital: the amount of the economy's stock of plants, equipment and residential structures wearing out during a year.

> *It is also called "consumption of fixed capital". It is part of gross investment, as money has to be spent on replacing capital that wears out during a year.* (p.30)

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Consumer Price Index (CPI): It is the price of a basket of goods and services a typical consumer purchases relative to the price of the same basket in some base year.

> *It is a measure of changes in the overall level of prices. First it is determined what basket of goods and services a typical consumer would buy. Then price data are collected for the goods and services in the basket. Every year it is calculated how much the purchase of this pre-fixed basket would cost. Comparing this cost between years will show how the prices on average changed.* (p.32)

Unemployed: is a person who does not have an employment, is available for work and has tried to find work during the four weeks before the time of the survey.

> *If somebody has an employment, the person is employed. If the person is not able to work (too young, too old, permanently disabled, etc.) or able to but not trying to find work, the person is not in the labor force.* (p.36)

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Topic 2: National Income in the Long Run (Chapter 3)

Topic overview

With topic 2 we are starting to explore how the economy works in the long run. The main characteristic that sets apart the long and the short run in economics is the ability of the prices to adjust. We will say that in the long run prices are able to adjust perfectly, or that they are perfectly flexible. Thus, the price mechanism can always bring the markets into equilibrium in the long run. When there is supply, the prices see to it that there is enough demand.
Now that we know from topic 1 that the performance or production or output of the economy is measured by the GDP (however imperfect a measuring tool it may be) we will first want to see what determines how much the economy will produce in the long run. Since the price mechanism ensures that resources are fully utilized in the long run, we are actually exploring how much an economy is able to produce, and what this ability depends on. This way we will get a first definition of the potential output, the level of GDP towards which the economy gravitates in the long run and from which it deviates in the short run during the business cycles.
We also know from the previous topic that producing a certain quantity of goods and services also means generating incomes. These incomes will be distributed among the owners of the factors of production, workers, capital owners and entrepreneurs. After we have found out how much income is generated in total we will explore the determinants of the income distribution and thus we will become able to analyze how the composition of GDP – from an income point of view – changes in the long run as an effect of different shocks to the economy.
Once the income is generated and distributed, to bring the flow of incomes to a full circle it is going to be spent on goods and services with the very production of which we started out in this topic. We are using the income equation studied in the previous topic which says that (in a closed economy) the total income equals the sum of spending on consumption, investment and government purchases. We will explore these factors one by one to find out about their determinants and to analyze how the composition of GDP – from an expenditure point of view – changes in the long run as a result of different shocks or economic policy interventions affecting the economy.

Learning outcomes

- *Students will get to know the definition of the long run and be able to identify when, how and for what purposes this model can be used, as well as its limitations.*
- *Students will understand the connection between production, income and expenditure approaches of the GDP*
- *Students will be able to analyze the long run consequences of shocks on income distribution or expenditure composition.*
- *Students will become proficient with using the goods market and the loanable funds market for reasoning about the composition of the GDP*
- *Students will be able to identify the influencing factors of the individual GDP components.*

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Definitions

Real wage: the purchasing power of the payment of labor which is measured in units of output rather than in monetary units.

Disposable income: it is the income that remains after all taxes have been paid. This is the income that the private sector is free to spend however they like.

Marginal propensity to consume: the amount by which consumption changes when disposable income changes by one (Ft or $).

Interest rate: is the cost of the funds used to finance investment.

Budget deficit: when governments spend more on goods and services and transfers than the taxes they receive from the households and companies, the difference is called budget deficit.

Crowding out: Increased government spending does not add to the GDP in the long run but decreases private investment instead while GDP stays unchanged.

True or False questions

A21. If investments increase the stock of capital in a country then the equilibrium real rent of capital goes down.
A22. If the labor force increases in a country, the equilibrium real rent of capital decreases in the long run.
A23. If workers in a country become more productive, this will increase their equilibrium real wage.
A24. In the long run, taxes only affect consumption but not the private savings.
A25. When the goods market is in equilibrium, investment is higher than public (government) savings.
A26. When the goods market is in equilibrium, public saving is equal to private savings.
A27. The higher the number of workers in the economy, the smaller share of the real income goes to workers in total.
A28. In the long run model better profit expectations and the increase of investment demand will lead to a higher share of investment within the GDP.
A29. In the long run model government saving depends on the income.
A210. In the long run model, both the government purchases and the tax multiplier are 0.
A211. Crowding out happens because fiscal policy cannot affect the income in the long run.
A212. In the long run model of the goods market, the interest rate is endogenous but the income level is exogenous variable.

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Single choice questions

B21. In the long run, the real GDP is determined by the
a) available quantity of resources.
b) real wage and real rent of capital.
c) amount of money in circulation.
d) overall price level.

B22. Suppose that a country only uses labor and capital to produce. If the capital stock increases, which of the following will decrease?
a) Output.
b) GDP.
c) Real wages.
d) Real rent of capital.

B23. Suppose that in a country the labor force decreases. Which of the following would be a long run result of this change?
a) The price level increases.
b) Equilibrium real wage decreases.
c) Equilibrium real rent of capital decreases.
d) Unemployment decreases.

B24. More workers in a country will in the long run
a) increase the output.
b) decrease the equilibrium real wage.
c) increase the equilibrium real rent of capital.
d) all the above are true.

B25. In the long run which of the following would decrease the equilibrium real wage of workers?
a) higher taxes.
b) increasing capital stock.
c) increasing number of workers on the labor market.
d) technological progress bringing about higher productivity.

B26. GDP can be broken down to the following components:
a) growth, inflation rate, rate of unemployment.
b) consumption, investment, government expenditures and net exports.
c) government saving, public saving and total national saving.
d) taxes, government spending and money supply.

B27. Suppose the government increases government spending ceteris paribus. What will this crowd out in the long run?
a) Consumption.
b) Invesment.
c) Taxes.
d) Income.

B28. Suppose that in a country from one year to the next investment increases. Which of the following is necessarily true?
a) The government saving increases.
b) The private saving increases.
c) The interest rate is lower.
d) Consumption increases.

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B29. In the long run, if taxes are lowered ceteris paribus,
a) the equilibrium interest rate increases.
b) government saving also increases.
c) investment will increase.
d) consumption will decrease.

B210. The share of the total income earned by the workers equals
a) the marginal product of labor
b) the real rent of capital multiplied by the amount of capital used
c) income divided by the number of available workers
d) the exponent of labor in the production function

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Solutions

A21.	True	B21.	A
A22.	False	B22.	D
A23.	True	B23.	C
A24.	False	B24.	D
A25.	True	B25.	C
A26.	False	B26.	B
A27.	False	B27.	B
A28.	False	B28.	C
A29.	False	B29.	A
A210.	True	B210.	D
A211.	True		
A212.	True		

Explanation to True of false questions

A21. If investments increase the stock of capital in a country then the equilibrium real rent of capital goes down.

TRUE. The supply of capital increases, capital becomes relatively more abundant, and thus becomes less expensive. The real rent of capital decreases until the firms will be willing to use all the now higher amount of capital.

A22. If the labor force increases in a country, the equilibrium real rent of capital decreases in the long run.

FALSE. An increase in the supply of labor decreases the real wage of labor, as labor becomes relatively more abundant. But at the same time if more workers are available this increases the demand for capital, so the real rent of capital will increase until only as much is demanded as the unchanged quantity available. The same amount of capital now is relatively scarcer than before.

A23. If workers in a country become more productive, this will increase their equilibrium real wage.

TRUE. Firms are willing to employ workers up to the point where their marginal product equals the real wage. When workers become more productive, their marginal product will increase, so firms will be willing to pay them higher real wages.

A24. In the long run, taxes only affect consumption, but not the private savings.

FALSE. Private saving equals disposable income minus consumption. Taxes decrease both the disposable income and the consumption, but consumption decreases to a smaller degree. Thus, saving will necessarily fall too. Put another way, part of the money paid as a tax will be taken away from consumption, and part of it from saving.

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A25. When the goods market is in equilibrium, investment is higher than public (government) savings.

TRUE. The definition for goods market equilibrium is that investment has to be equal to total savings, which is private plus public (or government) saving. In our model, private saving can never be negative, so national saving (or total saving) must be higher than public saving. Also, public saving can be negative, whereas investment cannot.

A26. When the goods market is in equilibrium, public saving is equal to private savings.

FALSE. The definition for goods market equilibrium is that investment has to be equal to total savings, which is private plus public (or government) saving, but it does not say anything about how the two kinds of savings have to relate to each other in equilibrium.

A27. The higher the number of workers in the economy, the smaller share of the real income goes to workers in total.

FALSE. Although the number of workers increase, and so does the income, the marginal product which is the real wage of the unit of work goes down. With a Cobb-Douglas type production function that we were using the income going to the workers is the product of the real wage and the number of workers, and this is a fixed share of the income (indicated by the exponent of labor in the production function). More workers earn less money each, but the product of the two is a constant share of GDP.

A28. In the long run model better profit expectations and the increase of investment demand will lead to a higher share of investment within the GDP.

FALSE. In the long run model the income (GDP) is given, so the only way for one component to increase its share is if at least another component is decreasing. Since G is exogenous, and C only depends on Y, none of them is going to be affected by the increase of I. It will only increase the equilibrium interest rate. Put another way, the same amount of saving meets a higher investment demand, so the scarcer funds have to be allocated, the price of investment funds, the interest rate, goes up.

A29. In the long run model government saving depends on the income.

FALSE. Government saving, or budget balance is the difference between taxes and government spending. The latter (G) is exogenous, does not depend on the income (neither in the long, nor in the short run model). Tax could depend on the income, but since the income is given in the long run model, so is the tax revenue, be it autonomous or income-dependent.

A210. In the long run model, both the government purchases and the tax multiplier are 0.

TRUE. These multipliers tell us, how income changes due to a unit change in G or T. Since in the long run model Y is exogenously given, tax and government spending only crowds out consumption and/or investment, but does not change the income itself. Thus, for the two multipliers we get $\frac{\Delta Y}{\Delta G} = \frac{\Delta Y}{\Delta T} = \frac{0}{\Delta G} = \frac{0}{\Delta T} = 0$.

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A211. Crowding out happens because fiscal policy cannot affect the income in the long run.

TRUE. Not affecting the real income means we have a fixed size pie we are cutting up into slices (C, I and G). When the government increases the size of its slice (G), this has to decrease the size of one or both of the other slices.

A212. In the long run model of the goods market, the interest rate is endogenous but the income level is exogenous variable.

TRUE. Income is fixed and determined in the long run by the available quantity of factors of production and technology. It will only change if any of these changes. Government also exogenously decides on G and T, the latter together with the fixed income fixes consumption. Now we have $\bar{Y} = \bar{C} + I + \bar{G}$. The only way to get the two sides to be equal is to set I, which is depending on the interest rate.

Explanation to single choice questions

B11. In the long run, the real GDP is determined by the

In the long run we assume that prices can freely adjust and bring all the markets into equilibrium, where demand equals supply.

a) available quantity of resources.

The production function tells us that production depends on the technology and the quantity of the factors of production used. But if in the long run the factor markets are in equilibrium, then all the available quantity will be used.

b) real wage and real rent of capital.

We could say that real wage and real rent of capital determine the quantities of the factors used and thus the GDP, but the causality is rather the opposite: the available quantity, together with the demand for the factors derived from the production function will determine the factor prices, not the other way around.

c) amount of money in circulation.

In the long run, money is neutral, so its quantity will only influence the prices and the nominal GDP.

d) overall price level.

The price level is a dependent variable rather than an independent variable. It is determined in the model as the ratio of the nominal GDP to the real GDP.

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B22. Suppose that a country only uses labor and capital to produce. If the capital stock increases, which of the following will decrease?

This can be represented as a right shift of the vertical capital supply function and also a right shift of the labor demand supply. Think about the graphs of the two factor markets and what happens to the equilibrium prices and quantities of the factors.

a) Output.

The same number of workers now has more capital to work with. They will be able to produce at least somewhat more.

b) GDP.

As a synonym for output, if the same number of workers uses more capital and produce more, they will also generate more income.

c) Real wages.

With more capital, workers will become scarcer, and therefore more valuable. Their real income will go up.

d) Real rent of capital.

With more capital, capital becomes relatively more abundant and therefore less valuable. Its real income will fall.

B23. Suppose that in a country the labor force decreases. Which of the following would be a long run result of this change?

This is a left shift in the labor supply function and a resulting left shift in the capital demand function.

a) The price level increases.

In the long run money is neutral, so the money market has nothing to do with the factor markets. You can safely rule this one out.

b) Equilibrium real wage decreases.

Labor becomes relatively scarcer, so at the original equilibrium real wage now there is excess demand, and excess demand always leads to an increase in the price of the thing in question: in this case the price of labor, which is real wage.

c) Equilibrium real rent of capital decreases.

Capital becomes relatively abundant. The same amount of capital will now be operated by less workers, so capital will be used less productively. As the marginal product of capital decreases, its real income must also decrease.

d) Unemployment decreases.

In the short run maybe. But in the long run we assume full utilization of resources, so full employment before and after the change.

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B24. More workers in a country will in the long run

Visualize again a right shift of the labor supply function and a right shift of the capital demand function.

a) increase the output.

In the long run all markets are in equilibrium so higher labor supply means higher employment too. More workers will produce somewhat more, even with the same amount of capital.

b) decrease the equilibrium real wage.

Labor becomes relatively abundant, and thus less valuable. The additional workers with the fixed amount of capital will have lower productivity, so firms will only employ them at a lower real wage. So this one is true as well.

c) increase the equilibrium real rent of capital.

Capital becomes relatively scarcer, more productive and more valuable. This is also true.

d) all the above are true.

Since we found that all the answers are true, only this can be the right answer.

B25. In the long run which of the following would decrease the equilibrium real wage of workers?

This question, unlike the previous ones gives you a result, and you have to identify the cause. Taking a usual Cobb-Douglas production function of $Y = A \cdot K^{\alpha} \cdot L^{1-\alpha}$ *the equilibrium real wage would be* $\frac{W}{P} = MP_L = \frac{\partial Y}{\partial L} = A \cdot (1-\alpha) \cdot \left(\frac{K}{L}\right)^{\alpha}$. *How could this decrease?*

a) higher taxes.

The above formula shows that real wage is independent of taxes.

b) increasing capital stock.

Capital stock is in the numerator of the real wage, so if it increases, real wage should increase too.

c) increasing number of workers on the labor market.

L is in the denominator of the real wage, so if that goes up, real wage will go down.

d) technological progress bringing about higher productivity.

Technological progress could be represented by an increase in A. As it is a multiplier, higher A will lead to higher real wage.

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B26. GDP can be broken down to the following components:

This goes back to the goods market of the circular flow models. We are looking for the income inflows to the goods market.

a) growth, inflation rate, rate of unemployment.

This combines a very long run concept (growth), a money market concept (inflation), and a factor market concept (unemployment).

b) consumption, investment, government expenditures and net exports.

For a 4 sector economy, or open economy these are the parts of the demand for or the expenditure on goods and services.

c) government saving, public saving and total national saving.

This is in connection with the goods market but is rather the composition of the total national saving.

d) taxes, government spending and money supply.

These are economic policy tools, the first two are for the government, and the last one for the Central Bank.

B27. Suppose the government increases government spending ceteris paribus. What will this crowd out in the long run?

Think about how in the long run a constant-size pie (the GDP) gets distributed to consumption, investment and government spending. If one becomes greater, another one, or both of the two others have to decrease.

a) Consumption.

Consumption only depends on income and taxes. Neither of these change, so consumption would not change either.

b) Investment.

Although private saving would not change (as neither the taxes, nor the income and consumption changes), government saving would decrease, so total national saving would go down and the loanable funds market tells us that when national saving decreases, investment must decrease too.

c) Taxes.

It is tempting to say that if the government spends more it also needs more taxes, but there is no such functional relationship between these two. Besides, 'crowding out' implies something would become smaller.

d) Income.

It is not influenced in the long run by how much the government spends. Its size will not be affected, only its distribution.

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B28. Suppose that in a country from one year to the next investment increases. Which of the following is necessarily true?

From the goods market equilibrium condition we know that investment equals total national saving.

a) The government saving increases.

It is only a part of total national saving. It is possible, but not sure that it has increased.

b) The private saving increases.

Again, this is just part of total national saving. Total national saving can increase with private saving staying constant or even decreasing.

c) The interest rate is lower.

Whichever part of total national saving increased, the result will be that more funds are available for loaning. Potential investors are only willing to loan these funds if they can do it at a lower price.

d) Consumption increases.

If investment increases this increase must be taken away from either C or G, but we cannot be sure which one happens.

B29. In the long run, if taxes are lowered ceteris paribus,

On the loanable funds market S = (Y – T – C) + (T – G). The key to the answer is what happens to this when taxes decrease.

a) the equilibrium interest rate increases.

Government saving will decrease by the amount of the tax but private saving will increase by less than the taxes, so altogether total national saving will decrease. As less funds are now available for investing, only those firms will be able to get these funds that pay more for it: investment funds become more expensive, the interest rate goes up.

b) government saving also increases.

Less taxes mean less income to the government so the government saving will decrease.

c) investment will increase.

Private saving will increase by less than the taxes, but government saving will decrease by the amount of the tax, so altogether total national saving will decrease, and so will investment.

d) consumption will decrease.

It is tempting to say that since consumption and saving are the two parts of the disposable income, than if one increases the other will necessarily decrease, but it is not so. Paying less taxes the private sector will have more disposable income from which both consumption and saving will increase.

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B210. The share of the total income earned by the workers equals

Income (Y) is earned by the owners of factors of production. Here the question is about how the income earned by all the workers together relates to the total income.

a) the marginal product of labor

The marginal product has to be equal to the real wage, but that is the real earning of one single unit of labor.

b) the real rent of capital multiplied by the amount of capital used

Real rent of capital is also the earning of one single unit of the factor of production, and also another factor of production, not the workers.

c) income divided by the number of available workers

That would be also calculated for one unit of labor, Y/L

d) the exponent of labor in the production function

From the classical theory of income distribution we know that what we are looking for, the $\frac{W}{P} \cdot L$ *is in fact equal to* $\propto \cdot Y$ *where* $Y = A \cdot L^{\alpha} \cdot K^{1-\alpha}$.

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Detailed definitions with page references

Real wage: the purchasing power of the payment of labor which is measured in units of output rather than in monetary units.

It shows how much a worker can buy from the money he/she gets for his/her work. If the payment of labor in monetary terms (Ft, $ etc.) increases, but the value of money decreases so that the price level goes up even more, the purchasing power of the wage, that is the real wage will decrease. One can write up real wage as W/P. (p.53)

Disposable income: it is the income that remains after all taxes have been paid. This is the income that the private sector is free to spend however they like.

Can be written up as $Y_{DI} = Y - T$ where T represents net taxes, and will subsequently be spent on consumption and saving. (p.61)

Marginal propensity to consume: the amount by which consumption changes when disposable income changes by one (Ft or $).

It is the slope of the consumption function and in our model assumed to be a constant number between 0 and 1. Higher disposable income thus leads to higher consumption. (p.62)

Interest rate: is the cost of the funds used to finance investment.

Expressed in percentage it shows how much needs to be paid back in excess if someone borrows money for investment, If the interest rate is 5%, than borrowing 100 you will need to pay back 105 after one year. (p.62)

Budget deficit: when governments spend more on goods and services and transfers than the taxes it receives from the households and companies, the difference is called budget deficit.

It means a negative government saving. In this case not only does the government not add to the funds financing investments, but the government itself needs funds for the deficit to be financed. (p.65)

Crowding out: Increased government spending does not add to the GDP in the long run but decreases private investment instead while GDP stays unchanged.

