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The Global Economy II

Nova SBE – Spring 2024

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Exam 22/05/2024 – Duration: 2h00

I (4.5)

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

i. Vehicle Currency: Currency that is accepted as means of exchange in bilateral currency markets, taking opportunity of its higher liquidity vis-a-vis the other currencies.

ii. Carry Trade: Risky activity consisting of borrowing in a low interest rate currency to invest in a high interest rate currency. The expected return, consisting in the deviation from UIP, can be interpreted as the reward of the risk taking.

iii. Degree of Pass-Through: How much (in percentage points) the real exchange rate varies in response to a variation in the nominal exchange rate. It depends on pricing practices, market competition and the weight in non-tradable goods.

iv. Original Sin: Inability of a country to borrow internationally in its own currency, due to credibility concerns on the part of the lender. This may give rise to excessive exposure to Exchange rate risk and fear of floating.

v. The Euro Trilemma: Argument stating that member states can only have 2 of the following: national sovereignty; democracy; monetary union. According to this argument, preserving the monetary union with democracy implies moving towards a fiscal union.

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IV (2)

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

a. Consider an agent that is to receive 1000 USD **in one year time** but needs the money today in domestic currency. The agent expects the future exchange rate, $E(e)$, to be higher than $\frac{e(1+i)}{(1+i^*)}$. Assume that the interest rates on loans and on deposits are equal. If the agent is risk neutral, he should: (i) engage in spot speculation, borrowing from abroad; (ii) sell the foreign currency at the forward exchange rate; (iii) borrow in home country and not cover the exchange rate risk; (iv) none of the above.

b. Under sticky prices, a temporary increase in the foreign demand will: (i) increase output and increase the nominal interest rate under float; (ii) have no impact on the nominal interest rate under fix; (iii) have no impact on domestic credit under float; (iv) all the above.

c. Suppose that the equilibrium in the AA-DD model corresponds to the kink of the AA curve (that is, we are under a liquidity trap). If the authorities want to increase the output level, they can implement (i) a temporary monetary expansion under float; (ii) a temporary fiscal expansion under float only if the Marshall-Lerner Conditions holds; (iii) a permanent fiscal expansion under fix; (iv) all the above.

d. The FIX line will be more on the right for countries: (i) with high incidence of inflation; (ii) that borrow in domestic currency; (iii) mostly engaged in intra-industry trade; (iv) all the above.

Solutions: iii; iv; iii; ii.

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II (13.5)

Please present the results with, at most, 2 decimal places.

II.A. Consider an economy with **sticky prices** under **float**, where the interest rate parity holds instantaneously, and PPP holds in the long run (one year time). The demand for real money balances is given by $m^D = \frac{Y}{5i}$, where $Y = 200$ refers to output (constant). The foreign price level is constant and equal to 4.

a) Assume initially that $M = 800$ and that $i = i^* = 5\%$. Describe the initial equilibrium:
(a1) Real Money Demand
(a2) Price Level
(a3) Nominal Exchange Rate.
(a4) Represent graphically the equilibrium in the money market and in the foreign exchange market.

b) Assume now that the central bank contracts the money supply on a **temporary** basis, such that $M' = 400$.
(b1) Compute the impact on the domestic interest rate and on the nominal exchange rate.
(b2) Explain the mechanism with the help of a graph.

c) Assume now that the shift in the money supply was **permanent**.
(c1) Quantify the short run effects on the nominal exchange rate, on the nominal interest rate and on the price level.
(c2) Quantify the long run effects on the nominal exchange rate, on the nominal interest rate and on the price level.
(c3) Describe graphically the short and long-term implications of the shock. Explain the intuition, comparing with the equilibrium in (b2).

