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INTERREGIONAL AND INTERNATIONAL TRADE

BY
BERTIL OHLIN



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To
MY PARENTS

PREFACE

IN this volume I have endeavoured to make a contribution towards the solution of the following problems:

(1) To build up a theory of international trade in harmony with the mutual-interdependence theory of pricing, — the universally accepted price theory to-day, — and thus independent of the classical labour theory of value. If it has been worth while to substitute the interdependence theory, as developed by such authorities as Walras, Menger, Jevons, Marshall, Clark, Fisher, Pareto, and Cassel, for the classical labour value theory, there is every reason for giving up the labour value analysis in the treatment of international trade problems as well. I have started from the Cassel form of the general price theory, but I think my theoretical system will also harmonise with the other forms of the interdependence theory of pricing.

(2) To demonstrate that the theory of international trade is only a part of a general localisation theory, wherein the space aspects of pricing are taken into full account, and to frame certain fundamentals of such a theory as a background for a theory of international trade, wherein the influence of local differences in the supply of factors of production and transportation costs *within* each country is duly considered. In this field collaboration between economists and economic geographers is urgently needed; the fact that the latter have received so little help and stimulus from the former seems chiefly due to the scanty attention economic theory has given to localisation problems.

(3) To analyse the domestic and international movements of the factors of production, and particularly their relation to commodity movements.

(4) To describe the mechanism of international trade variations and international capital movements under conditions of fixed foreign exchanges, e.g. a gold standard or gold exchange standard régime. This analysis will demonstrate, among other things, (a) that changes in the total *buying power* of each country are an essential part of such a mechanism, and (b) that a solution of the fundamental problem of foreign exchange (which since the War has chiefly been discussed with the purchasing power parity theory as a starting point) is tantamount to constructing a theory of international trade. On the other hand, I have dealt very little with the influence of monopolistic phenomena and with problems connected with the business cycle.

This book will, I hope, prove that I have tried to learn from the economists of all schools who have dealt with international problems — although references in footnotes are not numerous. My indebtedness to two schools of economic thought should, however, be expressly stated. Anyone conversant with the writings on international trade by the Harvard school of economists will find here many traces of their influence. Above all, the works of Professors Taussig, Viner, and Williams, as well as discussions with them and with Mr. W. Gardner, inside and outside the class room, have deeply influenced my views. On the other hand, my general theoretical background is coloured entirely by the ideas of the Stockholm group of economists, Professors Bagge, Brismann, Cassel, Heckscher, Myrdal, and others, and of the late

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Professor Knut Wicksell. Like Dr. Rohtlieb of Stockholm and Professor Birck of Copenhagen, they have helped me with fruitful criticism of earlier versions of this book. Carl Iversen of Copenhagen has read the manuscript and Mr. Tord Palander the second proof; both have made numerous highly valuable observations and criticisms. Messrs. Karl L. Anderson and J. T. Day have corrected the English and Miss Mona Williamsson has compiled the index. My thanks are due also to the Swedish Academy of Science, the American Scandinavian Foundation, and the Sk-Ørsted Foundation for financial aid in the preparation of this volume.

BERTIL OHLIN

STOCKHOLM COLLEGE OF BUSINESS

January 20, 1931

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APPENDIX I

SIMPLE MATHEMATICAL ILLUSTRATION OF PRICING IN TRADING REGIONS

§1. *An isolated region.* There is much disagreement among economists concerning the value of mathematical formulae in expositions of the complicated relationships of pricing. The present writer believes that they can serve a useful purpose in giving, better than could words, a bird's-eye view of the mutual relationship of prices under somewhat simplified conditions. On the other hand, attempts to make the formulae more and more complicated in order to bring them in closer accordance with actual life and thus make them usable for the solution of economic problems have so far rarely been fruitful — a fact that does not of course preclude a better result in the future.

From this point of view it appears natural to try to illustrate the nature of pricing in trading regions under simplified conditions by means of some simple equations, without going further and introducing all complicating circumstances. The latter make no fundamental change in the nature of the relationship which is to be illuminated, and render the mathematical exposition difficult for most readers to understand.

The system of equations given below resembles closely the one first presented by Professor Cassel in his "Theoretische Sozialökonomie." It is simpler than those of the Walräs-Pareto school, and consequently can serve better for the present purpose.¹

The following analysis is built on the assumption of full mobility and divisibility. Thus, among other things, the economies of large-scale production are ignored. Furthermore, the supply of the various factors of productions is assumed to be constant and known. With a preliminary illustration of the nature of pricing in trading regions in view it is unnecessary to introduce the fact that this supply is really a function of (1) the prices of the factors and (2) the psychology of effort and sacrifice of the various individuals, however important this fact may be from other points of view (compare Chapter VII).

¹ Unlike Professor Cassel I have introduced the individual incomes, the variability of the technical coefficients, and the value of money in the system. Like Cassel I do not consider the difficulties due to the fact that capital as a factor of production cannot be treated in the same way as other factors. In other words, the *time* element in pricing is insufficiently considered. Cf. Lindahl, "Prisbildningsproblemet uppsägning från kapitalteoretisk synpunkt" (The problem of pricing from the point of view of the theory of capital), *Ekonomisk Tidskrift* (1929).

First, let us look at the price system in an isolated region, which produces n commodities, has r different factors of production and s inhabitants.

The production of each of these commodities requires certain quantities of all or some productive factors. The quantities $a_{11} a_{12} \dots a_{1r}$ of the different factors of production are needed for the production of one unit of the first commodity and the quantities $a_{21} a_{22} \dots a_{2r}$ are needed for the production of one unit of the second commodity and the quantities $a_{n1} a_{n2} \dots a_{nr}$ for the production of one unit of the n th commodity. These terms, of which some are equal to 0, are called "*technical coefficients*"; they express the quantities of any factor of production that are needed for the production of any commodity and they are obviously dependent on the relative prices of the factors of production; for these prices determine the proportions in which the different factors are combined in a certain production. Further, the phrase "technical coefficient" implies a technical element, namely "*the physical conditions of production.*" If the prices of the factors of production are given, one commodity needs for its production certain proportions of certain factors of production, and another commodity other proportions. The "physical conditions of production" thus refer to the purely physical properties of nature (both commodities and factors of production) which are to be regarded as known in this economic examination. Thus the technical *coefficients* become functions of the relative prices of the factors of production; and the forms of the functions are known, because they are determined by the physical conditions:

$$(1) \quad \begin{array}{l} a_{11} = f_{11}(q_1 q_2 \dots q_r) \\ \cdot \quad \cdot \quad \cdot \quad \cdot \\ \cdot \quad \cdot \quad \cdot \quad \cdot \\ a_{nr} = f_{nr}(q_1 q_2 \dots q_r) \end{array}$$

The prices of the factors of production are above indicated by $q_1 q_2 \dots q_r$. By the aid of these q and the technical coefficients the cost of production of the commodities may easily be obtained. Indicate them $p_1 p_2 \dots p_n$ and we get:

$$(2) \quad \begin{array}{l} a_{11}q_1 + a_{12}q_2 + \dots + a_{1r}q_r = p_1 \\ a_{21}q_1 + a_{22}q_2 + \dots + a_{2r}q_r = p_2 \\ \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\ a_{n1}q_1 + a_{n2}q_2 + \dots + a_{nr}q_r = p_n \end{array}$$

The first commodity needs the quantities $a_{11} a_{12} \dots a_{1r}$ of the different factors of production, and their prices are respectively $q_1 q_2 \dots q_r$. The expressions concerning the other commodities are analogous. As

in any state of equilibrium and perfect mobility prices equal costs of production, $p_1 \cdots p_n$ evidently signify the various commodity prices.

The demand for the different commodities is determined by these prices $p_1 \cdots p_n$, by the income of each consumer, and by his "scale of requirements" or "scale of wants" (the psychic side of demand). If the prices of the commodities and his income were given, his "scale of wants" would determine how much he would buy of each commodity. Each individual's demand for a certain commodity may thus be expressed as a function of the prices of all commodities and services and of his income. The form of the function is determined by his "scale of wants."

Now, let us add together the demands of all individuals, and express the total demand for each commodity as a function of commodity prices and the various individual incomes, which are written $I_1, I_2 \cdots I_n$.¹

$$(3) \quad \begin{aligned} D_1 &= F_1(p_1 \cdots p_n, I_1 \cdots I_n) \\ D_2 &= F_2(p_1 \cdots p_n, I_1 \cdots I_n) \\ &\vdots \\ D_n &= F_n(p_1 \cdots p_n, I_1 \cdots I_n) \end{aligned}$$

The individual incomes are determined by the quantity of factors of production, from which each individual derives his income, and by the price per unit of these factors. It is as a seller of a certain quantity of such factors, e.g. the use of his labour or land, or the goods or services produced with them, that he acquires his purchasing power. In this examination the conditions of ownership to the different factors are supposed to be known. The individual number m owns l_{m1} units of the first factor, l_{m2} of the second factor, etc. Thus, the incomes of the various individuals may be written:

$$(4) \quad \begin{aligned} I_1 &= l_{11} q_1 + l_{12} q_2 + \cdots + l_{1r} q_r \\ I_2 &= l_{21} q_1 + l_{22} q_2 + \cdots + l_{2r} q_r \\ &\vdots \\ I_n &= l_{n1} q_1 + l_{n2} q_2 + \cdots + l_{nr} q_r \end{aligned}$$

If the price-mechanism is in equilibrium the production of commodities is just sufficient to satisfy the demand. Thus $D_1 \cdots D_n$ indicate the quantities of every commodity which are to be produced. It is now easy to go on to express the demand for the different factors of production as an equation. The quantity a_{11} of the first factor is needed for the production of one unit of the first commodity; for the production of D_1 units $a_{11} D_1$ units are therefore required. The pro-

¹ All incomes are assumed to be "used." ($\Sigma I = \Sigma Dp$. This equation is, however, implied in equations (2), (4) and (5).

duction of D_2 units of the second commodity requires $a_{21} D_2$ units of the same factor, etc., and the production of D_n units of the n -th commodity requires $a_{n1} D_n$ of this factor. By summing up these quantities the total demand for this factor of production may be computed as: $a_{11} D_1 + a_{21} D_2 + \dots + a_{n1} D_n$. This quantity of the first factor of production, which is wanted for the production of the commodities that are demanded at the prices $p_1 \dots p_n$, must be the whole available quantity of this factor, that is R_1 , which is equal to $t_{11} + t_{21} + \dots + t_{n1}$. Since the demand for the other factors of production may be computed in the same way, we obtain:

$$(5) \quad \begin{aligned} a_{11} D_1 + a_{21} D_2 + \dots + a_{n1} D_n &= R_1 \\ a_{12} D_1 + a_{22} D_2 + \dots + a_{n2} D_n &= R_2 \\ &\vdots \\ a_{1r} D_1 + a_{2r} D_2 + \dots + a_{nr} D_n &= R_r; \end{aligned}$$

Now the different D are, according to (3), functions of the different p and I . By means of the systems of equations (2) and (4) they can be expressed in terms of the different a and q . Further, by aid of the systems of equations (1) the different a may be expressed in terms of the different q . The number of "independent variables" is thus reduced to r , namely $q_1 q_2 \dots q_r$, and the series of equations (5) which contains r equations, is sufficient for the solution of the problem. The price system under the assumed conditions thus seems to be determinate. The basic data which govern it are the supply of productive factors owned by each individual¹ and the two sets of circumstances which determine the forms of the functions, i.e., the physical conditions of production and the wants and desires of the consumers.

