TRADE Lecture 1

→ Do the Ricardian Model from Lecture 2 of Micro notes

→ Then:

$$y_i = \frac{L_i}{a_i} \leftarrow a \; \frac{\text{units labor}}{\text{unit of output } i}$$

$w = p\,MPL \Rightarrow w = \frac{p_i}{a_i}$ bcs $MPL = 1/a_i$

NB: zero profit

$p_i y_i = w L_i$

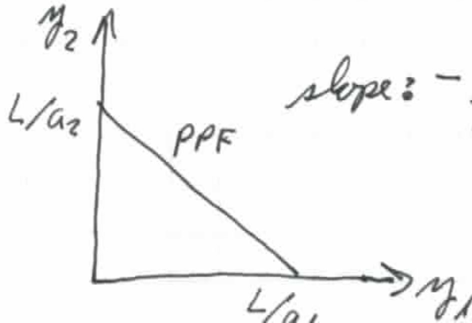
$p_i y_i = \frac{p_i}{a_i} L_i$

unit cost

$p_i = \frac{w L_i}{L_i / a_i} = w a_i = p_i$

$$\boxed{\text{wages equalised across industries if } \quad w = \frac{p_1}{a_1} = \frac{p_2}{a_2} \Rightarrow \boxed{\frac{p_1}{p_2} = \frac{a_1}{a_2}}}$$

