

# AN ESSAY ON TRADE AND TRANSFORMATION

BY

STAFFAN BURENSTAM LINDER

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In order to clarify matters relating to trade theory for myself,  
I have sometimes tried to expound them to my wife.  
As she has had evening walks destroyed by tedious expositions  
of the “dismal science” and as she has cheerfully endured  
other hardships on my academic path  
I dedicate this book

*To Thérèse-Marie*





## PREFACE

Trade theorists have come to discuss the effects of trade on welfare and economic structure in terms of a comparison between a hypothetical pre-trade situation and the situation which emerges when trade has been opened up and the factors of production have been *reallocated*. In this study we have tried to go beyond the reallocation approach. Our ambition has been to follow *processes of economic change through time* under the impact of trade. We have distinguished between the effects of trade on underdeveloped countries, on the one hand, and on growth countries, on the other hand.

In order to discuss the effects of trade more in detail within this general framework, it is essential to determine which forces dictate the pattern of international, or interregional, specialization. In doing this, trade theorists generally concentrate on differences in the supply of factors of production. In our analysis of the processes of transformation under trade, we have used a different explanation of the pattern of trade. What we have done is to stress the importance of *differences in production functions*—differences which, in their turn, are generated by international differences in demand for the various tradable products.

The guiding principle has been to suggest a variety of new approaches and ideas rather than to carry out a comprehensive investigation of all the aspects of the problems raised. Thus, we have called the present study “An Essay on Trade and Transformation”.

This Essay has been written over a three-year period, half of which has been spent in the United States. I there had occasion to visit the Massachusetts Institute of Technology, the University of California (Berkeley), and Yale University. I wish to express my sincere thanks to these institutions for all the hospitality I received as a visitor.

In the United States I made valuable contacts with many economists who were kind enough to discuss and criticize my ideas. I am particularly grateful to Professor Charles P. Kindleberger of MIT for his incessant encouragement and help. Professor Richard E. Caves of the University of California (Berkeley) worked through a very preliminary

version of this study. His sharp and constructive criticism I found most salutary.

Among others who have offered their advice and help I want to mention Professors Haberler, Brems, Eckaus, Hagen, Hirschman, Leibenstein, Letiche, G. Ohlin, Sohmen, and Jaksch.

Over the past year this study has been discussed on a number of occasions in the Thesis Seminar of the Stockholm School of Economics. Professors Ohlin, Dahmén, Bentzel and Metelius have participated in these seminar meetings. It goes without saying that the scrutiny to which they have exposed my ideas and the presentation thereof has been invaluable to me. As concerns Professor Dahmén, his participation in this seminar is only one of many ways in which he has, from the very beginning, encouraged and supported my work on this study. Among other members of the Thesis Seminar could be mentioned Messrs. Thalberg, Södersten, Palmstierna, Bouveng and Ståhl all of whom have offered helpful comments and enlivened the discussions.

My work on this study has been greatly facilitated by the understanding and extremely generous attitude taken by my employer, the Stockholms Enskilda Bank. I have received a scholarship from the Stockholm School of Economics and a grant from the Swedish Social Science Research Council. For these I want to express my gratitude.

Among those who have helped me in editing this study I want to mention Mr. Paul Huber, a post-graduate student at Yale whom I have often consulted during my work and who has read the final version of my manuscript and suggested a great number of corrections and improvements. Mr. David Lones has taken the great trouble of correcting my defective English. Last-minute changes in the manuscript will have to explain whatever linguistic blemishes nonetheless plague the text. Mrs. Kerstin Johanson has checked all quotations and literature references, assembled the bibliography and assisted in a number of other ways. Mr. Staffan Lundquist, a statistician of the University of Stockholm, has gone through the empirical excursus to Chapter III. Mr. Bengt Berg has drawn the figures and diagrams. Finally, Miss Brita Modin has typed, retyped and re-retyped all the various versions of the manuscript, the final version of which has now been "frozen in the stage of production", although I shall probably soon wish that I were in a position to make further alterations.

Stockholm, March 1961.

*S. B. L.*

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# I. THE THEORY OF INTERNATIONAL TRADE. A CRITICAL REVIEW AND CONSTRUCTIVE HYPOTHESES

The theory of international trade can be divided into three distinguishable but interrelated parts: welfare theory, the theory of international trade and economic structure, and the balance of payments theory.

This study will deal only with the welfare and structural aspects of international trade.

Welfare economics is that branch of economic science which attempts to evaluate economic policies on the basis of widely acceptable, postulated, or given criteria of what is to the general benefit. Thus, the welfare aspects of foreign trade theory deal with the whole field of commercial policies. Questions of a basic nature, such as "trade or no trade" and "free trade or protectionism" constitute welfare problems, the discussion of which has attracted much energy and theoretical elegance. The study of economic structure comprises the international determination, in general equilibrium and over time in dynamic processes, of product and factor prices, quantities of factors supplied and of products produced, traded and consumed.

The analysis of the welfare and structural aspects of the theory of international trade has been concentrated on the effects of the opening-up of trade under the assumption of given resources of factors of production. The effects of changes in factor prices on factor totals—usually assuming a positively-sloped supply curve—have been joined on to the pure reallocation analysis.

The more essential task of studying, under suitable assumptions, the impact of trade on the processes of growth and stagnation receives scant attention. This state of affairs is in contrast to the formulation of trade theory as first outlined by its great master, Adam Smith. Smith originally suggested that the growth of the economy and the improvement of allocative efficiency were the two consequences of international trade on which an analysis of trade problems should be based.

But, at least since Mill, interest gradually drifted away from the study of changes in factor totals, and the effects of such changes, over to an analysis of allocative effects. In this respect, the theoretical development in trade theory was typical of the trend in general economics.

This neglect of trade-induced changes in the quanta of factors of production has limited the scope of both structural analysis and welfare conclusions. The reallocation approach has resulted in a number of what might best be called "over-done formalizations" at the expense of other more crucial questions. Details which, in reality, are eliminated by more important but assumed-away relationships have provided material for ceaseless theoretical arguments. Confusion as to the significance of trade theory has arisen out of this indifference to certain important aspects of trade theory. The reallocation analysis has not provided proper guidance in explaining reality.

Current trade theory *both understates and overstates the gains from trade*. There is no contradiction in this statement. Trade may very well affect different countries differently. It is only in current theory that the effects of trade on economic structure and welfare are declared to be principally the same for all countries. This model would in applied economics have to be used for all countries, irrespective of essential institutional differences, to account for the effects of trade.

The automatism in the realization of gains from trade, which is typical of current theory, is a theoretical simplification built on certain institutional conditions characteristic of the countries in which economics as a science has been developed. To postulate response to profit opportunities (or ideal planning)—which is necessary to be able to discuss the reallocation of resources—is highly arbitrary for a number of countries presently participating in international trade. Lack of reallocative ability<sup>1</sup> might exclude any reallocation gains from trade. Even if gains from a reallocation of *consumption* according to the new price relationships can always be had—as seems probable in all kinds of countries—these gains may be smaller than the losses caused by the inability to reallocate resources. Such losses may arise if the original allocation of resources cannot be reconciled with the full utilization of resources when trade is opened up. The present gains from trade analysis might thus be utterly irrelevant for these countries, with a new engine of inquiry being needed to cover the complex effects of trade on such countries.

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<sup>1</sup> For simplicity, we shall often speak of "reallocative ability (inability)" as meaning the ability (inability) to reallocate *resources* as distinguished from *consumption*.

With respect to countries which *do* have reallocative ability in the form of response to profit opportunities, an analysis of the reallocation gains is only a beginning. A country with entrepreneurial response to profit opportunities is likely to be passing through a process of economic growth. It is somewhat inconsequential to assume (by implication) that a country is passing through a growth process and to neglect the effects of trade on this growth process. A mere compounding of the reallocation gains at the pre-trade growth rate of the economy will over time produce increasing and larger gains than what in traditional models are referred to as the gains from trade. If the opening-up of trade also changes the *rate* of growth, the effects of trade will, of course, be still greater. It is evident that not only the gains but also the structural changes arising from the opening-up of trade will be much bigger if looked upon in a growth context than they are in conventional reallocation models.

The conclusion we draw for the continuation of our discussion is that trade can have significantly different effects on different countries. It is our contention that we need *two alternative models* to strike a favorable bargain between theoretical simplicity and practical relevance. In the one model we shall follow the impact of trade on a country, the institutions of which effectively inhibit growth. This absence of growth capacity implies a lack of reallocative capacity, too. In the other model we shall study the structural and welfare effects of trade on a country going through a process of economic growth. The first model of what we shall call "u-countries"—i.e., countries supposedly bearing some similarity to the underdeveloped countries of the present-day world—represents a break with currently accepted trade models. Under the set of assumptions which will be selected for this model, we shall find that the gains from trade are significantly lower than in current theory. This, of course, also implies different results with respect to structural developments. The second model of what we shall call "growth countries" is basically an extension of the current reallocation models. Whereas the reallocation models have little significance for the analysis of the consequences of trade in u-countries, they will be a most important stepping-stone in the analysis of the effects of trade in growth countries. The model of growth countries constitutes an attempt to analyze the implications of the reallocation gains on a growth process. Looked upon in this fashion, the gains from trade and the structural changes will appear to be bigger than they do in current theory.

The distinction between the two groups of countries is based on the

ability and lack of ability, respectively, to reallocate resources. Such a distinction is by no means easy to apply in reality. The fundamental notions of having or lacking reallocative ability are relative, and so will be any distinction which is based upon them. However, a simplified theoretical analysis of the extreme cases—which most countries might actually be experiencing—could throw some light on the more complex, practical cases in between.

Our two models will be shaped in dynamic form. The current reallocation models have been constructed in terms of comparative statics. The welfare implications of, and the structural changes during, the period of adjustment to the *new equilibrium* in the reallocation models are certainly not unimportant. Nonetheless, it is probably possible to argue that, with the double assumptions of given resources and reallocation, it is the new equilibrium which attracts interest rather than the changes during the period of adjustment as such. In our model of u-countries we shall drop the reallocation assumption. As will be seen, this will make it impossible to retain the assumption of given quantities of factors, too. Under the circumstances which we presume to be prevailing, the *adjustment period* rather than the new equilibrium is of interest. We shall see that a careless empirical study of only the new equilibrium and its macro-economic categories might indicate that the conclusions of current theory are, on the whole, relevant even for countries resembling our hypothetical u-countries. But such inferences would be premature. A study of the changes occurring in the quanta of factors during the adaptation phase is necessary to distinguish the sequences and equilibria of our model from those implied in the comparative statics of conventional models. An analysis through time will thus prove necessary.

In our model of growth countries the adjustment period or reallocation process is analyzed no more than in current models. However, we wish to study the effects of trade on the growth process through which a country is passing. For this reason dynamic analysis is necessary. To avoid the complications of inserting the reallocation phase into a dynamic framework, too, it is formally possible in this model to assume that reallocation takes place instantaneously. In determining what the immediate new equilibrium situation looks like, we draw on the traditional reallocation analysis.

In the one model, we thus follow an adjustment period initiated by a disturbance—the opening-up of trade. In the other model, we study an equilibrium over time and do not analyze dynamically the adjustment



process which takes place after the opening-up of trade. Analytically, the adjustment process is thus treated differently in the two models. This is permissible and even desirable. Depending upon how the model is set up, the adjustment process becomes relatively interesting or relatively uninteresting. We accordingly concentrate on it or neglect it. The search for formulae which maximize relevance at a given degree of complexity and minimize complexity at a given degree of relevance necessitates such solutions.

We have now stated our first principal line of analysis to be followed in this study.

Within the framework of the traditional reallocation models, questions as to the structural effects of international trade are analyzed with the help of the factor proportions account often referred to as the Heckscher-Ohlin trade model. This model presents two theorems.

(a) International differences in relative factor endowments give rise to differences in the structures of relative commodity prices, thus making international trade possible.

(b) Not only commodity prices, but also factor prices, are equalized, or tend to be equalized, through trade.

The introduction of this model made it possible to study problems which the then existing theory did not attempt to solve except in a fragmentary fashion. It provided a general law of the principles of the international division of labor. Each country tends to export commodities, the production of which uses up much of its abundant resources, and vice versa. Some writers, notably Viner, with his unrivalled intimacy with classical and pre-classical writings, have suggested that the Heckscher-Ohlin approach was no more than a formalization of what had long been known.<sup>2</sup> However, as has been aptly remarked, "... momentary realization of an important truth, even its express formulation in a casual passage, is by no means the same thing as its incorporation into the fundamental body of one's theoretical analysis".<sup>3</sup> The factor-

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<sup>2</sup> See, e.g., Jacob Viner's contribution, "Relative Abundance of the Factors and International Trade", pp. 279-293 in the Festschrift to Bertil Ohlin *Ekonomi, Politik, Samhälle* (Stockholm, 1959). Here Viner notes (p. 280), with respect to the factor proportions account, that "Some early Christian writers adopted the theory, and by at least the sixteenth century it had become a commonplace".

<sup>3</sup> P. T. Ellsworth, "Comparative Costs, the Gains from Trade, and Other Matters Considered by Professor Viner", *Canadian Journal of Economics and Political Science*, 5: 239 (May 1939).

cost equalization theorem had, in any case, never been presented before. This perhaps indicates that the factor proportions account of comparative advantages had been anticipated only vaguely, if at all.

For our purposes, it is interesting to note that the sporadic attempts made by earlier writers to explain the pattern of comparative advantages centered on the relative abundances of *natural resources*. Capital and labor endowments never seem to have been introduced.

The Heckscher–Ohlin trade model furnished new analytical tools to be operated within the conventional framework; thus, it did not constitute any break with the reallocation analysis. In this, the new approach was definitely neo-classical. It did not return to the classical theme taking up the Adam Smith tenet of a growth effect. It did, however, through the factor-cost equalization theorem, suggest a generalization according to which changes in factor totals were attributable to factor price changes. But it did not, as already noted, provide any clue to how factor totals will change during processes of growth or stagnation. The analytical attractiveness of the Heckscher–Ohlin model has, nonetheless, proved to be great. The model has perhaps captured so much theoretical interest that a step beyond the reallocation analysis has been delayed longer in trade theory than in other branches of theory, where by now growth aspects have again been fashionable for more than a decade.

Even if the factor proportions model has, to some extent, contributed to the failure of trade economists to see the narrowness in approach which has come about since Adam Smith, this is, of course, no valid criticism against the model in itself. However—and this will be our second line of approach to be followed in this study—it can be argued that the model as such is inadequate in its explanation of trade phenomena.

Those writers such as Viner, who have belittled the Heckscher–Ohlin contribution, seem to have been possessed by the idea that the way in which Heckscher and Ohlin gave substance to the classical comparative cost model is necessarily and self-evidently the only way. It is interesting to note that nobody has in earnest questioned the basic principle of the factor proportions theory. Not even Leontief, who has made extensive empirical research and reached results conflicting with the factor proportions hypotheses, dared to conclude that the factor proportions approach was unsatisfactory. There are however, alternative ways of explaining differences in relative price structures. The factor proportions account is only one of many, not the only one. It is important to

realize this, or we shall not be able to get off the side-track onto which we have, in effect, been shunted.

In the alternative theory which will subsequently be formulated, we shall use differences in relative endowments to explain the pattern of trade in natural-resource-intensive products. In this, we conform not only to the Heckscher-Ohlin approach but also—as already noted—to the fragmentary explanations which had been suggested by earlier writers. It is with respect to trade in manufactures that we shall have recourse to a theory differing from that formulated in the factor proportions account. It will, instead, show some relationship to the Taussig “climate” theory. We shall claim that a country cannot achieve a comparative advantage in the production of a good which is not demanded on the home market. If this is a necessary (but not a sufficient) condition for securing a comparative advantage, it follows that trade will be most intensive among countries with similar demand structures. To the extent that per capita income determines the demand structure, trade between countries will be more intensive the more equal per capita incomes are. In the factor proportions model, the opposite hypothesis is maintained. The more capital and labor proportions—hence per capita incomes and, consequently, demand structures—differ, the more widely will commodity price structures differ and the greater will be the scope for trade.

The factor proportions account does not make it possible for us to explain *intra-regional* trade in manufactures as factor proportions, by Ohlin’s definition, do not differ within a region. A region, however, may comprise a large area, possibly including several countries with the same factor proportions. A flourishing trade within such an area has thus needed its own explanation stressing economies of scale, transport costs, etc. We shall try to formulate *one single theory* of trade, whether international or domestic, inter-regional or intra-regional.

Unfortunately, it is no easier to test empirically our alternative theory than the original factor proportions theory. An effort in this direction will, nonetheless, be made. We shall calculate the average propensities of various countries to import from each other. A study of the differences in the propensities of other countries to import from, say, Sweden can reveal something about the impact of per capita income differences, i.e., of endowment differences, on trade flows.

A substitution of a new theory for the factor proportions explanation of the trade pattern will necessarily lead to different conclusions with respect to the impact of trade on factor prices, too. In our alternative to

current theory, we shall try to point out the consequences of our explanation of the pattern of comparative advantages. We shall suggest a theory of trade and factor prices, according to which rents—but not wages and interest rates—are exposed to what is likely to be a “tendency to equalization”. A tendency to rent equalization will arise as we retain the factor proportions explanation for natural-resource-intensive products. It is our contention that, in spite of empirical contradiction, the theory of wage and interest rate equalization has been accepted by analogy because of the plausibility of rent equalization.

It may be noted that the already widespread doubts about the factor cost equalization theorem make the attempts to discuss the effects of factor price changes on factor supply uninteresting indeed. If the factor cost equalization theorem is rejected and no other theory formulated in its place, an analysis of factor supply changes arising from factor price changes in connection with the reallocation process can, at best, be a taxonomic exercise with supply and demand curves.

Our conclusions from the two basic models of u-countries and growth countries will be applied to our analysis of trade and factor prices. This will, among other things, give us a theory of international income inequalities, i.e., a theoretical explanation of a major present-day problem, the existence of which in present trade theory is virtually denied.

In summary, our two contentions are thus (1) that the reallocation analysis is too narrow a framework for theorizing with regard to welfare and structural aspects of international trade, and (2) that the present analysis of structural aspects of the reallocation approach is too limited in relevance to be useful. In the following chapters we shall develop our own hypotheses, thereby giving positive content to this blunt criticism.

A title referring to “Trade and Transformation” has been chosen not for its alliterative quality, but because our analysis will enable us to follow through time the continuous changes in factor totals and, thus, in per capita incomes. Changing factor totals mean changing methods of production; changing per capita incomes mean changing demand structures; although this is an open economy, a changing composition of demand, according to our theory of the trade pattern, implies—in its turn—a changing composition of production, too. There is a mutual interrelationship; trade initiates or affects a process of economic change and this process changes the conditions of trade. Our analysis provides

the starting-point for a fuller analysis of disaggregated magnitudes, i.e., of the qualitative characteristics of the processes of growth and stagnation measured in the broadest macro-economic categories. Reallocation, of course, always implies some transformation. But it is only by superimposing the effects of changing factor totals that we acquire a means of following systematically through time, in theoretical economic history or in economic forecasting and planning, the effects of trade on the transformation process.