In the long run, since the GDP is constant private investment and government spending are not complements but substitutes. (p.69)

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Topic 3: Money and Inflation in the Long Run (Chapter 4 and 19)

Topic overview

The role of money is very important in economics, and yet up to this point we just assumed that such a thing as money exists. We have only used it so far as a universal measuring tool to compare the values of different goods and services. The evolution of money has a long history starting from self-sufficiency, when everybody produced what they needed, through barter trade, when goods were exchanged for goods, to gold money to money backed by gold and to the modern-day paper money provided by a two-tier banking system.
In this topic we first introduce a definition for what we can call money, then we devise a method to measure how much money is there at any given moment in an economy. Since money also serves as a medium of exchange, the coins, banknotes and demand deposits do not sit idly, but are constantly circulating in the economy as the actors make transactions (buying and selling) with them. This will lead us to the quantity equation of money, which in its static form makes a connection between the velocity with which money is circulating in an economy, the quantity of money that circulates and the nominal GDP. In its dynamic form we will use this equation to connect the growth rate of the money supply, the growth rate of the GDP and the change in the price level, i.e. inflation.
The study of the money market together with the assumptions of the long run model introduced earlier will lead us to a twofold and perhaps surprising conclusion. Firstly, we will find that the price level in the long run mainly depends on the quantity of money in circulation, and that inflation, or how fast the prices are growing depends on how fast this money supply is growing. Secondly, we will find that the quantity of money that the central bank puts into circulation only affects the prices (and other nominal variables) in the long run, but not the real variables. This is what we call classical dichotomy.
In this topic we will also get to see how the central bank can influence the quantity of money in circulation, and will get a first cut at the effects of monetary policy.

Learning outcomes

- *Students will realize what a complex institution money is and will get a better understanding of the many ways it is used.*
- *Students will familiarize themselves with the functioning of the two-tier banking system and understand how modern money is created.*
- *Students will understand how changes in the money supply affect long run inflation.*
- *Students will understand the difference between nominal and real variables and will be able to use the appropriate ones when needed.*

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Definitions

Rate of Inflation: the percentage change in the overall level of prices. Generally it is measured by the consumer price index.

Money: a stock of assets that can be readily used to make transactions.

Liquidity: the ease with which any given asset can be converted into the medium of exchange and used to buy goods and services.

M1: also called narrow money. It consists of all currency (coins and banknotes) outside of the financial system plus checkable deposits (also called demand deposits).

Fischer effect: a 1% increase in the rate of inflation will cause the nominal interest rate to increase by 1% percent while leaving the real interest rate unchanged.

Neutrality of money: in the long run, changes in the quantity of money only affect nominal variables, and have no effect on real variables.

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True of False questions

A31. If we still used gold as money, total world GDP would be much smaller.
A32. When people withdraw money from their bank accounts the stock of money in circulation increases.
A33. The money supply shows how many coins and banknotes are being used in a country.
A34. The Central Bank can increase money in circulation simply by printing more money.
A35. With constant velocity, if the stock of money increases more than the real GDP, the result will be inflation.
A36. The central bank can use the reserve requirement to decrease the money supply easier than to increase it.
A37. In the long run, if the money supply goes up, real GDP also goes up.
A38. In the long run, prices do not affect production.
A39. In the long run, the output in a country does not depend on the prices.
A310. In the short run, prices and wages are flexible.
A311. When there is inflation, the real interest rate will be lower than the nominal interest rate.
A312. If the velocity of circulation is 1, then the transaction demand for money equals the real GDP.

Single choice questions

B31. Based on the quantity theory of money and assuming constant velocity, inflation happens whenever
a) the money supply grows.
b) the income (GDP) falls.
c) the money supply grows more than the income.
d) the money supply decreases.

B32. Based on the quantity theory of money and assuming constant velocity, inflation can be stopped if
a) the money supply decreases.
b) the income (GDP) falls.
c) the money supply changes the same way as the income.
d) the unemployment increases.

B33. If I go to my bank and withdraw cash from my checking account, then
a) M2 will increase and M1 will decrease.
b) M1 will increase but M2 will stay the same.
c) both M1 and M2 will stay the same.
d) it is an expansionary monetary policy intervention.

B34. Economic actors' demand for money is negatively related to
a) the money supply.
b) the interest rate.
c) the income level.
d) the price level.

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B35. According to the Fischer effect, if the inflation rate goes down you can expect to
a) see the GDP increasing in the country.
b) pay more interest to get a loan.
c) earn a lower real income on your money deposits.
d) get less money as an interest on your money deposit from the bank.

B36. In the long run, the quantity of money in circulation only affects
a) prices.
b) real GDP.
c) velocity of circulation.
d) real interest rate.

B37. One motivation of holding money balances is preparing for unforeseen expenditure. This type of money demand is
a) positively related to income and negatively related to interest rate.
b) negatively related to income and positively related to interest rate.
c) negatively related to interest rate but independent of income level.
d) positively related to income level but independent of interest rate.

B38. In most developed countries in the EU the M1 to GDP ratio is around … whereas in the USA and Hungary for example it is around ….
a) 50%; 70%
b) 50%; 18%
c) 5%; 80%
d) 70%; 2%

B39. The Central Bank can create money and thus increase the money supply by
a) issuing bonds
b) increasing the prime rate at which it is lending to commercial banks
c) selling government issued bonds to the public
d) buying foreign currency through the foreign exchange market

B310. Seeing the price tags I tell which of two goods is more expensive. In this case money is used in which of its functions?
a) income generating function
b) unit of account function
c) medium of exchange function
d) store of value function

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Solutions

A31. True
A32. False
A33. False
A34. False
A35. True
A36. True
A37. False
A38. True
A39. True
A310. False
A311. True
A312. True

B31. C
B32. C
B33. C
B34. B
B35. D
B36. A
B37. A
B38. B
B39. D
B310. B

Explanation to True or false questions

A31. If we still used gold as money, total world GDP would be much smaller.

TRUE. The quantity of gold in circulation could not be increased as much as the quantity of the current fiat money can. Using the quantity theory of money this would mean that M cannot grow that much, so if GDP wants to increase, either the velocity would have to increase, or the prices would have to go down. If they cannot do it any more, the GDP would not be able to increase further.

A32. When people withdraw money from their bank accounts the stock of money in circulation increases.

FALSE. The stock of money is M1, which consists of cash plus the money held on bank accounts that can be used immediately. When people withdraw money, they just change the composition of M1, but not its magnitude.

A33. The money supply shows how many coins and banknotes are being used in a country.

FALSE. Cash is only a part of what we call M1, which is the measure of money supply. And it is not even the greatest part! In Hungary, cash is about 1/3 part of the money supply.

A34. The Central Bank can increase money in circulation simply by printing more money.

FALSE. Printing money is not the same as putting it in circulation. It has to get to the economic actors somehow, and is generally not given away just like that. One way to do that is if the Central Bank buys something (for example government bonds) from the public, and pays money for it.

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A35. With constant velocity, if the stock of money increases more than the real GDP, the result will be inflation.

TRUE. From the quantity theory of money we know that holding the velocity constant the growth rate of money supply determines the growth rate of the nominal GDP. If this is greater than the growth rate of the real GDP, then the prices must have gone up, which is inflation.

A36. The central bank can use the reserve requirement to decrease the money supply easier than to increase it.

TRUE. When the central bank increases the reserve requirement it becomes more difficult for the commercial banks to lend money, and they cut back on outstanding loans, the money supply decreases. But when the central banks want to make it easier for the commercial banks to make loans, they may either be reluctant or unable to do so, and thus the money supply may not increase so easily.

A37. In the long run, if the money supply goes up, real GDP also goes up.

FALSE. In the long run, money is neutral. Real GDP is only determined by technology and the available quantity of the factors of production. Nominal GDP, however, would go up with an increase in the money supply.

A38. In the long run, prices do not affect production.

TRUE. See the previous question. The classical dichotomy says that in the long run production is determined by the labor market, and prices on the money market, and the two are independent of each other.

A39. In the long run, the output in a country does not depend on the prices.

TRUE. See previous 2 questions.

A310. In the short run, prices and wages are flexible.

FALSE. This is how we distinguish long run and short run. In the long run we assume that prices and wages can and will adjust, because they are flexible, but in the short run they will not, because they are fixed or at least sticky, slow to adjust.

A311. When there is inflation, the real interest rate will be lower than the nominal interest rate.

TRUE. The Fisher equation says that the nominal interest rate equals the real interest rate plus the rate of inflation. Thus, if the rate of inflation is positive it adds to the real interest rate and the nominal will be the higher.

A312. If the velocity of circulation is 1, than the transaction demand for money equals the real GDP.

TRUE. If the velocity is 1, coins do not actually circulate: if you use them once for a transaction, you will have to wait a whole period (year) to be able to use it again. So you need as much value of coin as the value of goods and services you are selling. Also from the quantity equation we know that $\frac{M}{P} = \frac{1}{V}Y$ *where the right hand side is the transaction demand for money.*

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Explanation to single choice questions

B31. Based on the quantity theory of money and assuming constant velocity, inflation happens whenever

The quantity equation says $M \cdot V = P \cdot Y$. Inflation is the increase in the price level. So if we rearrange the equation for the price level, we get $P = M \cdot V/Y$. The question is when would this increase.

a) the money supply grows.

With constant V an increase in M would in fact raise the P, but only if Y does not increase to a greater degree.

b) the income (GDP) falls.

If we do not know, what happens to the M, we cannot say for sure how a fall in the Y affects the price level. If Y falls, but M decreases even more, the price level will in fact fall.

c) the money supply grows more than the income.

Now we have information about both of the two possible variables. If both increase, but M increases more, than the numerator goes up by more than the denominator, and the price level definitely increases.

d) the money supply decreases.

The decrease in M alone points toward lower prices, but again, we do not know anything about what happens with the other variable, so we cannot be sure.

B32. Based on the quantity theory of money and assuming constant velocity, inflation can be stopped if

The dynamic version of the quantity theory says that $\Delta M\% + \Delta V\% = \Delta P\% + \Delta Y\%$. Rearranging for the inflation we get $\Delta P\% = \Delta M\% + \Delta V\% - \Delta Y\%$. With constant velocity the second term on the right hand side is zero. We want the left hand side to be zero.

a) the money supply decreases.

If the percentage change of Y is a greater negative number than the percentage decrease in the money supply, we would still have inflation.

b) the income (GDP) falls.

A negative percentage change in the Y alone points towards inflation. Even more so, if it would be accompanied by an increase in the money supply.

c) the money supply changes the same way as the income.

With constant velocity, if you write any number for the percentage change of M, and the same number for the percentage change of Y, the result will be a zero percent change in the prices.

d) the unemployment increases.

We do not have unemployment here as a variable. Also, the long run model says that unemployment is at its natural rate, and does not change over time.

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B33. If I go to the my bank and withdraw cash from my checking account, then

If you withdraw 1000 Forints from your checking account, the amount of cash in circulation (outside of banks) will increase by 1000 Forints, and the amount of money deposited on checking accounts will decrease by the same 1000 Forints.

a) M2 will increase and M1 will decrease.

M2 is M1 plus time deposits, so unless you are creating time deposits, M2 will not change.

b) M1 will increase but M2 will stay the same.

M2 will stay the same, since no new time deposit is created, but M1 does not increase: only its composition changes.

c) both M1 and M2 will stay the same.

You have only changed the form your liquid money takes, you still have the same amount of liquid money. So does the whole economy. Only the composition of M1 and M2 changes, not their magnitude.

d) it is an expansionary monetary policy intervention.

Expansionary monetary policy is the creation of new money. You did not create new money, you only changed the form of your money: now it is visible and touchable, but just as spendable than before.

B34. Economic actors' demand for money is negatively related to

You should think about what determines how much money would the economic actors hold in liquid form: what would be their motivation to hold liquid money, and how would this change.

a) the money supply.

Demand never depends on supply. Quantity demanded will be influenced by quantity supplied, however. Think about whether you even find out if the money supply changes.

b) the interest rate.

The interest rate is the cost of holding liquid money instead of depositing it. Holding liquid money balances you forgo the interest you could have gotten if you deposited the money. The higher the interest rate, the more you will be sad about this loss, and the less liquid money you will want to hold.

c) the income level.

It does influence the demand for money, but in the opposite way: generating more income, making more transaction requires that the actors hold higher money balances just to run the bigger economy smoothly.

d) the price level.

If prices increase, people will need more liquid money to buy the same amount of goods, so there is a positive correlation between price level and money demand. Unless prices increase

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extremely quickly, in which case increase in prices do decrease money demand as people turn away from the usage of money and resort to barter or using foreign currencies or gold.

B35. According to the Fischer effect, if the inflation rate goes down you can expect to

The Fischer effect connects the nominal and real interest rates to the rate of inflation so that $i = r + \pi$.

a) see the GDP increasing in the country.

Inflation is the rate of change of the price level. In the long run model changes in the prices do not affect the GDP.

b) pay more interest to get a loan.

The interest you pay for a loan is the nominal interest. Based on the above equation if inflation goes down this nominal interest would tend to fall.

c) earn a lower real income on your money deposits.

In the long run model, the real income is determined on the goods market according to $\Sigma S = I$. Changes in the prices do not affect real variables.

d) get less money as an interest on your money deposit from the bank.

This is what the Fischer effect actually says: a 1% lower inflation leaves the real interest rate unchanged but lowers the nominal interest rate by the same 1%.

B36. In the long run, the quantity of money in circulation only affects

This question is about what the long run neutrality of money means.

a) prices.

This is the only variable that will be determined by the money market, the only nominal variable mentioned here.

b) real GDP.

Y will be determined based on technology and the available quantity of resources. More or less money to distribute it will only mean that the nominal GDP goes up or down.

c) velocity of circulation.

The quantity theory generally assumes velocity that is constant or at best constantly changing over time, but exogenously.

d) real interest rate.

Another real variable. This one is determined on the goods market.

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B37. One motivation of holding money balances is preparing for unforeseen expenditure. This type of money demand is

People are faced with uncertainty and risk, and like to be prepared for unexpected events. This means reserving some income in liquid form, should any unexpected expenditure arise. This is one part of the demand for money, one motive of holding real money balances.

a) positively related to income and negatively related to interest rate.

The higher the income level, the more people can afford to reserve some of it to decrease uncertainty. Also higher income goes together with more transactions, and more uncertainty. But people see interest rate as the cost of holding these money balances that they might not even need, so higher interest rate (alternative cost) discourages them from reserving to many liquid money.

b) negatively related to income and positively related to interest rate.

This one is quite counter-intuitive: the less income I have, the more liquid money I want to keep, but out of what? Also it seems quite illogical that when banks are paying high interest on time deposits, I rather want to keep my money in a liquid form.

c) negatively related to interest rate but independent of income level.

This is the so called "speculation motive": if interest rates are low I am keeping a lot of liquid money in case I find a good investment opportunity, but as interest rates increase it becomes less and less likely that I find a better investment than keep my money in a bank.

d) positively related to income level but independent of interest rate.

This is the "transaction motive" of money demand: the higher the GDP, so the more we are producing and selling, the more liquid money we need to keep the economy rolling: paying for the workers and the material and the like.

B38. In most developed countries in the EU the M1 to GDP ratio is around … whereas in the USA and Hungary for example it is around ….

This question gives you some idea about the magnitude of M1. The exact value is not so much important as to remember that much less liquid money is in circulation than the value of goods and services it produces in a year.

a) 50%; 70%
b) 50%; 18%
c) 5%; 80%
d) 70%; 2%

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B39. The Central Bank can create money and thus increase the money supply by

This question is about how actually the Central Bank can change the quantity of money in circulation. Obviously not just by printing money and scattering it from a helicopter.

a) issuing bonds

Bonds are issued by the government, not the Central Bank. The government is the player that sometimes takes out a loan from the public through issuing bonds.

b) increasing the prime rate at which it is lending to commercial banks

Increasing the prime rate is making it more difficult for commercial banks to borrow from the Central Bank, and in turn makes it more difficult and costly to firms and individuals to borrow from the commercial banks. Increasing prime rates are a sign of strict monetary policy.

c) selling government issued bonds to the public

The Central Bank cannot issue bonds, but sell bonds that it earlier purchased. When selling bonds to the public, bonds get out to households and firms, and money gets back to the Central Bank, ceasing to be money any more. This is the opposite of money creation.

d) buying foreign currency through the foreign exchange market

If it is not selling, then it is buying which puts more money in circulation. It can be bonds, gold, foreign currency: if the Central Bank is buying it, newly created money gets out to the circulation, money supply is increased.

B310. Seeing the price tags I can tell which of two goods is more expensive. In this case money is used in which of its functions?

We are using money to express prices of everything relative to money and to calculate relative prices.

a) income generating function

there is no such function of money.

b) unit of account function

when we want to measure value, money (like forint) is used similarly to meter when we want to measure distance. This function of money does not even assume we have any of it.

c) medium of exchange function

money is used as a medium of exchange when it is facilitating trade. When doing so money and goods move at the same time in opposite directions: goods go from seller to buyer and money from buyer to seller.

d) store of value function

money functions as a store of value when it transfers purchasing power from the present to the future. Also we need to have the money to perform this function.

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Detailed definitions with page references

Rate of Inflation: the percentage change in the overall level of prices. Generally, it is measured by the consumer price index.

> *When there is inflation, the average level of prices rises. The yearly speed of this increase expressed in percentage is the rate of inflation. When there is a 10% inflation, not all the prices necessarily rise 10% a year, some may even fall, but prices, on average rise.* (p.79)

Money: a stock of assets that can be readily used to make transactions.

> *Money has a function as a store of value, as a unit of account and as a medium of exchange. Anything can be considered money to the degree that it fulfills these functions of money.* (p.80)

Liquidity: the ease with which any given asset can be converted into the medium of exchange and used to buy goods and services.

> *Money by definition is the most liquid asset in an economy: you can use it as a medium of exchange without any further cost or delay.* (p.81)

M1: also called narrow money. It consists of all currency (coins and banknotes) outside of the financial system plus checkable deposits (also called demand deposits).

> *It is practically the money that people have in their purses plus on their bank accounts that they can freely spend anytime, so the most liquid kind of money.* (p.84)

Fischer effect: a 1% increase in the rate of inflation will cause the nominal interest rate to increase by 1% percent while leaving the real interest rate unchanged.

> *A change in the money supply or the velocity of circulation changes the price level and inflation through the money market. The real interest rate, however, is determined on the goods market and is not influenced by these.* (p.94-95)

Neutrality of money: in the long run, changes in the quantity of money only affect nominal variables, and have no effect on real variables.

> *If the central bank increases the money supply, in the long run only the equilibrium price of everything will go up, but equilibrium quantities will not change.* (p.112)

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Topic 4: Unemployment
(Chapter 6)

Topic overview

In this topic we will delve into the third important macro question which concerns the employment situation in an economy. After having studied the goods market and the money market of an economy, this topic turns to and analyses the labor market.
Even though our long run model is assuming full utilization of resources, we never really see zero percent unemployment in any economy. The unemployment rate (as a measuring tool introduced in the first topic) is fluctuating in the short run along the business cycle, but it also has a certain average, or usual value towards which it gravitates in the long run. This is what we will call the natural rate of unemployment. The bathtub model of unemployment not only explains what influences this long run unemployment, but it also gives us an idea of how economic policy might affect it. In the United States for example this natural rate of unemployment seems to be around 4-6%, may slowly and slightly increase (as in the 80s), or decrease (as in the 90s), but is independent of the ups and downs of the business cycle.
In this topic we will also learn about other kinds of unemployment that are unrelated (or less directly related) to the cyclicality of the economy like frictional, voluntary, structural, sectoral and technological unemployment. We talk about the causes of these different kinds of unemployment and what can be done to lower them.

Learning outcomes

- *Students will understand who counts as unemployed and who does not.*
- *Students will learn about the different types of unemployment and about their causes.*
- *Students will appreciate what economic policy can do to lower unemployment (in the long run).*
- *Students will become aware of the individual and national cost of unemployment.*
- *Students will know about the most important current trends in the labor markets.*

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Definitions

Rate of unemployment: the ratio of those people in an economy that want to work but are not able to find a job to all those people that are able to, allowed to and willing to work (the labor force).

Natural rate of unemployment: is that rate of unemployment towards which the economy gravitates in the long run, given the labor market imperfections that impede workers from instantly finding jobs.

Structural unemployment: also called involuntary unemployment. It is unemployment caused by a higher than equilibrium real wage, resulting in labor supply exceeding labor demand.

True or False questions

A41. In a recession, the natural rate of unemployment goes up.
A42. When the labor market is in equilibrium, the whole labor force has an employment.
A43. Paying a real wage above the equilibrium can benefit not only the workers, but also the employers.
A44. If the unemployment rate is 10% in a country, then one in every ten citizens is unemployed.
A45. Structural unemployment is typically a short-run unemployment.
A46. Anything that can permanently increase the job finding rate can decrease the natural rate of unemployment.
A47. If labor demand increases, voluntary unemployment goes down.
A48. Higher real wage means more voluntary unemployed.
A49. The labor market equilibrium results in the highest possible employment in a country.
A410. Generous unemployment benefits in a country can contribute to higher unemployment.
A411. If the prices go up, structural unemployment can be reduced.
A412. Full time students are not in the labor force.

