Exam name: Macroeconomics (BPOLO1290E) - Written sit-in exam (UC)

Multiple Choice Questions:

1) d
2) b
3) b 4) c 5) d 6) c 7) b
8) a

EXC1

Ex 1

$C = C_0 + C_1(Y - T)$ $\quad I = b_0 + b_1 Y - b_2 i$

a) C_0 is the level at which people would consume if their income was zero, consumer confidence

C_1 is the propensity to consume, a fraction which is multiplies with income to determine how much of income goes to consumption.

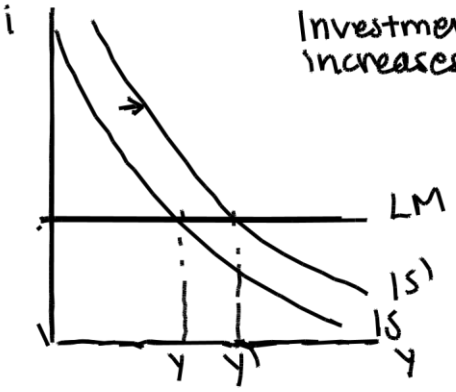
b) $Y \equiv C+I+G$ Equilibrium Goods market: $Y = Z$

$$y = C_0 + c_1(Y-T) + b_0 + b_1 Y - b_2 i + G$$
$$y = C_0 + c_1 Y - c_1 T + b_0 + b_1 Y - b_2 i + G$$
$$y - c_1 Y - b_1 Y = C_0 - c_1 T + b_0 - b_2 i + G$$
$$y(1 - c_1 - b_1) = C_0 - c_1 T + b_0 - b_2 i + G$$
$$y = \frac{1}{1-c_1-b_1}(C_0 - c_1 T + b_0 - b_2 i + G)$$
$$y = \frac{1}{1-0,6-0,3}(8 - 0,6 \cdot 10 + 2 - 100 \cdot i + 20)$$
$$y = 10(24 - 100i)$$
$$y = 240 - 1000i \quad = IS$$

c) $i = 0,01 \qquad y = 240 - 1000 \cdot 0,01 \qquad y = 230$

Output = 230

d) $b_0 = 4 \longrightarrow I\uparrow \longrightarrow Z\uparrow \longrightarrow Y\uparrow$

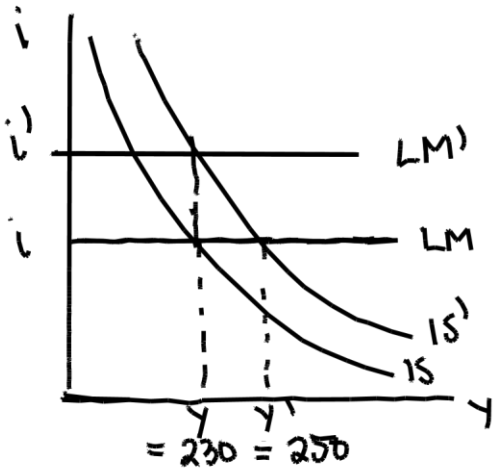


Investment increases, which means demand increases, which means Y increases.

New Equil output =

$$y = 10(8 - 0,6 \cdot 10 + 4 - 100 \cdot 0,01 + 20)$$
$$y = 10(26 - 100i)$$
$$y = 260 - 1000 \cdot 0,01 \qquad y = 250$$

New equil output = 250 = Y



$230 = 10(26 - 100i)$

$230 = 260 - 1000i$

$1000i = 30$

$i = 0,03$ Central Bank must increase i from 0,01 to 0,03

EXC2

The Solow Model

$$Y = 2K^{\frac{1}{2}}N^{\frac{1}{2}} \longrightarrow \frac{Y}{N} = 2\left(\frac{K}{N}\right)^{\frac{1}{2}}$$

$s = 0,4 \quad \delta = 0,1$

a)
$$\frac{K_{t-1}}{N} - \frac{K_t}{N} = s\frac{Y}{N} - \delta\frac{K_t}{N}$$

$$\frac{K_{t-1}}{N} - \frac{K_t}{N} = 0,4 \cdot 2\left(\frac{K}{N}\right)^{\frac{1}{2}} - 0,1\frac{K_t}{N}$$

b)

Steady state
$$s\frac{Y}{N} = \delta\frac{K}{N} \qquad s \cdot 2\left(\frac{K}{N}\right)^{\frac{1}{2}} = \delta\frac{K}{N} \longrightarrow$$

