Gravity Model 引力模型

Trade ⇒ size matters ⇒ $T_{ij} = A \cdot G_i \cdot G_j / D_{ij}$
with Whom

T_{ij}: value of trade; G_i, G_j: 两国GDP; D_{ij}: distance between i&j.

What to Trade ⇒ { Trade in Goods; Trade in Services.

贸易理论模型 ⇒ (完全竞争市场下). Countries trade with others because of their differences. Chapter 2-6.
{ economies of scale

① The Ricardian Model ⟹ labor productivity & Comparative advantage. chapter 7.

⇒ simply due to international differences in the productivity of labor.

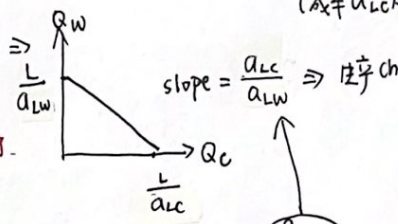
⇒ mechanism ⇒ trade with comparative advantage (relatively lower opportunity cost)

假设前提 ⇒ ① 2 parties (Home & Foreign)
② 2 products
③ 1 factor (只考虑 labor)
④ supply of labor L给定.

Unit labor requirement ⇒ 生产1单位产品所需劳动量 ⇒ 即生产成本. $\frac{1}{a_{LC}}$ (成本 a_{LC} 越↓，效率越↑).

PPF ⇒ production productivity frontier

$a_{LC} Q_C + a_{LW} Q_W \le L$.



slope $= \frac{a_{LC}}{a_{LW}}$ ⇒ 生产 cheese 的机会成本 interm of wine

$\Rightarrow Q_W = \frac{L}{a_{LW}} - \frac{a_{LC}}{a_{LW}} \cdot Q_C$

$W_C = \frac{P_C}{a_{LC}}$ & $W_W = \frac{P_W}{a_{LW}}$

⇓

若 $\frac{P_C}{a_{LC}} > \frac{P_W}{a_{LW}}$，即 $\frac{P_C}{P_W} > \frac{a_{LC}}{a_{LW}}$ ⇒ 则 $W_C > W_W$ ⇒ 都会当 cheese 工人.

cheese 的相对价格 > cheese 的相对成本

⇒ cheese 供>求，P↓，wine 供<求，P↑ ⇒ 最终 $\frac{P_C}{P_W} = \frac{a_{LC}}{a_{LW}}$.

Trade in One-factor Model

⇒ 前提 assumption ① Home has comparative advantage on cheese

⇒ 即 $\frac{a_{LC}}{a_{LW}} < \frac{a^*_{LC}}{a^*_{LW}}$

一国不可能在所有产品中都占比较优势，两国中，各一方比较优势，另一个一定劣势.

② Home has absolute advantage on both.

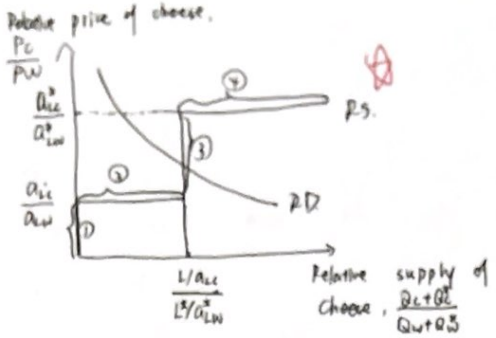
⇒ $a_{LC} < a^*_{LC}$ 且 $a_{LW} < a^*_{LW}$.

RS ⇒ relative supply.

Cheese 的 RS: $\frac{Q_C + Q_C^*}{Q_W + Q_W^*}$

Cheese 的 RP: $\frac{P_C}{P_W}$

⇒



⇒ RS的五阶段. ① $\frac{P_C}{P_W} < \frac{a_{LC}}{a_{LW}} < \frac{a^*_{LC}}{a^*_{LW}}$ ⇒ Cheese 相对价格 < 相对效率 ⇒ 全产wine. RS=0.

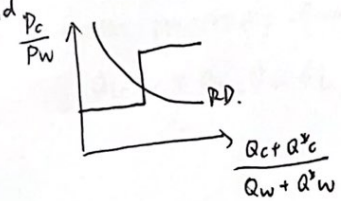
② $\frac{P_C}{P_W} = \frac{a_{LC}}{a_{LW}} < \frac{a^*_{LC}}{a^*_{LW}}$ ⇒ for Home, 生产啥无所谓
for Foreign, 相对价格 < 效率 ⇒ 只产 wine
⇒ RS 在 $[0, \frac{L/a_{LC}}{L^*/a^*_{LW}}]$ 波动.

