

International Trade Theory

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Abstract

International trade theory provides explanations for the pattern of international trade and the distribution of the gains from trade. The theory convinces most economists of the benefits of liberal trade. But many non-economists oppose liberal trade. Opponents include some who may have encountered trade theory but nevertheless fall prey to fallacious reasoning. This essay attempts to convey why trade theory is so persuasive to economists and also to deal with why many non-economists are not persuaded.

International Trade Theory

Why do nations trade what they do? Is trade a good thing? The theory of international trade provides answers. The answers are both convincing and elegant, hence the vast majority of economists agree about the desirability of liberal trade. But the argument is also subtle and often misunderstood or distorted. Thus a large proportion of the general population tends to oppose liberal trade from confusion. This essay will attempt to convey why the answers convince most economists and why their liberal trade position is so often misunderstood. The essay's focus is theory, but theory convinces when it succeeds in fitting the data. Thus passing reference will be made to empirical findings, a sensibility much more thoroughly developed in the graduate textbook of Feenstra (2003).

“Buy low, sell high” logic leads economists to comparative advantage theory. Comparative advantage means the comparison of *relative* price differences between nations to explain the pattern of trade. For example, compare the relative price of wheat in terms of cheese at home to the same relative price in the foreign economy in a hypothetical equilibrium with no trade (autarky) or with restricted trade. The country with the lower relative price of wheat is said to have a comparative advantage in wheat while the other country has, symmetrically, a comparative advantage in cheese. Buy low, sell high logic predicts that a country will export the good in which it has a comparative advantage.¹

Notice that the focus on relative prices tends to cancel out forces (exchange rate manipulations, environmental or labor standards) which cause national differences in levels of nontraded factor (or goods) prices. Note also that by this reasoning a country *must* have a comparative advantage in some good. Prices of nontraded factors of production adjust in general equilibrium so that each country ends up in the trade equilibrium with a competitive or absolute cost advantage in the good in which it has a comparative advantage. Partial equilibrium thinking takes factor prices as given and does not impose the external budget constraint that requires exports to pay for imports. Partial equilibrium reasoning leads to misunderstandings explored below as the

¹In the case of many goods, the prediction is that a country will on average export goods which are relatively cheap in the absence of trade and import goods which are relatively expensive in the absence of trade. The prediction is about correlation. Bernhofen and Brown (2005) show that Japan's opening to trade in the 1850's reveals data consistent with the prediction.

absolute advantage fallacy.

Comparative advantage differences between nations are explained by exogenous differences in national characteristics. Labor differs in its productivity internationally and different goods have different labor requirements, so comparative labor productivity advantage was Ricardo's predictor of trade patterns. Ricardian trade theory is useful in its simplicity and even rather loosely confirmed by empirical evidence. The factor proportions theory added relative factor endowment differences to the exogenous explanation of comparative advantage (Jones, 1987). More capital abundant countries have higher labor productivity, but the advantage gained relative to the less abundant countries varies with the relative capital intensity of the good's technology. Combining technology and endowment differences appears to account well for actual trade patterns (Davis and Weinstein, 2002).

Trade theory also encompasses endogenous differences between countries. One focus is on economies of scale. The wider market due to trade induces a cost advantage in an industry in one of the countries. Another theory is based on monopolistic competition, whereby the wider markets due to trade increase product variety as buyers seek the special characteristics of foreign brands. Differentiated products trade flows both ways within product categories.

Trade costs also shape the pattern of trade. The economic theory of gravity explains the complex bilateral trade patterns among countries. Actual trade is much lower than gravity predicts in a frictionless world, providing evidence of trade costs much larger than those due to policy or transportation. The costs are well explained by geography and a set of national differences. The stability of the relationships over time suggests that these costs change slowly.

There are gains from trade in all these models. But the division of the gains will be uneven and there will be losers. Distribution matters in two ways, between and within nations. Internationally, with only mild qualifications, gains are shared between nations: some trade is better than none. Each nation can act through trade policy to take more of the gain, however, leading to destructive trade wars with mutual losses. Within national economies, there are gains on average but there are ordinarily losers. National institutions act to redistribute some of the gains (U.S. Trade Adjustment Assistance) or provide temporary relief from losses due to trade (escape clause protection), at the cost of lowering the overall gain from trade.

The topics of this outline are developed below in more detail. Section

1 examines the causes of comparative advantage. Section 2 exposes the absolute advantage fallacy. Section 3 reviews endogenous advantage. Section 4 sets out the economic theory of gravity and its implications. The concluding section examines the gains from trade.

