

14.54 International Trade

—Lecture 12: Specific Factors Model (II)—

Today's Plan

- 1 Refresher on Specific Factor Model
- 2 Effects of Changes in Factor Endowments
- 3 Factor Abundance and Comparative Advantage

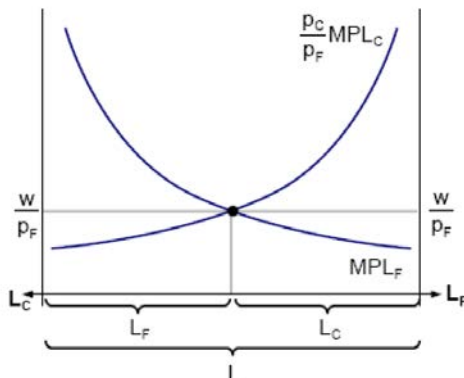
Graphs on slides 4, 10, 11, 15, 16, and 18-22 are courtesy of Marc Melitz. Used with permission.

Main Assumptions

- The technologies for producing C and F are now represented by two production functions: $Q_C = F_C(K_C, L_C)$ and $Q_F = F_F(K_F, L_F)$
- The capital allocated to each sector (K_C and K_F) is fixed
- The labor allocated to each sector (L_C and L_F) can change in response to outside shocks
 - Subject to an aggregate endowment constraint: $L = L_C + L_F$ where L is fixed

Determination of Factor Prices and Labor Allocation

- Factors (labor and capital) are paid the value of their marginal products
 - Capital: $r_C = p_C MPK_C$ and $r_F = p_F MPK_F$
 - Labor: $w = p_C MPL_C = p_F MPL_F$
- Think of wage in terms of purchasing power in units of F :
 $w/p_F = MPL_F = (p_C/p_F)MPL_C$



The Dutch Disease



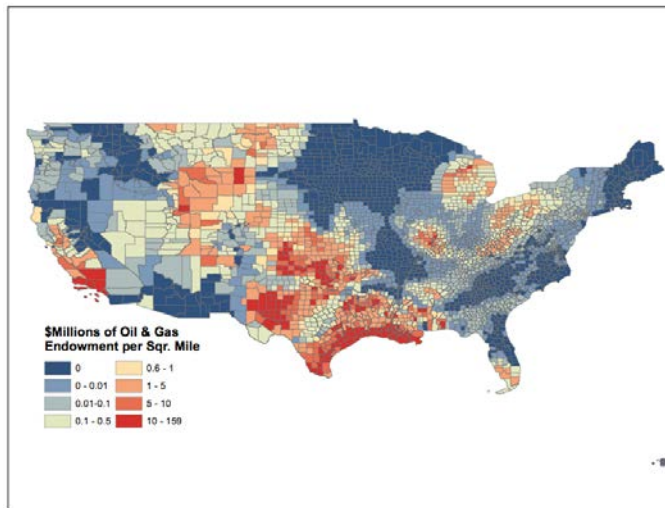
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The Dutch Disease

- What's Dutch about it?
 - In 1959, the Netherlands found the largest natural gas field in Europe
- Why is it a disease?
 - Expansion of commodity sector makes other sector, like manufacturing, less competitive
 - If you think that manufacturing is too small, that is a disease

New Dutch Diseases?

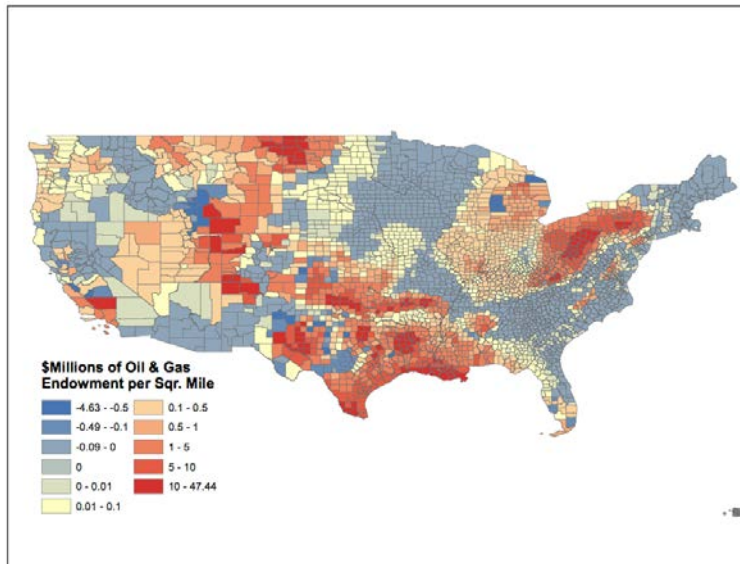
Fracking in the United States: Oil and Gas Endowments in 1960



Courtesy of Hunt Allcott and Dan Keniston. Used with permission.