③ $\frac{a_{LC}}{a_{LW}} < \frac{P_C}{P_W} < \frac{a^*_{LC}}{a^*_{LW}}$ ⇒ for home, 只产 cheese
for foreign, 只产 wine ⇒ $RS = \frac{L/a_{LC}}{L^*/a^*_{LW}}$

④ $\frac{a_{LC}}{a_{LW}} < \frac{P_C}{P_W} = \frac{a^*_{LC}}{a^*_{LW}}$ ⇒ for Home, 只产 cheese
for foreign, 无所谓 ⇒ 只产 wine ⇒ $RS = \frac{L/a_{LC}}{L^*/a^*_{LW}}$
只产 cheese ⇒ wine 产量为 0 ⇒ RS → ∞

⑤ $\frac{a_{LC}}{a_{LW}} < \frac{a^*_{LC}}{a^*_{LW}} < \frac{P_C}{P_W}$ ⇒ 全产 cheese ⇒ RS → ∞ (画不出).

RD ⇒ Relative demand



⇒ The gains from trade → ① think trade as an ~~it~~ indirect method of production.

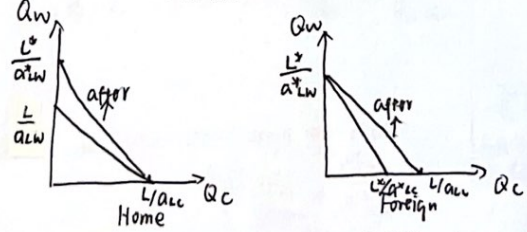
⇒ $\frac{a_{LC}}{a_{LW}} < \frac{P_C}{P_W} < \frac{a^*_{LC}}{a^*_{LW}}$. ⇒ 工人的工资也↑.

⇒ 贸易使得 Relative cost ↓

② think trade as a direct method of production

⇒ PPF 变动.

⇒ trade 的分析全部基于 comparative advantage 的分析. 与绝对优势无关



slope 由 opportunity cost 变为 relative price $\frac{P_C}{P_W}$.

RW => Relative Wage Rate.

$\Rightarrow \frac{w}{w^*} = \frac{P_c}{a_{Lc}} \Big/ \frac{P_w}{a^*_{Lw}} = \frac{P_c}{P_w} \cdot \frac{a^*_{Lw}}{a_{Lc}}$

本国生产 cheese，外国生产 wine

$\Rightarrow \frac{a_{Lc}}{a_{Lw}} < \frac{P_c}{P_w} < \frac{a^*_{Lc}}{a^*_{Lw}}$

$\Rightarrow \frac{a^*_{Lw}}{a_{Lw}} < \frac{w}{w^*} < \frac{a^*_{Lc}}{a_{Lc}}$

表示 Home 对 cheese & wine 的相对生产力 $\Rightarrow$ RW 由(RP)决定

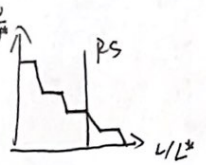
相对生产力 ↑

$\Rightarrow \begin{cases} wa_{Lc} < w^* a^*_{Lc} \\ a^*_{Lw} w^* < w a_{Lw} \end{cases} \Rightarrow \begin{cases} \text{本国生产 cheese 有成本优势} \\ \text{外国在生产 wine 上有成本优势} \end{cases}$

Comparative Advantage with many goods.

$\Rightarrow$ 生产的成本的 $\Rightarrow wa_{Li} < w^* a^*_{Li} \Rightarrow \frac{w}{w^*} < \frac{a^*_{Li}}{a_{Li}}$ 即相对生产力 > 相对工资.

$\frac{w}{w^*}$ 的决定 $\Rightarrow$ 劳动力市场



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② Specific Factor Model $\Rightarrow$ short-run effect of trade on income distribution

Basic Assumptions.

$\Rightarrow$ 2 countries × 2 products × 3 factors

Cloth Food.

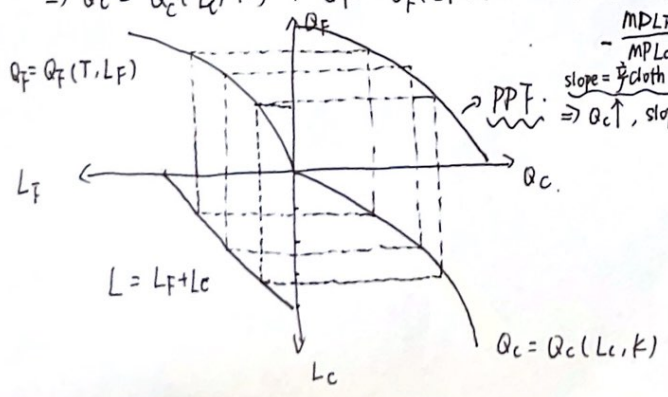
Labor (L), capital (K), land (T).

L T L T

Labor 可在两个行业间流转

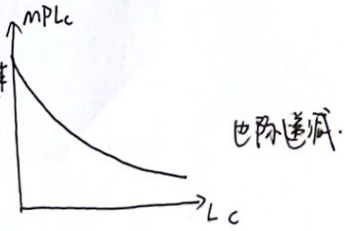
{ all factors are immobile across 2 countries.
endowments of factors are constant.

