Exercise List

BIG - INTRODUCTION TO MACROECONOMICS - 30326

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Note: This document contains exercises relative to the program of Macroeconomics by Blanchard-Amighini-Giavazzi (ch. 2-9). The program relies on the 3th edition of the book, except for IS-LM and AD-AS model, which is faithful to edition 2. Exercises are written by the author of the document, on the basis of Ferraguto exercise textbook.

Section 1 - The goods and financial markets

Exercise 1

a Explain what is meant by: labour force, unemployment rate and participation rate. Moreover, give a math formula when needed.

b Consider two periods of the economy $(t,\, t+1)$. In $t+1$ GDP deflator has gone down by 4%, and the real GDP growth has been equal to -3%.
Compute the growth rate of nominal GDP for this economy in $t+1$.

Exercise 2

Explain the difference between a closed and an open economy regarding the goods market studied in class. Write down the equations describing the two economies.

Exercise 3

The goods market of a country is described by the following equations:

$$\begin{aligned} C &= c_o + c_1 Y_D \\ Y_D &= Y - \bar{T} \\ Y &= C + \bar{I} + \bar{G} \end{aligned}$$

a Express the equilibrium level of income as function of the multiplier and the autonomous spending.

b Denote by $D = \bar{G} - \bar{T}$ the government deficit, and suppose $\bar{G}, \bar{T}$ are cut by the same amount, i.e $\Delta\bar{G} = \Delta\bar{T}$. Derive the expression of the change in equilibrium income given by a simultaneous change of both variables in Y. What happen to the equilibrium level of Y?

Exercise 4

The goods market of a country is described by the following equations:

$$\begin{aligned} C &= c_o + c_1 Y_D \\ Y_D &= Y - T \\ T &= \bar{T} + tY \qquad t \in (0,1) \\ Y &= C + \bar{I} + \bar{G} \end{aligned}$$

a Express the equilibrium level of income as function of the multiplier and the autonomous spending.

b What happens to the equilibrium level of income and the aggregate demand curve when there is an increase in government spending ($\Delta\bar{G} > 0$)? And what happens instead when there is a decrease in t? Draw the changes in 2 different graphs and comment on the relative differences.

Exercise 5

The goods market of a country is described by the following equations:

$$\begin{aligned} C &= c_o + c_1 Y_D \\ Y_D &= Y - \bar{T} \\ G &= \bar{G} - gY \qquad g > 0 \\ Y &= C + \bar{I} + \bar{G} \end{aligned}$$

a Express the equilibrium level of income as function of the multiplier and the autonomous spending.

b Suppose there is a simultaneous change in taxes and autonomous consumption, i.e. $\Delta c_0 = \Delta\bar{T} > 0$. Compute the changes that will occur on the following variables and give an economic interpretation of the results obtained:

1. Equilibrium level of Y;
2. Public Saving;
3. Private Saving;
4. National (total) Saving.

Exercise 6

The goods market of a country is described by the following equations:

$$\begin{aligned} C &= c_o + c_1 Y_D \\ Y_D &= Y - \bar{T} \\ G &= \bar{G} - gY \qquad g > 0 \\ Y &= C + \bar{I} + \bar{G} \end{aligned}$$

a Derive the private saving function in terms of income and derive the goods market equilibrium condition (level of Y) from the equality between investment and total savings.

b Describe what happens to the economy in terms of the aggregate demand curve and the equilibrium level of income if there is a reduction in taxes, i.e. $\Delta T < 0$. Moreover, discuss what happens to the deficit $D = G - \bar{T}$ after the reduction in taxes and if the overall effect depends on the level of g.

Exercise 7

Write equations for money demand and money supply.
Explain what they and the variables whose are composed mean. Draw them in a graph representing the money market and explain on what consists its equilibrium.

Exercise 8

Define what is *money* and the different means the public can make use of it.
Explain in simplified schemes the composition of *central bank* and *commercial bank* balance sheets, respectively.

Section 2 - IS-LM

Exercise 1

Consider the IS-LM model studied in class. Investment are endogenous to the level of income and interest rate now. A closed economy is described by the usual equations:[1]

$$\begin{aligned} C &= c_o + c_1 Y_D \\ Y_D &= Y - \bar{T} \end{aligned}$$

Suppose the functional form for the investment in IS and interest rate on money demand are given by:

$$\begin{aligned} I &= \bar{I} + d_1 Y - d_2 i \\ YL(i) &= f_1 Y - f_2 i \end{aligned}$$

a Derive the equations for IS and LM relations as seen in class; draw them in a graph and explain what they describe. In addition, what does represent the equilibrium point between these two curves?

b Rewrite IS and LM relations in explicit form ($y = mx + q$) (what are the x and y in the graph here?).

c Describe what happens (mathematically) to the equilibrium level of output when a positive change in M/P occurs. Show it also in a graph.