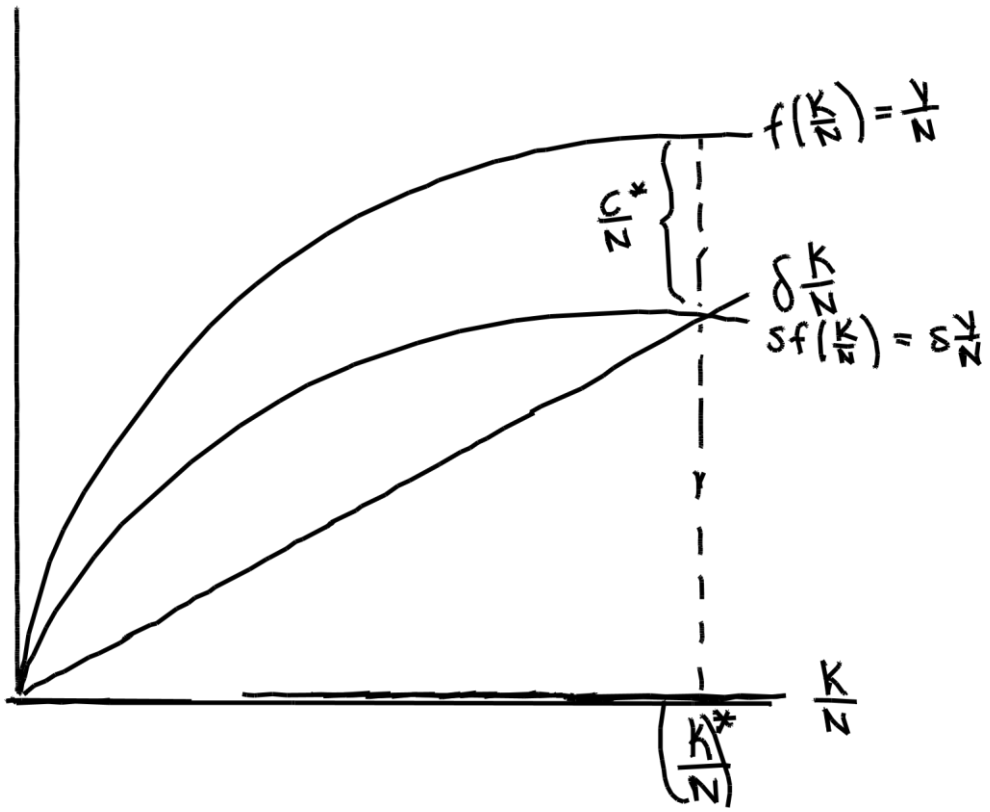
$$\frac{2s}{\delta} = \frac{\frac{K}{N}}{\left(\frac{K}{N}\right)^{\frac{1}{2}}} \rightarrow \frac{2s}{\delta} = \frac{K}{N} \cdot \left(\frac{K}{N}\right)^{-\frac{1}{2}} \longrightarrow$$

$$\frac{2s}{\delta} = \left(\frac{K}{N}\right)^{\frac{1}{2}} \rightarrow \left(\frac{2s}{\delta}\right)^2 = \frac{K}{N}^* \rightarrow \left(\frac{2 \cdot 0,4}{0,1}\right)^2 = 64$$

$$\frac{Y}{N}^* = 2\left(\frac{K^*}{N}\right)^{\frac{1}{2}} \rightarrow 2 \cdot 64^{\frac{1}{2}} = 16$$

$$\frac{C^*}{N} = (1-s)\frac{Y}{N} \rightarrow (1-0,4) \cdot 16 = 9,6$$

c)



d)

d) $\frac{K_t}{N} = 81$

$$\frac{K_{t+1}}{N} - \frac{K_t}{N} = s\frac{Y}{N} - \delta\frac{K_t}{N} \rightarrow$$

$$\frac{K_{t+1}}{N} - 81 = 0{,}4 \cdot 2(81)^{\frac{1}{2}} - 0{,}1 \cdot 81$$

$$\frac{K_{t+1}}{N} - 81 = 7{,}2 - 8{,}1$$

$$\frac{K_{t+1}}{N} = 80{,}1$$

$\frac{K_{t+1}}{N} < \frac{K_t}{N}$ ⟶ Growth rate is negative

Growth will be zero when steady state is reached.

e) This tells us that consumption would be maximized if savings rate was 0,1 higher. This can be seen in the graph where difference between $f(\frac{K}{N})$ and $sf(\frac{K}{N})$ is the largest.

f) Consumption is a function of income, Y, and taxes, T. If a larger share of income is consumed, that means that a smaller share of Y is saved. Lower savings means lower investment, which means that output would be lower. In the short term, the economy would grow, but in the long run, lower investments means that Economy would be out of steady state.

