

**Seminar Paper No. 684**

**THE YOUNG OHLIN ON THE THEORY OF  
"INTERREGIONAL AND INTERNATIONAL  
TRADE"**

by

**Harry Flam and M. June Flanders**



**INSTITUTE FOR INTERNATIONAL ECONOMIC STUDIES**  
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Harry Flam<sup>♣</sup> and M. June Flanders<sup>♥</sup>**

Bertil Ohlin's international fame as an economist rests to a large extent on his 1933 monograph *Interregional and International Trade* (Ohlin, 1933). The monograph marked the definitive break with the Ricardian and early neoclassical theory of international trade. Eli Heckscher's contribution of 1919 did not become known to a wider audience until his article was published in English in 1949 (Heckscher, 1949, 1991).

But *Interregional and International Trade* was not Ohlin's first formulation of the neoclassical theory of international trade; it was his third. His first attempt is his licentiate dissertation of 1922 and the second his doctoral dissertation published in 1924. The latter was published in English in 1991 under the title *The Theory of Trade* (Heckscher and Ohlin, 1991). The licentiate dissertation, entitled *The Theory of Interregional Exchange* has remained untranslated until very recently (Ohlin, 1999).

We will trace the development of Ohlin's thinking on international trade by comparing the three works. Special emphasis will be placed on *The Theory of Interregional Exchange* since it is the first and practically unknown. We have discussed and compared *The Theory of Trade* and *Interregional and International Trade* elsewhere (Flam and Flanders, 1991).

### **Origins of Ohlin's ideas**

The beginning of his work in international economics is described by Ohlin in his memoirs by the following sentence: "I started [in 1921] to write on the foundations of an

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approach to international trade theory that was to some extent new and for which I received the inspiration during a stroll on [the popular promenade] Unter den Linden in Berlin in 1920.”

The inspiration did not arrive from a lime tree. Ohlin graduated from the University of Lund in 1917, where he had spent two years studying economics, mathematics and statistics. From Lund he went on to the Stockholm School of Economics, then a college mostly for practical training of businessmen. He enrolled in Eli Heckscher’s seminar in economics in the fall of 1917. We do not know whether and to what extent Ohlin was exposed to trade theory in the seminar. Heckscher published *The Continental System: An Economic Interpretation* in 1918, a study of Napoleon’s blockade of England and its relation to the mercantilist system. Heckscher may have talked about this work in the seminar, but we can be fairly safe in saying that Heckscher had not thought out his new trade theory until well into 1919, since this was inspired by Wicksell’s review in 1919 of Heckscher’s collection of papers *Swedish Production Problems*. Heckscher’s seminal article was published later in 1919. We can, however, safely assume that Ohlin read the article, since Heckscher was his mentor, had introduced him into the Economics Club, a forum for academic economists in Stockholm, and given him a job upon his graduation from the Stockholm School of Economics in 1919. This was a position as a staff economist on a government commission dealing with tariffs and trade treaties of which he himself was a member.

Thus, Ohlin had been exposed to Heckscher’s ideas about trade when he moved on to graduate studies in economics at Stockholm College (later Stockholm University) in the fall of 1920. His professor there was Gustav Cassel. Cassel was a public figure both in Europe and the United States after the war, as a proponent of reestablishing the gold standard based on his concept of purchasing power parity. He was also well known among economists for his *Theoretische Sozialökonomie*, the centerpiece of which was a system of equations describing general equilibrium, very much like the early Walrasian system with fixed coefficients.

The idea that came to Ohlin during his walk in Berlin was to combine Cassel and Heckscher. Cassel had neoclassical general equilibrium for a single economy, Heckscher

a neoclassical theory of international trade. Ohlin's idea was to extend Cassel's paradigm to international equilibrium with two trading economies, where the reasons for trade and the trade pattern were those given by Heckscher.

### ***The Theory of Interregional Exchange***

*The Theory of Interregional Exchange* is composed of six chapters and consists of only 52 typewritten pages in the original. The core is chapter II, which gives the conditions for interregional exchange, to wit differences in factor endowments that lead to differences in comparative costs, and then discusses the effects of interregional exchange. Chapters III-V extend the model to include respectively interregional factor mobility, limited goods mobility and economies of scale due to indivisibilities of factors of production. Chapter I and VI are a short introduction and summary.

