Today’s Plan

1. Long Run Effects of Factor Accumulation
2. Empirical Evidence on the Heckscher-Ohlin Model of Trade

Graphs on slides 4, 5, 8, and 9 are courtesy of Marc Melitz. Used with permission.
What are the effects of immigration or foreign direct investment in the long run?

Assume that the economy is small enough such that the world relative price $p^T$ is unaffected by this factor accumulation.

Consider the case of immigration.
How does an increase in $L$ (holding $p^T$ fixed) affect a country’s PPF and RS curve?
Factor Accumulation and the Production Response

- How does an increase in $L$ (holding $p^T$ fixed) affect a country’s PPF and RS curve?

Thus $Q_C / Q_F \uparrow$ when $L \uparrow$

- But what happens to $Q_C$ and $Q_F$?
- Could $Q_F$ still increase?
- Does $Q_C$ increase by more or less than the increase in $L$?
Recall that when $L/K \uparrow$, both capital and labor move to the labor intensive sector (C)

- So $L_C/L, K_C/K \uparrow$ and $L_F/L, K_F/K \downarrow$

Can also determine this change from the weighted averages:

$$\frac{L}{K} = \frac{L_C}{K_C} \frac{K_C}{K} + \frac{L_F}{K_F} \frac{K_F}{K}$$

$$\frac{K}{L} = \frac{K_C}{L_C} \frac{L_C}{L} + \frac{K_F}{L_F} \frac{L_F}{L}$$

where $L_C/K_C > L_F/K_F$ both remain constant

- Since $L_C/L \uparrow$ and $L_C/K_C \rightarrow$, both $L_C$ and $K_C$ must increase by more than $L$
  - Hence $Q_C$ must also increase by more than $L$

- Since $K_F/K \downarrow$ and $L_F/K_F \rightarrow$, both $L_F$ and $K_F$ must decrease
  - Hence $Q_F$ must decrease
Rybczynski Theorem

- The previous predictions are often referred to as the **Rybczynski Theorem**
- The Rybczynski Theorem states that in a small, incompletely specialized open economy, an increase in the endowment of one factor leads to:
  - an increase in the output of the good that uses that factor intensively
  - a decrease in the output of the other good
- This is the dual of the Stolper-Samueson Theorem
Implications for the Immigration and Wages Debate

- Does immigration necessarily reduce the wages of workers of the same skill level?
Implications for the Immigration and Wages Debate

- Does immigration necessarily reduce the wages of workers of the same skill level?

- Partial equilibrium analysis does not take into account the increased demand for labor induced by a shift in production towards labor intensive sectors.
Empirical Application: The Mariel Boat Lift

Figure 5-10 from *International Macroeconomics* removed due to copyright restrictions.
Factor Content of Trade: Heckscher-Ohlin Vanek Theorem

- **Idea:** if trade is driven by differences in relative factor abundance across countries then trade flows across these countries should also reflect those differences in factors.

- **Definition:** Factor content of trade of country $i$ is total amount of factors used to produce the observed trade flows

\[ F^i \equiv AT^i \]

where \( T^i \equiv \left( \frac{Q_C - D_C}{Q_F - D_F} \right) \) and \( A \equiv \begin{pmatrix} a_{LC} & a_{LF} \\ a_{KC} & a_{KF} \end{pmatrix} \)

- **HOV Theorem:** Suppose that (i) technologies are identical around the world; (ii) factor price equalization prevails; and (iii) preferences are homothetic and identical around the world. Then:

\[ F^i = V^i - \frac{Y^i}{Y^W} V^W \]

w/ \( V^i \equiv \left( L_K \right), V^W \equiv \left( L_K^W \right), Y^i \) and \( Y^W \) are country $i$ and world GDP
First Empirical Test of the Factor Content of Trade

- This prediction was first tested for U.S. exports and imports by Leontief (1953), and then again by Baldwin (1971)

Since the U.S. was relatively very capital abundant, these results were viewed as a paradox

The subsequent work by Baldwin also showed that this paradox did not extend to other factors

... and this empirical paradox has disappeared since the 1970s
Extending the Factor Content of Trade to Multiple Factors and Countries

• Bowen, Leamer, Sveikaukas (1987) showed how this test can be extended to multiple factors and countries
  • HOV Theorem does not depend on number of countries, goods, factors
• For each factor and country, compute that country’s endowment of the factor as a share of the world endowment
• If that share is greater than the country’s share of world income, then that factor is relatively abundant in that country (relative to the world)
  • ... and the HOV Theorem predict that the country will be a net exporter of that factor
Empirical Measures of Factor Abundance

Figure 4.9 from *International Economics* removed due to copyright restrictions.
Extending the Factor Content of Trade to Multiple Factors and Countries (Cont.)

For every country-factor pair, Bowen, Leamer, Sveikaukas (1987) test whether the net factor content of trade is of the sign predicted by that country’s relative factor abundance:

Table 4-2, 4-3, and 4-4 from International Economics removed due to copyright restrictions.
Predictions for the Volume of Trade

One can also look at differences across countries in relative factor abundance to make predictions about the volume of trade.

Idea: bigger differences between countries in relative factor abundance should lead to relatively higher volumes of trade (holding everything else – especially overall country size – constant).

This empirical prediction performs miserably!

In part, poor performance due to the fact that developed countries with similar factor abundance engage in a high proportion of overall world trade.

In other part, this is due to some of the additional assumptions imposed on the Heckscher-Ohlin model:

- Common technology across countries
- No transport/trade costs so countries face same goods prices
  - ... which does not allow for non-traded goods/services
  - There is also substantial evidence on firm-level fixed costs of exports (so firm size and potential export market size matters)
- Non-homothetic preferences (to a much lesser extent)
Evidence on Technology Differences

- There are massive differences in overall productive efficiency (that affect all factors of production) across countries.
- ... as well as differences in the productivity of various factors:

Figure 4.9 from International Economics removed due to copyright restrictions.
Nonetheless, the Hecksher-Ohlin model does a very good job of predicting the composition of North-South trade:

Table 4-2, 4-3, and 4-4 from *International Economics* removed due to copyright restrictions.
Predictions for North-South Trade (Cont.)

![Graph showing the relationship between sector skill intensity and developed countries export share (1991-2000).](image)

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Predictions for North-South Trade (Cont.)

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Figure 2: Rybczynski Effect for the Asian Miracle Economies*
Combined US Import Shares 1960-1998
(*Singapore, Hong Kong, Taiwan, Korea)

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