## II. EFFECTS OF TRADE ON WELFARE, TOTAL PRODUCTION, AND FACTOR SUPPLY

In order to provide a background for the two trade models which will be formulated in this chapter, we shall briefly present the essential conclusions of the current welfare analysis with respect to trade. As welfare deductions reflect the results of positive analysis, this review will help us to characterize the theory as a whole. The "case for trade" analysis is conducted under various sets of assumptions. The results must, of course, be carefully kept apart.

First of all, there is the *general case for free trade*. On the assumption that utopian domestic economic policies prevent divergencies between marginal social values and costs, it is shown that free trade will maximize world economic efficiency. This result will come about through a maximization of production with existing resources and an optimization of trade in the total volume of goods produced. This analysis of the reallocation of resources and consumption is a straightforward application of Paretoan welfare analysis. Free trade will provide marginal equivalences which, together with those assumed under "utopian domestic economic policies", will lead to an optimum position.<sup>1</sup>

The assumption about domestic economic policies is made, as we know from the theory of the second-best, that the simultaneous existence of all the marginal conditions of equivalence between marginal social values and costs constitutes an optimum situation.<sup>2</sup> If any one of the marginal conditions is not satisfied, the others are no longer necessarily desirable

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<sup>1</sup> Discussions of Paretoan welfare economics and the marginal equivalence with which it is concerned can be found in, e.g., Melvin W. Reder, *Studies in the Theory of Welfare Economics* (New York, 1947); and Kenneth E. Boulding, "Welfare Economics", in *A Survey of Contemporary Economics*, ed. B. F. Haley (Homewood, Ill., 1952).

<sup>2</sup> Paul A. Samuelson, *Foundations of Economic Analysis*, Harvard Economic Studies, Vol. LXXX (Cambridge, Mass., 1947), pp. 252-253; James E. Meade, *Trade and Welfare* (Oxford, 1955), in particular chap. VII; R. G. Lipsey and K. Lancaster, "The General Theory of the Second Best", *Review of Economic Studies*, 24: 11-32 (1956-57).

in order to attain what can now only be a second-best solution. To advocate the establishment of some marginal equivalences in the absence of others is to become a victim of what has been called "piecemeal welfare economics".<sup>3</sup>

Thus, the conclusion is that if free trade is not universal or if utopian domestic economic policies in other respects are not pursued, then we are left with only a case for trade instead of a case for free trade. It is even conceivable that, under perverse conditions, the countervailing trade restrictions would reach such proportions that our general case for free trade would be reduced to a case for no trade at all.

Haberler has raised some well-reasoned objections against these second-best modifications. He argues that many marginal inequalities other than those due to the trade restrictions themselves can be corrected by freeing trade. As an example of this, one can think of a monopoly being broken up by foreign competition. Furthermore, using a very different argument, he warns us that even if various marginal inequalities under free trade would call for certain trade restrictions, the ideal planning of the Lerner-Lange kind which would have to be applied is not even remotely similar to that which is usually practised and which would have to be expected.<sup>4</sup> The marginal inequalities which would call for some kind of ideal countervailing planning are in themselves, he argues, at least to some extent the result of imperfect planning.

The general case for free trade is, as will be remembered, based upon a criterion of world welfare. But the case for trade has equally often been analyzed against the background of *national welfare*.<sup>5</sup> Under autarchy, the consumption possibility frontier is identical to the production possibility curve. When trade can take place, the consumption alternatives are not limited by the production alternatives but lie along a terms-of-trade frontier uniformly outside the production possibility curve. (See further Figure 1, p. 25.) As the terms-of-trade frontier lies outside the production possibility curve, more goods for the same inputs

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<sup>3</sup> I. M. D. Little, *A Critique of Welfare Economics* (Oxford, 1950), p. 89; and Lipsey-Lancaster, p. 17.

<sup>4</sup> G. Haberler, "The Relevance of the Classical Theory under Modern Conditions", *American Economic Review*, 44: 551 (May 1954).

<sup>5</sup> See, e.g., Paul A. Samuelson, "The Gains from International Trade", *Canadian Journal of Economics and Political Science*, 5: 195-205 (May 1939), reprinted in *Readings in the Theory of International Trade*, ed. H. S. Ellis and L. A. Metzler for the American Economic Association (Philadelphia, 1949), pp. 239-252.

could be had under trade than under autarchy. Trade in this sense makes society better off. But a change from an international to a national welfare criterion leads to a significant modification in the case for free trade: the optimum tariff proposition. Just as a monopolist and monopsonist can gain by deviating from a Pareto optimum—but only by causing others a loss that is greater than his gain—a country can, through a terms-of-trade improvement, gain by restricting its foreign trade. Without retaliation, a country is likely to gain; with retaliation, it may gain. However, as such an optimum tariff must never be prohibitive, we are still left with a case for trade. Furthermore, as all countries taken together cannot gain, the losers are able to bribe the gainers not to impose a tariff which would increase welfare for the latter group even under retaliation.<sup>6</sup> In this sense, we have a case for free trade even according to a national welfare criterion.

We shall now tackle the interesting problem of whether or not the general case for free trade, or rather the case for trade, has to be modified on account of welfare changes caused by the effects of trade on the distribution of income. Just as free trade does not maximize welfare for every country, it does not necessarily maximize welfare for every group of people within a country. To neglect the effects on income distribution amounts to an implicit welfare judgment that marginal utility of income is the same for every individual. It was Harrod who initiated what has been a prolonged discussion about these problems. The following classical passage from Harrod is worth quoting:

“Consider the Repeal of the Corn Laws. This tended to reduce the value of a specific factor of production—land. It can no doubt be shown that the gain to the community as a whole exceeded the loss to the landlords—but only if individuals are treated in some sense as equal. Otherwise how can the loss to

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<sup>6</sup> The optimum tariff discussion has its origin in the writings of John Stuart Mill. The argument was formalized by C. F. Bickerdike in “The Theory of Incipient Taxes”, *Economic Journal*, 16: 529–535 (December 1906). It was revived by N. Kaldor, “A Note on Tariffs and the Terms of Trade”, *Economica*, n.s. 7: 377–380 (November 1940). It has since then been widely discussed by, among others, T. Scitovsky, “A Reconsideration of the Theory of Tariffs”, *Review of Economic Studies*, 9: 89–110 (Summer 1942), reprinted in *Readings in the Theory of International Trade*, pp. 358–389; R. F. Kahn, “Tariffs and the Terms of Trade”, *Review of Economic Studies*, 16: 14–19 (1947–48); J. de V. Graaff, “On Optimum Tariff Structures”, *Review of Economic Studies*, 17: 47–59 (1949–50); Harry G. Johnson, “Optimum Tariffs and Retaliation”, *Review of Economic Studies*, 21: 142–153 (1953–54), reprinted in his *International Trade and Economic Growth* (Cambridge, Mass., 1958), pp. 31–55.



some—and that there was a loss can hardly be denied—be compared with the general gain? If incomparability of utility to different individuals is strictly pressed, not only are the prescriptions of the welfare school ruled out, but all prescriptions whatever.”<sup>7</sup>

In order to escape from this impasse and to be able to pass welfare judgments in situations where a proposed change is not beneficial to everybody, Kaldor, Hicks, Scitovsky and Samuelson have developed various compensation and bribery tests.<sup>8</sup> The Samuelson test is the most general. Under this test, a policy change marks an unequivocal improvement if the following condition is satisfied, viz., that it is possible arbitrarily to redistribute total production by lump sum transfers without welfare thereby being lowered as compared with what the situation would have been if a corresponding distribution had been affected prior to the change. As long as we do not know which income distribution is actually the socially preferred one, it is necessary to make this test with all the alternatives in order to avoid giving precedence to particular distributions such as the one which would exist without redistribution, and to be able to pass unequivocal welfare judgments. Even taking this severe test into account, no modifications in the case for trade have to be made.

However, as Samuelson has repeatedly emphasized, it is impossible to carry out ideal lump sum transfers.<sup>9</sup> If a change in trade policy, giving rise to a redistribution of income, is beneficial to those not favored by the social welfare function and large transfers have to take place, we might find that the transfer losses are greater than the reallocation gains from trade. This eventuality is, however, only one of all those assumed away under utopian domestic economic policies. If the need for transfers aggravates the difficulties of pursuing utopian economic policies to the extent that all marginal conditions cannot be fulfilled, then the ex-ante case for trade does not hold ex-post.

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<sup>7</sup> Roy F. Harrod, “Scope and Method of Economics”, *Economic Journal*, 48: 396–397 (September 1938).

<sup>8</sup> N. Kaldor, “Welfare Propositions of Economics and Interpersonal Comparisons of Utility”, *Economic Journal*, 49: 549–552 (September 1939); J. R. Hicks, “The Foundations of Welfare Economics”, *Economic Journal*, 49: 696–712 (December 1939); *idem*, “The Valuation of Social Income”, *Economica*, n.s. 7: 105–124 (May 1940); T. Scitovsky, “A Note on Welfare Propositions in Economics”, *Review of Economic Studies*, 9: 77–88 (November 1941); Paul A. Samuelson, “Evaluation of Real National Income”, *Oxford Economic Papers*, n.s. 2: 1–29 (January 1950).

<sup>9</sup> See Paul A. Samuelson, *Foundations of Economic Analysis*, pp. 247–248, and “Evaluation of Real National Income”, pp. 18–19.

This, in short, is how the case for trade is stated in currently accepted literature.<sup>1</sup> Our survey of the gains from trade analysis has served a double purpose: firstly, it has demonstrated what we asserted in our introductory chapter—that trade theory has been principally devoted to a study of reallocation effects; secondly, it has enabled us, particularly in our model of growth countries, to draw on the results of the reallocation models for our own purposes.

### A. Underdeveloped countries

Can the effects of trade on underdeveloped countries be adequately covered by currently accepted trade theory? This question has been raised in trade-theory literature in recent years and has been the cause of some heated arguments.

In the following we shall analyze the effects of trade on countries *characterized by a lack of reallocative capacity and by per capita incomes at subsistence level*. For the want of a better term, we shall call these countries “u-countries”. Our model will show that the current reallocation models provide no useful estimate of the impact of trade on such countries. On the whole, present theory exaggerates the beneficial effects of trade on u-countries. In the light of our theory, we shall be able to fit into place the attacks made on current doctrine. Thus, our model, in a sense, will yield a formalization of these insufficiently elaborated attacks.

#### *Haberler's model*

In a well-known paper in the *Economic Journal* of 1950, Haberler showed that a reallocation of factors of production is not a necessary condition for reallocation gains from trade.<sup>2</sup> As long as factor price rigidity does not result in the underemployment of resources, certain—but always relatively smaller—gains can, with the original allocation of resources, still be had from a reallocation of consumption. That this had

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<sup>1</sup> Left out are a host of protectionist arguments not generally recognized in the theory of international trade. Furthermore, the infant industry argument for protection has not been brought in. This generically different argument will be taken up when it can be fitted into its proper context. As will be explained later, its existence does not really reduce the validity of the generalizations about the “case for trade” analysis that will be attempted in the following.

<sup>2</sup> G. Haberler, “Some Problems in the Pure Theory of International Trade”, *Economic Journal*, 60: 223–240 (June 1950).

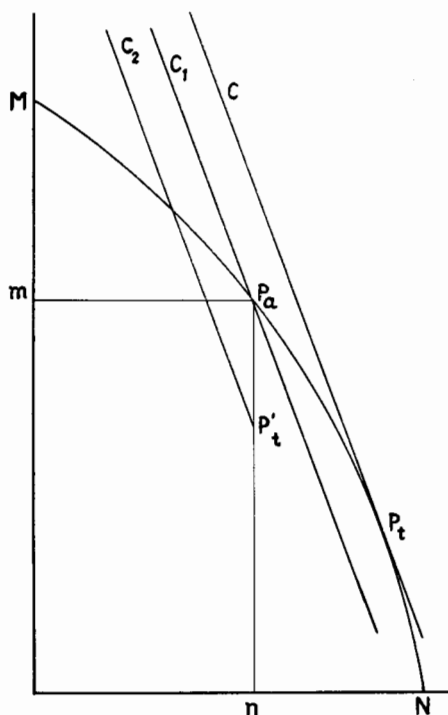


Fig. 1.

not been realized before<sup>3</sup> was—as Haberler points out—probably because of the classical writers' emphasis on perfect internal factor mobility in the labor theory of value.

Haberler's analysis proceeds in the following fashion. On a normal production possibility curve  $MP_aN$  in Figure 1, point  $P_a$  represents the composition, under autarchy, of production and consumption of the two goods  $M$  and  $N$ . The slope of the tangent—not drawn—indicates relative prices in the pre-trade situation. After the opening-up of trade, we assume that a new price relationship will be established,<sup>4</sup> given by the slope of  $P_tC$ . A reallocation of factors will move production from  $P_a$  to a new equilibrium  $P_t$ . Consumption will be somewhere along  $P_tC$  according to community preferences, say, at  $C$ . This is the simplest conventional geometrical representation of the national "case for trade".

<sup>3</sup> Actually, the point is made earlier, but perhaps more casually, by Paul A. Samuelson in "The Gains from International Trade", reprinted in *Readings in the Theory of International Trade*, pp. 239–252, especially pp. 249–250.

<sup>4</sup> If relative prices are the same, trade will not affect the country.

As we have stated in the "case for trade" discussion,  $C$  constitutes an improvement over  $P_a$ . Now, and this is the crucial step Haberler takes, let us assume that factor reallocation along  $MN$  is impossible. The production possibilities are then reduced to the point  $P_a$  and its perpendiculars. Welfare can, however, still be increased through trade. A movement along  $P_aC_1$ , representing a reallocation of consumption according to community preferences, would take us to a new consumption point, say,  $C_1$ . This point is inferior to  $C$  but superior to  $P_a$ —the autarchy alternative. Any point along  $P_aC_1$  is superior to any point along  $m P_a n$ —except at  $P_a$  itself—as the first frontier lies outside the latter. The welfare increase from  $P_a$  to  $C_1$  is brought about by a reallocation of consumption while the welfare increase from  $C_1$  to  $C$  is the result of a reallocation of production. The welfare increase from  $P_a$  to  $C$  is the total gain from a reallocation of both production and consumption.

However, as Haberler points out, the conclusion that consumption reallocation gains will be unequivocally sufficient to move the community to a higher welfare level presupposes *factor price flexibility*. If the factors employed in the production of the  $M$ -good—the imported good—do not accept lower remunerations, they will become unemployed as the domestic price of the  $M$ -good is uncompetitive. In our diagram, this unemployment will be reflected in a movement of the production point from  $P_a$  to somewhere along the perpendicular  $P_a n$ . The extent of this fall in the production of the  $M$ -good will depend upon how widespread is the refusal among the owners of the factors to accept lower prices. It will also depend upon whether production is taking place at increasing, constant, or decreasing costs. If the  $M$ -good is produced under increasing costs—as in our diagram, with a production possibility curve concave to the origin—something less than a complete halt in production might make the price of the  $M$ -good competitive at unchanged factor prices. However, as soon as there are any unemployed resources at all, the losses from this change might be greater than the gains from consumption reallocation. The bigger the drop in employment, the greater will the risk evidently be that a net loss will result. However, it should be observed, that, even if the production of the  $M$ -good is completely discontinued, the terms-of-trade might be so favorable—or, in other words, the slope of the line indicating the new price relationships so much more vertical or horizontal than that denoting the pre-trade relationship—that the consumption reallocation gains more than make up for the unemployment losses. In Figure 1, the distance between  $P_a$  and  $P'_1$  measures the drop in the production of the  $M$ -good.  $P'_1$  is the new

production point. The new consumption point will be somewhere along  $P_1' C_2$ , say, at  $C_2$ .  $C_2$  is inferior to  $C_1$ . It is impossible to say *a priori* whether we have passed the critical point where unemployment losses become greater than reallocation gains. Thus, we do not know whether or not  $C_2$  is superior to  $P_a$ .

The practical importance of Haberler's analysis is that it broadens the scope of the current "gains from trade" models so that even countries with poor reallocative capacity are included therein—or, at least, this is what his analysis appears to do. Viner, in his Brazilian lectures, has given exactly this application to Haberler's results. He claims, with implicit reference to underdeveloped countries, that even the most rigid economies can gain from participating in international trade, provided they have factor price flexibility.<sup>5</sup>

### *The effects of subsistence wages*

The fashion in which Haberler and Viner handle the assumption of factor price flexibility conveys the impression that our general supposition of rationality in economic behavior entitles this assumption to fairly casual treatment. At most, resistance against lower remuneration should be only temporary since the unemployment alternative is even less attractive. However, the possible reasons for factor price *rigidity* are discussed by neither Haberler nor Viner. The assumption of factor price flexibility appears to be introduced only for the completeness of the logic.

However, there is indeed good reason to expect factor price rigidity without there being irrational behavior on the part of labor. In countries with poor reallocative capacity, a strong element of factor price rigidity is likely to prevail since labor is employed at *subsistence wages* or at wages that are so low that a decrease to subsistence level would not be enough to ensure competitiveness. In such countries, labor is also the dominant factor of production; for the sake of simplicity, we might even, in our analysis, ignore land and capital price flexibility.

Whether or not labor in occupations put at a comparative disadvantage would like to work, it cannot. If wages are kept at subsistence level, the products will be unmarketable. If wages are reduced to below subsistence level, the workers will be incapacitated. This observation, in all its simplicity, must be an important one. The effects of trade on the distribution of income between the export and the import-competing

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<sup>5</sup> See J. Viner, *International Trade and Economic Development* (Oxford, 1953), pp. 37-38.

sectors assume significance here not only from a welfare, but also from a structural, point of view. Deteriorated economic conditions in the import-competing sector, unaccompanied by reallocation, mean a gradual extinction of one part of the economy. The labor force of the import-competing sector will be eliminated through higher a death rate (or emigration). As the relatively low-income import-competing sector is being gradually eliminated, this sector will weigh less and less in the computation of the per capita income of the whole economy. Per capita incomes in the export sector, on the other hand, will rise when trade is opened up. This will increase the rate of population reproduction and capital formation in this sector. The economy will evidently pass through a process of complex changes in quantities of factors of production, total production, and per capita incomes. The welfare effects of trade are extremely hard to assess under such circumstances. The traditional comparative statics framework is unsuitable for an analysis of these changes. A new dynamic model has to be designed.

Only if it were possible to administer an ideal scheme of subsidies could this adjustment process be halted and the economy instead benefit from the Haberler consumption reallocation gains. Transfers from the export sector would allow wages in the import-competing sector to be reduced to below subsistence level in order to make the  $M$ -good marketable. The production point would not move down from  $P_a$ . However, in the kind of economy where the effects of trade could possibly be those which we are now discussing, it does not seem plausible to assume that the institutional framework allows the operation of such a scheme of subsidies.

### *Our model*

Our model of the effects of trade on u-countries is set out in diagrammatic form (Figure 2).<sup>6</sup>

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<sup>6</sup> The geometric technique in its essential features is taken from E. E. Hagen, who has developed it for different, but related, purposes. See his "Population and Economic Growth", *American Economic Review*, 49: 310-327 (June 1959), particularly pp. 316-318. Hagen draws heavily on R. R. Nelson, "A Theory of the Low-Level Equilibrium Trap in Underdeveloped Countries", *American Economic Review*, 46: 894-908 (December 1956). Nelson's paper is the clearer one in its description of the model. However, Hagen introduces, for his purposes, certain changes in the model. These changes, which primarily concern the treatment of the factor land, have been adopted here. A model of the same content as the Nelson model was first formulated by H. Leibenstein, *A Theory of Economic-Demographic Development* (Princeton, 1954).