$\Rightarrow Q_C = Q_C(L_C, K)$, $Q_F = Q_F(L_F, T)$ $\Rightarrow L_C + L_F = L$.



slope = $-\frac{MPL_F}{MPL_C}$ = 产cloth的机会成本

$\Rightarrow Q_C$ ↑, slope 越陡.

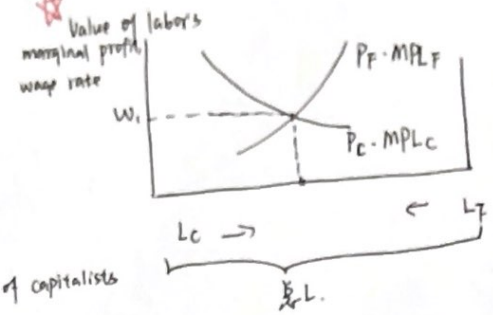


边际递减.

Allocation of Labor

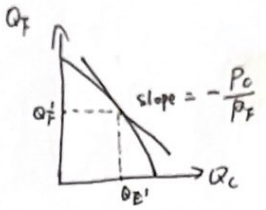
⇒均衡点，效益 max ⇒ Demand curve for labor $MPL \cdot P = W$.

⇒ $L\uparrow \Rightarrow MPL\downarrow \Rightarrow W\downarrow$.



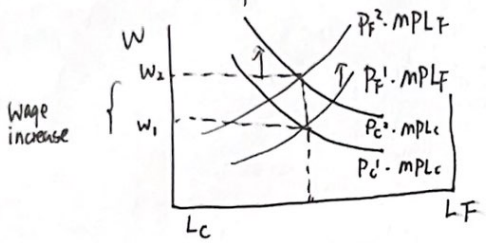
即长期下均衡 ⇒ $P_F \cdot MPL_F = P_C \cdot MPL_C = W$

即 $-\frac{P_C}{P_F} = -\frac{MPL_F}{MPL_C}$ = slope of PPF



⇒ 产品P对 income distribution 的影响

⇒ ① 绝对价格变 & 相对价格不变 (同比上涨).



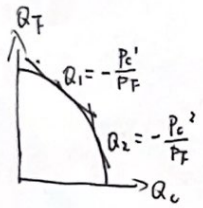
⇒ 不影响 allocation of labor ⇒ MPL 不变

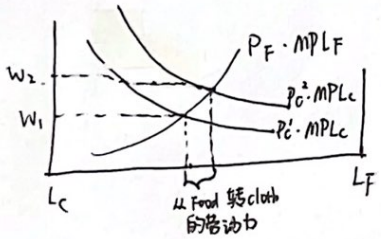
⇒ $\Delta W = \Delta P$

⇒ 工人&资本家及地主的收入均同比↑

⇒ income distribution 不变.

② 相对价格变 (假设 P_C↑)





⇒ P_C↑ → L_C↑ → MPL_C↓ → W↑但涨幅比P_C小 ⑨

⇒ income distribution

1) capital owner

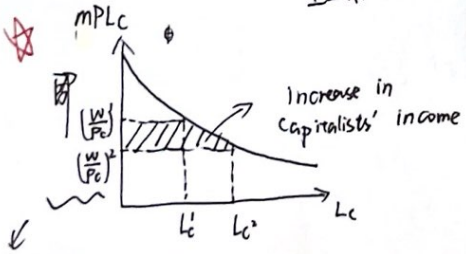
⇒ real income ↑

2) land owner

⇒ real income ↓

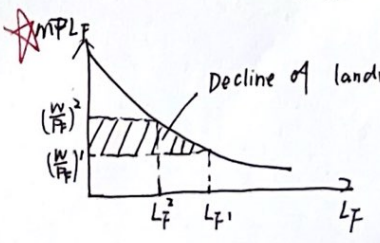
上三角为其 income

3) worker ⇒ 取决于其消费偏好 { 买F ⇒ $\frac{W\uparrow}{P_F-}$ ↑ ; 买C ⇒ $\frac{W\uparrow}{P_C\uparrow}$ ↓.

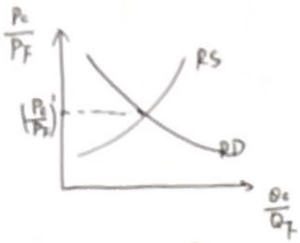


可见. P_C与W均↑

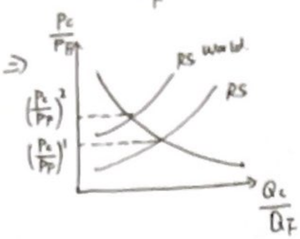
但 P_C 涨幅更大 ⇒ 需↓



RS ⇒



⇒ 上述 Pc↑后 ⇒



即贸易后消费组合 > 贸易前的PPF上的组合

⇑

⇒ 贸易下，相对价格上涨 ⇒ 国内还能否获益

⇓

从消费角度研究

$P_C \cdot D_C + P_F \cdot D_F = P_C \cdot Q_C + P_F \cdot Q_F$

约预算约束 (与PPF相切)