in autarky rel price of good one is equal to neg of slope of PPF



slope: $-\frac{a_1}{a_2}$

Specific-Factors Model

Manuf produced using K & L

Food produced using T & L

→ capital specific to manuf

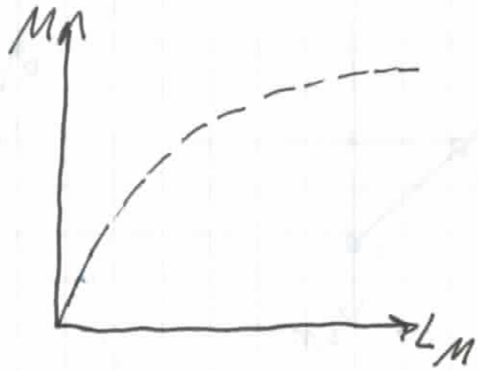
→ land specific to food

→ labor mobile factor

$$L_M + L_F = L$$

Prod Fn for Manuf

drawn for fixed $\bar{K}$

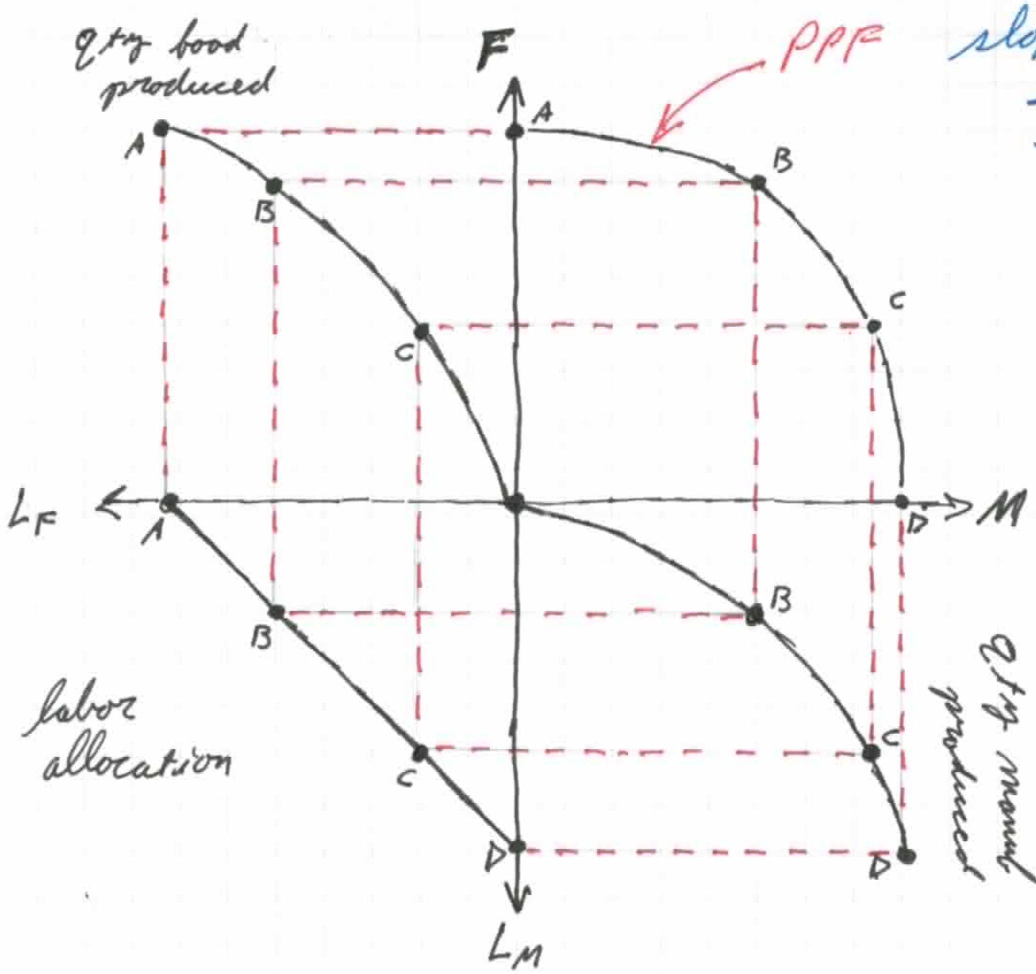


diminishing marg returns

bec each successive worker has less capital to work with, each successive increment of labor ~~[illegible]~~ adds less to production than the previous one

MPL_M

MPL_M = slope of prod fn



slope of PPF

$$\frac{-MPL_F}{MPL_M} = \text{opp cost of manuf}$$

$$F = F(T, L_F) \quad \text{but} \quad L_F = L - L_M$$
$$\text{and} \quad L_M = L_M(M)$$

inserting constraints:

$$F = F[T, L - L_M(M)]$$

$$\frac{\partial F}{\partial M} = \frac{\partial F}{\partial L - L_M} \cdot \frac{\partial L - L_M}{\partial L_M} \cdot \frac{\partial L_M}{\partial M}$$

$$= \frac{\partial F}{\partial L_F} \cdot -1 \cdot \frac{\partial L_M}{\partial M}$$

$\leftarrow$ NB: prod fn monotonically increasing

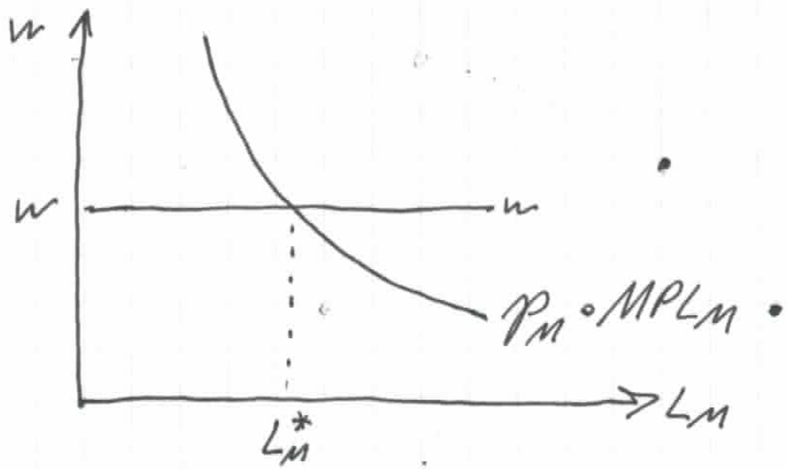
$$\therefore \frac{\partial L_M}{\partial M} = \frac{1}{\partial M / \partial L_M}$$

$$= \frac{-\partial F / \partial L_F}{\partial M / \partial L_M}$$

$$\boxed{\frac{\partial F}{\partial M} = \frac{-MPL_F}{MPL_M}}$$

How much labor will be employed in each sector?

Profit maximizing firm ~~they~~ hire labor up to the pt where: $W = p_M \cdot MPL_M$