1 Comparative Advantage

Ricardo explained comparative advantage as due to differences in labor productivity. Suppose that it takes two hours of labor to produce a bushel of wheat in the home country, while it takes four hours of labor to produce a bushel of wheat in the foreign country. Also, it takes three hours of labor to produce a pound of cheese in the home country while it takes eight hours of labor to produce a pound of cheese in the foreign country.

Ricardo saw that the world trade equilibrium would result in the home country exporting cheese and the foreign country exporting wheat. This is because in the absence of trade, a pound of cheese is worth 1.5 bushels of wheat (3 hours per pound of cheese divided by 2 hours per bushel of wheat) in the home country while a pound of cheese is worth 2 bushels of wheat in the foreign country. The labor market equilibrium which accompanies such a trade equilibrium must have a foreign wage of at most one-half of the home wage (since with a foreign wage equal to one-half the home wage, a bushel of wheat costs the same amount in each country, allowing production in both). Considering a low wage foreign economy, the labor market equilibrium accompanying the trade equilibrium could have a foreign wage no lower than three-eighths of the home wage (since in this case a pound of cheese costs the same amount in each country).

Notice that countries export the good in which they have the comparative labor productivity advantage, cheese for the home country and wheat for the foreign country. The numbers chosen make no difference to the logic, what is essential is that comparative labor productivities differ. One special aspect of the numbers deserves emphasis however: the home country has an absolute labor productivity advantage in both goods yet trade occurs regardless.

Subsequent developments of trade theory generalized the production model. The essence of comparative advantage theory remains: trade is due to differences in relative prices that would obtain in the absence of trade, and an average of each country's citizens gain from such trade. The Heckscher-Ohlin analysis of the factor proportions model predicted that a country would have

a comparative advantage in the good which made relatively intensive use of its relatively abundant factor. Thus if the home country were relatively abundant in capital (explaining why its labor was so much more productive in the preceding example), it would have a comparative advantage in the good which used capital relatively intensively (cheese in the preceding example). Conversely the foreign country is relatively abundant in labor and has a comparative advantage in the good which uses labor relatively intensively (wheat in the example above).

Trade in goods compensates for the international immobility of factors. The factor content extension of Heckscher-Ohlin trade theory predicts that trade patterns permit each country to consume factor services as if it were in a completely integrated world, smoothing out differences in national factor endowments. Recent empirical work has met with striking success in combining factor endowment differences with technology differences as an explanation of observed trade patterns (Davis and Weinstein, 2002).

Comparative advantage theory is much more general than the preceding discussion of special cases (Deardorff, 1984), but predictions about the pattern of trade weaken with generality. On average a country will import goods that would be relatively expensive in the absence of trade. See the Appendix for a technical statement. See Bernhofen and Brown (2004) for confirming evidence based on Japan's opening to trade in the 1850's. The assumptions of the general model are that (i) price taking consumers minimize the expenditure needed to realize any level of utility (real income), and (ii) producers behave so as to maximize the national product given the resource endowments. Assumption (i) implies downward sloping demand curves in the generalized form. Assumption (ii) leads to upward sloping supply curves in the generalized form. Scale economies and imperfect competition, treated below in the section on endogenous advantage, can lead to the violation of assumption (ii).

2 The Absolute Advantage Fallacy

Businessmen naturally compare the money cost of the same good in different locations to draw inferences about the direction of trade. Absolute cost advantage appears to imply that a nation imports goods that are cheaper abroad and exports goods that are more expensive abroad. The reasoning is insidious because it makes sense in many contexts. Absolute advantage

appropriately addresses the householder's question of which good should be purchased, the businessman's question of how tough are my competitors?

The individual businessman can appropriately take all other prices as given when contemplating his own actions, such as entering a new export market.

To see the difference between absolute and comparative advantage reasoning clearly, return to the Ricardian example above. If wages (measured in a common currency) were equal in the two countries prior to the opening of trade, the home country would have a 'competitive' or absolute advantage in both goods: it could undersell the foreign country in both wheat and cheese. Foreign businessmen would naturally be worried that they would all be driven from the market. This universal bankruptcy could not be an equilibrium, however, because the foreign workers would have no income to pay for home produced goods. The imbalance between expenditure and income would also mirror the absence of exports to pay for imports. Market equilibrium would be reached through price changes, lowering the foreign wage or raising the home wage until the foreign workers could be employed in the industry in which the foreign economy has the comparative advantage. (Unless the two currencies were pegged, the exchange rate of the foreign economy could depreciate and create the same effect.) More general models of production lead to the same conclusion: *equilibrium costs will adjust to confer absolute advantage in the good in which each country has a comparative advantage.*² The absolute advantage is weak in the mathematical sense in the case where both countries continue to produce the good.