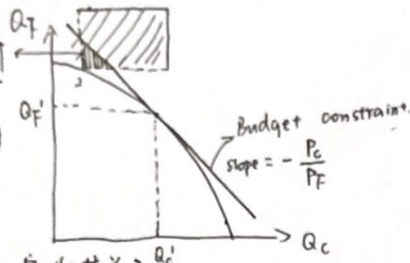
有可能消费

⇓

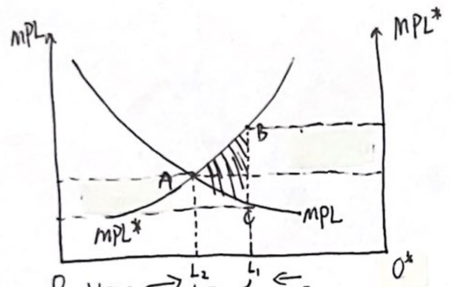
贸易定使我国整体获益

(但个人不一定均获益)

如前页所列，landowner 的 real income ↓，worker 未知.



③ International Labor Mobility Model. (under Specific Model)



⇒ 若无阻碍，即 labor mobility.

⇒ L 流向高工资水平地方 → MPL 高的地方. (MPL高 ↓ 就更高.)

即 $L_1 \to L_2$ ⇒ 工资水平趋同.

⇒ 本国产出减少 ⇒ ACL_1L_2 (四边形)

外国产出增加 ⇒ ABL_1L_2. (四边形.)

⇒ world output ↑ ⇒ ABC (三角部分). $ABL_1L_2 - ACL_1L_2$.

⇒ 结论：国际要素流动整体受益，但个体不尽然. (例如外国工人由于 labor immigration ⇒ W水平↓) 从B→A.

转去外国的工人获益

⇒ labor immigration → hurts landowner in Home (L↓)

benefits landowner in Foreign (L↑).

④ Heckscher – Ohlin Model.

—— long-run effect of trade on income distribution.

⇒ Relative abundance of factors of production 在国家中

↓

Relative intensity of factors of production in 生产过程中.

⇒ Basic Assumptions.

2×2×2. ⇒ 2 countries × 2 products × 2 factor

Labor(L) — Wage, w

capital (K) — Rental Rate, r.

⇒ ① supply of labor & capital are constant & varies across countries

② 长期下, capital & labor can more across sectors

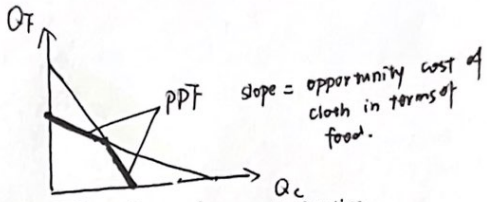
⇒ equalizing w & Rental Rate across sector

$Q_C = Q_C(L_C, K_C)$. $Q_F = Q_F(L_F, K_F)$. $L_C + L_F = L$ $K_C + K_F = K$.

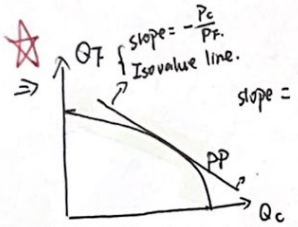
$a_{KC}Q_C + a_{KF}Q_F \le K$

$a_{LC}Q_C + a_{LF}Q_F \le L$.

代入 $a_{KC}, a_{KF}, a_{LC}, a_{LF}, K, L$ 值后 ⇒ 得



PPF without factor substitution.



⇒ slope $= \frac{MPL_F}{MPL_C}$ or $\frac{MPK_F}{MPK_C}$ ⇒ Q_C↑, MPL_C或MPK_C↓ ⇒ slope↑ ⇒ 陡.

即量↑, opportunity cost↑.

PPF with Factor substitution.

⇒ 如何生产分配 Q_F & Q_C ⇒ Maximize the value of production, V.

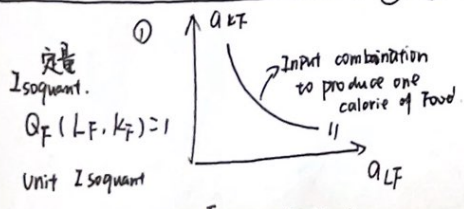
Isovalue line 等价线 ⇒ $V = Q_C P_C + Q_F P_F$

slope of it $= -\frac{P_C}{P_F}$

⇒ isovalue line 与 PPF 相切时, optimize. V.

即"相对价格 = 相对成本"

Factor distribution 的决定: (用多少 L & K).



① 定量 Isoquant. $Q_F(L_F, K_F) = 1$

Unit Isoquant

Factor distribution

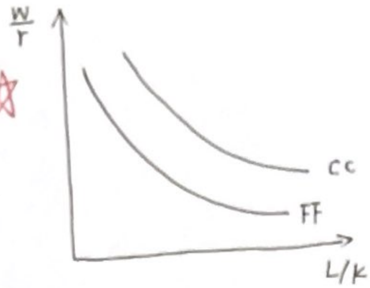
① 取决于 w & r. ⇒ $\frac{w}{r}$↑, more K, less L ⇒ $\frac{L}{K}$↓ in both F & C production.