#### *"Chapter II. The Theory of Interregional Exchange under Simplified Assumptions"*

After having established that differences in comparative costs (prices) constitute a necessary and sufficient condition for interregional exchange, Ohlin goes on to explain the reasons for such differences, "an issue hardly dealt with in most studies," and here he refers to Heckscher's article without comment. The explanation is carried out by "mathematical reasoning," that is, in terms of the equilibrium conditions that cost equals price for every good. But the explanation leads nowhere; all Ohlin says is that differences in relative factor prices are a necessary but not sufficient condition for differences in comparative costs. The non-sufficiency arises from the possibility that the technical input-output coefficients accidentally just neutralize the differences in relative factor prices. It is only after this discussion of the conditions for interregional exchange that Ohlin states, without any reference to his general equilibrium conditions, that the reason for differences in comparative costs is differences in the relative scarcity of factors of production. In practice, he now says, this is also a sufficient condition for interregional exchange.

On pages 14-15 in *The Theory of Interregional Exchange* Ohlin gives a clear and succinct explanation both of the Heckscher-Ohlin and the factor price equalization theorem:

The reason that the production costs for certain goods are lower in one region than in another is ... the difference in the relative scarcity of factors of production. Since there is a relatively good supply of certain factors of production in A and their prices thus are low, the goods requiring a relatively large share of these factors of production can be produced at a low cost in that region compared to the types of goods requiring a relatively larger share of the more scarce factors of production. ... Exports will then mainly consist of goods where the abundant factors of production are used in large quantities and the other factors in small quantities only, while imports consist of the types of goods requiring large quantities of the latter factors of production and factors of production not available in the region at all. The exchange of goods is thus an exchange of factors of production, in the sense that goods 'containing' the relatively scarce factors are imported and goods 'containing' less scarce factors of production are exported. ... The result is thus that the scarcity of factors of production is generally equalized. ... There is thus a tendency that all regions get exactly the relative scarcity that would have existed, had there been no obstacle to the mobility of factors of production. *In other words, interregional exchange tends to create a uniform price structure of the factors of production.* [Italics by Ohlin]

*"Chapter III. Modifications due to the interregional mobility of factors of production"*

In the rest of *The Theory of Interregional Exchange* Ohlin analyses the effects of making the model more realistic. This was a prime concern to him; on page 20 he writes: "All problems, for the solution of which abstracting conditions are not absolutely necessary, should be studied under conditions as close to reality as possible, in all respects."

Lifting the assumption that factors are immobile between regions would not alter the workings of the trade model qualitatively, according to Ohlin. Factors of production would be drawn to the region with the highest compensation. But this would in practice only lead to *gradual* changes in prices and resource allocation. The short run effects would be small. This would be true also in the case where large movements of factors were foreseen: "Price formation is mainly determined by the actual supply of labor and not by expected changes." It is not until *International Trade* that he formulates the idea

that the crucial magnitude is the difference in the price of a factor between regions compared to the annuity cost of transferring the required amount of the factor from one region to another. (This correct concern about the present value of future flow is reminiscent of his contribution to the forestry debate about the optimal rotation period in forestry, see Flam and Flanders, 1991.)

The only instance where factor movements across regions could have a significant and rapid effect was in the case of financial capital, that is, foreign borrowing and lending. Financial capital movements were unique, according to Ohlin, in that they affected the balance of payments, the exchange rate and thereby the entire equilibrium. Ohlin probably had the large capital flows of the late 19<sup>th</sup> century on his mind. We return to this point below.

*”Chapter IV. Modification due to the limited mobility of goods”*

Ohlin devotes just one and a half pages to the limited mobility of goods, that is, to the effects of transportation and other costs of interregional trade. He notes that these could be sufficiently high to prevent exports of goods produced at lower cost than in the importing region. In any event, they served to diminish trade and prevent equalization across regions of goods prices and therefore of factor prices. This would, Ohlin argued, lead to a loss in welfare equal the mobility costs themselves plus the resulting inefficient resource allocation.