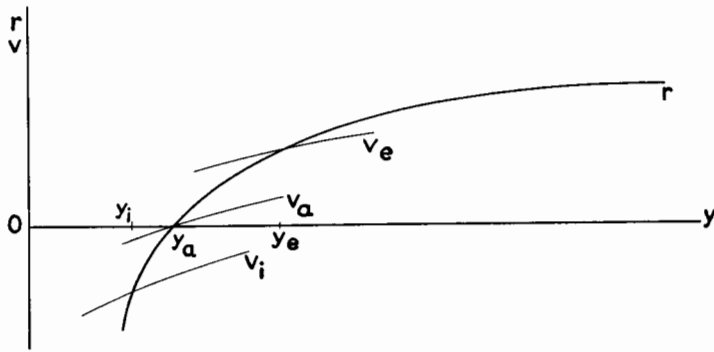


Fig. 2.

On the horizontal axis we measure per capita incomes ( $y = Y/P$ ). The changes per time unit in population ( $r = dP/P$ ) and in aggregate income ( $v = dY/Y$ ) are measured on the vertical axis. Population ( $P$ ) is assumed to change with  $y$ . The relationship is the Malthusian one, with high and stable birth rates and income-induced changes in death rates. The  $r$  curve cuts the horizontal axis at a per capita income which represents the subsistence level of  $y$ ; lower per capita incomes are assumed to reduce  $P$  and thus to make  $r$  negative; higher per capita incomes are assumed to increase  $r$  to a biological maximum, where the  $r$  curve flattens out.

The position of the  $r$  curve will also depend upon the distribution of income. The  $r$  curve has two parts: one above and one below the  $y$  axis. If these two parts were perfectly symmetrical, the particular distribution of income would not affect the position of the  $r$  curve. For instance, whatever the income distribution, low death rates among high-income-earners would then always exactly compensate high death rates among low-income-earners so that the average change in  $P$  would be identical to the average change if incomes had been equally distributed and  $y$  had thus represented not only the average but also the actual income going to every individual. The  $r$  curve would, in this case, always cut the  $y$  axis at the individual subsistence income. However, the general characteristics of the  $r$  curve are such that this curve cannot be symmetrical. The biological upper maximum has no counterpart in a similar biological lower maximum. This means that, generally speaking, an uneven income distribution will move the  $r$  curve to the right; low death rates among high-income-earners are too high to compensate fully for high death rates among low-income-earners. Thus, a higher  $y$  than subsistence income will be needed to keep  $P$  unchanged. However, an uneven income distribution does not necessarily move the actual  $r$  curve to the right of the  $r$  curve which corresponds to an even income distribution. Small differences in income distribution around the

subsistence  $y$  might produce a lower overall death rate than an even income distribution.<sup>7</sup>

There can be any number of  $v$  functions relating per capita income and the rate of change in aggregate income. Behind each  $v$  function is (1) the same  $r$  function giving the increase (decrease) in labor ( $L$ ) for each value of  $y$ , (2) a function giving the increase (decrease) in capital ( $K$ ) ( $S = dK/K$ ) for each value of  $y$ , and (3) the technological state of the arts. We assume that there are only two inputs,  $K$  and  $L$ .  $L$  is assumed to be a constant fraction of  $P$ . For the sake of simplicity, we also assume that there are constant returns to scale. The position of the particular  $v$  function on which the economy finds itself thus depends upon the supply of new productive resources at each value of  $y$  and the productivity of these resources. If the  $r$  function is fixed, the position of the actual  $v$  function will depend upon the particular savings function and the state of the arts. The more inefficient the production methods and the lower the savings function, the lower will be the  $v$  function on which the economy operates. The shape of a  $v$  function depends upon the propensity to use additional income for savings and investment purposes. If this propensity is high, the  $v$  function will rise more steeply. For higher values of  $y$ , the additions to  $P$  become constant. This will tend to slow down the rate of increase in aggregate income. The  $v$  curve may even turn downwards.<sup>8</sup> The *shape* of the  $v$  function as compared with the  $r$  function is important for many analytical purposes, such as the mechanics of take-off.<sup>9</sup> However, our problem—as we have defined it—limits our interest to the pre-take-off countries and their low-income equilibria. In such economies, the  $v$  functions will have the general property that, going from left to right, they intersect the  $r$  function from above and do not cut up through the  $r$  function from below. Such an intersection between a  $v$  function and the  $r$  function represents a stable low-income equilibrium, a “Malthusian trap”, where population and aggregate income increase or decrease at the same rate with unchanged per capita incomes.

To show that the intersection between the  $r$  curve and the particular  $v$

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<sup>7</sup> It should be noticed, however, that if there are differences in income distribution involving some incomes below the subsistence level, forces which eliminate such differences will—as we shall see—be set up.

<sup>8</sup> R. R. Nelson, “A Theory of the Low-Level Equilibrium Trap in Underdeveloped Countries”, p. 899.

<sup>9</sup> Hagen uses the model to analyze the mechanics of take-off.



function on which the economy happens to be constitutes a stable equilibrium, let us assume that an injection of capital, say, from capital imports, moved us to a higher  $y$ . We would now gradually slide back along the  $v$  function to the original  $y$  level, as the  $v$  value is lower than the  $r$  value. Total population increases faster (or decreases more slowly) than aggregate income, and the per capita incomes fall until equilibrium at the  $v$  and  $r$  intersection is reached again. Similarly, a loss of capital—bringing us to the left of the intersection of the  $v$  function—would entail relatively faster  $Y$  than  $P$  growth (or a slower decline in  $Y$  than in  $P$ ) and we would gradually return to the original  $y$  level.

One  $v$  function can be assumed to pass through the intersection between the  $r$  function and the horizontal axis. Here,  $y$  is at subsistence level, there is no population growth or capital accumulation, and aggregate income does not change. This is a stationary equilibrium.

An advance technologically or an increase in the propensity to save can move the  $v$  function upwards. The new intersection between the  $r$  and  $v$  functions will be the new equilibrium. Per capita incomes will be at a higher level. For the opposite reasons—a climatic deterioration, for instance—the  $v$  function can also fall. Whereas a  $r$ - $v$  intersection above the subsistence level means an endless multiplication of total population and aggregate income, an intersection below the subsistence level means gradual extinction.

Let us now introduce a third factor, land, which can only be augmented at increasing costs per unit. The value of  $v$  at any given level of  $y$  will no longer depend only on the level of technology and the capital/labor ratio. It will also depend on the quantity of capital and labor. If this quantity increases, its marginal productivity falls, and vice versa. Changes in  $v$  brought about in this manner, without a change in the capital/labor ratio, constitute a shift from one  $v$  function to another. If, in this case, advances in technology initially move the economy up onto a higher  $v$  function, the new equilibrium will not be where this function intersects the  $r$  curve. Instead, we shall gradually be pushed back to the subsistence level equilibrium. If, on the other hand, the  $v$  function should fall below the subsistence level, the ensuing decrease in capital/labor quantities will move the economy onto higher  $v$  functions. By abandoning poor qualities of land, the productivity of capital/labor will increase. Whether extinction will be avoided and we shall reach the subsistence level through this process will depend upon the nature and seriousness of the particular conditions which forced down the  $v$  function in the first place.

### *Operating the model*

We have now constructed the general framework within which we shall attempt to study the effects of trade on u-countries. We shall now begin to operate the model using different sets of assumptions. The first assumptions under which the model will be applied are stated below. The results will be worked out in some detail. As we later manipulate the assumptions, the differences with respect to the original conclusions will be roughly outlined. It should be possible for anyone to use the model in a detailed way under whatever assumptions he wishes once we have worked through one case.

We shall begin with the following assumptions:

1. As trade is opened up, the economy is split into two sectors: the export sector and the import-competing sector. We shall assume that in the pre-trade situation each sector employs half the labor force and produces half the aggregate income. The industries comprising both sectors will be supposed to be equally competitive (or uncompetitive) compared with foreign industries. Income distribution within each sector will be assumed to be equal.

2. There is no reallocation of factors between the two sectors. To be less demanding, but more obscure, it would be sufficient to assume that some reallocation takes place but too slowly to prevent the process in which we are interested. The reason for poor reallocative capacity is the lack of entrepreneurs in combination with economic and cultural barriers to the mobility of labor.

3. In the pre-trade situation the economy is operating on the  $v_a$  function in Figure 2 and finds itself at the  $y_a$  subsistence level of per capita incomes.

4. Those employed in the import-competing sector choose, after the opening-up of trade, to work for wages below subsistence level so as to earn something rather than to be unemployed and earn nothing. No transfers of subsidies can be carried out between the export and the import-competing sectors.

5. There are only two factors of production: labor and capital.

6. There is no inflow of foreign entrepreneurs when trade is opened up.

7. There are no movements of labor and capital internationally.

8. Demand for the products of the export sector is completely elastic. International prices are stable.

With these assumptions, the effects of trade will be as follows.

When trade is opened up, the original  $v$  function of the whole economy will be split into two  $v$  functions, one for the export sector, one for the import-competing sector. The  $v$  function of the export sector will be raised since, without there being a change in the capital/labor ratio, trade increases per capita incomes in this sector. The higher per capita incomes in the export sector are a consequence of an improvement as set forth in the conventional "gains from trade" analysis. The  $v$  function of the import-competing sector will be depressed as the factor rewards have to be reduced in order that the products may be marketable. Thus, instead of the whole economy operating on the  $v_a$  function, the export sector will be on what we have designated the  $v_e$  function and the import-competing sector on the  $v_i$  function. For this model to be of interest, it is essential that—on whatever  $v$  function we operate in the pre-trade situation—the  $v_i$  function intersects the  $r$  curve below the subsistence level. As we assume equal income distribution within each sector, the original  $r$  curve is still relevant for each sector separately. The  $r$  curve for the economy as a whole has probably moved to the right as personal income distribution has been changed and become more unequal. However, as long as our analysis is based on sectors, each of which has equal income distribution, the complication of changes in the  $r$  curve is avoided.

We now have two per capita income levels:  $y_e$  for the export sector and  $y_i$  for the import-competing sector. As we assume that there is no unemployment, we know, furthermore, that the average per capita income for the economy as a whole must have increased. This increase in aggregate income follows from the consumption reallocation gains as analyzed by Haberler. We are, at this moment, at  $P_a$  in Figure 1 and have moved consumption out along  $P_aC_1$ . As the two sectors are equally large, this initial increase in average per capita incomes has been taken into account in Figure 2 by making the distance from  $y_a$  to  $y_e$  bigger than the distance from  $y_i$  to  $y_a$ .

At a per capita income of  $y_e$ , the export sector will experience population growth at a rate which—at the new equilibrium—is equal to the increase in the production of exports. This rate is given by the intersection of the  $r$  curve and the  $v_e$  curve. This process will go on endlessly. Variations in the rate of increase in aggregate income are ruled out by our assumptions of no economies of scale, no factor of production—such as land—that can only be augmented at increasing costs, and no price changes on the international markets.

In the import-competing sector, the opening-up of trade, as we observed, pushed per capita incomes below the subsistence level in the initial period. A process of depopulation, capital decumulation and contracting production will immediately begin in this sector. This decline will proceed at a rate given by the  $r-v_i$  intersection. We thus have an adjustment not through reallocation but through changes in the quantities of factors. The process will go on until the import-competing sector has been eliminated.

It might appear contradictory to assume, on the one hand, that there will be no reallocation from the import-competing sector and, on the other hand, that there can be a continuous increase in production in the export sector due to the generation and employment of new factors of production. However, it is easier for existing entrepreneurs to employ the new factors at a rate sufficient for an increase in production of a couple of per cent annually than to reallocate resources corresponding to a substantial part of the economy before a process of elimination begins to affect the import-competing sector. Furthermore, it is probably easier for entrepreneurs in u-countries to use resources created within their own sector than to employ factors rendered superfluous in another sector. Various kinds of friction, such as costs of moving and retraining, are likely to make themselves felt. Thus, there is some justification for treating the accumulation process in the export sector separately from the decumulation process in the import-competing sector. It should also be noticed that, as long as reallocation is not complete, some reallocation does not upset our results in principle. It can thus be ignored for theoretical simplicity.

Until the elimination process is completed, the per capita income of the import-competing sector will remain at  $y_i$ . But, in a calculation of the average per capita income for the whole economy, the import-competing sector must be attributed a declining weight statistically. At first, the statistical weight of the import-competing sector will be  $1/2$ , since it is of the same size as the export sector. But, with the absolute decline of the import-competing sector, its weight will decrease to 0, while the weight of the export sector, which is growing, will go from  $1/2$  to one. *Thus, the per capita income of the whole economy is eventually  $y_e$ , i.e., the per capita income of the export sector.*

Furthermore, it should be noted that the decrease in  $K$  and  $L$  in the import-competing sector does not exclude an overall increase in  $K$  and  $L$  taking place right from the outset. Higher per capita income in the economy as a whole will tend to cause  $L$  to increase, while a more unequal income distribution will have the opposite effect. As the import-competing sector becomes less significant statistically, the likelihood of both  $L$  and  $K$  increasing on a net basis is heightened. When the

import-competing sector has been eliminated, growth of  $K$  and  $L$  in the export sector represents net growth.

The diagrammatic illustration of possible shifts in  $K$  and  $L$  would involve drawing the aggregate  $r$  function for the initial period to the right of the original  $r$  function (as the distribution of income has become less even). The initial overall per capita income is to the right of the intersection between the original  $r$  function and the horizontal axis, but it may or may not be to the right of the intersection of the new  $r$  curve and the horizontal axis. If it is to the right of this intersection, at least  $L$  will increase on a net basis right from the initial phase. As the elimination of the import-competing sector progresses, income distribution becomes more even; the  $r$  curve gradually shifts to the left toward its original position. Over the same period, per capita income increases. When  $y$  is—and, in the end, it must be—to the right of the intersection between the relevant  $r$  curve and the horizontal axis, then  $K$  and  $L$  grow on a net basis.

We shall now change our assumptions in various ways. Five cases will be studied. We do this to illustrate the flexibility of the model and to increase our insight into the possible effects of trade on different kinds of members of the general group of u-countries. In each case, the original assumptions will be applied except for those explicitly varied. One, two, or several assumptions will be changed in each case. The essential differences in the functioning of the mechanism will be pointed out. The case we have just analyzed will be used for reference purposes. The five cases should not be regarded as successive complications introduced to make our assumptions more “realistic”. Nor should the five cases be thought of as being exhaustive. Many other combinations of assumptions are possible. Countries are different, and what is most relevant for one country is not relevant for another country. The five cases are thus presented as alternatives to the one we have just worked out.

1. First, we want to see what difference it makes if we assume that there is widespread unemployment in the import-competing sector as a result of trade. The effect of this would be that the  $v$  function of the import-competing sector would fall below the position we assumed it to be occupying in our reference case. How much it would fall is not a particularly interesting question. This would depend upon the degree of unemployment. The fact that the  $v$  function falls additionally means essentially two things:

(a) it is no longer necessarily true that total income in the economy increases initially as the unemployment losses may be bigger than the consumption reallocation gains, and

(b) the process of adjustment in the quantities of factors in the import-competing sector will be speeded up as the forces behind capital decumulation and depopulation have been strengthened. This means that, even if the overall per capita income now falls initially, the average income in the export sector—which is higher than the pre-trade overall per capita income—will more rapidly become the average income of the economy.

2. Let us now assume that the various industries composing each sector are not equally competitive (or uncompetitive). (Our assumption of equal income distribution within each sector is now changed into an assumption of equal income distribution within each component industry.) This has certain implications for the process of elimination of the import-competing sector. The  $v_i$  function is now an average which will change over time. The most uncompetitive industries and their labor force will be eliminated first. The average per capita income of the sector will gradually rise from its initial average. The import-competing sector will successively move onto higher  $v$  functions. The process of elimination will be slower than indicated by the initial position of the  $v_i$  function. Before elimination is complete, the average rate at which it proceeds will be that of its least uncompetitive component industry. The export sector and its average  $v$  function will be exposed to a similar change. The most competitive industries will increase at a faster rate and will thus weigh more heavily in the average computations of per capita income, population growth and capital growth. However, as none of the competitive industries as distinguished from the uncompetitive ones are eliminated, the average  $v$  function will only approach the  $v$  function of the most competitive industry.

3. We shall now introduce a third factor of production, land, assumed to be augmentable only at increasing costs. It is important to know in which sector land is an input. We shall assume that land is used in the export sector but not in the import-competing sector.

The import-competing sector will go through the same process as in the reference case. The initial developments in the export sector will also be the same. But the  $v_e$  intersection with the  $r$  curve no longer represents an equilibrium. The export sector will successively move down to lower  $v$  functions as poorer land qualities are taken into use. The  $v_a$  function will be the equilibrium one.

Thus, per capita incomes will ultimately be back at the original level for the whole economy. If we assume no unemployment in the import-competing sector, we know that average per capita incomes were initially increased. However, we do not know anything about average per capita incomes during the adjustment phase. If, for instance, the export sector is back at  $y_a$  before the import-competing sector has been eliminated, there will be a period when average per capita incomes are lower than in the pre-trade situation.<sup>1</sup> The relative speed of adjustment in the two sectors is thus the crucial factor in this respect. Nor do we know whether the total labor force and capital stock has decreased or increased once the new equilibrium is established. This will depend upon whether or not the aggregate production of the export sector has had time to double before per capita incomes in this sector return to  $y_a$ .

4. Here we shall introduce a third sector which we shall call the "agrarian subsistence" sector and which will be assumed to be unexposed to any direct impact of foreign trade. This sector thus operates on the  $v_a$  function even when trade is taking place.

It should be noted that, in contradiction to conclusions which may arise through careless use of the comparative cost doctrine, it is not impossible that such a sector, untouched by the opening-up of foreign trade, constitutes the whole of the economy. (In Chapter V we shall return to this possibility.) At present, this extreme case is, however, analytically uninteresting.

We continue to assume the existence of the export and import-competing sectors. Therefore, the country is exposed to the impact of international trade, and indirect effects may be felt in the third sector.

These indirect effects are what we are interested in now. We shall assume one type of reallocation to take place, namely, a flow of labor from the import-competing sector to the agrarian subsistence sector, just as labor during depressions in underdeveloped countries is said to flow back into the agricultural areas. Such a flow probably encounters a minimum of barriers against mobility of labor and can take place without entrepreneurial efforts. With respect to the import-competing sector, such a flow means a shift to the right on the  $v_i$  function as the capital/labor ratio increases. However, once this shift has taken place, the familiar backward slide along the  $v_i$  function to the equilibrium rate

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<sup>1</sup> Observe that this is so although we retain the assumption of full employment in the import-competing sector during the process of elimination. If this assumption is changed, per capita incomes might not, even initially, be higher.

of elimination will occur. How far out to the right on the  $v_i$  function we shall move depends upon the amount of labor which flowed over to the third sector. It will also depend upon the marginal productivity of that labor.