Exercise 2

Rewrite IS and LM relations as in the previous exercise. What happens to the equilibrium when there is a negative change in $\bar{I}$? Give the mathematical results, show the effect in a graph and explain what happens economically in both markets.

[1] Be careful here, you miss an equation to complete the IS market. Hint: we are still in a closed economy!

Exercise 3

Rewrite IS and LM relations as in exercise 1. Suppose there is a simultaneous fall in $\bar{G}$, an increase in $\bar{T}$ and an increase in M. After these changes the level of output must remain unchanged. What happens to interest rate i and investments $\bar{I}$?

Exercise 4

Explain what is the *liquidity trap* and how it is represented in IS-LM equilibrium graph.

Section 3 - Labour market and AD-AS model

Exercise 1

Define and write the WS and PS relations (take them from course slides if you don't remember). Show them in a graph and describe in what consists an equilibrium in this graph.
What is the difference between short and medium run?

Exercise 2

Consider an economy at medium-run equilibrium on the WS-PS.

a Suppose a new law that increases unemployment benefits is issued. What is the variable changing in the relations? Are both curves interested by this change? Give a mathematical result, draw the change in a graph and explain the economic intuition occurring.

b Suppose the outcome on unemployment after the law passed is not welcomed by policymakers, who are pushed by unions to go back to the old level of unemployment rate. They think to do it by changing the rules of competition, that in turn provoke a reduction in μ. Do you think policymakers will reach their goal bringing unemployment level to the starting point?
Whatever you think is going to be result, prove it mathematically, then draw it in a graph and provide the economic intuition behind it.

Exercise 3

The goods market of this country is described by the following equations:

$$\begin{aligned} C &= c_o + c_1 Y_D \\ Y_D &= Y - \bar{T} \\ Y &= C + I + \bar{G} + (EX - IM) \\ I &= \bar{I} + d_1 Y - d_2 i \end{aligned}$$

As for remaining equations along the exercise, take them as given in lecture notes.

a Suppose a pandemic suddenly hit country A.
Policymakers decide for a lockdown of the country. People are obligated to stay at home, as a first consequence consumers reduce their autonomous consumption and increase their propensity to save. Show how the equilibrium level of income Y changes on the IS market. Define e_0 as the initial equilibium level of output and with e_1 the new one. Explain these effects mathematically, show them in a goods market graph and give economic explanation.

b Show how equilibrium changes in the IS-LM graph too.

c In order to counteract to the change in Y, both government and monetary authority decide to increase government spending and increasing money supply jointly. They want to foster output, but they will be not able to reach the initial pre-crisis level Y_0 at e_0. Show clearly any passage from e_0 to e_1 and e_2 on the IS-LM. [2]

d Write down equations and draw in a graph the WS-PS relations to describe the labour market.

e Now show all of the previous changes through the AD-AS model and its corresponding graph, determining the short-run equilibrium. Explain clearly what variables change during the process and how them affect AD and AS curves.

f What would happen in the medium-run equilibrium if the natural level of output remains unchanged to the initial level Y_0? Describe it through the AD-AS model and draw it down.

g Suppose after a while the health crisis is still going on and the economy is not rebounding: as a result the natural level of output decreases from Y_0 to $Y_0' \equiv Y_1$. Show how this affects the labour market first.[3] Does this affect the short run equilibrium you find in point (e)?

h How the lower level of natural output will affect the medium run equilibrium? Show it again through the AD-AS model.

i Now the composition of the current account change too. How would you think the current account will change in the scenario described so far? What happens to exports and imports?
How would this change affect aggregate demand? Describe in words your economic intuition.

[2] Mind the stages: e_0 is the pre-crisis equilibrium, e_1 is the equilibrium reached after the fall in consumption, e_2 is the new equilibrium deriving from the joint policies. Hint: Y_2 is higher than Y_1 but lower than Y_0.

[3] Think what happens to the natural level of unemployment

References

1. Blanchard, Amighini, Giavazzi. *Macroeocnomics. A European Perspective.* Third edition, Pearson, 2017.

2. Ferraguto, G.. *Macroeconomics. Problems and Questions.* Third Edition, Egea.