**Reseat Exam, Macroeconomics 2 - answers**

4th July 2022

12noon-2pm

* Carefully read the questions and briefly answer each item.
* Whenever you are asked, provide the economic explanation of the calculations you have developed. This explanation will be one of the most valued parts of the answer quote.
* You can use the A4 page form, prepared by you, exclusively with formulas on the subject.
* You can use a calculator that does not have external communication

**Group 1 (4 marks)**

Economist Mariana Mazzucato, in her book “Mission Economy”, defends the need to replicate now the strategy that allowed the Apollo voyage to the Moon:

*“'moonshot' thinking is about setting targets that are ambitious but also inspirational, able to catalyse innovation across multiple sectors and actors in the economy. It is about imagining a better future and organizing public and private investments to achieve that future”.*

Large projects, based on planning the intensive use of public and private resources to create a product or transform existing technology, such as the Concorde plane, the tunnel under the English Channel, the TGV, the Covid19 vaccine and others, are examples of success of this approach. But there are also failures, such as in climate change mitigation.

1- (2 marks) Briefly present a favorable argument and an unfavorable counter-argument about the Apollo strategy advocated by Mazzucato. Present, also briefly, your own conclusion on the controversy.

**Answer:**

**Favorable arguments: promotion of innovation applied to important problems, with the creation of scientific and technological capacity, concentration of resources that may be indispensable, creation of teams with the necessary size and knowledge, and mobilization of priorities. A recent example is the COVID vaccine. Arguments that have been presented as disadvantages, particularly in the context of neoclassical economics: there may be a crowding-out effect on private investment, an increase in risk, or an impact on public accounts. However, these arguments do not contradict the response to emergencies nor the unique ability of such projects to plan medium and long-term projects, like those that have been at the center of industrial revolutions (such as the internet, smartphones, or other communication technologies). The response to the environmental crisis is a fundamental example of the need for Apollo-type projects: there is no other way to achieve results that, in due time, restructure production and consumption systems. If the market decides on environmental responses, with its short-term capital accumulation effects, it will not be possible to implement coherent measures to mitigate and respond to climate change. The same applies to other dimensions of economic life.**

2- (2 marks) Can this kind of “Mission Economy”, driving investment, be a response to a cyclical downturn? Briefly discuss the issue in the context of the situation following the 2020-1 recession.

**Answer: It can be a response to a recession. In the case of COVID, the significant public investment or funding for the vaccine was crucial for its realization and development. It would not have occurred within the timeframe achieved without this investment. More generally, during a recession, the incentive for private investment is lower, which can create domino effects that worsen the decline in aggregate demand. Therefore, short-term measures (consumption, or support for wages, pensions, or tax and other aids) and structural measures (public investment, particularly in Apollo-type projects) are essential. The way to combat a recession is to stimulate aggregate demand, which typically only the State can achieve.**

**Group 2 (6 marks)**

In economy A, the aging rate, i.e. the weight of the number of retirees as a proportion of the total population, increased by 1.5% in 2021. We also know that productivity grew by 2% and GDP per capita decreased by 1.2% in that same year.

1- (2 marks) What was the growth rate of the ratio between total employment and the number of retirees? Briefly explain any social factor that may have caused this evolution.

**Answer:** $\frac{Y}{N}=\frac{Y}{L}\frac{L}{Nr}\frac{Nr}{N}$

**N: total population**

**L: total employment**

**Nr: total number of retirees**

$\frac{Y}{L}$**: productivity**

$\frac{L}{Nr}$**: ratio of employed people over retired people**

$\frac{Nr}{N}$**: share of retirees in total population**

$r\left(\frac{Y}{N}\right)=r\left(\frac{Y}{L}\right)+r\left(\frac{L}{Nr}\right)+r(\frac{Nr}{N})$ **⬄ -0,012 = 0,02 +** $r\left(\frac{L}{Nr}\right)$ **+ 0,015 ⬄** $r\left(\frac{L}{Nr}\right)$ **= -0,047**

**Several factors can explain this decrease in the ratio of employed people over retired people: population ageing (lower birth rates and higher life expectancy), emigration, an increase in average schooling years, etc.**

2- (3 marks) If, in this economy, the social security system is financed exclusively by a 33% fee on the salary, if that 33% rate remains unchanged, and if the only expense of the social security system is the payment of old-age pensions, by how much should the average salary change so that the average pension can be increased by 3.5%? Explain your economic reasoning.