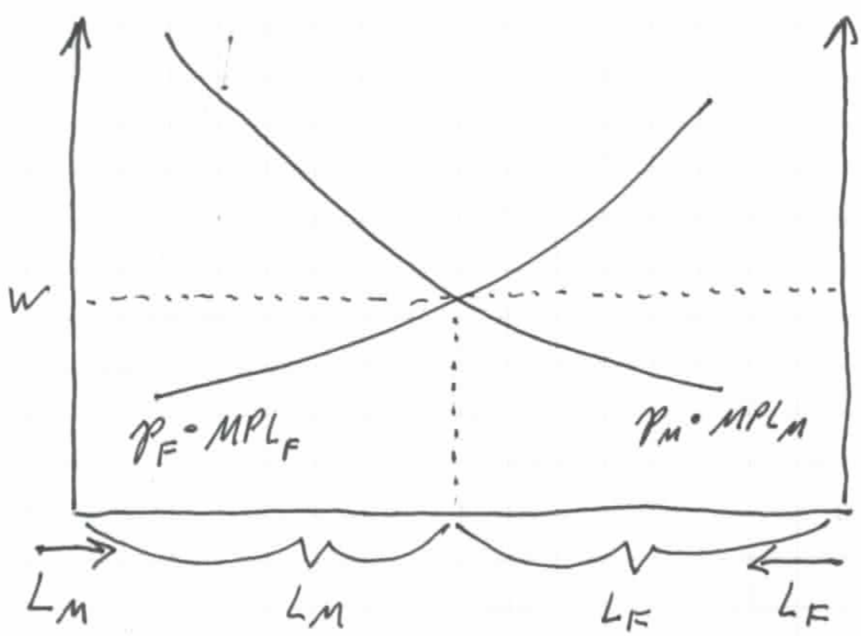
similarly in food sector: $W = p_F \cdot MPL_F$

but how is equilibrium wage determined?

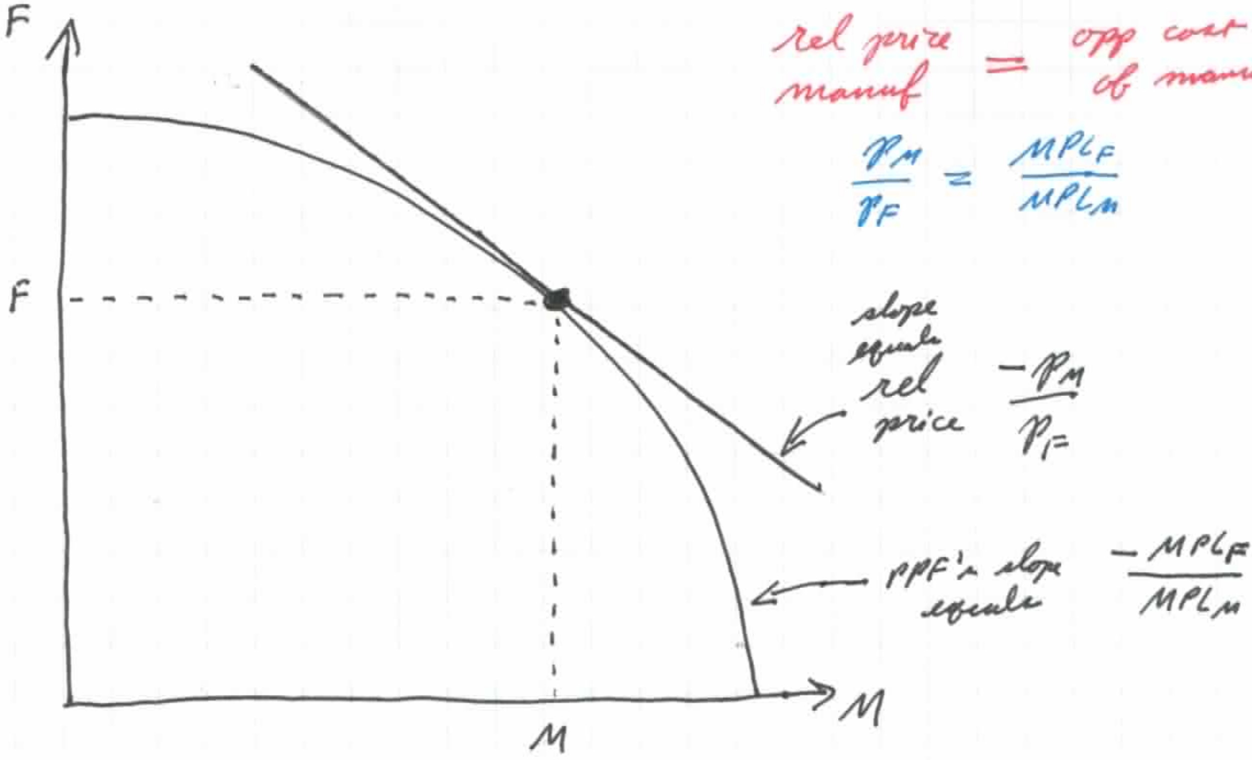
total labor demand = total labor supply

$$L_M + L_F = L$$

$$\boxed{\begin{gathered} W = p_M MPL_M = p_F MPL_F \\ \frac{p_M}{p_F} = \frac{MPL_F}{MPL_M} \end{gathered}}$$



