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International Macroeconomics

Nova SBE – Spring 2025 Miguel Lebre de Freitas, Tomás Falua Duarte Midterm Assessment 11/04/2025 – Duration: 2h00

I (4.5)

*Define <u>three</u> of the following concepts (3-5 lines each):*i. World equilibrium interest rate

ii. Price level indeterminacy

iii. Short-Term Deviations from relative PPP

iv. Nominal vs Real exchange rate

v. Convertible vs non-convertible currency



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IV (2)

In each question, choose one (correct answer: +0.5; wrong answer: -0.125):

- 1. All else equal, a country' NIIP improves when: (i) the risk premium of its sovereign debt increases; (ii) there is a surplus in the financial account; (iii) the stock market in that country improves; (iv) all the above.
- 2. When the degree of impatience decreases: (i) investment remains unchanged if the economy is open; (ii) investment decreases if the economy is closed; (iii) the interest rate increases if the economy is closed; (iv) none of the above.
- 3. All else equal, if two countries differ in terms of productivity in the tradable good sector, the one with lower productivity will exhibit: (i) a lower price of the tradable good when adjusted for currency differences; (ii) a higher price of the non-tradable good when adjusted for currency differences; (iii) a lower nominal wage rate when expressed when adjusted for currency differences; (iv) all of the above.
- 4. A solvency crisis in the domestic banking system will cause: (i) an exchange rate appreciation under float; (ii) an expansion of the money supply under fix; (iii) a reduction of the backing ratio under fix; (iv) none of the above.

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II (13.5)

Please present the results with, at most, 3 decimal places. Each subgroup (2A, 2B and 2C) must be answered in a different sheet.

II.A. Consider New New England, an economy with a single, homogeneous good. In this economy, the production function is given by $Q_t = 20K_t^{0.5}$, the initial capital stock is $K_1 = 225$, and $\delta = 1$. The representative consumer lives for two periods, with preferences represented by $U = C_1C_2$. Further assume that there are **no initial assets nor liabilities**. This economy is **open to capital flows** and faces a world interest rate of $r^* = 25\%$.

- a) Considering the information regarding New New England, determine:
 - (a1) The optimal investment in period 1
 - (a2) The net present value of investment
 - (a3) The lifetime wealth
 - (a4) The optimal consumption path
 - (a5) The trade balance in periods 1 and 2.
 - (a6) The NFIA in periods 1 and 2
 - (a7) The current account in periods 1 and 2

(a8) How would the economy respond in the presence of an **increase in the world interest rate**? Answer **without resorting to calculations**

- b) After elections, New New England appoints a new President, Donny Trumpet, who is against open borders and turns New New England into a **closed economy**. Determine:
 - (b1) The production possibilities frontier
 - (b2) The optimal consumption path
 - (b3) The optimal investment in period 1
 - (b4) The autarky interest rate
 - (b5) Is the economy better off compared to a)? Comment on the differences