As a matter of fact, however, one of the equations is not independent of the others;² hence, a solution of these systems of equations gives the different prices multiplied by an arbitrary quantity. All prices may be twice as high in one situation as in another and yet all basic circumstances and the equations be unchanged. To determine the prices one must introduce an assumption about the monetary system, e.g. that a certain quantity of a certain commodity (gold) is used as unit of reckoning. If the price of this commodity is called p_g , one obtains the equation $p_g = 1$. Thus the number of equations is equal to the number of independent variables and the system is determinate.

¹ In Part I this has been called (1) the supply of productive factors and (2) the conditions of ownership.

² If we know the $(n-1)$ first equations in (2) and the fact that total incomes of all individuals equal total expenditure ($\Sigma Dp = \Sigma I$) then the last equation in (2) follows. Cf. Walräs, *Elements d'Economie politique pure* (4th ed.), 1900, pp. 122 ff.

§2. *Trading regions.* A similar survey of the price formation under simplified conditions may now be given for two exchanging regions, which are called the region *A* and the region *B*. The symbols employed are as follows:

	<i>A</i>	<i>B</i>
Technical coefficients	$a = f ()$	$a = f ()$
Prices of factors of production . . .	q	g
Prices of commodities	p	v
Incomes of the various individuals	$I = \sum_k t_k q_k$	$J = \sum_k d_k g_k$
Demand for commodities	$D = F ()$	$\delta = \psi ()$
Supply of factors of production . .	R	S

The number of commodities is supposed to be *n* and the number of factors of production *r* and the number of individuals *s* in *both* regions. This assumption is, of course, immaterial, and made only to reduce the number of symbols. The only things which are common in the two regions before the commencement of trade are "the physical conditions of production," that is, the forms of the functions $f ()$. These conditions are determined solely by the physical properties of nature (commodities and factors of production) which are wholly independent of the locality of these factors and commodities.

The price-mechanism in the isolated region *A* is just the same as that presented above. The mechanism of the region *B* will be obtained merely by changing all symbols according to the table above. Now the problem is, what change of these price-mechanisms will take place when the exchange of commodities between the two regions is opened?

Let us represent the "foreign exchange," that is, the relation between the money units of the two regions, by *x*. One unit of *A*'s money will now correspond to *x* units of *B*'s money, and the prices of commodities

in the region *B*: $v_1 v_2 \dots v_n$ become $\frac{v_1 v_2}{x} \dots \frac{v_n}{x}$ in *A*'s money. The

inhabitants in *A* compare these prices with $p_1 p_2 \dots p_n$, which are the costs in home-production, and import the commodities which they can buy cheaper in *B* and export the commodities which they can produce cheaper than *B*. If we take a certain arbitrary value of *x*, then a certain number of commodity prices will be lower in *A* and the rest lower in *B*. Take another value of *x*. Then *another* number of commodities will be cheaper in *A* and the rest cheaper in *B*. To every possible value of *x* will correspond a certain definite number of com-

modities which are cheaper in *A* and thus produced there, while the rest are produced in *B*.

If we knew the foreign exchange x , which gives equilibrium, then we should also know which goods can be obtained at lowest cost in *A* and which in *B*. Let us give the former goods the numbers, $1, 2 \dots m$ and the latter $m + 1, m + 2, \dots n$. The equations showing that the costs of production are equal to the prices thus become ¹ (compare (2))

$$\begin{aligned}
 \text{(II)} \quad & a_{11} q_1 + \dots + a_{1r} q_r = p_1 \\
 & \quad \quad \quad \cdot \quad \quad \quad \cdot \quad \quad \quad \cdot \\
 & a_{m1} q_1 + \dots + a_{mr} q_r = p_m \\
 & a_{m+1,1} g_1 + \dots + a_{m+1,r} g_r = v_{m+1} \\
 & \quad \quad \quad \cdot \quad \quad \quad \cdot \quad \quad \quad \cdot \\
 & a_{n1} g_1 + \dots + a_{nr} g_r = v_n
 \end{aligned}$$

This series is almost the same as (2), the only difference being that $a_{m+1} \dots a_n$ are changed into $a_{m+1} \dots a_n$, and the corresponding $q_1 \dots q_r$ into $g_1 \dots g_r$ and $p_{m+1} \dots p_n$ into $v_{m+1} \dots v_n$, owing to the fact that the commodities $(m + 1) \dots n$ are produced only in *B*.

The equations for the demand for commodities will also be a little changed. Since the demand for any commodity is a function of the prices of *all* commodities, and these prices are now not $p_1 \dots p_n$ in *A* and $v_1 \dots v_n$ in *B*; but $p_1 \dots p_m; \frac{v_{m+1}}{x} \dots \frac{v_n}{x}$ in *A* and $p_1 x \dots p_m x; v_{m+1} \dots v_n$ in *B* the demand for the different commodities may be expressed thus:

$$\begin{aligned}
 \text{(III)} \quad & D_1 = F_1 (I_1 \dots I_s; p_1 \dots p_m; v_{m+1} \dots v_n; x) \\
 & \delta_1 = \psi_1 (J_1 \dots J_s; p_1 \dots p_m; v_{m+1} \dots v_n; x) \\
 & \quad \quad \quad \cdot \quad \quad \quad \cdot \quad \quad \quad \cdot \\
 & D_n = F_n (I_1 \dots I_s; p_1 \dots p_m; v_{m+1} \dots v_n; x) \\
 & \delta_n = \psi_n (J_1 \dots J_s; p_1 \dots p_m; v_{m+1} \dots v_n; x)
 \end{aligned}$$

The equations expressing the various individual incomes as functions of factor prices are the same as in the isolated state. It is superfluous therefore to write down the system (IV). For each of the two countries one equation in IV is dependent on the others. In their place we have the equations for the price of gold: $p_g = 1$ and $v_g = x$. The price in *B* of the quantity of gold, which costs 1 in *A*, is of course equal to the foreign exchange rate.

¹ Each commodity is supposed to be produced only in one region. See the introductory remarks to this appendix.

This equation, which may be called "the equation of interregional exchange," signifies, in terms of *B*'s money, that the imports balance the exports. Of the first commodity the region *B* imports the quantity δ_1 and, as the price is p_1 in *A*, *B* has to pay $\delta_1 p_1$ reckoned in *B*'s money, etc. Of the *n*th commodity *B* exports, and consequently *A* imports, the quantity D_n at the price v_n , etc.

By these six series of equations the price system in two exchanging regions under simplified conditions is illustrated, that is to say, a general idea of the nature of the interdependence of the different elements is provided. Evidently, any change in any part of the system may cause a change in any other part.

§3. *Certain conditions of trade.* This system of equations can be used also to throw some light on the question under what conditions two regions will *not* trade with each other. We have seen that if relative commodity prices coincide in the isolated state, no trade can occur. Under what conditions will they coincide?

We start from the equations, expressing the costs and prices of the various commodities.

$$\begin{array}{rcc}
 & A & B \\
 (1) & a_{11} q_1 + a_{12} q_2 + \dots + a_{1r} q_r = p_1; & a_{11} g_1 + a_{12} g_2 + \dots + \\
 & & a_{1r} g_r = v_1 \\
 & a_{21} q_1 + a_{22} q_2 + \dots + a_{2r} q_r = p_2; & a_{21} g_1 + a_{22} g_2 + \dots + \\
 & & a_{2r} g_r = v_2 \\
 & \cdot & \cdot \\
 & \cdot & \cdot \\
 & a_{n1} q_1 + a_{n2} q_2 + \dots + a_{nr} q_r = p_n; & a_{n1} g_1 + a_{n2} g_2 + \dots + \\
 & & a_{nr} g_r = v_n
 \end{array}$$

As soon as the two regions come into communication, exchange will arise if the relative commodity prices are different, that is, if the following condition is *not* fulfilled:

$$(2) \quad p_1 : p_2 : \dots : p_n = v_1 : v_2 : \dots : v_n$$

It will be seen below that this condition is satisfied and hence trade is impossible in two cases, which will now be analysed.

Assume that the relative prices of *the factors of production* are the same in both regions. This can be expressed:

$$(3) \quad q_1 = l g_1; q_2 = l g_2; \dots q_r = l g_r \text{ (where } l \text{ is an arbitrary positive quantity).}$$

When this is the case, the factors ¹ will be used in the same propor-

¹ Only factors of identical quality in the two regions are treated as being the same factor. It is recalled that the economies of large-scale production are disregarded.

tions in the production of any commodity in both regions. The "technical coefficients" will coincide, that is

$$(4) \quad a_{ij} = a_{ij}; \quad (i = 1, 2 \dots n; j = 1, 2 \dots r)$$

By aid of the equations (3) and (4), the expression (1) will be converted into

$$(5) \quad p_1 = lv_1; p_2 = lv_2; \dots p_n = lv_n$$

which is exactly the same as (2). Consequently the condition (2) holds good, relative commodity prices coincide, and no trade will arise if the condition (3) is fulfilled. It may, therefore, be stated that *no exchange will arise, if the relative prices of the factors of production coincide in the two regions.*

The condition (2) can, however, be fulfilled in another way, namely if

$$(6) \quad \begin{aligned} & a_{11} : a_{12} : \dots : a_{1r} = \\ & = \dots \dots \dots \\ & = a_{n1} : a_{n2} : \dots : a_{nr} = \\ & = a_{11} : a_{12} : \dots : a_{1r} = \\ & = \dots \dots \dots = \\ & = a_{n1} : a_{n2} : \dots : a_{nr}; \end{aligned}$$

that is if the factors of production are combined in exactly the same proportions in *all* commodities in *both* regions.

However, this is unthinkable if the relative prices of the factors of production do not coincide. The condition (6) is therefore in fact the same as condition (3), which has already been discussed.

