general equilibrium

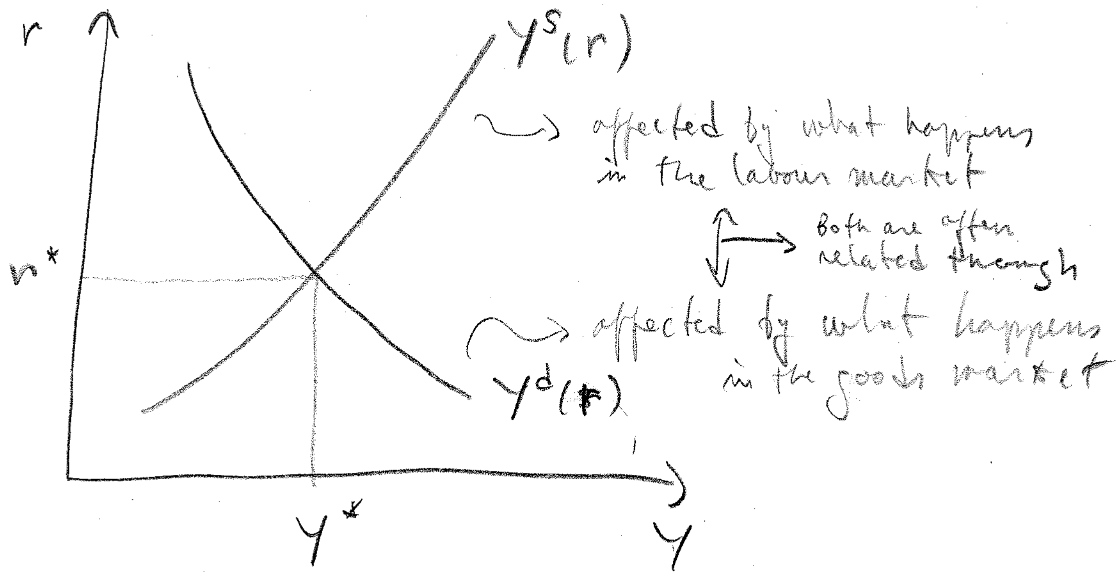
- 1° labour market is in equilibrium : $N^s = N^d$
- 2° goods market is in equilibrium : $Y = C + I + G$

↳ 1° determines the economy's aggregate supply as a function of r : $Y^s(r)$

2° determines the economy's aggregate demand as a function of r : $Y^d(r)$

→ the equilibrium value of r is such that

$$Y^d(r) = Y^s(r)$$



→ We can use this model to show what will happen if exogenous variables are varied

note: steady-state assumption?: $I_0 = \delta K_0$

→ we can look at temporary or permanent variations in exogenous variables

ex: . ↑ G_0 while leaving G_1 unchanged

↳ this is a <u>temporary</u> Δ in government spending

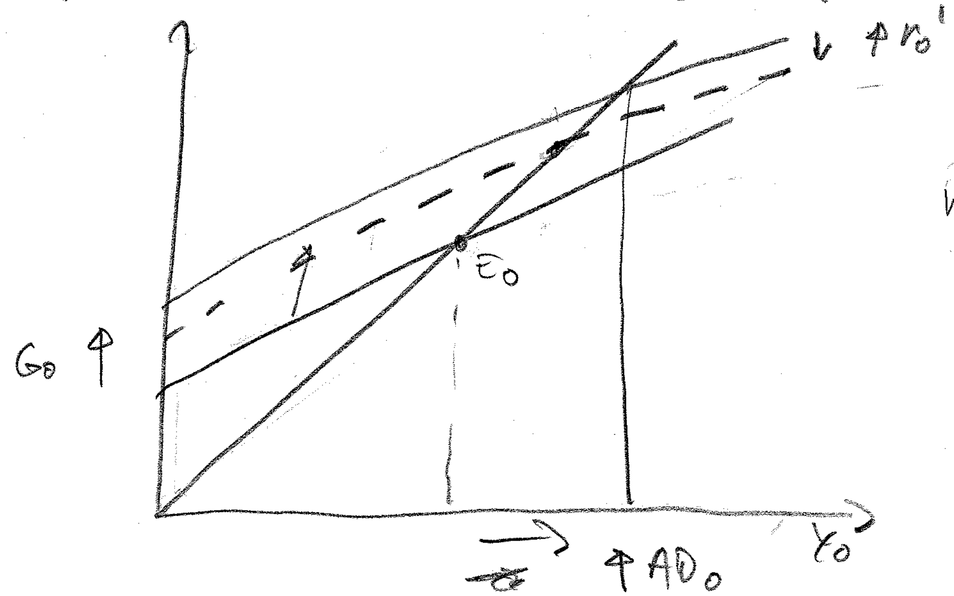
. an ↑ G_0 accompanied by an equivalent increase in G_1 is a <u>permanent</u> Δ.