*“Chapter V. Modifications due to the limited divisibility of factors of production”*

Far more space and far more importance is given by Ohlin to economies of scale and their effects on trade, with many ramifications and side discussions. In the restatement of the theory in the conclusion, it has essentially equal weight with factor proportions in causing trade. Ohlin starts his analysis by asking if trade would cease if relative factor supplies were equal between regions. His immediate answer is no; specialization would take place between regions due to increasing returns to scale (and, presumably, limited factor sup-

plies in any one region) and give rise to trade. Specialization would be strengthened by externalities: “Firms which are closely located learn from each other and find it easier to follow technological and organizational progress.” The gain from exploitation of increasing returns would be a more efficient use of resources, although Ohlin adds, true to his penchant for realism, that in practice not all firms can reach an optimum size. A major reason for this, in his view, is the fact that in practice there will be more than one indivisible factor, so it may be physically (mathematically) impossible to operate where average output is maximized for each factor of production. Increasing returns would also contribute to factor price equalization, to the extent that factors were used efficiently everywhere. But just as trade could not effect factor price equalization completely in practice “due to a certain disproportion in the distribution of the factors of production and their utilization,” increasing returns could not completely overcome the limited divisibility of factors and effect complete factor price equalization due to “another phenomenon of disproportion [that] will counteract the tendency to remove the effects of limited divisibility.” By “another phenomenon of disproportion” Ohlin meant that increasing returns could not be utilized to the full extent for every factor everywhere.

But most of the chapter is devoted to an explanation of how increasing returns come about through the limited divisibility of some factors; considerable space is taken up by a numerical example showing how average cost can be increasing and decreasing over some range of output. Ultimately, an optimum is reached where the disadvantages of mass production, such as “less efficient management, more expensive control and the employees having less initiative,” balance the advantages of extending production. To add more realism, Ohlin throws in transportation costs to show that they could protect smaller scale from larger scale producers and that efficiency requires producers to use marginal cost pricing and price discrimination between locations based on costs of transportation.

### ***The Theory of Interregional Exchange and The Theory of Trade compared***



Apart from being several times longer, *The Theory of Trade* contains some new elements compared to *The Theory of Interregional Exchange*. The most important are, first, a long chapter on international monetary economics, and, second, several chapters of verbal comparative statics exercises, or, as Ohlin saw it, transitional dynamics. There is also a short chapter on “interlocal” trade (perfect labor and capital mobility within a region and zero mobility between regions) and a chapter with a critical discussion of classical trade theory. But the basic outline is the same; first an analysis of the cause and effects of trade under simplifying assumptions, and then a repeated analysis where the assumptions about zero trade costs, perfect factor mobility, and constant returns are replaced one at a time by more realistic assumptions.

Both the discussion and the presentation of classical trade theory is much more highly developed and thoroughly explored in *The Theory of Trade* than in *The Theory of Interregional Exchange*, and much more still in *International and Interregional Trade*. This steady development may have been due, *inter alia*, to the Harvard influence. In *The Theory of Interregional Exchange*, the classical theory is presented tersely with little discussion, in terms of Ricardian wine and cloth, with consideration only of labor costs, since Ricardo does not consider compensation to other factors of production or considers it to be proportional to compensation to labor. Ohlin, however, wishes to discuss the question of the reason for the differences in comparative costs and prices of goods; an issue hardly dealt with in most studies. It is at this point that he cites the Heckscher paper. In *International and Interregional Trade* he devotes several long appendices to discussions of classical and neoclassical theories of comparative cost.

#### *Factor price equalization*

In *The Theory of Trade* as in *The Theory of Interregional Exchange*, Ohlin concludes that trade will serve to make factor prices more equal between trade partners. But he is also convinced that complete factor price equalization is unattainable in practice as well as in theory. To prove his assertion, he employs Cassel’s general equilibrium system, extended

to a world consisting of two countries instead of one and with flexible coefficients technology. Ohlin describes the transition from autarky equilibrium to trading equilibrium in the following way. Assume that both countries produce the same set of goods in autarky. Apply some arbitrary exchange rate to make autarky prices commensurable. There is a nice, rather classical, discussion of how exchange rates must be brought by trade and exchange to such commensurability. Then some goods will be found to be produced at a lower cost in A than in B, and the rest will be cheaper in B. From this he concludes that A will specialize in the production of the goods that are cheaper there, and B in the others. The equilibrium exchange rate, which ensures trade balance, determines the exact division of the autarky set of goods between A and B. Given complete specialization, factor prices cannot be equalized, except by chance.

