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ASSESSING THE CONCEPT OF HECKSCHER OHLIN MODEL

Ikechukwu, Igbokwe Flacid., Fyneface, Promise & Anochie, Chiamaka
M.Sc Students, Department of Management, Faculty of Management Sciences
Ignatius Ajuru University of Education, Rumuolumeni, P.M.B 5047, Port Harcourt
Rivers State, Nigeria

ABSTRACT

The classical economists have contributed to the knowledge and growth of international trade through their various theories. The theory of Absolute Cost Advantage propounded by Adam Smith, the theory of Comparative Cost Advantage by David Ricardo, the rent surplus theory etc. Classicals always laid emphasis on comparative advantage theory as they explain quite well how two nations can gain based on their comparative costs. The country with the lower comparative (or opportunity) cost has advantage in production of that commodity and hence completely specializes in the production of that commodity and export it to another nation. Similarly, it imports the commodity with the higher comparative cost produced by the other nation cheaply than others. There are, however, obvious limitations of these theories which gave rise to subsequent theories. One of which is Heckscher -Ohlin theory.

INTRODUCTION

According to Ricardian model, labor is the only factor of production and comparative advantage arises only because of international differences in labor productivity which then leads to changes in opportunity costs and hence prices. But it does not explain why such differences arise in the first place. Heckscher and Ohlin have attempted to explain the factors which cause differences in the comparative costs of different countries. The Heckscher-Ohlin (H-O) model was first conceived by two Swedish economists, Eli Heckscher (1919) and Bertil Ohlin (1933).

According to Heckscher and Ohlin, trade is only partly explained by differences in labor productivity. It also reflects differences in countries' resources endowments i.e. how much capital and labor does a country have and how do these factor endowments shape the content of trade. So according to Heckscher-Ohlin, trade is not solely dependent on labor productivity but also due to differences in a country's resource and factor endowments. Hence Heckscher-Ohlin model does not invalidate the classical theory of comparative costs, rather it powerfully supplements it because it also accepts comparative advantage as the basic cause of international trade. It builds on David Ricardo's theory of comparative advantage by predicting patterns of commerce and production based on the factor endowments of a country.

Definition of the Heckscher-Ohlin Model

The Heckscher-Ohlin model is a mathematical theory used in international trade to evaluate the export pattern of a country relative to the natural resources at their disposal. According to this model, countries majorly export items they can produce in abundance given their natural, land, labor and capital endowments. The Heckscher-Ohlin model was developed in the 1930as by two Swedish economists, Eli Heckscher and Bertil Ohlin. This model is otherwise known as the H-O model or 2x2x2 model. This model assumes it is best for countries to export materials they can produce in surplus and efficiently. In international trade, the model is also used to evaluate the equilibrium of trade between two countries given their different production capabilities and natural resources.

The Heckscher-Ohlin model maintains that the specific natural resources that a country has would give it an advantage in producing related goods, this is coupled with land, capital, and human resources. This model shows that a country will export goods or resources it has in abundance. This is why countries that have certain resources in abundance tend to have a comparative advantage than countries that do not in terms of exportation. The model

essentially states that international trade occurs because countries differ in their relative factor endowments and commodities differ in their relative factor intensities employed in its production. Relative endowments of factors of production (land, labour and capital) determine a country's comparative advantage. Countries have comparative advantages in those goods for which the required factors of production are relatively abundant and cheap locally. This is because the prices of goods are ultimately determined by the prices of their inputs. Goods that require inputs that are locally abundant will be cheaper to produce than those goods than require inputs that are locally scarce.

Based on relative factor endowments, countries may be categorized as capital abundant or labour abundant or land abundant countries. Similarly, based on relative factor intensities employed, goods may be grouped as capital intensive or labour intensive or land intensive goods. For instance, a country where capital is abundant, but labour is scarce will have comparative advantage in the production of capital intensive goods that require lots of capital but little labour. If capital is abundant, its price will be low.

