

# INTERNATIONAL ECONOMICS

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## Summary

The study of international economics provides a rich selection of theoretical models, which can be used to analyze a number of important current issues. This article describes how theoretical models are applied on such issues as the implications of globalization and the formation of regional trading groups; the implications of capital and labor movements across national boundaries; the effects of reducing trade barriers; the implications of economies of scale; and the behavior of foreign exchange markets in providing stability in international trade.

## 1. Introduction

International economics analyzes issues related to movement of goods, assets, and factors between and/or among countries. It is generally divided into two parts: the real (pure) and the monetary. The former does not concern itself with any monetary phenomenon. The pure theory of international trade commenced with the writings of David Ricardo (1772–1823). The widely used Heckscher-Ohlin (HO) model of trade was developed by Eli Heckscher (1879–1952) and Bert Ohlin (1899–1979). Trade theorists have used varieties of these basic models to analyze several issues in trade that countries face currently as well as those they faced in the more distant past. At the beginning of the twenty-first century, the world faces the following major issues in trade: a) the rising levels of protection in developed countries that restrict market access to developing economies' exports; b) the formation of large trading blocs; c) excessive volatility of exchange rates and their persistent misalignments; d) trade and structural

unemployment problems in Europe; e) globalization-related poverty and widening income inequality; and f) restructuring of the emerging economies. Many modern models of international economics have been created out of a desire to analyze these problems via trade theoretic analysis.

## 2. Trade Models

The two famous models of trade—Ricardo and HO—were both concerned with predicting the pattern of trade on the basis of comparative advantage. In both models, two goods  $X_1$ ,  $X_2$  are produced; these are denoted as boxes in Figure 1. In the Ricardian model, only one mobile factor, labor ( $L$ ), is used to produce both goods, as shown by the arrow at the top. The HO framework utilizes two mobile factors, labor and capital ( $K$ ), to produce both goods. A variation of these models is the specific factor model, where one factor is totally mobile while each good uses a specific factor. The specific factor model has been widely used to address interesting issues concerning protection and income distribution.

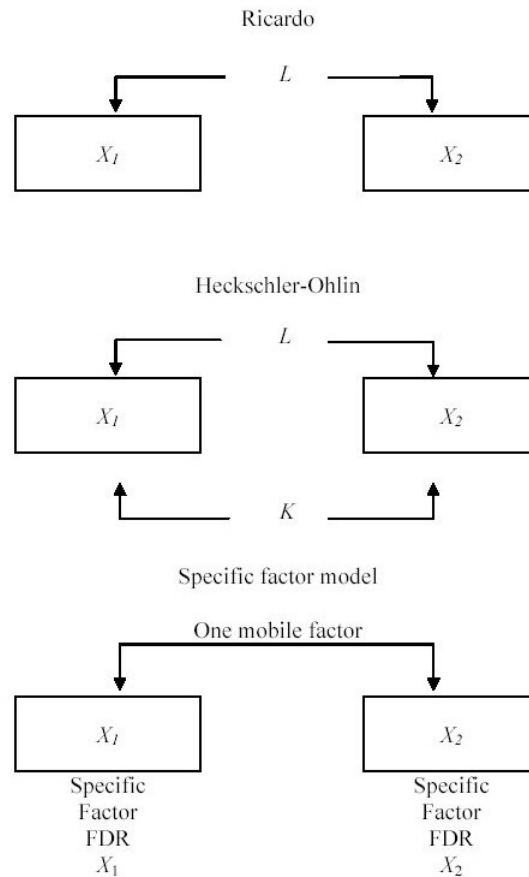


Figure 1. The trade models

The Ricardian and the HO models both defined comparative advantage and then used it to predict the pattern of trade. The proofs of Ricardian and HO theories of comparative advantage depend on two simple arguments. First, in both theorems the pre-trade or self-sufficiency prices are determined. Since the Ricardian model involves only one