→ we always look at these "experiment", beginning from an equilibrium situation.

<u>Temporary ↑ in G_0</u>

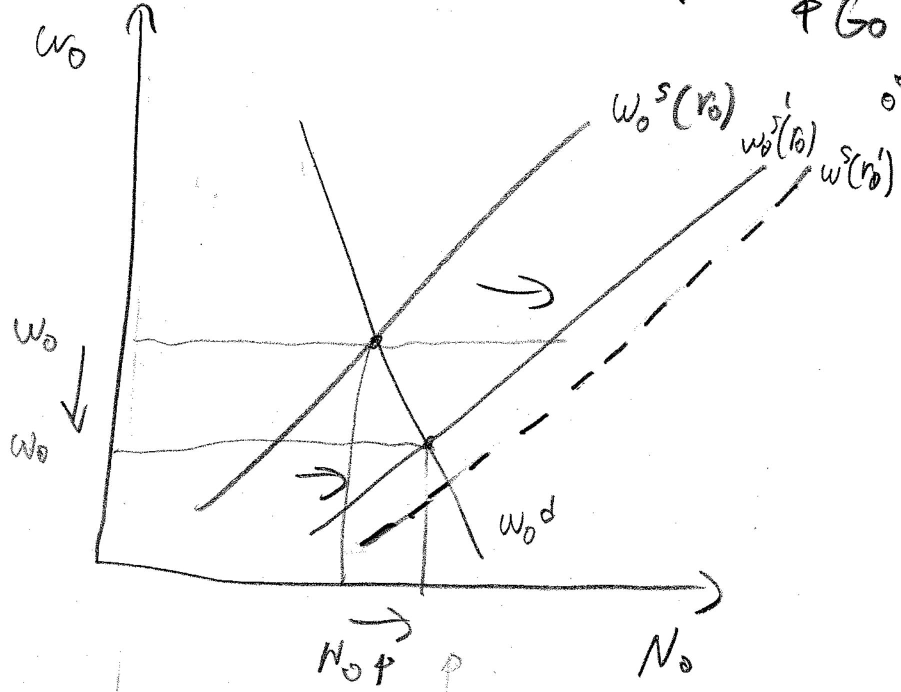
↑ G_0 has two effects
- ↗ goods market → Δ Y^d
- ↘ labour market → Δ Y^s