II A $m^D = Y/5i$ $Y = 200$ $P^* = 4$

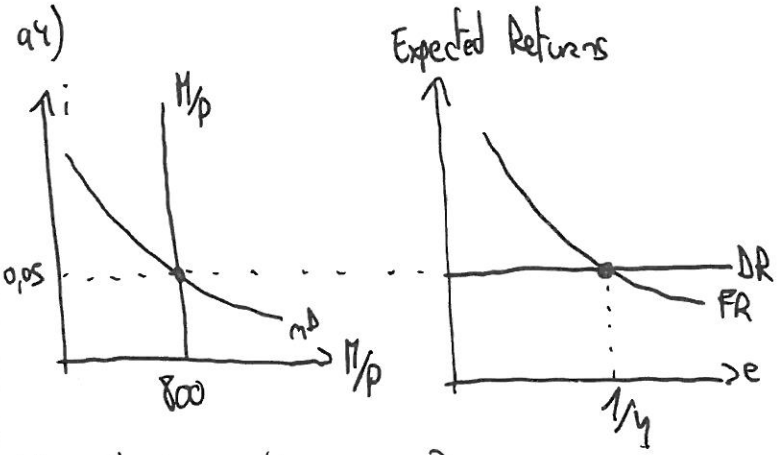
a) $M = 800$ $i = i^* = 0,05$

a1) $m^D = Y/5i = \frac{200}{5 \times 0,05} = 800$ a2) $M/P = m^D \Leftrightarrow P = \frac{M}{m^D} = \frac{800}{800} = 1$

a3) Since $i = i^*$, then $e = E^e$ (UIP: $i = i^* + \frac{E^e}{e} - 1$).

$e = E^e = P/P^* = 1/4$

a4)



b) $M' = 400$ (Temporary)

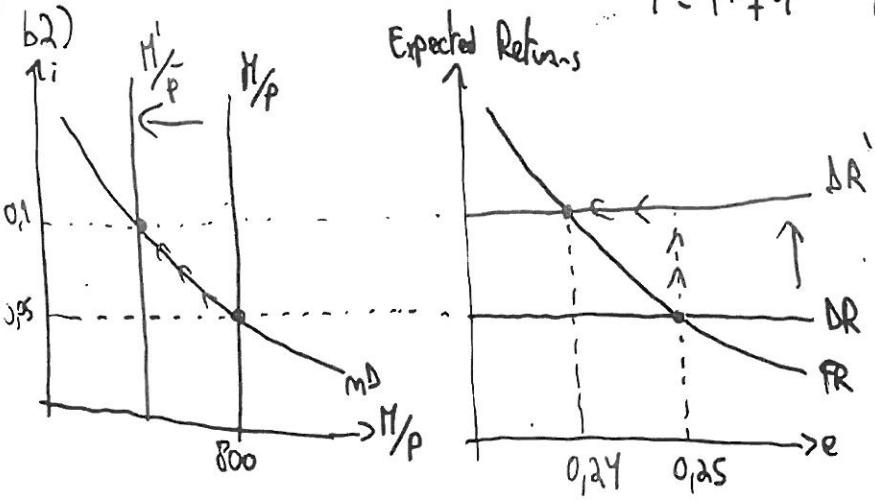
b1) Since this is a temporary shock, prices will not need to adjust in the long-Run, such that expectations don't change.

Short-Run equilibrium:

$m^D = M'/\bar{P} \Leftrightarrow \frac{\bar{Y}}{5i'} = \frac{400}{1} \Leftrightarrow \frac{200}{5i'} = 400 \Leftrightarrow 5i' = \frac{200}{400} \Rightarrow i' = 0,1$

UIP: $i = i^* + \frac{E^e}{e} - 1 \Leftrightarrow e' = \frac{\bar{E^e}}{i' - i^* + 1} = \frac{1/4}{0,1 - 0,05 + 1} \simeq 0,238 \simeq 0,24$

b2)



The temporary monetary contraction will ↑ the domestic interest. This ↑ DR above FR, thus ↑ the demand for domestic currency, ultimately appreciating the exchange rate.