The injection of labor into the third sector will decrease the capital/labor ratio in this sector. Per capita incomes will fall. If there were only two factors of production, this would be represented by a movement to the left on the  $v_a$  function. But, since the agrarian subsistence sector uses land there will also be a fall in the  $v_a$  function as poorer land qualities are taken into use. During the adjustment process, as the quantity of capital and labor decreases, the relatively poor land qualities just taken into exploitation will be given up again. This means that we move up onto higher  $v$  functions. Thus, through a movement to the right on what—at the time—is the relevant  $v$  function and an upward movement of the  $v$  functions, we shall eventually be back at  $y_a$ . The essence of this kind of reallocation is thus the shifting of part of the elimination process over to the third sector. It may be noted, however, that individuals other than those who migrated from the import-competing sector to the agrarian sector might be eliminated in the restoring of equilibrium at subsistence incomes in the third sector.

Average per capita income in the economy as a whole will, like the quantities of factors, vary in a complicated fashion during this process of adjustment. In the long run, however, aggregate income in the economy must grow through the expansion of the export sector. The per capita income of this sector is no longer the average per capita income. The per capita income of agrarian subsistence sector will hold down average per capita income. But the expansion of the export sector, which will be endless if we assume that it is not constrained by the supply of land, will tend to reduce the relative weight of the third sector to zero.

5. Finally, we shall now assume that in the pre-trade situation all economic activities are conducted within an agrarian subsistence sector. Nonetheless, the economy will be affected by the opening-up of trade as we also assume that there is an inflow of foreign entrepreneurship and capital. Land, apart from what is used in the agrarian subsistence sector, is assumed to exist in the form of unexploited natural resources. These resources are thus of the “vent-for-surplus” kind.<sup>2</sup> The foreign

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<sup>2</sup> This terminology has been used by J. S. Mill, J. H. Williams and Hla Myint to characterize an aspect of Adam Smith's theory of international trade: See J. S. Mill, *Principles of Political Economy* (London, 1904), Book III, Chap. XVII, § 4,



entrepreneurs come in only to exploit these resources for foreign markets, i.e., for their home markets.<sup>3</sup>

Through the activities of the foreign entrepreneurs, there will thus be some reallocation of factors to a newly-established export sector. Labor is assumed to flow from the agrarian subsistence sector to the export sector. We have no import-competing sector even to begin with, as the export proceeds will be spent wholly on goods which were not produced in the pre-trade situation.

The outflow of labor from the agrarian subsistence sector will cause the opposite changes to those occasioned by the inflow of labor from the import-competing sector in case 4.

As to the export sector, our analysis must unfortunately become more involved. We have to distinguish between (1) the per capita income of the export sector as a whole and (2) the per capita income of domestic factors in the export sector. The income of what Singer has called the "foreign sector" of the economy accounts for the difference.<sup>4</sup> The reason why we have to make this distinction is that income to foreign entrepreneurs will not generate population growth; nor need the savings produced by that income be invested in the particular economy under observation.<sup>5</sup> Its welfare significance is also different.

The opening-up of trade means an injection of capital. This capital increases the productivity of domestic factors. But nothing has happened that ensures a higher equilibrium per capita domestic income. The initial effect, instead of being a lifting of the  $v$  function, rather represents a shift to the right along the  $v_a$  function. This is also what happens in the agrarian subsistence sector. As, in this case, we assume a

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p. 350; J. H. Williams, "The Theory of International Trade Reconsidered", *Economic Journal*, 39: 195-209 (June 1929), reprinted in *Readings in the Theory of International Trade*, pp. 253-271, especially pp. 263-264; and Hla Myint, "The 'Classical Theory' of International Trade and the Underdeveloped Countries", *Economic Journal*, 68: 318 and 321-331 (June 1958). In Adam Smith, *Wealth of Nations* (E. Cannan ed., London, 1904), see Vol. I, p. 413.

<sup>3</sup> In the chapter on trade and production (III), we shall provide reasons to explain why this kind of factor movement is an intrinsic feature of international trade.

<sup>4</sup> Cf. Hans W. Singer, "The Distribution of Gains between Investing and Borrowing Countries", *American Economic Review*, 40: 473-485 (May 1950).

<sup>5</sup> It should be noted, however, that the income of the foreign sector might, through taxes, be made part of the national economy not only geographically but also from a welfare point of view. Such taxation of a limited number of earners of high incomes might be relatively easy to arrange even under inefficient administrative set-ups.

reallocation mechanism to function as between the two sectors, per capita incomes must develop similarly in the two sectors. The export sector will operate with an "unlimited supply of labor".<sup>6</sup> The long-run equilibrium per capita domestic income in both sectors will be  $y_a$ .

*Is the opening-up of trade advantageous for u-countries?*

Against the background of all these hypothetical cases, we shall now make an attempt to draw some welfare conclusions.

The task of making welfare deductions in conventional analysis is easy compared with the one facing us here. The size of the population is held constant in the "gains from trade" models. Furthermore, the *same* individuals are assumed to be living before and after the change. The adjustments are instantaneous, so that even the hazards of inter-temporal welfare comparisons for these individuals are excluded. Furthermore, compensations according to a social welfare function are assumed to be possible.

In our model, the situation is very different in all these respects. Compensations, except possibly those from the foreign sector, are assumed not to be feasible—at least, not intersectoral ones.<sup>7</sup> There will be changes in the size of the population, which raises the awkward question of whether per capita welfare or total welfare should be adopted as a criterion. The composition of the population will change, necessitating interpersonal welfare comparisons, and—as the adjustments are time-consuming—even the preferences of those living through the process might change. The demographic changes are not only a function of time but also, and this is important, a function of trade itself.

The basis for welfare judgments is fragile under such circumstances. To formulate policy prescriptions will thus be unusually difficult. We shall restrict ourselves to a few observations on the conclusions of present theory seen in the light of our findings. A comparison will be made on the basis of a national welfare criterion. With different types of countries exposed to different trade effects, it is difficult to use anything but a national welfare criterion. After an analysis of the impact of trade on growth countries, it might be possible to assess the net effect of trade using a world welfare criterion. The actual composi-

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<sup>6</sup> Cf. W. Arthur Lewis, "Economic Development with Unlimited Supplies of Labour", *Manchester School*, 22: 139-191 (May 1954), reprinted in *The Economics of Underdevelopment*, ed. A. N. Agarwala and S. P. Singh (London, 1958), pp. 400-449.

<sup>7</sup> There may only be transfers from the foreign sector.

tion of the world—as regards the number of growth countries and u-countries, respectively—would be important for the results of such a calculation.

Generally speaking, it can be said that we focus attention on the fact that trade is an *invitation* to gain. It is not, as in current theory, a *guarantee* for gains. If a country lacks the capacity to respond to the challenge of trade, the effects of trading may not be advantageous.

The current proposition that trade makes it possible for all countries to gain does not follow from our theorizing. Average per capita incomes might, as would be possible in our third case, fall when trade is opened up and remain below their original level in the new equilibrium. In this case, the welfare effects of trade obviously seem to be unfavorable. But trade might increase average per capita incomes, as in our reference case, or it might decrease per capita incomes only initially and then increase them gradually above their original level, as in the first of our five cases. But the welfare effects are nevertheless highly uncertain. One sector of the economy is adversely affected to the extent that its labor force is gradually eliminated. Its elimination might be the prerequisite for the increase in average per capita incomes. Only our fifth case, with an export sector and no import-competing sector, appears to yield welfare conclusions resembling those of current analysis.

It is important to be aware of the structural changes during the process of adjustment. We might otherwise be unable to reveal the fallacy in the crude notion that, particularly in cases where the proportion of goods produced for export is relatively high, as sometimes in underdeveloped, raw-material-exporting countries, the desirability of trade and international specialization is proved. If the agrarian subsistence sector is small, the elimination of the import-competing sector will result in an extremely high value for exports as a fraction of the GNP. Awareness of the structural changes will also prevent us from becoming credulous victims of calculations which try to prove that trade has benefited a country because per capita incomes have, as of a certain date, increased compared with pre-trade values. Such statistics are, of course, always dangerous but, because of the underlying population changes, the results in this case might well be unusually unrepresentative from a welfare point of view. Reder has suggested that it might be a mistake in welfare economics to disregard the welfare implications of the dynamic adjustment path.<sup>8</sup> The conclusions we draw from our model strongly endorse this view.

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<sup>8</sup> See Melwin W. Reder, *Studies in the Theory of Welfare Economics*, part II.

As our model is more complicated than current models, it is not surprising that it gives more complex results. But it is to be noted that our findings are not just a more detailed account of what traditional theory tells us. There are, as we have tried to show, basic differences in our account of the impact of trade on pre-take-off countries.

We have not discussed the possibility of a u-country being turned into a growth country under the impact of trade. A prolonged period of higher per capita incomes within the export sector may breed entrepreneurial abilities and gradually—through a “standard-of-living” effect on birth rates—depress the  $r$  curve, thereby facilitating a sustained growth process.<sup>9</sup>

As we still have underdeveloped countries taking part in international trade, it is obvious that trade can fail to initiate a growth process. To some extent, this might be due to the fact that land is an input in the export sector and that the period of higher incomes thus becomes too short to have any effective influence.

If we suppose that, in a particular case, trade eventually initiates a growth process, the analysis of the impact of trade on the country in question can be made up to the take-off phase within the framework of the model suggested earlier in this chapter. After take-off, the growth model in the next part of this chapter will provide a useful tool for analyzing the continued effects of trade. The structural changes due to trade would be comparatively easy to follow. But a take-off at some stage after the opening-up of trade does not do away with the welfare theoretical problem. The elimination of an import-competing sector will still have taken place through a process with welfare implications which cannot be accepted on the basis of current welfare criteria. However, after take-off there would be a continuous multiplication of average per capita incomes. The greater the long-run gains become, the smaller will the short-run losses appear to be.

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<sup>9</sup> Hagen uses his model to analyze the effects of a fall in the  $r$  curve. The likelihood that such changes will occur seems, however, to be overestimated by Hagen. He observes that in those countries for which data are available, population growth never kept pace with growth in aggregate income or reached its biological maximum. This is probably true. But it must not be overlooked that the aggregate  $r$  curve and the biological reproduction maximum is proportionately lower if income increases are spread, as in our model, very unevenly over the economy. The existence of a Malthusian pressure must not necessarily be reflected in the statistics as if everybody had received higher incomes. We may have an increase in per capita incomes combined with a decrease in population and still be exposed to a Malthusian pressure.

### *A wide generalization in the applicability of our model*

In accordance with the standard approach, our discussion has been phrased in terms of effects from "the opening-up of trade". It is evident that, if we restrict the scope of our model in this way, its empirical usefulness—and testability—would be very limited. For most countries, it is perhaps difficult to isolate any such epoch when trade was "opened up". The conventional models, engaged with the same—historically suspect—situation as that with which we are concerned, derive greater significance from the implicit proposition that, as the opening-up of trade is beneficial, the closing-down of trade is detrimental. This conclusion has, of course, important policy implications.

Assume that our model leads to the conclusion that the opening-up of trade was unequivocally detrimental for a particular country. Does the significant conclusion follow that a closing-down of trade would be beneficial? The important answer to this question is *no*. The reason why it would be disadvantageous to close down trade follows directly from the functioning of our model.

The opening-up of trade was detrimental as the economy had a subsistence per capita income and lacked the capacity to respond to changes in the price structure. *To close down trade would be to change prices once again.* Here the symmetry in the mechanics of conventional models contrasts with the asymmetry in the operation of our model. In conventional models, the opening-up of trade gives marginal gains and the closing-down of trade brings marginal losses. In our model, the opening-up of trade eliminates one part of the economy. A closing-down of trade eliminates another part. It is thus not only the opening-up of trade which causes difficulties but any economic change to which a country lacks the capacity to respond.

Throughout the various cases in which we analyzed the opening-up of trade, we assumed that international prices remain unchanged. However, as growth and transformation abroad leave their economic imprints, international prices will always be changing. As prices always change, the mechanism of our model will always be in operation. There will be a "continual opening-up of trade" in the sense that prices will continually be changing. The  $v$  function of the export sector may move up and down.

If the production of goods for export grows more slowly than the foreign markets for the particular export goods which the country produces, export prices will increase. Conversely, if the opposite rela-

tionship between the growth of export production and the growth of export demand obtains, export prices will fall. Changes in the export-mix are ruled out by lack of reallocative ability. Thus, even if we do not run into a limited supply of land, the  $v$  function of the export sector may be falling from the high position to which the opening-up of trade lifted it. A growth-induced fall in prices may even press the  $v$  function of the export sector below  $v_a$ . Bhagwati has spoken about "immiserizing growth".<sup>1</sup> Export prices may also fall because of absolutely shrinking foreign markets. If the price fall is sufficiently drastic, the former export sector will be exposed to the same fate as the import-competing sector, although it is now waning foreign demand rather than internal demand that triggers off an elimination process. If the circumstances responsible for such a fall in the  $v_e$  function are prolonged, due to structural changes rather than to business cycle influences, the effect may be an elimination of the whole export sector.<sup>2</sup> The "hazards of trade", to which there are some casual references in trade theory literature, become in our model potential calamities. Seen from this angle, the terms-of-trade movements for u-countries become more important than in current theory.

This observation about the *continual* opening-up of trade via price changes implies an immense generalization of our model. It becomes an instrument not for the analysis of a particular period in the hazy past, the existence of which we may doubt, but for the understanding of the living present and the undoubtable past, as well as of future developments.

We have already noted in passing that sharp criticism of trade theory and its relevance for underdeveloped countries has been voiced. The generalization of our model which has been made in this section enables us to relate our own model to this criticism, often referred to as the Prebisch-Singer-Myrdal thesis.<sup>3</sup> The analyses of these economists of the

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<sup>1</sup> J. N. Bhagwati, "Immiserizing Growth: A Geometrical Note", *Review of Economic Studies*, 25: 201-205 (June 1958); *idem*, "International Trade and Economic Expansion", *American Economic Review*, 48: 941-953 (December 1958).

<sup>2</sup> One is reminded of Sicilian sulphur, Chilean nitrate, and perhaps of the rubber plantations as examples of where this has happened or is happening.

<sup>3</sup> See the United Nations paper written by Raúl Prebisch, *The Economic Development of Latin America and Its Principal Problems* (Lake Success, N.Y., 1950) and his paper "Commercial Policy in the Underdeveloped Countries", *American Economic Review*, 49: 251-273 (May 1959); Hans W. Singer, "The Distribution of Gains between Investing and Borrowing Countries"; G. Myrdal, *Economic Theory and Under-developed Regions* (London, 1957).

detrimental effects of unhampered trade on underdeveloped countries contain many elements. For this reason, it is impossible to do justice to these contributions in a short presentation. However, at the heart of their argument lies an allegation of a terms-of-trade squeeze of underdeveloped countries.

As these economists have been primarily concerned with the problems of development of underdeveloped countries, it is natural that they have not come to look upon their investigations as a study of the effects of trade on countries lacking reallocative and growth ability. A marked terms-of-trade squeeze implies, however, as Kindleberger has stressed in his monograph on terms-of-trade problems,<sup>4</sup> a pronounced lack of reallocative ability.<sup>5</sup> The continuous growth of a certain export industry might under conditions of reallocative inability—as we have seen in our model—fail to bring many benefits. Thus, our analysis of the effects of the continual opening-up of trade on u-countries has much in common with the Prebisch–Singer–Myrdal thesis as this thesis has been interpreted here. We reach the same qualified conclusions in respect to the advantages of foreign trade for underdeveloped countries. Our model might even serve as a formalization of a central line of thought in the contributions of Prebisch *et consortes*. An advantage of analyzing explicitly the effects of trade under conditions of reallocative and growth inability is that a more effective rejection of current doctrine and thus a greater detachment in the analysis can thereby be obtained. We have more to say than that underdeveloped countries gain less from trade than they “ought to”. The fact that underdeveloped countries benefit less from trade than they “should” need not be explained by reference to any monopolistic plot or greedy unwillingness to trade on more favorable terms on the part of the industrialized countries, as has been alleged, but upon the inability of the u-countries to respond to the challenge of trade and economic change.

#### *Some empirical observations*

The purpose of constructing a model like the one we have presented here is to be able to discuss rigorously the relationship between those variables which we choose to single out from reality in order to achieve

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<sup>4</sup> Charles P. Kindleberger, *The Terms of Trade: A European Case Study* (New York and Cambridge, Mass., 1956), chap. 13.

<sup>5</sup> In industrial countries this inflexibility is, on the whole, the result of physical conditions—such as non-existent or scarce raw material resources—which rule out domestic production of certain goods.

a manageable approximation of the unmanageable reality. The usefulness of such an exercise depends upon the explanatory or predictive powers of the analytical results. To test the value of the model, empirical work is of course ultimately necessary.

Unfortunately, this task cannot be undertaken here. A full-fledged empirical test is beyond the scope of this book. In any case, our analysis of the impact of trade on u-countries could not be substantiated by reference to international statistics. The extinction process is singularly elusive from a quantitative point of view. Aggregate population data, for instance, are of no use. Population may increase or decrease at various rates during the process we have described. Similarly, aggregate income may increase or decrease, while the same is true of per capita incomes. Any simple analysis of more disaggregated statistics is made impossible by the notoriously poor quality of statistics in countries at times when they were, or are, in a pre-take-off phase. Furthermore, it is necessary to distinguish carefully between reallocation and elimination. The fact that industries are outcompeted under the impact of trade is not in itself extraordinary. It is part of a conventional reallocation process and a means of reaching a desirable end. Elimination in our sense is when industries are outcompeted without reallocation. Examples of elimination would provide the starting-point for the empirical unfolding of sequences discussed in our various cases.

The verification of our model would have to depend on an essentially qualitative and detailed analysis. It may well be that a scrutiny of treatises on economic history would furnish plenty of material, the interpretation of which would require our theory rather than current theory. But it is even more probable that the statistically elusive processes of elimination have escaped attention in empirical studies unguided by theoretical hypotheses concerning their existence.

We shall limit ourselves to an attempt to show that our model might be of some use in explaining the economic developments of southern Italy after unification. It is well-known that the economic upsurge in the north has not been paralleled in the south of Italy. It is also well-known that when southern Italy became more exposed to trade at the time of unification, handicrafts were well-developed in the south. Whether the south or the north was, at the time, the more advanced region has proved to be a controversial question.<sup>6</sup> Eckaus, after a careful

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<sup>6</sup> R. S. Eckaus, "The Development of Regional Economic Differentials in Italy: North and South at the Time of Unification", to be printed.



study of available data, concludes, however, that "the evidence points to a clear superiority, at the time of unification, of the North over the South in terms of per capita output and income".<sup>7</sup> If this was so, the north would have been in a position to outcompete the south, which at the same time was neither so backward that it had no industries that could be outcompeted, nor so advanced that it possessed the capacity to reallocate or to adjust factor rewards downwards in the import-competing sector without falling below subsistence level. Under such circumstances, an elimination process could have been initiated by trade. In fact, the percentage of workers in industry and transport in the south seems to have declined after unification.<sup>8</sup> Furthermore, still according to Eckaus, "the relatively poor showing of agriculture from unification to World War I was particularly pronounced in the South".<sup>9</sup> This might indicate that there was some decline in manufacturing not matched by an upsurge elsewhere or, in other words, that an elimination process was going on.