goods market: holding r fixed



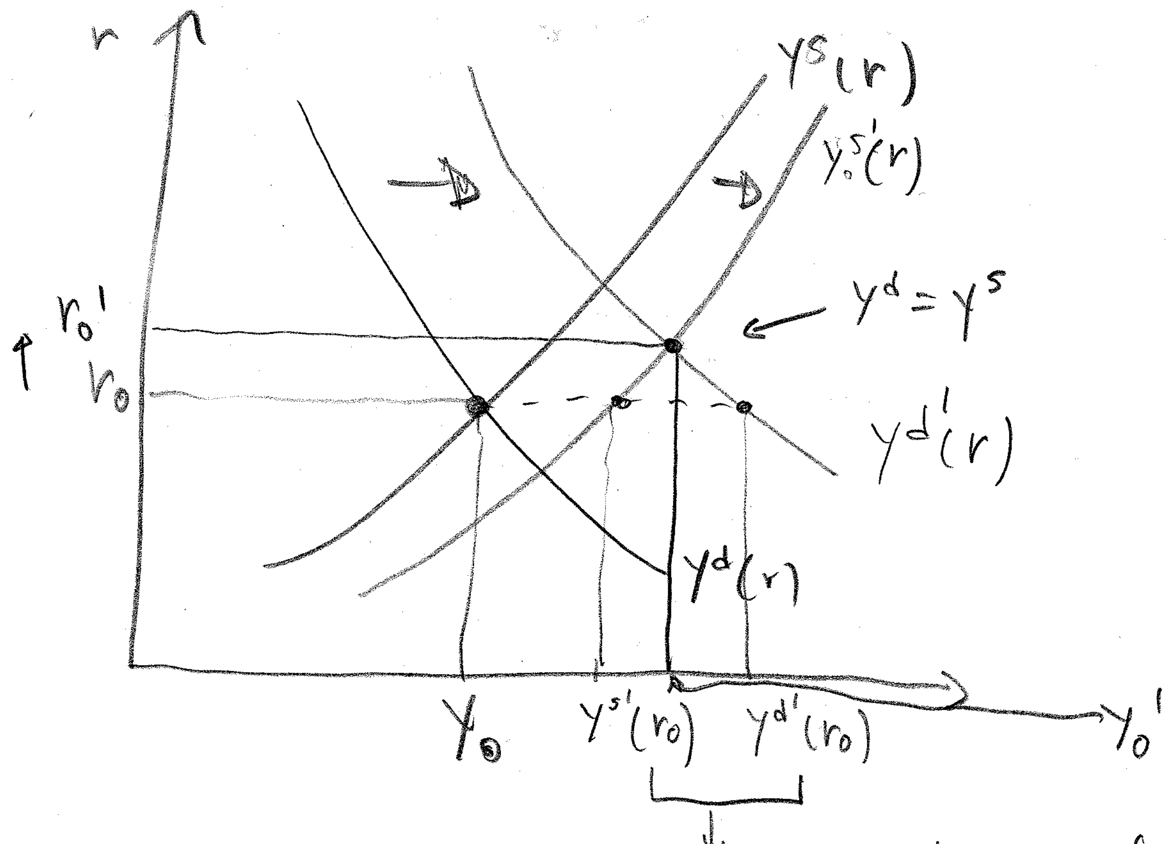
note: C_0 ↓

labour market [from goods market $\uparrow G_0 \to \downarrow C_0$]



$\therefore \downarrow$ leisure (normal goods) $\Rightarrow \uparrow N_0$

Thus, we have : $Y_0 \to Y_0'$, $r_0 \to r_0'$



demand exceeds supply

$\Rightarrow \uparrow P_0 \therefore \uparrow 1+r \left(= \frac{P_0}{P_1}\right)$

note: $\uparrow G_0 \rightarrow \uparrow Y_0 \; (\uparrow N_0)$

$\uparrow G_0 \rightarrow \uparrow r \rightarrow \downarrow C_0$

$\uparrow r \rightarrow \downarrow I_0$

$\uparrow G_0 \rightarrow \downarrow C_0$

$\uparrow G_0 \rightarrow \downarrow w_0$

$\downarrow C_0$, $\downarrow I_0$ – government spending crowds out private investment and consumption

→ consumers work harder for lower wage (less leisure, less consumption ∴ loss of welfare)

→ $\downarrow I_0 \rightarrow \downarrow K_1 \therefore \downarrow Y_1$ everything else equal

[$\uparrow G_0$ could lead to a recession in period 1]

Permanent $\uparrow$ in G

$G_1 \uparrow$ by the same amount as G_0

→ again, impact on Y^d and on Y^s

$\boxed{1+r = \frac{C_1}{\beta C_0}}$

recall [$\boxed{10a}$ p.2]

$$C_0 + G_0 = \frac{1}{1+\beta} Y_0 + \frac{\beta}{1+\beta} G_0 + \frac{1}{1+\beta}\left[\frac{Y_1^e - G_1}{1+r}\right]$$

$$\Delta G \rightarrow \left[\frac{\beta}{1+\beta} - \frac{1}{1+\beta}\,\frac{1}{1+r}\right]\Delta G$$

