## III. The Goods Market and the Private Sector Demand

→ Total Demand for Goods:

$$Z \equiv C + I + G + X - IM$$

but in a closed economy $X = IM$ (exports = imports)

$$\Rightarrow Z = C + I + G$$

→ Consumption function is a behavioral function ⇒ it captures the behavior of consumers

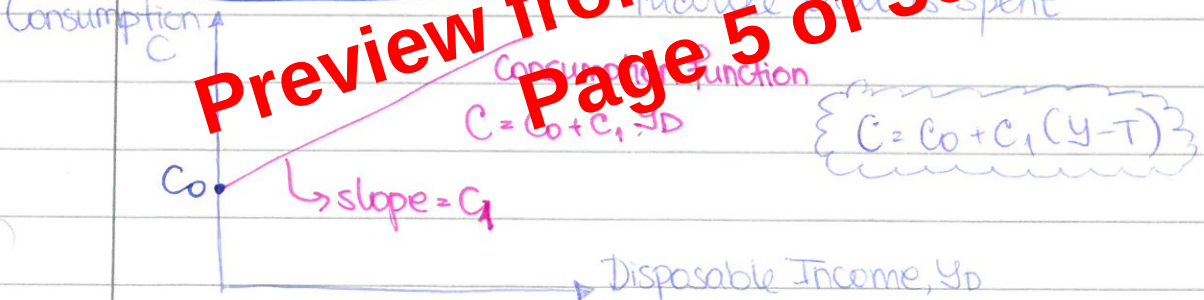
$$C = C(Y_D) \qquad Y_D = Y - T$$

$Y_D$ - disposable income
$Y$ - income
$T$ - taxes

$$\Rightarrow C = C_0 + C_1 Y_D$$

$Y_D$ - disposable income
$C_0$ - autonomous consumption ⇒ what is spent irrespective of income to fight unemployment
$C_1$ or MPC - Marginal Propensity to Consume

→ $MPC = \frac{\text{Change in } C}{\text{Change in } Y_D}$ ⇒ the [illegible] of an additional dollar of income that is spent




$\{C = C_0 + C_1(Y - T)\}$

→ Savings: the part of national income NOT spent on consumption

$$Y_D = C + S \Rightarrow S = -C_0 + C_1 \cdot Y_D$$

→ Investment - the purchases by firms of plants, equipment & inventory

- intended investment: investment spending that a producer intends to undertake
- inventory investment: purchases of inventory (goods & raw materials) that firms keep in reserve to facilitate production & sales.
- autonomous investment: independent of the level of income.

→ Wage-Setting Relation:

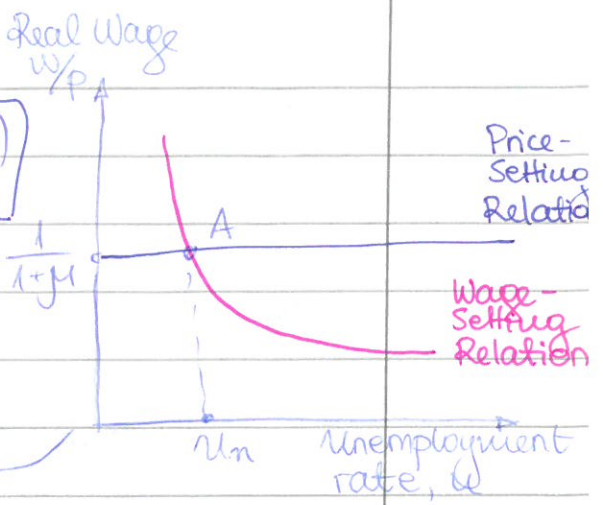
$W = P^e F(u,z)$

$P^e = P \Rightarrow W = P \cdot F(u,z)$ ↳ $\boxed{\frac{W}{P} = F(u,z)}$

→ Price-determination Equation

$P = (1+\mu) \cdot W \Rightarrow \frac{P}{W} = 1+\mu$

$\Rightarrow \boxed{\frac{W}{P} = \frac{1}{1+\mu}}$




→ ⇒ Real wage in wage setting is a decreasing function of unemployment and real wage in price setting is constant, independent of unemployment

→ Natural rate of unemployment ($u_n$) is when real wages from wage-setting & price setting are equal

$$\boxed{F(u,z) = \frac{1}{1+\mu}}$$

*) Increase in unemployment benefits leads to an increase in the natural level of unemployment (WS relation shifts to the right)

*) Increase in markups decreases real wage & leads to an increase in the natural level of unemployment (PS Relation moves down)

→ Employment: $\boxed{N = L(1-u)}$

- N - employment
- L - labor force
- u - unemployment rate

→ Natural Level of Employment: $\boxed{N_n = L(1-u_n)}$

→ From Unemployment to Output

Production function $Y = A \cdot N$ & assume that $A = 1 \Rightarrow Y = N$

$\Rightarrow \boxed{Y_n = N_n = L(1-u_n)}$

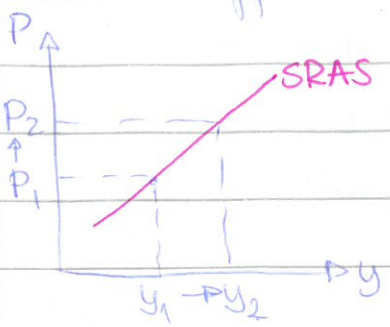
→ Equilibrium Unemployment Rate $\boxed{F(u_n, z) = \frac{1}{1+\mu}}$

→ Natural level of Output: $Y_n = L(1-u_n) \Rightarrow u_n = 1 - \frac{Y_n}{L}$

$\Rightarrow \boxed{F\left(1 - \frac{Y_n}{L}, z\right) = \frac{1}{1+\mu}}$

resources (new mineral deposits etc) or technology

→ Short-Run Aggregate Supply: Over the period of 1-2 years, an increase in P causes an increase in the quantity of goods and services supplied. ⇒ that is why SRAS is upward sloping!