Ohlin's reasoning can be illustrated with the help of an Edgeworth box diagram. The sides of the box measure the world supplies of the two factors, called labor and capital. Factor price equalization occurs when the world supply of factors is divided between country A and B inside the parallelogram in the box. For example, factor allocation E leads to factor price equalization and production of goods 1 and 2 in *both* countries. The slope of the rays from A and B shows the proportions in which capital and labor are used in the production of goods 1 and 2, and their length the quantities produced. Note that the rays from A and B respectively have the same slope for goods 1 and 2 respectively, indicating identical technology and factor price equalization.

Ohlin's view is that differences in goods prices under free trade must lead to complete and immediate specialization. He does realize that factor prices will become more equal, since abundant factors are exported and scarce factors imported. But he fails to take into account that the factor price changes in conjunction with substitution between factors in production will equalize production costs and make production of both goods in both countries competitive. What will happen in each country is that the price of the abundant factor will rise and the price of the scarce factor fall. Less of the abundant factor and more of the scarce factor will be used in each sector. An equilibrium is reached when factor prices and factor intensities in the respective sectors are equal, and hence also costs of production. The less intensive use of the abundant factor and more intensive use of the

scarce sector tends to create an excess supply of the former and excess demand of the latter. But factors remain fully employed by expansion of the sector intensive in the abundant factor and contraction of the sector intensive in the scarce factor.

Ohlin's neglect of factor substitution in the framework of factor price equalization is puzzling, since he was aware of it and its consequences for the factor and goods markets. The following quote is from *The Theory of Trade* (page 112):

If there is increased demand for a commodity that requires much land, for example, wheat, and decreased demand for a commodity requiring much capital, such as fine cloth, the rise in the production of the former and the decline in output of the latter lead to an increase in land rents and a decrease in the rental on capital. It then becomes profitable to use more capital and less land in all production, including that of totally different products. This will free some land which can be transferred to wheat production.

In terms of the box diagram, Ohlin would be right about complete specialization if the two countries were endowed with factors as shown by F. The factor endowments are too different to allow production of both goods in both countries. The extreme allocation of factors that allows factor price equalization is at G, where the production of the good intensive in the abundant factor is expanded so much in each country that it just employs all of the available factor supplies; production of the other good has just ceased. At F the abundant factor is used more intensively in each country to maintain full employment. This is possible only if the abundant factor becomes relatively cheaper. Hence, factor prices can no longer be equal.

There are several passages in *The Theory of Interregional Exchange* that show that Ohlin was thinking in terms of complete specialization for traded goods. For example, on page 9 he writes: “[T]he effects of a difference in comparative costs are that some goods can be produced at a lower cost in one region than in the other, while the opposite applies to other goods. Thus, exchange will occur and each region can concentrate its production to the goods it can produce at the lowest cost.” On page 17 he writes:

Assume that the production of a good, wine for example, requires land of a certain quality as well as a certain labor skill. A region fulfilling the condition of labor skill

might only have a limited supply of land of the desired quality, while another region, which lacks suitable labor, has an abundant supply of such land. The entire world demand for that good must then be produced in the first region.

This does not mean that Ohlin thought countries would produce no goods in common. In the chapter on trade costs, he points out that such costs could make goods nontraded, and consequently allow production of the same good in different countries. And in the chapter on increasing returns to scale, he also points out that transportation costs prevent complete specialization.

It seems that Ohlin's belief in factor price *non*-equalization was the result of his concern for realism in economics. He seems to have accepted on some level that factor price equalization was a theoretical possibility, not just an accidental fluke, but was so strongly influenced by the reality of non-equalization that he attempted nevertheless in *The Theory of Trade* to prove its theoretical impossibility. The following quote from *The Theory of Interregional Exchange* (page 16) is telling:

If goods as well as factors of production were perfectly mobile, the entire world would constitute an economic unit in the real sense of the word and the total supply of different factors of production would determine their relative scarcity. As mentioned, a free exchange of goods tends to give the same result *and might also do so, under certain conditions*. What are these conditions, or the other way around, what generally prevents this tendency from being fully realized?