$\beta > \frac{1}{1+r}$

$\beta(1+r) > \frac{1}{\beta}$

if $\beta = \frac{1}{1+r} \Rightarrow \Delta G$ leaves $C_0 + G_0$ unchanged

happens if $C_0 = C_1$ only

but if $C_0 \neq C_1$, either $\Delta G \rightarrow \uparrow AD$

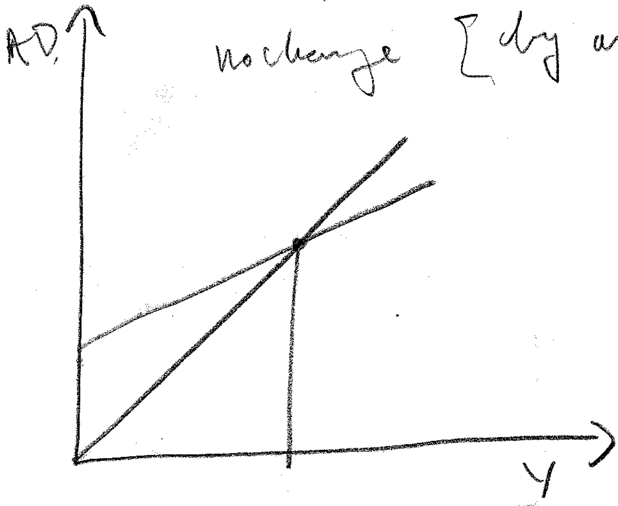
or $\Delta G \rightarrow \downarrow AD$

in the book, it is assumed that $\Delta AD = 0$

[ie: $C_0 = C_1$] is achieved

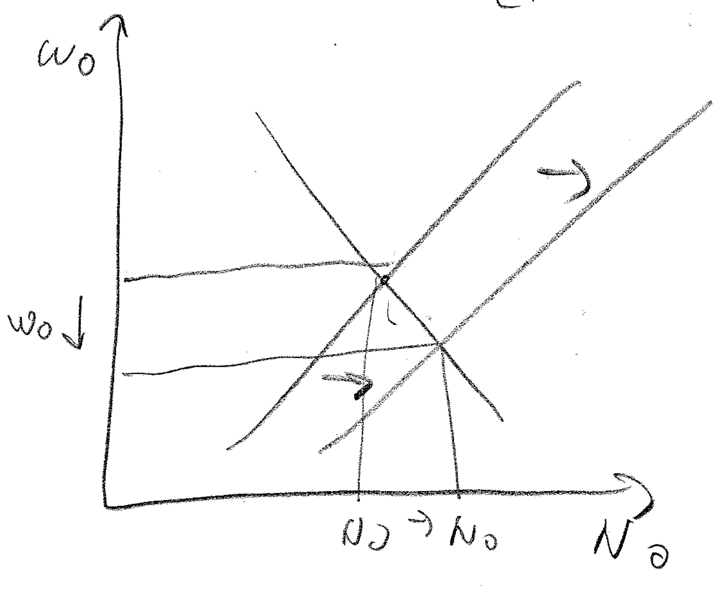
ie: $\uparrow G_0$ and $\uparrow G_1$ is matched by an equal $\downarrow$ in C_0 and C_1

no change [by assumption]