In the long-Run, $M = 800$, so we return to the initial equilibrium.

c) $M' = 400$ (permanent)

With a permanent shock, prices will need to adjust in the long-Run to ensure that $i = i^*$. Hence, expectations, through PPP, will change.

c2) Long-Run equilibrium:

$Y = 200$, $i = i^* = 0,05$ $\Rightarrow$ $m^D_{LR} = \frac{Y}{5 i^*} = \frac{200}{5 \times 0,05} = 800$. $P_{LR} = \frac{M'}{m^D_{LR}} = \frac{400}{800} = 1/2$

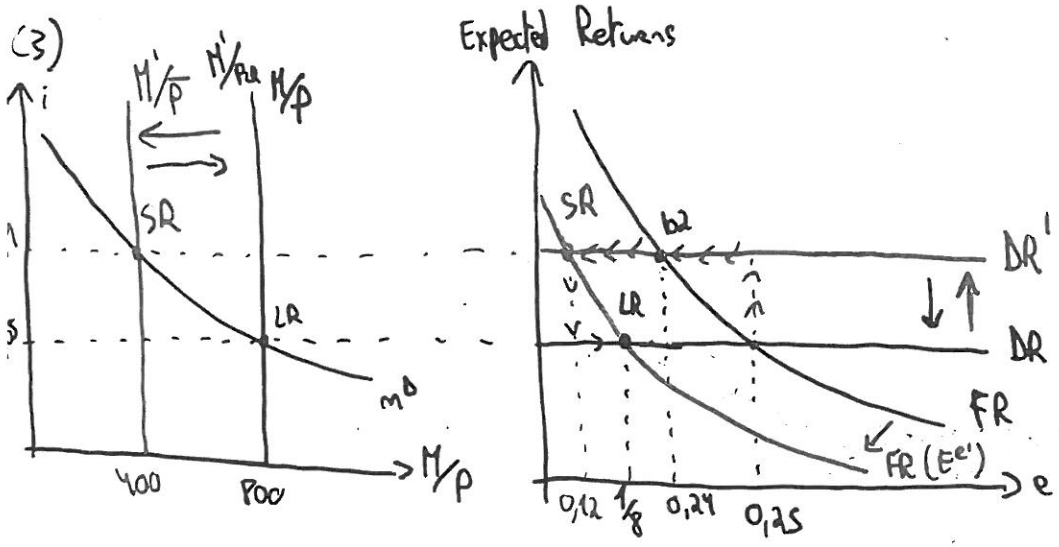
$E^{e'} = \frac{P_{LR}}{P^*} = \frac{1/2}{4} = 1/8$ Prices will ↓, and the expected exchange rate will appreciate.

c1) Short-Run equilibrium:

$m^D = \frac{M'}{P} \Rightarrow i' = 0,1$. UIP: $e' = \frac{E^{e'}}{i' - i^* + 1} = \frac{1/8}{0,1 - 0,05 + 1} \simeq 0,119 \simeq 0,12$

The interest rate ↑, prices are sticky, and the exchange rate appreciates.

c3)



The permanent shock will force prices to adjust in the LR, altering expectations. This makes the spot overshoot its new long-Run value in the short-Run equilibrium. This did not happen in b2), as expectations were unchanged, such that the initial equilibrium was restored in the long-Run. With the overshooting, the exchange rate appreciates more than it did before in the short-Run, while its long-Run value is permanetly lower, even if, between the short-Run and the long-Run, the currency depreciates. The interest rate ↑ as before in the short-Run, and prices ↓ in the long-Run to ensure that $i = i^*$.

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II (13.5)

Please present the results with, at most, 2 decimal places.

II.B. Consider the open economy of Byeschmidt which has **sticky** prices and a money demand of $m^D = \frac{Y}{10i}$. The central bank of Byeschmidt follows a **fixed exchange rate regime**, such that $e = E(e) = 1$ and, initially, $B_{CB} = 20$. The interest rate parity holds instantaneously, the foreign interest rate is equal to $i^* = 0{,}1$, and, initially, $P = 2$. Consider, as well, that the goods market equilibrium is described by the following expression: $Y = 2(\bar{A} + TB)$, where $\bar{A} = 45$ and $TB = 5\left(\frac{e}{P} - 1\right)$. Finally, the full employment level of output is given by $Y^f = 100$.

d) Assuming that the peg is credible:

(d1) Derive the DD Curve.

