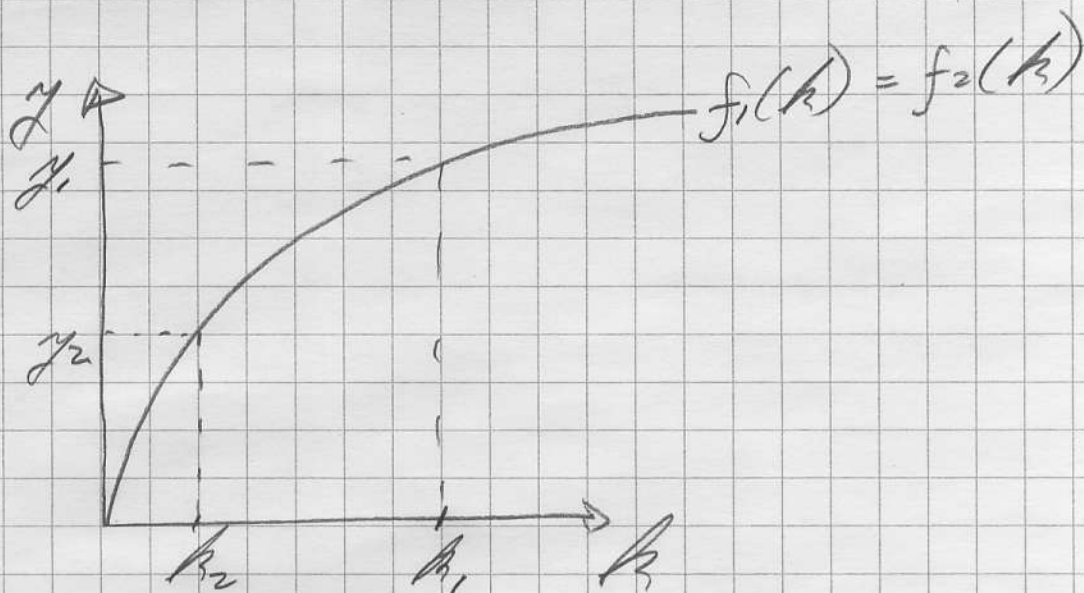


Macro II, 2ND mid-term

①

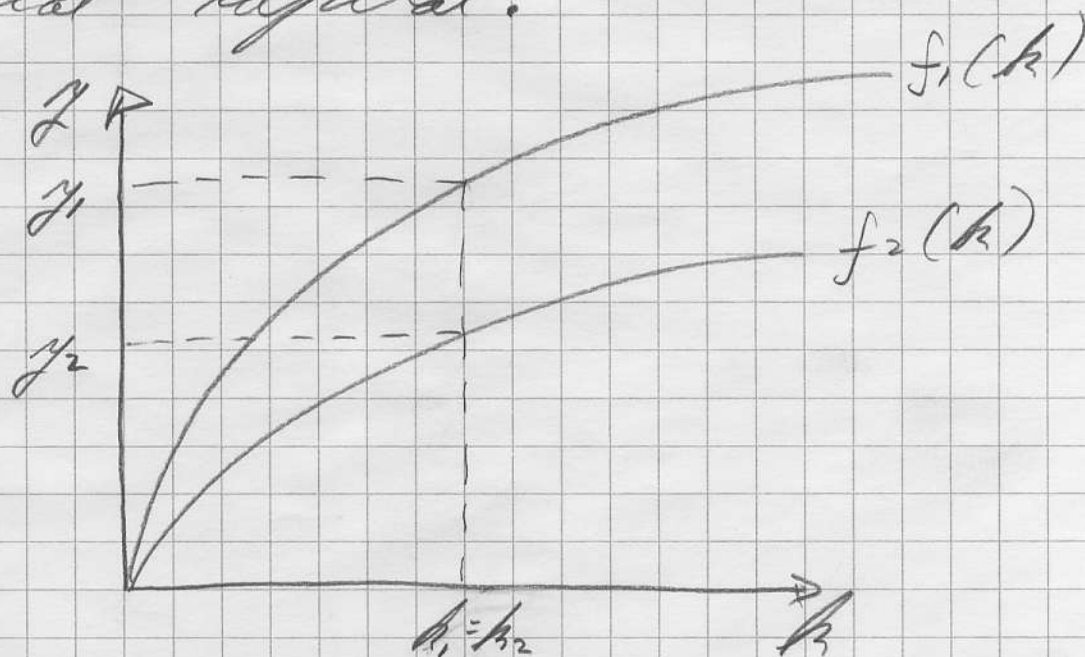
#1)

a)



