EC 380: Lecture 5

Trade Theory: Specific Factors Model

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Fall 2022

Prologue

Last Time

- Countries with no absolute advantage in production can still trade in both Ricardian and HO models
- In HO case, advantages are driven by abundancies in different factors which vary across countries
- While Ricardian trade openness gains for everyone, HO highlights a **reallocation** of resources across industries that may disadvantage the main factor of the now import-reliant sector

Today

- Specific Factors model, Model Empirics & Extensions

Specific Factors Model

Short run: factor mobility between industries is limited (e.g. repurosing a large piece of factory machinery to production of another specialized good).

Same true for labor.

Suppose world prices adjust and resources begin leaving the US steel industry.

In long run, they may retrain and find employment elsewhere but in short run they are stuck with pay cuts and potential unemployment.

Specific Factors Model

To address ability of production factors to reallocate across domestic industries, and incorporate **heterogeneity across time**, lets add conditions to the **HO model**.

- Three factors: land, labor, capital
- Two goods: steel and bread
- $Q_s = f(K, LB)$ and $Q_b = f(LB, LD)$

Labor is our **variable factor** that varies in use between both goods. LD and K are **specific factors** because they are exclusively used for specific goods.

Specific Factors Model

Modifying the **HO model** slightly, we have now extended it into a **specific factors model**.

Each good produced with a using a unique specific factor. Variable factor used for both.

Specific factors are **immobile** and cannot move between the two industries while the variable factor is **mobile**.

Specific Factors Model

Specific Factors Model

With each model we face, trade patterns are always determined by **comparative advantage**.

Who has the edge in which good in this model?

As with **HO**, this will be determined by factor endowments but critical role is now played by the specific factors.

For the two goods, they will present different needs for combinations for labor and each industry-specific factor.

Comparative advantage for the industry of which the specific factor is relatively more abundant.

Specific Factors Model

Recall logic of comparative advantage **always comes back to opportunity cost.**

Ireland well-endowed with land, relative to the UK (high pop density).

Since Ireland land-abundant, the opportunity cost of an additional unit of bread production is **lower** than it is in the UK.

In other words, one additional loaf of bread costs less losses in terms of the capital-intensive good's output relative to the UK.

What does that imply about the UK's comparative advantage and its primary specific factor that determines this advantage?

Specific Factors Model: Income

How does switching from autarky to an open economy impact the **income distribution**?

- Each country expands production into industry reliant on specific factor that country is **relatively** abundant in
- Demand shrinks for the **scarce** specific factor of each economy
- Ireland would cut back on capital-intensive good, capital owners in Ireland are hurt by lower income generated from leasing capital

Specific Factors Model: Income

In contrast, Irish landowners are delighted. Per unit returns on renting land are now higher due to greater domestic demand.

- UK sees opposite effect
- UK capital owner income rises and UK landowner income falls

Labor outcomes are indeterminate. It depends on whether labor shares of income generated were higher in the land-industry or capital-industry for each country.

Specific Factors Model: Income

From price perspective:

- Land-good demand rises in Ireland, since world price is higher than autarky price of bread. Capital-intensive good's price falls relative to autarky.
- From UK perspective, the capital-intesive good's price has risen and land-intensive good's price falls.

Net effects of for labor, following these price changes to world prices, are ambiguous and depend on consumption patterns.

Empirical Tests

So far we have argued these points on trade gains based exclusively on theory.

You should always ask yourself two questions:

1. Do the predictions of a generalized model hold in the data?
2. Are there other reasons these predict patterns may be observed in the data?

A great deal of work from economists works towards translating theory into empirical analysis

For example, **Blonigen & Wilson (2008)** examines whether port efficiency allows for greater volumne of trade

Empirical Tests: Comparative Adv.

All trade theories boil down to differences between countries establishing **comparative advantages** and motivating trade.

Each theory predicts which goods a country will import and export.

Empirical tests of trade are difficult due to our inability to observe an **'autarky' counterfactual** and difficulty in **measuring factor endowments**.

Rather than going between extremes of no-trade to completely free trade, we normally imagine changes in **'trade openness'** as a result of :

- Lower tariff rates and reduced trade quotas

Empirical Tests: Comparative Adv.

Ricardian Model: Challenging to test due to relative differences in technology, which augment labor productivity, being hard to interlink.

HO Model: Even harder to apply tests for given the challenges involved in accurately measuring factor endowments. Our measures of land and capital values are imprecise estimates.

As a result, Ricardian models have been more frequently and successfully tested.

Findings: As labor productivity in a particular industry rises, the intensive margin by which goods are export are exported increases. Country becomes a net exporter of that good.

Empirical Tests: Comparative Adv.

Tests of HO are more mixed.