*) SRAS is important because it reflects the effect of fluctuations in aggregate demand on output & employment (that is impossible w/ the vertical LRAS)

→ Theories of SRAS

① Sticky-Wage Theory: Nominal wages are sticky in the short run and are based on expected price $P^e$; if actual price $P > P^e$ ⇒ higher output & employment ⇒ higher y ⇒ SRAS slopes upward.

② Sticky-Price Theory: prices are sticky (in contracts) and are set based on $P^e$ ⇒ Assume Fed increases money supply ⇒ P should increase in long-run, but @ first sticky prices remain unchanged & relatively low ⇒ increase of demand ⇒ increase of output and employment ⇒ higher y ⇒ SRAS slopes upward.

③ Misperceptions Theory: confusion of P and relative price ⇒ P may rise above $P^e$ ⇒ the firm sees price rising ⇒ may believe relative price is rising and ~~to~~ may increase output & employment ⇒ ⇒ higher y ⇒ SRAS slopes upward.

⇒ Common in the Theories: $\boxed{y = y_n + \alpha(P - P_E)}$

- y = output $y_n$ - Natural rate of output
- P - actual price $P^e$ - expected price
- $\alpha > 0$ - how much y responds to unexpected changes in P

→ In the long run, sticky wages & prices become flexible, and mis-perceptions are corrected ⇒ $P_E = P$ & AS is vertical.

→ Shifts in SRAS Curve: they might be caused by everything

Equilibrium Unemployment Rate: $F(u_n, z) = \frac{1}{1+\mu}$

Natural Level of Output: $F\left(1 - \frac{y_n}{L}, z\right) = \frac{1}{1+\mu}$

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AS-AD

Theories of SRAS

$Y = Y_n + \alpha(P - P_E)$

- $Y$ - output
- $Y_n$ - natural level of output
- $P$ - actual price
- $P_E$ - expected price
- $\alpha > 0$ - how much $Y$ responds to changes in $P$

Long-Run AD & AS: $P^E = P$ & $Y_n = Y$

a) IS Relation

$Y = 200 + .25 Y_D + 150 + .25Y - 1.000i + 250$

$Y_D = (Y - T) \Rightarrow Y_D = Y - 200$

$\Rightarrow Y = 200 + .25(Y-200) + 150 + .25Y - 1.000i + 250$

$Y = 200 + .25Y - 50 + 150 + .25Y - 1.000i + 250$

$\Rightarrow 0.5Y = 200 - 50 - 1.000i + 250 + 150$

$\frac{1}{2} Y = 400 - 1.000i + 150$

$\Rightarrow Y = 800 - 1.000i + 300 = 1100 - 2000i$

b) LM Relation $m/P = Y \cdot L(i)$

$m/P = 1.600 = 2Y - 8.000i$

$\Rightarrow i = \frac{2Y - 1.600}{8000} = \frac{Y}{4.000} - \frac{1}{5}$

c) Equilibrium real output

$Y = 1100 - 2.000i = 1.100 - 1.000\left(\frac{Y}{4000} - \frac{1}{5}\right)$

$\Rightarrow Y = 1100 - \frac{2.000Y}{4000} + 400$

$\frac{3}{2} Y = 1.500 \Rightarrow Y = \frac{1500 \cdot 2}{3} = 1.000€$



d) $Y = 1.000 \Rightarrow i = \frac{1000}{4.000} - \frac{1}{5} = \frac{1}{4} - \frac{1}{5} = \frac{5}{20} - \frac{4}{20} = \frac{1}{20} = 5\%$

e) $Y_D = Y - T = 1.000 - 200 = 800$

$\Rightarrow C = 200 + .25 \times 800 = 200 + 200 = 400$

$I = 150 + .25 \times 1000 - 1.000 \times 0,05 =$

$= 150 + 250 - 50 = 350$

$G = 250$

$C + I + G = 1.000€$ ✓

## VI Labor Market

1) Natural Rate of Unemployment

$\mu = 5\%$ $W = P(1-u)$

a) Price-setting equation

$\frac{W}{P} = \frac{1}{1+\mu} = \frac{1}{1.05} = 0.952$

$\frac{W}{P}$ or real wage $= 0.952$

b) $u = 1 - W/P \Rightarrow u = (1 - 0.952) = 0.048 = 4.8\%$

c) $\mu$ increases to 10%

$\Rightarrow \frac{W}{P} = \frac{1}{1+\mu} = \frac{1}{1.1} = 0.909$

$\Rightarrow u = 1 - W/P = 1 - 0.909 = 0.091 = 9.1\%$

Increase in markup leads to a decrease in real wage and an increase in unemployment rate. Increase in markup means more market power for firms which they will use to increase prices of goods by reducing supply $\Rightarrow$ production will fall $\Rightarrow$ the demand for labor will fall $\Rightarrow$ natural rate of unemployment rises

2) a) delivery person vs. network administrator: The second one has a bigger bargaining power, as it is a more complicated job which increases the rarity of specialists as well as switching costs for them $\Rightarrow$ their bargaining power is bigger

b) Rate of unemployment has the biggest effect on bargaining power, as if it rises, it is easier for firms to find people to work for them $\Rightarrow$ bargaining power of workers fall.

c) worker bargaining power increases $\Rightarrow$ real wage?

Real wage: $W/P = \frac{1}{1+\mu}$ $\rightarrow$ always given by the price setting relation

$\Rightarrow$ this applies to both short-run and medium run, as it depends on actual price level & not expected one