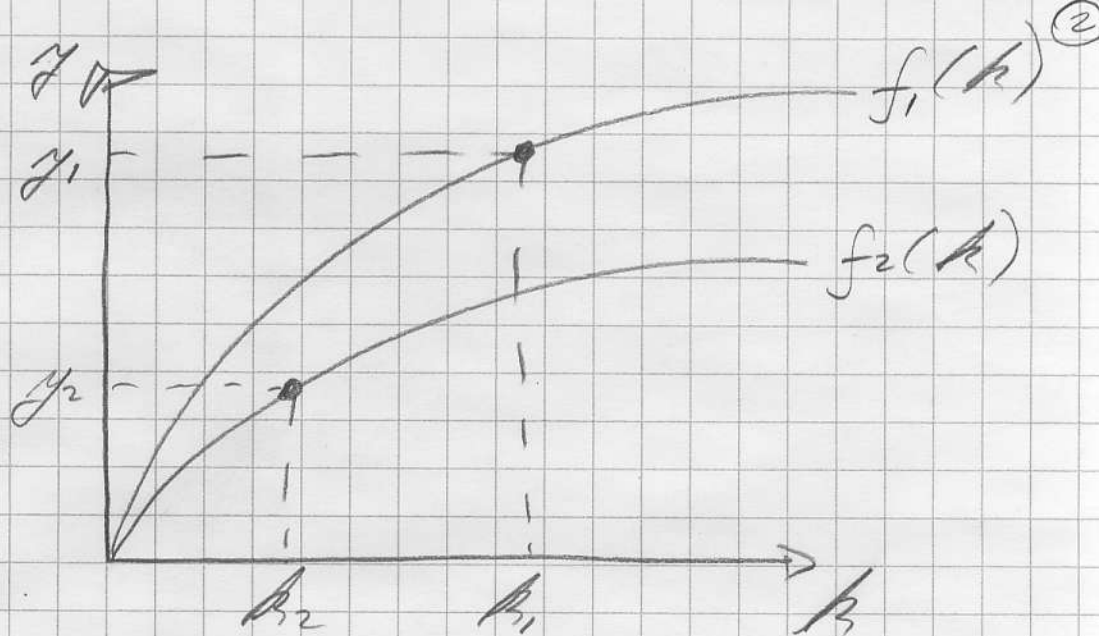
Both countries have the same productivity, i.e. same output functions. But country 2 is poorer because it lacks physical capital.

b)



Both countries have the same quantities of capital. But country 2 cannot produce as much as country 1 with the same resources. It is thus less productive.

c)



Country 2 produces less for two reasons:

- ① It has less capital: $k_2 < k_1$
- ② Its productivity is lower: $f_2(k) < f_1(k)$

Macro II: 2nd mid-term

#2 | $y = \bar{A} k^{\alpha} h^{1-\alpha}$, $\alpha = 1/3$

a) We have:

$$\frac{y_p}{y_m} = \frac{A_p}{A_m} \cdot \frac{k_p^{1/3} h_p^{2/3}}{k_m^{1/3} h_m^{2/3}}$$

Using the data provided, this implies:

$$0.625 = \frac{A_p}{A_m} \cdot 0.90$$

$$\Rightarrow \frac{A_p}{A_m} = 0.70$$

TFP in Peru is 70% that of Mexico.

b) Lower TFP in Peru causes income to be 30% lower. Lower capital accumulation causes income to be 10% lower than Mexico. TFP is thus 3 times more important to explain Peru's lower income level.

c) With $E_p = E_m$, we have

$$\frac{A_p}{A_m} = \frac{T_{P,2007}}{T_{M,2007}} = 0.7$$

$$\text{Let } T_{P,2007} = T_{M,2007-G}$$

Given that technology grows at rate $g=81\%$, we have

$$\begin{aligned} T_{M,2007} &= T_{M,2007-G} (1.0081)^G \\ &= T_{P,2007} (1.0081)^G \end{aligned}$$

$$\Rightarrow \frac{T_{P,2007}}{T_{M,2007}} = (1.0081)^{-G} = 0.7$$

$$\Rightarrow \ln(0.7) = -G \ln(1.0081)$$

$$\Rightarrow G = 44 \text{ years.}$$

If both countries are equally efficient, then Peru must be 44 years behind Mexico to explain its lower productivity.

Such an important technological lag is unacceptable. Therefore, efficiency in Peru must be lower than in Mexico.