$Y = 2(A+TB) \Leftrightarrow Y = 2\left(45 + 5\left[\frac{e}{P} - 1\right]\right) \Leftrightarrow Y = 90 + 10\left(\frac{e}{2} - 1\right) \Leftrightarrow Y = 90 + 5e - 10 \Leftrightarrow \boxed{Y = 80 + 5e}$ DD_0

(d2) Is there internal balance and/or external balance? Justify.

$\rightarrow Y = 80 + 5 \cdot \bar{e} = 80 + 5 \cdot 1 = 85$ $\quad Y \neq Y^f \ (85 \neq 100) \Rightarrow$ no internal balance

$\rightarrow TB = 5\left(\frac{e}{P} - 1\right) = 5\left(\frac{1}{2} - 1\right) = -2{,}5$ $\quad TB \neq 0 \Rightarrow$ no external balance

(d3) Draw the central bank balance sheet.

$\rightarrow m^D = \frac{Y}{10i} = \frac{85}{10 \cdot 0{,}1} = \frac{85}{1} = 85$ [note that under a fixed e, $E(e) = e \Rightarrow i = i^*$; provided that there is credibility]

$\rightarrow M = P \cdot m^D = 2 \cdot 85 = 170$

A		L	
$eB^{\$}_{CB}$	150	M	170
B_{CB}	20		

$\rightarrow M = eB^{\$}_{CB} + B_{CB} \Leftrightarrow 170 = eB^{\$}_{CB} + 20 \Leftrightarrow eB^{\$}_{CB} = 150$

(d4) Derive the AA curve.

$\rightarrow \frac{M}{P} = \frac{Y}{10i} \Leftrightarrow \frac{PY}{M} = 10i \Leftrightarrow i = \frac{P}{M}\frac{Y}{10} \Leftrightarrow i^* + \frac{E(e)}{e} - 1 = \frac{P}{M}\frac{Y}{10}$

$\rightarrow 0{,}1 + \frac{1}{e} - 1 = \frac{2}{170}\frac{Y}{10} \Leftrightarrow -0{,}9 + \frac{1}{e} = \frac{Y}{850} \Leftrightarrow \boxed{Y = -765 + \frac{850}{e}}$ AA_0

e) The authorities of Byeschmidt are known for not doing anything to change the economic performance of the country. Therefore, assuming that the peg is kept and that no further policy actions are taken:

(e1) Find the long-run price level.

$\rightarrow$ By the DD curve and knowing that, in the LR, $Y = 100 \wedge e = 1$:

$Y = 80 + 10\frac{e}{P} \Leftrightarrow 100 = 80 + \frac{10}{P} \Leftrightarrow 20 = \frac{10}{P} \Leftrightarrow P_{LR} = 1/2$

(e2) Derive the long-run DD curve.

$\rightarrow Y = 80 + 10\frac{e}{1/2} \Leftrightarrow \boxed{Y = 80 + 20e}$ DD_{LR}

(e3) Find the endogenous money supply and show the changes in the central bank balance sheet.

$\rightarrow m^D = \frac{Y}{10i} = \frac{100}{10 \cdot 0{,}1} = 100 \Rightarrow M = P \cdot m^D = 0{,}5 \cdot 100 = 50$

$\rightarrow M = eB^{\$}_{CB} + B_{CB} \Leftrightarrow eB^{\$}_{CB} = 50 - 20 \Leftrightarrow eB^{\$}_{CB} = 30$

$\Delta M = -120$ [50 − 170] $\quad \Delta B_{CB} = 0$

$\Delta eB^{\$}_{CB} = -120$ [30 − 150]

(e4) Derive the long-run AA curve.

