

In the past (up to roughly the 1970s), trade theory has been focused on applications, modifications, or extensions of standard (Ricardian, HOS and specific factors) models, where trade is based on differences between countries. However, empirical work, while consistent with Ricardian model, repeatedly rejects the predictions of the HOS model. Data also indicates that a substantial amount of trade occurs between similar developed countries and within the same product categories (intraindustry trade), instead of between very different countries and across product categories (interindustry trade). Due to the existence of a large proportion of unexplainable trade, many trade theorists abandoned the old theories and turned to constructing new theories capable of explaining the yet unexplained. Also, old theories say trade conflicts should break out when countries try to restrict trade (by using tariffs or quotas), but trade disputes commonly occur between countries subsidizing exports. Finally, a third of international trade occurs through multinational firms (foreign direct investment), with the bulk of FDI also occurring between similar countries. FDI is growing faster than international trade, which is growing faster than world output. Conflict between theory and reality dictated a need for some new international trade theories.

COMPARATIVE ADVANTAGE

Most standard trade models are based on the notion of comparative advantage. Suppose two countries produce two goods and have different autarkic relative prices. The autarkic relative price in each country equals the marginal rate of substitution (MRS), which equals the marginal rate of transformation (MRT). Since the two countries

have different autarky prices, they have different MRS and MRT from each other. An opportunity for gains from trade exists: trade equalizes MRS and MRT across countries. Accordingly, the greatest gains from trade arise from the greatest differences between countries. Since trade permits countries to concentrate in producing what they do well, *imports should be quite different from exports in composition*. In the Ricardian model, differences in technology (unit labor requirements, with labor as the only factor) provide the source of CA.

HECKSCHER-OHLIN-SAMUELSON THEORY

In the HOS theory, differences in factor endowments provide the source of comparative advantage. Two countries (home and *foreign) produce two goods (apples A and bearings B) using two factors (capital K and labor L). The two countries differ only in their endowments of these two factors, and these factors are not able to move across borders. The assumption that both factors are internationally immobile is common to most models of international trade: goods need to move across borders because factors cannot. While factors can indeed often cross borders in reality, goods can cross most borders more easily than factors in most cases.

Suppose the home country is capital abundant relative to the foreign country: $K/L > K^*/L^*$. Therefore home country has higher wage to rental ratio: $w/r > w^*/r^*$. Suppose bearing production is capital intensive, uses more capital per unit of labor than apple production. The home country has comparative advantage in the capital-intensive good (bearings). The price of a bearing in terms of an apple in autarky (absence of international trade) will be lower at home than abroad. International trade causes the home country to shift resources out of producing apples into producing bearings. The relative price of apples in terms of bearings and wage to rental ratio falls in home country and rises in the foreign country in the move from autarky to free trade.

As long as home still produces both goods, the wage

falls and rental rate rises relative to both goods prices. This general result, called the Stolper-Samuelson theorem, states that international trade lowers the real reward of the relatively scarce factor and raises the real reward of the relatively abundant factor. Due to this redistribution of income across owners of different factors, a country *opening up to trade should result in conflicts between groups associated with different factors* within a country. These groups are defined by source of income, not sector where employed, since they can move between sectors within a country.

Also, factor prices will become equalized across countries if factor endowments are not too different. This result, aptly called the factor price equalization theorem, implies that with equal factor prices, no incentive remains for factors to flow between countries (if they could). Thus, *countries with similar factor endowments should have identical factor prices and no observed factor flows between them*. Due to the equalization of factor prices, trade in goods and trade in factors are substitutes: no additional gains from trade in factors occur if free trade in goods already, also no additional gains to trade in goods occur if free trade in factors already.

If home acquires more capital, additional capital must be absorbed by expansion in the capital-intensive sector. Expansion of the capital-intensive sector draws labor out of the labor-intensive sector. Thus, *factor endowment changes cause amplified changes in production*: output of the capital-intensive good rises more than proportionately to an increase in capital, while output of the labor-intensive good falls, the Rybczynski theorem. Growth biased towards exports should deteriorate terms of trade (TOT).

The overall HOS result is that a country *exports the good that relatively intensively uses its relatively abundant factor*. We can also predict trade pattern based on autarkic relative prices - a country exports the good where its autarkic relative price is lower than the foreign country's autarkic relative price; however, autarkic prices are rarely observed so that version is not very useful in practice.

REALITY CHECK

The implications of these standard theories do not perform well at describing the world. The Leontieff paradox provides evidence that U.S. exports are less capital intensive than imports, the wrong content for a capital abundant country such as the U.S. Reducing trade barriers in Western Europe failed to lead to greater specialization. Most world trade is intraindustry trade between similar countries, not interindustry trade between dissimilar countries. Foreign direct investment is becoming increasingly two-way and occurs principally between similar countries. Export promotion policies seem to play as important a role as trade restrictions in trade conflicts between countries. Groups pushing for protection are identified by industries rather than factor ownership. At most, only factor price equalization holds up reasonably well, so theory has been reconstructed to more closely resemble reality. A few minor adjustments were made to the old theories, but most of the recent (last twenty years) research activity involves new theories where trade occurs between similar countries, and markets are not perfectly competitive.