Another illustration of the absolute advantage fallacy arises in popular concerns about the rapid productivity growth of China compared to the US. A 10% improvement in productivity will indeed secure a 10% cost advantage

²Imports need not equal exports bilaterally in a many country world; overall balance only is required. Imports also need not equal exports in any single time period, with the aggregate trade imbalance offset by international borrowing or lending. Balanced trade in the aggregate at a point in time is a simplifying assumption appropriate to analyzing the causes of trade and the gains from trade. When allowing for intertemporal trade, the expected present value of trade balances must be equal to zero (if not, trade is a Ponzi scheme). With full-blown intertemporal trade, essentially the same forces determine the pattern of trade and the gains from trade. Naturally, however, the time path of prices, especially the factor prices in the two countries, has important implications for trade volume and the gains from trade.

With many goods, comparative advantage applies to ranges of goods rather than to a single good, and the dividing line between comparative advantage and disadvantage is endogenous.

for the businessman over his competitor. A 10% improvement in all Chinese productivity relative to the US is unlikely to change comparative advantage (indeed, in the Ricardian example, comparative labor productivity advantage is unchanged) because Chinese wages will rise relative to US wages. Similarly a 10% drop in all US productivity due to tighter environmental regulations will be unlikely to change comparative advantage because US factor returns will fall.

The widespread practice of making international comparisons of ‘competitive advantage’ is essentially misguided because it suggests the metaphor of a race. The race metaphor is extended in concerns about ‘a race to the bottom’, which supposedly expresses the dilemma of countries seeking to implement pollution or labor standards but being pressured to lower standards by their competition with foreign countries that have low standards. But nations do not ‘compete’ as firms do. A firm may well be unable to survive after implementing pollution reduction when its competitors abroad do not follow suit and no other prices change in the new equilibrium. Nations cannot similarly put themselves out of business because factor prices will change in the new equilibrium. Polluting industries may or may not survive at the new factor prices under the new regulations, but the nation’s factors will be productively employed somewhere in the economy. Pollution reduction is costly with or without trade; nothing about the nature of a trading economy makes any essential difference to the nation’s ability to implement desired standards. The desirability of trade is an *essentially* separate matter.

3 Endogenous Advantage

Many goods are traded because they are simply unavailable from local production. Some kinds of availability are exogenous to the interaction of nations — diamonds and oil are found only in a few locations. Endogenous availability is in contrast driven by advantage arising from the economic interaction of nations. Endogenous advantage normally coexists with comparative advantage but it is simpler to consider special cases independent of comparative advantage. Theory focuses on endogenous advantage resulting from economies of scale.³

³In a formal but trivial sense, oil or diamond trade can be seen as comparative advantage trade — big oil deposits lead to a low relative price of oil where they are found. Moreover, comparative advantage trade is often associated with the disappearance of some

Trade based on scale economies features the possibility of multiple equilibria — one country will produce a good with scale economies but which nation ends up producing can be a matter of chance. Since advantage is endogenous, it appears attractive in developing countries to attempt to reverse the historical head start of rich countries by starting up production behind protection and then later being able to compete on world markets. The record of success in such efforts is mixed.

Openness to trade will generally allow economies of scale to be more thoroughly exploited, so this is a new source of gains from trade. Moreover, wider markets may support a wider range of products, still another source of gains from trade. Each country shares in the gains from trade with scale economies under conditions that appear to be met in practice.⁴ The theoretical possibility that a country can lose from trade based on scale economies has drawn a lot of attention from development economists in particular (Ethier, 1982b).⁵ Gains can be guaranteed if a country expands production in goods with scale economies, so it looks more attractive to use policy to promote production of such goods.

Scale economies come in two forms: external to the firm and internal to the firm. External scale economies are typified by specialized labor markets such as Silicon Valley, where the concentration of the market reduces search costs for computer engineers. External scale economies need not be location-specific, however. Increases in the scale of downstream final production can permit carrying on upstream input production with a specialized process that is cheaper at large enough scale. Such scale economies can operate at the level of the world economy and appear to be bound up with the recent phenomenon of outsourcing (Ethier, 1982a). Global scale economies tend to guarantee mutual gains from trade among countries.