It may be pointed out that these conditions, (3) and (6), which are of course never satisfied in the real world, resemble somewhat two assumptions of which considerable use is made in the classical theory of international trade. When dealing with non-competing groups Professor Taussig bases his final conclusions concerning their small importance for international trade on the presumed fact that "in the occidental countries . . . as a rule the stratification of industrial groups proceeds on the same lines," i.e. that relative wages are fairly equal in different countries.¹ It is fortunate that he does not make this assumption for *all* the productive factors, in which case international trade would be impossible, except in so far as it would be called into existence by the economies of large-scale production.

In other cases Taussig and others assume that the various labour qualities and capital, but not land, enter in the same proportions in *all*

¹ Taussig, *International Trade*, p. 56.

commodities, and that therefore relative costs are known, when the relative quantities of unskilled labour used for their production are known or, which amounts to the same, it is assumed (Bastable) that a "unit of productive power" can be used as a basis in the cost calculations. It is fortunate that this assumption does not include land and that equal proportions in *both* countries are not assumed, for otherwise trade would be impossible, except when due to economies of large-scale production.

§4. *A generalisation.* Let us assume that the kind of productive factors existing in *A* and in *B* as well as the sort of commodities produced in these countries in the isolated state are entirely different. It offers no difficulty to change the system of equations so as to correspond to these circumstances. The forms of the functions of the technical coefficients will be different in the two countries; the supply in *B* of all the factors which exist in *A* will be zero, and vice versa. Nevertheless a system of equations is obtained which describes the equilibrium of international trade under the simple assumptions made.

The conditions which have to be fulfilled if trade is to arise cannot be described as different relative commodity and factor prices. Nor can one speak of a tendency towards an equalisation of factor prices when trade has started. Nevertheless, the reactions of the supply prices of commodities, when a foreign demand for some of them comes forth, will be described in essentially the same way as in the text (Chapters II, III, and VII). It depends upon the change in relative factor prices under the influence of the new demand conditions and the reactions of factor supply, as well as upon the economies of large-scale production.

For a treatment of practical problems it is, in my opinion, beyond doubt most practical to use the assumptions underlying Part I of the text and §§ 1-3 of this appendix as a first approximation, and to deal with the differences in the quality of commodities and factors as explained in Chapter V.

APPENDIX II

ON SOME EARLIER THEORIES OF INTERNATIONAL TRADE

§1. *Pareto.* The present treatise was begun in the years after the War as an attempt to explain the forces beneath the surface which govern the variations of the foreign exchanges. I soon became convinced that this could best be done if the mutual interdependence theory of pricing was extended to cover several trading regions. If the classical labour value theory had been discarded as an explanation of prices in the one case — for instance by Walràs, Menger, Jevons, Clark, Cassel and, in spite of conservative terminology, by Marshall, who had all put in its place a mutual interdependence system of pricing — why should it be retained in an analysis of pricing in several communicating markets? To do so seemed all the more absurd as a part of the classical theory of international trade — Mill's equation of reciprocal demand — represents a sort of mutual interdependence theory, although resting on the base of a labour cost theory within each country. Would it not be natural to use the one-market interdependence theory of pricing as the basis of the theory of international exchange? This could be done by depriving the classical theory of international trade of its labour cost elements and presenting it as a simple extension of the mutual equilibrium reasoning, as developed in the one-market theory. In that way, and only in that way, it seemed to me possible to arrive at a harmonious theory of pricing. I hoped that such a treatment of international trade problems would not only do away with a fundamental "Schönheitsfehler" but would also, if consistently pursued, lead to new and fruitful results concerning special problems, and thus prove to be something more than a restatement of the classical doctrine in a different form; just as the one-market interdependence theory of pricing, superseding the classical value theory, has brought many advantages in the analysis of profit, risk, and other important questions.

Not until this book was almost ready in the form in which it is published did I come to know that a part of the work had already been done in the 'nineties, a small part of it even earlier by Cournot.¹ Cournot's work on international trade had attracted little attention, which is no doubt partly to be explained by the fact that his conclusions are on the whole erroneous. Little is to be learned from him except about the method of attack. The Lausanne school before Pareto does not

¹ *Recherches sur les principes mathématiques de la théorie des richesses.* (Paris, 1838.)

seem to have understood its importance for an analysis of international trade. In 1896, however, Pareto published the first part of his *Cours d'Economie Politique*, followed next year by the second part.¹ They contained an extension of his system of equations, to be valid for a number of trading markets, and thus presented, if not a new theory of international trade fundamentally different from the orthodox one, then at least a starting point for an alternative theory.

These equations for trading markets have since been "commune bonum" to economists of the Pareto school. See for instance Barone, *Principi di Economia Politica*, 1908 (German edition, 1928); Pietri-Tonelli, *Traité d'Economie Rationelle*, 1927, Amoroso, *Lezioni di Economia Matematica*, 1921. It is not surprising that the equations worked out by Pareto and kept with comparatively small alterations by his pupils resemble those presented in Appendix I of this book.² Of course, following Cassel, the latter are free from marginal utility or "Ophelimité" concepts, but the way of combining the price systems for the various markets is and must be similar.

On the other hand, it is astonishing that the Anglo-Saxon literature on international trade has overlooked that Pareto did not bring some minor modifications of the classical doctrine, but attacked the problem in an entirely different way. It is true that he has not developed a body of doctrines comparable to the one presented by the classics and their followers, but he has drawn the obvious inference that the mutual interdependence theory must be valid for several markets as well as for one, and thus has provided at least a stepping stone for the construction of an alternative theory of international trade. In fact he has done a little of this construction himself through his discussion of the effects of protection.

That Pareto's new approach has been so little noticed and utilised is, perhaps, partly due to the circumstance that mathematical formulas and equations convey little meaning to people who are not familiar with this method of expression. Even to mathematically trained persons they illustrate rather than explain. This is true of the well-known equations of pricing in one market, which are no more than the beginning of a theory of commodity prices and distribution of income; it is equally true of the international trade equations. Pareto and his followers have not, so far as I know, attempted to build up a concrete theory of international trade, alternative to the classical one. In fact,

¹ Pareto had dealt with international trade along these lines in "Teoria Matematica dei Cambi Forestieri," *Giornale degli Economisti*, 1894.

² Some Italian economists have introduced all sorts of complications in their formulas; as I have used this mathematical treatment merely as an illustration of the character of the relationship, I have had no reason to do so.

they do not seem to have been clearly aware that their theory is quite inconsistent with the classical one. This fact goes a long way towards explaining why other economists, particularly when not interested in mathematics, have got the impression that Italian economists only wanted to change the classical terminology a little to get it to fit in with their characteristic methods of dealing with economic problems in general.

Professor Angell's relatively complete history of international trade theory contains the following illuminating passage:

The majority of the Italian economists have taken over the classical theories bodily, premisses and conclusions alike. Only at certain rather isolated points have they attempted any important modifications, and then with somewhat indifferent success. Moreover, at each given time the reflections of English doctrine have usually been based not on *current* English ideas, but on the ideas of a generation before. In consequence, to students already familiar with its antecedent originals the Italian literature must necessarily seem lacking in vigor and freshness. Even the writers of the mathematical school, which has had a larger following in Italy than in any other country, have not explicitly tried to overthrow the classical theory itself. Rather they have sought only to modify it, and to restate its propositions in accordance with their own characteristic views on general economic theory and methodology.¹

Pareto himself is not without responsibility for the impression that he has only "restated" the classical doctrines. He does not formally reject the Ricardian doctrine of comparative cost,² although he points out that it has been stated in inexact terms by non-mathematical writers like Mill and Cairnes. Furthermore, he uses simple illustrations in terms of labour quantities, particularly in his later work, *Manuel d'Economie Politique*. Although he is careful to state that this is misleading and that a correct statement can be given only by means of mathematical formulas of a rather complicated sort, non-mathematical readers naturally get the impression that his criticism of the classical doctrine is concerned with terminology more than with realities.

In fact, however, Pareto's doctrine is fundamentally different from Ricardo's and that of the later classical writers. Pareto rejected all attempts to measure costs in objective terms, i.e. he discarded the basis of the whole classical theory of value.

¹ *The Theory of International Prices*, 1926, p. 303.

² His statement of it, freed from its opportunity cost terminology, really runs in terms of relative prices and comes to the same thing as my price reasoning in Chapter 1, at the beginning of § 3.

Les 'sacrifices' qu'ils font, en concourant à la production, sont des quantités hétérogènes, qu'on ne saurait sommer ensemble. Une chose n'a pas un coût objectif en ophélimité, elle a des coûts subjectifs, différents suivant les différents individus.¹ Cairnes paraît croire que le coût (en ophélimité) des marchandises se compose de *travail* et d'*abstinence*. Sous cette forme, la théorie des coûts comparés n'est pas seulement inexacte, elle est fautive.²

Instead, the costs of each individual, which cannot be compared with the costs of another or added together for society as a whole, are to be measured in "ophélimité." The real costs are

les coûts que l'on fait pour se procurer les marchandises (leur coûts en ophélimité).³ . . . Parler des "sacrifices" de l'Angleterre n'a aucun sens. En réalité, il y a des Anglais qui font des "sacrifices" et ces sacrifices sont des quantités hétérogènes qu'on ne peut sommer ensemble. Lorsqu'il s'agit de décider s'il convient mieux d'employer un terrain pour y établir l'exploitation d'une mine de houille, ou pour y cultiver du blé, on ne considère ni les "sacrifices ni l'abstinence," qui n'ont, en ce cas, qu'une influence absolument insignifiante. On considère seulement les différentes quantités des biens économiques que l'on pourra obtenir de ce terrain, selon l'usage que l'on en fera.⁴

Evidently Pareto has in mind a sort of *marginal* individual opportunity costs which, when measured in terms of his "ophélimité," are proportional to prices.⁵

Whatever one may think of the usefulness of this concept, which forms the basis of Pareto's whole economic system, it is clear that his comparative cost theory is in harmony with his general price theory, is quite different from the classical objective cost theory, and when stripped of its psychological parts is reduced to a statement in terms of relative prices similar to the one in Chapter I of this book.

It seems to the present writer too obvious to need further discussion, that Pareto's position is widely different from the classical one, and that his way of dealing with international trade represents the first attempt to construct a theory which is in harmony with the general price and value theory of the mutual interdependence type. Except for the use of "ophélimité" his treatment runs along lines very similar to those followed in part I of this book.

Unfortunately, neither Pareto himself nor his followers have as far as I know built further on the basis he laid and proceeded to an illustration of their doctrines by means of concrete cases or to an analysis of international trade problems. The only exception is their study of

¹ *Cours d'Economie politique*, p. 211.

² *Op. cit.*, p. 222.

³ *Op. cit.*, p. 211.

⁴ *Op. cit.*, p. 222.