$\frac{w}{r}$↓, more L, less K ⇒ $\frac{L}{K}$↑

② 就是哪种要素密集型.

要素间相对价格.

⇒ 假定 cloth 为劳动密集型，food 为资本密集型.



两曲线表示在给定的要素相对价格下，两部门投入的 factor distribution
$\frac{W}{r}$.

$\frac{W}{r}$ → 决定 L/K

影响 $\frac{P_c}{P_F}$ ⇒ 完全竞争市场. 产品价格 = 生产成本
所需要素投入价格.

⇒ if $\frac{W}{r}$↑ → $\frac{P_c}{P_F}$↑.

"Stolper – Samuelson theorem"
一产品相对价格↑ → 其密集使用的要素相对价格↑.
$\frac{P_c}{P_F}$↑ → $\frac{W}{r}$↑
(Labor intensive)

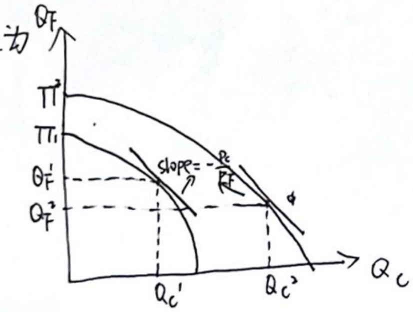
⇒ L/K ⟵ $\frac{W}{r}$ ⟵ $\frac{P_c}{P_F}$.

即 $\frac{P_c}{P_F}$(衣服相对P)↑ → 劳动相对价格 $\frac{W}{r}$↑ → $\frac{L}{K}$↓ ⇒ 故两产品生产中, L比重均↓.

要素数量变动 ⇒ 对产出的影响.

若 L↑ → Q_c↑ ⇒ 但 $\frac{P_c}{P_F}$ 不变 ⇒ 要素组合不变 ⇒ 产cloth的K↑ → Q_F↓.

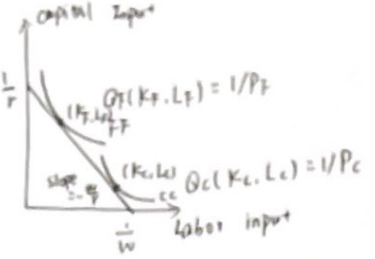
图示为



PPF扩张但F与C的涨幅不同
⇒ 扩张后的最优 ⇒ slope 不变的时候
⇒ Q_c↑, Q_F↓.

"Rybczynski Theorem"
即产品价格恒定时, 一要素数↑
⇒ 该要素密集型产品Q↑, 另一种Q↓

$\frac{P_C}{P_F}$ 给定时，生产要素价格决定



$\Rightarrow \frac{P_C}{P_F}$ = 生产要素密集度

Unit cost Isocost Line $\Rightarrow 1 = wL_i + rK_i$, 对于 i

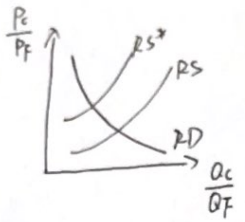
$\Rightarrow$ slope $= -\frac{w}{r}$

两国也仍贸易

$\Rightarrow$ 假设 ① 本国劳动更丰富，即 $L/K > L^*/K^*$

② 两国技术水平相同，消费偏好相同

$\Rightarrow$ 两国需求比例一致 & 本国产 cloth 有 comparative advantage.



$\Rightarrow \frac{P_C}{P_F}$ 一定时，本国供给更多，即 RS 在 RS^* 右也.

$\Rightarrow$ 贸易统一价 $\Rightarrow$ 本国市场，cloth 的相对价格↑ $\Rightarrow$ 更多要素投入 cloth 中

而 RD 不变，cloth 产出 > Demand，food 产出 < Demand.

$\Rightarrow$ 我国为 cloth 出口国 & food 进口国.

即 "HO 定理"

拥有啥要素多，就出口该要素密集产品.

Income distribution

贸易 $\Rightarrow \frac{P_C}{P_F}$↑ $\rightarrow \frac{w}{r}$↑ $\Rightarrow$ 工人的 real income↑

资本家的 real income↓.

$\Rightarrow$ 即贸易使本国相对丰富要素所有者受益

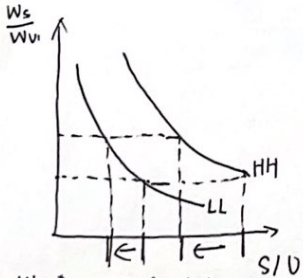
本国相对稀缺要素所有者受损.