Internal scale economies are associated with imperfect competition when the size of the firm looms large relative to the market size. Trade tends to intensify competition and thus to reduce the inefficiency of monopoly, industries in some countries. Neither of these associations of comparative advantage with availability is essential to the model, however.

⁴This claim is based on the results from numerous simulation models of trading economies that have been developed since the mid-70's.

⁵Losses result when a trading equilibrium has a country importing the good with scale economies while still producing it. Since domestic scale is smaller, unit costs are higher, meaning that market forces perversely 'choose' to import a good with higher price than in autarky. Simulation models have not found such equilibria but they are possible.

another gain from trade.

The most fruitful form of imperfect competition for trade theory has been monopolistic competition. Only Ford Motor Co. produces Ford autos (monopoly) but dozens of brands compete for auto buyers. Each design has a fixed cost of design (and marketing) which must be covered by sales net of variable cost. The total market size limits the number of designs which can profitably be produced. A signal accomplishment of trade theory in the 1980's was the embedding of monopolistic competition in a general equilibrium trade model (Helpman and Krugman, 1985; Ethier, 1982a). Progress was enabled by the simplifying assumption of symmetric firms: all brands were equally desirable and all firms' costs were the same.

Monopolistic competition provides an explanation of the two way international trade that is found in many products such as autos, and for why two way trade is more prevalent between similar countries. Trade between rich and poor countries, in contrast, is explained mainly by comparative advantage as autos exchange for agriculture. Relative country size matters too, the home market effect of Krugman (1980). Here the insight has been rigorously proved only for a two country example. Start with two equally sized countries, then increase one relative to the other. Trade costs imply that the larger country will have a more than proportionally larger share of brands. Intuitively, with access to foreign markets being costly the home market being larger allows scale economies to be more readily exploited, increasing its share of differentiated goods production more than its share of world income.

Monopolistic competition theory has recently focused on the heterogeneity of firms. Retaining the symmetry of firms on the demand side, differences in firms' productivities imply differential responses to trade. The best firms export disproportionately while imports drive out the worst firms. Fixed trade costs add explanatory power; only the best firms choose to incur the cost of trade. A key element of the model is productivity shocks, firms discover their productivity after committing fixed costs. The distribution of surviving firms is related to the distribution of productivity shocks as well as economic determinants. The models of Bernard, Eaton, Jensen and Kortum (2003) and Melitz (2003) deserve special attention. The former focuses on competition within a variety while the latter focuses on competition across varieties. Both models imply new gains from trade in the form of overall productivity gains: opening trade causes the exit of weak firms and the expansion of strong ones.

4 Bilateral Trade Patterns

The trade theories presented above are focused on explaining the cross-commodity trade pattern of essentially two trading countries. The contemporary world of more than 100 countries (most of which are collections of distinct economic regions) has complex trade patterns.

The economic theory of gravity complements the preceding models by providing an explanation of bilateral trade (Anderson and van Wincoop, 2004). Gravity fits the data well and reveals important information. The model is based on four assumptions: expenditure on goods from all sources is equal to income from sales to all sources, markets for all goods clear, and, more restrictively, each country or region produces a unique good and all countries have the same tastes for goods.

The third assumption, products differentiated by place of origin, appears to be the most restrictive. In practice, only models of this type do at all well in fitting bilateral trade patterns. Monopolistic competition provides one explanation for why products appear to be differentiated by place of origin. Eaton and Kortum (2002) show alternatively that productivity shocks in a Ricardian model will select producers within product lines, resulting at the aggregate level in what appears to be two way trade. In either case, gravity ends up describing trade flows.

In a frictionless world, gravity theory predicts that the bilateral trade in a commodity as a share of world production of the commodity will be equal to the product of the source country's share of world production of the commodity times the consuming country's share of expenditure on the commodity. Alternatively, the model predicts that size-adjusted-trade, the bilateral flow divided by the product of source country supply and consuming country expenditure, should be constant across country pairs in a frictionless world.

Actual trade flows are far smaller than the frictionless prediction (while shipments within regions are far larger, home bias). The deviations of actual bilateral trade from the frictionless prediction allows inference about bilateral trade costs. Distance appears to be more costly than can be accounted for by transport costs. Other costs are associated with non-contiguity, language barriers, exchange rate barriers, insecurity and other plausible bilateral characteristics. Just crossing a border imposes a cost which is larger than can be explained by policy variables.