⁵ Compare Haberler's indication of a similar construction in "Die Theorie der Komparativen Kosten," *Weltwirtschaftliches Archiv*, 1930, H. 2.

the effect of protective duties, which centres around the changes in the gain from international trade, measured in quasi-psychological terms by means of the "ophélimité" concept, which I have preferred not to introduce in this book. It is perhaps only natural, therefore, that I have found no reason to make any alterations after reading some works by the Pareto school. But a study of their writings a few years earlier would have saved me some trouble and work.

§2. *Marshall*. Several Italian economists of the Walràs-Pareto school have made contributions to the analysis of demand and supply curves in international trade, which was elaborated in the late 'sixties by Mangoldt and Marshall. Marshall's theory was not made public until two decades later in a book by Pantaleoni. These three economists, together with Edgeworth, had managed as early as in the 'nineties almost to complete an apparatus which in deft hands has rendered important results. It has been used by writers of the classical Cambridge school as well as by economists belonging to the mathematical Pareto school. This fact has probably served to strengthen the impression that after all there was not much difference between the classical theory of international trade and the approach used by Pareto. Did not the English and the Italian economists handle international trade problems by means of supply and demand curves in the same way?

In reality, however, this proves nothing. As a matter of fact, the Marshallian curve analysis can be made a part of the classical cost theory as well as of the interdependence theory of pricing. Marshall's analysis does not go back to the things behind supply schedules, i. e. to the relation between costs and supply prices. Both supply and demand schedules in international trade are regarded as given, and variations in these schedules and the effects of duties are studied. In brief, there is no connection between this analysis and the general system of prices in each trading country. It is, therefore, in no way dependent upon the labour value theory or any other general price theory.

As mentioned above, Mill's study of the play of international supply and demand is in complete harmony with a mutual interdependence theory. Its fault is that it is put on the top of a classical labour value theory, assumed to explain domestic prices. When the analysis, as in Marshall's curves, is confined to the former part and runs in terms of "bales of goods" instead of "days of labour" or "units of productive power" there is clearly no reason for objecting to it from the point of view of the Pareto theory or any other interdependence theory.

Some reviewers of Marshall's belated work *Money, Credit, and Commerce* (1923) have observed that it contained little new on the

subject of international trade. This may be true. But certainly there is one appalling thing, namely that significant parts of the classical doctrine are left out entirely. Marshall makes hardly any use of the real cost analysis in terms of days of labour or units of productive power. Note the difference from Professor Taussig's *International Trade*. Only in Appendix H does Marshall use examples of the Portugal-England type, the mainstay of the whole classical analysis since Ricardo. He seems to have shrunk from tying his curve analysis of the play of international supply and demand down to a labour value theory of the Ricardian type.

Of course Marshall could have modified the classical theory of international trade radically by basing it on his own interdependence system, where certain cost ideas are an essential part. He could have extended his system for one market to cover several markets, gathering together, systematising, and developing the many remarks in this direction that his *Principles* contain. It would not have been easy to do so, for the construction of Marshall's system is complicated, but no doubt it could have been done. In fact, however, he did not do it. On the whole, he seems to have been content with dealing with international exchange in the most narrow sense without putting it in its organic connection with the general system of price and value.

This Marshallian curve analysis will, I think, always be regarded as a useful tool in the discussion of certain problems. To certain minds it is easier to handle than other forms of analysis. It does not, however, appeal to me. That I have made no use of it is also due to the fact that other sides of international trade — e.g. the changes in the interior price mechanisms — seemed in greater need of treatment than problems which have attracted the special attention of some of the greatest intellects economic science ever reckoned among its adepts. But I am well aware that certain chapters of this book would have gained if use had been made of the Marshallian curves and of some which have been fruitfully used by Barone.¹

§3. *Angell*. The fact that the Marshallian curve analysis of the play of international supply and demand is only a part of a complete theory of international trade — which must have the form of a general price theory extended to cover several markets — throws some light on a recent attempt to break new ground in this field of economics, Professor Angell's interesting book *The Theory of International Prices*, which has already been quoted above.

If the term "theory of international prices" is to mean anything at all it must be that it explains the relations between the various price-systems of trading nations. No analysis which assumes demand and

¹ *Principi di Economia Politica*, Roma, 1908.

supply schedules to be known can do this. Yet Professor Angell confines himself to this analysis, — and that of the monetary mechanism, — and does not attempt to go behind the supply schedules to put anything in the place of the comparative cost doctrine which he rejects. Evidently his procedure resembles closely that of Marshall. A quotation will make his position clear.

Our analysis . . . has been made to run solely in terms of the demand and supply schedules for the articles concerned in each country. Given such schedules, we have found it possible to establish the character and limits of the trade. The practice of dealing only with current ratios of exchange and the factors controlling them, however, is evidently at marked variance with that of the classical writers. The classical theorems here paid relatively little attention to the phenomena of ratios of exchange — prices — and sought instead to go back of them to factors exerting a more fundamental control over international trade. These factors were held to find their expression in comparative labor costs. Should we not now, therefore, similarly extend our analysis to include the presumably dominant though less conspicuous conditions with which the older doctrine was concerned? Unequivocally, no. . . . In attacking this last problem (the determination of ratios of *international* exchange) the only directly relevant factors are the demand and supply schedules, and the ratios of exchange, which actually or hypothetically prevail in the countries concerned. The problem itself therefore reduces to the relatively simple one of showing how these factors operate, and how they control the course of trade. *It is impossible to go back of them to a single more "fundamental" set of factors, and futile to try.*¹ They are themselves — to borrow from the vocabulary of algebra — the lowest common terms to which the situation can be reduced. Any further reduction leads, instead, to complexity and incompleteness. No one of the elements which go to make up the demand and supply schedules in each country is adequate, of itself alone, to explain these schedules.²

It is of course true that no single element can be dealt with alone, if one wants to go back of the supply schedules and show how the price systems of trading countries are connected. But, it is hard to understand why this should make such an attempt impossible. And it is still more difficult to understand that Angell's position can lead him to state later on (p. 473) that the comparative cost doctrine is untenable and that "an alternative analysis has therefore been worked out, which is based on actual money costs and money prices." It would seem that the very thing he has declared impossible is to work out an alternative doctrine.

What a pity that instead of taking this negative attitude Professor Angell has not followed up a suggestion of his own on the previous page:

¹ Curs. by B. O.

² *Op. cit.*, p. 460.

If we take international exchange in the aggregate and over periods of time, it is evidently quite true that the course and character of the exchange is determined by a certain kind of comparative cost. But these costs must themselves be interpreted with respect to entire countries, not with respect to specific products or even specific branches of production. If one country is relatively richer than another in natural resources, for example, while it is inadequately supplied with labour, the general character of the trade between the two is established. The trade between the United States and western Europe, especially in the nineteenth century, is a conspicuous example. The United States had natural resources, but relatively little labour and capital. Europe was in the opposite situation. We exported food stuffs and raw materials and took manufactures in payment.

This and one or two other passages in *The Theory of International Prices*, as well as writings by Viner ¹ and others,² contain indications and ideas closely similar to some which have been developed in this work, already in the Swedish edition of 1924. As so often before, the same ideas have been born practically simultaneously in the minds of different persons.

Another fact which has made me feel that a treatise of international trade on non-classical lines would meet a real need, is that so many economists have lately offered serious criticism of the orthodox theory. Besides Angell, names like Graham, Mason, Nogaro, Viner, and Weigmann offer themselves at once. There seems to be widespread feeling that a more realistic theory than the one based on the classical comparative cost schedules is desirable, a theory in closer contact with the business man's way of looking at things.

¹ *Journal of Political Economy*, 1926.

² Cf. Chapter I.

APPENDIX III

CRITICISM OF THE CLASSICAL THEORY OF
INTERNATIONAL TRADE¹

§1. *Introduction.* I shall attempt in the following pages to present a criticism of the orthodox theory of international trade which seems to me sufficiently damaging to justify my attempt to construct a different theory. To avoid misunderstanding let me emphasise, however, that the orthodox theory has enabled a great number of practical problems to be dealt with satisfactorily and that, consequently, as far as these problems are concerned, a new theory will mean only a restatement of the essentials of the old one. A new theory can only justify itself if it can deal equally well with these problems and better with some others. It is, therefore, incumbent on me to demonstrate that there are in certain respects serious deficiencies inherent in the orthodox theory and that in these respects the theory expounded in the present volume is more satisfactory. Let me begin with a criticism of the classical labour value theory. As the orthodox theory of international trade is built on this value theory, it is inevitable that it should be open to the same objections as the latter.

§2. *Criticism of the labour value doctrine.* Ricardo measures the cost of production of goods in terms of days of unskilled labour, not in terms of money. He considers the real cost, expressed in labour (what Marshall calls "effort and sacrifice"), not the expenses of production. The relative value of goods is determined by the amount of labour which has gone to produce them. In order to arrive at comparable cost figures, he is obliged to introduce a number of simplifying assumptions which may be summarised as follows: "(1) The cost at the production margin serves as a basis for calculations. Rent is thus eliminated. (2) Various categories of labour can be reduced to a common denominator on the assumption of a fixed relation between them. (The relative remuneration scale is assumed to be fixed.) If the wages of one worker are twice as high as those of another, one working day of the first equals two of the second. In this way, every kind of work can be converted into "unskilled labour." (3) Capital and labour are employed in the same proportions in the production of all commodities.

Ricardo was well aware that these assumptions do not correspond to the facts, but he was obliged to accept them. An acute logical mind

¹ This is a considerably revised and enlarged version of a paper published in the *Weltwirtschaftliches Archiv* (1927) under the title: "Ist eine Modernisierung der Aussenhandelstheorie erforderlich?"

like his could not fail to realize that, in order to argue at all about relative values, a common denominator for the production cost of all goods was necessary. If one does not take money costs for this purpose, one is naturally led to take labour, the most important factor in the process of production, and attempt to express all costs of production in terms of it.

These premises form the basis of the orthodox value theory. Far from being arbitrary, they are essential and have in fact a fundamental significance. It will, therefore, have to be seen whether they correspond to the facts sufficiently to be accepted as a convenient starting point in analysing the actual phenomena.

The assumption of an equal relation between capital and the cost of labour in all industries is, of course, in striking contradiction to reality. There are industries in which wage costs are twenty-five times as high as capital expenses, whereas, in others, capital expenses are considerably higher than wage costs. The amount of capital per worker in the manufacturing industries of the United States has recently been estimated as follows:¹ Chemical industry \$10,000, iron and steel industry \$4,000, textile industry \$1,900, tobacco industry \$1,700. In Swedish industry before the War the relation between wages paid and interest expenses was² for food industries $\frac{7}{10}$:1, for pulp and paper factories $\frac{9}{10}$:1, for wharfs 8:1, for stone quarries 26:1. A post-War investigation, made by Messrs. Alford and Hannum, showed that the output per 1,000 hours of labour ranged from \$548 in the yarn and thread industry to \$10870 in the die and punch-making industry in the United States.³

There is hardly more to be said in favour of the existence of a fixed relation between the wages of different categories of labour. (The assumption of such a relation excludes the possibility of examining a fundamental problem such as that suggested by changes in the relative positions of social classes, e.g. the question why the real wages for office work have declined in the last thirty or forty years, while the wages for manual labour have risen considerably. It is evident that such changes — apart from the interest they present from the point of view of the distribution of income — affect the relative prices of goods.)