An ILO study, *Social Aspects of European Economic Co-operation* (by a group of experts with Professor Saraceno of Milan as a member and Ohlin in the chair), notes that at the time of unification it was taken for granted that political unification would bring about a more rapid expansion in all the states. The poverty of the south was regarded not as an obstacle but as an advantage because of the attractively low wages. However, in actual practice, the elimination of the tariff walls which for the south were about four times as high as those applied in the other Italian states "led to the virtual disappearance of the southern industries, while those of the north (which initially were only weakly protected) enjoyed most of the advantage of the new national market".<sup>1</sup> The same conclusion has also been drawn by Myrdal:

"the hampering of industrial growth in the poorer southern provinces of Italy, caused by the pulling down of internal tariff walls after Italy's political unification in the last century is a case in point which has been thoroughly studied: industry in the northern provinces had such a lead, and was so much stronger, that it dominated the new national market, which was the result of

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<sup>7</sup> Eckaus, p. 35.

<sup>8</sup> Eckaus, table 1, p. 7.

<sup>9</sup> R. S. Eckaus, "The Development of Regional Economic Differentials in Italy: North and South after Unification", to be printed, p. 31.

<sup>1</sup> International Labour Office, *Social Aspects of European Economic Co-operation. Studies and Reports*, n.s. No. 46 (Geneva, 1956), p. 15.

political unification and suppressed industrial efforts in the southern provinces."<sup>2</sup>

Since our model is a device for theoretical simplification, it is, of course, much too blunt an instrument to be applied, with any claims to precision, to a complete historical case. First-hand knowledge of the empirical material is really needed. To suggest tentatively that the Italian case could be analyzed to more advantage through the application of our model than through the reallocation model might nonetheless be permitted.

And, even if the empirical support we have been able to give our model is weak,<sup>3</sup> it is useful to have investigated deductively the consequences of the lack of reallocative ability at subsistence incomes. There should be little doubt that, in the world of today, many countries are plagued by exactly these characteristics. As already pointed out, Kindleberger in his monograph on the terms-of-trade emphasizes that much of the widespread concern in respect to terms-of-trade movements is due to factor inflexibility.<sup>4</sup> As concerns the subsistence incomes, we are all aware of the fact that a high proportion of the world population suffers from malnutrition. The apparently simultaneous existence in certain countries of the basic conditions for our model—lack of reallocative ability at subsistence incomes—strengthens the possibility that this model could serve a useful alternative to current doctrine.

<sup>2</sup> G. Myrdal, *Economic Theory and Under-developed Regions*, p. 28.

<sup>3</sup> Perhaps the following quotations could be of some interest, although it is, of course, possible that their authors have temporarily forgotten that the opening-up of trade is always likely to destroy some parts of an economy. The big question is whether the resources are reallocated or whether they vanish. W. A. Lewis: "quite highly developed handicraft industries [in India] were adversely affected by cheap imports from Lancashire and from Birmingham."—See *The Theory of Economic Growth* (London, 1955), p. 347; G. Myrdal: "Examples are easy to find of under-developed countries whose entire culture has been impoverished as trading contracts with the outside world have developed. In Baghdad, for example, of the old handicrafts for which the city was famous there survive only a few silversmiths who themselves have adopted patterns from abroad requiring less craftsmanship. Similarly, it is only with the greatest difficulty that one can buy a book of Arabic literature, while cheap magazines in English or Arabic abound," in *Economic Theory and Under-developed Regions*, p. 52; William Ashworth: "But contact with the outside world did not bring about a comparable change in the methods of existing native activities carried on for local consumption. In some cases native industries were partly undermined by the competition of machine-made imports; instead of being mechanized they diminished," in *A Short History of the International Economy 1850-1950* (London, 1952), pp. 76-77.

<sup>4</sup> Charles P. Kindleberger, *The Terms of Trade: A European Case Study*, chap. 13.

## B. Growth countries

In the preceding section we constructed a model showing that, under certain—plausible—conditions, the conventional “gains from trade” analysis overstates the desirability of an opening-up of trade. We shall now show that under other conditions, i.e., those of the conventional models, gains from trade are *understated*.

Countries with an ability to *reallocate* factors of production are likely to be able to *accumulate* material resources at a rate faster than that at which population increases, and they are thus probably passing through a process of economic growth reflected in rising per capita incomes. It is our contention that the growth path under trade will differ substantially from the growth path under autarchy. It is the task of “gains from trade” analysis and structural analysis to assess these differences. Even if there is ample evidence in international trade literature that trade theorists are not unaware of the effects of trade on growth, the formalized models give an incomplete picture. These models do not compare the growth paths. They compare one stationary equilibrium, the pre-trade one, with another stationary equilibrium, the one under trade with resources and consumption reallocated according to new price relationships. The results of present theory are, however, of extremely great importance as a foundation for a more complete analysis. Indeed, the contribution we are going to make may be looked upon as a mere manipulation of the results of the traditional models once the results of these models are firmly established. Perhaps even the amplifications which will be suggested are so well understood that trade economists have simply not bothered to make them explicit. There is, however, little ground for assuming this to be the case. Even the obvious can remain obscure, and there are reasons to believe that this is a case in point. The following survey of the existing literature on the effects of trade on growth will illustrate this.

### *The theme of Trade and Growth in the theoretical literature*

In Ohlin's *Interregional and International Trade*, it was pointed out that “. . . the supply of industrial agents may sometimes more adequately be described as the *result* of trade than as its cause . . .”<sup>5</sup> Ohlin

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<sup>5</sup> Bertil Ohlin, *Interregional and International Trade*, Harvard Economic Studies, Vol. XXXIX (Cambridge, Mass., 1933), p. 67. Italics in original. In his earlier book, *Handelns Teori* (Stockholm, 1924), Ohlin expresses the same thoughts, although perhaps less emphatically. See pp. 110–112.

did not, however, go beyond the neoclassical reallocation approach here. Instead, our quotation is the conclusion of a piece of analysis where Ohlin incorporates into the reallocation analysis changes in factor totals brought about by trade-induced changes in *factor prices*. The Heckscher-Ohlin theorem of trade and factor prices made it possible, using various assumptions as to the slope of the supply curve, to say something about such effects of trade on factor totals.

This approach has been followed by many writers trying to analyze the mutual relationship between trade and factor supplies by tamely stretching the axis in box diagrams.<sup>6</sup> However, this type of analysis is not necessarily very useful. Firstly, utter confusion reigns as to what the effects of trade on factor prices actually are. Secondly, the slope of the supply curves of aggregates such as labor and savings is uncertain. If the supply is completely inelastic—as we shall assume in our model—factor price changes would be of no importance even if we happened to know in which direction factor prices have moved.

Useful or not, the inclusion of price-induced changes in factor totals could never in any circumstances be an analysis of the growth effects of trade. It could, instead, be regarded as a final development within the reallocation framework. Thus, it does not reduce the validity of our proposition that trade theory has come to ignore the growth aspect of international trade as originally stressed, along with the reallocation aspect, by Adam Smith and John Stuart Mill. We shall now take a look at these classical contributions and some later expositions also emphasizing the effects of trade on growth.

It is Hla Myint who has most emphatically brought attention to the fact that Smith and Mill did not speak solely of the reallocative effects.<sup>7</sup> Even if Smith's distinction between reallocation and growth effects is not very articulate, Myint's analysis of Smith's intentions is convincing.<sup>8</sup> It is founded on the general, and correct, observation that the "scarcity" concept, so dear to the neoclassicists, was not of central importance in the classical writings. The classical writers were as interested in the general growth of productive forces as in the rational employment of

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<sup>6</sup> See, e.g., K. M. Savosnick, "The Box Diagram and the Production Possibility Curve", *Ekonomisk Tidskrift*, 60: 183-197 (September 1958).

<sup>7</sup> Hla Myint, *Theories of Welfare Economics* (London, 1948), pp. 3-4, 53-65 and 83-88; *idem*, "The 'Classical Theory' of International Trade and the Underdeveloped Countries", pp. 318-319.

<sup>8</sup> G. Haberler has subscribed to Myint's interpretation of the classical theory. See his *International Trade and Economic Development* (Cairo, 1959), p. 9.

these forces. Thus, in Myint's terminology, the "widening effects" as well as the "tightening-up effects" of international trade attracted attention. Smith observed that:

"The industry of the society can augment only in proportion as its capital augments, and its capital can augment only in proportion to what can be gradually saved out of its revenue. But the immediate effect of every such [trade] regulation is to diminish its revenue, and what diminishes its revenue is certainly not very likely to augment its capital faster than it would have augmented of its own accord, had both capital and industry been left to find out their natural employments."<sup>9</sup>

Mill spoke of the "indirect effects [of trade] which must be counted as benefits of a high order" when he wanted to draw our attention to how "a country which produces for a larger market than its own, can introduce a more extended division of labour, can make greater use of machinery, and is more likely to make inventions and improvements in the processes of production".<sup>1</sup>

Even if, since Mill, the reallocation analysis has become the prime occupation of trade economists, awareness of the growth effects of trade has not, however, disappeared completely. It has always existed—at least in the form of a bad conscience. In a trenchant criticism of trade theory in general, and its scope in particular, John H. Williams formulated in 1929 four propositions, the second of which is of present interest:

"... the relation of international trade to the development of new resources and productive forces is a more significant part of the explanation of the present status of nations, of incomes, prices, well-being, than is the cross-section value analysis of the classical economists, with its assumption of given quanta of productive factors, already existent and employed."<sup>2</sup>

Such plain language, mistaken only in blaming the classical economists rather than their followers, should, in coming from an influential economist, have been more effective than it actually was. But Ohlin's *Inter-regional and International Trade*, which has been of largely decisive influence with respect to the development of trade theory during recent decades, was already completed in its theoretical framework. And, as we have already pointed out, Ohlin's vision of the scope of international

<sup>9</sup> Adam Smith, *Wealth of Nations*, Vol. I, Book IV, chap. II, p. 423.

<sup>1</sup> John Stuart Mill, *Principles of Political Economy*, Book III, chap. XVII, § 5, p. 351.

<sup>2</sup> John H. Williams, "The Theory of International Trade Reconsidered", reprinted in *Readings in the Theory of International Trade*, pp. 253-271. Quotation from Readings, p. 255.

trade theory was formed in the neoclassical tradition rather than inspired by the wider classical approach. However, even if it is true that the analytical attractiveness of the Heckscher–Ohlin theorem has prevented attention from being focused on growth aspects in trade theory, there are many instances in more recent literature where the growth effects have been duly recognized. Romney Robinson, in an interesting attack on trade theory, rediscovers that:

“the most important aspect of trade... (is)... its stimulus toward creation of *new* productive factors, the resulting gains being far in excess of those likely to be derived by raising the marginal product of existing factors.”<sup>3</sup>

In the field of applied international economics, similar observations as to the growth effects of foreign trade have been made. These have not generally been forwarded as criticisms of pure trade theory but have rather been advanced as explanations of historical facts. D. H. Robertson notes that:

“The specialisations of the nineteenth century were not simply a device for using to the greatest effect the labours of a given number of human beings; they were above all an engine of *growth*.”<sup>4</sup>

In the reams of literature on economic development, the rôle of international trade is, in texts on history as well as on policy, often conceived of as an “engine of growth”. Nurkse and Lewis can be mentioned among the many economists who have stressed international trade in their interpretations of historical growth patterns.<sup>5</sup>

It may also be noted that Ohlin himself has given clear evidence of his being very much aware of the growth effects of trade, even if these remained in the background in his *magnum opus*. In an ILO report by a group of experts, the chairman of which was Ohlin, it is stated that “the most important contribution of freer trade to the raising of living standards is through its effects on economic growth”.<sup>6</sup> Economies of

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<sup>3</sup> Romney Robinson, “Factor Proportions and Comparative Advantage: Part II”, *Quarterly Journal of Economics*, 70: 346 (August 1956). Italics in original.

<sup>4</sup> D. H. Robertson, “The Future of International Trade”, *Economic Journal*, 48: 1–14 (March 1938), reprinted in *Readings in the Theory of International Trade*, pp. 497–513. Quotation from Readings, p. 501. Italics in original.

<sup>5</sup> Ragnar Nurkse, “Some International Aspects of the Problem of Economic Development”, *American Economic Review*, 42: 571–583 (May 1952), reprinted in *The Economics of Underdevelopment*, ed. A. N. Agarwala and S. P. Singh, pp. 256–271; W. Arthur Lewis, *The Theory of Economic Growth*, particularly pp. 274–283.

<sup>6</sup> International Labour Office, *Social Aspects of European Economic Co-operation. Studies and Reports*, p. 11.

scale and of specialization, improvements in business organization, and more rapid diffusion and application of technical advances were indicated as being the main ways in which freer trade stimulates growth.

An even more strongly worded espousal of the "growth from trade" tenet comes from Haberler. In his Cairo lectures, *International Trade and Economic Development*, he adopts a truly classical interpretation of the rôle of trade.<sup>7</sup> The growth effects receive due attention along with the effects of reallocation:

"If we were to estimate the contribution of international trade to economic development, especially of the underdeveloped countries, solely by the static gains from trade in any given year on the usual assumption of given production capabilities . . . we would indeed grossly underrate the importance of trade. For over and above the direct static gains dwelt upon by the traditional theory of comparative cost, trade bestows very important indirect benefits, which also can be described as dynamic benefits, upon the participating countries."<sup>8</sup>

Haberler goes on to list various "dynamic benefits" and expands the discussion into an elaboration of each point. As a background for our own study, let us quote the following passage from Haberler where he lists the growth effects:

"First, trade provides material means (capital goods, machinery and raw materials and semifinished materials) indispensable for economic development. Secondly, even more important, trade is the means and vehicle for the dissemination of technological knowledge, the transmission of ideas, for the importation of know-how, skills, managerial talents and entrepreneurship. Thirdly, trade is also the vehicle for the international movement of capital especially from the developed to the underdeveloped countries. Fourthly, free international trade is the best antimonopoly policy and the best guarantee for the maintenance of a healthy degree of free competition."<sup>9</sup>

In an interesting piece of analysis, Fritz Abb has taken a different line of approach.<sup>1</sup> Whereas Haberler and others have enumerated the reasons why trade may stimulate growth in general terms, Abb has reduced these reasons to one particular consequence of the opening-up of trade. He contends that the capital-output ratio will be lowered as trade is opened up. Through the reallocation gains, output will go up without there being any increase in capital. Within the framework of a

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<sup>7</sup> G. Haberler, *International Trade and Economic Development*.

<sup>8</sup> Haberler, p. 10.

<sup>9</sup> Haberler, p. 11.

<sup>1</sup> Fritz Abb, "Die Aussenwirtschaft in der Modellanalyse des ökonomischen Wachstums", *Zeitschrift für Staatswissenschaft*, 114: 468-490, particularly pp. 482-485 (Heft 3, 1958).

Cassel-Harrod-Domar model, he then observes how a lower capital-output ratio augments the rate of growth. Although it is not self-evident or logically necessary that the capital-output ratio *in the future* will be as low as it becomes just after trade is opened up and the reallocation gains are made, and although the treatment is inconsistent insofar as it neglects the effects of the reallocation gains as such on the growth path, Abb's paper represents a stimulating attempt to compare the growth paths under trade and under autarchy.

Although of different origin, interesting contributions to the "growth from trade" problem can also be found in location theory. The old Weberian approach describes a typical sequence of stages from subsistence farming through gradual industrialization. It has, however, been contended that this analysis is irrelevant as an explanation of regional development in North America. Pioneering empirical work by Innis focused attention instead on the rôle of staples, such as fish, fur, gold, lumber and grain, in the regional development of North America.<sup>2</sup> As production of staples means production for export, it is evident that the "staple" theory—as opposed to the "stages" theory—touches on the problem of growth from trade.

The "staple" approach is very clearly presented in a paper by Douglass C. North.<sup>3</sup> For his analysis of what he refers to as "development as capitalist venture", he formulates a model under the assumption of response to profit opportunities, interregional capital and labor mobility, and the absence of population pressure. The development of North's region in its early stages is a function of the success of its export base consisting of staple commodities. Industry auxiliary to the export industry will develop and magnify the contribution to total growth which is made directly by the export sector. As the process goes on, the relative importance of the primary export base will shrink. In the later stages of the process as analyzed by North, the region achieves economic proportions enabling it to feed its own growth process through indigenous savings. The region will still belong to a larger whole, but it will be less exposed to capricious shifts in the structure of world demand.

What emerges is a model of trade and growth with several attractive features. The whole process is generated by trade. Reallocation is not focussed on, but instead a growth path under trade as distinct from a

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<sup>2</sup> Harold A. Innis, *Problems of Staple Production in Canada* (Toronto, 1933), and other works.

<sup>3</sup> Douglass C. North, "Location Theory and Regional Economic Growth", *Journal of Political Economy*, 63: 243-258 (June 1955).



growth path under autarchy. Emphasis is always on the *cumulative* effects of world demand for staples. Initially, the region—being more or less an economic vacuum—has to rely on an influx of factors. But, as soon as the process of growth has started, the assumption of inter-regional factor mobility is in no way essential. If it is relaxed, the result will probably only be a slower pace in the growth of the region, at least during the period it would be likely to be a net receiver of resources, i.e., presumably during the early stages. Thus, even if we wished to isolate the effects of trade from the effects of factor movements, the model could still provide an analytical framework.

We have now given some examples, although not a full account, of how the growth effects of trade have been observed in trade theory literature. These contributions are exceptions to our rule that the growth effects have been ignored, but the exceptions are so few that it is safe to conclude that they prove the rule. However, it is nonetheless clear from the literature we have discussed that it would be dangerous to claim that the positive model which we are to construct is something completely novel. However, we shall try to achieve some important improvements over the earlier presentations. Above all, we hope to be able to state very precisely the conditions necessary for trade to stimulate growth. In the first place, this will help us to avoid the mistaken judgment (made, for instance, by Haberler) that underdeveloped countries have fared particularly well from trade. If our model for u-countries holds good, this cannot be true. In the second place, a precise statement of the assumptions under which trade will generate growth will make it possible for us to ascertain under what conditions trade will impede growth *in growth countries*. In this way, we shall be able to interpret and pass judgment on the List and the Manoilescu trade theories. Our model will help us to show that there is no logical contradiction, but a difference in assumptions, between the two schools—the one emphasizing growth gains, and the other growth losses, from trade. It should be noted that we shall discuss the List and the Manoilescu arguments in this chapter on growth countries, and not in the chapter on u-countries, as these two arguments presume the existence of an inherent growth capacity in the countries concerned.

Apart from stating more rigorously the conditions necessary for trade to stimulate growth, we shall try to penetrate more deeply into the effects of trade on the relationships which are usually regarded as strategic for the growth of a country. Among other things, we shall take into account the effects of the reallocation gains on the subsequent

growth path. Apparently, only Smith has pointed out that the reallocation gains result in a higher total income out of which larger savings will subsequently flow.<sup>4</sup> Over time, such additions to savings will have very significant effects. This important feature of the process must not be ignored if we are to make use of the reallocation analysis as an important stepping-stone in the construction of a more complete theory.

It is in the spirit of the contributions which we have just reviewed that our own model will be constructed. We shall study how and why the growth path under trade differs from the growth path of the same country under autarchy. But, before we begin this study, we shall first discuss two groups of models which are also concerned with trade and growth but which deal with different aspects.