factor, labor, these prices equal the labor productivity ratio; in the HO model these prices are a function of the factor proportions since two factors are used in production. Second, it is argued that a country exports (imports) that commodity whose relative pre-trade or self-sufficiency price is lower (higher) than that of the other country. In the Ricardian model, the theorem translates into stating that a country exports (imports) that commodity in which comparative labor productivity is higher (lower); in the HO system a country exports (imports) the commodity that uses the abundant (scarce) factor intensively. For example, if country *A* is capital abundant vis-à-vis country *B* (i.e. it has a higher capital to labor endowment than country *B*) and good *X* is capital intensive (i.e. good *X* uses more capital to labor than good *Y*), then country *A* will export good *X* and import good *Y*. To be valid, these propositions require a number of assumptions. It should also be stated that both theorems can be construed as belonging to either positive (is statements) or normative (ought statements) economics. Trade is mutually beneficial under both theorems. In the Ricardian model, the restrictions are two-commodities; a single factor, labor, is used to produce these commodities; constant returns to scale in each activity; and, most importantly, the techniques of production are different across countries. In the case of HO, the assumptions include identical technology in both countries; commodities have different factor intensities; tastes across countries are identical. The most important difference between these two models is that in the Ricardian model trade arises due to technological differences while in the HO model it arises due to differences in factor endowments with identical technologies. The HO model is widely used by both trade theorists and policy makers. Three main theorems are derived from this model. These are the Stolper-Samuelson theorem, the Rybczynski theorem, and the factor price equalization theorem.

The Stolper-Samuelson theorem describes the relationship between changes in commodity and factor prices. This theorem was a by-product of work commissioned by the U.S. government after World War II to analyze the impact on wages of a cut in tariff protection. This theorem states that if the price of the capital-intensive good rises, then the price of capital (the factor used intensively in its production) will rise and the wage rate paid to labor will fall. Consider the following example. If the price of steel rises and steel uses capital intensively, then the rental rate on capital will also rise and the real wage rate will fall. Similarly if the price of the labor-intensive good rises, the wage rate will rise and the rental rate fall. This particular theorem has been used by economists and government in policy making to analyze the effects of changes in tariff protection and the impact of capital and labor mobility on factor rewards.

The factor-price-equalization theorem establishes a relation between commodity and factor prices. It establishes that when commodity prices are equalized between countries, as in free trade, then the factor prices (capital and labor) will also be equalized between the countries. This particular result requires a number of very restrictive assumptions for its validity. These assumptions are rarely fulfilled in the real world. In such a setting, a more interesting interpretation of this theorem is that free trade brings factor prices closer to each other in different countries despite the absence of factor movements.

The Rybczynski theorem relates changes in endowments to changes in outputs at constant prices. Thus, assuming prices are constant, an increase in a country's

endowment of a factor will cause an increase in the output of the good that uses that factor intensively and a decrease in the output of the other good. This particular theorem is useful for analyzing the impact of capital, labor, migration, de-industrialization, and growth.

### 3. Economies of Scale

The Ricardian and HO theorems explain trade through differences in technology and factor endowments, respectively. An empirical prediction of the HO theorem is that we should observe an inverse relationship between similarity of countries and the volume of trade between them. However, more than half of the world's trade consists of trade between industrial countries that are similar in their relative factor endowments; that is, the countries in Western Europe, North America, and Japan. Moreover, this share of trade among industrial countries has been rising and at the same time the similarity between these countries has been increasing in terms of the HO model. Trade is also dominated by very large firms rather than by the perfectly competitive firm of standard trade theory. The existence of large firms suggests industries may be characterized by increasing returns to scale. In this context it is interesting to note that economies of scale were central to Adam Smith's eighteenth-century explanation of production specialization.

The orthodox theories have great difficulty explaining the large volume of intra-industry trade between countries with similar endowments, which may also be a problem that stems from an ambiguous definition of goods and/or aggregation. It turns out that economies of scale provide an explanation of some of these empirical puzzles. Economies of scale occur when the cost per unit of production falls as more units are produced. These economies of scale can be external or internal: they are external when the cost per unit depends on the size of the industry but not necessarily on the size of any one firm, and internal when the cost per unit depends on the size of an industrial firm but not necessarily on that of the industry.

The distinction between external and internal economies of scale can be illustrated as follows. Consider an industry that initially consists of 10 firms, each producing 10 gadgets. Suppose the industry were to double in size (to 20 firms), each firm still producing 10 gadgets. Will the efficiency of production rise (that is, will the per unit cost of production fall)? If yes, then this is an example of external economies of scale (it has arisen because of the larger industry). If, on the other hand, the industry's output is held constant, but the number of firms is halved so that each now produces 20 gadgets, then this would be characterized as a case of internal economy of scale (a firm is more efficient because the output is larger). It is possible to create trade models where scale economies (external) are consistent with perfect competition. However, if scale economies are internal to the firm, and are not exhausted at low levels of output, then we would not expect these firms to operate in a perfectly competitive framework.