其不足之处

① 现实中，已有技术因素

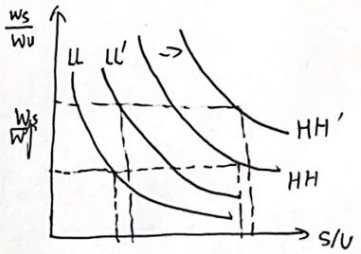
$\Rightarrow$ 贸易 & skill-biased 技术变化对 skilled worker & unskilled worker 间 income distribution 的影响.

a. 贸易 $\Rightarrow$ 高技术人才相对工资上升



$\frac{W_S}{W_U}$↑ $\Rightarrow$ 两行业就业比例↓

b. skill-biased technological change.



技术变化 $\rightarrow \frac{W_S}{W_U}$↑ $\rightarrow$ 就业比例仍↑（对高技术人才需求↑）

② HO模型中，$\frac{P_C}{P_F} \sim \frac{w}{r}$ ⇒ 贸易统一价下，同一要素在不同国家价格一样

现实中⇒存在技术差异 ⇒ 同一要素不同国家的生产力不同 ⇒ 价格不同

eg. 工人工资.

③ 统一价不现实

⇒ 贸易壁垒，transaction costs.

④ HO Model ⇒ long run ⇒ 要素价统一

而短期内，要素无法在行业间自由流动 ⇒ 不同国家要素差异.

⑤ HO Model 建立在两国产品相同的基础上 ⇒ 不太可能.

⟹ 除此上干扰影响外，HO Model 准确性较高.

※ HO Model 中 "Factor-Price Equalization Theorem".

⇑ 上述几点是此定理不现实的地方

前提：① free trade

② both countries produce same goods

③ identical constant-returns-to-scale production technologies.

⇒ 在上述前提下，贸易使得 要素相对价格也统一.

商品商品相对价格统一

Instruments of Trade Policy ⇒ 采用局部均衡分析 partial equilibrium analysis.

⇒ 进口关税、配额、出口补贴、自愿出口限制(VER) only focus on 1 market

① Tariff.

⇒ Forms: specific tariff 从量税; ad valorem tariff 从价税.

进口关税税率 ⇒
- MFN Tariff Rate (最惠国~)
- Conventional Tariff Rate (协定~)
- Preferential Tariff Rate (特惠~)
- General Tariff Rate (普通~)
- Quota Tariff Rate (关税配额~) < in-Quota, Out-Quota.

出口关税 Rate ⇒ temporary tariff Rate

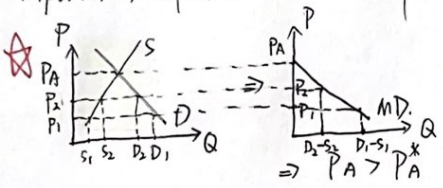
进口 ⇒ ① import tariffs ⇒ 目的 ①增加政府收入 ②保护国内企业.
② value-added tax
③ consumption tax.

出口 ⇒ ① export tariffs
② export drawback (出口退税)

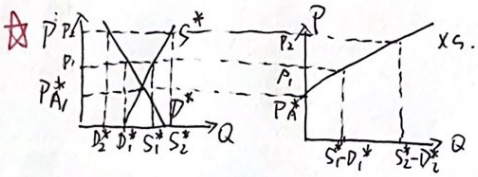
⇒ Basic set-up ⇒ 1) no transaction cost
2) 2 countries, wheat is produced & consumed.
3) competitive perfected ⇒ P由D&S决定. ⇒ taken as given by C & producers..
4) 汇率不受 policy 影响.

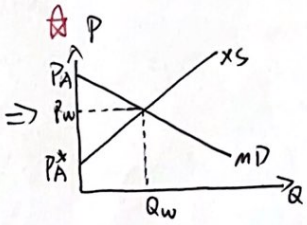
⇒ 假设 我国为 wheat importer, 外国为 exporter 即无贸易时 $P > P^*$

⇒ Home ⇒ $MD = D - S$ (import demand)

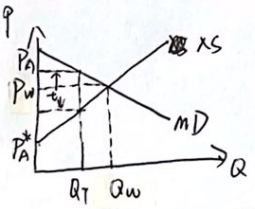


Foreign ⇒ $XS = S - D$ (export supply)





⇒ 贸易后均衡即为

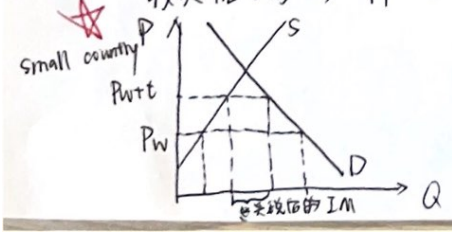


收关税 t 后 ⇒ $P_T = t + P_T^*$ ⇒ Big country ⇒ 体量大, 可影响外国P.

⇒ 关税使得 MD↓ ⇒ 影响外国市场价格 ⇒ tariff ↘ Home 消费者 外国生产者.

small country ⇒ 关税负担由本国消费者全部承担.

