2 ctys < H, F   2 goods < C → L intensive, F → L intensive

2 fops < T, L   CRS Tech.

Labor mkt clearing ⇒. $L_F + L_C = L$

$\Rightarrow \left(\frac{L_F}{Q_F}\right) Q_F + \left(\frac{L_C}{Q_C}\right) Q_C = L \Rightarrow a_{LF} Q_F + a_{LC} Q_C = L$

ly $a_{TF} Q_F + a_{TC} Q_C = T$

Intensity   C is more L-intensive

$\Rightarrow \frac{a_{LC}}{a_{TC}} > \frac{a_{LF}}{a_{TF}}$

$\Rightarrow \frac{a_{LC}}{a_{LF}} > \frac{a_{TC}}{a_{TF}}$

Example   Leontief: $C = \min\left[\frac{L_C}{a_{LC}}, \frac{T_C}{a_{TC}}\right]$

⇒ To produce 1 unit of c:

$C = 1 = \min\left[\frac{a_{LC}}{a_{LC}}, \frac{a_{TC}}{a_{TC}}\right] = \min[1, 1] = 1$

⇒ Need a_{LC} units of L_C

& a_{TC} " " T_C

ly $F = 1 = \min\left[\frac{a_{LF}}{a_{LF}}, \frac{a_{TF}}{a_{TF}}\right] = \min[1, 1] = 1$

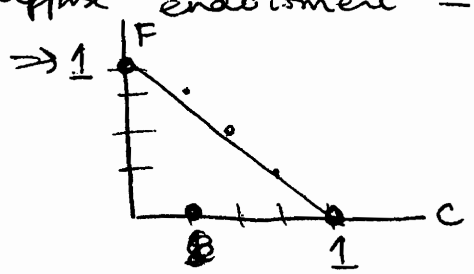
⇒ C L-intensive if $\frac{a_{LC}}{a_{TC}} > \frac{a_{LF}}{a_{TF}}$

Numerically: $C = \min\left[\frac{L_C}{2}, \frac{T_C}{4}\right]$

$F = \min\left[\frac{L_F}{1}, \frac{T_C}{4}\right]$

$\Rightarrow \frac{a_{LC}}{a_{TC}} = \frac{2}{4} > \frac{1}{4} = \frac{a_{LF}}{a_{TF}}$

Suppose endowment = (L, T) = (4, 4)



Endowments : 2 ctys:

$H \rightarrow (T, L) = (1, 16)$

$For \rightarrow (L, T) = (16, 1)$

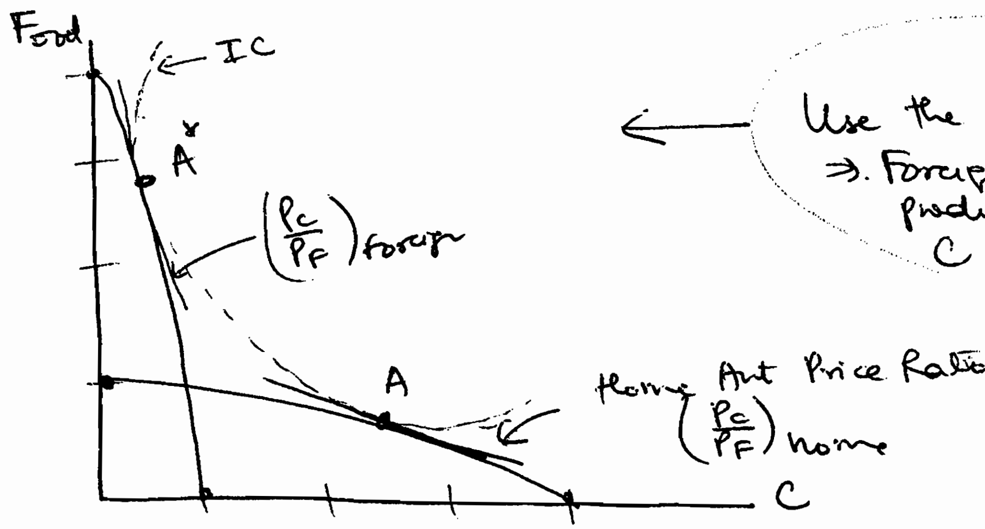
$\Rightarrow$ Home is L-abundant $\left(\frac{L}{T}\right)_{home} > \left(\frac{L}{T}\right)_{foreign}$

$\Rightarrow$ Produces more C than F (assuming "identical" "nice" preferences)