$\rightarrow i^* + \frac{E(e)}{e} - 1 = \frac{P}{M}\frac{Y}{10} \Leftrightarrow -0{,}9 + \frac{1}{e} = \frac{0{,}5}{50}\frac{Y}{10} \Leftrightarrow$

$\Leftrightarrow -0{,}9 + \frac{1}{e} = \frac{Y}{1000} \Leftrightarrow$

$\Leftrightarrow \boxed{Y = -900 + \frac{1000}{e}}$ AA_{LR}

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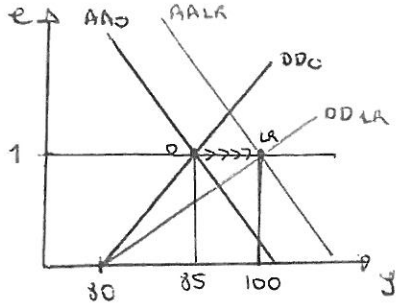
(e5) Represent both the initial equilibrium and the long-run equilibrium in the AA-DD diagram, explaining why the AA and/or the DD curves change.



The AA curve changes because M and P change.

The DD curve changes because P changes.

(e6) Characterize this equilibrium in terms of internal and external balance.

→ $Y = 80 + 20 \cdot 1 = 100$ $\quad Y = Y^f$ [100 = 100] ⇒ there is internal balance

→ $TB = 5\left(\frac{e}{P} - 1\right) = 5\left(\frac{1}{0,5} - 1\right) = 5 \cdot 1$; $TB \neq 0$ ⇒ no external balance

f) Suppose now, **departing from d**, that agents start believing that the central bank will perform a one-time currency devaluation to bring the economy to full employment in the short run. If the central bank performs such policy action:

(f1) Find the new value for the peg.

→ By the DD curve knowing that P and the same (SR action) and $Y = 100$

$Y = 80 + 5e \Leftrightarrow 100 = 80 + 5e \Leftrightarrow 40 = 10e \Leftrightarrow \bar{e} = 4$

(f2) Find the endogenous money supply, showing the changes in the central bank balance sheet.

→ $m^o = \frac{100}{0,1 + 0,10} = 100 \Rightarrow M = P \cdot m^o = 2 \cdot 100 = 200$

→ $M = e B^{\downarrow}_{CB} + B_{CB} \Leftrightarrow e B^{\downarrow}_{CB} = 180$

Comparing with d)
- $\Delta H = 30$ [200 − 170]
- $\Delta e B^{\downarrow}_{CB} = 30$ [180 − 150]
- $\Delta B_{CB} = 0$

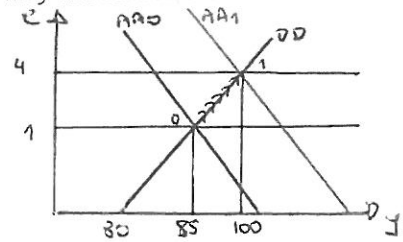
(f3) Derive the AA and DD the curves.

→ no changes in A or P ⇒ same DD curve ⇒ $\boxed{Y = 80 + 5e}$ DD_1

→ AA

$i^* + \frac{E(e)}{e} - 1 = \frac{P}{M}\frac{Y}{10} \Leftrightarrow -0,1 + \frac{4}{e} = \frac{2}{200}\frac{Y}{10} \Leftrightarrow -0,1 + \frac{4}{e} = \frac{Y}{1000} \Leftrightarrow \boxed{Y = -900 + \frac{4000}{e}}$ AA

(f4) Represent both the initial equilibrium and the equilibrium after the policy in the AA-DD diagram, explaining why the AA and/or the DD curves change.



No change in the DD curve

AA changes because M and E(e) change

(f5) What are the impacts of this policy in terms of trade balance? Is there an improvement, comparing with the case where the economy converges to the long run without any policy action? Justify.

→ $TB = 5\left(\frac{e}{P} - 1\right) = 5\left(\frac{4}{2} - 1\right) = 5$

→ Same TB as in question e given that the adjustment that was done in terms of prices in e) was now done with the nominal exchange rate.