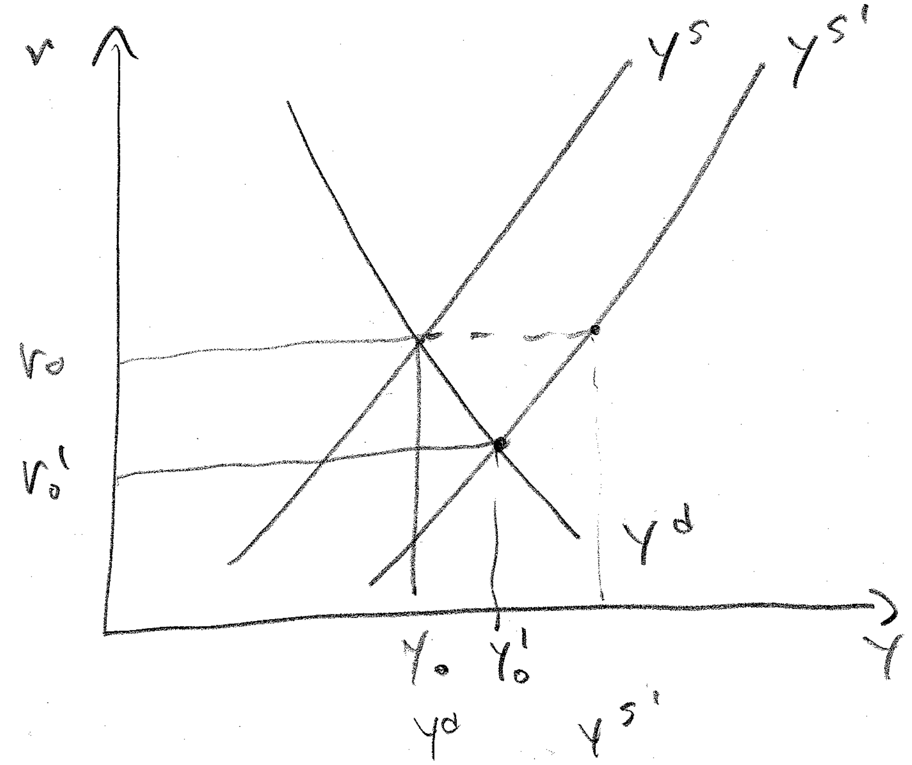


but $\downarrow C_0$ affects the labour market

[$\uparrow G_0$ and $\uparrow G_1 \rightarrow \downarrow$ wealth]