$H: \quad C_{max} = L^{3/4} T^{1/4} = 1.2 = 2$

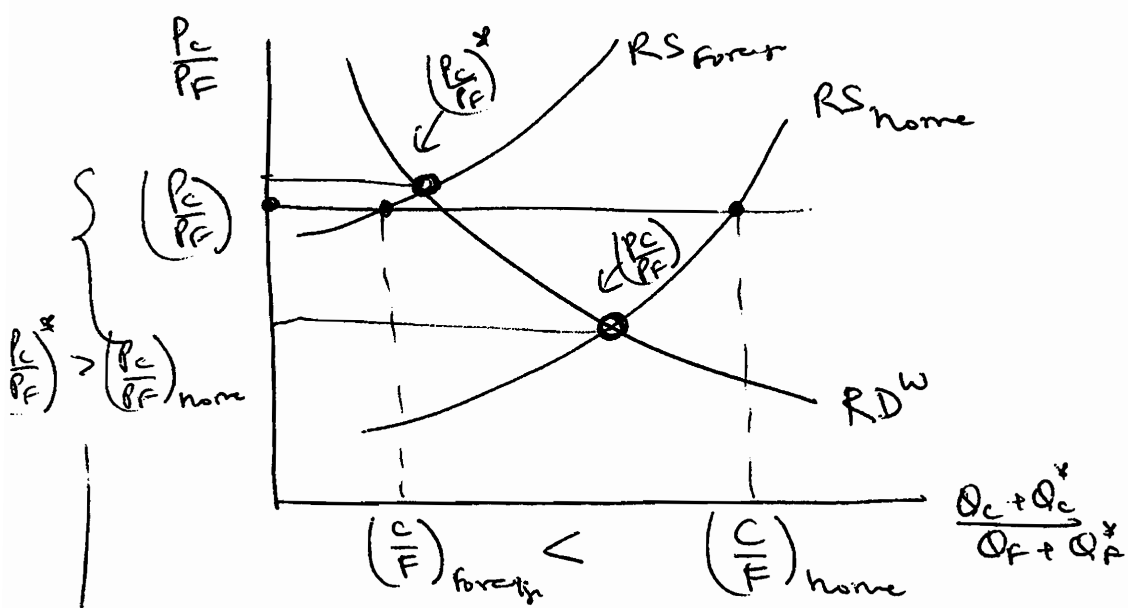
$\qquad f_{max} = L^{1/4} T^{3/4} = 1.8 = 8$

$For: \quad c_{max} = 8 \qquad f_{max} = 2$



Use the home $\frac{P_C}{P_F}$ for PPF*

$\Rightarrow$ Foreign will produces less C than home



$\hookrightarrow$ $OCC^* > OCC^{home}$

$\Rightarrow$ Home has CA in Cloth (L-intensive)
(L-abundant)

Factor Prices

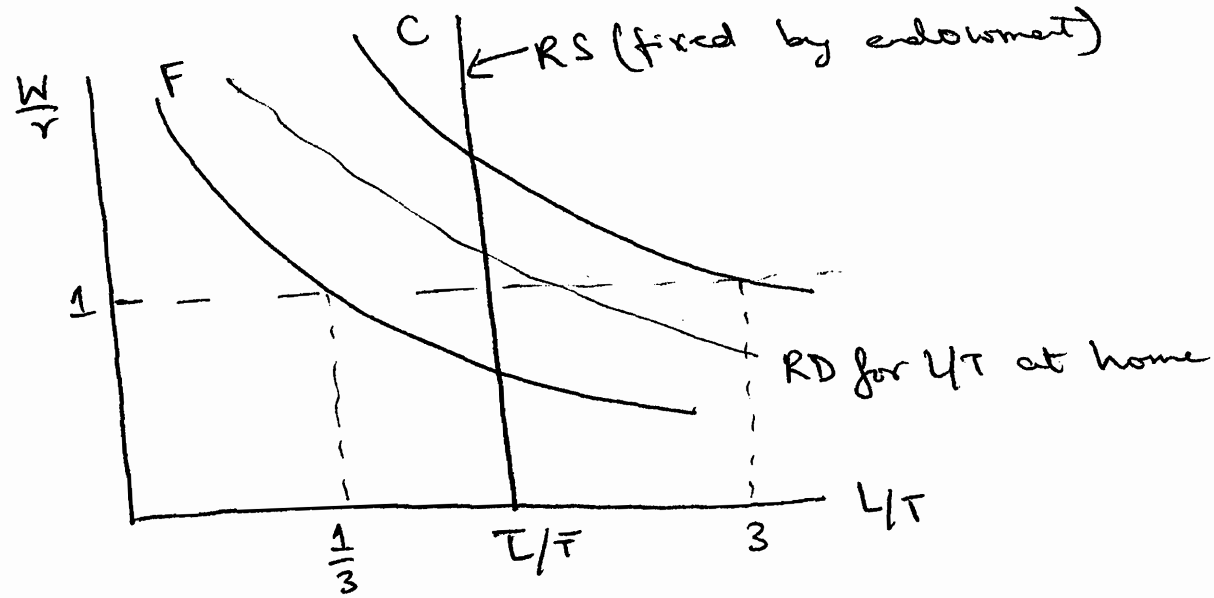
Same Example:

$\left(\frac{L}{T}\right)_c = 3\,\frac{r}{w}$ $\qquad$ $\left(\frac{L}{T}\right)_F = \frac{1}{3}\,\frac{r}{w}$

$\Rightarrow$ (1) $\frac{L}{T}$ depends on $\frac{w}{r}$ in each sector

(2) Given $\frac{w}{r}$, C uses more $\frac{L}{T}$ than F

(3) Given $\frac{w}{r}$, $\frac{L}{T}$ same (fixed for a given $\frac{w}{r}$ ~~[illegible]~~ ratio)



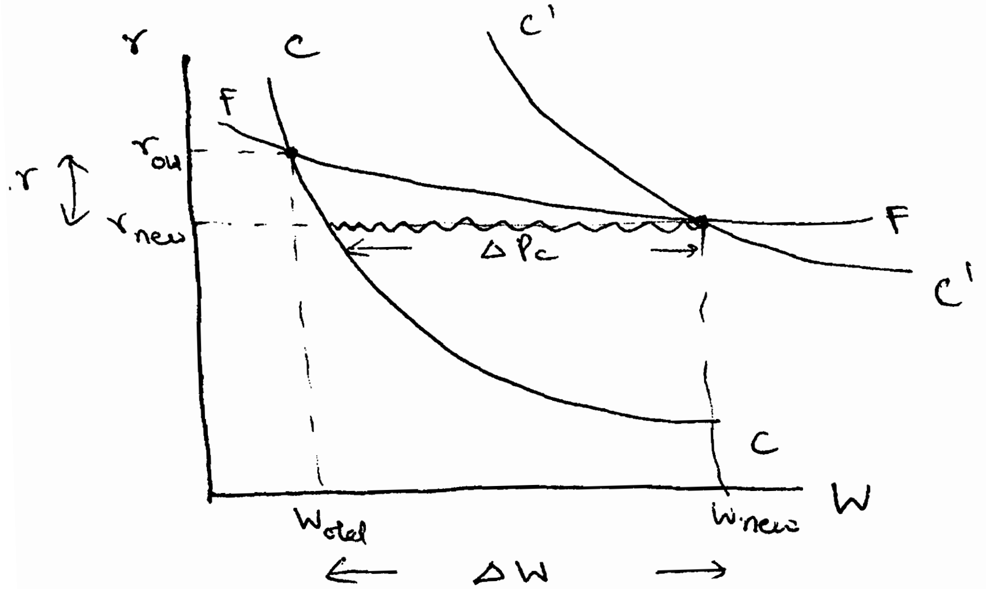
Depicting an ↑ in P_c

Assume $P_F = 1$ (i.e. Food is the numeraire)

2 methods < Feenstra diagram $(\frac{w}{r}, \frac{L}{T})$ / Unit Cost functions.

Unit Cost Functions ($\uparrow P_c$)

When P_c ↑, nothing changes in the $P_F = AC_F$ curve ⇒ FF stays the same
But now to satisfy $P_c = AC_c$, must pay more w ~~or~~ r ⇒ ~~[illegible]~~ CC curve shifts up to C'C'