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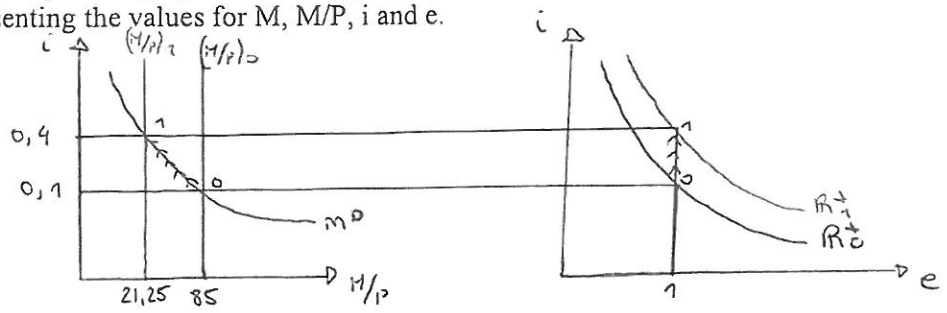
g) **Departing from d**, consider that $E(e) = \alpha\bar{e} + (1-\alpha)e_0$, with $\bar{e} = 1$, and $e_0 = 4$.
Initially, 10% of the agents in the economy believe that the central bank is going to devalue the currency, even though the central bank is not planning to do so. Find:
(g1) The new expected exchange rate, the nominal interest rate and the money supply.

→ $E(e) = 0,9 \cdot 1 + 0,1 \cdot 4 = 1,3$ (↑)

→ $i = i^* + \frac{E(e)}{e} - 1 = 0,1 + \frac{1,3}{1} - 1 = 0,4$ (↑)

→ $m^D = \frac{y}{10i} = \frac{85}{10 \cdot 0,4} = 21,25 \Rightarrow M = P \cdot m^D = 2 \cdot 21,25 = 42,5$ (↓)

(g2) Represent graphically the adjustment in the money market and in the foreign exchange market, presenting the values for M, M/P, i and e.



R^+ changes because $E(e)$ ↑

M/P changes because M ↓ (M is now 42,5

Suppose now that the central bank's credibility decreases. As a result, 25% of the agents in Byeschmidt now believe that the central bank is going to devalue the currency, even though the central bank is still not planning to do so.
(g3) Find the new expected exchange rate and nominal interest rate.

→ $E(e) = 0,75 \cdot 1 + 0,25 \cdot 4 = 1,75$ (↑)

→ $i = i^* + \frac{E(e)}{e} - 1 = 0,1 + \frac{1,75}{1} - 1 = 0,85$ (↑)

(g4) Draw the central bank balance sheet, comparing with the case in (g2).

Initially (g2)

A	L
$B_{CB} = 20$	$M = 42,5$
$eB^*_{CB} = 22,5$	

Now (g4)

A	L
$B_{CB} = 20$	$M = 20$
$eB^*_{CB} = 0$	

↳ $m^D = \frac{85}{10 \cdot 0,85} = 10$

↳ $M = P \cdot m^D = 2 \cdot 10 = 20$ //

(g5) Does the peg break in any of the cases (g2 and g4)? Justify.

- The peg will only break when the central bank runs out of foreign reserves.
- In (g2), $eB^*_{CB} = 22,5$, meaning that the central bank is still able to sustain the peg.
- In (g4), $eB^*_{CB} = 0$, as $M = B_{CB} = 20$. This means that the peg breaks.

(g6) Based on this exercise, explain the reasoning underlying the second generation of speculative attack models.

- The second generation of speculative attack models presents a situation where there is a belief that the central will devalue the currency, even if the monetary authority has no intention to do so. This raises the expected exchange rate in excess of the nominal exchange rate, and so the nominal interest rate will have to increase.

- The central bank has a contingent commitment in relation to the peg, meaning that it will break the peg if things get "bad enough". The rise in the nominal interest rate rises the costs of the peg, meaning that the peg might break.

- Whether the peg breaks or not depends on the central bank's credibility. As shown by this exercise, the lower the credibility of the central bank (that is, the lower the alfa), the higher the probability that the peg will break.