EXC3

Inflation and the Output Gap

a) GDP deflator = $\frac{\text{nominal GDP}}{\text{Real GDP}}$

2016 $\frac{80}{100} = 0,8$

2017 $\frac{100}{108} = 0,9259$

2018 $\frac{120}{120} = 1$

b) Inflation rate = $\frac{\Pi_t - \Pi_{t-1}}{\Pi_{t-1}}$ $\frac{\Pi_{t-1} - \Pi_t}{\Pi_{t-1}}$

2017 = $\frac{100-108}{108}$ = $\frac{108-100}{108} = 0,0741$ $\quad |-0,0741$

$\Pi = \frac{P_{t-1} - P_t}{P_t}$ $\longrightarrow$

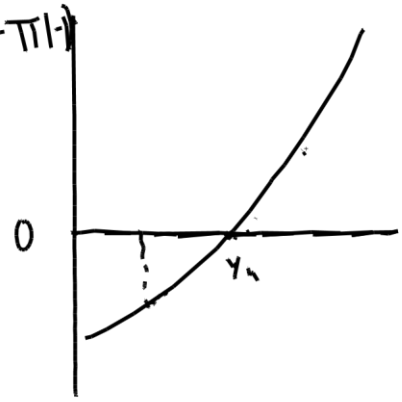
c) 2018 $\pi_{t-1} = 8\%$

2019 $\pi = 5\%$ $\pi^e = \pi_{t-1}$

$\pi_t - \pi_{t-1} = \frac{\alpha}{L}(Y - Y_n)$

$\pi_t = 5$

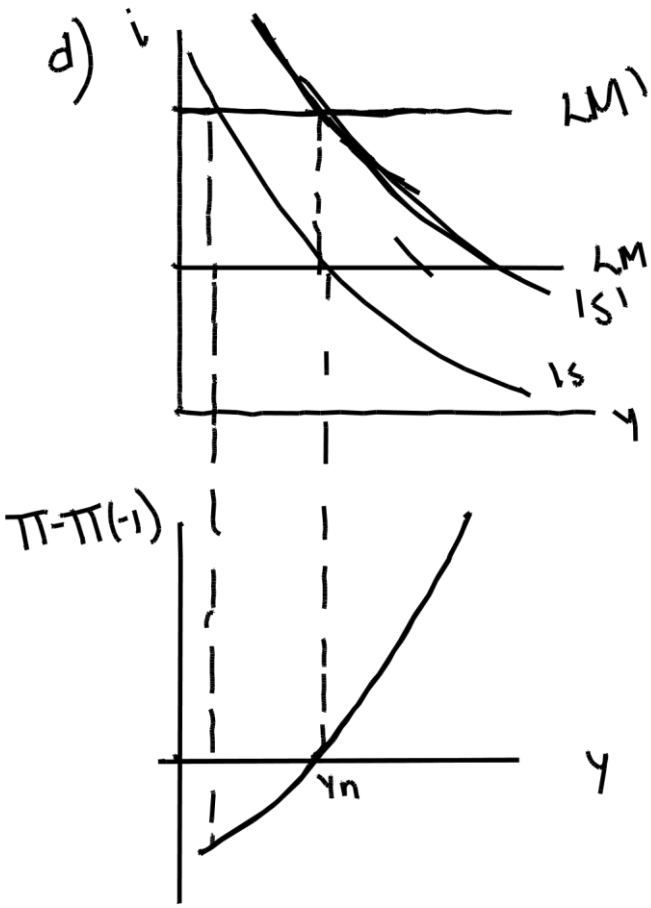
$\pi_t - \pi_{t-1} = -3$



If people base expectations on previous years and inflation in 2019 = 5%, that means that inflation difference is $5 - 8 = -3$

This means that output is below natural output

This means that there is negative growth.



Initially, the CB should increase policy rate as to get goods- and money market back in equilibrium. This would decrease output.

Then Government should increase Government spending or decrease taxes → shifting IS right. This would put output back at Y_n.

e) If policy makers do nothing, then the economy might enter a deflation trap. Since expectations are based on previous years the expectation of a slowing economy could lead people to spend less → spiral of deflation. Government must make sure that consumers keep buying things today by increasing spending and raising interest rate.