It is difficult to find a general answer to this question. On the most profound level, *there is probably a certain disproportion in the distribution of the factors of production and their use in production* that prevents the same outcome as when the factors of production were mobile, whatever the location of production. The exchange of goods can only create a situation where one type of good will be produced here and another there, that is, that each good is produced in that or those places where the most favorable of the existent combinations of factors is to be found. [Italics added]

In *The Theory of Trade* Ohlin is more elaborate and more precise on the conditions that would allow factor price equalization

It is difficult to give a precise meaning to the conditions for complete equalization of the prices of factors of production. The closest one could come, it seems, would

be that there must be a specific relationship between (1) the technical characteristics of the goods and the factors of production, including the limited divisibility of the latter, (2) the supply of the factors of production, (3) the nature of demand. This relation must be such that at certain prices of the factors, common to all regions, there is a particular combination of industries in each region that uses the factors in precisely the same proportions as they are supplied. As will be explored in greater detail in the following chapter, this condition can be satisfied only if there is an appropriate relationship between the three elements stated above, which must be considered to be given in the price determination problem. Unfortunately it is impossible to assess the likelihood of this occurring, and there is therefore no justification for assuming that it will. A purely mathematical analysis shows that it is far more probable that particular constants will not fulfill the required conditions than that they will do so. Under such conditions the conclusion is that the tendency of interregional trade to effect a uniform price structure will not be fully realized.

It is clear from the passage cited on the conditions for factor price equalization that Ohlin was on the right track, but his mathematical treatment of the problem led him to conclude that the probability of the right combination of quantities and parameters was very low.

It should be added in conclusion on this point that the mathematical proof of non-equalization appears in both the 1933 and 1967 editions of *Interregional and International Trade*.

An important reason for the non-equalization of factor prices, however, can be found in the indivisibility phenomenon. In *The Theory of Trade*, Chapter II, he argues that trade tends to equalize factor prices, but this will be incomplete, in general, because of indivisibilities of factors (economies of scale). That is, here the emphasis is on indivisibility as a barrier to factor price equalization, not just as a cause of trade. Ohlin's reasoning is somewhat contradictory when discussing the effects of indivisibility on factor price equalization. On one hand, he argues that exploitation of increasing returns will lead to a more intensive utilization of indivisible factors of production, and thereby to a tendency to factor price equalization. On the other hand, he argues that in the absence of transportation costs, increasing returns will be exploited to the full, leading to specialization in production between regions and, presumably, to unequal factor prices.

## *International monetary economics*

*The Theory of Interregional Exchange* contains no international monetary economics while *The Theory of Trade* contains a long chapter on capital mobility in which Ohlin deals with fixed and flexible exchange rates, the gold standard, money supply, the price level, and balance of payments adjustments, among other things. Also, there is a shorter chapter on international differences in price levels.

Here one can detect the influence on Ohlin of his stay at Harvard during the academic year 1922-23. At Harvard, he took a course in international finance and came into contact with Taussig's students in international economics, especially John H. Williams and Jacob Viner. Viner let Ohlin read the manuscript of *Canada's Balance of International Indebtedness 1900-13*, published in 1924. Some of what Ohlin learned from his reading is reproduced in *The Theory of Trade*, published the same year.

Perhaps the most interesting part of Ohlin's treatment of international financial flows is his analysis of the effects of international borrowing and lending on the terms of trade. The question discussed by Ohlin is whether Canada's relatively large international net borrowing in the beginning of the 20<sup>th</sup> century had caused an improvement in her terms of trade. If all goods were traded, no change in the terms of trade would occur. The borrowing was tantamount to a shift in "buying power" from the lending countries to Canada. The lending countries would demand less domestically produced and Canadian goods, but this fall in demand would be replaced by equal increases in Canadian demand for domestic and foreign goods. Implicit is the assumption of identical and homothetic demands in Canada and among her trading partners. But in reality some goods were not traded. In Canada, the increased demand for nontraded goods would raise factor prices in the nontraded sector and this would spill over into the traded goods sector, raising costs and prices. The reverse would take place abroad. Thus, the Canadian terms of trade would improve. The adjustment to international capital flows therefore normally consisted both of changes in spending and of changes in the terms of trade, which in turn would cause changes in the pattern of production (making the nontraded sector in Canada expand relatively to the traded sector).

