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The Princeton Encyclopedia of the World Economy**

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JACOB W. MUSILA

■ comparative advantage

The term *comparative advantage* was first used in England in the early 19th century by economists of the classical school, which dates from the publication of Adam Smith’s *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776). Sometimes denoted by the synonymous term *comparative cost*, it expresses the principle by which a nation that opens to international trade is led to specialize in and export certain commodities and to import others. Whereas the former commodities are those in which it has a comparative advantage, the nation is said to have a comparative disadvantage in the latter. The concept

of comparative advantage is vital for understanding the structure of world trade and how each country contributes to it. It underlies the whole field of international trade theory and policy, the earliest and arguably the most important of the applied fields of economics and of its predecessor, political economy. Textbooks of international trade devote successive chapters to exploring the reasons why nations have a comparative advantage in certain commodities, and the welfare implications of specialization in accordance with its dictates. Comparative advantage is also relevant to different regions of a country in studying the pattern of interregional trade.

Starting in England at the end of the 17th century with mercantilist writers such as Sir Dudley North and Henry Martyn, the sources of comparative advantage and the gains from the trade that it induces were explored by the luminaries of the nascent economics profession: Smith himself and the classical economists who followed him, such as David Ricardo, Robert Torrens, and John Stuart Mill. Ricardo (1817) enshrined comparative advantage as a key concept for economists by illustrating it with a numerical example relating to trade in wine and cloth between England and Portugal. In the first half of the 20th century the neoclassical school of thought added its own perspectives to the concept of Ricardian comparative advantage when it was generalized by Gottfried Haberler (1936) and critiqued by two Swedish economists, Eli Heckscher (1949) and Bertil Ohlin (1933). Heckscher and Ohlin postulated that the source of comparative advantage resides in the differential factor endowments of trading countries. The Heckscher-Ohlin theory became the mainstream theory of trade after World War II. Since the late 1970s, doubts that had been raised about the empirical validity of comparative advantage led some economists to formulate a New Trade Theory that harks back to another source of trade mentioned by Ohlin (1933), economies of scale, and explains why much of the trade between advanced economies consists of differentiated commodities produced under conditions of imperfect competition.

Despite the frequency with which the principle of comparative advantage is discussed, a precise defi-

nition is hard to find, and most authors cite particular economists or associate the concept with numerical examples, such as Ricardo's, based on two countries, two commodities, and a single input, labor. An algebraic definition along Ricardian lines can clarify the concept. Consider two commodities, 1 and 2, and two countries, A and B. Define L_i^C as the input of labor per unit of output of commodity i ($i = 1, 2$) in country C ($C = A, B$). Then country A has an *absolute advantage* in commodity 1 if $L_1^A < L_1^B$, and a *comparative advantage* in commodity 1 if

$$L_1^A/L_2^A < L_1^B/L_2^B. \quad (1)$$

Inequality (1) is consistent with the possibility that $L_1^A < L_1^B$ and $L_2^A < L_2^B$, so that A has an absolute advantage in both commodities but a comparative advantage in the first. Absolute advantage in a commodity thus indicates a smaller absolute cost in terms of a factor such as labor, whereas comparative advantage implies that the ratio between the unit costs of production is lower in A than in B. What is being "compared" in comparative advantage are unit costs relating both to countries and to commodities: a double-barreled comparison. Since relative prices before trade conform to the ratios L_1^C/L_2^C in A and B according to the labor theory of value, the commodity whose relative cost of production is lower is exported in exchange for the other commodity. If $L_1^A < L_1^B$, $L_2^A < L_2^B$, and inequality (1) holds, specialization according to comparative advantage has important welfare implications for both countries: A is better off if it participates in international trade despite its greater efficiency in producing both goods, and B can participate gainfully in the international division of labor despite its absolute disadvantage in both commodities. If $L_1^A < L_1^B$, $L_2^A < L_2^B$, and (1) is changed to the equality $L_1^A/L_2^A = L_1^B/L_2^B$, A has an absolute advantage in both commodities and a comparative advantage in neither. Trade cannot take place since both countries face the same relative price. Comparative advantage clearly trumps absolute advantage as a cause of trade.