$L_M + L_F = L$



rel price manuf = opp cost of manuf

$$\frac{p_M}{p_F} = \frac{MPL_F}{MPL_M}$$

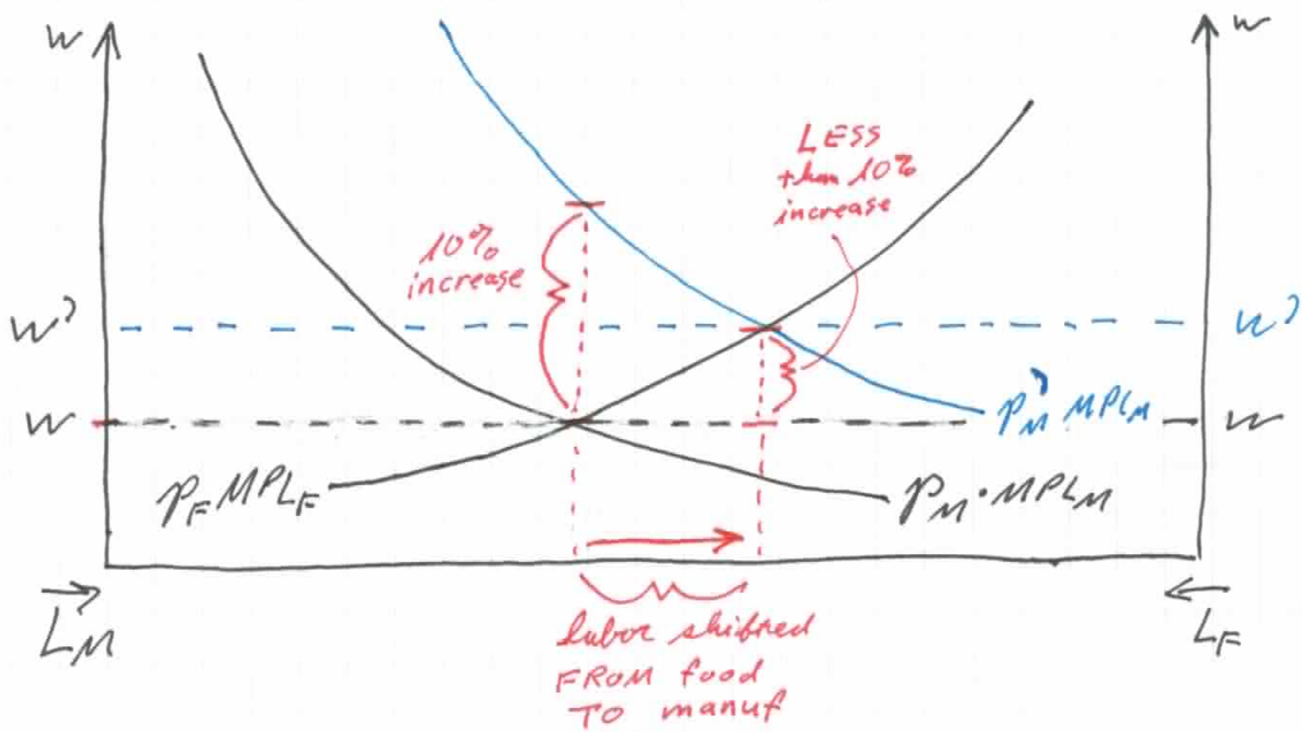
$$W = p_M \, MPL_M = p_F \, MPL_F \Rightarrow \boxed{\frac{p_M}{p_F} = \frac{MPL_F}{MPL_M}}$$