The analysis of the effects of international capital flows is interesting because it is clearly influenced by Taussig, Viner, and Williams (who wrote his dissertation on the Argentinian experience of borrowing under flexible exchange rates), and prepares Ohlin for his interchange with Keynes in the *Economic Journal* in 1929 on the transfer problem. Ohlin himself attributes to Wicksell's influence the underlying awareness of the importance of matching aggregate supply and demand in analyzing the transfer problem. This was precisely what helped him show that Keynes's analysis was incomplete. Keynes had argued that for Germany to be able to pay reparations to England after World War I it would have to create a trade surplus. This would necessarily worsen its terms of trade and impose an additional burden to the transfer. Ohlin's point was that the transfer of buying power from Germany to England would not change the terms of trade if the decreases in demand for German exportables and imports from England in Germany were exactly offset by increases in demand for German goods and English exportables in England. In any case, the deterioration in Germany's terms of trade would be considerably less than in Keynes's model.

And yet, without the monetary analysis, the discussion of the transfer of capital and the difference between it and the transfer of any other factor in *The Theory of Inter-regional Exchange* is very succinct and elegant. In one of the few passages relevant to countries rather than regions in general, he argues that capital is like labor in being mobile between regions, but, the obstacles to the mobility of capital between different countries are so high that the transfer of capital cannot considerably affect the capital resources of a country in the short run, despite the different interest levels. But a capital flow which is small relative to the capital stock of a country may be large relative to the trade flows. The need to equate prices of goods in the two countries converts into another equilibrium, where a larger or smaller number of the domestic goods fetch higher prices, so as to achieve a new equilibrium, in which the deficit in the trade balance will be exactly covered by capital imports. He goes on to describe changes in prices and utilization of factors of production as some industries increase and others decrease, and how changes in income and prices of goods will also incur a restructuring of consumption. Since capital

flows are important and volatile, shifts in the entire equilibrium may not only be numerous and frequent but also significant and hence different in their effects from flows of either labor or the organizational factors, which affect the equilibrium only slowly.

### *Transitional dynamics*

Perhaps the greatest influence of the Harvard group is seen in what we choose to call transitional dynamics. That the economic system is dynamic and should be treated as such was important to Ohlin, as is quite evident in *The Theory of Trade and Interregional and International Trade*. Nothing of that can be found in *The Theory of Interregional Exchange*. The lack of dynamics in classical theory was of great concern to Williams, who discussed it with Ohlin. Williams apparently influenced Ohlin strongly on this point. One may only guess that Ohlin appreciated dynamics not only for its own sake but also because it helped him to differentiate his product from classical theory.

*The Theory of Trade* is divided into three parts. The second part is by far the longest, and contains much transitional dynamics. By that is meant that Ohlin introduces an exogenous change, for example a shift in demand or a change in factor endowments, and then describes the various adjustments to the change over time. Ohlin did not believe in equilibrium or steady state except as a theoretical construct. In his view, the economy is forever adjusting to various shocks. He just focused on one shock and analyzed its consequences *ceteris paribus*.

Chapter IX, entitled "The Mobility of Capital," contains the best examples of Ohlin's transitional dynamics exercises. He starts out the section analyzing the effects of a capital inflow on page 128 in the following way:

Borrowing implies a transfer of buying power, which enables the borrowing region to buy a larger share of world output than before, while other regions buy less. If there were no transport costs, changing the location of consumption for some goods would have no effect on production. Only if the borrowing region demanded goods other than those that the rest of the world ceased to produce would there be a change in the composition of total demand and eventually also a change in the pattern of production.