*Two groups of theories dealing with special problems of trade and growth*

The first of these two groups of models studies the transmission of growth through the terms-of-trade. It is impossible to do justice to these elaborate exercises in pure theory in a short presentation. A detailed discussion, however, would not be justified since we are not going to use these models as a basis for our own model. Their characteristic feature is that they assume a process of growth in productive capacity going on in one country ("Mancunia"). They investigate the effects of this capacity-growth process, as transmitted through terms-of-trade changes, on the real income of the growing country itself and on the real income of a stagnant country ("Agraria"), these two countries being trading partners. In the simplest case, if there is complete specialization and if the *A*-good (produced by country *A*) is not inferior, the growing country *M* will demand more goods from the static country *A*. But, as the supply in *A* is unchanged, more goods cannot be supplied at unchanged prices. The terms-of-trade will turn against *M*. Part of the growth gains will accrue to *A*. As soon as we introduce incomplete specialization, however, growth in *M* may be concentrated on the imported good and there need no longer be a terms-of-trade improvement for *A*. In short, it can be shown that, as we complicate our assumptions, the terms-of-trade may move in any direction, depending upon the nature of the growth process with respect to its trade bias (import-biased, export-

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<sup>4</sup> Haberler, for instance, speaks instead of capital accumulation taking place independently of international trade. See his *International Trade and Economic Development*, p. 9.

biased) and its factor intensity (neutral, capital-using, capital-saving progress); furthermore, the outcome will depend upon the income elasticities of the traded goods and the propensities to import.<sup>5</sup> We may finally note that, without changing the method of analysis, we can deal with the effects of capacity growth taking place in both countries at the same time.

Although the results are inconclusive, the taxonomy is useful. We have learnt that we do not know whether growth gains will, through trade, be transmitted from growing to stagnant countries. And we are able to specify in the model the conditions for the one or the other outcome. However, these models—although avowedly dealing with “trade and economic growth”—put their problem in a different way from that in which we want to put ours. Essentially, it is a question of how the growth in capacity is dealt with. In our model, it is going to be the object of analysis. In the terms-of-trade models, capacity growth is assumed to take place *exogenously*. What is analyzed instead is how terms-of-trade changes, in the wake of capacity growth, can influence the income growth path so that capacity growth and income growth are not identical. Thus, the terms-of-trade models do not investigate what, after all, is the primary problem, i.e., in what way the capacity growth path under trade differs from the capacity growth path under autarchy. They are only interested in the deviations of the income *growth* path from an assumed capacity growth path. Such deviations are caused by terms-of-trade changes accompanying capacity growth in an open economy. This secondary problem is, of course, also of great interest. In order to simplify our own analysis we could, however, assume that no terms-of-trade changes take place. Capacity growth and income growth are then identical.

In his *Patterns of Trade and Development*, the Wicksell lectures of 1959, Nurkse repeatedly stressed the rôle of trade as an “engine of

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<sup>5</sup> See J. R. Hicks, “An Inaugural Lecture”, *Oxford Economic Papers*, n.s. 5: 117–135 (June 1953); E. J. Mishan, “The Long-Run Dollar Problem: A Comment”, *Oxford Economic Papers*, n.s. 7: 215–220 (June 1955); H. G. Johnson, “Economic Expansion and International Trade”, *Manchester School*, 23: 95–112 (May 1955), reprinted in his *International Trade and Economic Growth*, pp. 65–93; W. M. Corden, “Economic Expansion and International Trade: A Geometric Approach”, *Oxford Economic Papers*, n.s. 8: 223–228 (June 1956); R. Findlay and H. Grubert, “Factor Intensities, Technological Progress, and the Terms of Trade”, *Oxford Economic Papers*, n.s. 11: 111–121 (February 1959). Not shaped in the same form, but basically similar, is the paper by D. M. Bensusan-Butt, “A Model of Trade and Accumulation”, *American Economic Review*, 44: 511–529 (September 1954).

growth".<sup>6</sup> In his analysis of the mechanics of this engine, the emphasis was on how "a vigorous process of economic growth came to be transmitted from the center to the outlying areas of the world".<sup>7</sup>

It is evident that Nurkse tried to use terms-of-trade models exclusively in his analysis of the effects of trade on economic growth. To understand the nature of the terms-of-trade models, it is illuminating to study how such an attempt failed.

To explain why countries such as Canada, Australia and New Zealand experienced trade-induced growth so markedly in the last century, while other countries, such as Malaya, Egypt, Indonesia and most of the oil-producing countries, are still underdeveloped although they have participated in world trade for an equally long period was an awkward problem for Nurkse. As we might expect from the analytical framework Nurkse used, the explanation he forwarded was that the nineteenth-century pattern of trade transmitted more "growth" than the present pattern. He listed six reasons why growth transmission now is weaker: (1) the concentration of industrial production in the growing economies is shifting away from industries where the raw material content of finished products is high to industries where it is low, (2) as a special case of this movement, the rising share of the service industries in total output tends to slow down in the increase in demand for raw materials, (3) income elasticity for many agricultural commodities tends to be low, (4) agrarian protectionism, (5) economies in the use of raw materials, and (6) the spreading use of synthetics.<sup>8</sup>

It could immediately be observed that certain offsetting factors have been omitted. It is impossible to disregard depletion in the "center", newly-created demand for raw materials like uranium, bauxite and oil, and the rise of new consumers of raw materials like Japan, who has become a member of the "center" only during the course of the present century. It is highly disputable what the net effects have been. In any case, it is insufficient to argue that there has been a declining rate of increase in demand for goods from the "outlying" countries. As long as there has been any increase at all in absolute terms, the present pattern of trade should transmit even more gains than the nineteenth-century pattern. Only absolute falls in demand could have worsened the situation. But, if demand has passed some peak already, it remains to clarify

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<sup>6</sup> Ragnar Nurkse, *Patterns of Trade and Development* (Stockholm, 1959).

<sup>7</sup> Nurkse, p. 14.

<sup>8</sup> Nurkse, p. 23.

why these countries did not at that time experience the same growth process as Australia, New Zealand, etc.

A model which distinguishes between the effects of trade with respect to growth countries, on the one hand, and countries with poor response to profit opportunities at low income levels, on the other, can explain what has happened without bothering with the net effects of changes in the terms-of-trade. The reason why trade to some people seems to have less of a growth effect nowadays could, in fact, simply be that all those members of the "outlying area" who were easy to stimulate have already experienced a trade-supported growth process and joined the "center", leaving for trade in the present century the task of trying to incite the most hard-frozen underdeveloped countries. The result of trade on the development of underdeveloped countries being less spectacular in the twentieth than in the nineteenth century one is enticed to speak about decreased "growth transmission" from the "center" to the "outlying areas". In this way, attention is focused on something that may or may not be true but that is relatively unimportant. The growth countries may very well have been helped by successive terms-of-trade improvements, but it would be a great underestimation of the growth effects of trade not to see that trade, irrespective of the terms-of-trade changes, has generated a faster growth in capacity than would have occurred under autarchy. The underdeveloped countries, on the other hand, have experienced no, or very limited, capacity growth. Whether they have had any income growth from terms-of-trade improvements is an open question. In our language, it is a question of whether, once trade has been opened up, the  $v_e$  function has been shifting upwards or downwards over time. In fact, the terms-of-trade models are excellent means of illustrating how there is a "continual opening-up of trade" in the sense we used this expression in the model of u-countries. Nurkse's six reasons could be interpreted as arguments in favor of the view that the  $v_e$  function has been falling over time.

A second group of theories deals with still another aspect of trade and growth.<sup>9</sup> Trade is not always balanced. If an economy has an export

<sup>9</sup> See Roy F. Harrod, *Towards a Dynamic Economics* (London, 1948), pp. 101-115; H. G. Johnson, "Equilibrium Growth in an International Economy", *Canadian Journal of Economics and Political Science*, 19: 478-500 (November 1953), reprinted in *International Trade and Economic Growth*, pp. 120-149; Henry J. Bruton, "Growth Models and Underdeveloped Economies", *Journal of Political Economy*, 63: 322-336 (August 1955), reprinted in *The Economics of Underdevelopment*, ed. A. N. Agarwala and S. P. Singh, pp. 219-241; and the two papers by James

surplus, part of the savings of that economy is invested abroad. If it runs an import surplus, more than is saved internally is invested at home. By undoing the identity between investment and domestic savings, trade will influence the rate of growth of the economy.

In principle, the rate of growth of a capital-exporting country will be lower and that of a capital-importing country higher than if trade had been balanced. But, at least for capital-exporting countries, this outcome may be reversed by means of returns from foreign investments, the terms-of-trade improvements that may follow from investments in the export sector—i.e., often in the raw material sector—of the capital-importing countries, and increased marginal productivity of home investments. If a capital-exporting country has a higher rather than lower rate of growth, this does not imply that the capital-importer has a lower rate of growth instead of the expected higher one. The reason why it is even probable that both countries have a higher rate of growth is that the capital movements—to the extent they are not perverse—bring about a more efficient allocation of resources and thus a higher total income to be divided between the two countries.

As we see, the problem taken up in these models is very different from ours. These models study the impact of trade imbalances, i.e., *capital movements*, on the rate of growth under trade, whereas—to repeat once again—we want to study the differences in growth under trade and under autarchy. The analytical complications which would arise from trade imbalances can be eliminated by simply assuming that trade is always balanced.

#### *Assumptions of our model*

(a) There is assumed to be no pressure from population growth. This could well mean that there is some population growth but we shall, for simplicity, assume that the actual rate is zero. There will be no international migration of labor. Alternatively, we could assume that internal population changes and migration offset each other. Thus, a percentage increase in total income ( $Y$ ) will lead to the same percentage increase in per capita income ( $y$ ). We shall also assume that the working population is a constant fraction of the total population. Thus, the supply of

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C. Ingram, "Capital Imports and the Balance of Payments", *Southern Economic Journal*, 22: 411-425 (April 1956) and "Growth in Capacity and Canada's Balance of Payments", *American Economic Review*, 47: 93-104 (March 1957); Fritz Abb, "Die Aussenwirtschaft in der Modellanalyse des ökonomischen Wachstums", pp. 476-482.

labor is affected neither positively nor negatively by changes in the wage rate. The working population is assumed to be fully employed. We are not interested in cyclical phenomena, only in full-employment output through time.

(b) The savings ratio is assumed to be constant. The volume of savings which equals the growth of the stock of capital is explicitly assumed to be a variable of  $Y$  only. The accumulation of real capital is thus assumed to be unaffected by changes in the price of capital. The total inputs of both labor and capital are thus—as distinguished from the models with changes in factor totals brought about by trade-induced factor price changes—unaffected by factor price changes.

(c) There is assumed to exist a relationship between total income and the stock of real capital ( $K$ ) which, as employment has been assumed to be constant, can be expressed as  $Y_t = f(K_t)$ . The form of the function  $f$  can, actually, implicitly express an assumption as to technological progress, too. Furthermore, it is assumed that the form of the function  $f$  is such that it gives, together with our assumption as to savings, an exponential growth of total income. (Confer equation (1) below.) As one possibility, we might suppose that  $f$  is linear, i.e.,  $Y = \alpha K + \alpha_0$ , where  $\alpha$  and  $\alpha_0$  are constants. In this case the percentage growth of  $Y$  equals  $\alpha$  times the savings ratio.

(d) The economy will be assumed to respond to profit opportunities. Together with our assuming the absence of pressure from population growth, this assumption clearly distinguishes the economy from that of a u-country. Response to profit opportunities means that factors will be reallocated when trade is opened up. Although reallocation is a time-consuming process, it *will be treated as if instantaneous*. Our model is not intended, any more than are the traditional reallocation models, to analyze the problems of adjustment during the reallocation phase.

(e) Various internal economic circumstances are assumed to fulfil the marginal conditions so that reallocation, when trade is opened up, results in gains as set out in the traditional “gains from trade” analysis.

Even if the internal marginal conditions are fulfilled, the elimination of *some* trade restrictions is not sufficient to ensure reallocation gains. This follows from the theorem of the second-best. When we speak of the “opening-up of trade” we must mean—in order for our conclusions to hold unconditionally—the change-over from autarchy, or some protection, to *free* trade. For practical purposes, however, our analysis can probably be regarded as being valid even in the case of a change-over from some protection to less protection.

The significance of the assumption that the marginal conditions are such that trade leads to reallocation gains will be explored further when we discuss the theories hostile to the notion of growth through trade.

(f) To eliminate the analytical complications of trade imbalances on growth paths, we assume trade always to be balanced.

(g) Similarly, once trade has been opened up, the subsequent growth path is assumed to be unaffected by terms-of-trade changes. *Offsetting* influences on the terms-of-trade can, of course, take place under trade without causing any difficulties for us in the form of discrepancies between changes in income and capacity. To show the relationship between the terms-of-trade models and our model, we shall later indicate geometrically what the effects would be with net growth transmission (positive or negative) through the terms-of-trade.

### *The model*

The growth path of an economy will be described by the simple formula for compound interest. The following equation will denote the *autarchy growth path*:

$$(1) \quad Y_{t+n} = Y_t e^{rn},$$

where  $Y_t$  is the total income of the economy under autarchy at time  $t$ ;  $e$  is a constant (the base of natural exponential and logarithmic functions);  $r$  is the percentage growth in  $Y$  per unit of time, a rate which depends upon the propensity to save and our production function and thus, in fact, also upon what has been implicitly assumed as to technological progress;  $n$  is the number of time units.

When trade is opened up at time  $t$ , certain reallocation gains will arise. Thus, the  $Y_t$  we have to insert in our equation for the growth path under trade is not identical to the  $Y_t$  under autarchy.

Before introducing the reallocation gains into the equation, we have to decide whether we should treat them as some function of the total resources and consumption which will be reallocated or simply as a constant. There are reasons to believe that as long as the terms-of-trade have not deteriorated—although they need not have improved either—the *reallocation gains will be higher, in absolute terms, the more resources and consumption we have to reallocate*. Otherwise, it would be possible to open up trade at a particular moment of time for only one part of the economy and nonetheless to have full reallocation gains, just



as the full reallocation gains undoubtedly could be had if trade had been opened up completely in some earlier period when the whole economy was exactly as big as that particular part of the economy for which trade has now been opened up. But this would be absurd. If trade is opened up for the remaining part of the economy, some additional gains could surely be derived. The sum of the reallocation gains would thus be greater than in the earlier period which we happened to use in our comparison. Apparently, the reallocation gains are positively related to the total amount of resources and consumption to be reallocated.

To argue that there is such a positive relationship for one and the same country at different sizes of the economy with unchanged terms-of-trade is very different from saying that, if there are two countries trading with each other, the bigger country necessarily receives larger reallocation gains measured in absolute terms. The second hypothesis, which is clearly wrong, does not follow from the first.

We see no particular reason why the reallocation gains should increase proportionally more, or proportionally less, than the resources and consumption to be reallocated. In the following discussion, we shall take total income as an index of the amount of total resources and consumption to be reallocated. We assume that the reallocation gains are directly proportional to total income and that they can be expressed as a fraction  $c$  of  $Y$ . If we call total income under trade  $Y^*$  and if the rate of growth is unaffected by trade, the *growth path under trade* would be described by the following equation:

$$(2) \quad \begin{aligned} Y_{t+n}^* &= (Y_t + c Y_t) e^{rn} \quad \text{or} \\ Y_{t+n}^* &= Y_t (1 + c) e^{rn}. \end{aligned}$$

It is a larger income that will now be compounded. Although the rate of growth is the same, the compounding of the additional  $cY_t$  will lead to increasing absolute differences in total income—and thus also in per capita incomes—under trade and under autarchy.

If we wanted to introduce a minimum of complications into our model of trade and economic growth and yet achieve something with considerable explanatory power, we could stop right where we are. The simple notion of compounding the reallocation gains yields important insights into the effects of trade on welfare and economic structure over time. However, to end without a discussion of the effects of trade on the various factors which may affect the *rate* of growth seems un-

natural. Such a discussion of the effects of trade on the rate of compounding could bring us closer to reality without complicating our model to such an extent that the complications would be out of proportion to the additional insights which might be gained.

Under our assumptions, the rate of growth under trade as compared with that under autarchy might be influenced by:

(a) the need in each successive period for a larger absolute increase in income to sustain the autarchy growth rate after this income had been increased by reallocation gains from the opening-up of trade,

(b) the improvement of the future allocative efficiency in the economy as a result of the opening-up of trade, and

(c) a change in the rate of technological progress.

We shall now discuss the combined effect on the rate of growth of these factors.

When the reallocation gains ( $cY$ ) are added to the pre-trade income, the absolute additions to income in each successive period must be  $c$  times higher than under autarchy if the autarchy rate of growth is to be maintained under trade. An increase in the additions to income may in fact occur because, when the reallocation gains are added to the pre-trade income, the flow of savings will also increase  $c$  times. The question is, however, whether the higher rate of capital accumulation will bring about a sufficient absolute increase in income in each period to keep the rate of income growth unchanged. More capital accumulation in each period than would occur under autarchy may perhaps take place only with diminishing returns. If, for the time being, we assume the rate of technological progress not to be affected by trade, the additional capital accumulation is likely *in every period* to result in an increase in the output flow which will not be proportionally higher. We can distinguish between two extreme cases: (1) the additional capital accumulation brings about a proportional increase in income. This case is favorable and the growth rate would remain the same as under autarchy. (2) The additional capital accumulation brings about no additional increase in income. In this case, which is as unfavorable as implausible, the growth rate would *at first* fall from  $r$  under autarchy to  $r/(1+c)$  when trade is opened up. The growth rate will be  $r/(1+c)$  since an unchanged increase in absolute terms has to be related to an income which is  $1+c$  times larger. Or, in other words,  $r$  is defined as  $dY/Y$ , whereas the growth rate, when trade is opened up, will be  $dY/[Y(1+c)]$ —which is the same as  $r/(1+c)$ . However, there can be a lower growth rate only temporarily. If—in this way—the growth rate

becomes lower when trade is opened up than was the case under autarchy, the difference between the trade and the autarchy incomes will gradually vanish. This means that  $c$  in the denominator by which  $r$  must be divided will gradually vanish. As  $c$  approaches zero,  $r/(1+c)$  will approach  $r$ , meaning that the economy will ultimately grow at the same rate and along the same path as if it had remained under autarchy.

However, we need not worry about the peculiarities and implications of such a growth path. It is inconceivable that it could ever arise, taking into account the other factors which influence the growth rate. We argued that the reallocation gains are positively related to resources and consumption. This has implications not only for the size of the reallocation gains. It will also influence the rate of growth. What we shall refer to as the *current allocation gains* will increase the rate of growth. It is not only a question of existing resources and consumption being *reallocated*; there are also additional resources in a growing economy that can be *allocated* more efficiently once trade has been opened up. Thus, the current allocation gains will in every period increase the additions to income.

There is no logical difference between the nature of the reallocative gains and the current allocation gains. If a country started to grow under trade right from scratch, the improved allocative efficiency that follows from trade would be reflected wholly in current allocation gains. But there is a big practical difference between reallocation gains and current allocation gains. By occurring successively, the current allocation gains will be continuously compounded. The reallocation gains, on the other hand, constitute a once-and-for-all increase in income after a period of growth under autarchy.