Cross-country measures of capital, land and labor endowments are often measured using different means due to **methodological differences** across various national accounting bodies.

For example, housing's contribution to CPI is based on mortgage values in Europe while the US uses a rental equivalence approach.

McQuinn et al. (2018) highlights that these differences in methodological approaches can have severe consequences for the resulting inflation index.

Empirical Tests: Comparative Adv.

So how do we address international economic theories when countries are all measuring our key statistics in different manners?

This normally requires an NGO or world body to apply data collection methods in a cross-country manner.

For example, data from **Enterprise Surveys** provided to me by the World Bank yields firm-level data on capital holdings, labor expenditure, land ownerships, sales, as well as trade activity.

This has allowed me to address how **corruption** acts as a barrier to trade activity at the firm level and, in turn, limit nations' gains from trade.

Empirical Tests: Comparative Adv.

Other differences between countries, beyond technology and factor endowments, explain differences in trade flows across countries.

- Economies of scale
- Corporate structures
- Economic policy
- Public infrastructure
- Institutional quality

Extensions to Trade Theory

Given these empirical concerns and other key country-level differences, further extensions to HO have been developed.

- Gravity Model
- Product Cycle
- Trade vs FDI
- Offshoring & outsourcing

Each of these theoretical settings explains a portion of existing trade.

Extension: Gravity Model

To explain how a country trades with other countries, we must factor in distance and GDP.

- The **larger** the other country is, the more demand it represents on the global market for our given good
- The **closer** that other country is, the cheaper it is to access that market

Many empirical analyses leverage model specifications on these key factors, which explain much of the variation observed in country-level trade flows.

Extension: Product Cycle

Developed by Raymond Vernon, explains exports of sophisticated manufactured goods from countries scarce in skilled labor and capital.

HO model would be scratching its head over this phenomenon.

Many manufactured goods go through product cycle where **factor inputs change over time**.

At these early stages, product components change often and require proximity to market of demand for updates/changes.

Developing and experimenting on new components takes considerably sosphisticated capital and highly skilled labor.

Extension: Product Cycle

Over time, product incorporates less adjustments to design.

Can be consistently produced without further value-added contributions from **development phase** factors of production.

Standardized phase begins and production contributions are increasingly stemming from unskilled labor factor.

In the **late phase** of the product cycle, when consumption exceeds local production, costs are kept low by moving out production to other countries specialized in providing unskilled labor services

Composition of factor inputs changing over time leads to relocation of production efforts, increasingly towards unskilled labor setting.

Extension: Trade/FDI

In **product cycle** argument, firms invest abroad and some output generated is sent home for consumption.

This pattern differs greatly from **HO**, where no investment abroad is accounted for and factor endowments cannot cross countries.

FDI: This theory suggests cases may exist where firms elect to **invest abroad** rather than ship goods abroad.

Intrafirm trade: It also suggests output shipped from foreign affiliate back home is handled under one firm's umbrella.

> IE: By the mid-90s, $\frac{1}{3}$ of US goods exports and $\frac{2}{5}$ of US goods imports attributed to intrafirm trade.

Extension: Trade/FDI

Why do some firms set up foreign operations instead of buying imports directly from foreign firm? Why do some firms build factories abroad to sell in a foreign market, rather than just export to that market?

There must be scenarios in which either choice is the profit maximizing decision, dependent on a choice set of key characteristics.

The product cycle theory would suggest low income countries should be hubs for FDI, but not the case in the data. The greatest proportion of FDI goes **between developed nations**.

Separate theory exists to explain this **proximity-concentration** trade-off, but beyond scope of this class.

Extension: Offshore/Outsource

Offshoring: Set up a plant abroad to make stuff.

Outsourcing: Contract a different enterprise to make stuff for you. Agreement can be international.

Modernization of the trade process has made these **international features** of production and distribution chains more feasible.

Largely driven in the 1990s by internet availability, satellite communication, containerization of cargo and better computing power.

Easier to succesfully manage business operations abroad (marginal cost of multinational enterprise operations lower).

Extension: Offshore/Outsource

Effects include a trend towards international production, with comparative advantages across countries featuring in individual firms' supply chains.

Rather an specialize in goods, countries can specialize in **key intermediate inputs**.

Trade economists refer to this as increased formations of **global value chains**.

Many exports and local production processes now rely on the availability of imports. **Huge vulnerability if ports become congested**.

To summarise:

- **Specific Factors Model** predicts gains and loses when switching from autarky to free trade
- Model empirics are supportive of **Ricardo model**, but have mixed results for **HO model**
- Predictions of HO deviated from in data
- These differences can be explained by patterns in FDI that substitute for what would otherwise be trade flows

Next time

Discuss issues of trade wrt jobs, wages and migration