Since capital is the main factor used in the production of capital intensive goods, the price of these goods will be low and hence attractive for both local consumption and export. Labour intensive goods, on the other hand, will be very expensive to produce since labour is scarce and its price is high. Therefore, the country will be better off importing those labour intensive goods.

A country is said to be capital-abundant given the ratio of quantity of capital to quantity of labour in that country is greater than the corresponding factor quantity ratio in the other country irrespective of the fact whether or not the ratio of price of capital to price of labour in that country is less than the corresponding factor price ratio in the other country, (Anand V.).

The original work that led to the development of the Heckscher-Ohlin model was a paper written in 1919 by Swedish economists, Eli Heckscher at the Stockholm. The model was subsequently expanded in the 1930s. The core premises of the Heckscher-Ohlin model are;

- The model explains how resources are imbalanced throughout the world.
- Naturally, resources are not evenly distributed across the world, some parts of the world have certain resources in abundance while some have other resources in abundance.
- Since each country has its own unique natural resources and specialized area of production, mathematically, a country will export resources it has in abundance.
- The Heckscher-Ohlin model is not limited to natural resources or commodities, it also accounts for factors of production such as labor, land and capital and how they affect exportation.
- The Heckscher-Ohlin model helps to find a trade balance between the two countries involved in international trade.

Components of the Heckscher Ohlin Model

The four major components of the theory are as follows:

- **Factor Price Equalization Theorem –** The most fragile of all, the FPE states that it will equalize the prices of factors of production among countries because of international trade. Free and competitive trade would make factor prices converge along with traded goods prices. This states that the prices of identical factors of production, such as the wage rate or the rent of capital, will be equalized across countries because of international trade in commodities.
- **Stolper-Samuelson Theorem** – The Stolper-Samuelson theorem (SST) proposed that, in any particular country, an increase in the relative prices of the labor-intensive goodwill makes labor better off and capital worse off. The converse also applies.
- **Rybczynski Theorem –** At constant prices, an increase in endowment of one factor will lead to an expansion in the sector's output that uses that factor and will lead to a complete decline in production of the other goods. So, when the amount of one factor of production increases, the production of the good that uses that particular production

factor intensively increases relative to the increase in the factor of production, since the H–O model assumes perfect competition where price is equal to the costs of factors of production.

- **Heckscher-Ohlin Trade Theorem –** This is a critical theorem of this model, which boils down to this statement "a country having capital in abundance will produce goods that are capital intensive, and a country having abundant labor will produce labor-intensive goods."

Assumptions of Heckscher-Ohlin model

The following set of assumptions is important for the purpose of understanding the theory in its most basic and simple form:

1) Two countries, two commodities and two factors.

In continuation with the Ricardian model assumption of two countries and two commodities, H-O model further assumes that there are two factors of production (labor and capital) instead of a single factor of production assumed earlier and that both factors are employed in the production of both commodities. In short, it is a 2X2X2 model.

2) Each commodity is produced under constant returns to scale

The two commodities are produced under constant returns to scale, that is, if both inputs are doubled, the output will also double.

3) Perfect competition in all markets

This assumption rules out monopolistic and oligopolistic market structures. It also rules out price and wage rigidities. Every firm is a price-taker. Each country is too small to exert market power and influence market price. Also perfect competition means that in the long run, there are no economic profits, each factor is paid according to their marginal product and everyone in the economy has perfect knowledge.

4) Technology is given and identical.

The two commodities are produced with the same technology in both nations. The available means of production are same no matter where we are. This is an unrealistic assumption but it is assumed to focus one's attention on differences in factor endowments alone in explaining trade.

5) Consumer tastes are identical across countries

Consumer demands are assumed to be approximately similar in both countries. And since consumer preferences are represented by Indifference Curves, this assumption implies that ICs for the two countries will be identical. This is again assumed to make factor endowment the key operating force at the margin.

6) Factors are mobile within each country but immobile between countries

Factors (labor and capital) can move across industries within each country but they cannot move across countries. This means that factors can move from high paying industry to low paying industry until earnings are equalized in all industries. But there is zero international factor mobility so that international differences in factor earnings would persist in the absence of trade.