New Dutch Diseases?

Fracking in the United States: Oil and Gas Endowments Today



Courtesy of Hunt Allcott and Dan Keniston. Used with permission.

New Dutch Diseases?

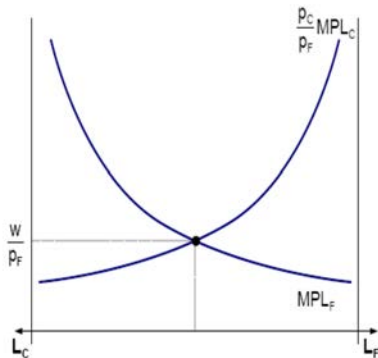
It does not have to be oil!



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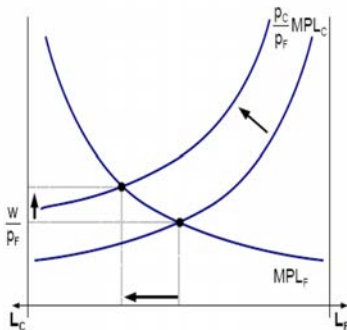
Changes in Factor Endowments

- What is the effect of factor accumulation on the welfare of all factors?
- Consider first the case of a small open economy (so p^T unaffected by factor accumulation)
- Consider first an increase in a fixed factor (K_C for example)
 - How are MPL curves affected?
 - What happens to allocation of labor across sectors?



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Effects of K_C Increase on Welfare

- What happens to welfare of workers?
 - $w/p_F \nearrow$ and thus $w/p_C \nearrow$ since $p_C/p_F \rightarrow$
 - So the welfare of workers increases
- What happens to welfare of capital owners in F sector?
 - $r_F/p_F = MPK_F \searrow$ since $L_F \searrow$ and thus $r_F/p_C \searrow$
 - So the welfare of capital owners in F decreases
- What happens to welfare of capital owners in C sector?
 - $r_C/p_C = MPK_C$
 - Conflicting effect of $L_C \nearrow$ and $K_C \nearrow$ – which effect dominates?
 - We know that $MPL_C \nearrow$: this means that $\% \Delta K_C > \% \Delta L_C$
 - Hence $MPK_C \searrow$ and thus $r_C/p_C \searrow$ and $r_C/p_F \searrow$
 - So the welfare of capital owners in C decreases
- What would happen to welfare of all factors if productivity in C sector had increased (MPL_C and MPK_C shift up) instead of K_C increase?

Effects of Capital Accumulation or Productivity Increase for a Large Economy

- What would happen if this country were large enough to affect world prices?
 - Capital accumulation in C or productivity increase in C will lead to growth biased towards C
 - What effect will this have on the world equilibrium trade price p_C^T / p_F^T and the reallocation of labor and output between F and C ?
 - $p_C^T / p_F^T \searrow$ and hence Q_C / Q_F and $L_C / L_F \nearrow$ by less than when $p_C^T / p_F^T \rightarrow$
- What would be the consequences for the associated welfare effects?
 - This price change improves welfare for capital owners in F and reduces welfare for capital owners in C

Who Favored Immigration in the United States?

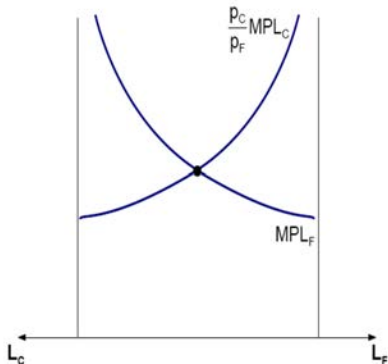
Capitalists, Landlords, or Labor Unions?



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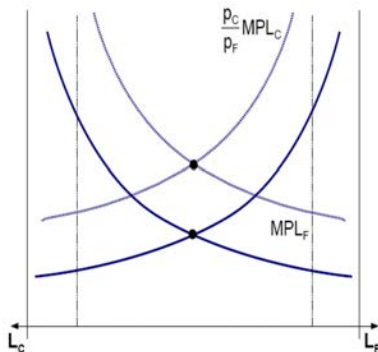
Effects of an Increase in Labor Endowment L

- Now consider an increase in the total labor endowment L
 - What happens to the allocation of labor across sectors?