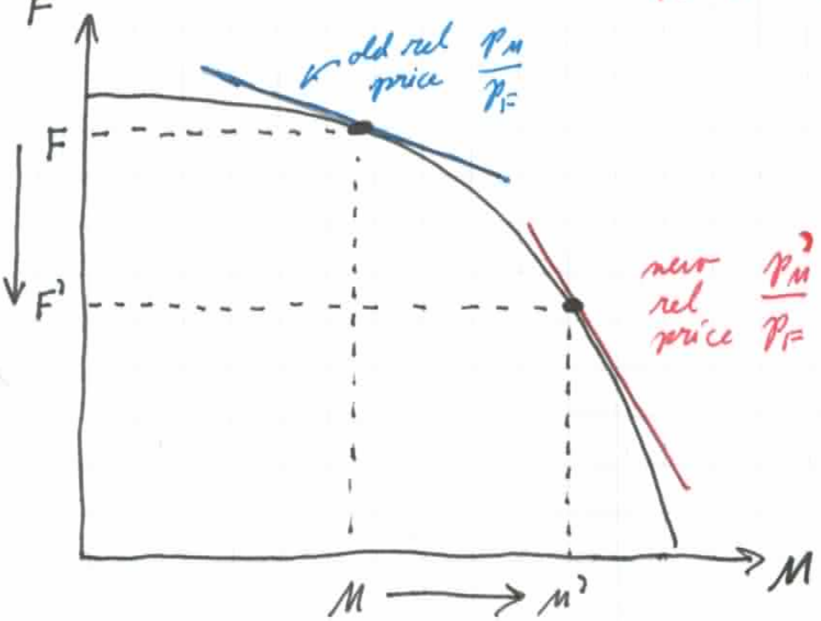
→ so allocatn of labor between the two sectors determines how much food + how much ~~[illegible]~~ manuf will be produced

Now suppose $P_M \uparrow$ 10%, while P_F constant

→ the ~~demand~~ labor demand curve in the manufacturing sector would rise in proportion to the 10% increase in P_M

→ but the wage would rise by less than 10% because MPL_M falls as more labor hired in manuf sector





because labor shifts from food to manufacturing

MORE manuf produced

LESS food produced

Income Distribution

DEFINE $\hat{X} = \%\Delta X$

we assumed that:

$\hat{p}_M = 10\%$ CAUSES $0\% < \hat{w} < 10\%$

$\hat{p}_F = 0\%$

therefore: $\boxed{\hat{p}_F < \hat{w} < \hat{p}_M}$

recall from calculus that a percentage change in a ratio is equal to the difference between the percentage change in the numerator & the percentage change in the denominator

$$\boxed{\frac{\Delta\left(\frac{w}{p_M}\right)}{w/p_M} = \frac{\Delta w}{w} - \frac{\Delta p_M}{p_M}} \quad \widehat{(w/p_M)} = \hat{w} - \hat{p}_M$$

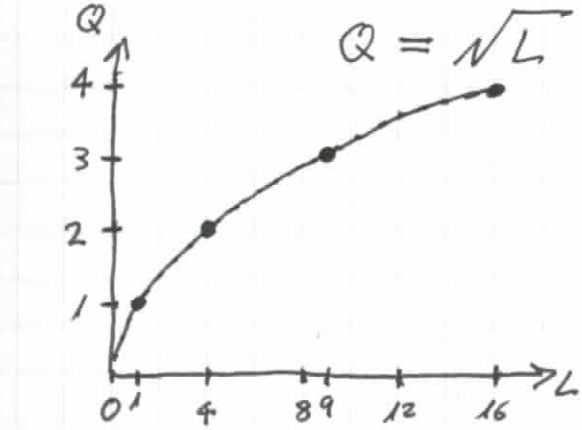
laborers benefit from a higher real wage in terms of food $\hat{w} - \hat{p}_F > 0$

but they suffer from a lower real wage in terms of manufactures $\hat{w} - \hat{p}_M < 0$

so effect on laborers is ambiguous, they'll gain if they consume a lot of food, but they'll suffer if they consume a lot of manufactures

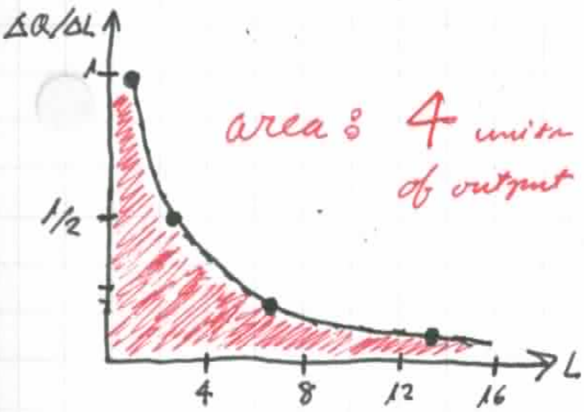
but what about income of capitalists?
what about income of landowners?

recall from calculus that the area underneath a marginal function equals the total fn