 $II.A = 20VK_t K_1 = 225 S = 1 U = 4(z b_0 = 0 n^* = 0.25)$

(a1) Agent's Solve $\max V_1 = -K_2 + \frac{\alpha_2}{1+n} = -K_2 + \frac{20\sqrt{K_2}}{1+n}$ $F_{r}O_{r}C: \frac{\partial V_{1}}{\partial K_{2}} = 0 = s - 1 + \frac{20}{1 + n} \cdot \frac{1}{2\sqrt{k_{2}}} = 0 = s \frac{10}{\sqrt{k_{2}}} = 1 + n = s \frac{10}{\sqrt{k_{2}}} = 1.25 = s$ $E > K_2 = 64$ $S = 1 = > I_1 = K_2 = 64$ $\begin{array}{l} (A_2) \\ \hline \textbf{L}_{0:3} \end{array} V_1 = -k_2 + \frac{\sigma_2}{1+n} = -64 + \frac{20\sqrt{64}}{1+0.25} = -64 + \frac{160}{1.25} = 64 \\ \end{array}$ $\begin{array}{l} (a3) \ \mathcal{N} = \ 0 \ 1 + v_1 = 20 \ \sqrt{225} + 64 = 300 \ + 64 = .364 \\ \begin{array}{l} \textbf{\Sigma}_{0.3} \end{array} \end{array}$ (a4) Agent's Solve mox U = G(2 S.t. J2 = G + C2 3G, 64 of the optimum, $C_1 = \frac{1+p}{2+p}$, $C_2 = \frac{1}{2} \times 364 = 182$ $C_2 = \frac{1+n}{1+p}$ $C_1 = \frac{1.25}{1} \times 182 = 227.5$ (a5) $TB_1 = Q_1 - Q_1 - I_1 = 300 - 182 - 64 = 54$ $TB_2 = Q_2 - C_2 - I_2 = 160 - 227 - 5 = -67.5$ $\begin{array}{c} (a6) \\ 5_0 = 0 \\ 5_1 = (1+n^*)b_0 + TB_1 = 0 + 54 = 54 \end{array}$ $NFIA_1 = n^{t}b_0 = 0$ $NFIA_2 = n^{t}b_1 = 0.25 \times 54 = 13.5$ (a+) $CA_1 = TB_1 + NFJA_1 = 54+0 = 54$ $CA_2 = TB_2 + NFJA_2 = -67.5 + 13.5 = -54$ (a.8) An increase in no will cause investment to fall, reducing K2. Thus, Q2 falls, Lo.3) An increase imports V1 and -12. To smooth out this shock, the home economy will link more. Consuption in period 1 falls, consuption in period 2 increases. Estudints one expected to briefly explain the import channels and draw conclusions based on the specific economy in the exercise]

(1)
$[1.5] [0.3] Q_1 = (1 + I_1) = S Q_1 = (1 + K_2) = S K_2 = Q_1 - (1 + S) K_2 = 300 - (1 + K_2) = S K_$
$Q_2 = C_2 = C_2 = 20 \sqrt{k_2} = 20 \sqrt{k_2} = 20 \sqrt{300 - k_1}$
(62) Agent's Solve MAXU= (162 S.t. 62=20V30-1 E) 34,64
(=) MAX (120 V300-4) 344
$\frac{1}{2\sqrt{3}} = 0 = 3 \ 20\sqrt{3} = -4 + (4 \cdot 20) = -1 = 0 = 3 \ 20\sqrt{3} = -4 = -10 = -4 = 3$
(=) ZO(300-4) = 10(4 (=) 6000 - 20(4 = 10(4 (=) 30(4 = 600))) = 600 (=) (1 - 20))
$(2 = 20\sqrt{300 - 200} = 20\sqrt{100} = 200$ $I_1 = K_2 = 300 - 200 = 100$
$ \begin{array}{c} (64) \\ \hline 1 + n^{*} = MPK = 3 \\ \hline 1 + n^{*} = \frac{10}{\sqrt{k_{z}}} = 3 \\ \hline 1 + n^{*} = \frac{10}{\sqrt{100}} = 3 \\ \hline 1 + n^{*} = 1 = 3 \\ \hline n^{*} = 0 \\ \hline n^{*} = 0$
$[0.3]$ Im a): $U_{1} = C_{1}C_{2} = 182 \times 227.5 = 41405$
$(11) \qquad $
Although C, and I, increase, agent's decrease their concomption in period 2
period.
L'étuits are free to auxun in diffecut ways, as longe as it is the
win the question and the concorte exercise?



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II.B. The small open economy of ACEDECEE, led by Mr. Johnson, has two sectors, a **tradable** (**T**) and a **non-tradable** (**N**). The production functions are given as: $Y_T = aL_T$ and $Y_N = bL_N$. Initially, a = 8 and b = 2. The nominal exchange rate is set at e = 4. Furthermore, assume that each price weights 50% in the consumer price index [the CPI is given by $P = P_T^a P_N^{1-a}$], that $P^* = 1$ and $P_T^* = 1$.