**Answer:**

**Since w.L.b = P.Nr, we have: r(w) = r(P) – r(**$\frac{L}{Nr}$**) – r(b), where b is the rate of contribution to Social Security, w is the average wage and P is the average pension.**

**In order to have r(P) = 0,035:**

**r(w) = 0,035 – ( – 0,047) – 0 = 0,082 or 8,2%**

**Since the ratio of employed people to retired people has declined and the rate of contributions to Social Security has not changes, the only possibility for raising the average pension and maintain the equilibrium between revenues and expenditures of the Social Security system is to increase the revenue side of the system by raising the average wage.**

3- (1 mark) In the context of a recession, should the State reduce pensions in order to reduce the deficit and the long-term effect on public debt? Briefly discuss this option.

**Answer: there are reasons to believe that this would not be an adequate approach. On the one hand, reducing the average pension may increase income inequality in this country. On the other hand, it reduces household disposable income and therefore reduces aggregate demand, which could worsen the economic crisis. In Portugal, it is worth noting that decreasing pensions is unconstitutional.**

**Group 3 (6 marks)**

The government of country A, whose economy behaves according to the Harrod-Domar model, has set a target for its country's GDP to increase from 200 billion currency units in 2021 to 240 billion c.u. in 2026.

1. (2 marks) If over these five years the savings rate is 14% per year and the average productivity of physical capital is equal to 0.2, show that the government's objective cannot be achieved.

**Answer:**

**s = 0,14**

**v =** $\frac{1}{0,2}$ **= 5**

$\frac{s}{v}$ **=** $\frac{0,14}{5}$ **= 0,028, meaning that** $g^{w}$ **will, at best, be equal to 0,028 (if δ=0; it cannot be negative)**

**Therefore: 200 x** $(1+0,028)^{5}$ **= 229,6 ( < 240)**

2. (2 marks) If the capital-output ratio is 4 and the depreciation rate is 3%, calculate what the minimum investment rate needed to ensure the government's objective should be.

**Answer:**

$(\frac{240}{200})^{\frac{1}{5}}$ **– 1 = 0,037**

$g^{w}=\frac{s}{v}-δ$ **⬄ 0,037 =** $\frac{s}{4}$ **– 0,03 ⬄ s = 0,268**

3. (2 marks) Briefly explain the differences between the Harrod-Domar and Solow models with regard to: i) the production functions that underlie them; and ii) the implications of these production functions for the productivity of physical capital.

**Answer: The Harrod-Domar model is based on a Leontief production function (a function with fixed coefficients), which assumes complementary production factors and implies that the productivity of physical capital is constant (it is the inverse of the capital-output ratio). The Solow model is based on a Cobb-Douglas production function, which assumes substitutable production factors and implies that the productivity of physical capital varies (decreases) as capital intensity increases.**

**Group 4 (4 marks)**

On 17 June 2022, the World Trade Organization approved a compromise text between India and South Africa, and other countries of the South, and the European Union, the USA, Switzerland and the United Kingdom, determining the possibility of countries under pressure from the pandemic to provisionally limit patent rights on Covid19 vaccine and produce the drug. The proposal had been presented two years ago. Proponents welcomed the agreement, but there were voices condemning the delay in this decision.

1. (2 marks) “Respect for the right to patent is the guarantee that protects investment in research”. Discuss this conclusion and present a possible alternative to the patent system, in order to boost scientific research and its applications.

**Answer:**

**The argument about patent guarantees has been refuted by experience, including the debate at the WTO on the suspension of the COVID patent. It was a late decision with little practical effect, two years after both the U.S. government and the European Commission had announced they accepted the proposal. However, it still showed the necessity to promote the dissemination of the vaccine at an affordable price, which required lifting the patent, especially since the investment and a significant part of the basic research originated from public institutions. The previous experience with HIV medications had already demonstrated the importance of this decision.**

**Furthermore, the history of emerging economies highlights the importance of policies promoting access to essential technologies and products, which the now-developed economies used in the past. If the patent system protects private companies, this incentive can be replaced by other forms of financing when the public interest prevails.**

2. (2 marks) Indicate advantages and disadvantages of patents in the context of an industrial policy.

**Answer:**

**Assignment of exclusive rights for use and/or licensing of use and production involves the payment of a fee supposedly equivalent to compensation for innovation costs (research effort + uncertainty and risk). This is supposed to promote innovation by rewarding innovators.**

**However, it fosters artificial rigidity/scarcity in access to knowledge, generating unproductive rents that are often unjustifiable due to other public measures supporting innovation (such as public investment and subsidies for research and production of COVID vaccines) and other market advantages (scale, control of production chains, access to finance and/or naturally protected markets, as seen with multinationals and again with the COVID vaccines).**

**An industrial policy explicitly directed at specific technologies, industries, and markets (such as subsidies, links between research centers and industry, and state procurement) can operate more effectively and efficiently than patents, without their associated risks, uncertainties, and rent-seeking behavior.**