Normally, the borrowing region will be producing nontraded goods and the increase in demand for both nontraded and tradable goods will raise the relative price of the former, since their supply is less elastic. The increase in demand for exportables and imports, and lending countries' decreased demand for the borrowing country's exports will create an import surplus. This will help to maintain equilibrium in the balance of payments. In the next round of adjustments, demand is shifted from nontraded to tradable goods because of the relative price increase of the former. The import surplus is increased further, helping to maintain the balance of payments. There are also adjustments on the supply side; resources are moved from the tradable to the nontraded sector. Imports are then replacing production of importables, so that the import surplus is increased even more. Equilibrium in the balance of payments can be maintained if the import surplus precisely matches the capital imports. In the third round of adjustments, factor supplies will change in response to changes in factor prices. Specifically, factors used intensively in the nontraded sector will receive higher rewards and their supply will increase. This will, however, take some years, since it may involve changes in occupational choice and capital investments. Finally, the terms of trade may change as a result of the capital inflow. Ohlin maintains the assumption that the borrowing country is small on world markets and therefore has little influence on export and import prices. But in rare cases the small country may be large on the market for its exports and can shift higher production costs onto foreign consumers, so that the terms of trade improve.

The general case of a capital inflow is then illustrated by two particular cases, those of Canada and Argentina. Here the account is borrowed from Viner, on Canada, and Williams, on Argentina.

Transitional dynamics of this kind was introduced in *The Theory of Trade* and very much expanded in *Interregional and International Trade*, together with many more empirical examples and much more detail.

**Finally**

When he wrote his licentiate thesis, Bertil Ohlin, at 23, had the core (not only the seed) of what was to become his more fully-articulated theory of trade and payments. In the three monographs which constitute the body of his work in trade theory, he built, developed, and added, but never changed the main arguments. (We have concentrated here primarily on the passage from *The Theory of Interregional Exchange* to *The Theory of Trade*, having discussed elsewhere the development from *The Theory of Trade* to *Interregional and International Trade*.)<sup>1</sup> What came later, as we have noted, was the highly important monetary and macro ramifications of the theory, clearly stimulated by the Harvard experience. However, his brief but incisive early discussion in *The Theory of Interregional Exchange* of the difference between the mobility of capital and that of other factors of production can be considered the beginnings of his research agenda on this subject. He did not have to go to Harvard to understand that capital is not simply mobile, that it has to be transferred, and that this has important repercussions on the other factors of production and on trade and output.

As well as the macro analysis, the licentiate thesis lacked the relatively detailed criticism of the classical school which, like the monetary analysis, was developed considerably in *The Theory of Trade* and expanded and extended in *Interregional and International Trade*. But the core of his trade theory, the emphasis on the importance of factor endowments and factor intensities in production is there in the licentiate thesis, albeit tempered by his almost equal stress on economies of scale. These he gave less prominence in later works, and they were, of course, eschewed by trade theorists of the Heckscher-Ohlin persuasion until the last two decades and the emergence of the “new trade theory.” Why Ohlin dropped the emphasis on the economies of scale is somewhat of a puzzle on which we can only speculate.

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<sup>1</sup> The difference in the titles of the three works is interesting and instructive. In all three of them he took pains to emphasize the distinction between international, interregional and interlocal trade while at the same time switching the discussion interchangeably between them. The distinction had mainly to do with factor mobility and transportation costs and it was important to Ohlin, who was much preoccupied with the locational significance of trade theory.

In the short period intervening between *The Theory of Interregional Exchange* and *The Theory of Trade*, from the licentiate to the doctorate, Ohlin seems to have been influenced by, and attracted to, even more than previously, the work of his teacher Cassel (and to have continued to drift from Heckscher). Thus he proudly displays general equilibrium as expressed in Cassel's *Theoretische Sozialökonomie*, much more heavily emphasized in *The Theory of Trade* than in *The Theory of Interregional Exchange*. He also develops more fully his objections to classical and early neoclassical trade theory and has more detailed and specific arguments with them.

What did not change was his basic approach, his style, the heart of the idea, the passion for realism and for detail, and the insistence on empirical relevance.

Ohlin was competent mathematically, and he highly valued, as we have noted, what he occasionally called the "Lausanne method" but most of his analysis, in this and later works, is verbal. His desire to carry out general equilibrium analysis was combined with an unwillingness to abstract for long from reality and lack of ability (or desire) to simplify and pare reality. (This was done subsequently by several of the people sitting in this room.) Here he deviated considerably from the style and inclinations of his teachers. Heckscher's paper is archetypal simple verbal general equilibrium analysis, though as passionately committed as Ohlin's work to empirical relevance, and even more so to policy issues. Cassel's work is either formal general equilibrium or, as in the monetary works on purchasing power parity, straightforward, monocausal, and simple. Ohlin could not walk down the strait and narrow path without stopping to smell the roses, making countless detours into the woods, though always coming back. As a result, following him, though difficult, is always exciting.

