Macroeconomics 2 – Exam – Regular Season
7 June 2024
3-5pm

Please use four separate answer sheets, one for each group of questions, and write your name and student number in all of them.
You may use a one-page, one-sided, handwritten formulae sheet, containing formulae only.
You may use a calculator as long as it does not have any external communication capabilities.

Read the questions carefully and answer them succinctly, and do not forget to provide any theoretical explanations or commentaries that may be requested.

Group 1 (7 points)

Consider an economy which behaves in accordance with the hypotheses of the Solow model and which is adequately described by the following Cobb-Douglas production function:

$Y = 0{,}4.K^{\alpha}.L^{1-\alpha}$

In this economy, the partial elasticity of output with respect to labour equals 0.6. Moreover, the annual growth rate of the population (and of the labour force) is 0.6%, while the investment rate is 22% and the depreciation rate of physical capital is 4%.

1.1 (2 points) What are the steady state values of the physical capital stock per worker and of GDP per worker?

1.2 (2 points) Between 2013 and 2023, the level of GDP of this economy increased from 173 billion euros to 192 billion euros. Considering the annual growth rate of the labour force indicated above, was the economy in question above or below the steady state in this period? Justify your answer.

1.3 (1 point) Describe the expected long-run trajectory of this economy according to the hypotheses of the Solow model.

1.4 (2 points) Discuss to what extent economic growth models such as Solow's – which analyse the economy as a whole and do not consider its sectoral composition – can account for the full range of factors which drive economic growth. Provide examples based on the evolution of the Portuguese economy in the last few decades.

Group 2 (4 points)

2.1 (2 points) Define industrial policy and provide three examples of policy instruments typically used in its implementation.

2.2 (1 point) Indicate two reasons why, in the last few years, industrial policy has once again acquired greater centrality and legitimacy in the economic and political debate.

2.3 (1 point) Explain why it is that the choice of the social discount rate has such a relevant impact upon the conclusions of different economists when it comes to policies to address climate change.

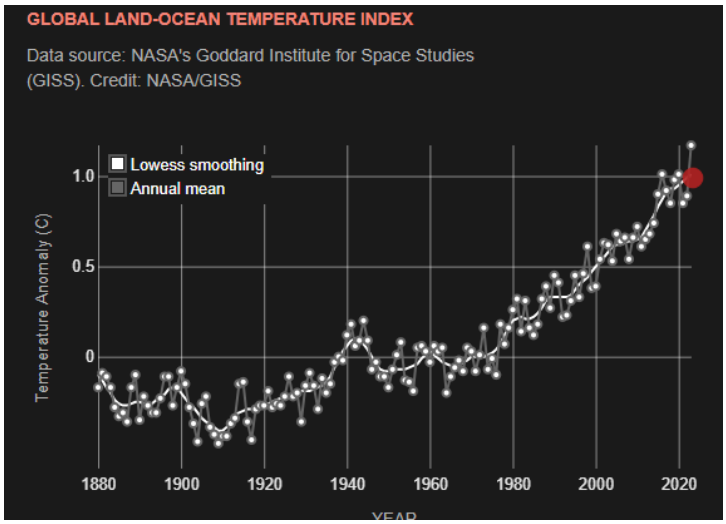
Group 3 (5 points)

3.1 (3 points) The government of country X has adopted a plan to fight poverty based on increasing the average old-age pension by 15% next year, in the context of a pay-as-you-go social security system which is currently in balance (revenues equal expenditures). It is known that the number of old-age pensioners will increase by 7% next year due to population ageing and it is expected that the average wage will increase by 2%. The ratio of employed workers to the total population will increase by 3% and the total population itself will also increase by 3%.
Assuming that the government does not change the social security contributions rate levied on wages, what part of the necessary increase in the revenues of the social security system must come from the State Budget, if the system is to remain in balance?

3.2 (2 points) Addressing poverty requires structural changes in the economy and society. If you had to write a report focusing on two measures that you believe would have the greatest impact on poverty in the short run, which measures would you choose and why?

Group 4 (4 points)

The following graph published by NASA shows the evolution of the Global Land-Ocean Temperature Index over time.



4.1 (2 points) What conclusions may be drawn with respect to the evolution of global temperature and what measures may be taken to address the question of the climate and environmental crisis?

4.2 (2 points) It is an established fact that a temperature increase by more than 1.5.°C-2°C will bring about serious problems of sea-level rise with devastating consequences for coastal regions and communities. Indicate some of those potential societal consequences, especially for the populations of developing countries.