Trade flows in the model are predicted to vary with relative resistance,

equal to the ratio of the direct bilateral trade cost to the product of inward and outward multilateral resistance. Multilateral resistance is an index of bilateral trade costs, inward from every source to a particular destination or outward from a particular source to every destination. Multilateral resistance is linked to country size and thus to explaining an important aspect of trade patterns. Since borders are costly, a big country tends to have lower multilateral resistance than does a small country because a smaller fraction of its shipments must cross borders. . The size adjusted internal trade of big countries will be smaller than that of small countries because big countries have higher relative resistance to its internal trade. These differences can be quite dramatic, as shown by studies of US and Canadian trade (Anderson and van Wincoop, 2003), where the US is about ten times larger than Canada.

5 Division of the Gains

The widespread support of liberal trade by professional economists is because theory and evidence persuade them that there are gains from trade in an average sense in all these models of the determinants of trade. But the division of the gains will be uneven and there can be losers. Most policy intervention with trade is explained by the policy makers' desire to alter the distribution of gains.

The gains from trade reasoning is illustrated with comparative advantage based trade. Focus on a 'typical' household. Suppose that in autarky equilibrium, as in the Ricardian numerical example, the Home typical household is willing to swap 1 unit of cheese for 1.5 units of wheat. That is, he would be indifferent to moving his consumption and production a small distance to offer the market 1 cheese for 1.5 wheat or 1.5 wheat for 1 cheese. Suppose that a typical foreign country household in the autarky equilibrium is willing to swap 2 wheat for 1 cheese. Now allow frictionless trade, and suppose for illustrative purposes that the new equilibrium price is equal to 1.75 wheat per unit of cheese. (Generally the price must lie between 1.5 and 2, always implying mutual gains.) Each Home household offers cheese to Foreign households in exchange for their wheat. Formerly it cost 2 wheat for 1 cheese in Foreign but now the 2 wheat will procure 1 cheese and leave 0.25 wheat left over, a gain from trade. Similarly each Home household can obtain 1.75 wheat for 1 cheese where formerly this would procure only 1.5

wheat, a gain from trade of 0.25 wheat. Both households and hence both nations gain from trade. The numbers chosen illustrate a general principle: mutual gains result from trade when autarky relative prices differ. See the Appendix for a more formal discussion.

The mutual gains from trade claim may seem dubious because with the numbers chosen, trade equilibrium requires that foreign wages must be lower than home wages. In effect, trade facilitates an exchange in which more than one unit of foreign labor exchanges for one unit of home labor, the home country is 'exploiting' foreign labor. Some anti-trade sentiment on the left in rich countries is based on this observation.⁶ Nevertheless, foreign labor gains from trade, as does home labor. Prior to trade, a pound of cheese cost 1.5 bushels of wheat in the home country while it cost 2 bushels of wheat in the foreign country. By specializing in wheat production and exchanging it for cheese, foreign workers can obtain cheese more cheaply, at a price somewhere between 2 and 1.5 bushels of wheat. This exchange must make them better off. As for home workers, prior to trade, a pound of cheese obtained 1.5 bushels while with trade it obtains somewhere between 1.5 and 2 bushels. This must make them better off. Concern about the 'fairness' of the exchange in rich countries should lead to policies which might actually help the poor countries. Trade theory shows that antitrade policies by rich countries will instead harm the poor countries

Scale economies and imperfect competition models of trade suggest further gains. With scale economies, trade implies that the force of wider markets drives costs lower. With imperfect competition, trade stimulates competition and drives profit margins lower. Trade equilibrium with monopolistic competition suggests that consumers and intermediate input users gain from more variety of differentiated products. See Helpman and Krugman (1985).

The distribution of the gains matters, both between and within nations. Nationalist trade policy can take more of the gains, leading to destructive trade wars with mutual losses. Negotiation of trade agreements and their enforcement through international institutions such as the WTO help to restrain the destructive tendencies of unilateral action. Nations have an incentive to participate in negotiations and to join institutions such as the WTO because some trade is better than none for each nation. Theoretical qualifications to this statement must be entered in models of trade involving

⁶Marxism embeds the observation in a wider system of analysis, but it probably is no longer a basis for much sentiment on the left.

scale economies and imperfect competition, but in practice simulation of such models suggests that some trade remains better than none for each nation.

Within national economies the division of gains issue is much sharper: some members of a nation ordinarily lose from trade. Ricardo's one factor trade model submerges income distribution. Multi-factor production models feature groups who must lose from trade. Loosely speaking, these groups are associated with import competing production. See Jones, (1987).