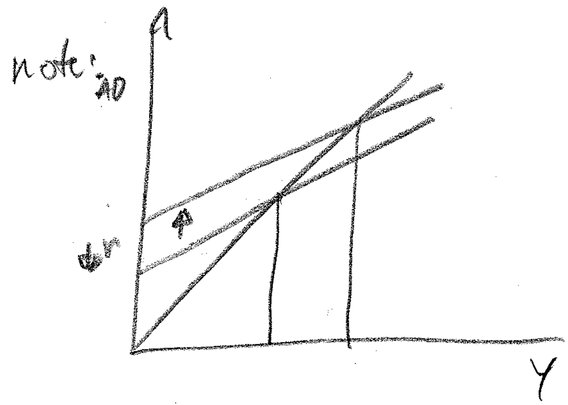


holding r fixed, $Y^s(r) \uparrow$, Y^d remains fixed

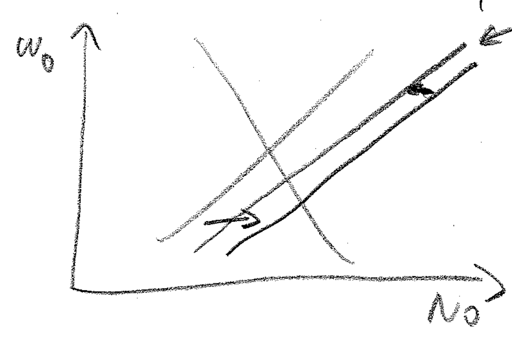


$Y^{s'} > Y^d \to \downarrow P_0 \to \downarrow 1+r$
$(\downarrow P_0/P_1)$

∴ $r_0 \downarrow$, $Y_0 \uparrow$



$(\uparrow C_0, \uparrow I_0)$
↳ $\uparrow K_1 \to \uparrow Y_1$

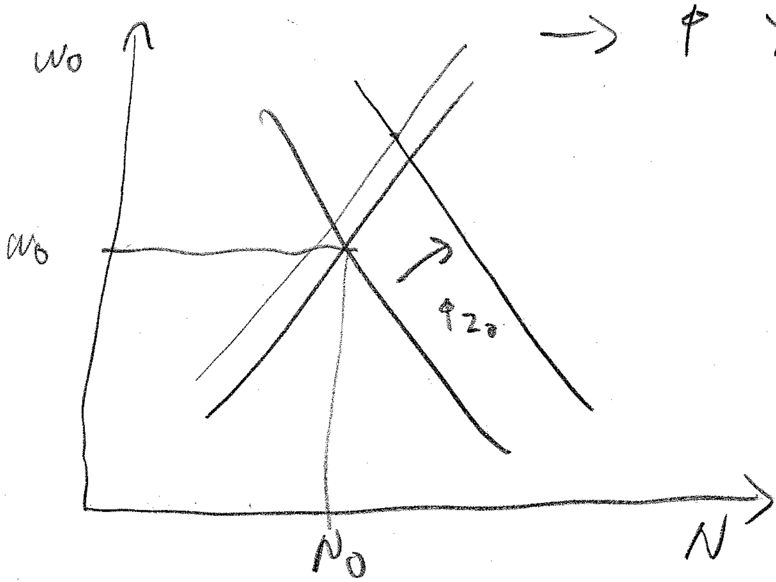


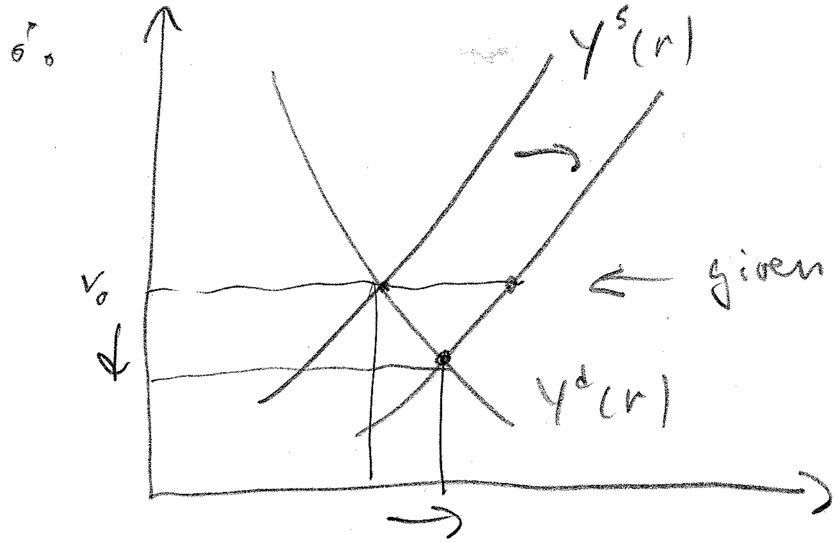
$\downarrow r \to \uparrow C_0$

temporary
$\uparrow$ in TFP ($\uparrow z_0$) [$\downarrow$ price of energy, for ex.]

$\uparrow z_0 \rightarrow \uparrow MPN_0 \rightarrow \uparrow$ labour demand ($\uparrow N_0$)
$\rightarrow \uparrow Y_0 \rightarrow \uparrow C_0 \rightarrow \downarrow N_0$

net effect is an $\uparrow$ if substitution effect dominates





$\leftarrow$ given r $Y^s > Y^d \rightarrow \downarrow r$
($\downarrow \beta_0$)

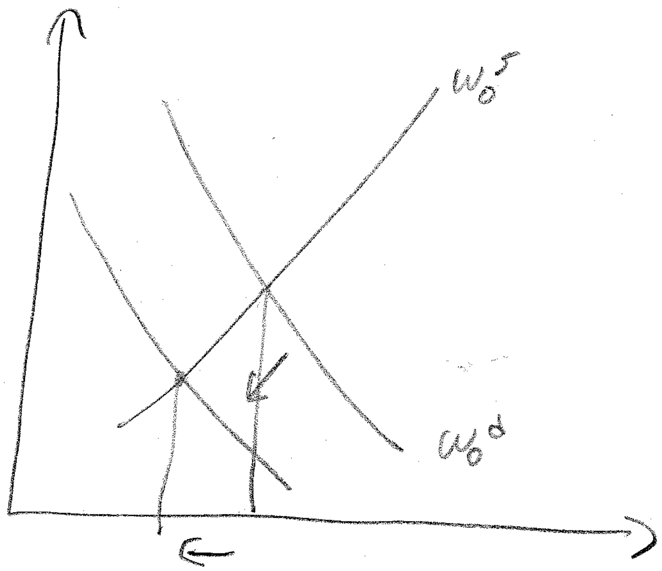
RBC theory $\rightarrow \Delta z \rightarrow \Delta y$

$\downarrow$ in K_0 [natural disaster, war]

1°/ $\downarrow K_0 \longrightarrow \downarrow MPN_0 \quad [MPN_0 = (1-\alpha) K_0^{\alpha} N_0^{-\alpha}]$

↳ too many workers for the number of machines

∴ $\downarrow$ labour demand (holding n constant)