Single choice questions

B41. The labor market is in a steady state and at the natural rate of unemployment when
a) as many people are employed as unemployed.
b) the job separation and the job finding rates are equal.
c) as many employed lose their job as unemployed find a new job in a year.
d) the natural rate of unemployment equals to the job finding rate.

B42. Which of the following is unemployed?
a) A full time university student.
b) Someone who is looking for a job but is not satisfied with the offered wage.
c) A worker on sick leave from his/her workplace.
d) An old age pensioner.

B43. If a country is decreasing the number of months for which a worker is eligible for unemployment benefit, it will
a) increase job separation rate.
b) decrease job separation rate.
c) increase job finding rate.
d) decrease job finding rate.

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B44. In which case could a minimum wage law be beneficial?
a) when there is an excess supply of a certain type of labor.
b) when there are lots of young and inexperienced workers on the labor market.
c) for highly-paid professionals like university professors or CEOs.
d) when there is high inflation in the country.

B45. A real wage above the equilibrium causes
a) structural unemployment.
b) frictional unemployment.
c) sectoral unemployment.
d) labor shortage.

B46. Downward nominal wage rigidity is caused by
a) unemployment.
b) inflation.
c) collective bargaining by labor unions.
d) low unemployment benefits.

B47. Structural unemployment will increase, if
a) aggregate demand rises.
b) the wages go down.
c) companies become more productive.
d) real wages increase.

B48. Voluntary unemployment will increase, if
a) job separation ratio increases.
b) aggregate demand rises.
c) the nominal wages go down.
d) real wages increase.

B49. According to the efficiency wages theory firms pay higher than equilibrium wages because they fear that if they lower wages, their best employees will leave first. This idea is called
a) adverse selection
b) moral hazard
c) biohazard
d) job rationing

B410. The total population of a country is 10 million. 2 million are not in the labor force. 5 million people are employed. What is the unemployment rate?
a) 3/8 = 0,375 so 37,5%
b) 3/5 = 0,6 so 60%
c) 3/10 = 0,3 so 30%
d) 2/8 = 0,25 so 25%

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Solutions

A41. False
A42. False
A43. True
A44. False
A45. True
A46. True
A47. False
A48. False
A49. True
A410. True
A411. True
A412. True

B41. C
B42. B
B43. C
B44. A
B45. A
B46. C
B47. D
B48. C
B49. A
B410. A

Explanation to True of false questions

A41. In a recession, the natural rate of unemployment goes up.

FALSE. The main idea behind the natural rate is that it is independent of the business cycle. It can be considered as the trend, around which the economy fluctuates when there are booms and recessions.

A42. When the labor market is in equilibrium, the whole labor force has an employment.

FALSE. Labor market equilibrium only means that everybody who wants to work (i.e. is willing to supply labor at the going real wage) will be employed. We can still have voluntary unemployed, who are in the labor force, but find the going real wage too low.

A43. Paying a real wage above the equilibrium can benefit not only the worker, but also the employers.

TRUE. The efficiency wage theory is giving a few reasons why firms also find it in their interest to pay higher than equilibrium wages including for example reduced turnover. Remember how Henry Ford said that paying a high wage was one of his best cost saving ideas ever.

A44. If the unemployment rate is 10% in a country, then one in every ten citizens is unemployed.

FALSE. The rate of unemployment is the number of the unemployed, relative to the labor force. So a 10% unemployment rate only means that one in every ten people in the labor force is unemployed. Since the labor force is at best about 50% of the total population, this would rather mean that only one of every about 20 citizens are unemployed.

A45. Structural unemployment is typically a short-run unemployment.

TRUE. I would consider this true, as structural unemployment can rise and fall with the decrease or increase of the labor demand, which can be brought in connection with the short run fluctuation of economic activity and demand for goods and services.

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A46. Anything that can permanently increase the job finding rate can decrease the natural rate of unemployment.

TRUE. Based on the bathtub model of unemployment, if it becomes easier to find a new job, more people will end up being employed in the long run. If this is just a temporary increase, than the long run rate of unemployment might not change, we are just reducing cyclical unemployment.

A47. If labor demand increases, voluntary unemployment goes down.

FALSE. Voluntary unemployment is about the difference between the labor force and the labor supply at any real wage. This is not influenced by labor demand. If the question was about structural unemployment, then it was true.

A48. Higher real wage means more voluntary unemployed.

FALSE. Voluntary unemployment basically depends on labor supply, and labor supply is a positive function of the real wage. Higher real wage means more people are willing to work, and less people will be left looking around for a better offer.

A49. The labor market equilibrium results in the highest possible employment in a country.

TRUE. In the equilibrium labor supply and labor demand are equal. Since actual employment always equals to whichever is higher between the two, no matter whether the real wage is higher or lower than equilibrium, either the labor demand, or the labor supply, and consequently employment will be definitely smaller than in the equilibrium.

A410. Generous unemployment benefits in a country can contribute to higher unemployment.

TRUE. If being an unemployed I can count on receiving this "free income" for a longer time, I will be less likely to start looking for a job, I might reject offers that I don't like for some reason, so overall I may stay unemployed for longer. At a national level, more people will do the same, and the unemployment rate will be higher.

A411. If the prices go up, structural unemployment can be reduced.

TRUE. Higher prices reduce the real wage which in turn induce the firms to demand more labor. This, paired with less people wanting to work means that the difference between quantity of labor supplied and demanded falls, and this difference is what we call structural unemployment.

A412. Full time students are not in the labor force.

TRUE. They are in the working age population but are not part of the labor force (also called active population). Thus even though they are not employed, we can also not call them unemployed. So if an unemployed person decides to go back to being a full time student, the unemployment rate can fall.

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Explanation to single choice questions

B41. The labor market is in a steady state and at the natural rate of unemployment, when

This question is about the long run equilibrium of the labor market, based on the bathtub model of unemployment,

a) as many people are employed as unemployed.

This would mean a 50% unemployment rate, which seems to be quite high. Besides, it also appears quite unlikely that the same result should come out for all countries in the equilibrium.

b) the job separation and the job finding rates are equal.

These two rates are necessary to determine the steady states, but they are exogenously given, and the steady state can be calculated whether they are equal or not. The latter is more likely…

c) as many employed lose their jobs as unemployed find a new job in a year.

This is similar to answer a), but is not about stock (how many employed and unemployed we have), but about flow (how these change). The bathtub model says that if movements across these two groups (determined by the job finding and job separation rates) are equal, the number of people in the two groups does not change from one year to the next: we reached the steady state.

d) the natural rate of unemployment equals the job finding rate.

The natural rate can be calculated as s/(s+f), so this would only happen if s/(s+f) = f, all of which are exogenously given. It may happen, but it is surely more an exception than the rule.

B42. Which of the following is unemployed?

You have to know the definition of unemployed and see if you find an answer for which all criteria are fulfilled.

a) A full time university student.

University students are not employed, but they are also not looking for a job so they are considered out of the labor force.

b) Someone who is looking for a job but is not satisfied with the offered wage.

This person is unemployed because he/she is willing to work, but is not actually working. At least it is his/her choice, so the person is voluntary unemployed.

c) A worker on sick leave from his/her workplace.

This person is employed but is currently not working for health reasons. This is quite similar to employed persons when they are sleeping in the night: they are still employed but temporarily away from their workplace. They of course still receive wages (unless it is an hourly wage).

d) An old age pensioner.

Is again out of the labor force. He/she is not working but also not called unemployed. Same as babies or primary school kids.

B43. If a country is decreasing the number of months for which a worker is eligible for unemployment benefit, it will

The unemployment benefit is an alternative source of income for both employed and unemployed. When people decide if they are supplying labor at any given real wage, they consider alternatives like this.

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a) increase job separation rate.
I don't think more people would be fired or that more people would quit just because they can get unemployment benefit for a shorter time.

b) decrease job separation rate.
I also don't think it would become more difficult to fire people, though people would probably become more reluctant to quit because of a less generous unemployment benefit system.

c) increase job finding rate.
By making being unemployed a worse alternative, people would become more willing to look for jobs or more eager to accept offers even if they are not so advantageous to them. Either way, more people would move from unemployed to employed.

d) decrease job finding rate.
Things that would decrease the job finding rate are those that either make working relatively less attractive (or more difficult) or being unemployed more attractive.

B44. In which case could a minimum wage law be beneficial?
Minimum wage law is about not allowing firms to pay wages lower than a certain government-set level, independent of whether the workers or the firms would find it advantageous.

a) when there is excess supply of a certain type of labor.
Excess supply of anything always leads to its price being bid down. If we don't want to let firms taking advantage of a large pool of workers and pay them low wages we would find it useful to make it illegal to pay a too low wage. Thus, firms would stop competing against each other to bid down wages.

b) when there are lots of young and inexperienced workers on the labor market.
This is the group of people most heavily affected by minimum laws. Their productivity is low and accordingly firms would only employ them at a lower real wage. If they are not allowed to pay low real wages, they would rather not employ these people.

c) for highly-paid professionals like university professors or CEOs.
Their wages are generally much higher above the going minimum wage requirements, so for them this lower bound is not effective, it has no effect whatsoever. A minimum wage of 140,000 forints does not change anything for people whose salaries begin around 4-500,000 anyway.

d) when there is high inflation in a country.
Minimum wages affect different groups of people differently, but inflation is having an effect on everyone. So just because there is high inflation, minimum wages would still be beneficial for some situations but maybe harmful for others.

B45. A real wage above the equilibrium causes
Such a real wage would mean that demand for labor will be higher than supply of labor.

a) structural unemployment.
Excess supply on the labor market is called structural unemployment.

b) frictional unemployment.
From the definition we know that this has nothing to do with wages.

c) sectoral unemployment.
This is caused by sectoral shifts in the economy.

d) labor shortage.
This is rather the opposite of excess demand, and is caused by a real wage below the equilibrium.

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B46. Downward nominal wage rigidity is caused by

The question is about why is it that nominal wages do not like to adjust downward.

a) unemployment.

Unemployment is more the result than the cause of downward wage rigidity.

b) Inflation

Inflation reduces real wages when nominal wages are fixed and thereby lowers structural unemployment. But in this case it is real wages that adjust downward, not nominal wages.

c) collective bargaining by labor unions.

Labor unions want to set the highest possible wage for their members and they have the power to do so. When they see prices increase, they will start collective bargaining again to increase nominal wages too, but if prices fall, they certainly will try to hinder firms from paying less to the workers.

d) low unemployment benefits.

While it is true that generous unemployment benefits force the firms to pay higher wages too, low unemployment benefits do not generally bring the wage offers down with them.

B47. Structural unemployment will increase, if

Structural unemployment is the difference between the labor demand and the labor supply, the number of people that would like to work but will not find employment. We can also look at it as the magnitude of the excess supply in the labor market.

a) aggregate demand rises.

If the aggregate demand rises people will want to buy more goods and services than before, making the firms produce more. But in order to produce more they will need more workers, so labor demand increases, which in turn lowers structural unemployment.

b) the wages go down.

If wages go down firms will be willing to employ more workers (even workers that are less productive), while some people looking for employment will be discouraged by the lower wages. Excess supply decreases.

c) companies become more productive.

This would mean an increase in labor demand. With higher demand some people willing to work but not finding employment earlier will now be able to work, structural unemployment would decrease.

d) real wages increase.

Employers have to pay these wages to the workers, so they will only employ workers that are productive enough. The least productive ones will be fired. At the same time, the higher real wage would attract more people to the labor market. Excess supply will be even greater than it was.

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B48. Voluntary unemployment will increase, if

Voluntary unemployment is the difference between the actual labor supply and the active population that could theoretically work. The active population is the upper limit of labor supply.

a) job separation ratio increases.

When firms can fire workers more easily, or just simply find it more profitable to do so, unemployment may rise, but it is surely not voluntary.

b) aggregate demand rises.

A higher demand for goods and services would also raise the demand for labor, but by itself would neither encourage nor discourage people from looking for work.

c) the nominal wages go down.

Lower nominal wage makes more people say "I will not work for such a low wage", so more people would choose to be unemployed.

d) real wages increase.

Higher real wages would encourage more people to start looking for work, so the quantity of labor supplied will increase. Employment, however, will not necessarily, as it also depends on labor demand, which is reduced by higher real wages.

B49. According to the efficiency wages theory firms pay higher than equilibrium wages because they fear that if they lower wages, their best employees will leave first. This idea is called

Efficiency wages theory explains why it might be profitable to firms to pay a real wage above the equilibrium real wage.

a) adverse selection

We also call this idea "survival of the least fit". When all firms pay high wages except me than my workers are going to leave me for a higher pay elsewhere. Since at a higher than equilibrium wage there is an excess supply, the employers can pick who they want to employ, and less productive workers would not be picked, so they stay. My firm being the only one paying lower wages will be left with the least productive workers.

b) moral hazard

This refers to the notion that by paying high wages the firms want to economize on monitoring cost. They assume that when they pay a lot to the workers they will automatically work as good as they can in fear of losing their well-paying job.

c) biohazard

This is something totally unrelated to economics.

d) job rationing

This is also in connection with high wages, but this refers to the very phenomenon that if wages are higher than equilibrium there is going to be and excess supply of labor, and the employers will have to ration the scarce job opportunities to who they believe are the best candidates.

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B410. The total population of a country is 10 million. 2 million are not in the labor force. 5 million people are employed. What is the unemployment rate?

The unemployment rate can be calculated as the number of the people unemployed divided by the active population, or labor force, U/L.

a) 3/8 = 0,375 so 37,5%

Labor force is L = 10 – 2 = 8 million and unemployment is U = 8 – 5 = 3 million.

b) 3/5 = 0,6 so 60%

This would be the ratio of the unemployed to the employed, or U/E.

c) 3/10 = 0,3 so 30%

This time we are relating the number of unemployed to the total population, a much bigger category than we need.

d) 2/8 = 0,25 so 25%

This is the ratio of people outside the labor force and the labor force.

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Detailed definitions with page references

Rate of unemployment: the ratio of those people in an economy that want to work but are not able to find a job to all those people that are able to, allowed to and willing to work (the labor force).

> *Thus a 10% unemployment rate means that for every 10 persons in the labor force, 1 is unemployed. Old age pensioners, newborn babies do not increase the rate of unemployment.* (p.163)

Natural rate of unemployment: is that rate of unemployment towards which the economy gravitates in the long run, given the labor market imperfections that impede workers from instantly finding jobs.

> *It is a country-specific measure. It is directly proportional to how easily an employed person can lose his/her job and inversely proportional to how easily unemployed can find a new job.* (p.164)

Structural unemployment: also called involuntary unemployment. It is unemployment caused by a higher than equilibrium real wage, resulting in labor supply exceeding labor demand.

> *If the wages are higher than the equilibrium wage, more people will want to work then the number of workers companies would want to employ at that wage. This puts a downward pressure on wages. If wages are rigid and cannot adjust downward to equilibrate supply and demand, the number of available jobs becomes a constant bottleneck and companies have to ration the jobs.* (p.169)

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Topic 5: Aggregate Demand I: Goods- and Money Market Equilibrium (Chapter 10)

Topic overview

In the next four topics we explore the short run model of the economy. This is also called AS-AD model and the economic fluctuations model. In the previous topics we focused on the persistent features of the economy, the trend and our main question was what the value the economy (production, unemployment, prices) converges to in the long run is. We will now start to ask why the economy deviates from this long term value. We noticed already that both positive and negative deviations from the trend can happen: we will study now what determines these fluctuations.
In this topic we will concentrate on the goods market and the money market of the short run model separately, and for now we will assume – contrary to the long run model – that the prices are totally fixed and that the income can vary. We will find that the short run model is demand-driven, so yet again contrary to the long run model, supply does not create its own demand but rather whenever there is demand, the supply will adjust, similarly to when there is not.
In the goods market our most important notion is going to be the planned expenditures. We will find that income has to be equal to how much we are actually going to spend but not necessarily to how much we plan to spend. We will explore the expenditure components of the GDP but this time assuming that the cake (the GDP, or income) is not fixed, and will see how planned expenditures and eventually also actual expenditures depend on the income level which we will allow to vary. Also we will look into how different exogenous shocks to the goods market influence the equilibrium outcome.
Turning to the money market we will look at a more sophisticated money demand function and let the money market equilibrium determine the interest rate. Also in this market we will look into the effects of different external shocks.
All through this topic we will assume that income is an endogenous variable, that prices are fixed and that the goods and the money market are separated from each other as they are treated in the long run model. The last two assumptions will be relaxed in the very next topic.

Learning outcomes

- *Students will be aware of the difference between the assumptions of the long run and the short run model and the consequences of their differences*
- *Students will understand how the goods market gets into equilibrium in the short run, and how income level is determined in the goods market*
- *Students will understand how the money market functions and how equilibrium is reached and the interest rate determined in the short run*
- *Students will be able to assess how external shocks affect the equilibria on the two markets studied*

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Definitions

Planned Expenditures: the sum of planned consumption spending, planned investment and government spending. Directly proportional to but may be more or less than actual income.

Equilibrium income: is that level of income at which the planned expenditures are just equal to the actual income. The economic actors' plans have been realized, there is no reason for anybody to change their behavior.

Government-purchase multiplier: is a number which shows by how much an additional unit (forint) of government spending will raise the equilibrium income on the goods market ceteris paribus. Government purchases have a more direct and thus stronger effect on the income than taxes.

Tax multiplier: shows by how much an additional unit (forint) of tax taken by the government will change (lower) the equilibrium income on the goods market ceteris paribus. Taxes have a more indirect and thus smaller effect on the income as government purchases.

IS curve: shows all possible combinations of interest rate and income level which bring the goods market in equilibrium. A higher interest rate means lower investment, lower planned expenditures and thus lower income.

LM curve: shows all possible combinations of interest rate and income level which bring the money market in equilibrium. A higher income raises the demand for real money balances, and with a constant money supply this has to lead to an increase of the interest rate.

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True or False questions

A51. When the taxes increase by 100, people will decrease their consumption by 100 to be able to pay the taxes.
A52. Marginal propensity to consume shows how sensitively the investors react to changes in the interest rate.
A53. Higher interest rate lowers planned investments.
A54. Planned expenditures are necessarily equal to income at any level of the GDP.
A55. The goods market is in equilibrium if the interest rate equals the income.
A56. If the tax multiplier is –5, it means that 1 Ft increase in taxes will lower the GDP by 5 Ft.
A57. Government spending has a stronger effect on the equilibrium income than a tax of the same magnitude.
A58. Money demand is directly proportional to income but negatively related to the interest rate.
A59. When the interest rate rises, the supply of money falls.
A510. Excess demand on the money market increases the interest rate.
A511. When the income level is lower than what would bring the goods market into equilibrium the entrepreneurs will find their inventories are too high.
A512. When the government increases both taxes and spending by the same amount, the income level is not affected.

Single choice questions

B51. Planned consumption expenditures does *not* depend on
a) the income.
b) the taxes.
c) the marginal propensity to consume.
d) the interest rate.

B52. Which of the following would not affect the Planned Expenditures function?
a) Marginal propensity to consume decreases.
b) Investors become more optimistic about the future.
c) The government decreases the taxes.
d) The capital stock in the country increases.

B53. On the goods market we see that the planned expenditures are lower than the current income level. What would happen on the goods market?
a) the money supply will go up.
b) the income will go up.
c) the income will go down.
d) the interest rate will increase.

B54. The IS curve describes
a) a negative relationship between interest rate and equilibrium income.
b) a positive relationship between interest rate and equilibrium income.
c) a negative relationship between the taxes and the equilibrium income.
d) a positive relationship between the price level and the equilibrium interest rate.

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B55. Suppose the government purchases multiplier in a country is 5. This means that 1 Ft increase in the *G* leads to a 5 Ft increase in…
a) consumption.
b) the interest rate.
c) equilibrium income.
d) government savings.

B56. The current income-interest rate combination is above the IS curve. In this case there is a(n)
a) excess supply on the goods market.
b) excess demand on the goods market.
c) excess supply on the money market.
d) shock in the goods market.