According to Jones and Neary (1984, 3), "While the principle of comparative advantage may thus be defended as a basic explanation of trade patterns, it is not a primitive explanation, since it assumes rather

than explains inter-country differences in autarkic relative prices." Autarkic relative prices are those that prevail in a state of *autarky*, when a country is closed to trade. Successive models of international trade have been based on different "primitive explanations" for why relative prices differ in autarky, such as intercountry differences in technologies, factor endowments, or tastes. The specification of an autarky equilibrium is, for most countries, a thought experiment designed to ascertain the prices that would prevail in the unlikely event that an economy were isolated or self-sufficient. It is part of an exercise in "comparative statics," in which an economy's resource allocation and economic welfare in autarky are compared to their pattern under free trade. If transportation costs are neglected, free trade equates the prices of traded commodities across countries. Each country's export good rises in value while the import-competing good falls. Under free trade one can therefore no longer speak of a country being a "low-price" country for the goods in which it holds a comparative advantage.

18th-Century Views on the Causes of Specialization Before Ricardo, comparative advantage was interpreted in a looser way than that indicated earlier, namely, as the reason why particular economies show a tendency toward specialization in certain types of commodity. In 1752 the philosopher David Hume published a series of essays analyzing a variety of commercial issues including trade between more developed economies such as England and less developed ones such as his native Scotland. Lower wages give a competitive advantage to more backward economies, allowing them to compete successfully with more advanced ones in the simpler manufactures. In a similar vein the English pamphleteer Josiah Tucker argued that

It may be laid down as a general Proposition, which very seldom fails, That *operose* or *complicated Manufactures* are cheapest in rich Countries; and *raw Materials* in poor ones: And therefore in Proportion as any Commodity approaches to one, or other of these *Extremes*, in that Proportion it will be found to be cheaper, or dearer in a rich, or a poor

Country. . . . [Moreover] there are certain *local* Advantages resulting either from the Climate, the Soil, the Productions, the Situation, or even the natural Turn and peculiar Genius of one People preferably to those of another, which no Nation can deprive another of.

(Tucker 1774, 188, 193)

Tucker not only spoke of national “advantages,” but traced them to climate, soil, and even “the natural turn and peculiar genius” of the people, factors that were often subsequently cited as explanations of economic specialization by the classical school of economists. He engaged with Hume in what became known as the “rich country–poor country” debate, in which they argued whether poor countries could catch up with or even surpass the standard of living of richer ones. In opposition to Hume, Tucker maintained that the built-in advantages of rich countries are hard to reverse. Without citing Tucker, Adam Smith also anticipated the theory of comparative advantage by maintaining that “the most opulent nations . . . generally excel all their neighbours in agriculture as well as in manufactures; but they are commonly more distinguished by their superiority in the latter than in the former” (Smith 1776, 16). This notion of a “natural” territorial division of labor between rich and poor countries was adopted by most 19th-century economists.

Ricardo’s Example of Comparative Advantage

The principle of comparative advantage is contained in chapter 7 of Ricardo’s *Principles of Political Economy and Taxation* (1817), which is devoted to foreign trade:

The quantity of wine which she [Portugal] shall give in exchange for the cloth of England, is not determined by the respective quantities of labour devoted to the production of each, as it would be, if both commodities were manufactured in England, or both in Portugal.

England may be so circumstanced, that to produce the cloth may require the labour of 100 men for one year; and if she attempted to make the wine, it might require the labour of 120 men for the same time. England would

therefore find it her interest to import wine, and to purchase it by the exportation of cloth.

To produce the wine in Portugal, might require only the labour of 80 men for one year, and to produce the cloth in the same country, might require the labour of 90 men for the same time. It would therefore be advantageous for her to export wine in exchange for cloth. This exchange might even take place, notwithstanding that the commodity imported by Portugal could be produced there with less labour than in England.

Though she could make the cloth with the labour of 90 men, she would import it from a country where it required the labour of 100 men to produce it, because it would be advantageous to her rather to employ her capital in the production of wine, for which she would obtain more cloth from England, than she could produce by diverting a portion of her capital from the cultivation of vines to the manufacture of cloth.

Thus England would give the produce of the labour of 100 men, for the produce of the labour of 80. (Ricardo 1817, 135)

These paragraphs contain four numbers denoting the amounts of labor needed to produce wine and cloth in England (120, 100) and Portugal (80, 90). International trade textbooks interpret them as constant labor coefficients per unit of output of wine and cloth, and deduce from them linear production possibility frontiers and complete specialization in both countries (unless one of them happens to be “large” and remains nonspecialized). Ruffin (2002) and Maneschi (2004) show that this interpretation is incorrect. A close reading of the first three paragraphs of the foregoing passage reveals that the two numbers relating to each country refer instead to the amount of labor embodied in its *total exports* and the amount it would require to produce its *total imports* of the other commodity. In the second paragraph, Ricardo is able to assert which commodity England exports before even mentioning the two numbers relating to Portugal. It is clear that Portugal has an absolute advantage in both commodities since it uses less labor

than England does to produce both traded amounts of wine and cloth. Ricardo did not justify the four numbers by referring to particular economic characteristics of the two countries. Economists have assumed that differences between them in the technology of production account for their respective comparative advantage.