How big the current allocation gains will be in each period is yet another problem. If, however, we have made the reallocation gains a constant fraction of  $Y$ , we may make the current allocation gains the same constant fraction of the increase in  $Y$  which would arise if there were no current allocation gains. Under such circumstances, the rate of growth would be  $r+cr$  or  $r(1+c)$ . It will be  $r+cr$  because, as  $dY/Y$  is equal to  $r$ ,  $dY/Y+cdY/Y$  must be equal to  $r+cr$ .

We can now combine these two complementary effects on the rate of growth under trade. We shall find that in *the most unfavorable case*, with no net addition to income from the larger volume of savings, the growth rate will be:

$$\frac{r(1+c)}{1+c} \text{ or } r.$$

In this case, equation (2) would be applicable. In *the most favorable case*, the rate of growth will be  $r(1+c)$ , with the equation

$$(3) \quad Y_{t+n}^* = Y_t(1+c)e^{r(1+c)n}.$$

Thus, there will be a growth rate under trade greater or equal to  $r$  and less or equal to  $r$  plus  $cr$ . But this *interval of possible growth rates* is relevant only if the opening-up of trade does not change the rate of technological progress. However, as was pointed out on several occasions in our survey of trade literature, the rate of technological progress is likely to be *higher* under trade than under autarchy. If the rate of technological progress is stepped up, additions to income will be greater. We can thus conclude that, with faster technological progress, the rate of growth will be greater than  $r$  without there being any upper maximum. The growth rate under trade is thus unequivocally higher than under autarchy. If we make the particular assumption that technological progress is so rapid that the additional capital accumulation, which follows from the reallocation gains, can take place without using technology that is inferior to that which would have to be used under autarchy, then the growth rate under trade would be  $r(1+c)$ . In this special case, our equation would be identical to equation (3). In practice it might, however, be difficult to distinguish the effects of faster technological progress from current allocation gains.

#### *A digression on the Cassel model*

Cassel expressed the growth path of an economy by means of an exponential equation where the growth rate was determined by the propensity to save and the capital-output ratio.<sup>1</sup> Such an equation, which has become well-known and widely-used under the name of the Harrod-Domar models, is written:

$$(4) \quad Y_{t+n} = Y_t \left( 1 + \frac{s}{k} \right)^n,$$

where  $s$  is the propensity to save and  $k$  is the capital-output ratio. The meaning of the term  $s/k$  is that if the propensity to save is, say, 0.2 and the capital-output ratio is, say, 4, the economy will grow at a rate of 0.05 or 5%.

We shall not discuss the merits or demerits of Cassel equations. It is,

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<sup>1</sup> Gustav Cassel, *Theoretische Sozialökonomie* (5. neubearbeit. Aufl., Leipzig, 1932), pp. 55-60.

however, of interest to translate our model into a Cassel equation. This will make it possible to link our exposition with other presentations of the same or related aspects of trade and growth which have been made within the framework of a Cassel model.

To do this, we shall introduce successive modifications into equation (4), the equation denoting the autarchy path. To begin with, we have to introduce the reallocation gains, this giving rise to:

$$(5) \quad Y_{t+n}^* = Y_t(1+c) \left(1 + \frac{s}{k}\right)^n.$$

The larger volume of savings which would be set aside from the higher incomes, bolstered by the reallocation gains, might not lead to proportional increases in income. Although, in Cassel models, the capital-output ratio is kept constant and any distinction between average and marginal ratios eschewed, we now have to make this distinction. If an increase in capital accumulation leads to a less than proportional increase in income, the marginal capital-output ratio would increase. The growth rate would be slowed down. In the worst possible case, capital accumulation would increase without any additional increase in income. The marginal capital-output ratio would then increase in the first period by  $kc$ , from  $k$  to  $k(1+c)$ . This is due to the fact that we would have an increase in the capital stock during that period of  $dK + cdK$  to relate to  $dY$ . As  $dK/dY = k$ , it follows that  $(dK + cdK)/dY$  is equal to  $k(1+c)$ .

In the least favorable case, the growth path, with this modification taken into account, would thus be:<sup>2</sup>

$$(6) \quad Y_{t+n}^* = Y_t(1+c) \left(1 + \frac{s}{k(1+c)}\right)^n.$$

In the most favorable case, an increase in capital accumulation will result in a proportional addition to the increase in income. Equation (5) would then be applicable.

But we also have the current allocation gains to take into account. The improved allocative efficiency might be assumed to increase the

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<sup>2</sup> As was pointed out above, the lower rate does not represent a stable equilibrium rate. The growth rate will increase over time up to the autarchy rate since lower additional capital accumulation, as compared with that under autarchy, will occur. Eventually, the marginal capital-output ratio under trade would be back at  $k$ .

rate of growth by the same fraction as that by which reallocation would increase the pre-trade income.

Equation (6) could thus be modified into:

$$(7) \quad Y_{t+n}^* = Y_t(1+c) \left( 1 + \frac{\frac{s}{k(1+c)}}{1+c} \right)^n, \quad \text{i.e.,}$$

$$Y_{t+n}^* = Y_t(1+c) \left( 1 + \frac{s}{k} \right)^n.$$

Equation (5) could, to reproduce the most favorable situation, be modified into:

$$(8) \quad Y_{t+n}^* = Y_t(1+c) \left( 1 + \frac{\frac{s}{k}}{1+c} \right)^n.$$

We divide  $k$  by  $1+c$  because, as  $k = dK/dY$ , we must obtain  $k/(1+c)$  from  $dK/(dY + cdY)$ .

If the rate of technological progress were stepped up to, say, a level where the increased volume of savings could be invested without any increase in  $k$ , even without considering the effects of the current allocation gains, then the growth path under trade could be expressed by our equation (8).

In our survey of trade literature, it was pointed out that the Cassel model had been used to clarify the effects of capital movements on growth. The rate of growth under trade has been denoted as  $(s-b)/k$ , where  $b$  is the export surplus expressed as a fraction of income. (If there is a negative export surplus, i.e., an import surplus,  $b$  is added to  $s$ .) The economic meaning of  $b$  is that if the economy runs an export surplus, part of the savings is invested abroad and growth is consequently retarded. The reverse would be true of an import surplus. As the effects of capital movements are more complicated than this, various other changes have been introduced, too. Our modified equation provides a method of comparing the autarchy growth path of an economy with the trade growth path of the same economy when no assumption regarding the balancing of trade is made.

The attempt made by Fritz Abb to compare the growth path under autarchy with that under trade can also be considered more accurately now than in our survey of the literature. If we use our symbols, Abb formulated the following equation relating to growth under trade:

$$(9) \quad Y_{t+n}^* = Y_t \left( 1 + \frac{\frac{s}{k}}{1+c} \right)^n.$$

A lower capital-output ratio is inserted into the equation, reflecting the fact that the opening-up of trade has, through the reallocation gains, increased income whereas the volume of capital remains the same. Although there is no explanation of why the capital-output ratio may be expected to *remain* lower, Abb in fact introduces what we have called the current allocation gains. The omission of the reallocation gains as such in the equation is, in itself, a weakness and explains why Abb has come to ignore the conditions required for the economy to sustain a higher growth rate on an increased income.

#### *A diagrammatic representation*

Our growth equations can, of course, be reproduced in diagrammatic form. We can measure time on the horizontal axis and total income (thus, by implication, per capita income, too) vertically on a logarithmic scale. A straight line would then represent a constant rate of growth over time. The autarchy path would be a straight upwards-sloping line. The trade path would, because of the reallocation gains, begin higher up on the vertical axis if we assume trade to be opened up at time  $t$ . Without faster technological progress, the trade path would, in the worst case, be a parallel line above the autarchy path. As we have observed, it is, however, likely that the trade path not only begins higher up but is steeper, too.

There are many reasons why, in reality, the trade as well as autarchy growth paths would not be straight. But there are some special reasons why, in an open economy, the growth path under trade would not be straight. There may, for instance, be certain effects from trade imbalances and shifts in such imbalances. Another, and most interesting, reason for irregularities in the trade growth path is terms-of-trade shifts. For simplicity, we have assumed away such complications. We might, however, at this juncture try to indicate the principal effects of terms-of-trade changes on the trade growth path. An improvement in the terms-of-trade would make the line turn upwards since income would grow faster than capacity; a terms-of-trade deterioration would make the line turn downwards. However, in growing economies competing with each other and capable of flexible reallocation and allocation of resources, terms-of-trade shifts should not be expected to be

pronounced. They would rather be short-lived signals for adjustment. Only when the demand and supply changes affect the fixed and limited natural resources could the repercussions be considerable. There is thus reason to believe that terms-of-trade changes could be represented by small kinks along the growth path. It follows from the traditional "gains from trade" analysis that a downturn in income under trade can never be so deep that the path drops below the autarchy path. If resources can be reallocated, income under trade must be higher than under no trade. Thus, in growth countries, there can be no "immiserizing growth" of the Bhagwati kind.<sup>3</sup>

We shall now introduce something which we shall refer to as the "opening-up locus". Such a locus connects all points to which the reallocation gains would bring us if we opened up trade at time  $t$ ,  $t+1$ ,  $t+2$ , . . .,  $t+n$ . If the reallocation gains are constant in absolute amounts, the opening-up locus would be a curve commencing where the trade path begins on the vertical axis and approaching the autarchy path asymptotically. If—as we have assumed—the reallocation gains are instead a constant fraction of total income at the moment of the opening-up of trade, the opening-up locus would be a line parallel to the autarchy path commencing on the vertical axis where the trade path begins.

The opening-up locus is a useful device. From any point along the locus, we may draw a line parallel to the growth path with trade opened up at time  $t$ . Such a line would indicate the subsequent growth path of an economy with trade opened up at the particular moment of time whence we began on the opening-up locus. If the growth rate were not higher under trade than under autarchy, the line from the chosen point on the opening-up locus would coincide with the growth path with trade opened up at time  $t$ . This is simply due to the fact that the opening-up locus would be identical to the growth path with trade opened up at time  $t$ .

We may also speak of a "closing-down locus", connecting all points to which the reallocation *losses* would bring us if trade were closed down. We shall assume that the reallocation losses can be expressed by a constant fraction of total income so much smaller than  $c$  that the losses arising from the change-over from trade to no trade are equal to the gains arising from the change-over in the opposite direction. The closing-down locus must commence where the autarchy path begins on the

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<sup>3</sup> See p. 44.



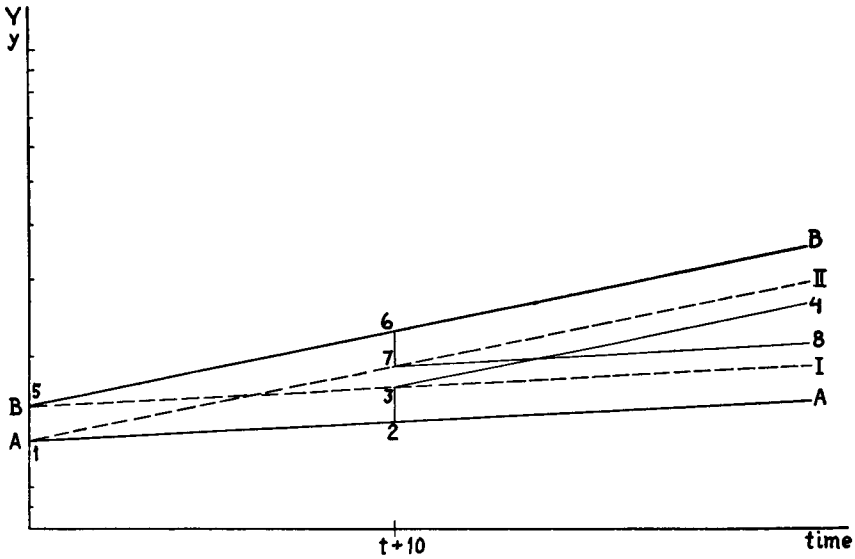


Fig. 3.

vertical axis, this being the point we would come to if trade were closed down immediately after its having been opened up. From this point, it will be a line parallel to the trade line. This means that if income under trade grows at the same rate as income under autarchy, the closing-down locus would be identical to the autarchy growth path. If, on the other hand, the rate of growth is higher under trade than under autarchy, the closing-down locus would be steeper than the autarchy line.

All this can be seen in Figure 3, where the *AA* line is the autarchy growth path; *BB* is the trade growth path with a faster rate of growth than under autarchy; *BI* is the opening-up locus; *AII* is the closing-down locus; the line 1-2-3-4 describes the growth path of an economy with trade *opened up* at time  $t+10$ ; the line 1-5-6-7-8 describes the growth path of an economy with trade opened up at time  $t$  but *closed down* at time  $t+10$ .

*What are the "gains from trade"?*

In the current "gains from trade" analysis (which was reviewed in the first part of this chapter), the reallocation gains from trade are treated as being synonymous with the gains from trade. This definition of the gains from trade is not very useful. As we want to maximize the gains from trade, the current definition would lead us to postpone the

opening-up of trade. We would be forced into this bewildering conclusion because the later trade is opened up, the bigger would be the resources and consumption to reallocate and thus the bigger the reallocation gains. If we open up trade at, say, time  $t+10$ , the reallocation gains would be equal to  $c(Y_t e^{r \cdot 10})$ , the parentheses containing the expression for the autarchy income at time  $t+10$ . If we had opened up trade at time  $t$ , the reallocation gains would have been only  $cY_t$ . That the reallocation gains are bigger the later we open up trade can also be seen from our graph by measuring the distance between the autarchy path and the opening-up locus on the logarithmic vertical axis.

But, as the reallocation gains are compounded, an earlier opening-up of trade will not result in a smaller income at time  $t+n$ , *even if the rate of growth is not higher under trade*. For instance, total income at time  $t+10$  with trade opened up at  $t+10$  would be:

$$(10) \quad Y_{t+10}^* = Y_t e^{r \cdot 10} + c(Y_t e^{r \cdot 10}).$$

This equation can be changed into

$$(11) \quad Y_{t+10}^* = Y_t(1+c)e^{r \cdot 10}$$

or the same as the equation with trade opened up at time  $t$ . Thus, even if the rate of growth is unchanged, the compounding of the smaller reallocation gains yields the same total income. *As we always lose income in the intervening periods by postponing the opening-up of trade*, it is self-evident that we should open up trade as early as possible.

If the rate of growth is higher under trade than under autarchy, we would lose from postponing the opening-up of trade, even if we do not take into account the income loss during the intervening periods. This can be clearly seen from Figure 3, where the opening-up locus runs below the trade growth path.

It is evident from this discussion that equating the reallocation gains to the gains from trade is not warranted. We must suggest a new definition of the gains from trade.

Lacking a single neat definition of what constitutes the gains from trade, we shall suggest three alternative definitions with the hope of arousing some discussion about their relative appropriateness.

We must find a definition of the gains from trade which clearly shows that they are bigger the earlier we open up trade. The following three definitions should be tested against this criterion:

1. The reallocation *losses* if trade were closed down at the time of

calculation (the distance 6-7 on the  $Y$  axis for time  $t+10$  in Figure 3). The longer trade has been going on, the bigger these losses will be.

2. The difference between the income at time  $t+n$ , if trade had been opened up at time  $t$ , and the income at time  $t+n$  if trade had never been opened up (the distance 2-6 on the  $Y$  axis for time  $t+10$  in Figure 3).

3. The total of the present, past and future differences in income under trade and autarchy discounted to their present value (i.e., the  $Y$  value of the area between  $BB$  and  $AA$  discounted to its value at the time of calculation).

The first definition has been implicit in various practical calculations of the "dependence upon trade" as a measurement of the hazards of potential economic isolation—during wars between third parties, for instance. Even for the purposes for which this definition has been used, it perhaps understates the losses by neglecting the effects of isolation on future growth. The second definition is sometimes subconsciously used in statements such as that a particular country would not have "existed" if it had not been able to participate in international trade. This definition recognizes more clearly than the first that much of the current productive power of a country is the result of trade. The gains from trade would, according to this definition, generally be greater than the gains according to the first definition. This is clearly seen in Figure 3.

If the opening-up of trade does not increase the rate of growth (and we move along a path above but parallel to  $AA$ ), the two first definitions would still be superior to the current definition as they do not ignore the compounding of the original reallocation gains.<sup>4</sup> Thus, although the growth rate has not increased, they do not say that the opening-up of trade should be postponed in order to maximize the reallocation gains. Their implication is instead that the timing of the opening-up of trade is immaterial. However, since they say no more than this, they fail to meet the criterion we have adopted. When the impact of trade does not increase the rate of growth, our criterion as to a useful definition can only be met by taking past and future gains from trade into account. Thus, although our third definition is more cumbersome, it is more appropriate for showing the importance of the timing of the opening-up of trade.

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<sup>4</sup> If the rate of growth is not higher under trade, the first two definitions say the same thing, only in different words.

### *Trade as a possible obstacle to growth in growth countries*

Interestingly enough, one important advantage of our model of trade and economic growth is that it enables us to throw some light upon the conditions under which trade acts as an *obstacle* to growth. In the section on u-countries, we dwelt on the rationale of the various attacks on trade and trade theory launched by economists like Myrdal, Singer and Prebisch. These economists claim that unhampered trade gives fewer benefits to underdeveloped countries than to developed countries. Here, we shall investigate whether trade may, under certain circumstances, slow down growth *in growth countries*. We shall discuss some existing theories that are, implicitly or explicitly, hostile to the notion of trade as an instrument of growth. Although these theories have, in common with the theories of Prebisch *et al.*, a negative attitude towards trade, they do not advocate protection to protect *what exists*, as we could do on the basis of our model of u-countries. They rather advocate protection to create *what does not yet exist*, whereas, in our earlier growth model, free trade could be used to create *more of what already exists*.

In the broad development of economic doctrine, the classical school emphasized the reallocation and growth effects of trade; later, a branch of the historical school, with the illustrious combatant Friedrich List, endorsed the reallocation analysis and rejected the growth analysis.<sup>5</sup> The neoclassical school then inserted extensive qualifications into the reallocation analysis and ignored the growth aspects. This almost complete neoclassical neglect of the growth effects of trade has, however, been combined with a recognition of the relevance of the Listian arguments. The infant industry case for protection, the essential argument against trade as a growth engine, has gained almost universal approval. Thus, the antithesis of the classical tenet has been accepted while the thesis has hardly been discussed. To encounter amidst the pieces of real-

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<sup>5</sup> Friedrich List, *Das nationale System der Politischen Oekonomie* (2. Aufl., Jena, 1910). Verification of the sometimes unnoticed fact that List accepted the idea of reallocation gains, which his policy would have to forfeit for the long-run gains, is to be found on the two last pages of the Introduction in Chapter 12, and in Chapter 18. In Chapter 18, List rejects agricultural protection as such protection cannot be expected to create new productive forces. To ensure the most efficient use of the existing and given resources, there should thus be, according to List, free trade in agricultural products. Haberler has stressed that List did not deny that free trade, whether in manufactured or agricultural products, would give reallocation gains. (See G. Haberler, *The Theory of International Trade, With Its Applications to Commercial Policy*, translated by A. Stonier and F. Benham (London, 1936), pp. 278-280.)

location analysis a declaration of the validity of the infant industry case for protection gives a strange impression.<sup>6</sup> Such an approval cannot be granted until after an analysis of the growth effects of trade, and might then have to be withheld. It is one of our present tasks to remove this inconsistency in the presentation of the traditional "case for trade".