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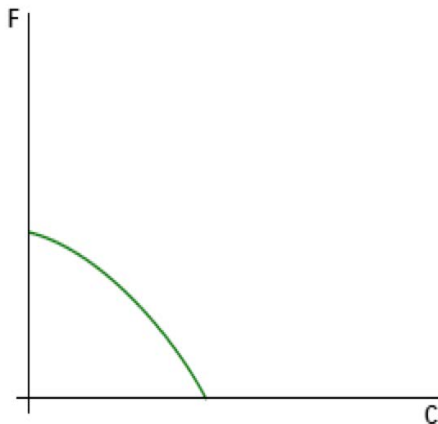
- Some of additional labor goes to both sectors, so $L_C \nearrow$ and $L_F \nearrow$

Effects of an Increase in Labor Endowment (Cont.)

- What happens to the welfare of workers?
 - $w/p_C = MPL_C \searrow$ and $w/p_F = MPL_F \searrow$ since $L_F \nearrow$ and $L_C \nearrow$
 - So the welfare of workers falls
- What happens to the welfare of capital owners?
 - $r_C/p_C = MPK_C \nearrow$ since $L_C \nearrow$ and $r_F/p_F = MPK_F \nearrow$ since $L_F \nearrow$
 - At a constant p_C^T/p_F^T , then $r_C/p_F \nearrow$ and $r_F/p_C \nearrow$
 - So the welfare of both capital owners increases
- In the 1920s, the U.S. imposed tight immigration restriction, largely because of labor unions

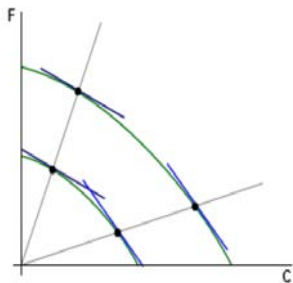
Proportional Accumulation of All Factors

- What happens to a country's PPF if all factors increase by the same proportion?



Proportional Accumulation of All Factors

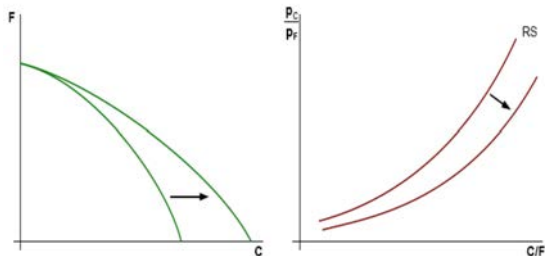
- What happens to a country's PPF if all factors increase by the same proportion?



- Consider the production point on the new PPF where labor allocation is chosen such that L_C and L_F increase by same proportion as K_C , K_F , L
 - Then Q_C and Q_F increase by this same proportion and MPL_C and MPL_F remain unchanged
 - So this growth must be unbiased

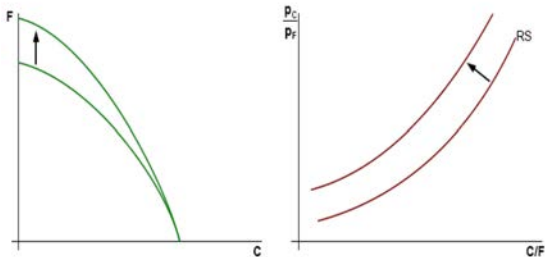
Disproportionate Accumulation of Some Factors

- What happens to PPF and RS curve if K_C increases proportionately more than K_F and L ?
 - Assume that $K_C/L \nearrow$ while $K_F/L \rightarrow$
- Growth will be biased towards C



Disproportionate Accumulation of Some Factors (Cont.)

- What happens to PPF and RS curve if K_F increases proportionately more than K_C and L ?
 - Assume that $K_F/L \nearrow$ while $K_C/L \rightarrow$
- Growth will be biased towards F

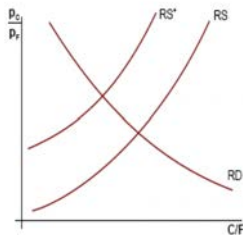


The Relationship Between Factor Abundance and Comparative Advantage

- Now assume that there are 2 countries who share the same technologies (production functions) but have differences in their relative endowments of factors such that:

$$\frac{K_C}{L} \geq \frac{K_C^*}{L^*} \text{ and } \frac{K_F}{L} \leq \frac{K_F^*}{L^*}$$

- What is the pattern of comparative advantage between these 2 countries?



- Home has a comparative advantage in C , Foreign in F

Specific Factor Model: Summary

- In sharp contrast to Ricardian model, the import competing sector does not 'disappear' when a country opens up to trade
- There is a very strong effect of changes in relative prices p^T on the distribution of income and welfare across factors
- Even when countries share the same technologies, differences in factor abundance lead to differences in comparative advantage and hence aggregate gains from trade
 - In the Ricardian model, there is no motive for trade if countries have the same technologies
- Improving the flexibility of factors across sectors mitigates the distributional consequences of trade
- Question for next chapter/topic: What happens when specific factor can be reallocated across sectors in the long run?
 - Are we back to the Ricardian model?

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