B57. Looking at the money market, we see that the current interest rate is lower than the equilibrium interest rate for the current income. What would happen on the money market?
a) the money supply will go up.
b) the income will go down.
c) the interest rate will go down.
d) the interest rate will go up.

B58. When the money demand ceteris paribus increases
a) the money supply also increases to stay in equilibrium.
b) the new equilibrium is attained by raising the interest rate.
c) the interest rate sinks to get the market into equilibrium again.
d) the money market gets back into equilibrium by a lowering of the income.

B59. The LM curve shows combinations of …
a) interest rates and price levels that bring the goods market into equilibrium.
b) interest rates and income levels that bring the money market into equilibrium.
c) money supply and money demand that bring the money market into equilibrium.
d) interest rates and income levels that bring the goods market into equilibrium.

B510. Positive money market shocks
a) shift the LM curve to the right.
b) move the income – interest rate combination away from the LM curve.
c) shift the LM curve up.
d) can only come from the central bank.

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Solutions

A51. False
A52. False
A53. True
A54. False
A55. False
A56. True
A57. True
A58. True
A59. False
A510. True
A511. False
A512. False

B51. D
B52. D
B53. C
B54. A
B55. C
B56. A
B57. D
B58. B
B59. B
B510. A

Explanation to True of False questions

A51. When the taxes increase by 100, people will decrease their consumption by 100 to be able to pay the taxes.

FALSE. People use their disposable income for consuming and saving. If taxes reduce the disposable income, they will reduce both consumption and saving. So the additional tax will be paid partly out of former consumption (MPC < 1 share of it), and partly out of former saving (MPS = 1 – MPC share).

A52. Marginal propensity to consume shows how sensitively the investors react to changes in the interest rate.

FALSE. It is by definition the slope of the consumption function, and thus shows households' sensitivity to changes in the disposable income.

A53. Higher interest rate lowers planned investments.

TRUE. Investment inversely depends on interest rate. Higher interest rate means it is more costly to get a loan, and ceteris paribus only a lower number of prospective investment possibilities would be good enough to result in enough revenue for the investor to pay back the loan and the interest, and still be profitable.

A54. Planned expenditures are necessarily equal to income at any level of the GDP.

FALSE. Actual income is necessarily equal to actual expenditure, but planned expenditure can be higher and lower than the actual income. The difference is mostly the change in unplanned inventories. If income is higher than planned expenditure, than unplanned inventories build up, and less will have to be produced in the next year. If planned expenditure is greater than actual income, inventories fall below their planned level, so production will have to increase.

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A55. The goods market is in equilibrium if the interest rate equals the income.

FALSE. The two are measured on a quite different scale, they don't even have the same unit of measurement. Income for Hungary is for example 32,000 Bn Forints, and interest rate is only about 1%. In the goods market equilibrium the income is equal to the planned expenditures.

A56. If the tax multiplier is –5, it means that 1 Ft increase in taxes will lower the GDP by 5 Ft.

TRUE. Taxes reduce disposable income by their own magnitude, through that they reduce consumption and planned expenditures to a smaller degree (–MPC-times), and the equilibrium income to a greater degree, than their original magnitude (–MPC/(1 – MPC)-times).

A57. Government spending has a stronger effect on the equilibrium income, than a tax of the same magnitude.

TRUE. Taxes affect planned expenditures and equilibrium income indirectly, through consumption, but government spending affects it directly. Therefore, the effect is greater, the absolute value of the government purchases multiplier is greater than the value of the tax multiplier.

A58. Money demand is directly proportional to income, but negatively related to the interest rate.

TRUE. In exercises the money demand function was $L = m \cdot Y – b \cdot r$. The direct proportion to income is the transaction demand: for more transactions people need more money. The inverse proportion to the interest rate is because it is the cost of holding money: with higher interest rate it is more costly to hold money, so people will want to hold less of it.

A59. When the interest rate rises, the supply of money falls.

FALSE. The inverse proportion is between the interest rate and the demand for money, not the supply of it. The money supply is a decision of the central bank and is determining the interest rate rather than being determined by it.

A510. Excess demand on the money market increases the interest rate.

TRUE. In the money market of the short run model the variable that brings the market into equilibrium is the interest rate. It can also be viewed as the price of holding liquid money. When the demand for liquid money increases, the price of it also increases like it happens in any other markets.

A511. When the income level is lower than what would bring the goods market into equilibrium the entrepreneurs will find their inventories are too high.

FALSE. When the income is too low, we have excess demand in the goods market meaning that people want to buy more goods and services that firms are producing. The firms are willing to produce more to them, and they will notice the excess demand by seeing their inventories being quickly run down.

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A512. When the government increases both taxes and spending by the same amount, the income level is not affected.

FALSE. This is in connection with government spending G having a stronger effect on the equilibrium income than taxes T. Although the two are affecting income in the opposite direction, higher G increases it more than the decrease brought about by higher T, so income will increase. Be careful, here it is about increasing G and T by the same amount (Ft). If it is increased by the same percentage, income might increase (if T is small enough relative to G), it might decrease (if T is high enough), or might even remain unaffected.

Explanation to single choice questions

B51. Planned consumption expenditures does *not* depend on

The consumption function is $C = C_0 + MPC \cdot (Y - T + TR)$.

a) the income.
The main variable determining consumption is income.

b) the taxes.
Taxes also play an important role in determining consumption, as they modify the income to become disposable income.

c) the marginal propensity to consume.
As a definition it shows how much an additional forint of disposable income adds to consumption.

d) the interest rate.
While an important variable in the goods market, it does not have an effect (at least in our short run model) on consumption.

B52. Which of the following would not affect the Planned Expenditures function?

As a definition PE = C + I + G, so things that do not affect any of consumption, investment or government spending will necessarily not affect planned expenditures. You can think through the variables and parameters in the PE function.

a) Marginal propensity to consume decreases.
MPC is an important determinant of consumption.

b) Investors become more optimistic about the future.
It must be about investments. In our exercises this would be the constant part of the investment function.

c) The government decreases the taxes.
Taxes influence disposable income, and through that, indirectly the consumption expenditures.

d) The capital stock in the country increases.

Capital stock has to do with the supply side of the economy: more capital will give the country a better potential to produce, but not necessarily a higher production, if there is no more demand. It is not in a functional relationship with any of the parts of planned expenditures.

D53. On the goods market we see that the planned expenditures are lower than the

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current income level. What would happen on the goods market?

The way we pictured the goods market was the Keynesian cross. The Planned expenditures function with a positive intercept and a lower than 1 positive slope was the demand, and income itself, a line of a slope of 1 starting from the origin was supply. We are now in a position when the PE function is below the Y function, which is the case of excess supply.

a) the money supply will go up.

The money supply has nothing to do with the goods market.

b) the income will go up.

Income is the variable that brings the goods market into equilibrium. Because the PE function starts above the Y function but has a smaller slope, the situation we are at can only happen at an income above the equilibrium. So an even higher income would mean an even greater excess supply.

c) the income will go down.

Income is the variable that brings the goods market into equilibrium. Because the PE function starts above the Y function, but has a smaller slope, the situation we are at can only happen at an income above the equilibrium. So if the income decreases, the excess supply becomes smaller and eventually disappears.

d) the interest rate will increase.

For the goods market we treated the interest rate as an exogenous variable. But anyway if the interest rate increased, the demand on the goods market (PE) would fall, so the excess supply would become even greater.

A54. The IS curve describes

You can use here the definition of the IS curve. What are the two variables it mentions?

a) a negative relationship between interest rate and equilibrium income.

The definition tells you that the variables of the IS curve are r and Y, but you have to remember that it gives a negative relationship: if r goes up, Y goes down.

b) a positive relationship between interest rate and equilibrium income.

If you just remember from the definition the two variables, but not the direction of the relationship, you will have a hard time choosing between a) and b). When r↑, investment↓, so planned expenditures↓ and consequently equilibrium income↓: the relationship is indirect or negative.

c) a negative relationship between the taxes and the equilibrium income.

While we could write up a function where equilibrium income depends on taxes, that would not be the IS curve. For this relationship we used the tax multiplier. But at least it is a negative relationship.

d) a positive relationship between the price level and the equilibrium interest rate.

In the goods market, all the variables we used were real variables, so the price level did not enter the picture.

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A55. Suppose the government purchases multiplier in a country is 5. This means that 1 Ft increase in the *G* leads to a 5 Ft increase in…

The definition of the multiplier gives you the answer.

a) consumption.

A 1 Ft increase in the government purchases would have an indirect effect on consumption by raising the income level.

b) the interest rate.

Interest rates are not even expressed in Ft (or money) terms, but in percentages.

c) equilibrium income.

The multiplier shows the effect of a 1 Ft change in one determinant of the planned expenditures on the equilibrium income. In case of government purchases multiplier is $\Delta Y/\Delta G = 5$. Rearranging we get $\Delta Y = 5 \cdot \Delta G$.

d) government saving.

By spending more the government saving not only does not increase by more, but it outright decreases. It is the budget deficit that increases, but a 1 Ft additional spending would increase the budget deficit by 1 Ft (unless there are income dependent taxes, in which case it would decrease a little less).

B57. Looking at the money market, we see that the current interest rate is lower than the equilibrium interest rate for the current income. What would happen on the money market?

To analyze the money market we were using the theory of liquidity preference with the money supply and money demand curves. If at the going income the interest rate is too low we have an excess demand in the money market. The market mechanism will either lower demand or increase supply to create equilibrium.

a) the money supply will go up.

In the money market the supply was an exogenous (economic) policy variable. It cannot automatically change, it is a result of a decision of the Central Bank.

b) the income will go down.

In the money market income is seen also as an exogenous variable. If it would exogenously go down, however, the demand would fall and we could reach equilibrium at the current interest rate, but this would likely happen slower and in the goods market.

c) the interest rate will go down.

In the money market it is the movement of the interest rate which brings the market into equilibrium. If we initially had an interest rate below the equilibrium creating excess demand, an even lower interest rate would mean an even greater excess demand.

d) the interest rate will go up.

When the interest rate is below the equilibrium, people would want to hold more liquid money than available. If the quantity available does not change, the only way to reach an equilibrium is to make holding money balances more expensive, that is, increasing the interest rate until enough people will be discouraged from the excessive holding of liquid money.

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B59. The LM curve shows combinations of …

The definition of the LM curve lets you answer this question right. You can also think about the graph of the LM curve.

a) interest rates and price levels that bring the goods market into equilibrium.
LM stands for Liquidity-Money, so it is not about the goods market.

b) interest rates and income levels that bring the money market into equilibrium.
LM is for the money market, and the two variables on the axes of the LM graph are income on the horizontal axis and interest rate on the vertical axis.

c) money supply and money demand that bring the money market into equilibrium.
We generally look at the two sides of different markets one by one, and the supply side does not depend on the demand side. This answer suggests you can graph demand against supply, having the two on the axes of a system of coordinates.

d) interest rates and income levels that bring the goods market into equilibrium.
Again LM is not about the goods market. This definition would be good for the IS curve.

B510. Positive money market shocks …

The definition of a positive shock would be one that tends to increase the income level.

a) shifts the LM curve to the right.
This means that for any interest rate the new LM assigns a higher income level.

b) move the income – interest rate combination away from the LM curve.
In the very short run maybe, but by upsetting the equilibrium on the money market, the change will set in motion the adjustment mechanisms and the result will be an LM that is to the right of the original after the adjustment period. Using comparative statics we generally care about where we started out from, and where we eventually stop.

c) shift the LM curve up.
For downward-sloping functions an up shift is also a right shift, but the LM curve is downward-sloping, so the up shift is actually a left shift. We get a higher interest rate for any level of income, or for any level of interest rate a lower income.

d) can only come from the central bank.
The central bank can intervene in the money market by changing the money supply just like an external shock, and if the intervention is in the appropriate direction (we would need an increase in the money supply) then this is in fact a positive money market shock. This, however, is not the only possible positive shock that can affect the money market.

Detailed definitions with page references

Planned Expenditures: the sum of planned consumption spending, planned investment and government spending. Directly proportional to but may be more or less than actual income.

Actual expenditure is what the households, firms and governments do spend on goods and services, and planned expenditure is what they would like to spend. While the former must by definition be equal to the income, the latter may be more or less than that. (p.289)

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Equilibrium income: is that level of income at which the planned expenditures are just equal to the actual income. The economic actors' plans have been realized, there is no reason for anybody to change their behavior.

> *If the income level would be above this than unplanned inventories are building up, and firms will produce less, reducing income. If the income level would be below this than inventories fall below their desired level which is an indication to firms to produce more, and the income will increase* (p.291)

Government-purchase multiplier: is a number which shows by how much an additional unit (forint) of government spending will raise the equilibrium income on the goods market ceteris paribus. Government purchases have a more direct and thus stronger effect on the income than taxes.

> *Additional government spending increases income by more than 1. An additional forint of government spending increases the planned expenditures by 1, raising the equilibrium income by 1. This income increase in turn will increase consumption by mpc, which again increases planned expenditure and the equilibrium income by mpc, which increases consumption further by mpc·mpc and so on. The government purchase multiplier can be calculated as 1/(1 – mpc).* (p.292)

Tax multiplier: shows by how much an additional unit (forint) of tax taken by the government will change (lower) the equilibrium income on the goods market ceteris paribus. Taxes have a more indirect and thus smaller effect on the income as government purchases.

> *The logic is the same as with the government purchases multiplier only in the opposite direction: an additional tax burden of 1 will cut back consumption by mpc, leading to a fall in the planned expenditure and the equilibrium income by mpc. This drop will lower consumption further by mpc·mpc, lower planned expenditure and equilibrium income further, and so on. The tax multiplier can be calculated as –mpc/(1 – mpc).* (p.295)

IS curve: shows all possible combinations of interest rate and income level which bring the goods market in equilibrium. A higher interest rate means lower investment, lower planned expenditures and thus lower income.

> *There is an indirect relationship between interest rate and income on the goods market, the IS curve is downward-sloping, has a negative slope. A change in the government spending, taxes, mpc or autonomous consumption will shift the IS curve to the left or right, while a change in the interest rate will result in a movement along a given IS curve.* (p.298-301)

LM curve: shows all possible combinations of interest rate and income level which bring the money market in equilibrium. A higher income raises the demand for real money balances, and with a constant money supply this has to lead to an increase of the interest rate.

> *There is a direct relationship between income and interest rate on the money market, the LM curve is upward-sloping, has a positive slope. A change in the money supply or price level will shift the LM curve to the left of right, while a change in the level of income results in a movement along the given LM curve.* (p.304-305)

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Topic 6: Aggregate Demand 2: Using the IS-LM System (Chapter 11)

Topic overview

This is the second topic of the short run or economic fluctuations model. In this topic we put together the puzzle pieces we prepared in the previous topic.
We are improving upon our simple model from topic 5 in two regards: first, we are going to allow the goods and the money market to interact with each other. The result is a two-way feedback mechanism which ensures that both markets end up in equilibrium, and that the two markets together are able to determine a unique combination of interest rate and income that eliminates excess supply and excess demand on both of the markets. Any shocks will now take effect within this more complex system, and will change the equilibrium income and interest rate as well. The second improvement is the endogenization of the price level: we will allow it to change. A change in the price level will act as a shock to the money market, affecting the LM curve, and interacting with the goods market and the IS curve, eventually the equilibrium income level too. We will thus be able to derive the aggregate demand curve, a functional relationship between the price level and the corresponding equilibrium income. Any shocks to the economy will shift this AD curve indirectly by shifting either the LM or the IS curve.
Since the short run model is a demand-driven model, it is essential to understand what factors are influencing the aggregate demand, how it can increase or decrease.

Learning outcomes

- *Students will understand how the goods and the money markets interact and come to a simultaneous equilibrium.*
- *Students will be able to track the effects of any good or money market shock to the equilibrium income and interest rate.*
- *Students will understand the conceptual importance of the Aggregate Demand function and how it differs from goods market demand.*
- *Students will be able to use the IS-LM system to explain, interpret and make predictions.*

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Definitions

Monetary transmission mechanism: is the way how (effectively) money supply affects the level of income. When changing the money supply, the Central Bank affects the interest rate, and that, through affecting investment in turn will eventually change the level of income in the short run.

Shocks: exogenous changes in variables that affect either the goods or the money market. The origin of the shock is not relevant (it comes from somewhere outside of the model), but it affects the endogenous variables on the markets like equilibrium income and/or interest rate.

Aggregate demand: the inverse relationship between the price level and the income that brings the goods and the money market into simultaneous equilibrium. When prices increase, real money supply falls, which increases the equilibrium interest rate on the money market, which in turn decreases planned investment, expenditures and eventually the equilibrium income.

True or False questions

A61. If either of the goods or the money markets of the short run model is not in equilibrium, income and interest rate will adjust until both are in equilibrium.
A62. In the short run a drop in aggregate demand tends to cause higher inflation.
A63. If the price level increases, investments go down.
A64. Aggregate demand shows the equilibrium interest rate as a function of the price level.
A65. Positive shocks shift the AD curve to the right.
A66. Goods market shocks shift the AD to the right, money market shocks shift it to the left.
A67. Economic policy can shift the AD curve.
A68. A change in the price level will not change the aggregate demand function.
A69. Any point above the AD curve means an excess supply in the goods and the money markets.
A610. The AD curve cannot have incomes higher than the potential output.
A611. In the short run model the prices do have an influence on the potential output.
A612. The more flat the IS, the more flat the AD.

Single choice questions

B61. The AD curve describes
a) a negative relationship between price level and equilibrium income.
b) a positive relationship between price level and equilibrium income.
c) a negative relationship between the taxes and the equilibrium income.
d) a positive relationship between the price level and the equilibrium interest rate.

B62. Which of the following would shift the aggregate demand (AD) curve to the right?
a) tax cuts.
b) less government expenditure.
c) increased capital stock.
d) lower nominal wages.

B63. Which of the following does *not* influence the AD curve?
a) taxes.
b) technology.
c) interest rate.
d) propensity to consume.

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B64. Which of the following would not affect aggregate demand?
a) Marginal propensity to consume decreases.
b) Investors become more optimistic about the future.
c) The government decreases the taxes.
d) The capital stock in the country increases.

B65. Which of the following would shift the AD curve to the right?
a) A positive goods market shock.
b) A negative money market shock.
c) Any kind of money market shock.
d) Any negative shock.

B66. If the IS curve shifts to the left, then the equilibrium income
a) increases while the equilibrium interest rate remains unchanged.
b) decreases while the equilibrium interest rate decreases as well
c) decreases, but the equilibrium interest rate increases.
d) and the interest rate both remain unchanged, because the LM curve also shifts to the left.

B67. After a right shift in the LM curve the initial (Y; r) combination would result in an …., so the first thing to happen would be …. .
a) excess demand on the money market; that the interest rate rises.
b) excess supply on the goods market; that the income level increases.
c) excess supply on the money market; that the income level increases.
d) excess supply on the money market; that the interest rate decreases.

B68. A certain change has decreased both the income level and the interest rate in an IS-LM system. What has happened?
a) A negative money market shock and a left shift in the LM.
b) A positive money market shock and a right shift in the LM.
c) A negative goods market shock and a left shift in the IS.
d) A positive goods market shock and a right shift in the IS.

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Solutions

A61. True
A62. False
A63. True
A64. False
A65. True
A66. False
A67. True
A68. True
A69. False
A610. False
A611. False
A612. True

B61. A
B62. A
B63. B
B64. D
B65. A
B66. B
B67. D
B68. C

Explanation to True of false questions

A61. If either of the goods or the money markets of the short run model is not in equilibrium, income and interest rate will adjust until both are in equilibrium.

TRUE. In the short run model, the two markets not only have their own mechanism to move to equilibrium (adjustment of income for the goods market and adjustment of interest rate for the money market), but they are interconnected, so what happens on one of the markets will have an effect on the other and vice versa. When both markets are in equilibrium, there is no reason for any of the markets to move away.

A62. In the short run a drop in aggregate demand tends to cause higher inflation.

FALSE. In microeconomics we saw that a decrease in the demand for something will ceteris paribus lead to a decrease in its price. In macro terms this means that if demand for all kinds of goods and services fall, then prices on average will decrease, which means either a deflation, or a smaller inflation.

A63. If the price level increases, investments go down.

TRUE. Higher prices decrease the available real money supply, so for the same level of income the interest rate will increase, and the LM curve shifts to the right. The intersection point of the new LM and the original IS is at a smaller income and a higher interest rate. This latter, in turn, will cause investment demand to fall (which will decrease planned expenditures and result in the smaller equilibrium income mentioned above).

