

The Specific Factors –SF- Model

International Trade

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Lecture Slides

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Overview

The Model:

- i. Two sectors of production X and Y .
- ii. Three factors of production, two of them (K, T) are industry specific:

$$X = F(K, L) \quad Y = G(T, L)$$

- iii. Technology is the same across countries.
- iv. The SF model can be thought as the short run version of the HO model: Some factors are "stuck" in the short run but can relocate to other industries in the longer term

Production pattern: Incomplete specialization

The country will produce on the point on its PPF where the slope equals the relative price of the two goods.

In the case of two goods and two specific factors, one can use graph 1 to determine how much labor will be employed in each sector, which, given K, T determines the level of production of X and Y.

Under the assumption of competitive labor markets, a firm in industry i pays a wage rate that is equal to the value of the marginal product of labor – VMP_L – in that industry: $w_i = VMP_L^i = p_i MP_L^i$.

Additionally, labor mobility implies that the wage rate must be the same in both sectors, $w_i = w_j = w$.

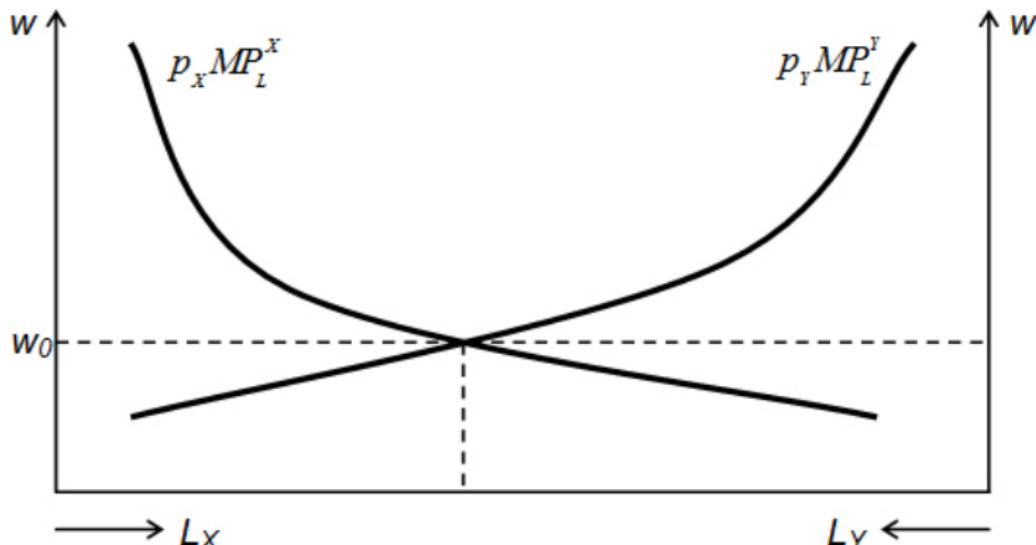


Figure 1: Allocation of labor

Trade pattern:

If factor endowments differ across countries, relative prices will also differ.

Home exports X if $\left(\frac{p_X}{p_Y}\right) < \left(\frac{p_X}{p_Y}\right)^W$.

Note: A plentiful (abundant) specific factor makes it likely that the good that uses this factor will end up being the exportable good.

Effects of international trade

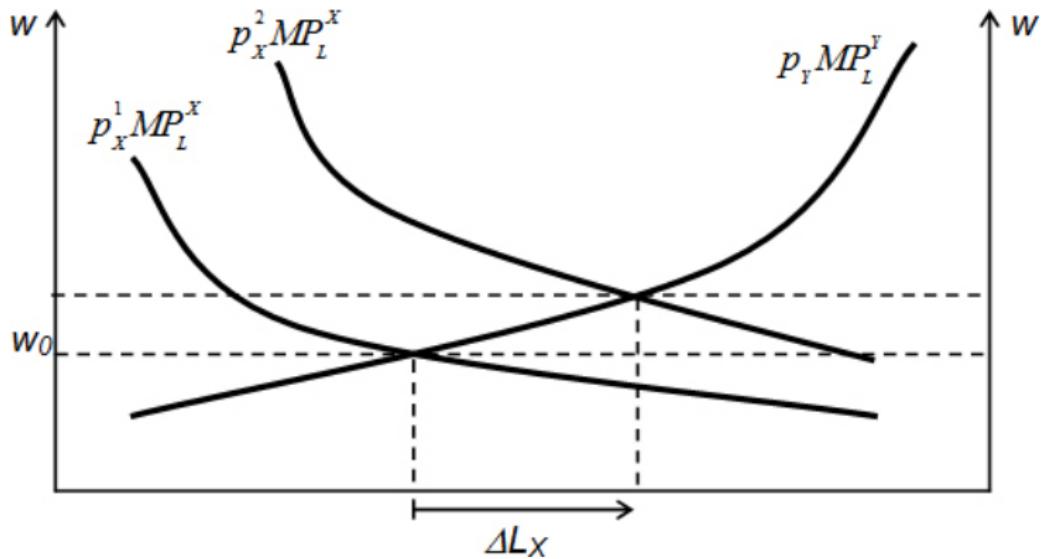
Effects of international trade on production and the distribution of income