7) No transportation costs

Transportation costs are assumed to be zero. It is true that transportation costs inhibit and reduce trade volume but it does not reverse the trade pattern between the countries. The purpose is not to ignore reality but to illuminate the pure effects of trade.

8) Free Trade

H-O Model is based on the assumption that final outputs are traded freely.

9) Commodities are ranked in terms of their factor intensity
If a nation has two commodities and two factors then one commodity will require relatively more of one factor than the other commodity and thus can be ranked in terms of capital-labor ratio. This is being done to make the theorem simpler to analyse.
10) Complete specialization not possible
The introduction of international trade does not cause complete specialization in the production of goods in either country. This means that both nations will be producing both commodities after trade.

Real World Example of the Heckscher-Ohlin Model
The Heckscher-Ohlin Model can be studied extensively in the real world trade between different countries. For example, while some countries are the largest exporters of oil and petroleum products, some have coal in abundance, some cotton, some precious metals, while others have agricultural products in abundance. The Heckscher-Ohlin model explains the imbalance of natural resources throughout the world and gives an explanation of why countries export the resource they have at most. For example, OPEC countries are the largest exporters of oil, this does not mean they do not have other natural resources such as coal, metal, and others, but they have oil reserves in abundance, wherein lies their strength. The Heckscher-Ohlin model also amplifies the benefits of international trade and how exporting resources that are naturally abundant in some countries help other countries.
In other words, the model stresses the benefits of international trade and the global benefits to everyone when each country exerts the most effort into exporting resources that are domestically naturally abundant. All countries benefit when they import the resources they are naturally not endowed with. Because a nation does not have to rely solely on domestic markets, it can take advantage of elastic demand. The cost of labor increases and marginal productivity declines as more countries and emerging markets develop. Trading internationally allows countries to adjust to capital-intensive goods production, which would not be possible if each country only sold goods domestically.
To further explain this model, let us assume two countries: country A and country B;

country A is said to be capital abundant relative to country B, if country A is endowed with more units of capital per unit of labour relative to B, that is, if the following inequality holds:
QCA/QLA> QCB/QLB
Where Q is quantity, CA is the total amount of capital in country A, LA is the total amount of labour in country A, and CB and LB are the total amount of capital and labour, respectively in country B. Therefore, if country A has abundant capital according to this definition, it implies that country A has a preference in favour of producing capital intensive goods. This is further illustrated in figure 1 below. The assumption in the figure is that good M is capital intensive good and good N is labour intensive good. If both countries were to produce the goods in the same proportion, say along the straight line OZ, country A would be producing at point S1 on its production possibility curve and country B would be producing at point S2 on its production possibility curve. The slope of country A's production possibility curve at S1 is steeper than the slope of country B's curve at S2.

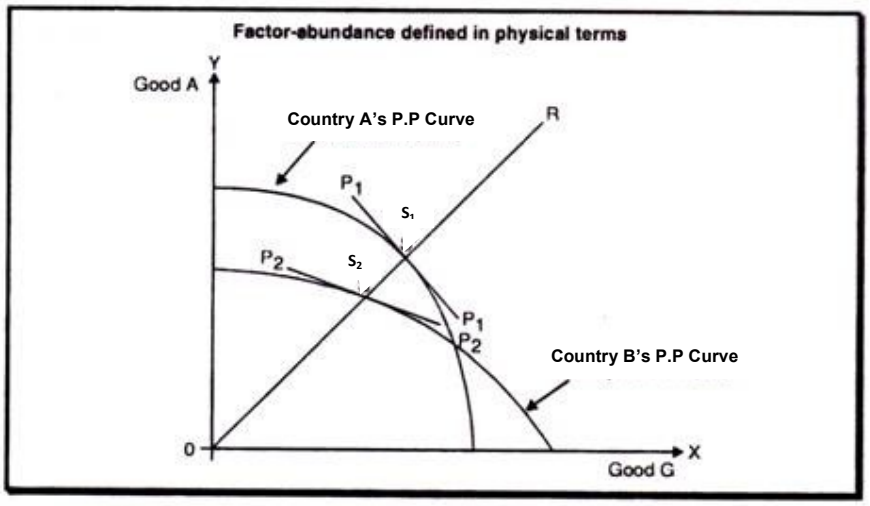

Fig. 1

Adapted from Anand V. https://www.economicsdiscussion.net/articles/the-heckscher-ohlin-h-o-model