SPECIFIC FACTORS

The specific factors model is actually a revival of an old theory. This theory finds that industry association is important for determining the impact of international trade on factor incomes if factors are tied to their initial use (specific factors means the factors are immobile between sectors). A price increase in one sector raises the reward to factors tied to that sector and lowers reward to factors tied to the other sector. The location of the factors' initial employment limits its subsequent use in the most extreme sense in the specific factors model: the factor must remain in that sector forever.

Since complete and permanent attachment to one sector is unlikely, the specific factors model is often viewed as short-run version of the Heckscher-Ohlin-Samuelson model.

In the short-run, the factors are fixed in their initial sector and the specific factors model results apply, but eventually factors can move across sectors and the HOS model results apply. Suppose labor is relatively intensively used in sector A, which experiences price increase. Eventually, once factors move, the wage will rise and the rental rate will fall according to the HOS model. Initially, the wage rises in sector A but falls in B, also the rental rate rises in sector A but falls in B. So wages in sector A rise and rental rates in B fall both short run and long run, but wages in B fall then rises while the rental rate in A rises and then falls. Thus, opposition to free trade agreements such as NAFTA can be linked to sectors if factors worry most about the short run and or the long run is a long ways off due to slow adjustment between sectors.

REVERSALS

Two countries on opposite sides of a factor intensity reversal could explain Leontieff paradox. B could be capital intensive in capital abundant country but labor intensive in labor abundant country. Whichever country imports B violates HOS theorem.

Demand reversal could also explain Leontieff paradox, if taste differences swamp production differences. Suppose labor-abundant country has extreme relative demand for labor-abundant goods. Then labor abundant country would export the capital intensive good.

Countries are generally found to have a taste bias towards goods produced in their countries, but not clear that the bias is large enough to swamp the production bias. While interesting theoretical points, these possible explanations are unsupported or unsupported by empirical tests, so attention turned elsewhere.

HIGHER DIMENSIONS

As noted, trade flows have factor endowment basis not captured by 2 x 2 HOS model. Closer inspection indicates basic trade theorems critically dependent on the simple 2 good, 2 factors structure of these models. Thus a search was begun for conditions needed for strong versions of HOS theorems to remain valid for $n \times n$, with $n > 2$. Global univalence, a one-to-one relation between factor and commodity price, remained elusive. Conditions for $n \times n$ require technology to possess particular mathematical structures, where required conditions are complicated, lack intuitive economic content, and are unlikely to be satisfied as they essentially require the economy to have a 2 x 2 structure for any division of the goods and factors.

Thus researchers turned to looking for weaker versions that say something about some but not all goods.

- SS: Commodity price increase benefits some factor while harming some other factor in real terms.
- R: Factor endowment increase expands more than proportionately production of some good and decreases production of some other good.
- FPE: Free trade generates factor price equalization between countries with sufficiently similar relative endowments, provided the number of factors does not exceed the number of goods.

This condition can be weakened to requiring sufficiently many international markets, since trade in factors can take the place of trade in goods.

Researchers also derived weaker versions (correlations) that say something on average about tendencies without saying anything concrete about any one good alone. Principal of comparative advantage survives on average but not on a commodity-by-commodity basis.

- HOSp: on average, goods with relatively low autarky prices will tend to be exported and those with relatively high autarky prices will tend to be imported.

- HOSq: Country tends to export goods that make relatively intensive use of relatively abundant factors.
- SS: Changes in commodity prices are correlated with changes in factor prices.
- R: Changes in factor endowments are correlated with changes in output.

Expect home to export goods with low home relative to foreign autarky price, but country size, demand and technology interactions affect whether any one good exported (a good with a high relative price might be exported if it lowers cost of some other good). The result no longer identifies exactly which goods, just that trade flows are correlated with autarky price differences. Can precisely describe the factor content of trade instead of the commodity content.

SCALE ECONOMIES

HOS model and existence of intraindustry trade between similar countries are not logically inconsistent. Developed countries have higher incomes and lower trade barriers, so volume of trade should be large. Trade volume between similar countries would have to be large to generate implicit factor exchange due to similarity. Nonetheless, HOS would predict little gains from trade between similar countries, yet these countries seem to have prospered due to their openness. Thus need other models that indicate gains from specialization, where countries are able to produce more at lower cost through international trade. Scale economies provide a basis for trade logically independent of (pre-existing) comparative advantage.