A64. Aggregate demand shows the equilibrium interest rate as a function of the price level.

FALSE. Aggregate demand tells us for any price level, what income level brings the goods and the money markets into a simultaneous equilibrium, so AD: Y = f(P).

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A65. Positive shocks shift the AD curve to the right.

TRUE. Positive shocks are changes that tend to increase the income level. These would shift either the IS or the LM curve to the right, thereby also shifting the AD to the right.

A66. Goods market shocks shift the AD to the right, money market shocks shift it to the left.

FALSE. You can imagine a right shift in the AD as an increase in demand, and a left shift as a decrease in demand. It is very unlikely that whatever happens on the money market, for example, would decrease demand: whether the money demand increased or decrease. If one of them does in fact decrease demand, than the other one must increase it. Be careful: the word "change" can mean an increase and a decrease as well.

A67. Economic policy can shift the AD curve.

TRUE. Anything that shifts either the IS or the LM curves will also shift the AD. Since economic policy can change exogenous variables on the goods and money markets, it acts as a shock to these markets, and will shift IS or LM.

A68. A change in the price level will not change the aggregate demand function.

TRUE. In the AS-AD system the price level P and the income level Y are the endogenous variables, and change in an endogenous variable does not change the function. It is rather a movement along the function.

A69. Any point above the AD curve means an excess supply in the goods and the money markets.

FALSE. Points on the AD curve are definitely equilibria on both the goods and the money markets, but without knowing about the current interest rate as well, we are not able to tell from any point above the AD curve where it is relative to the IS and LM curves.

A610. The AD curve cannot have incomes higher than the potential output.

FALSE. It shows what income would bring both the goods market and the money market into equilibrium for a certain price level, but this income does not have to be possible to reach in the economy. Moreover, in the short run the economy can go above the potential output.

A611. In the short run model the prices do have an influence on the potential output.

FALSE. On the actual output yes, but not on the potential output. The potential output is what it is (coming from the long run model), and in the short run, the economy will produce either more or less than that.

A612. The more flat the IS, the more flat the AD.

TRUE. This is easier to imagine with a graph. Imagine an IS curve that is very flat, almost horizontal, and one which is very steep, almost vertical. Now take two LM curves, which are for different price levels P_0 and P_1. Let us suppose, that for P_0 the intersection points with both IS variants give Y_0. Then for P_1 the first variant will give you Y_{1a} and the second variant Y_{1b} so that $Y_{1a} > Y_{1b}$. This means that for the AD curve we have a point $(P_0;Y_0)$ and for the flat IS curve $(P_1;Y_{1a})$ and for the steep IS curve $(P_1;Y_{1b})$. Connecting the two points for the flat IS we will have a flatter AD than connecting the two points for the steep IS.

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Explanation to single choice questions

B61. The AD curve describes

The easiest way is to remember the graph of the AD curve: the variables on the axes tells you what are the two things the relationship of which the curve describes, and the direction of the graph (upward or downward) tells you if it describes a negative or a positive relationship.

a) a negative relationship between price level and equilibrium income.

Both the direction and the variables are correct.

b) a positive relationship between price level and equilibrium income.

The variables are correct, but the direction of the relationship is not.

c) a negative relationship between the taxes and the equilibrium income.

The direction is ok, but the variables are not.

d) a positive relationship between the price level and the equilibrium interest rate.

Both the direction and the variables are wrong.

B62. Which of the following would shift the aggregate demand (AD) curve to the right?

The AD curve moves to the right as a result of a positive demand shock, either from the goods or the money market.

a) tax cuts.

This is a positive goods market shock increasing consumption demand. Also it is an expansionary fiscal policy intervention.

b) less government expenditure.

This is a restrictive fiscal policy intervention, a negative goods market shock. This would shift the AD curve, but to the left.

c) increased capital stock.

This one would be a positive supply shock, would not affect the AD curve, but would shift the AS curve to the right.

d) lower nominal wages.

This also would be a positive supply shock. Be careful not to confuse nominal wages with income.

B63. Which of the following does *not* influence the AD curve?

We are looking for things now that do not appear either in the goods- or in the money market.

a) taxes.

They appear as a parameter in the goods market. A change in taxes is a goods market shock (and a fiscal policy intervention) and it moves the AD curve.

b) technology.

Technology is in connection with the production function and thus the supply side. If technology changes (generally improves), it is a positive supply shock, shifting the AS curve to the right, not affecting the AD curve, but eventually influencing the actual income-price level combination.

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c) interest rate.
Interest rate can only change as a result of a movement of the IS or the LM curve. If any of these changes then for any price level, the income that brings the goods and the money market into a simultaneous equilibrium will change and thus the AD will shift.

d) propensity to consume.
This is a parameter in the consumption function. If it changes, the IS curve will shift, and the AD too.

B64. Which of the following would not affect aggregate demand?
We are looking for things now that do not appear either in the goods- or in the money market. Here we are given not only a variable or parameter, but also the direction of the change.

a) Marginal propensity to consume decreases.
This means a left shift in the IS curve and in the AD too.

b) Investors become more optimistic about the future.
This will shift the IS curve to the right, and AD as well.

c) The government decreases the taxes.
This is an expansionary fiscal policy: such interventions shift the IS and the AD curves to the right.

d) The capital stock in the country increases.
The capital stock is in connection with production and the supply side. The AS will shift to the right.

B65. Which of the following would shift the AD curve to the right?
A right shift in the AD curve causes the equilibrium income level to be higher for all price levels. We then have to identify what can cause the income level to grow ceteris paribus.

a) A positive goods market shock.
Goods market shocks shift the IS and also the AD curve, and positive shocks tend to increase the income. A shock like this would be for example the increased marginal propensity to consume due to rising consumer confidence.

b) A negative money market shock.
Negative shocks reduce aggregate demand. Interestingly an increased demand for liquid money would be such a money market shock If money in circulation remains constant, increased demand for money would hike up the interest rates and reduce investment demand and subsequently the income level too.

c) Any kind of money market shock.
Money market shocks do affect the AD curve, but positive and negative shocks obviously affect it in the opposite direction. The key word here is "any" (which can mean either a positive or a negative shock).

d) Any negative shock.
If it was about a left shift in the AD, then this answer would be correct.

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B66. If the IS curve shifts to the left, then the equilibrium income

You can imagine the downward-sloping IS curve and the upward-sloping LM curve, and their intersection, then shift the IS curve and visualize what happens.

a) increases while the equilibrium interest rate remains unchanged.

This is the easiest to rule out. If only one of the curves shifts, then both endogenous variables will have to change.

b) decreases while the equilibrium interest rate decreases as well.

With a shift in the IS the simultaneous equilibrium will actually move along the unchanged LM curve. With a left shift in the IS we move left along the LM curve. Since the LM curve is upward-sloping, this means both endogenous variables will decrease.

c) decreases, but the equilibrium interest rate increases.

This would be a result of a left shift in the LM, so a negative money market shock.

d) and the interest rate both remain unchanged, because the LM curve also shifts to the left.

Students often think that if a function shifts to the left, then there is a mechanism that shifts the same function back to the right, so nothing changes, or that there is a mechanism that shifts the other function to the left too, so nothing changes. Both of these are generally wrong.

B67. After a right shift in the LM curve the initial (Y; r) combination would result in an …., so the first thing to happen would be… .

There are two gaps in the question, so the right answer should be correct for both of the gaps. A right shift in the LM curve is a positive money market shock, and the second part of the question reflects the notion that if the simultaneous equilibrium is disturbed, one of the markets will adjust faster than the other.

a) excess demand on the money market; that the interest rate rises.

Positive money market shocks are either an increase in the supply, or a decrease in the demand, both of which result in excess supply.

b) excess supply on the goods market; that the income level increases.

Since the goods market is not directly affected by the shock, the initial combination is still on the unchanged IS curve until either of the endogenous variables change. It is true, however, that in the end, the income level will increase.

c) excess supply on the money market; that the income level increases.

The excess supply part is correct, and the income increase is also going to happen eventually. The question, however, is about the first reaction of the market effected, and the money market reacts with a change in the interest rate.

d) excess supply on the money market; that the interest rate decreases.

The excess supply part is correct, the first reaction of the money market is to change the interest rate, and the direction of the change is downward. After this initial response the goods market will react to the lower interest rate by increased investment expenditures, which will raise the income level to which the money market reacts again, and so on, until we reach the new equilibrium which is at a lower interest rate but higher income than initially. The final interest rate will not be so low as the first reaction.

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B68. A certain change has decreased both the income level and the interest rate in an IS-LM system. What has happened?

This question gives you the result and you have to identify the cause. I would start drawing up an IS-LM system with an initial equilibrium. Try to find out which one curve had to move, so that the equilibrium combination moves to the left and down along the other curve.

a) A negative money market shock and a left shift in the LM.
The IS would remain unchanged, so we had to move to the left along the downward-sloping IS. This means a decreasing income, but a higher interest rate.

b) A positive money market shock and a right shift of the LM.
Positive shocks tend to increase the income, so we can easily rule out this one. This is, by the way, the opposite of the previous one: a movement along the IS to the right, which means indeed lower interest rate, but also lower income level.

c) A negative goods market shock and a left shift in the IS.
When the IS shift the equilibrium will move along the LM curve, with a left shift to the left. The LM is upward-sloping, so a movement along it to the left means a lower income and a lower interest rate as well.

d) A positive goods market shock and a right shift in the IS.
In this case both interest rate and income level would go up.

Detailed definitions with page references

Monetary transmission mechanism: is the way how (effectively) the money supply affects the level of income. When changing the money supply, the Central Bank affects the interest rate, and that, through affecting investment in turn will eventually change the level of income in the short run.

The Central Bank cannot directly raise the income, only through influencing the investment demand trough influencing the interest rate through influencing the money supply. When the monetary transmission mechanism works well, it is easier for the Central Bank to predict how a certain change in the money supply will affect the income level. (p.315)

Shocks: exogenous changes in variables that affect either the goods or the money market. The origin of the shock is not relevant (it comes from somewhere outside of the model), but it affects the endogenous variables on the markets like equilibrium income and/or interest rate.

The model does not explain why the shock happened, it just predicts what its effects are going to be. The word "shock" is not an evaluative term: it can be a good thing as well as a bad thing. If the effect is favorable we call it positive shock, if it is disadvantageous we call it negative shock. (p.318)

Aggregate demand: the inverse relationship between the price level and the income that brings the goods and the money market into simultaneous equilibrium. When prices increase, real money supply falls, which increases the equilibrium interest rate on the money market, which in turn decreases planned investment, expenditures and eventually the equilibrium income.

The aggregate demand curve is downward-sloping, or has a negative slope. As the price level increases the LM curve shifts to the left and intersects the unaffected IS curve at a lower income level. (p.321)

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Topic 7: Models of Short Run Aggregate Supply (Chapters 13)

Topic overview

With this topic we are putting together the last pieces of the AS-AD model, or the short run economics fluctuations model.
Aggregate supply looks at the short run model from the producers' point of view, and asks how they decide from the price signals how much to produce. The short run model's aggregate supply is somewhere between the supply we talked about in the long run model, and that of the very short run model. In the long run we found that because prices are totally flexible, factor markets adjust, and the economy will work by the full utilization of resources, our aggregate supply is vertical. In the very short run, however, if prices are not flexible at all, and factor markets are not able to adjust, the aggregate supply is horizontal. In the short run model we will use two models (the model of sticky prices and that of sticky wages) to show that there is a positive correlation between the price level and the output firms are willing and able to produce. This leads to two important realizations. First we will have to remember again, that in macroeconomics there is not one big model that allows us to explain everything, but different models are concentrating on different problems. Just as we cannot say that either the short or the long run model is correct, we will not be able to say whether the sticky prices or the sticky wages model is correct in describing how the firm sector works. The two emphasizes different aspects of reality, and each contributes to our understanding of how supply in the short run behaves. Second, we will have to remember that causations described by functions can sometimes go both ways: the sticky wages model explains how the firms base their production decision on the price level, but the sticky prices model shows us how the pricing decision of the firms depends on the income level.
In this topic we will give a new kind of definition to the potential income and will interpret it not as a kind of maximum, but as a kind of natural level in income, around which the actual income fluctuates: so actual income can be either less or also more than the potential.
We will also introduce a very important macroeconomic relationship: that between inflation and unemployment. This topic sets the stage for the demand-side economic policy interventions and its effects in the next topic.

Learning outcomes

- *Students will understand the reasons for the positive slow of aggregate supply in the short run.*
- *Students will be able to appreciate the connection between the very short, short and long run models studied so far.*
- *Students will be able to make a distinction between factors that affect the supply side of the economy and those that affect demand.*
- *Students will understand the supply side factors of inflation.*
- *Students will understand why and how inflation and unemployment are connected.*

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Definitions

Sticky Prices: an assumption of the short run macroeconomic model. In the short run some or all of the firms do not adjust their prices constantly, so for a while, the level of prices is considered inelastic, sticky, or even fixed.

Expectations: expectations are economic actors' guesses of the future values of important variables (like inflation, income, etc.). When the economic actors are not perfectly informed about something, they form expectations and base their decisions not on the actual values of the variables (which will only become known later), but on their expectations.

Phillips curve: shows the tradeoff between inflation and unemployment. In the short run, decreasing inflation goes together with higher unemployment and inflation goes up when unemployment decreases.

Okun's Law: states that the deviation of output from its natural level is inversely related to the deviation of the unemployment from its natural level. When unemployment rises above the natural rate, the output will fall below its natural level and output can be higher than the natural level driving the unemployment rate below the natural rate.

Inflation inertia: when people form their expectations based on past experiences, even with no new shocks affecting the economy we might observe inflation just because people expect inflation.

NAIRU: It is another name for the natural rate of unemployment. In connection with the short run Phillips curve this is the rate of unemployment that – if there are no supply shocks – causes the inflation neither to increase above or decrease below its expected level.

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True or False questions

A71. In the sticky wages model higher prices lead to higher employment.
A72. When people expect higher prices, they will be willing to fix lower nominal wages.
A73. When the prices are higher than the expected price, the real wage is lower than the expected real wage.
A74. In the sticky wage model an increase in the nominal wages decreases aggregate supply.
A75. The AS function's shape in the sticky wages model heavily depends on the macro production function.
A76. In the sticky prices model, higher expected prices will lead to higher prices set by the companies using flexible prices.
A77. The more companies set fixed prices, the more steep the short run AS curve gets.
A78. According to the logic of the sticky prices model, an increase in income causes higher prices, and not the other way around.
A79. According to the AS curve if the expected price level goes down, actual production (output) also goes down.
A710. In most real-life economies real wages are pro-cyclical.
A711. An increase in the nominal wages will cause the economy to move along the Phillips curve to the right.
A712. You can lower inflation by creating high unemployment.

Single choice questions

B71. When the actual price level is above the expected price level
a) the rate of unemployment is below its natural rate.
b) the country produces its potential output.
c) the economy is in a short run equilibrium.
d) taxes should be decreased.

B72. In the sticky prices model when the expected price increases,
a) for every price level we get higher income, so the AS curve shifts to the right.
b) for every income level we get lower prices, so the AS curve shifts down.
c) for every income level the price level will be higher, and aggregate supply decreases.
d) the AS will not be affected since the potential output did not change.

B73. When the income level decreases in a recession, the sticky prices model predicts that
a) the potential income will also decrease, so the AS curve shifts to the left.
b) lower nominal wages will be fixed, so we move up along the AS curve.
c) the share of companies setting flexible prices increases and the AS becomes steeper.
d) flexible price setting companies reduce their prices and we move down along the AS.

B74. If the flexible price setting firms become more sensitive to changes in the income level, then
a) the share of flexible price setters increases too.
b) the AS curve becomes steeper.
c) the AS curve becomes flatter.
d) the AS curve shifts to the left.

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B74. In the sticky wages model if the price level is higher than the expected price level
a) the rate of unemployment is above its natural rate.
b) the country produces less than its potential output.
c) the economy cannot be in a long run equilibrium.
d) there is deflation.

B76. In the sticky wages model the nominal wage is fixed according to the formula
a) expected real wage times expected price level.
b) marginal product of labor times price level.
c) real GDP divided by the number of workers.
d) actual real wage times actual price level.

B77. In the sticky wages model an increase in the expected price level leads to a decreasing aggregate supply because it
a) shifts the AS to the left.
b) will raise the nominal wages.
c) lowers labor supply.
d) increases the share of firms using flexible wages.

B78. Which of the following affects the aggregate supply?
a) capital stock.
b) price elasticity of demand.
c) taxes.
d) GDP deflator.

B79. From the AS function we know, that in the short run the level of output a country is able to produce does *not* depend on
a) the potential output.
b) the taxes.
c) the expected prices.
d) the price level.

B710. Which of the following explains that in the long run the GDP is at its potential level?
a) In the long run, all firms are able to adjust and use flexible prices.
b) In the long run, labor contracts can be renegotiated and the nominal wage can change.
c) People hold adaptive expectations, so expected price level adjusts.
d) All the above are correct.

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Solutions

A71. True
A72. False
A73. True
A74. True
A75. True
A76. False
A77. False
A78. True
A79. False
A710. True
A711. False
A712. False

B71. A
B72. C
B73. D
B74. B
B75. C
B76. A
B77. B
B78. A
B79. B
B710. D

Explanation to True of false questions

A71. In the sticky wages model higher prices lead to higher employment.

TRUE. The sticky wages model says that nominal wages are fixed, and that there is excess supply in the labor market. Higher decrease excess supply with higher labor demand. There are still more people wanting to work, but now more will actually be able to find an employment.

A72. When people expect higher prices, they will be willing to fix lower nominal wages.

FALSE. When nominal wages are fixed, people keep in mind a real wage that they want to have if the prices are as expected. Nominal wage to be fixed will be equal to desired real wage multiplied by the expected price level.

A73. When the prices are higher than the expected price, the real wage is lower than the expected real wage.

TRUE. The actual real wage is $\frac{\bar{W}}{P} = \frac{w_e \cdot P_e}{P}$. *The numerator is fixed, so a higher denominator will decrease the value of the fraction.*

A74. In the sticky wage model an increase in the nominal wages decreases aggregate supply.

TRUE. When the nominal wages increase then for all price levels real wages increase too. This would make firms less willing to employ workers, and less workers will be able to produce less. So we end up with lower Y for every P: the Aggregate supply shifts to the left, that is, it decreases.

A75. The AS function's shape in the sticky wages model heavily depends on the macro production function.

TRUE. To derive the AS function of this model we used the 4 sector diagram where one of the sectors (lower right quadrant) was the production function. Another one, the lower right was the labor demand, which also comes from the macro production. In contrast, for the sticky prices model we did not use the production function.

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A76. In the sticky prices model, higher expected prices will lead to higher prices set by the companies using flexible prices.

FALSE. Expected price level is used by companies with sticky prices. In their case the statement would be true. Companies with flexible prices are able to use the actual price level and actual income level to determine their prices.

A77. The more companies set fixed prices, the more seep the short run AS curve gets.

FALSE. The steepest AS we could imagine would be vertical: so for any price level it would assign the same income level. That would be the aggregate supply of the long run, when we said that prices can perfectly adjust. It means all the firms can set flexible prices. In contrast, when no firms set flexible prices, then whatever the actual income level, the price level equals to the expected price level, and we get an infinitely flat, horizontal aggregate supply curve. That would be our very short run.

A78. According to the logic of the sticky prices model, an increase in income causes higher prices, and not the other way around.

TRUE. The sticky prices model uses the price level as dependent, and the income level as independent variable. Thus, based on the income being higher or lower than the potential, the economy will determine a price level above or below the expected price level. The sticky wages model uses the logic reversed: if the price level is higher/lower than the expected, the output will be higher/lower than the potential.

A79. According to the AS curve if the expected price level goes down, actual production (output) also goes down.

FALSE. The general form for the AS is $Y = Y_{pot} + \alpha \cdot (P - P_e)$, so the expected price level has a negative coefficient, and thus in an inverse relationship to the output. When the expected price level goes up firms with sticky prices will produce the same quantity as before. An increase in the expected price level will raise the actual price level too which makes the flexible price firms to produce more. Total output will increase.

A710. In most real-life economies real wages are pro-cyclical.