In the conventional trade model with perfect competition, firms are price takers: that is, since any industrial firm represents a small part of the market they are unable to influence the price they receive for their product. Firms are defined as non-competitive when they have the ability to be price makers. In non-competitive markets, firms are

aware that they can influence the prices and hence face a downward-sloping demand curve for their products (i.e. a reduction in price implies that they can sell more of their product). A single firm industry is termed a monopoly (see *Economies of Scale and Imperfect Competition*)

Even in the presence of economies of scale and imperfectly competitive markets, differences in the characteristics of countries remain a major predictor of the pattern of trade. This is true in a wide variety of models. In an economy characterized by increasing returns to scale, comparative advantage may not be required as an explanation of pattern of trade. Economies of scale provide an additional explanation for trade and countries may be identical in both technology and endowments. Trade patterns could reflect the influences of technology, factor endowments, and economies of scale. In a world in which some goods are produced with increasing returns to scale, some specialization and trade will occur even when the countries are identical in terms of factor endowments. For example, with increasing returns to scale, a firm's marginal cost is lower than its average cost. Such a firm cannot exist in a perfectly competitive setting as it must set its price equal to marginal cost and thus incur losses. Increasing returns to scale are therefore incompatible with perfect competition and, in general, result in a natural monopoly. In a laissez-faire equilibrium, increasing returns to scale will result in a global monopoly and trade will occur due to specialization. One implication of this is that the observed pattern of trade that occurs with increasing returns to scale is often determined by which country entered the industry first. This "first mover advantage" ensures that the first entrant gains by achieving low costs and expertise. This also discourages potential foreign entrants who would incur a higher initial cost to compete. In addition, if the products in an industry are differentiated and each variety is produced under increasing returns to scale, then a country may produce a subset of the products. In this case, gainful intra-industry trade between countries may take place.

The relationship between economies of scale and imperfect competition and welfare effects of trade is somewhat paradoxical. In a world that departs from perfect competition, there are increased potential gains from trade in the sense that even identical countries can be made better off by opening trade. Four sources of potential *extra* gains from trade in a world with imperfect competition and economies of scale have been identified. These four sources can provide gains over and above those from conventional comparative advantage, or provide gains from trade when there is no comparative advantage (e.g. when countries have identical relative factor endowments). The sources of additional potential gains are the following:

**Own production effects:** Trade will tend to produce gains over and above those that would occur in a perfectly competitive world if on average such trade results in an expansion of a country's increasing returns industry. Increases in scale may be viewed as technological progress that raises the efficiency of the economy. Less obviously, expansion of the output of firms with large monopoly power is similar in its welfare implications to expansion of increasing returns sectors because both raise output, allowing the system to move towards a competitive level.

**Concentration of production:** Under certain conditions international trade will lead to a concentration of each increasing returns to scale industry in a single country. This will arise when there are country- and industry-specific external economies, provided factor prices are equalized in contestable markets. Such concentration creates a larger scale of production for the world as a whole than would have prevailed in a no-trade situation. This in turn suggests that prices of increasing returns goods will fall, benefiting even countries where production of such goods has ceased as a result of trade.

**Rationalization:** In imperfectly competitive industries, trade will tend to increase competition and reduce profits. In the case of free entry and exit, it will lead to a reduction in the number of firms and an increase in the output per firm (which will increase productivity under increasing returns), other things being equal. Thus, both in industries producing homogeneous products and in those producing differentiated products, the tendency of international competition to reduce the number of firms is a force working towards additional gains from trade.

**Diversity:** Finally, a trading world economy can provide a greater variety of products than can a closed-economy equilibrium. This can lead to gains either because consumers value variety and/or because this allows production of more specialized intermediate inputs. International trade theory has been richer and more exciting because of numerous models that cover diverse market structures and industries. Since these models are necessarily developed in a second-best world, there are many possible outcomes and it is difficult to discern a systematic or a particular pattern for policy implications. This array of models and results will need to be narrowed with the help of empirical work to try to resolve what appear to be inconsistent policy implications. Given the observed large volume of trade between the very similar economies of North America, the European Economic Community (EEC), and Japan, there appears to be strong evidence that scale economies, imperfect competition, and producer differentiation are important determinants of trade.

Trade models with economies of scale can be classified into three categories: economies of scale that are consistent with the assumption of perfect competition; scale economies with monopolistic competition; and models that use the framework of oligopoly.

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