It has been said that the pure labour value theory, which is based on the above artificial assumptions, yields only roughly approximate results and that it is possible by subsequent modification to take sufficient account of the facts that different commodities require very

¹ Woytinski, *Die Welt in Zahlen*, Vol. III (Berlin, 1926).

² *Statens offentliga utredningar*, no. 37 (1923).

³ *The Times Trade and Engineering Supplement* (December 29, 1928).

different proportions of capital and labour, and that the relative remuneration scale is subject to changes. Indeed, does not Ricardo himself point this out at the end of the first chapter of his *Principles*, and does not Mill endeavour to explain that variations in the rate of interest as well as in the general wage level must influence the relative prices of commodities?

As far as I can see, these and later attempts were unsuccessful and were, as a matter of fact, doomed to failure from the beginning. If one holds — with Ricardo and Mill — that relative prices are primarily determined by the quantities of labour employed, and if at the same time the quantity of capital employed is considered to be relevant, one has in fact abandoned the orthodox cost theory which was based on the assumption that all cost elements can be expressed in terms of one. It is only by means of that assumption that the costs of all commodities may be compared, if a money measure is ruled out. (If the theory is “modified,” and if the difference in the proportionate use of capital is taken into consideration, so that goods requiring much capital for their production are given a higher relative value, the question remains by how much their value increases.) This question can only be answered by a calculation in terms of money. Only thus does it become possible to compare the costs of production of different commodities. Instead of finding the “cost,” expressed in terms of days of labour or in units of energy, one arrives at the “expenses of production” expressed in money. Thus, the whole orthodox value theory is reduced to the statement that the prices of goods are determined by their relative costs of production measured in terms of money. As production costs depend on the prices of the factors of production, which, in their turn, are not *a priori* known but depend on the prices of commodities, Mill found himself in exactly the same dilemma that Ricardo tried to avoid by his labour value theory and which can in fact only be avoided by the mutual interdependence theory.) According to this theory, the prices of goods and of the factors of production react upon one another, thus creating an interdependence which characterises the whole mechanism of price formation.

(An attempt to “modify” the labour value theory and to transform it to some other form of real cost theory leads, necessarily, to the giving up of its main premises.) The foundation of such doctrines, i.e. the elimination of money in the calculation of the cost of production, is destroyed. Ricardo and Mill, after having mentioned the modifications in question, still base their subsequent reasoning on the original and unmodified labour value theory. Would it not have been more natural to base the treatment of subsequent problems on the modified theory? The fact that the classical economists preferred to go back

on their steps and, in dealing with international trade, preferred to reason as though the simple labour value theory required no modification, certainly seems to confirm the opinion that no real modification was made. Another fact points in the same direction, namely the fact that later writers have never attempted to build up a theory of international trade on the *modified* classical value doctrine instead of on the original one.

Before showing the effects of the shortcomings of the orthodox value theory on the orthodox theory of international trade, I must point out another important defect connected with the orthodox value and distribution theory, namely, the inadequate treatment of the "laws" of increasing and diminishing return. The relation between capital and labour in production and the relative prices of different categories of labour are treated as fixed and "frozen." (It is therefore impossible ever to make a satisfactory study of the interrelated changes in the relative combination and the relative prices of these factors of production.) How far such changes in prices bring about changes in the relative combination of the various factors of production, and how far this affects the yield — these are problems which have been completely neglected by the classical economists. They limit themselves to a study of how the growth of population influences the combination of labour and capital with land. This accounts for the fact that the law of decreasing returns is regarded as principally applicable to the productivity of the soil.

The general law of varying returns which, strangely enough, has only been formulated in the present century, chiefly by American economists such as Bullock, Carver, and Clark, is based on the fact that all factors of production are in the same position with regard to the combination problem. (Changes in their combination without considerable changes in the scale of production increase the yield per unit of some factors and lessen the yield of the others.) Only in exceptional cases can the yield per unit of any one factor remain the same.

In the case of an increasing demand for a commodity, it follows from what has just been said that the price and the production cost of that commodity will probably undergo a change. (The factors required in large quantities for the production of that commodity will become more expensive. That leads to a change in the combination of factors and for that reason also the relative prices of commodities are changed.) It is a different story that certain economies of large-scale production exist and that, consequently, changes in the quantities produced affect expenses of production, irrespective of changes in factor prices. Besides, the supply of production factors is naturally influenced by changes in price, differently in different circumstances. In the case

of specially qualified labour, higher wages will cause the supply of labour to rise and this will again entail a lowering of wages. It may happen that after some time, thanks to the advantages of mass production, the commodity in question will become even cheaper than before. On the other hand, the supply of natural resources is hardly or not at all influenced by rising prices. A greater demand for such factors will, therefore, bring about an increase in the corresponding commodity prices. Thus, one is justified in assigning a special position to "land" as regards the reaction of supply towards price changes. (In order to explain the ultimate effects of a change in demand, it will be necessary in each individual case to examine the capacity of every single factor to adjust its supply to variations in price.) There is no doubt, however, that such changes in demand cause variations in the costs of production and prices of commodities.

In view of this, it is not possible to maintain that the supply of any commodity may be increased or diminished without any effect on the cost of production or on prices and subsequently to modify this statement merely in regard to the "decreasing return of land." Simplifications are undoubtedly useful in many cases, and very often necessary; they should not, however, affect the essentials of the phenomenon which is to be explained. (It is one of the essential characteristics of price formation, that a change in demand — like other primary changes — alters the relative prices of goods and production factors and that it leads to new combinations of factors and to variations in the cost of production.)

Thus, a "constant cost" with varying quantities produced, as assumed by the exponents of the orthodox value theory, may be natural from the point of view of that theory; as a general premise for the study of price movements, however, it is unfortunate. ¶

§3. *Defects of the classical value theory as a basis for a theory of international trade.* I have shown above that the assumption of the orthodox value theory, that capital and labour contribute in the same proportions to the production of all goods, is a very rough and by no means satisfactory simplification. It is at the same time of fundamental significance for the theory and it has not been replaced, later on, by other hypotheses more closely corresponding to the facts. Now, it seems obvious that, if the basis of the classical doctrine is inadequate for the study of price formation within a single market, an examination on that basis of pricing in several exchanging markets cannot be more satisfactory.

Experience has shown that certain commodities require for their production much more capital than others; further, that the interest rates differ in different countries. Consequently, the countries with a

low rate of interest can produce goods requiring relatively large amounts of capital comparatively cheaply, whereas the countries in which there is a shortage of capital, *ceteris paribus*, produce the commodities which require less capital at a relatively low cost. In other words, the latter countries produce goods which require a large amount of capital at a relatively high cost.

There is no doubt that the great differences in interest rates in the post-War years have affected production and trade in this way. In Germany, the high interest rates considerably increased the cost of all those branches of production which require much capital, whereas those branches in which wages are relatively more important have had comparatively lower expenses. This fact has, of course, been largely obscured by the disorganisation of German economic life, due to certain after-effects of the long period of inflation, such as the over-supply of fixed capital in form of buildings and machines. The same phenomenon may be observed even more clearly in the Baltic countries where rates of interest fluctuated between 15 and 30 percent during recent years. A number of industries requiring particularly large supplies of capital are still paralysed as a result of the War years, whereas other industries which require less capital have recovered fairly quickly.¹

If the interest rates of such countries fall considerably, the competitive position of their industries vis-à-vis corresponding industries abroad, and consequently international trade, are bound to be affected. This is what we are likely to observe in Germany in the next decade. The high price of capital hampers her industrial development, but it affects different industries in extremely varying degrees, being most fatal to those which require most capital. The future drop in interest rates will, therefore, influence the cost of production of different industries and the competitive position of these industries very differently. Industries requiring a large amount of capital, which, up to now, could expand neither their production nor their export, will come into a much more favourable position. Those, on the other hand, which enjoyed an extra stimulus in low wages and were not particularly affected by the high interest rates, will be worse off and less able to compete on the international market when the interest rate declines and wages rise. Their exports will decrease, or the corresponding imports increase, while imports will be checked or exports stimulated in the industries requiring much capital.

It is obvious that all factors which affect the costs of production in a country must also influence its international trade. Changes in wages

¹ It goes without saying that other factors, such as the loss of the Russian market, have, of course, potentially affected the situation in these countries.

and interest rates in opposite directions, caused by increased supplies of capital, must, therefore, have this effect. It should be observed that the classical doctrine is really unable to explain these phenomena.¹ If one assumes that capital and labour be embodied in all commodities in the same proportions, it is, of course, impossible that changes in wages and in the rate of interest should affect the *relative* prices of German goods except to the extent to which the "margin of cultivation" of land is changed. In all cases where no important change of this kind takes place, all commodities will be either cheaper or more expensive than before, but they will never be affected in different directions. There will be no change in relative prices and, consequently, none in international trade which, according to the classical doctrine, can only be affected by changes in relative prices.

This conclusion is so obviously at fault that the underlying premisses may be taken to be inadequate without further ado. It is true, however, that for some problems differences and changes in interest costs may be ignored, e.g. a reasoning in terms of output per head may be sufficient. But, this is certainly no justification for basing the central theory on such a violent simplification which, for the purpose of analysing other problems, is unsatisfactory.

The second assumption made by the classical economists is equally inadequate, namely, the assumption that different categories of labour are paid according to a fixed remuneration scale and that any day of skilled labour can be converted into so many days of unskilled labour. Suppose that in country A the workers in the last group receive as high wages as the skilled workers, whereas in country B they receive only half as much. In such a case the orthodox method would count one day of skilled labour as two days of unskilled labour in B, while, in A, skilled labour would not be given a special coefficient and all days of labour would merely be added up. The production cost of all goods would thus be expressed in terms of days of unskilled labour. The comparative costs calculated on this basis would determine international trade.

If, instead, one calculates in terms of money without giving up the classical premises, the following results are obtained: Let us suppose that country A pays each worker \$5 per day, while B pays \$3.50 to the unskilled and \$7 to the skilled workers. In such conditions, commodities requiring mainly skilled workers for their production will be

¹ Taussig (*International Trade*, pp. 65-67) makes great effort to show that the differences in the rates of interest only call for (1) modifications of the orthodox theory, (2) and that these modifications are unimportant. As may be seen from the text, I disagree with both these conclusions. I hope to publish a detailed criticism of Taussig's doctrines elsewhere.

more expensive in B than in A, while goods which are produced mostly by unskilled workers will be more expensive in A than in B.