TRUE. Pro-cyclical means it goes in the same direction as the business cycle, so when GDP increases, real wages increase too. If we look at the data, that is what we are mostly going to see. The opposite of pro-cyclical is counter-cyclical. Unemployment, for example, is counter-cyclical.

A711. An increase in the nominal wages will cause the economy to move along the Phillips curve to the right.

FALSE. A movement to the right along the Phillips curve would mean an increase in the unemployment and a decrease in the inflation. A nominal wage increase, however, is a negative supply shock, shifts the AS function to the left, resulting in both higher unemployment and higher inflation. It is thus rather a shift in the Phillips curve to the right.

A712. You can lower inflation by creating high unemployment.

FALSE. Coincidence is not causation. Even though smaller inflation and higher unemployment go together, the second is not directly causing the first. Rather, there is a common cause affecting both in the appropriate direction.

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Explanation to single choice questions

B71. When the actual price level is above the expected price level

There is an unexpected rise in the prices, so an unforeseen inflation.

a) the rate of unemployment is below its natural rate.

With prices above the expected level the actual real wage is lower than what people expected, so firms are willing to hire more workers, and unemployment goes down.

b) the country produces its potential output.

As a definition the income is at the potential level when the price level equals its expected level.

c) the economy is in a short run equilibrium.

The economy could be in a short run equilibrium with a lower than expected price level just as well.

d) taxes should be decreased.

If taxes are decreased, the price level can be lowered, but the higher than expected price level does not prescribe that taxes be decreased.

B72. In the sticky prices model when the expected price increases,

In this model the overall price level is the weighted average of prices set by fix price and sticky price using companies. The former only depends on the expected price level, and the latter positively on the actual price and income level, and negatively on the potential income.

a) for every price level we get higher income, so the AS curve shifts to the right.

This would mean that even if the income level increases somewhat, the price level remains unchanged. This cannot be the case, as with a higher expected price level the fixed price setting companies will increase their prices, and with a higher income the flexible price setters would raise their prices. So a higher income would lead to a higher price level on two accounts.

b) for every income level we get lower prices, so the AS curve shifts down.

In case of the AS function a down shift is the same as a right shift. Now it is even easier to see that a higher expected price level, since it increases the prices set by fixed price using companies cannot lower the overall level of prices.

c) for every income level the price level will be higher, and aggregate supply decreases.

Higher expected prices will induce fixed price setting companies to use higher prices, which will increase the overall price level, which will induce the flexible price setting companies to increase their prices, which will further raise the price level. Thus the AS function shifts up or to the left, which is a decrease of supply.

d) the AS will not be affected since the potential output did not change.

Even though the potential output is in fact not changed, the AS function will be affected as it is determined by both the potential output and the expected income level.

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B73. When the income level decreases in a recession, the sticky prices model predicts that

The sticky prices model tells us about how the general price level in an economy is determined and the main idea is that it is a weighed sum of the fix and flexible prices. We have to identify how a recession influences any of these.

a) the potential income will also decrease, so the AS curve shifts to the left.

The potential income is the long run value of the income it always converges toward, and is independent of the business cycle. A recession will decrease the actual income, but not the potential income.

b) a lower nominal wage will be fixed, so we move up along the AS curve.

The nominal wage part should give this one away: nominal wages are part of the sticky wages model, we did not say anything about them in the sticky price model. Moreover, a movement up the upward-sloping AS curve would mean an income increase.

c) the share of companies setting flexible prices increases and the AS becomes steeper.

What share of companies uses fix or flexible prices was an exogenous parameter of our model. It might change, but we did not look into why they may change. Even if it did change that is certainly not in a functional relationship with business cycles.

d) flexible price setting companies reduce their prices and we move down along the AS.

This is exactly what the logic of the model tells us. Since for the AS Y and P are our endogenous variables, if any of these changes we just move up or down the AS function.

B74. If the flexible price setting firms become more sensitive to changes in the income level, then

The overall price level is $P = sP^e + (1-s)(P + a(Y - Y_{pot}))$*. The question is about what happens when we increase the "a" parameter.*

a) the share of flexible price setters increases too.

The parameter "s" is in no functional relationship with how sensitively the flexible price setters react to income changes.

b) the AS curve becomes steeper.

The AS curve will pivot around the potential output point: a certain income increase will now make the flexible price setters set a higher price, so the average price level will also be higher as before. The same goes for income decreases.

c) the AS curve becomes flatter.

Flatter would mean that we need a larger increase in the income to get the same increase in the price level as before. This would indicate a reduced sensitivity to income changes.

d) the AS curve shifts to the left.

A left shift is a decrease in the aggregate supply. But the pivot that this change causes is not a general decrease. It actually is a decrease for incomes above the potential, but an increase for incomes below it.

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B74. In the sticky wages model if the price level is higher than the expected price level

There is an unexpected rise in the prices, so an unforeseen inflation.

a) the rate of unemployment is above its natural rate.

If the price level is above the expected, the real wage will be below the expected. This would result in a higher quantity of labor demanded and lower quantity of labor supplied, and consequently a lower (structural and overall) unemployment.

b) the country produces less than its potential output.

With a higher than expected price level the real wage will be lower than expected, which would increase the quantity of labor demanded and employment too, the result being rather greater output.

c) the economy cannot be in a long run equilibrium.

Long run equilibrium is defined as the state when the income is at its potential level, unemployment at its natural level and the prices are at their expected level.

d) there is deflation.

When deflation happens the price level could sink back to the level of the expected price level. But what is more likely to happen is that the expected prices will rise to the level of the current price, so when there is unforeseen inflation people will adjust and start to expect the inflation.

B76. In the sticky wages model the nominal wage is fixed according to the formula

The first step in the sticky wages model was about labor unions trying to negotiate a wage that will supposedly allow the workers to buy as much goods and services as they plan to if the inflation is what they expect it to be.

a) expected real wage times expected price level.

The first is the purchasing power we want to have, and we have to inflate it with the price level. Since we have to fix this nominal wage before we know what the actual price level is going to be, we inflate it with whatever we think inflation is going to be.

b) marginal product of labor times price level.

Marginal product of labor is a function, and price level with which we would multiply it will only become known only later, after we have fixed nominal wages.

c) real GDP divided by the number of workers.

You might remember something like this from the second topic. The first problem is that this is a real wage (a kind of), and second problem is that to get the real wage you would first take only a share of GDP (indicated by labor's exponent in the production function) and then divide it by the number of workers.

d) actual real wage times actual price level.

This is a kind of circular reasoning. Real wage is nominal divided by the price level, so without having first a nominal, you will not be able to calculate the real.

B77. In the sticky wages model an increase in the expected price level leads to a decreasing aggregate supply because it

Here we only need the first step in the chain of causation.

a) shift the AS to the left.

Higher expected price level does shift the AS to the left, but saying that AS decreased because it shifted to the left is similar to saying a speedometer showing a high speed causes the car to go fast.

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b) will raise the nominal wage
Since nominal wages are fixed as a product of the planned real wage and the expected price level, if the latter increases, the nominal wages will sooner or later increase as well.

c) lowers labor supply
In this model the labor supply function is not directly affected by the expected price level.

d) increases the share of firms using flexible wages.
Don't mix the terminology of the two models. In the sticky wages model the whole economy is using a certain pre-determined nominal wage and in the long run model all wages are flexible. In the sticky prices model, however, some firms use fix prices, and some use flexible prices.

B78. Which of the following affects the aggregate supply?
We put the AS together from the labor market and from the production technology. Anything that affects any of these will necessarily have an effect on the supply too.

a) capital stock.
Labor, technology and capital stock determine how much the firms are willing to and able to produce.

b) price elasticity of demand.
We did not even look at demand elasticity in macroeconomics! This notion might be familiar to you from microeconomics

c) taxes.
Taxes affect the demand side of the economy not the supply side. At least those type of taxes that we learned about (income tax).

d) GDP deflator.
Does not have a direct effect on the AS.

B79. From the AS function we know, that in the short run the level of output a country is able to produce does *not* depend on
We put the AS together from the labor market and from the production technology. Anything that affects any of these will necessarily have an effect on the supply too.

a) the potential output.
The short run AS function tells us that output can be higher or lower than the potential output, if the price level differs from its expected level. So if the potential output changes, that changes actual output for any price level: the AS curve shifts.

b) the taxes.
Taxes affect the demand side of the economy, and will shift the AD function

c) the expected prices.
A change in the expected prices will shift the AS curve up or down.

d) the price level.
If the price level changes, we are moving along the AS curve.

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B710. Which of the following explains that in the long run the GDP is at its potential level?

In the long run GDP is at its potential level for any price level and the long run aggregate supply function (LRAS) is vertical. You have to think about what were the important model assumptions of the short run models explaining positively sloped AS function.

a) In the long run, all firms are able to adjust and use flexible prices.
In the sticky price model if we increase the ratio of firms setting flexible prices than the AS function becomes steeper and steeper, until when we have 100% flexible price setting companies and $P = 0 \cdot P_e + 1 \cdot (P + \alpha \cdot (Y - Y_{pot}))$, *so* $Y = Y_{pot}$.

b) In the long run, labor contracts can be renegotiated and the nominal wage can change.
According to the sticky wages model nominal wages are fixed, so changes in the price level will move the actual real wage, employment and income level. If the nominal wages can change, employment can always return to full employment (in the macroeconomic sense).

c) People hold adaptive expectations, so expected price level adjusts.
The way to move from one point of the long run supply curve to the other is to change the expectations and shift the short run supply function, so to move from one short run supply curve to another.

d) All the above are correct.
All the other three answers give you a part or an aspect of the whole picture, and help you reconcile the short run model and the long run model by showing, that the long run is a special case of the short run, or vice versa.

Detailed definitions with page references

Sticky Prices: an assumption of the short run macroeconomic model. In the short run some or all of the firms do not adjust their prices constantly, so for a while, the level of prices is considered inelastic, sticky, or even fixed.

A reason for holding prices steady can be for example that it is costly or takes time to change prices (long-term contracts may fix prices), but even without these firms may chose not to change in order to avoid annoying their regular customers with frequent price changes. (p.381)

Expectations: are economic actors' guesses of the future values of important variables (like inflation, income, etc.). When the economic actors are not perfectly informed about something, they form expectations, and base their decisions not the actual values of the variables (which will only become known later), but on their expectations.

Expectations can be static (I keep on expecting the same outcome whatever happens), adaptive (if the variable changes, I change my expectation accordingly, and it becomes an educated guess) or rational (I use every relevant information to form my expectation). (p.382)

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Phillips curve: shows the tradeoff between inflation and unemployment. In the short run decreasing inflation goes together with higher unemployment and inflation goes up when unemployment decreases.

> *It is a result of an upward-sloping short run aggregate supply curve. Government economic policy can shift the aggregate demand to the right or to the left, but the actual price-income combination will move along the aggregate supply, where higher income (and lower unemployment) goes together with higher prices (inflation) and the other way around.* (p.388)

Okun's Law: states that the deviation of output from its natural level is inversely related to the deviation of the unemployment from its natural level. When unemployment rises above the natural rate, the output will fall below its natural level and output can be higher than the natural level driving the unemployment rate below the natural rate.

> *This is because when unemployment increases the people who are displaced will not contribute any more to the GDP, and thus the income will fall* (p.262 and p.389)

Inflation inertia: when people form their expectation based on past experiences, even with no new shocks affecting the economy we might observe inflation just because people expect inflation.

> *Expected inflation is one component of actual inflation beside cyclical unemployment and supply shocks. Thus if in one year inflation is 4% as a sum of all three components, and people form their expectations on past experience, next year the expected inflation component itself will be 4%, so this inflation can prevail even without further cyclical unemployment and no supply shock* (p.390)

NAIRU: It is another name of natural rate of unemployment. In connection with the short run Phillips curve this is the rate of unemployment that, if there are no supply shocks causes the inflation neither to increase above or decrease below its expected level.

> *The name is an abbreviation for "Non-Accelerating Inflation Rate of Unemployment". Suppose that NAIRU is 5%. This means that without supply shock if the government does not try to push unemployment below 5%, the inflation will not increase and if the government does not let unemployment above 5% inflation will not decrease.* (p.390)

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Topic 8: Economic Policy: Tools, Objectives and Costs (Chapters 11, 15-16)

Topic overview

In this topic we will have an important application for the AS-AD model that we have compiled so far. In previous topics we have learned what factors are affecting our model and how these external shocks are shifting the IS and LM curves and what effects they have on the equilibrium income, interest rate and price level. What we were saying actually was: "what are the factors that cause economy fluctuations, unemployment and inflation?"
Now we are going to look at a special kind of external shock: economic policies. They are external shocks in the sense that they are also coming from outside the model, and they are special because they are the results of deliberate decisions. We introduce the two main variations of demand side economy policies: the fiscal and monetary policies. We are going to look into what tools they use to influence aggregate demand and eventually income level, unemployment, interest rate and price level. When an external shock moves the economy away from its long run equilibrium then economic policies can be used to bring it back to this long run equilibrium faster than it would on its own. This is why we also call these policies stabilization policies. Whatever economic distress a country experiences – be it a recession, unemployment or inflation – we have an appropriate economic policy to fight it. However, we will find that these stabilization efforts of the economic policy makers come at the cost: demand side economic policies always entail a trade-off. This short run trade-off between inflation and unemployment is shown by the Phillips-curve.

Learning outcomes

- *Students will learn the different economic policy players, the tools and the ways of operation of fiscal and monetary policy interventions.*
- *Students will understand the trade-off between inflation and unemployment, that is inevitably present in the demand side economic policy intervention.*
- *Students will know which economic problems requires what economic policy intervention, what the likely advantages and disadvantages of these are going to be.*
- *Students will be able to make predictions about what likely effects an economic policy intervention in an economy will have.*
- *Students will be able to identify for an economic policy intervention the likely reason behind its application.*

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Definitions

Fiscal Policy: the intervention of the government into the functioning of the economy through changing the taxes, transfers and/or government expenditures. With these the government can affect the goods market, shifts the IS curve and eventually increases or decreases the aggregate demand.

Monetary Policy: the intervention of the central bank into the functioning of the economy through changing the money supply. By doing this the central bank affects the money market, shifts the LM curve and eventually increases or decreases the aggregate demand.

Expansionary policies: any kind of economic policy intervention (either fiscal or monetary) aiming at increasing the aggregate demand. Such policies have a tendency to increase the GDP and decrease unemployment, but generally go together with higher inflation.

Restrictionary policies: any kind of economic policy intervention (either fiscal or monetary) aiming at reducing the aggregate demand. These policies have a tendency to lower inflation at the cost of higher unemployment and lower GDP.

Lag: the time between a shock and the government or the central bank identifying the shock and making the necessary policy changes (inside lag), and the time between the economic policy interventions are made and their effects are realized (outside lag).

Lucas critique: economic policy evaluations should take into account how the economic policies affect the expectations of the economic actors.

True or False questions

A81. When the government decides to spend more, this will increase the stock of money in circulation.
A82. Expansionary fiscal policy always has a negative effect on government saving.
A83. Governments are not able to conduct expansionary fiscal policy for too long, because it leads to budget deficit.
A84. Monetary policy in the short run affects the interest rate, but not the income level.
A85. A restrictionary monetary policy will increase investment.
A86. Neither monetary nor fiscal policy can influence income in the long run.
A87. Government can boost employment by expansionary fiscal policy intervention.
A88. You cannot have higher income and lower unemployment at the same time.
A89. Economic policy cannot go for lower prices and lower unemployment at the same time.
A810. The effects of a negative supply shock can be countered by restrictionary economic policies.
A811. Negative shocks to an economy tend to increase inflation.
A812. A monetary intervention takes effect faster, with less lag, than a fiscal intervention.

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Single choice questions

B81. If the Government would like to increase the income level in a country, it should
a) increase the price level.
b) increase the money supply.
c) increase the taxes.
d) increase the government spending.

B82. If the government would like to decrease unemployment in the short run, it should
a) increase the capital stock.
b) increase the money supply.
c) increase the taxes.
d) increase the government spending.

B83. Expansionary fiscal policy is good against which macroeconomic problem?
a) government budget deficit.
b) recession.
c) high interest rates.
d) inflation.

B84. If the Central Bank would like to fight inflation in a country, it should
a) decrease the interest rate.
b) decrease the money supply.
c) decrease the taxes.
d) decrease the government spending.

B85. Economic policies that increase the GDP generally also increase the
a) money supply.
b) real wages.
c) prices.
d) unemployment.

B86. Expansionary monetary policy tends to cause
a) inflation.
b) recession.
c) higher unemployment.
d) government budget deficit.

B87. Restrictive monetary policy is effective against
a) recession.
b) inflation.
c) unemployment.
d) government budget deficit.

B88. In case of a cost push inflation the prices increase because
a) aggregate supply decreases.
b) aggregate supply increases.
c) aggregate demand increases.
d) aggregate demand decreases.

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B89. A cost-push inflation is for example
a) when the demand for goods and services increase.
b) when the money supply increases.
c) when resource prices go up.
d) when more factor income is flowing into the country than out.

B810. A cost-push inflation is for example
a) when the capital stock decreases.
b) when the demand for goods and services increase.
c) when taxes increase.
d) when more transfer income is flowing into the country.

B811. A cost-push inflation is for example
a) when the price level increases.
b) when taxes increase.
c) when the nominal wages are going up.
d) when the Central Bank puts more money into circulation.

B812. A demand-pull inflation is for example
a) when the labor demand of the companies increases.
b) when the workers demand higher nominal wages.
c) when taxes increase.
d) when the Central Bank puts more money into circulation.

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Solutions

A81.	False	B81.	D
A82.	True	B82.	D
A83.	True	B83.	B
A84.	False	B84.	B
A85.	False	B85.	C
A86.	True	B86.	A
A87.	True	B87.	B
A88.	False	B88.	A
A89.	True	B89.	C
A810.	False	B810.	A
A811.	False	B811.	C
A812.	True	B812.	D

Explanation to True of false questions

A81. When the government decides to spend more, this will increase the stock of money in circulation.

FALSE. More spending is a fiscal policy measure, increasing the money stock is monetary policy. The government will finance its spending either from taxes, or from loans from the private sector. None of these increases the money stock.

A82. Expansionary fiscal policy always has a negative effect on government saving.

TRUE. Expansionary fiscal policy is either spending more or levying less taxes. As the government saving is $S_G = T - G$, these measures necessarily worsen the budget.

A83. Governments are not able to conduct expansionary fiscal policy for too long, because it leads to budget deficit.

TRUE. Constant expansionary fiscal policy would mean always spending more and more or levying less and less taxes. Even if the government runs a surplus in the beginning, with continuous fiscal expansion they will sooner or later start to slip into deficit.

A84. Monetary policy in the short run affects the interest rate, but not the income level.

FALSE. Monetary policy first affects the money market and the interest rate. As a result of this, the LM curve will shift and the goods market will start adjusting the income level. Monetary policy that changes the interest rate will affect the income level through the investments.

A85. A restrictionary monetary policy will increase investment.

FALSE. Restrictionary monetary policy is reducing the money supply. As money becomes scarcer, holding money becomes more expensive: the interest rate

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goes up. This, in turn will lower investment demand, as interest rate is also the cost of borrowing funds for investment.

A86. Neither monetary nor fiscal policy can influence income in the long run.

TRUE. In the short run both can. In the long run, however, monetary policy will only affect prices and fiscal policy the composition of GDP. The income level in the long run will be determined by technology and the available quantity of the factors of production.

A87. Government can boost employment by expansionary fiscal policy intervention.

TRUE. Expansionary policies shift aggregate demand to the right. If demand for goods and services increases, firms will see an incentive for producing more, thereby on the one hand generating more income, and on the other hand employing more workers.

A88. You cannot have higher income and lower unemployment at the same time.

FALSE. Okun's law says there is an inverse relationship between income and unemployment: when more people work, so unemployment is lower, the more workers will produce more and so generate higher income. Or reversed: when we want more production, more workers are needed, so unemployment decreases.

A89. Economic policy cannot go for lower prices and lower unemployment at the same time.

TRUE. We studied demand-side economic policy shifting the aggregate demand function to the left (restrictive) or to the right (expansionary). If we assume an upward-sloping aggregate supply function in the short run, then as the AD shifts left we get a lower income, higher unemployment but lower prices combination, and with a right shift the result is higher income, lower unemployment but higher prices. Prices and unemployment move in the opposite direction, just as described by the Phillips curve.