$\Delta P_T = t$. ⇒ $P_T = P_W + t$

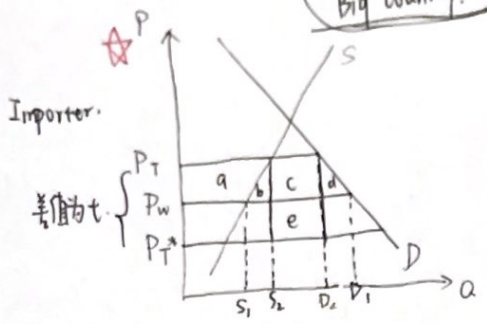


有效保护率 ⇒ 看关税多大程度保护国内生产者.

Effective Rate of protection. ⇒ 看 change of added value.

关税的成本&收益.

Big country.



关税为t.

⇒ 加关税后 ⇒ 价格 $P_W \to P_T$ ($P_T = t + P_T^*$)

⇒ ∵

consumer loss = a+b+c+d.

producer gain = a

government revenue gain = c+e

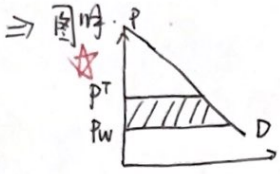
overall change of welfare = e-(b+d)

e为贸易条件改善所得. ⇒ terms of trade gain.

b+d为关税 distortion ⇒ 均为 efficiency loss

{ b为 production distortion loss
  d为 consumption distortion loss.

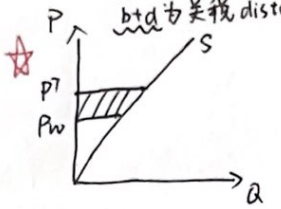
⇒ 图呀.



上三角为 CS

⇒ $P_W \to P_T$

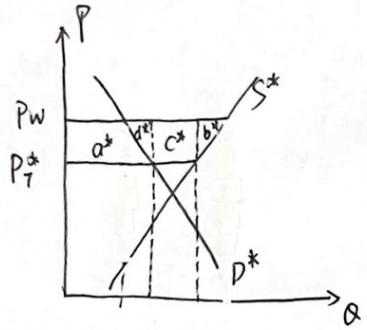
⇒ ΔCS = -阴影部分.



下三角为 PS

∴ 当 $P_W \to P_T$

⇒ ΔPS = +阴影部分.



$P_W \to P_T^*$

⇒ change of CS = a^*

change of PS = $-(a^* + d^* + c^* + d^*)$

change of Government Revenue = 0 (关税由 importer 所加).

overall change of welfare = $-c^* - (b^* + d^*)$ ⇒ net losses.

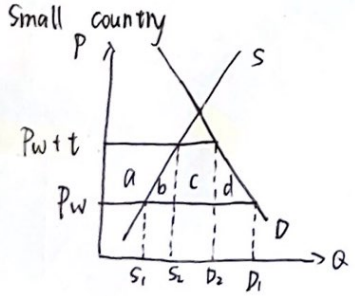
c^* ⇒ terms of trade worsening.

b^* ⇒ production distortion

d^* ⇒ consumption distortion.

⇒ 对大国而言. e > b+d ⇒ 他国可能采取反制措施以↓losses. ⇒ 转而 hurt importer country.

Small country



⇒ 关税全由 consumer 承担

consumer loss = a+b+c+d.

producer gain = a.

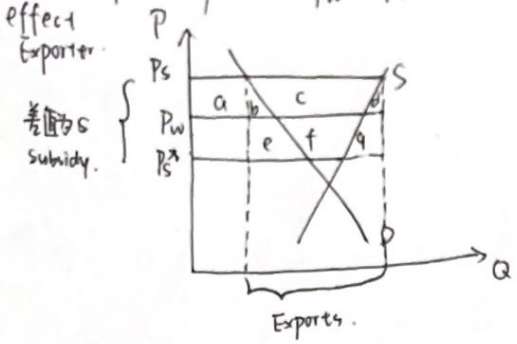
government revenue gain = c.

⇒ overall change of welfare = -(b+d) ⇒ 负收益.

② Export subsidies. ⇒ 100% 的负收益

Big country. $P_W \to P_S$.

effect Exporter



⇒ change of CS = $-(a+b)$

change of PS = $a+b+c$

cost of government subsidy = $b+c+d+e+f+g$

efficiency loss = $b+d$

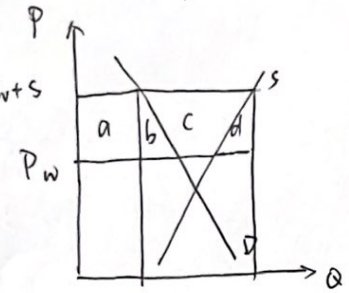
terms of trade worsen = $e+f+g$

⇒ Net loss of welfare = $b+d+e+f+g < 0$.

Small Country

⇒ subsidy ⇒ $P_S = P_W + S$ ，不影响贸易条件变化.

effect on exporter



⇒ change of CS $= -(a+b)$

change of PS = $a+b+c$

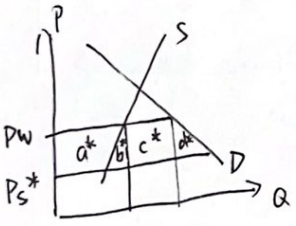
Cost of government subsidy = $b+c+d$

efficiency losses = $b+d$

⇒ Net loss of Welfare = $b+d$.