r ↓ w ↑

Moreover, $\Delta r < \Delta P_c < \Delta W$

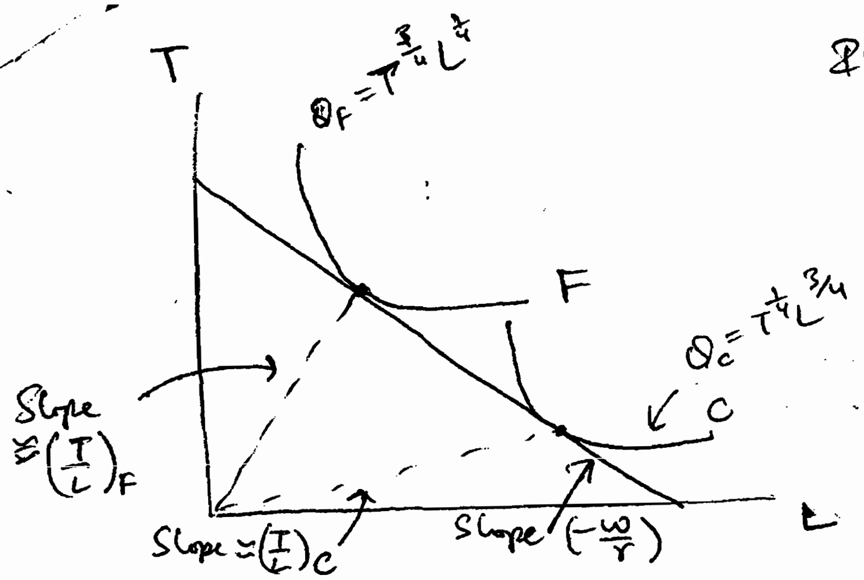
$\Rightarrow W\uparrow > P_c\uparrow$

Real Returns:

$\frac{r\downarrow}{P_c\uparrow} \Rightarrow \downarrow \quad \frac{r\downarrow}{P_F \Leftrightarrow} \Rightarrow \downarrow \quad \Rightarrow$ Real r falls

$\frac{W\uparrow\uparrow}{P_c\uparrow} \Rightarrow \uparrow \quad \frac{W\uparrow}{P_F \Leftrightarrow} \Rightarrow \uparrow \quad \Rightarrow$ Real w rises

⇒ Stolper Samuelson Theorem ⇒ Factor used intensively in C (whose P_c ↑) is better-off & other factor is worse-off

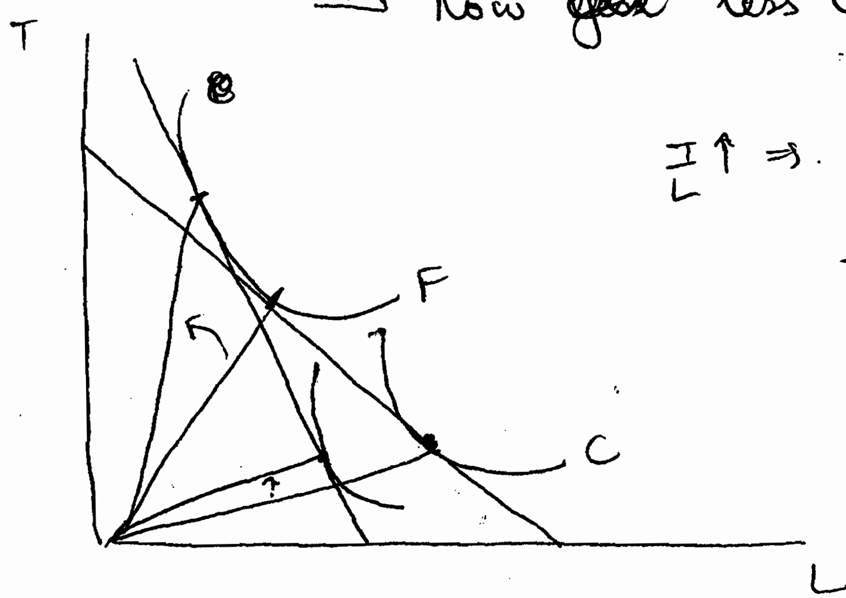


If φ ⇒ Inputs needed to produce ~~[illegible]~~ 1 dollar worth of F & C (why \$ not unit because they exch for each other)

Slope = MRTS $= \dfrac{MPL}{MPT} = \dfrac{w}{r}$

If $P_C \uparrow$ ⇒ $\left(\frac{w}{r}\right)\uparrow$ ⇒ $\left(\frac{T}{L}\right)\uparrow$ in both sectors

⇒ Now ~~get~~ less C for 1 \$



$\frac{T}{L}\uparrow$ ⇒ Now produce less F/C because otherwise will run out of T/L

What happens when 1 cty becomes smaller?

$$\frac{C+C^*}{F+F^*} = \underbrace{\left(\frac{F}{F+F^*}\right)}_{\equiv} \frac{C}{F} + \left(\frac{F^*}{F+F^*}\right)\frac{C^*}{F^*}$$

$$= (\lambda)\frac{C}{F} + (1-\lambda)\frac{C^*}{F^*}$$

$\lambda \equiv \frac{F}{F+F^*}$ $\Rightarrow$ If $F^* \uparrow$ then $\lambda \downarrow$
" $F^* \downarrow$ " $\lambda \uparrow$