L	Q	$\Delta Q/\Delta L$	$\frac{\Delta Q}{\Delta L}\cdot\Delta L$
0	0	1	1
1	1	1/2	1
4	2	1/5	1
9	3	1/7	1
16	4		

sum: 4



$$Q = \sqrt{L}$$

$$\frac{dQ}{dL} = \frac{1}{2}\cdot\frac{1}{\sqrt{L}}$$

$$\int_0^{16} \frac{1}{2}\cdot\frac{1}{\sqrt{L}}\, dL = (c+\sqrt{16}) - (c+\sqrt{0})$$

$$= \sqrt{16} = 4 \text{ units of output}$$

more generally:

$$\boxed{\int_0^{L_M} MPL_M \cdot dL_M = M}$$

from zero-profit condition:

$$p_M M = w L_M + r K$$

$$M = \frac{w}{p_M} L_M + \frac{r}{p_M} K$$

$$\boxed{\int_0^{L_M} MPL_M \, dL_M = \int_0^{L_M} \frac{w}{p_M} dL_M + \int_0^{L_M} \left(MPL_M - \frac{w}{p_M}\right) dL_M}$$

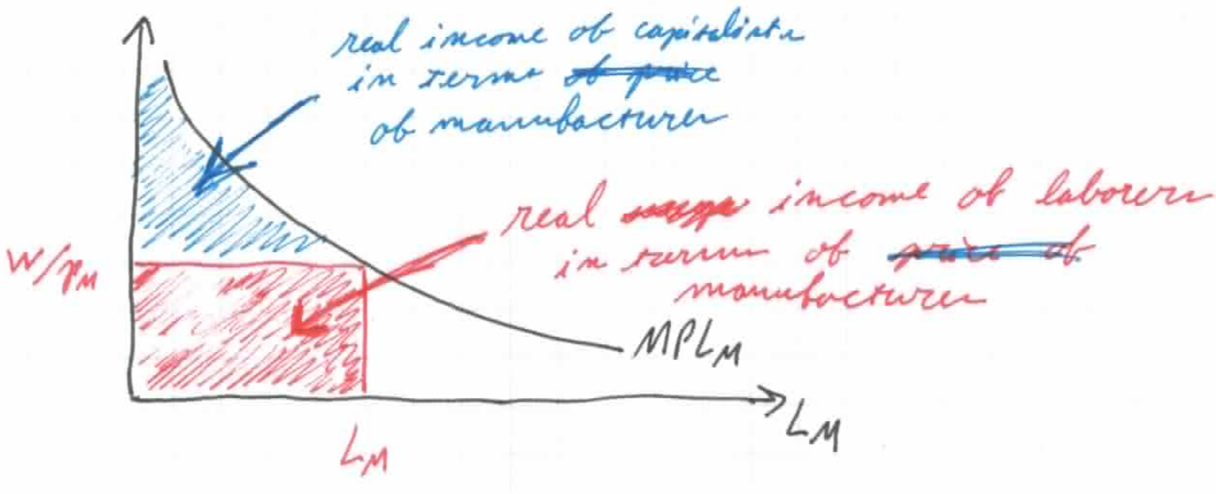
this must be true

but $\int_0^{L_M} MPL_M \, dL_M = M$

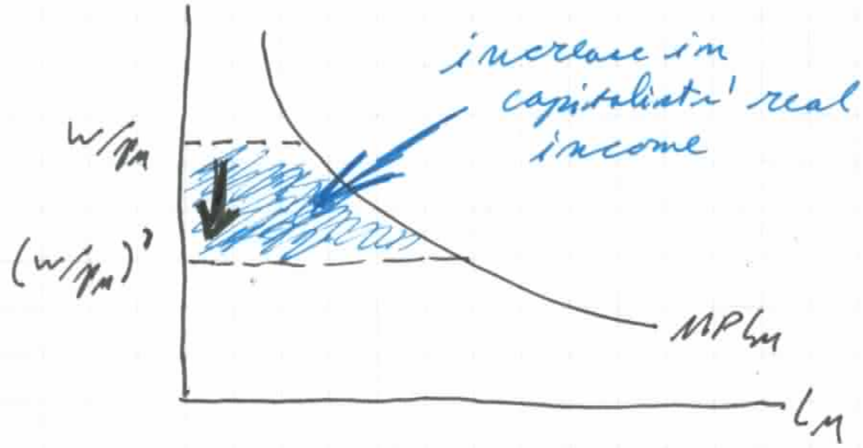
$$\int_0^{L_M} \frac{w}{p_M} dL_M = \frac{w}{p_M} \int_0^{L_M} dL_M = \frac{w}{p_M} L_M$$

therefore: $\frac{r}{p_M} K = \int_0^{L_M} \left(MPL_M - \frac{w}{p_M}\right) dL_M$

area beneath MPL_M + above w/p_M equals real income of capitalists (in terms of price of manufactures)