Let us now suppose that the supply of skilled workers in B increases gradually as a result of improved education, Government measures, etc. This will gradually reduce the difference between the wages for skilled and unskilled labour; eventually the difference will disappear entirely, as it previously did in A, so that both groups of workers will receive, say \$5 per day. This change will, of course, affect certain industries fundamentally. Commodities which previously were imported into B from A, because their production demands skilled labour to a great extent, can now be produced just as cheaply in B. Goods which were previously exported from B, because their production requires mainly cheap unskilled labour, can no longer be sold at a price below their cost in A, because the wages for unskilled labour have risen.)

However much simplified this example may be — all other factors which affect production having been left out of consideration — it certainly shows that changes in the relation between the wages of different groups of workers affect the production cost of different goods differently and consequently that they influence international trade. It is no use replying that these are long-period changes and consequently of little practical importance. (In the first place, it would seem that a theory should be able to explain long- as well as short-period changes and, secondly, modern trade-union policy, which in some countries seems more and more to be approaching the closed-shop ideal, has created a great number of non-competing groups whose wages fluctuate very differently. Of course, these fluctuations affect both the cost of production and international trade.)

Can the orthodox theory explain such a development? I cannot see that a description of these phenomena is at all possible in classical terms. One is obliged first to equate one day of skilled labour in B with two days of unskilled labour and then to regard both groups as equivalent. And what is the value of an attempt to express the cost of production in terms of a purely technical unit if it obliges one not only to make economic reservations in establishing that unit, but also to modify its very meaning in accordance with varying economic phenomena? All these modifications in fact involve a complete abandonment of the orthodox standpoint. (The production cost is really if not formally calculated in terms of money and the attempt to express it in terms of technical units has actually been given up.) Would it not be simpler and more natural to make the analysis in such a way that the effect of fluctuations in the relative wages of different categories of labour on production costs and international trade is taken into account from the outset?

Modern English economists, like Keynes and Pigou, do not seem to realise that the assumption of fixed relative wages is a violent simplification, and even appear to feel no need for later modification. Pigou makes extensive use of a very curious equilibrium conception, of which one condition is that after every disturbance wages return to their old relative position.¹ In fact, however, (a) there is no reason for assuming that precisely the same position will ever return and (b) the "temporary" relative wage situation may itself be of primary interest. In my opinion, one should either deal with a whole series of "equilibria" and describe the development from one to another, or not talk about equilibria at all.²

Taussig takes the line of defence for the orthodox attitude that changes in international demand do not materially affect the relation between different classes of wages.³ The need for modification is, therefore, slight. The answer would appear to be that (a) variations in relative wages for other reasons than demand changes have to be taken into account as indicated above and (b) changes in international demand may be very potent in causing a new wage relation in *small* countries. Surely the theory of international trade should be applicable to the latter as well as to the United States and other large manufacturing nations!

The difficulty caused by the existence of non-competing groups might be avoided in still another way. One might assume, in analogy to the treatment of labour and capital, that the different categories of labour are embodied in all commodities in the same proportions.⁴ A like method would, however, be equally unsatisfactory. One could make the same criticisms here as in the case of the analogous assumption for capital and labour, namely, that it is in too blatant contradiction with the facts and cannot be regarded as a means of even preliminary approximation which might be corrected by subsequent modifications, because it "locks up" certain elements of the mechanism of price fluctuation.

The assumption of fixed relative incomes of different categories of labour has led the classical doctrine, even in its modern form, to avoid

¹ See Pigou, "Disturbances of Equilibrium in International Trade," *The Economic Journal* (September, 1929).

² Cf. Parts II-V of this volume.

³ *International Trade*, p. 56. He also asserts, which is a second line of escape, that "in occidental countries . . . as a rule the stratification of industrial groups proceeds on the same lines. And it is between these countries that the principle of comparative costs is presumably of greatest importance."

⁴ The three methods out of the orthodox dilemma are: (1) fixed relative factor prices, (2) equal relative factor prices in all countries, and (3) the factors used in the same proportions in all commodities in each country.

the important problem of the connection between international trade and income distribution. Starting from the orthodox premisses, there can be no such connection at all; for if relative wages were fixed and if capital and labour were embodied in all goods in the same proportions, an adjustment of production caused by changes in international trade, e.g. owing to new import duties, could affect neither relative wages nor the relative scarcity of labour and capital. International trade could only alter the scarcity of land in relation to capital and labour. It is interesting to note that *this* question has been discussed by many orthodox writers. Imports of overseas wheat, in the case of lower duties or costs of transport, would cause a decline in European land values as the cultivation of wheat in Europe would be reduced.

Had the classical theory of international trade been easily adaptable to the actual phenomena, in other words, had its conclusions been mere approximations which could be modified subsequently, then the neo-classical theory would hardly have neglected such an important problem as the influence of international trade variations on the distribution of income in general. After all, it is self-evident that in a given country a change in the trend of production, caused by international trade, will reduce the demand for those factors that were previously required in relatively large quantities for the production of goods which are now imported. On the other hand, there will be a rise in demand for factors specially required for the production of export goods when industries have to satisfy demand abroad in addition to the home demand. In other words, the demand for production factors is entirely different in the case of an international distribution of production from what it is when each individual country has to produce everything at home. (The scarcity of production factors and the distribution of income must consequently be different too.)

The fact that the influence of international trade on the distribution of income is overlooked, is closely connected with the unfortunate assumption that the cost of production, measured in terms of quantities of labour, does not vary with the amount of goods produced. Thus, the cost of production expressed in money would only vary with varying wages. An increased foreign demand would merely cause a rise of the wage level and would not otherwise affect prices. There would be no objection to this argument had it been used provisionally to eliminate the difficulties presented by the advantages of large-scale production;

¹ The only exception I know of is Taussig, who seems to feel that an analysis of this question fits in badly with the orthodox doctrine in general and, as already observed, gets out of the difficulty by assuming that this influence is small and need only be mentioned in passing. This attitude probably explains why the influence of "restricted competition labour groups" on the terms of trade and its bearing on the "gain" from protection has been neglected. See p. 302 above.

in other words, had it been assumed for reasons of simplification that small-scale production is just as profitable as large-scale production. It is, however, quite obvious that an increase in foreign demand must affect the relative scarcity of the production factors in a country in favour of those which are used more especially in the export industries. This entails changes in the economic combination of production factors in all industries. Consequently, not only the prices of export goods, but very probably also all other commodity prices, will undergo greater or less change, but in different degrees and in different directions and not, as the orthodox theory maintains, in the same degree and in the same direction. The classical economists make a single exception where land is involved to a considerable degree, since, as already mentioned, they do take account of changes in the relative scarcity of this factor as compared with labour.

It should be quite clearly understood that — as explained in §2 — changes in the quantities of goods produced in a country will normally affect the relative prices of production factors and commodities in such a way as to raise, at all events in the beginning, the prices of the goods for which demand has risen as compared with the prices of all other commodities. Undoubtedly other forces will soon work in the opposite direction, since the supply of production factors is also affected by changes in prices. If, for instance, the wages for certain groups of workers rise, the supply of this kind of labour will increase and a tendency towards a decline of wages and prices will thus be set in motion. The subsequent price movements are, consequently, uncertain and depend on the circumstances of each individual case. Not only the different relative scarcity of the production factors, but also the fact that large-scale production has certain advantages over small-scale production is of importance in this connection. As a result of the latter, prices will often tend to fall when the quantity produced increases. This is, however, not always the case. It holds good only in cases where the industry concerned has not already reached its optimum extent of production, or an improved utilisation of production capacity is still possible. The first condition cannot be regarded as being usually present; and one rarely finds the second over a long period. One must inquire, in each case, how relative factor prices are affected and which rôle the economies of large-scale and of fuller utilisation of capacity play, at different times, if one is to explain the price development.

Thus, the problem of the effects of international trade fluctuations and of changes in the quantities of goods produced on the expenses of production, expressed in money, has not been satisfactorily analysed by the classical doctrine.

§4. *Other defects in the classical theory of international trade.* In §3 I have dealt with those defects in the classical doctrine which seem to be inherent in the general orthodox value theory. These defects vitiate the study of price movements both in a single market and in international trade. I will now deal with other defects which more or less result from the orthodox method. It might be possible in certain cases to rectify these defects, while still maintaining the fundamental ideas of the classical method; nevertheless they are closely connected with those fundamental ideas.

If one tries by means of the orthodox theory to explain why a given country is able to export a certain commodity to other countries, one is led to adopt a very unreal line of reasoning. The simple, straightforward course is, naturally, to take a complete cost account in the different countries for the commodity in question and to examine to what extent the cheapness of production in one country is due to low wage expenses, low interest expenses, low transportation expenses, etc. Then the next step is to go behind these cost items and examine their relation to the quantity of labour employed, the wage level, the quantity of capital employed, the interest level, etc.; in other words, the relations of the cost items to the price system in each country. The orthodox theory does not permit such a simple procedure. First the data must be used to calculate output per manual worker and then the result must be compared with the wage figures in the various countries. In many cases it is then found that the comparative cost table obtained is misleading, as other cost items besides wages differ from one country to another. Then these differences are introduced as "modifications." In other words, one considers first the wage item alone in a somewhat artificial manner, namely by comparing the output of labour per day with the wage, leaving other cost items for later consideration.¹

The question arises: if these other cost items play a significant part in the determination of the conditions of competition — as they certainly do in many cases — why ignore them in the first instance and make elaborate calculations in terms of output per days of labour² when one is obliged to modify the conclusions immediately afterwards by taking account of those items? Had the comparative cost figures been easily obtainable, they might have been used in the absence of more complete figures. In fact, however, the ordinary cost accounts are much easier to get, especially in all industries where several com-

¹ As a matter of fact they are often left out altogether. Even in Taussig's presentation they are unimportant guests invited to come later, with very little right to be present.

² Only *current* labour is considered, not past labour.

modities are produced and in different proportions. In an analysis of the coal industry, comparative cost reasoning may be useful, as little harm is done in neglecting other cost items than wages; but what about the dye-stuffs and machinery industries, for example?

Let me now turn to a different question: As is well known, the variations in international trade due to changes in demand, technique, etc. are treated as though the only subject for examination was their effect on the exchange relation between the prices of imported and exported goods. Which country derives the greater benefit from a change in that relation? This question can be regarded as the main problem of the classical theory of international trade.

This attitude is quite natural. Mill starts his discussion of international values by pointing out that only the relative value of commodities produced not far from one another can be determined by cost. It is to be gathered from the context that he is not thinking of geographical distance, but of districts between which factors of production do not move. He regards the different countries as such districts. The value of goods imported into England is not determined by the number of days of labour employed abroad, but (*a*) by the quantity of English goods which go to pay for them and (*b*) by the number of days of labour required to produce those English goods. The last point contains no difficulty. It is only necessary to analyse the first, i.e. the terms of exchange in international trade, as a supplement to the ordinary value theory.