$\Rightarrow \downarrow Y^s$

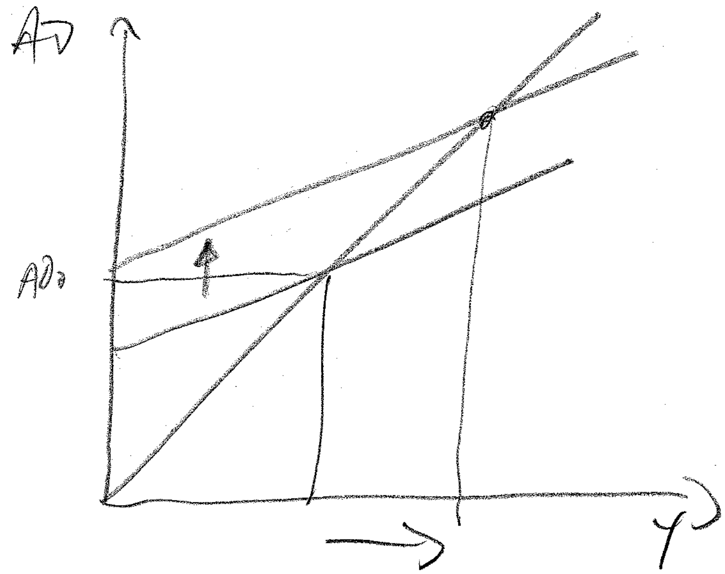
2°/ $\downarrow K_0 \longrightarrow \uparrow I_0$ need more investment spending to reach the same K_1 [optimal]

ie: $I_0 = K_1 - K_0 + \delta K_0$

$I_0 = K_1^* - (1-\delta) K_0$

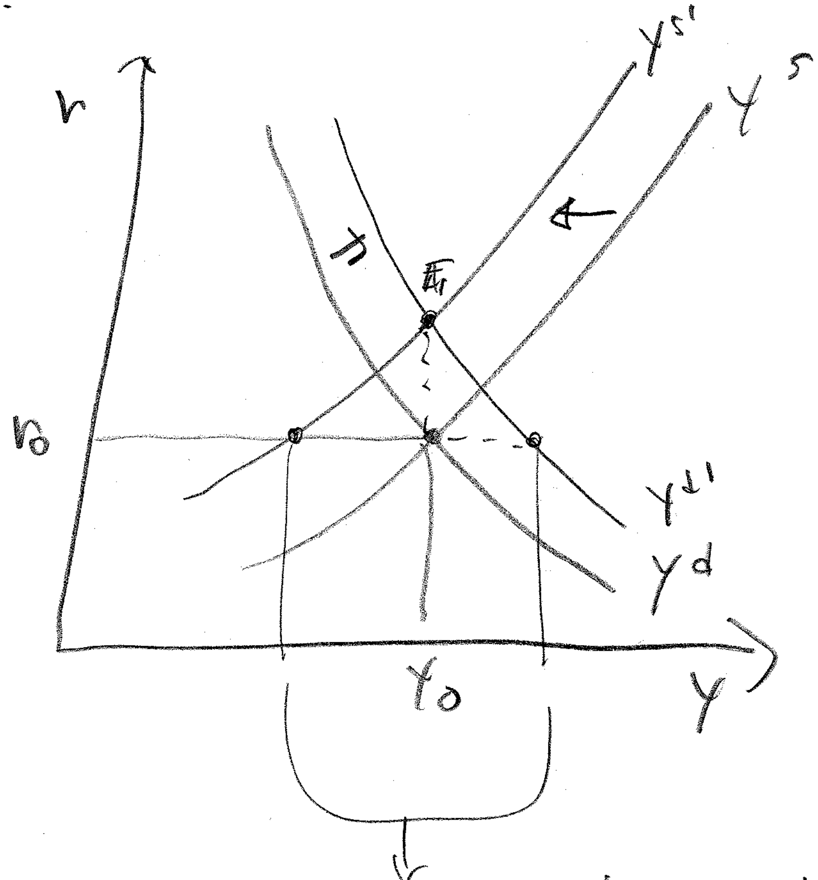
$\uparrow \longleftarrow \downarrow$ holding K_1^* fixed

$\rightarrow \uparrow AD_0$



$\therefore \Rightarrow \uparrow Y^d$ (holding r fixed)

ie!



At r_0, $Y^{d'} > Y^{s'} \rightarrow \uparrow P_0\ (\uparrow 1+r)$
until E_1 is reached

note: $\Delta Y_0 = 0$ $\rightarrow$ could be (+) or (−) ambiguous
$\rightarrow$ however, r must $\uparrow$