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## **Macroeconomic Policies**

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**Resit Exam** (20 June 2022)

### **I (4.5 points)**

Define ***three*** of the following concepts (3-5 lines each):

- i) Level effect vs growth effect
  
  
  
  
  
  
  
  
  
  
- ii) The financing gap (Harrod-Domar equation)
  
  
  
  
  
  
  
  
  
  
- iii) The theory of liquidity preference
  
  
  
  
  
  
  
  
  
  
- iv) Expectations-augmented Phillips curve
  
  
  
  
  
  
  
  
  
  
- v) Dynamic aggregate demand

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#### IV (2.5 points)

*In the following questions, choose the only correct answer. Answering correctly yields 0.5 points, wrongly -0.125.*

1. Differences in per capita output across countries cannot be explained by differences in saving rates because: (i) real interest rates are not that high in poor countries; (ii) the elasticity of capital in the production function is too small; (iii) capital does not flow from rich countries to poor countries; (iv) all the above.
2. Comparing to the first best, under tax evasion, a benevolent planner will set: (i) a higher tax rate on the liable input and the same level of public provision; (ii) a lower tax rate on the liable input and lower public provision; (iii) the same tax rate on the liable input and lower public provision; (iv) none of the above.
3. When banks are constrained on capital, an expansion in domestic credit may be achieved with: (i) a decrease in reserve requirements; (ii) a decrease in the marginal deposit facility; (iii) a purchase of distressed assets from banks by the central bank; (iv) all the above.
4. A monetary expansion will fail to produce real effects in the following case: (i) Rational expectations and menu costs, if anticipated; (ii) flexible prices and adaptive expectations; (iii) inconsistent equilibrium under discretion and flexible prices; (iv) none of the above.
5. The Phillips curve will be flatter: (i) the lower the proportion of firms with menu costs; (ii) the higher the fiscal multiplier; (iii) the greater the recent experience with price stability; (iv) none of the above.

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## II (13.0 points)

For this group, questions II.A, d), e) and g) are mandatory. Among the other 2, namely f) and h), choose 1.

**II.A (Growth)** Consider an economy where the production function is given by  $Y = AK$ . In this economy, the government imposes a tax on production  $tY$ . The population is constant, capital does not depreciate, and initially  $A = 1/4$ .

- a) Assume first that government revenues are wasted in consumption. (a1) Describe the main income identities of this economy and place them in a flow income chart. (a2) Assuming  $s = 0.28$ , examine the impact of an increase in the tax rate from  $t = 0$  to  $t = 1/4$  on the growth rate of per capita income. (a3) Which other phenomena, apart from taxes, can be captured by parameter  $t$ ?
- b) Assume now that households were able to optimise consumption according to  $\gamma_t = r_t - \rho$  with  $\rho = 0.18$ . (b1) Explain the underlying assumption. Find out the growth rate of per capita income when (b2)  $t = 0$ , (b3)  $t = 1/4$ . (b4) Based on this exercise, explain why bad policies are more likely to be tolerated in poor countries than in rich countries.
- c) Consider now the case with  $A = G/Y$ , where  $G$  is a publicly provided good, financed with a tax on production (that is  $G = tY$ ) (c1) Find out the actual production function in this economy. (c2) Explain why there is a market failure; Find out the optimal levels of the: (c3) tax rate; (c4) public provision. (c5) Describe, with the help of a graph, how the benevolent planner choice would change if waste in public administration,  $\varphi$ , increased.

**II.B (Keynes)** Consider a closed economy where the labour supply is inelastic at  $N^S = 100$ . In this economy, the production function and aggregate demand are given, respectively, by  $Q = zN$  with  $z = 1$ , and  $Q^d = \left(\frac{M}{P}\right)^2$ . Assume that, initially,  $M = 10$ .

- d) (**Baseline**) Assuming perfect competition and flexible prices, find out the equilibrium levels of (d1) output (i.e. full employment) and the real wage rate. Analyse the effects of an increase in the labour supply to  $N^S = 121$  on (d2) employment, (d3) the real wage and (d4) output, by quantifying and graphically describing them in the labour and output spaces.
- e) (**Transmission mechanism**) Assume now that nominal wages are sticky at  $\bar{W} = 1$ . Go back to the case where  $N^S = 100$  and consider a market for goods and services described by private savings,  $S^P = 0.25(Q - T) - 1/10r$ , government savings,  $S^G = T - G$ , and investment,  $I = 3/20r$ . The money market equilibrium condition is  $\frac{M}{P} = \left(\frac{Q}{r}\right)^{0.25}$ . Initially, consider  $G = T = 0$ . (e1) Find out the expression for aggregate supply and describe it graphically. (e2) Show that aggregate demand is indeed  $Q^d = \left(\frac{M}{P}\right)^2$ . Examine the implications of a monetary

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contraction from  $M = 10$  to  $M = 8$ , by quantifying and graphically describing what happens in (e3) the labour market, (e4) the P-Q locus and (e5) in the money market.

- f) **(Fiscal policy)** Departing from the equilibrium under  $M=8$  in e), suppose that the government uses a balanced budget  $T=G$  to reach full employment. (f1) Find out the new AD curve, as a function of  $G$ . (f2) Compute the required  $G$  and represent the new equilibrium in the AD-AS graph. (f3) Describe graphically the adjustment in the money market and quantify the new interest rate. Explain. (f4) Describe the adjustment in the I-S diagram and compute the new investment level. Explain what happened to investment. (f5) Describe with the help of a graph the adjustment in the labour market.

**II.C (AD-AS)** Consider a closed economy described by a (i) Phillips curve,  $\pi = \pi^e + 0.002(q - q_n)$ ; (ii) a market for goods and services,  $q = \bar{A} - 500r + \varepsilon$ ; and (iii) a Taylor rule,  $i = \bar{i} + 2(\pi - \bar{\pi})$ . Potential output is  $q_n = 100$ , the interest rate target is  $\bar{\pi} = 2\%$ , and autonomous spending is  $\bar{A} = 125$ .  $\varepsilon$  is a zero-mean stochastic process.

- g) Find out (g1) the natural real interest rate in the economy. (g2) Which equilibrium nominal interest rate,  $\bar{i}$ , should the central bank target? (g3) Find out the expression for aggregate demand and explain it.
- h) **(Shock)** Imagine there is a one-period shock of  $\varepsilon = 50$ . Analyse the short and long run impact of the shock when (h1) inflation expectations are anchored at  $\pi^e = \bar{\pi}$  and (h2) consumers have adaptative expectations, i.e.  $\pi^e = \pi_{t-1}$ . (h3) What if the shock was permanent? Use graphical analysis to explain your answer. (h4) Given the central bank's mandate to keep inflation at target, should it respond to the shock in the permanent case and, if so, how? Quantify and use graphical analysis.