Ricardo never specified the quantities exported by each country. If X is the amount of cloth exported by England and Y that of wine imported, the *terms of trade* (defined as the relative price of the export good) are Y/X units of wine per unit of cloth. Since England requires 100 units of labor to produce X and 120 units to produce Y , the unit labor coefficients are $100/X$ and $120/Y$ respectively, so that its opportunity cost of cloth in terms of wine is $(100/X)/(120/Y) = (5/6)Y/X$. The corresponding unit labor coefficients in Portugal are $80/Y$ for wine and $90/X$ for cloth, so that its opportunity cost of cloth in terms of wine is $(9/8)Y/X$. If these opportunity costs remain constant for all levels of output they are equal to the internal price ratios, so that Portugal has a comparative advantage in wine while England has it in cloth. Since $(9/8)Y/X > Y/X > (5/6)Y/X$, these opportunity costs lie on either side of the terms of trade Y/X , so that trade causes the price of the imported commodity to fall in each country.

Classical Perspectives on Comparative Advantage after Ricardo Another classical economist, Robert Torrens, is often mentioned with Ricardo as a codiscoverer of the comparative advantage principle. In his *Essay on the External Corn Trade* published two years before Ricardo's *Principles*, Torrens argued that even if England produces "corn" (grains) more efficiently than Poland, it may be to England's advantage to import it from Poland: "tracts of her territory, though they should be equal, nay, even though they should be superior, to the lands of Poland, will be neglected; and a part of her supply of corn will be imported from that country" (Torrens 1815, 264–65). Although England has an absolute advantage in corn, it has a comparative advantage in manufactures and specializes in them in order to import corn. Despite Torrens's two-year precedence in print with a passage that shows that he appreciated the dis-

inction between absolute and comparative advantage, Ricardo deserves his reputation as the discoverer of the principle of comparative advantage since (unlike Torrens) he presented it in terms of a numerical example that allowed both the determination of the direction of trade and the gains from trade accruing to each country. Ruffin (2002) highlights other deficiencies in Torrens's formulation of this principle.

Torrens deserves to be remembered for another reason. In his comparative cost example, Ricardo postulated the existence of a trade equilibrium but never explained how the terms of trade, and hence the division of the gains from trade between the two countries, are determined. Torrens advanced the notion that they depend on the reciprocal demand of each country for the export goods of the other country. As O'Brien (2004) points out, Torrens was a pioneer in the theory of trade policy by proposing that a tariff can turn the terms of trade in a country's favor, and hence insisting on reciprocity with other countries in tariff policy. His argument for an aggressive trade policy was critiqued, and the theory of reciprocal demand developed more rigorously, by John Stuart Mill (1848), who among the classical economists ranks with Ricardo as a great innovator in international trade theory. Mill postulated that reciprocal demand determines the terms of trade in such a way that a country's exports match the value of its imports. He noted that the terms of trade are located between, and bounded by, the autarky price ratios of the two trading countries. The gap between the two countries' autarky price ratios, which indicate their respective comparative advantages, thus fixes the possible range of the terms of trade, while reciprocal demand determines their location in this range. Mill also analyzed how technical change in the export good of one of the countries alters the pattern of comparative advantage and turns the terms of trade against it.

The first professor of political economy in Ireland, Mountifort Longfield, took an important step in generalizing the Ricardian model to many commodities, observing that a commodity is exported by a country if and only if the productivity of the labor

producing it, relative to the other country's, exceeds their relative wages. In his words, "That kind of labour will succeed in each country which is more productive in proportion to its price" (Longfield 1835, 56). Longfield realized the importance of reciprocal demand in determining the range of commodities exported, noting that "if a nation enjoyed an immense superiority in the production of two or three articles of very general demand, the wages of her labourers might be, in consequence, so high that she could not compete with the rest of the world in any other manufacture, under a system of free trade" (69). In the two-commodity Ricardian world, comparative advantage is determined entirely by techniques of production that dictate that one good is exported and the other imported. In a multi-commodity world, a country's comparative advantage depends not only on technology but also on the reciprocal demand of each country for the other's commodities, such that commodities are exported (imported) when the ratios of their labor productivity are greater (smaller) than the ratio of their wage rates. As Longfield asserted, a country that enjoys a very high wage rate compared to its trading partner produces and exports very few commodities.