It stands to reason that the mutual interdependence which, according to the modern theory, characterises the price system, does not permit such a procedure. The changes in international trade are not sufficiently explained by an examination of the changes in the terms of exchange only. As already mentioned, changes in foreign demand will change the relative scarcity of production factors at home and thus affect the production and prices even of such commodities as are not subject to international exchange. In analysing the rôle of international trade and tracing its various effects, one should, therefore, examine all aspects of pricing. Even the special question of the advantages of international trade is inadequately dealt with, if one limits the examination to the import and export goods only. (The "advantage" of international trade must consist in this: that it changes the whole economic life and enables wants to be better satisfied than in a state of isolation.)

Another weak point in the orthodox theory is that it usually reasons on the basis of two kinds of commodities only and for only two different countries. This is indeed a simplification; but it is a very dangerous simplification which leads to unwarranted conclusions. The most

important of them is that, when two countries, hitherto isolated, come into contact, the comparative costs, measured in terms of days of labour, determine which goods will be subject to export and import. This is the case treated by Ricardo in his well-known example of the trade between England and Portugal. (As soon as three or more commodities are considered, one must, however, take account of the demand conditions also in order to determine not only the terms of exchange, but also which goods each country is to export.) I will explain this more fully by taking a very simple case along classical lines which, however, refers to three different commodities, A, B, and C. These commodities are produced in two countries, Germany and England, at a cost as shown in the table below. The production cost has been expressed in money by assuming — for reasons of simplification — equal wages of \$5 per day in both countries.

	(A)	B	C
England (wage rate: \$5)	8 days of labour = \$40	7½ days of labour = \$37½	5 days of labour = \$25
Germany (wage rate: \$5)	9 days of labour = \$45	7 days of labour = \$35	4 days of labour = \$20

In this case the conditions of equilibrium demand that England should export A and import B and C from Germany.

Now, let us suppose that the demand for C increases considerably in both countries, while the demand for A and B decreases. According to the classical reasoning, the result would be an export surplus for Germany causing an import of English gold and thereby a fall in the English price level and a rise in that of Germany. The wage levels in both countries are also subject to changes. Let us suppose that the wages in England sink to \$4.50, while in Germany they rise to \$5.50. What is the result? The following table will answer the question.

	A	B	C
England (wage rate: \$4.50)	8 days of labour = \$36	7½ days of labour = \$33.75	5 days of labour = \$22.50
Germany (wage rate: \$5.50)	9 days of labour = \$49.50	7 days of labour = \$37.50	4 days of labour = \$22

Germany's cost of production for B now exceeds that of England and she will no longer be able to export this commodity. She will import both B and A and export only C. Since the demand for C has

¹ See F. Graham, "The Theory of International Values Re-examined." *The Quarterly Journal of Economics* (Cambridge, Mass.), Vol. XXXVIII (1923-24), pp. 54 ff. This fact has been stressed first by Mangoldt, later by Marshall and Edgeworth. See next page.

increased in England and Germany's demand for A has decreased, a trade equilibrium of this sort is possible.

This highly simplified example shows that, even if one starts from constant comparative costs measured in terms of days of labour, a change in demand can create such changes in international trade that commodities hitherto exported are now imported. (International trade does in fact not only depend on comparative cost, i.e. on supply, but also on conditions of demand.¹) The conditions of equilibrium cannot be expressed in terms of technical units as they are purely economic. The condition of the existence of equilibrium is that the value of imports equals the value of exports. One must bear in mind that we have excluded all other international transactions except the exchange of goods. It is only in measuring the value of imports and exports in terms of money that one can take account of the circumstances that determine international trade.²

The following is a simple way of demonstrating in classical terms how the conditions of demand determine which commodities are exported and which imported: make out a table of the number of days of labour required in country B to produce the quantities of the different commodities (a, b, c, etc.) which can be produced in country A by 100 days of labour. The comparative cost table then becomes:

	A	B
a	100	k_1
b	100	k_2
c	100	k_3
d	100	k_4
e	100	k_5
.....
.....

If the commodities are arranged in such an order that the series $k_1 k_2 k_3 \dots$ is rising, then country B has a comparative advantage in the production of the goods at the top of the table. In accordance with the conditions of demand the goods are divided by a horizontal line into two groups; B exports the goods in the upper group, A those in the lower one. B has a comparative advantage with regard to the former, A with regard to the latter. Note, however, that any horizontal line establishes two groups of which this last thing is true, even

¹ See Mangoldt, *Grundriss der Volkswirtschaftslehre* (1863), Marshall, *Money, Credit, and Commerce* (1923), Appendix H, and Edgeworth, *Papers Relating to Political Economy*, Vol. II (1925).

² "All demand is demand at a price, and, in theory as in practice, money is the best measure of price." Therefore, "the principle of reciprocal demand seems also to require, for adequate presentation, the conception of price." Nicholson, *Principles of Economics*, p. 299.

though B may import certain goods belonging to the "comparative-advantage-group" or may export goods belonging to the "comparative-disadvantage-group." The position of the line which separates import goods from export goods is determined by the condition that the value of imports must equal that of exports. Hence the comparative cost reasoning alone explains very little about international trade. It is indeed nothing more than an abbreviated account of the conditions of supply.¹ (It is only when the conditions of demand and of equilibrium are also considered, that one is able to describe what happens.)

It is all very well to say that it is easy to take these demand conditions into account and thus discover which goods will be exported. In fact, however, it is very difficult to do so when many commodities and many countries are considered.² For this reason, orthodox economists have usually confined their analysis to two countries and two or three commodities. They have, however, not hesitated to apply to concrete problems the conclusions arising from such an analysis — a thoroughly dangerous procedure. (Be this as it may, one thing is obvious, the simplicity and clarity of the orthodox theory is reached at the expense of a close consideration of the demand conditions. When they have to be analysed under the assumptions of more than two commodities and countries this theory proves a clumsy tool.)

In this connection, it should also be observed that a comparative cost table tells very little about supply conditions for the simple reason that it is impossible to study supply without introducing demand. The conditions of supply cannot be described in technical terms, irrespective of those of demand. This must be proved below in some detail. In the first place, the cost of producing a commodity depends upon the scale of production. This is not so serious, as a series of cost figures for each commodity — varying with the quantity to be produced — can be inserted in the comparative cost table. Greater difficulties arise in view of the fact that in many cases the process of producing a commodity is divided between several countries. The orthodox theory has, as far as I know, always assumed the contrary, and this, it would appear, for a very good reason — the impossibility of explaining such cases. This will be most clearly seen from an example.

¹ It is often suggested that Ricardo left the theory there and that Mill added the equilibrium analysis through his equation of reciprocal demand. As a matter of fact, however, Ricardo (*Principles*, §§ 51–52, ed. Gonner) presented a penetrating analysis of international price relations, where this equation is really tacitly assumed to exist. There is nothing in this analysis which cannot be easily fitted into a mutual interdependence theory.

² Cf. Graham, "Some Aspects of Protection Further Considered," *Quarterly Journal of Economics*, Vol. XXXVII, pp. 199 ff.

Assume that both Sweden and Estonia manufacture cotton cloth. A given quantity of this cloth is produced in Estonia by a given number of workers. The fact that the production takes time is left out of account. We therefore omit any consideration of the capital aspects; nor do we pay any attention to the differences in the wages of the various groups of workers. It would be possible to argue from these premisses — on classical lines — that the production of 1000 meters of cloth of a given quality requires such and such a number of days of labour. These days would, of course, include not only textile labour proper, but also transport and office work, the labour employed in producing the raw cotton, the machines, etc. The same calculation could be made for Sweden, and a comparison according to the classical method could be made.

It has so far been assumed that all the production factors required are available in the country. If, however, the machines are imported from England or Germany (as is usually the case), not only a certain number of Estonian or Swedish workers, as the case may be, but also a number of English or German workers are required for the production of those 1000 meters of cloth. In that case, is a comparison between the relative costs still possible? Artificial assumptions might make it so, if the technique of production is identical in Estonia and in Sweden. If, however, the considerably higher wages in Sweden lead to the use of more, and more expensive, machines per worker than in Estonia, I see no possibility of such a comparison being made. The same quantity of cloth, if produced in Estonia, would require a hundred Estonian and ten German days of labour (the latter in machine industries), and if produced in Sweden, fifty Swedish and twenty German days. Would a comparison on such grounds be of any value? Could one, in such a case, say that the comparative costs determine international trade? If the difference in the rate of interest is introduced, a further difficulty arises: The depreciation costs of capital goods in the two countries become different. In other words, one cannot say how much "embodied" German labour is used up each year in each country, unless the difference in the interest level is considered.

There remains for the orthodox doctrine only one way of escape,¹ namely, to consider the quantity of labour used for the production of the goods exported to pay for the imported machinery (this to represent the cost of this machinery to Sweden and Estonia) and to add it to the quantity of textile labour employed.² This procedure does not per-

¹ This way has been pointed out to me by Professor Taussig in private correspondence.

² The difficulty arising from depreciation remains. Strictly speaking, however, this belongs to the same group of difficulties as the differences in interest expenses, dealt with in the beginning of this Appendix.

mit the comparative cost conditions to be described until the terms of exchange in international trade are known, the thing which I had to prove. Further, as it is impossible to regard certain individual Swedish or Estonian export goods as exported to pay for the machinery, one has to consider the whole of the international trade of these countries in order to discover the terms of exchange. It is most improbable that either Sweden or Estonia export to Germany the same value of goods as they import from her. How, then, is one to know on what terms one day of Swedish labour is exchanged for German labour? How is one to know how many days of Swedish labour have been used to pay for a machine which embodies 100 days of German labour? The only possible method is to examine how much Swedish labour is used in producing export goods sold abroad for the same sum of money that has been paid for the German machines. The reasoning in terms of days of labour would appear to have failed and an analysis in monetary terms is necessary.

The unpractical reasoning of the orthodox method may also be demonstrated by introducing the costs of transport. The cost tables do not say whether the price difference between two countries for a certain commodity is sufficient to make it flow in spite of the cost of transport. If the transportation is done by a third country, the quantity of labour embodied in goods exported to pay for this transportation must be included in the cost table and different figures of transportation costs in terms of days of labour must be tabulated for each possible export market. In my opinion, the scanty attention given to the question of international — and domestic — transfer relations¹ indicates that it does not easily lend itself to treatment along orthodox lines.