Assume that a country's relative price $\left(\frac{p_X}{p_Y}\right)$ is smaller than the world relative price. After opening up to trade, the country will export X and import Y . For simplicity let us assume that p_Y remains at the initial level and only p_X rises from p_X^1 to p_X^2 . This shifts the Value of the Marginal Product curve in X outwards.

What happens to the production pattern and the income distribution?

(a) Production:

The sector of export goods (X in this example) draws more of the mobile factor (labor) and expands at the expense of import competing industries (Y).



(b) The distribution of income:

Who benefits from free trade and who loses?

Factor rental price = (good price) · (marginal product of factor–MP)

The MP of a factor depends on how much of the other factors it is combined with. For instance, the MP of a worker is higher when she has her own computer than when she has to share the same computer with five other employees. A simple example:

$$X = AL_x^\alpha K^{1-\alpha}; MP_L^X = dX/dL_x = \alpha A(K/L_x)^{1-\alpha}, 0 < \alpha < 1$$

$$r_K = p_X MP_K^X$$

$$MP_K^X = f\left(\frac{L_X}{K}\right), f' > 0$$

$$r_T = p_Y MP_T^Y$$

$$MP_T^Y = f\left(\frac{L_Y}{T}\right), f' > 0$$

$$w = p_X MP_L^X = p_Y MP_L^Y$$

$$MP_L^X = f\left(\frac{K}{L_X}\right), MP_L^Y = f\left(\frac{T}{L_Y}\right), f' >$$

The relative price of the exportable good, p_X goes up

Capital owners:

$$p_X \uparrow, L_X \uparrow \Rightarrow MP_K^X \uparrow \Rightarrow (p_X \uparrow) \cdot (MP_K^X \uparrow) = \underline{\underline{r_K \uparrow}}$$

Land owners:

$$\overline{p_Y}, L_Y \downarrow \Rightarrow MP_T^Y \downarrow \Rightarrow \overline{p_Y} \cdot (MP_T^Y \downarrow) = \underline{\underline{r_T \downarrow}}$$

Workers:

$$\underline{\underline{w \uparrow}} = (p_X \uparrow) \cdot (MP_L^X \downarrow) = \overline{p_Y} \cdot (MP_L^Y \uparrow)$$

But what happens to the real wage $\frac{w}{p}$ is ambiguous

So when the relative price of the exportable good goes up, the factor specific to that sector is better off while the other specific factor loses. The mobile factor is less affected and could end up either gaining or losing.

Political implications of free trade: The issue of free trade will find the specific factors in diametrically opposite positions, each one vying for the support of the mobile factor.

Effects of international factor mobility

Assume: $\overline{p_X}$ and $\overline{p_Y}$

- **Case 1:** $L \uparrow, K, T$

$$\underline{\underline{r_K}} \uparrow = (\overline{p_X}) \cdot (MP_K^X \uparrow)$$

$$\underline{\underline{r_T}} \uparrow = (\overline{p_Y}) \cdot (MP_T^Y \uparrow)$$

$$\underline{\underline{w}} \downarrow = (\overline{p_X}) \cdot (MP_L^X \downarrow) = (\overline{p_Y}) \cdot (MP_L^Y \downarrow)$$

The immigration of a factor of production affects the income of the specific factors inversely than that of the mobile factor.