A810. The effects of a negative supply shock can be countered by restrictionary economic policies.

FALSE. A negative supply shock shifts the AS curve to the left, and the new equilibrium is at a lower income level (and higher unemployment) and higher price level. We have two negative effects here that we cannot counter at the same time with demand-side economic policies. So stabilization policy either concentrates on the income level, in which case an expansionary economic policy is used, or on the price level, using restrictionary economic policy. In the first case the prices will increase even further, in the second case the fall in the income will be even greater than caused by the original supply shock.

A811. Negative shocks to an economy tend to increase inflation.

FALSE. Negative shocks will shift either the AS or the AD curve to the left. If the AS is shifted, the new equilibrium will in fact be at a higher price level, so there would be inflation. But if the AD is shifted, the result will be lower prices. If, for any reason demand for goods and services decrease, people will buy less of the goods and services and also will not be willing to pay so much for them as before.

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A812. A monetary intervention takes effect faster, with less lag, than a fiscal intervention.

TRUE. When an economic problem is identified, the Central Bank can react much faster (they have a Monetary Board consisting of a handful of people to make decision) than the government could (the parliament consisting of more than hundred MPs debating and voting to reach a decision). Also the money market reacts faster to changes in money supply than the goods market reacts to changes in T or G.

Explanation to single choice questions

B81. If the Government would like to increase the income level in a country, it should

The aim is higher income. So in the IS-LM model we want an intersection of the IS and LM curves to the right of the initial intersection. This can be done by shifting one of the curves to the right. For the government, it is going to be the IS.

a) increase the price level.

If the IS curve is shifted to the right, the result is in fact going to be a higher price level, so inflation. Inflation, however, is accompanying the income increase, and not causing it. The government obviously would not be able to increase income just by ordering that all prices be doubled overnight.

b) increase the money supply.

The money supply is the responsibility of the Central Bank, not the government. This is not the right answer even though the increase of the money supply would in fact result in a higher income level.

c) increase the taxes.

Changing the taxes is one of the tools of fiscal policy, but it is a restrictive one: one that will shift the IS curve to the left, causing the income to fall.

d) increase the government spending.

Changing G is a fiscal policy tool and an expansionary one. It will create higher planned expenditures and increase the equilibrium income in the goods market.

B82. If the government would like to decrease unemployment in the short run, it should

The aim is higher employment. Firms will be willing to employ more people if there is a higher demand for goods and services they could produce employing these additional workers. So output should increase, which means income should increase. This is actually the same question as the previous one.

a) increase the capital stock.

Even though a higher capital stock would increase labor demand and aggregate supply, and eventually probably the employment as well, it is not something that would be the competence of the government. Supply side economic policies, which we did not cover talk about how the government could influence the producers' side of the economy.

b) increase the money supply.

see B81.

c) increase the taxes.

see B81.

d) increase the government spending.

see B 81.

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B83. Expansionary fiscal policy is good against which macroeconomic problem?

Expansionary fiscal policy is decreasing T or increasing G. Both of these shifts the IS and AD curves to the right. Putting that together with the AS (and LM) the result will be higher P, higher Y and higher r.

a) government budget deficit.

Both higher outlays or lower revenues for the government mean a lower government saving. So if the budget shows a deficit initially, after the expansionary fiscal intervention the deficit will be even greater.

b) recession.

Recession means the income falls back. If the government creates additional demand for goods and services, income can increase again.

c) high interest rates.

The right shift in the IS will result in higher interest rate.

d) inflation.

The right shift of the AD will cause the price level to rise, so expansionary fiscal policy creates an inflationary pressure.

B84. If the Central Bank would like to fight inflation in a country, it should

We are looking for a monetary policy intervention that causes the price level to decrease. To do this, the AD function needs to be shifted to the left, which can be done through restrictive monetary policy.

a) decrease the interest rate.

Restrictive monetary policy shifts the LM to the left and will result in a higher interest rate. Also, the interest rate is not the policy tool itself, but an endogenous variable influenced by the economic policy decisions.

b) decrease the money supply.

Money supply is the tool of the monetary policy, and decreasing it is a restrictive measure. The LM and AD curves will shift to the left.

c) decrease the taxes.

Taxes are fiscal policy instruments. Their decrease would moreover be an expansionary fiscal policy intervention.

d) decrease the government spending.

If G falls, the price level will in fact decrease, so it is a way economic policy can fight inflation. G, however, is not set by the Central Bank, but by the government.

B85. Economic policies that increase the GDP generally also increase the

GDP will be increased it the AS and AD intersect at a higher income. The economic policy can shift the AD to the right with any kind of expansionary policy (fiscal of monetary). What other effect would this right shift in the AD have?

a) money supply.

Increased money supply would be the cause rather than the result of the economic policy intervention. So the causation should run the other way around: higher money supply tends to increase the GDP.

b) real wages.

To get a higher income firms have to produce more and they will need to employ more workers. If nothing else changes they are

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only willing to do this if employing workers becomes cheaper, so if real wages fall (see also the sticky wages model)

c) prices.

When the AD shift to the right, the equilibrium P-Y combination moves up and to the right along the AS curve, so higher demand creates an inflationary pressure besides stimulating the economy.

d) unemployment.

Higher income means we produce more, and to do that we need more workers.

B86. Expansionary monetary policy tends to cause

Expansionary monetary policy is increasing the money supply, which causes the LM and AD curves to shift to the right. Putting that together with the IS and AS we can find out what happens to the income and price level and interest rate.

a) inflation.

If AD shifts to the right, it will intersect with the AS at a higher price level, which means inflation. Increasing the money supply creates inflationary pressure.

b) recession.

Recession is a temporary fallback in the income level. When the AD shifts to the right, the new intersection will be at a higher income level.

c) higher unemployment.

Expansionary monetary policy is a good way to stimulate the economy. More money in circulation will eventually generate more demand for goods and services, and the firms to satisfy this increased demand will employ more workers. As other expansionary policies, this too will lower unemployment.

d) government budget deficit.

There is no direct link between monetary policy and the budget deficit. But an increase in the income level would rather improve the budget balance (if there are income dependent taxes), than worsen it.

B87. Restrictive monetary policy is effective against

Restrictive monetary policy is the decreasing of the money supply, which shifts the LM and AD curves to the left. The question is about actually why would the Central Bank want to do this.

a) recession.

The new intersection between the original AS and the new AD will be at a lower income level, so restrictive monetary policy is not only not effective against recession, it is outright causing it.

b) inflation.

The new intersection will be at a lower price level. So if there was inflation earlier, it can be reduced.

c) unemployment.

Taking money out of the circulation will eventually mean people will cut back their demand for goods and services. If people are not willing to buy as much as before, firms will produce less

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and will fire some workers, increasing the unemployment.

d) government budget deficit.

Restrictive monetary policy is not in direct relationship to budget balance, but if anything, it rather causes than decreases budget deficit (if there is income-dependent tax, than the decrease in the income caused by the restrictive monetary intervention will automatically reduce government revenues)

B88. In case of a cost push inflation the prices increase because

We were looking at two possible causes of inflation: one coming from the supply side and one from the demand side. Both cause inflation through creating excess demand at the going price level.

a) aggregate supply decreases.

A decrease in the supply does create excess demand, and changes in the costs (like oil prices or wages) affect the economy through the supply side.

b) aggregate supply increases.

Increased supply would create excess supply, and would drive the price level down.

c) aggregate demand increases.

An increased aggregate demand would create excess demand, but costs of production do not directly affect either the goods or the money market.

d) aggregate demand decreases.

Decreased demand would create excess supply and would act against inflation.

B89. A cost-push inflation is for example

Cost push inflation comes from the supply side and creates inflation through decreasing the aggregate supply, shifting the AS to the left.

a) when the demand for goods and services increase.

This would shift the AD to the right, and create inflation, but a demand-pull inflation.

b) when the money supply increases.

This is again an example of a demand-pull inflation. More money in circulation will in the short run partly increase prices and partly increase income, in the long run only prices will go up.

c) when resource prices go up.

Resource prices are important determinants on the supply side. If they go up, producing becomes more expensive, and as a result firms will ceteris paribus cut back production, shifting the AS to the left.

d) when more factor income is flowing into the country than out.

We mentioned in- and outflowing factor incomes at the SNA-topic, it has nothing to do (at least in our model) with the short run economic fluctuations.

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B810. A cost-push inflation is for example

Which of the following causes the AS curve to shift to the left and create excess demand?

a) when the capital stock decreases.

When we have less capital, it will be more expensive to produce the same quantity of goods and services, so the aggregate supply decreases.

b) when the demand for goods and services increase.

This would be an example for a demand-pull inflation.

c) when taxes increase.

An increase in the taxes as a restrictive fiscal policy intervention would cause the AD to shift to the left, and would decrease the price level. So it is rather against inflation than creating it.

d) when more transfer income is flowing into the country.

We could bring the transfer in- and outflows to a country in connection to inflation only in a very complicated way, we were not learning anything about these.

B811. A cost-push inflation is for example

Which of the following causes the AS curve to shift to the left and create excess demand?

a) when the price level increases.

This is inflation itself, not its cause. It is like saying you have fever because the thermometer shows a high temperature.

b) when taxes increase.

Tax increases decrease aggregate demand and the price level too.

c) when the nominal wages are going up.

Nominal wages as a universal part of production costs have a significant effect on aggregate supply. If wages increase, production becomes more expensive. If you think about the sticky prices model you can remember that the sticky price firms will increase their prices which in turn will raise the general price level too.

d) when the Central Bank puts more money into circulation.

This is an example of creating inflation, but this is a demand-pull type.

B812. A demand-pull inflation is for example

The demand-pull inflation is a rise in the price level as a result of excess demand that is caused by an increase in the aggregate demand (rather than a decrease in the aggregate supply, like in the case of cost-push inflation).

a) when the labor demand of the companies increases.

This would mean that at the going prices firms are willing to hire more workers and produce more, so this is an increase in the aggregate supply, leading eventually to a fall in prices.

b) when the workers demand higher nominal wages.

Higher nominal wages would result in inflation, but this would be a typical cost-push inflation.

c) when taxes increase.

Tax increases reduce consumption and aggregate demand.

d) when the Central Bank puts more money into circulation.

More money will eventually transform into more demand for goods and services, shift the AD curve to the right leading to higher prices.

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Detailed definitions with page references

Fiscal Policy: the intervention of the government into the functioning of the economy through changing the taxes, transfers and/or government expenditures. With these the government can affect the goods market, shifts the IS curve and eventually increases or decreases the aggregate demand.

Fiscal policy tool are T, Tr and G: these can be either increased or decreased. The main objectives of the fiscal policy can be to promote economic growth, to monitor the budget deficit, or to lower the unemployment.

Monetary Policy: the intervention of the central bank into the functioning of the economy through changing the money supply. By doing this the central bank affects the money market, shifts the LM curve and eventually increases or decreases the aggregate demand.

The monetary policy tool is the money supply, it can be increased or decreased. Objectives of the monetary policy can be the monitoring of the value of the currency, the promotion of economic growth or the restriction of inflation.

Expansionary policies: any kind of economic policy intervention (either fiscal or monetary) aiming at increasing the aggregate demand. Such policies have a tendency to increase the GDP and decrease unemployment, but generally go together with higher inflation.

Any economic policy tools that shift either the IS or the LM curve to the right will also shift the Aggregate demand curve to the right. If this happens, the new curve will intersect the upward-sloping AS at a higher income and a higher price level.

Restrictionary policies: any kind of economic policy intervention (either fiscal or monetary) aiming at reducing the aggregate demand. These policies have a tendency to lower inflation at the cost of higher unemployment and lower GDP.

Any economic policy tools that shift either the IS or the LM curve to the left will also shift the Aggregate demand curve to the left. If this happens, the new curve will intersect the upward-sloping AS at a lower price level and a lower income.

Lag: the time between a shock and the government or the central bank identifying the shock and making the necessary policy changes (inside lag), and the time between the economic policy interventions are made and their effects are realized (outside lag).

When you bump your elbow into something, you immediately feel the pain. When it goes wrong for the economy, it takes time to even be aware of it: GDP data for example are only available after a good 1-1,5 years – this is inside lag. Then you need time to find out what is wrong, devise an economic policy answer, a medicine, and wait for the medicine to take effect – this is the outside lag. (p.447)

Lucas critique: economic policy evaluations should take into account how the economic policies affect the expectations of the economic actors.

Our simple model of macroeconomics mainly assumes that expectations are not changed by changes in the variables (Y, P, u). However, if economic actors form their expectations rationally, economic policies might have much different effects than based on the standard macroeconomic model. (p.451)

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Topic 9: Economic Growth
(Chapters 7-8)

Topic overview

This topic is the very long run model of the economy. The long run gave us the trend, the short run gave us the fluctuation. This topic is going to tell us why the potential output, the value of GDP to which the economy converges in the long run, actually is increasing slowly but steadily.
We will use the Solow model which was developed by Robert Solow in the late 50s, and is still used as a kind of benchmark because despite of its simplicity its predictions are quite robust. The main focus of this topic is the evolution of the per capita GDP (as opposed to just simply the GDP) in a country, and three variants will be studied: the baseline model, one containing population growth and one containing technology improvements. The first two are extensive growth models and the last one is an intensive growth model.
The most important notion in these growth models is investment: something we had in our models right from the beginning as a demand component of the GDP, but were never asking what happens to the money an economy spends on investment. The Solow growth model gives us the answer for this: investment helps a country to accumulate capital which will then be used in production.
Another important feature of the growth models is their dynamic nature: that the changes described by the equations happen through time, and the system needs time to converge to the equilibrium. Until this equilibrium is reached, the system changes, but once it is reached, the system is in a resting position: this is what we call steady state.
The two extensive growth models will show us that growth based on involving more resources into the production cannot last infinitely and although until the steady state is reached, GDP might increase, but once it has been reached, growth stops. The intensive model, based on the improvement in technology can uphold sustained economic growth, and as of now it seems like technology – or more broadly: the increase in knowledge – can be the only thing resulting in sustained growth.

Learning outcomes

- *Students will understand the difference between a static equilibrium and a steady state.*
- *Students will understand how capital accumulation can lead to temporary economic growth.*
- *Students will see the limitations of growth based on extensive use of resources.*
- *Students will become familiar with growth accounting and learn how to identify the role of technology improvement in the economy.*

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Definitions

Economic growth: The yearly change of the GDP per capita expressed in percentages.

Steady state: a long-run equilibrium, a state of rest for a dynamically changing system when the endogenous variables describing this state will not change over time.

Golden Rule level: among the many possible steady states an economy can attain, the golden rule level is that particular one, where the per capita consumption is the highest possible.

Extensive growth: an economic growth that is attributable to increased usage of capital and/or workers.

Intensive growth: an economic growth that occurs even when the same amount of capital and workers are used. It is attributable to technological progress.

Total Factor Productivity (TFP): a measure of technology, the amount of output produced per unit of input, where inputs are combined according to their share in the production function. The overall or average efficiency with which inputs are combined to outputs in an economy.

Technological progress: A simple view of technological progress is that it increases the efficiency of labor, so that the same number of workers with the same amount of capital is now able to produce more.

True or False questions

A91. Economic growth stops when investment becomes small enough to only cover replacement of used capital.
A92. In a given country if 100 units of investment happen in a year the capital stock will increase by less than 100 units.
A93. Higher steady state per capita GDP also means higher per capita consumption.
A94. According to the growth model countries with faster population growth will have either slower growth or lower per capita GDP.
A95. The government can encourage economic growth if it can ceteris paribus increase the savings rate.
A96. If there is technological progress, per capita GDP will grow even in the steady state.
A97. For one country steady state *A* is better than steady state *B*, if *A* means a higher income per worker.
A98. Economic growth based on capital accumulation will eventually stop, it cannot go on infinitely.
A99. Economic growth in the emerging markets and developing countries on average is more than two times faster than in the developed countries.
A910. Expansionary monetary policy leads to economic growth.
A911. Lower steady state capital (per worker) causes faster population growth.
A912. The faster capital depreciates the more saving is left for capital accumulation.

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Single choice questions

B91. What does the growth model explain?
a) The reasons why the potential output in a country grows.
b) The reason why the GDP in a country fluctuates.
c) The reason why the distribution of the GDP changes.
d) The reason why the prices increase in the long run.

B92. What happens in the growth model if gross investment is more than depreciation?
a) The savings rate will go down to decrease gross investment.
b) Capital stock will depreciate faster.
c) Net investment will be positive and capital per worker will increase.
d) Income per worker decreases.

B93. In the steady state
a) the output (GDP) of the economy grows fastest.
b) the capital stock per worker is stable from year to year.
c) unemployment is at its natural rate.
d) there can be no population growth.

B94. Which of the following results in a *lower* (steady state) capital per worker?
a) higher level of income per worker.
b) higher savings rate.
c) technological progress.
d) higher population growth.

B95. The Solow model of growth predicts that countries where population grows faster will have…
a) faster economic growth.
b) lower savings rate.
c) lower inflation.
d) lower steady state level of capital per worker.

B96. Which of the following can enable a country's income per worker to grow sustainably?
a) Technological progress.
b) The growth of the labor force.
c) The growth of the money supply.
d) The growth of the capital stock.

B97. Suppose your country is currently in the steady state. If you are an economic policy maker, which variable would you try to increase to get your country to grow further?
a) Depreciation rate.
b) Saving rate.
c) Rate of economic growth.
d) Rate of population growth.

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B98. According to the Solow model, the EU countries enjoy a higher standard of living than the Sub-Saharan African countries because the saving rate in the EU is … on average, while in the Sub-Saharan Africa it is about … on average.
a) 64%; 31%.
b) 32%; 51%.
c) 23%; 14%.
d) 18%; 22%.

B99. Net investment (per worker) in the Solow model is inversely related to
a) savings rate
b) capital per worker
c) the steady state
d) the exponent of capital in the production function

B910. With a yearly *n*% of population growth and a *g*% of technological improvement, real GDP will increase in the steady state by
a) 0%
b) *n*%
c) *g*%
d) (*n* + *g*)%

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Solutions

A91. False
A92. True
A93. False
A94. True
A95. True
A96. True
A97. False
A98. True
A99. True
A910. False
A911. False
A912. False

B91. A
B92. C
B93. B
B94. D
B95. D
B96. A
B97. B
B98. C
B99. B
B910. D

Explanation to True of false questions

A91. Economic growth stops when investment becomes small enough to only cover replacement of used capital.

FALSE. When economic growth happens, due to the higher income per capita, investment also increases, at an always smaller rate. At the same time the capital stock also grows and thus the depreciation increases, at a constant rate. So it is better to say that growth stops when depreciation becomes big enough that replacement requires the whole of investment.

A92. In a given country if 100 units of investment happen in a year the capital stock will increase by less than 100 units.

TRUE. Investment has two parts, one part goes for the replacement of capital that has been used up, and only the rest can be used for buying additional capital goods. This part is also called net investment. The 100 units is the gross investment.

A93. Higher steady state per capita GDP also means higher per capita consumption.

FALSE. We can reach a higher steady state by increasing the savings rate. Suppose in the steady state the per capita GDP is originally 100 and we save 20% of it: consumption is 80. If increasing the savings rate to 50% the steady state per capita GDP goes up to 140, the consumption is only 70. The statement is possible, but not sure.

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A94. According to the growth model countries with faster population growth will have either slower growth or lower per capita GDP.

TRUE. Population growth is one more thing beside depreciation that lowers k, capital per worker. So with faster population growth k will decrease more than without, thus the same investment will either not increase k so much, or stop at a lower k, than without the population growth.

A95. The government can encourage economic growth if it can ceteris paribus increase the savings rate.

TRUE. More saving means more funds for investment. If there is more to invest, than more is left after replacing used capital for increasing the capital stock than before. As a result, either growth will be faster than it was, or we arrive at a steady state with a higher capital and income per worker.

A96. If there is technological progress, per capita GDP will grow even in the steady state.

TRUE. In case of technological progress the workers work more effectively, so the same amount of capital and worker can produce a higher output. In the steady state income per effective worker is not changing, but the technological progress increases effectivity, so income per worker does increase.

A97. For one country steady state *A* is better than steady state *B*, if *A* means a higher income per worker.