Neoclassical Perspectives on Comparative Advantage The classical school of thought gradually gave way to the marginalist economics of W. Stanley Jevons in England, Carl Menger in Austria, and Léon Walras in France and Switzerland, and then to the neoclassical school that originated with Alfred Marshall in England. Marshall achieved a "neoclassical" synthesis by combining insights derived from the marginalist economists on the important role played by demand in price determination with the supply-side view of the classical economists that price is determined by the cost of production. This spelled the end of the classical labor theory of value used to determine the autarky prices in the theory of comparative advantage of Ricardo and Mill. The prestige enjoyed by the theory of comparative advantage guaranteed its continued longevity for several more decades, as shown in Jacob Viner's (1937) scholarly *Studies in the Theory of International Trade*, which painstakingly analyzed and critiqued the

achievements of the mercantilist, classical, and neoclassical writers in international trade theory and policy.

Marshall did not do much to advance the theory of international trade beyond graphically translating Mill's analysis of reciprocal demand and terms of trade determination by means of the two trading countries' offer curves. The latter show how much of the good in which each country holds a comparative advantage it is willing to export in exchange for alternative amounts of its import good. The slope of the ray joining the origin to the intersection of the offer curves yields the terms of trade. Offer curve analysis was developed in greater detail by Francis Edgeworth, who incorporated the two countries' comparative cost ratios in the offer curves and showed diagrammatically that they bound the terms of trade. Both Marshall and Edgeworth used offer curves to illustrate the impact of a tariff on the terms of trade and to investigate the stability of a trade equilibrium.

Considerably more progress was made by the Austrian-born economist Gottfried Haberler in a 1933 book that appeared in English translation three years later as *The Theory of International Trade with Its Application to Commercial Policy* (Haberler 1936), and by the Swedish economists Eli Heckscher (1949) and Bertil Ohlin (1933). Haberler generalized Ricardian comparative advantage to an economy in which price is defined by the opportunity cost of a commodity in terms of another, rather than by its constant "real cost" of production. He depicted by means of a transformation curve, or production possibilities frontier (PPF), the menu of outputs that can be produced with the economy's factors of production and the available technology. Whereas the PPF is linear in the textbook Ricardian case since real costs of production are constant for any level of output, the neoclassical PPF is concave to the origin. Its slope measures the opportunity cost of one commodity in terms of the other and increases with the level of output because of increasing unit costs. In autarky this slope differs for the two trading partners and signals their comparative advantage in the commodity that is cheaper there. Unlike in the Ri-

cardian case, this slope is no longer independent of demand considerations, and the mix of factors used changes along the PPF together with its slope. Haberler thus generalized the comparative cost model while accepting most of its welfare conclusions.

In an article published in Swedish in 1919 and translated into English in 1949 as “The Effect of Foreign Trade on the Distribution of Income,” Eli Heckscher set out to discover for the Ricardian trade model the hitherto missing rationale for why comparative advantage differs across countries and, as the title of his paper suggests, to explore how trade affects income distribution. The clue lies in the difference in the relative abundance of factor endowments across countries combined with differences in the intensities with which commodities use factors in production. Under autarky these features yield differences in commodity prices across countries that in turn lead to trade between them. Making the additional assumption that techniques of production are identical across countries, Heckscher argued that trade causes factor prices to converge and even become equal if neither country becomes fully specialized, a result that later became known as factor price equalization. As in the case of Haberler’s PPF, the difference between comparative costs responsible for trade in the first place is erased by the very trade it engenders. After trade is established, and unlike the Ricardian constant-cost case, the difference in comparative costs disappears since it is no longer needed to ensure continued trade.

Haberler’s generalization of the Ricardian model and Heckscher’s rationale for comparative costs in the context of that model did not go far enough for Heckscher’s student Bertil Ohlin, who in 1933 published a book-length critique of the Ricardian model. Together with Heckscher’s 1919 article, whose assumptions and conclusions were adopted by Ohlin, it laid the foundations for what became known as the Heckscher-Ohlin theory, the mainstream theory of international trade after World War II. According to Ohlin’s critique, the Ricardian model could not be reformed or generalized, but must be rejected as based on false assumptions in order to reconstruct the theory of trade on the new