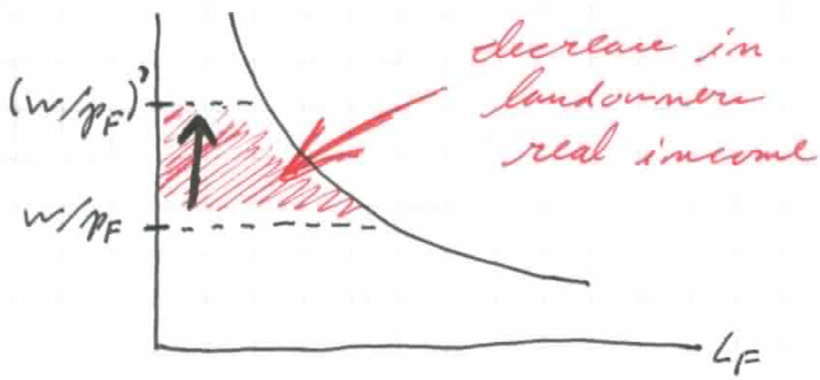


so when $\hat{p}_M = 10\%$
and $\hat{w} < 10\%$ } $\frac{w}{p_M}$ falls



$$\boxed{\hat{r}_T < \underset{\text{zero}}{\hat{p}_F} < \hat{w} < \hat{p}_M < \hat{r}_K}$$

similarly ~~incom~~ real income of landowners falls



because

$0\% < \hat{w}$

and $\hat{p}_F = 0\%$

so $\frac{w}{p_F} \uparrow$

owners of capital benefit from
→ lower real wage in terms of manuf
→ higher rel price of good they produce

owners of land suffer bec
→ higher rel wage in terms of food
→ lower rel price of good they produce

So how is all of this relevant to int'l trade?

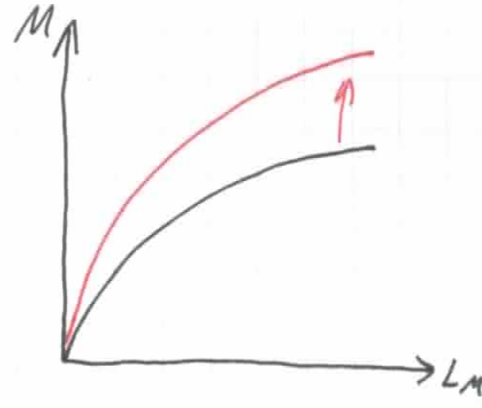
I'm getting there!

Consider two countries that ~~have~~ are identical in every respect HOME + FOREIGN

- → same preference for food + manuf + ∴ same rel demand
- → same technology
- → same labor supply
- → same land supply
- → same capital stock

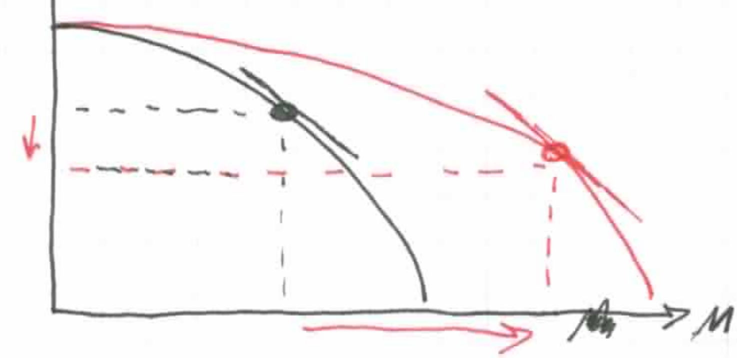
Now suppose that capital stock increases in home country