This implies that good M would be cheaper to produce in country A than in country B, and that good N would be cheaper to produce in country B than in country A, assuming the two countries producing at the respective points. This is also illustrated by the fact that the commodity M price line P_1P_1 is steeper than the line P_2P_2 for commodity N. The opportunity cost of expanding production of good M is, therefore, lower in country A than in country B, and vice versa for good N. This shows that country A, the capital rich country, has a preference in favour of the capital intensive good (M) from the production side, and that the country abundant in labour, country B, has a preference in favour of producing the labour intensive good (N).

Limitations of the Heckscher-Ohlin Model

- Poor prediction and performance.
- The unfair assumption is that all labor is employed. This model assumes that all work in the country is engaged, thus ignoring the concept of unemployment.
- The unrealistic assumption is that similar production exists. Furthermore, this model assumes that nations have the same technology used for production, undermining the effects, and ignoring the technological gaps.
- Although the Heckscher-Ohlin model appears simple and straightforward, there is difficulty by most economists in finding evidence to support it. A variety of other models have been used to explain why industrialized and developed countries traditionally lean toward trading with one another and rely less heavily on trade with developing markets. One of such is the Linder hypothesis. It states that countries with similar incomes require similarly valued products and that this leads them to trade with each other.

Criticism of Heckscher-Ohlin Theory

No doubt, the Heckscher-Ohlin theory has been found to be more exact, precise, scientific, and analytically superior to the earlier approaches to the theory of international trade, still it has certain deficiencies for which it has been criticized by many a writer.

Partial Equilibrium Analysis: The theory failed to develop a general equilibrium concept; it only partially explained the partial equilibrium analysis. The theory seeks to explain the pattern of trade only based on factor proportions and factor intensities, while ignoring several other influences such as transport costs, economies of scale, external economies etc., which also exert influence on the cost of production.

Oversimplifying Assumptions: This theory is based upon very simplistic assumptions of perfect competition, full employment of resources, identical production function, constant

returns to scale, absence of transport costs and absence of product differentiation. Given this set of assumptions, the whole model becomes quite unrealistic.

Static Analysis: The Heckscher-Ohlin model assumes fixed quantities of factors of production, given production functions, incomes, and costs. It means the theory investigates the pattern of international trade in a static setting. The conclusions drawn from such an analysis are simply not relevant to a dynamic economic system.

Identical Factors: This theory does not recognize qualitative differences in factors and these factors are capable of exact measurement so that factor endowment ratios can be calculated. In reality, however, qualitative factor differences do exist. In addition, there are more than one variety of each factor. This creates serious complications in the measurement and comparison of costs and the determinations of trade pattern.

Neglect of Product Differentiation: The theory ignores the role played by product differentiation in international trade. Even when the production agents are identical in two countries, the international trade may still take place due to product differentiation. For example, German cars could be sold in America and American cars sold in Germany. In this context, factor prices would not determine costs rather, it is the car prices that would determine factor prices. Prices of goods are determined by the utility they provide to the buyers or users and prices of factors like raw materials, labour etc., are ultimately dependent on the demand and prices of final goods because the demand for them is derivative in nature.

SUMMARY

To sum up, this model postulates that countries export what they can produce. This model proposes that countries export what they can create abundantly or what they have already in the abundance of (reserves). A country will have a comparative advantage in the good that intensively uses its relatively abundant factor. Though this model has been proven to be better than the traditional model, this model adopts assumptions that can hardly be expected to be fulfilled.

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