$\Rightarrow$ When foreign cty becomes smaller
(all ratios are the same but the size has shrunk $\Rightarrow$ ~~the~~ $F^* \downarrow$ though $\frac{C^*}{F^*}$ is same)

$$\Rightarrow \frac{C+C^*}{F+F^*} = \lambda\frac{C}{F} + (1-\lambda)\frac{C^*}{F^*}$$

$$= (\uparrow) \leftrightarrow + (\downarrow) \leftrightarrow$$

$$= \underbrace{\qquad}_{\uparrow} + \underbrace{\qquad}_{\downarrow}$$

$\Rightarrow$ Weight of home cty increases (in the RS picture)
& " " foreign " falls

EXTRA MATERIAL (Baby version)

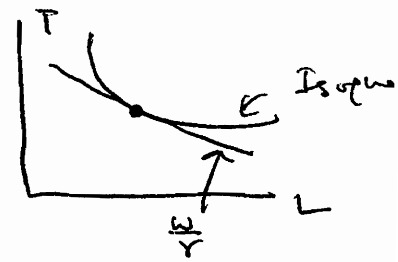
Factor Prices: Long-Run Changes (Magnification Effect)

From Bhagwati, Panagariya & Srinivasan.
Let i denote a sector.

In Eqb^n, $P_i = AC_i = a_{Li} w + a_{Ti} r$

$$\Delta P_i = a_{Li} \Delta w + a_{Ti} \Delta r + \underbrace{[w \Delta a_{Li} + r \Delta a_{Ti}]}$$

Remember a profit maximizing producer chooses $\frac{w}{r} = MRTS$
$= \text{Slope of IQ}$.



But Slope of IQ $= -\frac{\Delta a_{Ti}}{\Delta a_{Li}}$

$$\Rightarrow \quad \frac{w}{r} = -\frac{\Delta a_{Ti}}{\Delta a_{Li}} \quad \Rightarrow$$ The terms in square brackets sum to zero

So, $\Delta P_i = a_{Li} \Delta w + a_{Ti} \Delta r$

Now divide by P_i on both sides and re-arrange terms

$$\Rightarrow \quad \frac{\Delta P_C}{P_C} = \frac{\Delta w}{w} \frac{w a_{LC}}{P_C} + \frac{\Delta r}{r} \frac{r a_{TC}}{P_C}$$

Similarly for Food, $$\frac{\Delta P_F}{P_F} = \frac{\Delta w}{w} \frac{w a_{LF}}{P_F} + \frac{\Delta r}{r} \frac{r a_{TF}}{P_F} = 0$$ (Since food is numeraire

$$\Rightarrow \quad \frac{\Delta r}{r} = -\left(\frac{\Delta w}{w} \frac{w a_{LF}}{P_F}\right) \Big/ \left(\frac{a_{TF} r}{P_F}\right)$$

Substitute this back in $\frac{\Delta P_C}{P_C}$ expression & solve for $\frac{\Delta w}{w}$

$$\Rightarrow \quad \frac{\Delta w}{w} = \frac{\frac{a_{TF} r}{P_F} \frac{\Delta P_C}{P_C}}{\frac{w a_{LC}}{P_C} \frac{r a_{TF}}{P_F} - \frac{w a_{LF}}{P_F} \frac{r a_{TC}}{P_C}}$$

$$= \frac{(\Delta P_C / P_C)}{\underbrace{\frac{w a_{LC}}{P_C}}_{(<1)} \left[1 - \left(\frac{a_{LF}}{a_{TF}}\right) \Big/ \left(\frac{a_{LC}}{a_{TC}}\right)\right]}$$

Share of Labor $\leftarrow$ (<1)

What does the Magnification Effect mean?

$$\frac{\Delta W}{W} > \frac{\Delta P_C}{P_C} > \frac{\Delta r}{r}$$

$\Rightarrow$. Rg $\frac{P_C}{P_F}$ $\uparrow$ (after trade)

then $\hat{w} > \hat{P}_c > \hat{P}_F (= 0) > \hat{r}$

At home : $\hat{w} > \hat{P}_c > 0 > \hat{r}$ $(P_c \uparrow)$

In foreign : $\hat{w} < \hat{P}_c < 0 < \hat{r}$ $(P_c \downarrow)$

$\Rightarrow$. $\frac{\hat{W}}{\hat{r}} \uparrow\uparrow$ at home

$\frac{W}{r} \downarrow\downarrow$ in foreign

$\Rightarrow$ Factor prices are moving closer in the 2 ctys.

In fact, "eventually" $\left(\frac{W}{r}\right)_{Home} = \left(\frac{W}{r}\right)_{Foreign}$

$\Rightarrow$ Factor Price Equalization.