

# TESTING THE HECKSCHER-OHLIN-VANEK PARADIGM IN A WORLD WITH CHEAP FOREIGN LABOR

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# Outline of the talk

- Trade in goods is a veil for trade in the factor services.
- Empirical tests have not given the theory its due.
- Trade in factor services is not trade in physical units.
  - A hectare of land
  - The annual rent on a hectare of land
- Empirical results
  - The conventional test predicts the direction of factor trade well
  - Imposing identical technologies predicts the direction and volume of factor trade well
  - Adjusting endowments into efficiency units predicts the direction and volume of trade well too.

# What I won't do in this talk

- The way we convert factors into international efficiency units is quite novel.
- I will not discuss this theory at length, but our empirical test are based upon a strong such foundation.
- I won't deprecate the recent literature, but I will quote Trefler and Zhu (2010) who say that “definitional mistakes are endemic.”
- I will not wax philosophical about what HOV theory means when countries do not have the same technologies, but you can egg me on if you might like.

# Literature review

- Leontief (1953)
- Leamer (1984)
- Trefler (1995)
- Davis and Weinstein (2001)
- Fisher and Marshall (2011)

# The theory and its predictions

- The predicted factor content of trade is:

$$v_c - s_c v$$

- The measured factor content of trade is:

$$\Theta_0(x_c - m_c)$$

- There are 39 countries and 5 factors, giving 195 predictions.
- The technology matrices reduce the dimensionality of trade vectors from 26 to 5.

# Why the fixation on physical factors?

- Input-output accounting was developed during World War II to predict the employment effects of the demobilization.
- Leontief was an intellectual giant, but he analyzed only one country.
- What does the theory mean when technologies are different?
  - If technologies are identical, then the difference between physical factors and local factor services is moot, just a scaling factor.
  - Only recently have consistent cross-country measures of technology become available.

Table 1. Simplified technology matrices

| Factors/Sectors   | United States |        |              |          |
|-------------------|---------------|--------|--------------|----------|
|                   | Food          | Mining | Manufactures | Services |
| Land              | 0.43          | 0.00   | 0.02         | 0.00     |
| Natural Resources | 0.02          | 0.48   | 0.05         | 0.01     |
| Capital           | 0.16          | 0.12   | 0.34         | 0.37     |
| Labor             | 0.39          | 0.39   | 0.59         | 0.62     |
|                   | Canada        |        |              |          |
|                   | Food          | Mining | Manufactures | Services |
| Land              | 0.28          | 0.00   | 0.02         | 0.00     |
| Natural Resources | 0.05          | 0.67   | 0.12         | 0.03     |
| Capital           | 0.18          | 0.08   | 0.32         | 0.36     |
| Labor             | 0.50          | 0.25   | 0.54         | 0.60     |
|                   | China         |        |              |          |
|                   | Food          | Mining | Manufactures | Services |
| Land              | 0.07          | 0.00   | 0.01         | 0.01     |
| Natural Resources | 0.02          | 0.34   | 0.06         | 0.03     |
| Capital           | 0.14          | 0.23   | 0.44         | 0.48     |
| Labor             | 0.78          | 0.42   | 0.49         | 0.48     |

# Simplified factor conversion matrices

- Rybczynski effects:  $dy_c = \Theta_c^{-1} dv_c$
- Stolper-Samuelson effects of a change in world prices that is caused by a change in the reference country's factor prices:  

$$\hat{w}_c = (\Theta_c^{-1})^T \hat{p} = (\Theta_c^{-1})^T (\Theta_0)^T \hat{w}_0$$

- Simplified factor conversion:  $E(\theta_c) = \theta_c \theta_c^{-1}$

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