- c) Assuming that firms maximize profits, find:
 - (c1) The labour demand equations for both sectors.
 - (c2) The price of tradables
 - (c3) The nominal wage rate
 - (c4) The price of non-tradables
 - (c5) The price level
 - (c6) The real exchange rate
- d) Mr. Scott, former resident of ACEDECEE, thunderstruck the foreign economy with policies that caused an inflation surge, leading to a rise in the foreign price level to $P^* = 2$ and the international tradable price level to $P_T^* = 4$. Determine:
 - (d1) The price of tradables
 - (d2) The nominal wage rate
 - (d3) The price of non-tradables
 - (d4) The price level
 - (d5) The real exchange rate. Does the relative and/or the absolute PPP hold in this case?
 - (d6) The real wage rate
- e) **Departing from e**), assume now that the goal of <u>Mr.</u> Johnson was to **keep the domestic price level constant at the level found in (c5)**. Calculate:

(e1) The nominal exchange rate

(e2) The real exchange rate. Comparing with d), does the relative and/or the absolute PPP hold? Why?

(e3) The real wage rate. Compare to the value in (d6). In which case are workers better off? Explain

$$\begin{split} \blacksquare B \quad Y_{T} = 8L_{T} \quad Y_{N} = 2L_{N} \quad x = 4 \quad x = 0.5 \quad P^{*} = 1 \quad P_{T}^{*} = 1 \\ \begin{array}{c} (2) \\ (21) \\ [21] \\ [22] \\ [23] \\ [24] \\ [24] \\ [24] \\ [24] \\ [24] \\ [24] \\ [24] \\ [24] \\ [24] \\ [24] \\ [24] \\ [24] \\ [24] \\ [24] \\ [25] \\$$

(e3)
$$\frac{\omega}{p} = \frac{32e}{8} = \frac{32}{8} = 4$$
 Sine as in (d6), workers are as well off.
Although Mominal wages fell, the price level also beened.
No real import on real wages.



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II.C. Consider the open economy of Big-Bang, where the central bank follows a **flexible exchange** rate regime. In Big-Bang, the real money demand is given by $m^D = \frac{Y}{20i}$, the foreign price level is $P^* = 1$, the real interest rate is 5%, both the Fisher principle and PPP hold in each moment in time, and the money supply grows at 20% every year. Further assume that, at time t, M = 648, $eB_{CB}^* = 598$ and Y = 432.

- f) Considering the information on Big-Bang, at time t:
 - (f1) Find the inflation rate
 - (f2) Find the nominal interest rate
 - (f3) Find the real money demand
 - (f4) Find the price level
 - (f5) Find the nominal exchange rate
 - (f6) Describe the money market equilibrium in a graph
- g) Suppose that Sheldon, the president of the central bank, decided to stop inflation by fixing the nominal exchange rate at a value of e = 1, at time t. Determine:
 - (g1) The nominal interest rate
 - (g2) The real money demand
 - (g3) The price level
 - (g4) The endogenous money supply
 - (g5) Draw the central bank balance sheet. Explain the change in foreign reserves
 - (g6) Comment on the pros and cons of this policy
 - (g7) Draw the time paths for:
 - (g7.1) The nominal interest rate
 - (g7.2) The real money demand
 - (g7.3) The price level
 - (g7.4) The money supply
- h) **Departing from g**), assume that the head of the Big-Bang government, Leonard, asks for financing from the central bank to cover recurring deficits. This causes **domestic credit to grow at 20%** per year, while the **central bank tries to hold the peg at** e = 1. Assume also that agents are rational and have perfect foresight.
 - (h1) Determine the real money demand after the peg breaks

(h2) Determine the timing of the speculative attack. Draw the central bank balance sheet after the attack

(h3) Why is the speculative attack not sooner or later? Explain the reasoning behind agent's actions regarding the speculative attack and its timing (no need for calculations or graphs)

 $\underline{T.C} \quad M^{d} = \frac{\gamma}{20i} \quad P^{*} = 1 \quad n = 5\gamma, \quad \mu = 20\gamma, \quad M_{t} = 648 \quad \ell B^{*}_{CB_{t}} = 548 \quad Y = 432$