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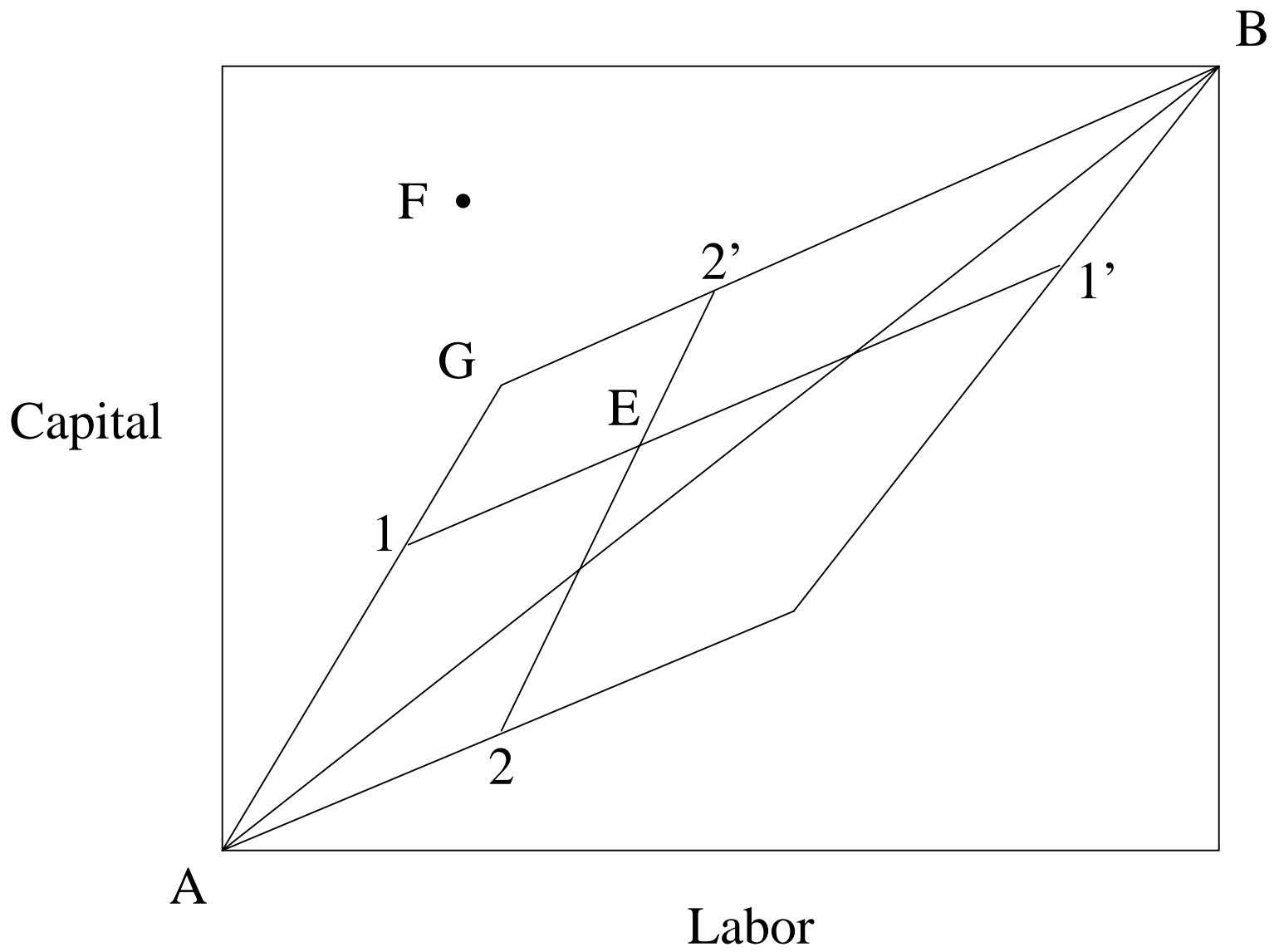
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