foundations sketched by Heckscher and the neo-classical school. The association of the term *comparative advantage* with the theory of comparative costs that Ohlin wished to discredit explains why this term is hardly used in his 1933 book and disappears completely from the revised edition of 1967. When Paul Samuelson (1948) applied the Heckscher-Ohlin model to two countries, two commodities, and two factors of production and thereby made it more comprehensible and suitable for graphical representation, he was not deterred from using the term *comparative advantage* in connection with it. In fact, Samuelson formulated what became known as the Heckscher-Ohlin theorem: a land-abundant (labor-abundant) country has a comparative advantage in the land-intensive (labor-intensive) commodity and exchanges this commodity for the other since in autarky it is cheaper than in the other country. Its validity depends on numerous assumptions, including identical demands in the two countries such that at the same price ratio they consume goods in the same proportion. It is somewhat ironic that, following Heckscher’s lead and despite Ohlin’s objection to the term *comparative advantage*, Ohlin ultimately provided the first book-length explanation of the causes of comparative advantage based on international factor endowment differences and differential factor intensities for commodities.

Comparative Advantage and the New Trade Theory The Heckscher-Ohlin (H-O) theorem was tested empirically by Wassily Leontief (1953). Despite his surmise that the United States was then the world’s most capital-abundant country, Leontief discovered that it exported labor-intensive and imported capital-intensive commodities! His finding became known as the Leontief paradox and gave rise to numerous articles that attempted to account for it. The underlying H-O theory was extended to more factors than the two (capital and labor) considered by Leontief, including natural resources and skilled labor. Later empirical tests that included these extensions sometimes reversed, sometimes reaffirmed the Leontief paradox. Moreover, contrary to what the H-O theory suggests, most trade flows were shown to occur between industrialized countries whose factor

endowments are fairly similar. Much of this trade is intraindustry in nature, meaning that the same types of commodity (such as automobiles) are both exported and imported. Dissatisfaction with the underlying H-O theory led in the 1970s to the formulation of a *new trade theory*, some of whose models dispense altogether with the notion of comparative advantage. They allow instead for increasing returns to scale, external economies, differentiated products, and the associated imperfectly competitive market structures. Trade can arise even between economies that are identical with respect to factor endowments and technical knowledge. The new trade theorists later realized that Ohlin himself had partly anticipated them in 1933. In chapter 3 of his book, titled “Another Condition of Interregional Trade,” Ohlin argued that a powerful secondary reason for trade is economies of scale, due to the indivisibility of certain factors of production. Ohlin remarked that trade and specialization are partly determined by history and accident, factors also stressed by Paul Krugman (1990). Emphasizing increasing returns and monopolistic competition in economies in which comparative advantage plays no role, Krugman showed that the New Trade Theory can provide a satisfactory explanation for intraindustry trade. Other models of the New Trade theorists combine comparative advantage with economies of scale to produce a rich variety of possible trade outcomes.

Comparative Advantage: An Enduring Legacy

Comparative advantage has been attributed to many causes in the trade literature, such as different techniques of production in the Ricardian model and differential factor endowments in the writings of Heckscher and Ohlin. The strategy adopted by the innovators of each theory was to discover a factor that differs between countries, hold everything else in them the same, and build a theory based on this difference. As the French put it, *c'est la différence qui compte*.

Although comparative advantage plays no role in a few models of the New Trade Theory, where the industries that countries adopt are immaterial as long as they end up specializing and thus reaping economies of scale, some of its other models combine such increasing returns with traditional comparative ad-

vantage. Models of the Ricardian or Heckscher-Ohlin type thus endure as significant explanations of comparative advantage in the world economy. The drastic changes in the structure of world trade since the mid-20th century and the emergence of new major exporters such as China and the countries of the “East Asian miracle” present economists and policymakers with the task of analyzing and keeping up with the rapid evolution of comparative advantage in the presence of multinational corporations and of phenomena such as outsourcing and the instantaneous transmission of technological knowledge across frontiers.

See also absolute advantage; economies of scale; gains from trade; Heckscher-Ohlin model; intraindustry trade; monopolistic competition; New Trade Theory; Ricardian model; terms of trade

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ANDREA MANESCHI

■ competition for foreign direct investment

See subsidies and financial incentives to foreign direct investment

■ competition policy

The term *competition policy* is typically taken to include all government policies that influence the degree of competition in a nation’s markets, including trade policy. Competition law, in contrast, refers to a specific set of legal provisions concerning the manner in which firms collaborate and compete with one another. That set usually includes measures on cartels, other forms of interfirm collaboration (including so-called vertical restraints), mergers and acquisitions, and abuse of market power. Competition law, therefore, is an element of competition policy but not vice versa.

The appropriate relationship between national trade and competition policies and the merits of different international initiatives on competition law have long been controversial matters both in economic analysis and in international deliberations.