FALSE. The "goodness" of steady states is assessed based on consumption per worker. As the savings rate increases the steady states move along the productivity curve meaning ever increasing income per worker, but consumption only increases up to a certain point, and then starts decreasing. If the savings rate is 0 than we could consume the whole of the income, but income is going to be 0, and if savings rate is 1, then we get a very high income, but we don't get to consume any of it. In between somewhere is that s which maximizes consumption (see golden rule).

A98. Economic growth based on capital accumulation will eventually stop, it cannot go on infinitely.

TRUE. The steady state is the point in time when capital accumulation fueled growth stops. Until k is small, we get growth and move towards the steady state slower and slower. If k is large, we get negative growth, also moving ever slower towards the steady state.

A99. Economic growth in the emerging markets and developing countries on average is more than two times faster than in the developed countries.

TRUE. According to the World Bank, the developed countries (EU, Japan, US, Australia, Canada etc.) showed a 2% growth in real GDP in 2016, compared to the 4,5% growth of the emerging markets and developing countries.

A910. Expansionary monetary policy leads to economic growth.

FALSE. Monetary and fiscal (demand-side) policies can be useful weapons against economic fluctuations in the long run, but we have shown that they are unable to affect the economy (real GDP) even in the long run, not to mention the very long run.

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A911. Lower steady state capital (per worker) causes faster population growth.

FALSE. These two things do go together in the Solow model, but the causality is reversed: faster population growth is what causes a lower steady state k. The original statement is similar to saying that receiving a grade 5 in macroeconomics causes you to understand macro well.

A912. The faster capital depreciates the more saving is left for capital accumulation.

FALSE. Capital accumulation is also called net investment, or change in the capital (per worker) and is calculated as $\Delta k = s \cdot y - \delta \cdot k$. When δ, the depreciation rate increases, as that term is a subtraction, net investment decreases. Or: if more money from the savings is spent on replacing worn out capital, less remains for buying additional new capital.

Explanation to single choice questions

B91. What is the growth model explaining?

We were using the growth model to extend the long run model of the economy. What additional explanations did the growth model give us, which could not to be explained by either the long run or the short run models studied earlier?

a) The reasons why the potential output in a country grows.

In the long run, the economy gravitates towards the potential output if the quantity of resources and the technology is given. The growth model makes the quantity of capital endogenous, thereby putting an explanation behind why the potential output itself would change.

b) The reason why the GDP in a country fluctuates.

Our short run model was the model of economic fluctuations. The differences between the actual level of output and the potential can be explained by fluctuations in the aggregate demand.

c) The reason why the distribution of the GDP changes.

The GDP gets distributed among the owners of the factors of production (capital owners and workers) according to their contribution to it in the short and the long run alike.

d) The reason why the prices increase in the long run.

The growth in the name of the topic does not refer to increase in the prices. To explain that we had models of inflation.

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B92. What happens in the growth model if gross investment is more than depreciation?

These two forces determine together how the capital stock is changing over time. Gross investment increases capital per worker while depreciation decreases it.

a) The savings rate will go down to decrease gross investment.

Savings rate is an exogenous country-specific factor in the growth model. It is true, that if it is decreasing then gross investment might be equal to the depreciation, but their difference will not affect the savings rate.

b) Capital stock will depreciate faster.

The depreciation rate is also exogenously given in the growth model. It is hard to imagine at the national level, that even if firms would know gross investment is above depreciation, just because of this they would start using their capital stock, their machinery more heavily.

c) Net investment will be positive and capital per worker will increase.

Net investment is the difference between gross investment and depreciation, it shows, how much money is left for investing after replacing worn out capital. If it is positive, firms will be able to buy additional capital, a capital per worker will increase (and so will output per worker).

d) Income per worker decreases.

Income per worker will eventually change but in the opposite direction.

B93. In the steady state

Steady state in dynamic systems means a kind of resting point of the system, when forces moving it in one direction or the other are balanced.

a) the output (GDP) of the economy grows fastest.

Fast growth means that the economy is not steady at all but moving forward. In the growth model faster growth means that the economy is further from the steady state.

b) the capital stock per worker is stable from year to year.

Stable means it is not changing from one year to the next. If the capital per worker is stable, then so is income per worker: economic growth stops at the steady state.

c) unemployment is at its natural rate.

In the growth model we were assuming full utilization of resources, so natural rate of unemployment not only in the steady state, but on the whole way leading there.

d) there can be no population growth.

We can calculate the steady state with or without population growth. Population growth is not connected to the existence or non-existence of the steady state.

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B94. Which of the following results in a *lower* (steady state) capital per worker?

We were looking at different changes in the exogenous variables affecting the steady state capital per worker and income per worker. You only have to find out which variables have an effect on these in the growth model, and direction of the change.

a) higher level of income per worker.

A change in the income per worker is rather the result than the cause of a change in the capital per worker. Also the direction of the change should be the opposite: if capital per worker is lower, income per worker is also lower.

b) higher savings rate.

The savings rate influences gross investment. If a higher share of the income is saved, more funds will be available for investing, so capital per worker will increase and stop at a higher level.

c) technological progress.

Technological progress is a way of sustained economic growth.

d) higher population growth.

This is a force pointing towards lower capital per worker. Simply put with higher population growth we will have more people using the same quantity of capital, so capital per worker will decrease.

B95. The Solow model of growth predicts that countries where population grows faster will have…

Population growth means that the county will have an always higher number of people employing the scarce capital stock, so the capital per worker will decrease faster than without population growth.

a) faster economic growth.

If all else is the same, the model predicts a slower economic growth for countries with greater population growth.

b) lower savings rate.

Although countries with faster population growth do tend to have lower savings rate, the model does not assume any functional relationship between the two. Both of them are exogenous variables independent of each other.

c) lower inflation.

Population growth is in no particular functional relation with prices.

d) lower steady state level of capital per worker.

Through causing a higher break-even investment, countries with faster population growth will have less opportunity to expand their capital stock and income per worker, so they will grow slower and stop growing sooner, at a lower level of capital and income per worker.

B96. Which of the following can enable a country's income per worker to grow sustainably?

You can think about which of the followings we mentioned as a potential source of economic growth in this topic, and then about which would have no upper boundary of expansion.

a) Technological progress.

Technology is one factor of (intensive) economic growth, and as of now we do not see the upper limits to where technology can evolve.

b) The growth of the labor force.

The growth of labor force acts against economic growth.

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c) The growth of the money supply.
Money supply will not affect the potential output.

d) The growth of the capital stock.
Increasing the capital stock is a source of extensive growth, but we have seen from the steady state, that capital stock will only increase up to a certain point, and can generate economic growth only up to that point.

B97. Suppose your country is currently in the steady state. If you are an economic policy maker, which variable would you try to increase to get your country to grow further?
In the steady state economic growth stops. Steady state is reached when saving and investment is just enough to cover decrease of capital per worker due to depreciation and population growth. To get the economy growing we either need to increase addition to the capital stock or decrease the depletion of it.

a) Depreciation rate.
If depreciation rate is increased than the same investment would no longer be enough to cover replacement of used capital, the capital stock will decrease and we get negative growth.

b) Saving rate.
If the government can induce the economic actors to save a larger portion of their income, than this saving can generate more investment, which will then be more than needed for replacement of used capital, so the capital stock will increase and the economy can grow towards the new steady state.

c) Rate of economic growth.
Although when the economy starts growing the rate of growth increases, this is not something the policy makers can directly influence. This would be like saying that if you want to go faster with your car all you have to do is reach a higher speed: this is not the cause, but the effect.

d) Rate of population growth.
On the one hand it is quite difficult for a government to influence the rate of population growth, but even if it was possible, higher population growth means another force towards the decrease of the per worker capital stock, so this points in the direction of negative growth.

B98. According to the Solow model, the EU countries enjoy a higher standard of living than the Sub-Saharan African countries because the saving rate in the EU is … on average, while in the Sub-Saharan Africa it is about … on average.
To Solow growth model predicts a positive relationship between savings rate and income per person. So countries with higher saving rate are predicted to end up wealthier.

a) 64%; 31%.
The wealthier countries have higher savings rate, but 64% is just too high. No individual country actually has this high savings rate.

b) 32%; 51%.
This contradicts the prediction of the Solow model.

c) 23%; 14%.
These are the actual numbers. As you can see, savings rate in the EU countries is about twice as high as in the Sub-Saharan Africa, like in answer a, but both numbers are smaller in reality.

d) 18%; 22%.
The numbers again are contradicting the Solow model.

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B99. Net investment (per worker) in the Solow model is inversely related to

Net investment is the actual change in the capital stock (per worker) k, and is the difference between gross investment and depreciation so $\Delta k = s \cdot f(k) - \delta \cdot k$.

a) savings rate

Savings rate s shows what percentage of the income is saved for buying capital. Net investment is strictly increasing in s. More saving is more gross investment and more gross investment always means more net investment ceteris paribus.

b) capital per worker

As capital per worker k increases, income and saving increases at a decreasing rate, but depreciation increases at a constant rate, so their difference, the net investment decreases in k, and that in an increasing rate. Be careful: the gross investment is directly related to k!

c) the steady state

This is not a variable, it is a specific value of the variables of the model. Thus we cannot say how the net investment depends on this.

d) the exponent of capital in the production function

This is a complicated one. As this exponent increases, our production function is pivoting upwards meaning for any k we are now able to produce more. If we can produce more, we can also save more, which means that both gross and net investment increases ceteris paribus.

B910. With a yearly *n*% of population growth and a *g*% of technological improvement, real GDP will increase in the steady state by

Every year the labor force grows by n% and labor becomes g% more efficient or productive. What we want to know is not how this affects y (GDP per worker), but Y itself.

a) 0%

The steady state means our endogenous variable is not changing, or is changing 0%, but our endogenous variable is now neither the GDP, nor GDP per worker, but GDP per efficiency unit. That is what is stable in the steady state.

b) *n*%

Having population growth will lead to GDP per person being constant in the steady state, but GDP itself increasing n%, without technological change.

c) *g*%

When we have technological progress, in the steady state the GDP per worker is going to increase by g%.

d) (*n* + *g*)%

If we have both technological progress and population growth, than GDP per worker increases by g% in the steady state, and GDP has now two sources due to which to grow: it will increase n% because of population growth, and g% because GDP per worker grows, altogether (n + g)%.

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Detailed definitions with page references

Economic growth: The yearly change of the GDP per capita expressed in percentages.

If the per capita GDP increases from one year to the next, the growth rate is positive and there is economic growth. If the per capita GDP is decreasing, there is a negative growth, a recession (p.191).

Steady state: a long-run equilibrium, a state of rest for a dynamically changing system when the endogenous variables describing this state will not change over time.

If the system is in the steady state unless some exogenous shock acts on the system the endogenous variables will stay the same from year to year. If the system is not in the steady state endogenous variables will change and the system moves towards that (p.196-197).

Golden Rule level: among the many possible steady states an economy can attain, the golden rule level is that particular one, where the per capita consumption is the highest possible.

If the savings rate is too high, we might end up with a high per capita capital and income, but we consume only a small part of it. If the savings rate is too low, we end up with a low per capita capital and income, so even if a great share of it is consumed, per capita consumption is still small. There is a particular savings rate with which the steady state capital per worker and the per capita GDP is such that it enables the highest possible per capita consumption. This savings rate is the exponent of capital in the production function (p.204)

Extensive growth: an economic growth that is attributable to increased usage of capital and/or workers.

One way to increase per capita GDP is to use more resources with the existing technology. This is why nations of old times started wars: to get more land and more labor force.

Intensive growth: an economic growth that occurs even when the same amount of capital and workers are used. It is attributable to technological progress.

When countries do not have an opportunity to increase input usage, or they chose not to they can still increase production by using the existing quantity of factors of production more efficiently.

Technological progress: A simple view of technological progress is that it increases the efficiency of labor, so that the same number of workers with the same amount of capital is now able to produce more.

Graphically it is an upward shift of the production function (p.223).

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Short essay questions

- What are the main areas of enquiry, questions or problems of macroeconomics? Can we find analogies for these in microeconomics?
- Why is GDP not an exact measure of economic performance of a country? Why is it also not measuring welfare or wellbeing correctly? Give some examples.
- Why do the GDP-deflator and the CPI give you different values for the change in the price level?
- What is the difference in the model assumptions of the long run and the short run? What are the main consequences of these differences?
- Explain the crowding out effect of an additional tax in the long run.
- What types of unemployment do we know? What reasons cause these different types of unemployment and how can we fight them?
- What causes inflation? What can we do against it?
- How can economic policy-makers react to negative supply shocks? What are the different effects (good and bad) of the different reactions?
- What kind of costs are associated with unemployment?
- Explain how increased money supply leads to increased production in the short run.
- Explain how a tax cut can decrease unemployment in the short run.
- Why may that be a good idea for the companies to pay a real wage to the workers that is higher than the equilibrium?
- How can the Central Bank influence the quantity of money in circulation, that is, how can it increase or decrease the money supply?
- Explain what excess supply means on the goods market, and how in such a case the goods market gets to the equilibrium.
- Explain what excess demand means on the money market, and how in such a situation the money market gets to the equilibrium.

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SAMPLE FINAL EXAM ECONOMICS

Szeged, 2015.

I. Short Essay (4 points)

1. Explain how economic policy can move along the Phillips-curve, and trade off unemployment for inflation.

II. Definitions (5 points each)

Define shortly the following economic concepts!

2. Crowding out:

3. Structural unemployment:

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III. single choice question (2 points each)

Chose the answer that you believe is the correct one! There is only one totally correct answer, though more might be partially correct. Enter your final answer with capital letter in the grid on next page. Do not change your answer in the grid.

4. In the long run, which of the following would increase the equilibrium real wage of workers?
   a) higher taxes.
   b) increasing capital stock.
   c) increasing number of workers on the labor market.
   d) decrease in the price level.

5. In the long run, if taxes are lowered ceteris paribus,
   a) the equilibrium interest rate increases.
   b) government saving also increases.
   c) investment will increase.
   d) consumption will increase.

6. In the long run if the Central Bank overestimates the GDP growth, a given increase in the money supply will
   a) increase the velocity of circulation.
   b) result in a non-equilibrium in the money market.
   c) cause a higher inflation than expected.
   d) cause a lower inflation than expected.

7. During the 2008 global financial crisis the unemployment rate in the US increased
   a) from around 2% to close to 15%.
   b) from around 8% to close to 10%
   c) from around 5% to close to 10%
   d) from around 3% to close to 8%

8. Which of the following would shift the aggregate demand (AD) curve to the left?
   a) Tax cuts.
   b) Less government expenditure.
   c) Increased capital stock.
   d) Lower nominal wages.

9. In the sticky wages model if the price level is higher than the expected price level
   a) the rate of unemployment is above its natural rate.
   b) there is deflation.
   c) the country cannot be in a long run equilibrium.
   d) the country produces less than its potential output.

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10. If the government would like to decrease unemployment in the short run, it should
    a) decrease the interest rate.
    b) increase taxes.
    c) decrease the money supply.
    d) increase the government spending.

11. What happens in the growth model if gross investment is less than depreciation?
    a) capital per worker decreases because net investment is negative.
    b) the savings rate increases to generate more investment.
    c) depreciation of capital stock becomes slower.
    d) Income per worker increases.

IV. True or False question (1 point each)

Write your answer („true" of „false") in the grid below! You may not change your answer in the box.

12. When the GDP deflator goes up, the consumers price index must also increase.

13. Taxes and transfers can change the distribution of the GDP among the owners of factors of production.

14. In the long run a ceteris paribus increase in the money supply causes the GDP to go up.

15. The goods market is in equilibrium if the interest rate equals the income.

16. The AD curve tells us when is the money market equal to the goods market.

4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.

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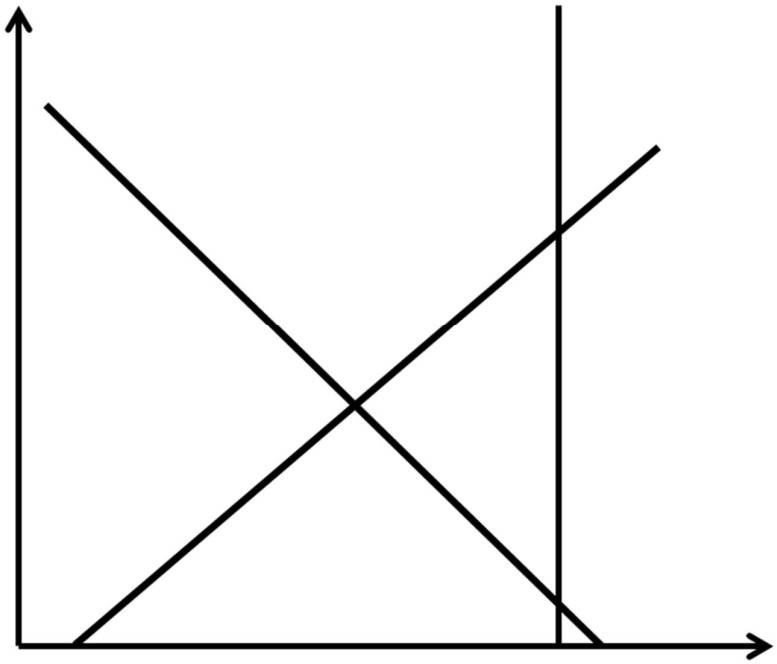
V. Geometrical Exercise (5 points)

17. The graph below shows the labor market of an economy that works according to the sticky wage model. Label the axes and identify labor demand, labor supply and the active population (2 points). Draw an initial real wage so that there is excess supply. Show how many people are employed, structural unemployed and voluntary unemployed (2 points). Show on the graph what happens to the real wage, the number of employed and unemployed, if an inflation happens in this economy (1 point).



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Sample Final Exam Key

1. The Phillips-curve show a negative relationship between unemployment and inflation. The trade-off is this: we can have lower unemployment but only at the cost of having higher inflation or the other way around. Economic policy can move along the Phillips-curve, because the demand side economic policy interventions can affect either the prices or the income and unemployment. By doing expansionary economic policies (like decreasing taxes, increasing government spending or the money supply) the economic policy eventually generates higher demand: as a result of that the firms are willing to produce more and employ more people, so unemployment will decrease, but will ask for higher prices, so there will be inflation. Restrictive policies, on the other hand tend to decrease the prices so reduce inflation but also decrease the income causing higher unemployment.

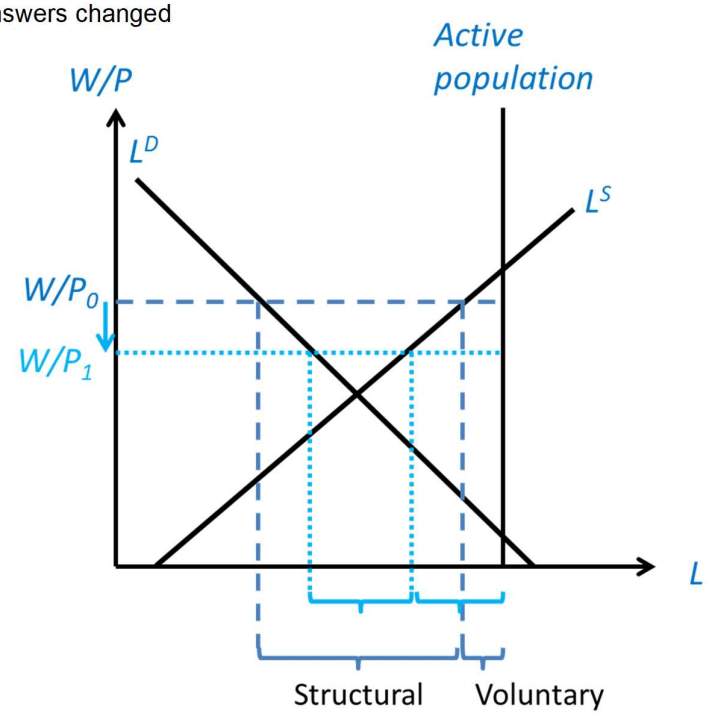
2-3. See definition list.

4.	B	variation of B25 with answer d) changed.
5.	A	see B29.
6.	C	New question. Based on the quantity equation.
7.	C	New question. I will ALLWAYS have a question about actual economic data
8.	B	See B62, the direction of the shift is changed.
9.	C	See B74, order of answers changed
10.	D	See B82.
11.	A	Variation of B92

12.	False	A111
13.	True	New question
14.	False	A37
15.	False	A55
16.	False	New question

17.

As $P\uparrow$, $W/P\downarrow$, so



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Definition Index

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