Note that unlike HO where labor immigration makes one sector expand and the other contract (the Ryb. Th), here it makes both sectors expand

- **Case 2:** \bar{L} , $K \uparrow$, (or, $T \uparrow$)

$$\underline{\underline{r_K \downarrow}} = (\overline{p_X}) \cdot (MP_K^X \downarrow)$$

$$\underline{\underline{r_T \downarrow}} = (\overline{p_Y}) \cdot (MP_T^Y \downarrow)$$

$$\underline{\underline{w \uparrow}} = (\overline{p_X}) \cdot (MP_L^X \uparrow) = (\overline{p_Y}) \cdot (MP_L^Y \uparrow)$$

Mobile and immobile factor fortunes move in opposite directions.

The capital that comes into the country goes to sector X, increasing the MP_L^X and pushing the wage up. This helps attract labor from industry Y, which suppresses the MP_T^Y and r_T . The return to domestic capital declines as the K/L_x ration declines despite the inflow of labor because K/L_x is smaller than before (try to prove this by contradiction).

Implications of SF for political alliances on issues of immigration-factor movements across countries:

The domestic specific factors will be united in their support (or, opposition) to factor immigration policies (while they are always on different sides concerning trade policy).

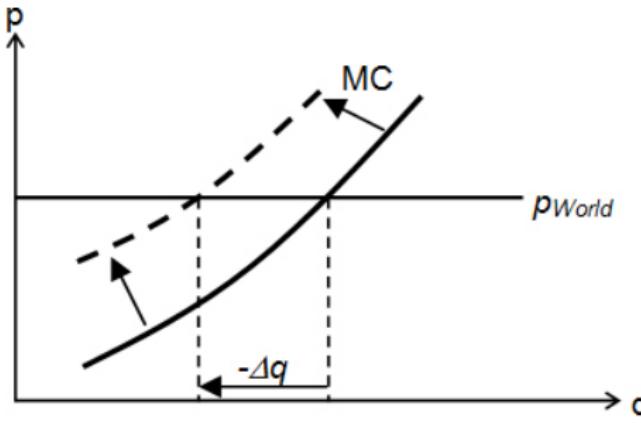
Further topics

The Dutch disease

A favorable change in international conditions for one exportable sector may spell doom for other exportable sectors:

Suppose a number of industries produce and sell their products on the world market. For the production they need labor (which is mobile across industries) combined with another factor that is specific to each industry. As the world market price for one of these exportables rises, the industry expands, leading also the wage rate to rise. This increase in wages squeezes the other exporting industries because they also face higher wages (and hence higher cost of production) but the world market prices for their goods remains at the former level. This means that companies in the exporting sector do not welcome positive developments in other (even completely unrelated) export industries

Example: North Sea oil and manufacturing in the UK and the Netherlands



The non-traded goods sectors are less susceptible to changes in international economic conditions because the increase in labor costs can partially be passed over to consumers.

Empirical analysis

Key prediction of the SF model:

In the domain of trade policy, political coalitions (to support or oppose policy) will be based mostly on **industry** affiliation rather than on **factor ownership**!

This contrasts sharply with the implication of the HO model which implies that factor ownership is the relevant criterion (a class struggle flavor).

What is good for capital is bad for labor and vice versa

The empirical evidence from lobbying for US trade agreements favors the SF over the HO prediction

	HO			SF	
Industry	K	L		K	L
1	P	F		P	P
2	P	F		P	P
3	F	P		F	F
4	F	P		F	F
5	F	P		F	P

HO			
	L		
		P	F
K	P		1,2
	F	2,3,4	

SF			
	L		
		P	F
K	P	1,2	
	F	5	3,4

Table 6.2 Lobbying on the 1973 Trade Reform Act: industry agreement (disagreement) of labor and capital

Position of the industry's labor

	<i>Protection</i>	<i>Freer trade</i>
<i>Protection</i>	Distilling, Shoes, Chemicals, Textiles, Stone products, Apparel, Iron & steel, Cutlery, Plastics, Hardware, Rubber shoes, Bearings, Leather, Watches	Tobacco
<i>Freer trade</i>	Petroleum	Paper, Machinery Trucks, Aviation, Tractors

Source: Magee (1980)

Summary: The key concept of factor endowments-intensities

- As in HO, the relative national supplies of factors of production coupled with the "preference" for certain factor by certain industries determine the pattern of trade
- International trade can have dramatic implications for the income of specific factors but not for that of the non-specific
- International trade can have dramatic implications for the viability of industries (Dutch disease)
- Specific factors agree on issues of immigration /int'l factor mobility.
Disagree on free trade