Exporter ⇒ Big country

effect. Importer



$P_W \to P_S^*$

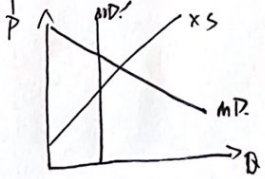
⇒ change of CS = $a^*+b^*+c^*+d^*$

change of PS = $-a^*$

change of government revenue = 0.

⇒ overall change of welfare = $b^*+c^*+d^* > 0$.

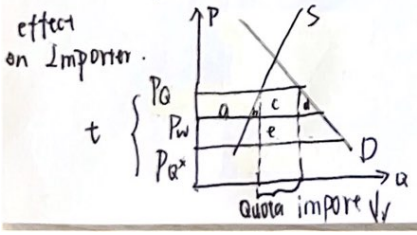
③ Import Quota. ⇒ 只能进口一定数量 Goods. ⇒



Big country & ⇒ imposing import quota.

$t = P_Q - P_Q^*$

effect on Importer.



⇒

$P_W \to P_Q$

change of CS $= -(a+b+c+d)$

change of PS = a

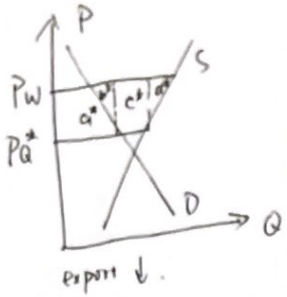
Quara Rents of license holder = $c+e$

Overall change of welfare = $e-(b+d)$ Ambiguous.

$b+d$ ⇒ efficiency loss. e ⇒ terms of trade gain.

Big country (Home).

effect on Exporting country.



$Pw \rightarrow Pw^*$

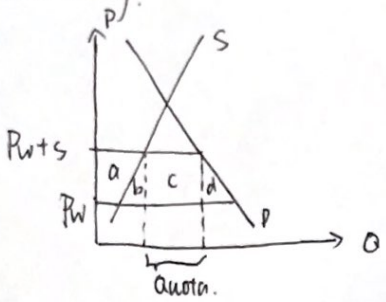
change of CS = a^*

change of PS = $-(a^* + b^* + c^* + d^*)$

change of Quota Rents = 0

Overall change of welfare = $-(b^* + c^* + d^*)$.

Small country.

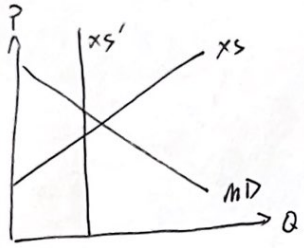


⇒ P↑, ~~Qdm~~ consumption ↓, production ↑, import ↓.

change of welfare = $-(b+d)$ ↓.

④ Voluntary Export Restraint (VER) "like import quota"

↓ imposed by exporting country at the request of Importing country.

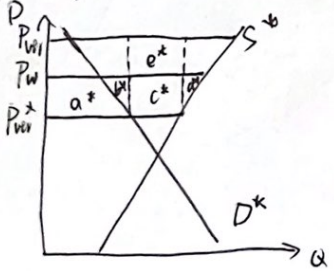


Big country (Foreign)

$P_{ver} - P_{ver}^* = t$

Big Country (Foreign)

Exporter



$Pw \rightarrow P_{ver}^*$

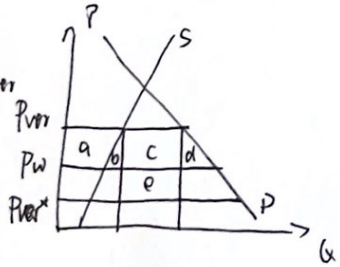
⇒ change of CS = a^*

change of PS = $-(a^* + b^* + c^* + d^*)$

Changes in Quota rent = $c^* + e^*$

change of overall welfare = $e^* - (b^* + d^*)$

Iimporter



⇒

$Pw \rightarrow Pver$

change of CS = $-(a+b+c+d)$

Change of PS = a.

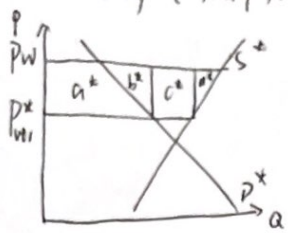
change in Quota Rents = 0.

change of overall welfare = $-c-(b+d)$

terms of trade loss

Small Country (Foreign).

Export



$\Rightarrow P_W \rightarrow P^*_{w/t}$

$\Rightarrow$ Change of CS = a^*

change of PS = $-(a^* + b^* + c^* + d^*)$

change of quota rents = c^*

$\Rightarrow$ change of overall welfare = $-(b^* + d^*)$

$\Rightarrow$ export $\downarrow$, production $\downarrow$, consumption $\uparrow$, welfare $\downarrow$.