As we begin to make more concrete assumptions than those commonly employed by the classical economists, it becomes evident that a mutual interdependence theory is necessary which can only with the greatest difficulty be expressed in terms of days of labour. As a matter of fact, one gets nowhere except with the assistance of a supplementary process of reasoning in money terms. Why not adopt as a basis the conception of mutual interdependence and conduct our reasoning in terms of money? This procedure does not in the least preclude a later consideration of effort and sacrifice and other factors which contribute to the formation of prices. (Such considerations take the form of an analysis of the supply functions of the various productive factors.)

I shall pass over the difficulties which one would encounter in analysing such questions as dumping in terms of days of labour instead of

¹ See Parts III-IV in the text.

money. Nor shall I touch upon the orthodox treatment of international price relations, as this question has been briefly discussed in the text.

I should like, however, finally to mention two defects in the orthodox doctrine which are of a different nature: first, (the unsatisfactory analysis of the movements of the factors of production.) As is well known, the orthodox theory is based upon the assumption that international mobility of capital and labour is practically non-existent. One is, therefore, not a little surprised to find a chapter in Bastable¹ dealing with the international movements of capital, without a single word being said to explain how far these movements affect the fundamental arguments of the foregoing chapters. Several Harvard economists, under the lead of Professor Taussig, have done excellent work in explaining the nature and the effects of international capital movements. They have, however, not analysed the question of whether and to what extent these capital movements necessitate a modification of the theory built on the assumption of the immobility of capital as between countries. In this volume I have made an attempt to do so, i.e. to throw some light on the relation between movements of commodities and production factors.

I must add, secondly, (that the labour value reasoning had led to an over-emphasis of wage variations and to a neglect of other income changes, in discussing the *mechanism* of international trade variations and capital movements.)

While the importance of the existence of international factor mobility in connection with the theory of international trade does not seem to have been sufficiently appreciated, the assumption of free inland movements errs in the opposite direction. The mobility of capital and labour within individual countries is by no means as complete as assumed by orthodox economists. This part of their theory needs to be completed in view of the division of countries into more or less sharply divided regions and a lack of mobility in general. International trade should be regarded as a special case within the general concept of inter-regional, or perhaps rather inter-local trade. It is only thus that one can claim to have sufficiently elucidated the geographical or territorial element in price formation.

The theory of international trade is nothing but *internationale Standortlehre*. The fact that nobody has attempted to construct a theory of domestic localisation in comparative cost terms would seem

¹ C. F. Bastable, *The Theory of International Trade*. With some of its applications to economic policy. 4th ed. London, 1903.

² *Viz.* Keynes, *A Treatise on Money*, Bk. IV. 1930.

to suggest that a uniform treatment of the whole localisation problem along classical lines would be very difficult.

The classical theory of international trade has been able to clear up a great many problems. To a large extent the contents of this volume are only a re-statement, in a different form, of the orthodox analysis. Even a defective tool may yield great results when employed by a master hand. When applying the classical doctrine, every good economist tacitly makes all sorts of modifications, which enable him to arrive at a fairly correct impression of what is happening. In this, however, I cannot find sufficient reason for not attempting to build up a theory, in the framework of which the circumstances necessitating "modifications" are duly considered. When studying concrete cases, economists sometimes use such expressions as "comparative advantage in the production of these goods" in a loose way, including all sorts of natural advantages, cheap capital, etc., and not in the least thinking in terms of the "effectiveness of labour." This seems to show the need of a theory in terms of money costs. Certainly both to business men and to economic geographers such an approach is more natural than that of the labour value theory.

It is sometimes objected by the defendants of the classical theory that when we come to decide about economic policy it is necessary to consider such things as "real cost" and the circumstances which lie behind it. Hence, only an analysis in terms of real costs, not in terms of money costs, can be used as basis for action. To this it has to be answered that it suffices to consider "effort and sacrifice" and such matters when the theory has to be applied to problems of economic policy. To mix viewpoints which are tinged with normative considerations with the objective analysis cannot contribute to clarity. Further, there are many other things than those involved in the real cost reasoning which have to be considered, e.g. the distribution of income and social and political goals in general. It seems best to consider all these things, e.g. the "desirability" of free trade or protection, under a special heading and not in the objective theory. If a formal income concept is used as in this book, such a theory can, however, describe certain changes in the size and distribution of income which are of interest from the point of view of many different political standards. If, as some writers suggest, real costs are as a rule proportional to money costs, there is every reason for building up the theory in terms of the latter, thus avoiding many difficulties, and then "translating" the conclusions into real cost terms, when questions of economic policy are discussed. If, on the other hand, real costs are not proportional to money costs, it is difficult to believe that the former concept is a practical tool for the study of trade and price problems.

APPENDIX IV

PRICE STATISTICS

TABLE I

THE PRICE DEVELOPMENT IN U. S. A., ENGLAND, FRANCE, AND GERMANY
1890-1910¹

(Base period 1890-92)

Year	U. S. A.	England	U. S. A.	France	U. S. A.	Germany
1890	102	101	102	103	102	103
1891	103	102	102	101	104	102
1892	94	97	96	96	94	94
1893	94	95	93	97	93	91
1894	86	87	84	90	82	83
1895	84	87	83	87	82	83
1896	75	85	78	85	77	83
1897	77	86	79	87	79	85
1898	84	90	84	91	85	91
1899	92	97	94	99	85	97
1900	99	109	99	106	100	102
1901	99	100	98	99	98	98
1902	106	98	101	97	104	97
1903	101	98	101	100	104	97
1904	100	99	102	99	104	96
1905	102	103	105	102	108	103
1906	108	110	109	112	111	112
1907	114	115	116	118	120	117
1908	109	105	109	106	113	110
1909	115	106	115	109	117	109
1910	120	112	122	119	119	112

¹ Mitchell, *International Price Comparisons*, Department of Commerce (Washington, 1919), p. 13. Each couple of indices comprises the same commodities. On the other hand the three American indices comprise slightly different groups of commodities.

TABLE II

THE PRICE DEVELOPMENT IN SWEDEN, GERMANY, AND ENGLAND
1881-1912¹

(Base period 1861-70)

Year	Sweden	Germany	England
1881-87	82	82	77
1888-92	81	85	71
1893-1905	79	79	67
1906-12	92	98	78

¹ The figures used for the computations are to be found in *Kommercielle Meddelanden* (1921), p. 1266.

TABLE III
THE PRICE DEVELOPMENT IN CERTAIN COUNTRIES 1860-1913
(Base period 1871-77)

År	Sverige ¹ (Åmarkt)	Tyskland ¹ (Schmitz)	England ¹ (Sauerbeck)	Österrike-Ungern ² (Bela von Jancovitz)	Australien ² (Knibbs ³)	Nya Zeeland ² (McIlraith)	År	Sverige ¹ (Åmarkt)	Tyskland ¹ (Schmitz)	England ¹ (Sauerbeck)	Österrike-Ungern ² (Bela von Jancovitz)	Australien ² (Knibbs ³)	Nya Zeeland ² (McIlraith)
1860	99	95	99	..	..	..	1890	82	86	72	79	79	67
1861	97	94	98	..	..	116	1891	82	84	72	79	71	68
1862	103	97	101	..	..	117	1892	77	77	68	73	69	65
1863	103	98	103	..	..	122	1893	75	74	68	72	63	63
1864	108	100	105	..	..	123	1894	71	67	63	64	56	62
1865	103	94	101	..	..	119	1895	70	67	62	70	57	58
1866	97	96	102	..	..	126	1896	71	67	61	70	69	60
1867	97	97	100	99	..	118	1897	73	69	62	71	69	61
1868	95	96	99	99	..	116	1898	69	73	64	75	67	61
1869	93	96	98	96	..	103	1899	81	79	68	76	60	63
1870	92	94	96	97	..	97	1900	85	85	75	82	67	64
1871	95	99	100	103	92	94	1901	82	80	70	80	73	62
1872	106	109	109	112	100	97	1902	81	80	69	78	78	63
1873	114	114	111	110	108	103	1903	81	81	69	80	78	63
1874	107	105	102	105	104	101	1904	82	80	70	82	66	60
1875	102	98	96	96	100	93	1905	83	83	72	85	68	62
1876	97	96	95	92	101	88	1906	88	90	77	91	71	64
1877	99	96	94	95	98	91	1907	92	96	80	95	76	67
1878	88	89	87	88	91	85	1908	88	91	73	91	83	65
1879	87	81	83	86	90	80	1909	89	90	74	94	74	64
1880	92	90	88	89	83	82	1910	92	91	78	..	75	65
1881	89	88	85	87	84	79	1911	94	95	80	..	75	..
1882	88	85	84	85	96	77	1812	98	105	85	..	87	..
1883	86	83	82	84	88	74	1913	100	..	85	..	..	..
1884	82	80	76	82	84	72							
1885	79	75	72	76	82	70							
1886	75	71	69	72	81	68							
1887	72	73	68	72	79	65							
1888	80	77	70	73	80	65							
1889	80	81	72	76	87	70							

¹ *Kommersiella Meddelanden* (1921), p. 1266.

² *Bulletin de l'Institut International de Statistique*. Vol. 19, Part III, p. 156. For the period 1867-96 the index numbers are calculated on a gold basis through a multiplication of the actual figures by the gold value of the paper money.

³ *Index Numbers of Wholesale Prices in the United States and Foreign Countries*. Bulletin of the U. S. Bureau of Labor Statistics, No. 173, 1915, pp. 165, 300.

⁴ Base period 1871-77.

TABLE IV
THE PRICE DEVELOPMENT IN CERTAIN COUNTRIES 1890-1910
(Base period 1890)

Year	Denmark ¹ (Koetoeft)	Japan ² (Hanabusa)	Russia ³ (Handelsdep.)	India ⁴ (Atkinson)
1890	100	100	100	..
1891	103	91	99	..
1892	93	105	97	..
1893	93	114	100	..
1894	87	107	92	..
1895	85	117	88	..
1896	86	112	87	..
1897	88	122	90	..
1898	92	128	97	100
1899	96	157	101	96
1900	101	147	107	114
1901	98	131	110	111
1902	100	142	105	102
1903	96	153	102	98
1904	99	147	106	96
1905	101	162	110	107
1906	105	168	119	125
1907	108	183	126	133
1908	103	149	120	143
1909	106	144	122	..
1910	111	..	123	..

¹ *Bulletin de l'Institut International de Statistique*, Vol. 19, del. III, p. 219.

² *Ibid.*, pp. 241 ff.

³ *Index Numbers of Wholesale Prices in the United States and Foreign Countries*. Bulletin of the U. S. Bureau of Labor Statistics, No. 173, 1915, p. 309. For the years 1890-95 the index numbers are calculated on a gold basis in the same manner as in Table IV.

⁴ *Ibid.*, p. 282. The base is the year 1868. Before that year the external value of the rupee was rapidly falling.

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