In equilibrium the gains must ordinarily outweigh the losses within each nation, by the preceding national gains from trade argument. For an economy with non-identical households, this implies that there are gains from trade on average. Under special circumstances the gains can be redistributed so that all households gain. In practice, these circumstances are rarely met completely.⁷ Even so, most economists tend to favor efficiency-enhancing policies such as liberal trade on the pragmatic grounds that efficiency-reducing policies such as protection also cause gainers and losers, so it is better to go with the larger net gains and supplement them with feasible programs to compensate the most obvious losers.

What if losers are not compensated? A person taking this seriously must decide on liberal trade by weighting individual gains and losses. Ethical considerations give more weight to losses or gains to the poor than to the rich. The case for liberal trade is strengthened by ethical considerations because the illiberal trade policies of rich countries hurt the poor disproportionately, as documented by Gresser (2002). Poor countries have comparative advantage based on cheap low skilled labor, hence discrimination against their exports harms the poor citizens of poor countries. At home in rich countries, protection makes food and clothing more expensive, a regressive tax on poor

⁷A benevolent and very powerful government can in principle calculate and implement the lump sum transfers (negative for gainers, positive for losers) that are required to achieve redistribution so that all gain. In practice, information is more limited and implementation more difficult (because households modify their behavior to reduce their tax or increase their subsidy) than with the lump sum story. Trade and public economic theory have relaxed the conditions somewhat. Income taxation can in some circumstances achieve redistribution with efficiency, but information limitations rule them out as a practical matter; see Guesnerie (2001). Dixit and Norman (1986) show that a system of consumption taxes (differentially taxing each commodity) that sacrifices some of the gains from trade is powerful in achieving gains for all. For a qualification of their argument, see Kemp and Wan (1986). Again, information limitations vitiate the applicability of this idea. Finally, a government that can discriminate powerfully between households is sure to be lobbied intensively by those able to organize politically, to the detriment of the unorganized.

consumers. Among the poor, losers from protection appear almost surely to outweigh gainers.

On the way to equilibrium, it is theoretically possible that adjustment cost losses may temporarily exceed gains, justifying temporary relief measures. For example, workers displaced by import competition may be unemployed for a time. Extensive investigation of US cases suggests that such adjustment cost losses from trade are small, of short duration, and are swamped by the gains from trade. A typical investigation reports that the net cost to the economy of using protection to re-employ a worker far exceeds the wage the worker would receive in the job, usually several times the wage ranging up to ten times the wage. In practice, therefore, temporary protection for workers cannot be justified on efficiency grounds, though it remains possible to justify it on equity grounds. Economists in favor of liberal trade point out that protection can be replaced with much less inefficient methods of compensation to displaced workers.

A substantial part of the opposition to liberal trade is based on confusion and ignorance. Confusing absolute advantage with a valid theory of trade sows fear that a nation must protect itself from overwhelming competition. Greatly exaggerated notions of the size of adjustment costs leads to support for protection. Ignorance of the harm done to the world's poor by protection persuades many who support redistribution of income to support protection that harms the majority of those they seek to help. The combination of confusion and ignorance among the 'disinterested' with well organized special interest groups explains the power of protectionism.

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7 Appendix

The general statement of comparative advantage is that on average a country will import goods that are relatively expensive in autarky. Let m denote the vector of excess demands in equilibrium, positive for imports and negative for exports. Let p denote the vector of relative prices in autarky in the home country and let p^* denote the vector of relative prices in autarky in the foreign country. Then the vector inner product $(p - p^*)^T m \geq 0$.

The key requirement for the proposition is ‘as if’ optimization by consumers and producers, leading downward sloping demand and upward sloping supply in the generalized sense (the substitution effects matrix of real income compensated excess demands, m_p^c , is negative semi-definite). If the actual trade equilibrium involves trade distortions, the additional requirement is that trade not be on balance subsidized. Let t be the vector of trade taxes, positive for import taxes and negative for export taxes (and negative for import subsidies and positive for export subsidies). The requirement is $t^T m \geq 0$.

The “buy low, sell high” logic implies that a surplus is captured by trade, so comparative advantage trade is closely linked to the gains from trade. ‘As if’ optimization means that consumers lower the expenditure required to support given real income by reallocating consumption in trade equilibrium as compared to autarky while optimization by producers means that income is raised by reallocating production in trade equilibrium as compared to autarky.

Similar comparative advantage statements can be made concerning the factor content of trade, countries tend to import (embodied in goods) the factors that are relatively expensive in autarky. See Neary and Schweinberger (1986).

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