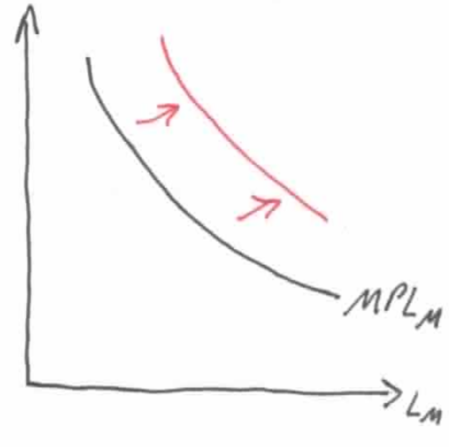
→ MPL_M will rise



→ opp cost of manuf will fall

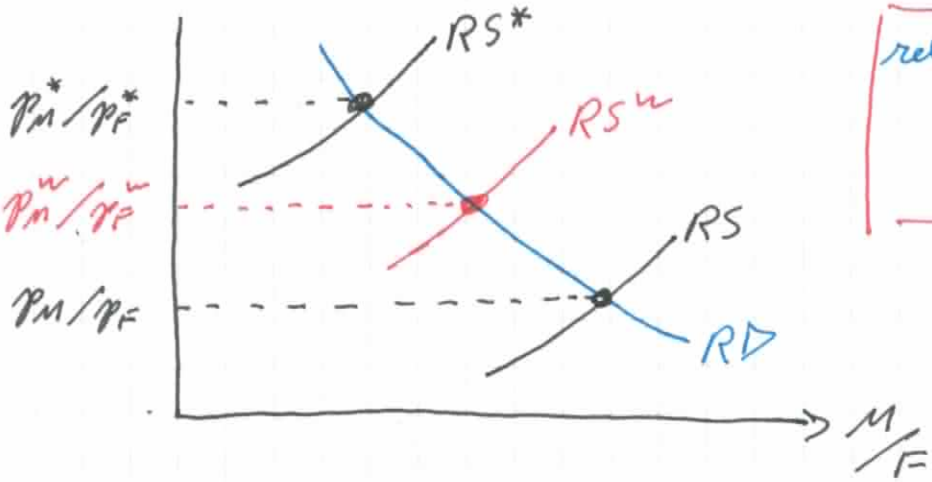
$\frac{MPL_F}{MPL_M}\downarrow$





→ Since opp cost of manuf lower after increase in capital stock ~~[illegible]~~ ~~[illegible]~~ a country with a larger capital stock has a comp adv in manufacturing

→ it therefore has a lower autarky rel price of manuf



rel price manuf
FALLS in foreign
RISES in Home

→ when Home + Foreign trade, world rel supply curve lies bet w/in RS and RS*

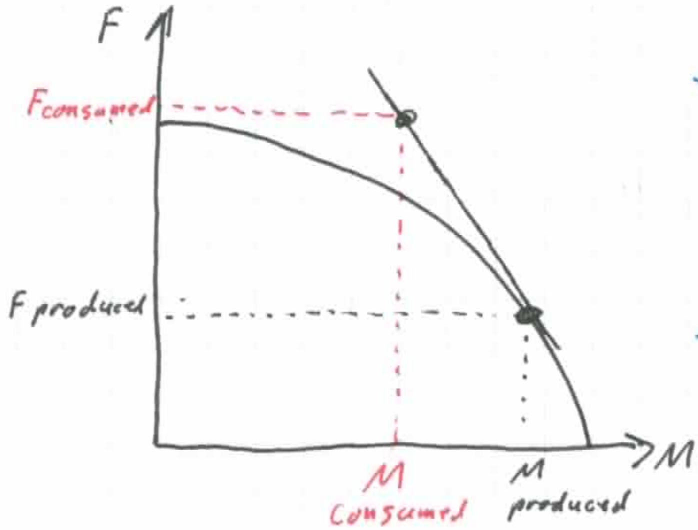
→ ∴ world rel price of manuf will lie bet w/in the two countries' autarky rel prices of manuf

→ because trade equalizes the rel price of manuf in the two countries:

- rel price of manuf FALLS in Foreign
- rel price of manuf RISES in Home

→ Home will export manuf & import food
Foreign will import manuf & export food

→ trade expands consumption possibilities



→ before trade consumption possibilities limited to what econ can produce (i.e. limited to PPF)

→ w/ trade, country specializes where has comp adv & can consume ~~more than can produce~~ more of both goods than can produce on own

→ Since econ as a whole consumes more of both goods, it is possible in principle to give each individual more of both goods

→ but ~~that~~ just because everyone could gain from trade doesn't mean everyone actually does

income distribution

→ because rel price of manufactures rises (at home)

→ capitalists gain unambiguously

→ ~~[illegible]~~ landowners lose unambiguously

→ laborers benefit from increased purchasing power in terms of food, but ~~[illegible]~~ suffer from lower purchasing power in terms of manufactures

→ in principle, a redistribution could make everyone better off

→ but that's not what happens

→ landowners (ie farmers) ~~[illegible]~~ lobby congress ~~[illegible]~~ for trade barriers

EXAMPLE total cost to society of trade barrier $10,000

total benefit to producers of trade barrier $5,000

if costs spread over 1000 people, but benefits concentrated on 50 people, then

→ each member of society pays $10

→ each producer receives $100

who's going to scream the ~~[illegible]~~ loudest?