NATIONAL EXTERNAL ECONOMIES OF SCALE

Assume increasing returns to scale external to the firm but internal to the industry in the country. Production tends to concentrate production of IRS good all in one

country. If start out with identical countries, role of countries random and so multiple equilibria can occur. Some of the multiple equilibria are mirror equilibria where only the identity of the countries is changed.

- Knife edge: both incompletely specialized
- Graham: one specialized in IRS good, other incompletely specialized
- FPE: one specialized in CRS good, other incompletely specialized
- Ricardian: both completely specialized

The knife edge case is unstable. In Graham case, the incompletely specialized country loses from trade. Due to mirror equilibria, the identity of the losing country is not known before trade occurs. FPE has equal factor prices across countries since the CRS good is produced in both countries. The Ricardian case is as if the IRS technology were CRS with the technology at the equilibrium level of output - wages reflect technology differences across countries. Multiplicity of equilibria undesirable from a policy perspective, so move to more general models of scale economies without multiplicity of equilibria.

INTRAINDUSTRY TRADE

Assume IRS sector has horizontally differentiated product (different varieties). Assume all existing varieties enter consumers utility symmetrically. All varieties will be produced and consumed in equal amounts. Countries will both import and export differentiated IRS good; intraindustry trade occurs. Assuming factor endowment differences as well generates HOS-style interindustry trade also. As factor endowments become more similar, intraindustry trade expands. Interindustry trade, based on factor differences, substitutes for international factor mobility. Intraindustry trade, based on differentiated products, is complementary to factor mobility. Dissimilar countries have predominantly interindustry trade; similar countries have predominantly intraindustry trade.

INTERNATIONAL ECONOMIES OF SCALE

Global size of an industry may be more relevant than geographic location. Returns to scale modeled as depending on the size of the world industry rather than national industry. World production possibilities well-defined although national production possibilities are not. Efficient resource allocation same as if no scale economies. Inconveniences of Graham equilibria eliminated by making scale economies international. Thus the possibility of a country losing from trade relies not only on IRS but national IRS (and parameters that lead to the Graham equilibrium rather than Ricardian or FPE).

PRODUCT DIFFERENTIATION

Now have each variety of a good produced by a single firm operating under monopolistic competition. Vertically differentiated products (quality) have all consumers agree on what brand is best; horizontally differentiated products (variety) have consumers disagree on what brand is best. Ideal variety approach equivalent to having consumers love variety for its own sake; variable elasticity so number of varieties and scale of production adjust. Internal international returns to scale leads to multinational firms. Even if IRS, the product differentiation is sufficient to ensure that no country loses from international trade (and so the Graham case requires homogeneous goods).

OLIGOPOLY

Suppose each country has a single monopolist in autarky and countries identical in all respects. When trade is opened, have a duopoly. Results depend on model of firm behavior used. In Cournot-Nash, firms choose quantity and total quantity increases with increased competition. Can have gains from trade even though no trade actually occurs; gains are from potential competition. If

firms choose quantity for each market then get two-way trade. If impose transport costs, get wasteful two-way trade of identical products. Interesting welfare conclusions because oligopoly profits contribute to national income. Assume all output sold to a third country to eliminate consumer surplus effects in welfare. If government can credibly commit to subsidizing exports, can increase profits. Explains why trade policy might take the form of promotion rather than restriction. As number of domestic firms increases, optimal policy shifts from subsidy to tax; also if firms choose price instead of quantity, optimal policy becomes a tax. A common resource available in fixed supply also limits the profit shifting ability of export subsidies for symmetric firms. Uncertainty over correct policy limits usefulness in practice.

FOREIGN DIRECT INVESTMENT

Many models developed to explain why firms produce in more than one country when doing so is expensive (due to lack of familiarity with the foreign economic environment, difficulty coordinating activities over large distances, etc.). Ownership advantage if some patent or ability (even reputation) to be exploited in multiple markets. Locational advantage if tariff (or transportation cost or factor price difference) to rule out concentrating production in one country and exporting to the other. Internalization advantage if arms length use of markets unattractive due to risk of opportunistic behavior by licensee (international enforcement of contracts difficult) or other reasons. When ownership, location and internalization advantages coexist, optimal way to serve a foreign market is through foreign direct investment (FDI or DFI). Firms with production or other activities in multiple countries are called multinational firms (or multinational enterprises or multinational corporations or MNEs or MNCs or just plain multinationals). FDI has been growing rapidly, making FDI a ripe area for further research.

ENDOGENOUS TRADE POLICY

Given that free trade is generally optimal, why do so many countries interfere with free trade? Political power may be organized such that decisions are not based on a truly representative consumer/producer. Producers may be organized into industry lobby groups and consumers may be poorly organized to counter the political pressure of these industry based special interest groups (SIGs).