Apart from these open attacks, it is possible to deduce, from the qualifications introduced into the reallocation analysis, theories which lead to the conclusion that trade could brake the process of economic growth. To study these theories and their implications on the growth path under trade will be a second task.

We thus have to distinguish between (a) theories *explicitly* rejecting the growth thesis, although not questioning the probability of reallocation gains, and (b) theories stressing the possibilities of reallocation losses and thus *implicitly*, in the logic of our growth model, rejecting, or at least questioning, the growth thesis.

Apart from studying each of these two types of theories, we shall investigate the differences between them and establish a logical harmony between them and our model of trade and growth.

To begin with, let us discuss the latter group of theories. One objection against the "case for trade" is, as we know, that various internal marginal inequalities may exist that could cause losses from reallocation if free trade were opened up.<sup>7</sup> It is obvious that, if the  $cY_i$  term becomes negative, the growth path will differ from that we have in-

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<sup>6</sup> The generically different background of the infant industry protectionist argument, and the different analytical level on which it is advanced, explains why it was not discussed when we went through the traditional "case for trade" analysis. As the infant industry argument lies totally outside the analytical framework of current theory, its existence does not invalidate the general conclusions we have drawn with regard to the characteristics of present theory.

<sup>7</sup> We are not going to consider the imposition of optimum tariffs as a means of making the  $cY_i$  term bigger than would be the case if free trade were opened up. The optimum tariff argument is greatly weakened when interest becomes focused on the continuously changing state. Only in a stationary economy would it be realistic to imagine that the real resources necessary to formulate the optimum tariff through a process of trial and error could be lower than the gains. Under changing conditions, it would be impossible to balance the once-for-all cost of the tariff against a succession of years giving tariffs gains. Here, every period would have to bear newly-incurred costs for reformulating the tariff. Under such circumstances, we are not entitled to disregard the cost of finding the optimum tariff. It is rational to be irrational when the cost of finding out what is rational is higher than the cost of being irrational. The optimum tariff is a theoretical curiosum applicable only in a hypothetical stationary state.

dicated. To safeguard ourselves formally in our growth model, it was assumed (assumption (e), p. 61) that the internal economic conditions were such that free trade would produce reallocation gains. We shall now reverse this assumption.

Of all the innumerable distortions which—if in practice they could be counterbalanced—would call for some protectionist arrangements, emphasis has been focused on inter-industry wage differentials. As all the possible arguments are analytically identical, all of them dealing with the effects of marginal inequivalences, let us examine briefly only this one.

If certain industries have to pay higher wages for the same quality of labor than other industries in the same country, free trade may not be the best policy. This is the Manoilescu argument, trying to justify protection of manufacturing industry in developing countries. It has been scrutinized by, among others, Viner and Haberler and most recently by Hagen.<sup>8</sup>

In order to clarify how reallocation losses may occur, let us reproduce Hagen's geometrical illustration.<sup>9</sup> In Figure 4,  $AM$  is a production possibility curve. Assuming a wage differential making the cost per unit of labor higher in manufacturing ( $M$ ) than in agriculture ( $A$ ), the input mix will never be ideal (except when only one of the two goods is being produced). Relatively too little labor will be used in manufacturing and too much in agriculture. Thus,  $AM$  will be inside the efficiency production possibility curve (not drawn). Because of the wage differential, the exchange ratio between manufactures and agricultural products will not be determined by the slope of the tangent at each point along the production possibility curve representing various output mixes. Ideally, the slope of the tangent should indicate at any particular output mix how many units of one good could be exchanged for one unit of the other good. Here, however, the line giving the exchange ratio at each point along  $AM$  will cut  $AM$ . At point  $P$ , for instance, and at all

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<sup>8</sup> Mihail Manoilescu, *The Theory of Protection and International Trade* (London, 1931); J. Viner, in a review of this book, in *The Journal of Political Economy*, 40: 121–125 (February 1932), reprinted in his *International Economics* (Glencoe, Ill., 1951), pp. 119–122, and in *International Trade and Economic Development* (Oxford, 1953), pp. 46–54; G. Haberler, *The Theory of International Trade*, pp. 196–198 and “Some Problems in the Pure Theory of International Trade”, pp. 223–240; and Everett E. Hagen, “An Economic Justification of Protectionism”, *Quarterly Journal of Economics*, 72: 496–514 (November 1958).

<sup>9</sup> This is a simplified version of Hagen's Figure III, in “An Economic Justification of Protectionism”, p. 509.

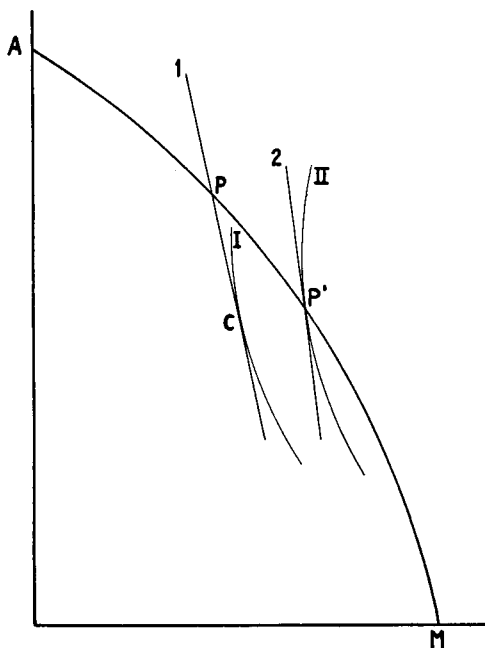


Fig. 4.

other points, the exchange ratio will be steeper than the tangent as we have assumed that wage costs in manufacturing are higher per unit of labor than in agriculture. A line steeper than the tangent indicates, as can be seen from the diagrams, that the marginal cost of production is such that, in comparison with the tangential exchange ratio, less units of manufactures can be had for one unit of agricultural products. Lines 1 and 2 measure domestic exchange ratios at two hypothetical output mixes. We assume that line 1 is also identical to the international exchange ratio. This price line is a straight line as we assume that the country is unable to influence its own terms-of-trade. To derive his equilibria, Hagen uses community indifference curves. Under trade, the country will produce a particular output combination which makes the domestic exchange ratio equal to international prices. Production will thus be at point  $P$ . Consumption will be at point  $C$ , where the price line is tangent to an indifference curve ( $I$ ). However, the indifference curve through  $P$  (not drawn) is steeper than price line 1 and, if trade did not take place, consumers would thus be willing to have more manufactures and less food than they would have at  $P$ . Production would shift along  $AM$  to  $P'$ , where the domestic exchange ratio equalled consumer pre-

ferences given by community indifference curve *II*.  $P'$  is, of course, in this case also the consumption point. Indifference curve *I* is lower than *II*. Trade has resulted in a welfare loss.

This piece of geometry shows that certain distortions may cause losses from trade. It does not prove, however, that trade under such conditions necessarily lowers welfare. The external exchange ratio might be steeper than line 2 or, in other words, manufactures more expensive internationally than domestically under autarchy. The country would then, in spite of the wage differential, export manufactures.<sup>1</sup> Trade would consequently increase welfare. Furthermore, the terms-of-trade might be so favorable (line 1 so flat in relation to line 2) that the tangency with an indifference curve would occur to the right of an intersection between line 1 and indifference curve *II*. If manufactures are in this way sufficiently inexpensive internationally, trade would increase welfare. In our diagram, *C* would, instead of being south-west of  $P'$ , be sufficiently south-east of  $P'$ . Hagen's failure to point out that his proof is highly restrictive is somewhat dangerous as he begins his paper with a careful empirical review, showing that in most countries wage differentials actually exist, and have long existed, between manufacturing and agriculture. The conclusion at which Hagen clearly hints at the end of his paper, that all these countries would have benefited from protection, is invalid to the extent (1) the terms-of-trade for agricultural exports have been favorable enough, or (2) international price conditions such, that the countries have nevertheless exported manufactures.<sup>2</sup>

Let us now assume, however, that the conditions are such that the opening-up of trade really results in reallocation losses. The growth path will then begin below the autarchy path.<sup>3</sup> But to be able to say anything about the future growth path, which is what we ultimately want, we must, however, know at what *rate* the economy will grow. We have to try to ascertain this on our own as such considerations have not entered into these applications of reallocative analysis.

The rate of growth will, in the first place, depend upon how an absolutely lower volume of capital accumulation affects the absolute

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<sup>1</sup> *C* would in this case be north-east and not south-west of  $P'$ .

<sup>2</sup> Japan, although mentioned by Hagen as a country with inter-industry wage differences, is most likely to be an example of how a country, irrespective of wage differences, exports manufactures.

<sup>3</sup> The autarchy path under less than ideal conditions lies, to begin with, below the autarchy path under ideal conditions.



increase in income in relation to the now reduced income. In the most favorable case, lower capital accumulation will give the same absolute increase in income. This will tend to increase the rate of growth.<sup>4</sup> In the least favorable case, lower capital accumulation will cause a proportional fall in income increases. This would then not affect the growth rate. But we would also have the opposite to current allocation gains, i.e., current allocation losses. These losses, in combination with the above-mentioned effect, would in the most favorable case result in an unchanged rate of growth. In the least favorable case, the combined effect would be a growth rate of  $r(1-c)$ . However, before concluding that the likelihood is a lower growth rate, we must point out that a freer flow of technical contacts and information might have beneficial effects on the growth rate. Probably even more important is what Haberler has repeatedly stressed, namely, that many *distortions* of the kind we are at present concerned with *may be removed* by means of free trade and international competition. If these distortions are gradually eliminated, the rate of growth will eventually be higher than under autarchy. When all the distortions have completely vanished, the economy will be growing at a rate equal to that of a growth country under free trade in our positive model.

The conclusion to be drawn is that it is by no means necessary for  $Y_{t+n}$  under trade to be lower than under autarchy, even if—to begin with—there are reallocation losses from trade and the term  $cY_t$  is negative. The peculiar neglect of the effects over time severely limits the practical value of the theories currently being discussed. This should be mentioned because policy conclusions have actually been drawn from inconclusive results worked out in these models.

If the marginal inequalities which cause the reallocation losses are gradually removed, we shall obtain a growth path which eventually crosses the autarchy path from below.<sup>5</sup> If List's theories are formulated in terms of our model, the free trade growth path has a less steep slope than the autarchy—or rather the protection—growth path. The free trade path begins *above*  $A$  on the  $Y$  axis because of the reallocation gains (which were not questioned by List). Therefore, the free trade growth path cuts the autarchy path from above, and the situation has the opposite characteristics to those described above. The area between the

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<sup>4</sup> But only temporarily for reasons discussed on pp. 65 and 67 n.

<sup>5</sup> Until all marginal distortions have been eliminated, the path may be very irregular, as piecemeal removals may worsen allocative efficiency. See pp. 20–21.

paths left of the intersection represents the short-run trade gains which List wanted to forsake in order to obtain the long-run protection gains indicated by the area between the paths to the right of the intersection. The reason why the Manoilescu and the List types of theories could have the opposite characteristics and still both be hostile to the notion of growth from trade is that they value the short and the long runs completely differently.

The case for infant industry protection has been criticized on both practical and historical grounds. It has been observed that planners and administrators lack the technical skill to apply the protection correctly and the moral strength to remove it justly. But, assuming perfect planning and administration, are there any economic grounds for believing that a protectionist growth path can be steeper than a free trade growth path in growth countries? Perhaps List and the other creators of the infant industry case for protection have forgotten the compounding of the reallocation gains and drawn a horizontal growth path under trade? This is what Adam Smith contended in the quotation we have given on page 51.

The gist of the infant industry protection argument is that those growth countries which are less developed than the pioneering countries may have difficulties in establishing new industries; not because they lack the fundamental possibilities for being low-cost producers, but only because the leading countries have—by being first—achieved a virtual, but economically artificial, monopoly. The basis for their monopolistic position is decreasing costs and prohibitive learning costs for newcomers trying to break in.<sup>6</sup> The basis for protection is that it will provide late-comers with a nursing and growing period, enabling them to establish their competitiveness, upon the likelihood of which the infant protection should be based.

In the terms of our model, the disadvantages of free trade referred to in the infant industry argument for protection would be reflected in a *loss of investment opportunities*. Those who wanted to invest and introduce new techniques could not become competitive fast enough to be successful. Even if factor prices could eventually become much higher, were it only possible to invest fully, they may at their existing level be too high for innovators without protection of new lines of industry. If free trade has such effects, the marginal efficiency curve

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<sup>6</sup> Within the pioneering countries, there may well be fierce competition although competitors in *other* countries cannot enter the market.

of capital would fall. This curve is, as should be noted, not only a function of the rate of technological progress but also of the *capacity to absorb* new techniques. If we can increase the marginal efficiency of capital by some protectionist measures, temporarily instituted for each industrial protégé, we shall—granted the detrimental effects of deteriorated current allocative efficiency are more than offset—be able to increase the rate of growth. The List equation would be as follows:

$$(12) \quad Y_{t+n}^* = Y_t(1 + c - d)^{r(1+c-d)^b n},$$

where  $d$  is a fraction which is smaller than  $c$ <sup>7</sup> and represents the *reduction* in reallocation gains when we do not have free trade. We thus begin the growth path lower on the  $Y$  axis than we would under free trade. The fraction  $d$  is also deducted in the exponent as there will be smaller current allocation gains. But if the expression  $b$ , which symbolizes the desirable effects of protection on investment ability and thus on the marginal efficiency of capital, is sufficiently high, the growth rate under protection will be higher than under free trade.

Probably, the circumstances under which the infant industry protection argument is relevant are those in a country which is experiencing its first stages as a growth country, when learning periods are longer and more expensive. But the country must have the basic characteristics of a growth country. The foreign trade policy of a u-country must be very different. In a u-country we must try to preserve rather than to create.

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<sup>7</sup> It ought to be smaller than  $c$  as it is unlikely that the protection which would be applied would make the allocative efficiency even poorer than under autarchy.

### III. EFFECTS OF TRADE ON THE COMPOSITION OF PRODUCTION

In the preceding chapters, our prime objective was to assess the welfare effects of trade. However, welfare analysis and structural analysis are intimately connected. To say anything about the effects of trade on total and per capita incomes, we had to study the impact on production of trade-induced changes in the supply of productive factors. Such changes are, in themselves, of great interest from a structural viewpoint; they are also important for the solution of such a challenging problem in structural analysis as the effects of trade on factor prices.

In the following chapters, we shall discuss problems of primarily structural importance. A crucial question which we have not yet touched upon is that of how trade affects the location of production. Even though we have established how aggregate production is affected by trade, we have not yet analyzed how the composition of that aggregate changes. We need to study the patterns of international specialization in order to gain insights into the relocation of production resulting from the opening-up of trade and into the location of production under trade. Apart from being intrinsically interesting, such a study—in combination with our theory of trade and factor totals—will make it possible for us, in a subsequent chapter, to offer some suggestions as to the effects of trade on factor prices. These latter effects are also interesting from a welfare point of view.

#### *Existing explanations of the pattern of trade*

Before beginning our attempt to determine which goods will be exported by a country and which goods will be imported by the same country, it is natural to discuss, as a background, the existing generalizations.

The most simple and basic of all theories dealing with this problem is, of course, the truistic observation that a country will export goods which can be produced domestically at lower costs than in other countries and that it will import goods which can be produced only at

higher costs at home.<sup>1</sup> Thus, when price systems in the various countries and regions are connected through trade, the relatively inexpensive goods of a country or region will be exported, and vice versa, to such an extent that all commodity prices are equalized.

But if we are to say anything specifically about how the composition of production will change, we must first explain *why* prices differ. The factor proportions theorem, suggested by Heckscher and Ohlin, tries to do this.<sup>2</sup> According to this theory, *differences in relative factor proportions* are the most important single cause of differences in price structures from country to country. A relatively land-abundant country will have a price advantage in respect of those goods which embody much of this land resource and consequently it will be able to export these goods. A capital-abundant country will be able to export capital-intensive products, and so on. This theory was an extension of a view which had earlier been applied systematically only to trade in raw materials. As to comparative advantages in manufactures, earlier theories—that of Tausig, for instance—stressed the importance of environmental human and technological factors.<sup>3</sup>

To Ohlin, the trade pattern was not dictated solely by relative factor proportions. Transport costs, economies of scale, tariffs and taxes, etc., were also acknowledged as being important for the location of industry and the determination of trade patterns. However, economists have come to regard the emphasis on the rôle of differences in relative factor endowments as Ohlin's most important innovation. When we speak of the Heckscher-Ohlin model, we do not refer to Ohlin's more complex version of the forces behind the pattern of trade but to what has become known as the factor proportions explanation of trade.

The factor proportions theorem of the principle of international specialization is the universally accepted approach. It has remained so because of its common-sense appeal—particularly as regards trade in

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<sup>1</sup> The idea that the *pre-trade* relative prices are decisive has been nurtured in misleading two-commodity models. However, the only relevant price structure is the one which emerges when trade itself has been allowed to affect the production possibilities. Trade in raw materials, for instance, may completely upset the pre-trade price structures.

<sup>2</sup> Eli F. Heckscher, "The Effect of Foreign Trade on the Distribution of Income", *Ekonomisk Tidskrift*, 21: 497-512 (1919). Translated from the Swedish by S. Laurson, this paper appears in *Readings in the Theory of International Trade*, pp. 272-300; B. Ohlin, *Interregional and International Trade*, Harvard Economic Studies, Vol. XXXIX (Cambridge, Mass., 1933).

<sup>3</sup> F. W. Taussig, *International Trade* (New York, 1927), pp. 180-196.

raw materials—in spite of the fact that empirical attempts to sustain the theory have invariably proved inconclusive. MacDougall, Kravis and particularly Leontief have encountered great difficulties in verifying the hypothesis that comparative advantages in manufacturing industry are due to differences in factor proportions.<sup>4</sup> MacDougall takes horsepower as a rough index of the capital intensity of an industry at prevailing factor prices. He finds that the tendency for Britain to export to the U.S. products requiring low ratios of capital to labor is no more pronounced than the tendency for Britain to import such goods from the U.S. Kravis reports that his attempt to find any relationship between the book value of capital in the various U.S. industries and the position of these industries with respect to the pattern of trade has proved inconclusive. Leontief, on the basis of his comprehensive studies of the input-output relationships in the U.S. economy, finds that the capital/labor content in U.S. exports is considerably lower than in U.S. imports.<sup>5</sup> All these findings run counter to what one would expect on the basis of the Heckscher–Ohlin theory.

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<sup>4</sup> W. W. Leontief, "Domestic Production and Foreign Trade; The American Capital Position Re-examined", *Proceedings of the American Philosophical Society*, 97: 332–349 (September 1953), reprinted in *Economia Internazionale*, 7: 9–38 (February 1954); D. MacDougall, "British and American Exports: A Study Suggested by the Theory of Comparative Costs, Part I", *Economic Journal*, 61: 707–708 (December 1951); Irving B. Kravis, "'Availability' and Other Influences on the Commodity Composition of Trade", *Journal of Political Economy*, 64: 147 (April 1956).

<sup>5</sup> The interested reader may further consult the abundant literature on the Leontief paradox: see, above all, W. W. Leontief, "Factor Proportions and the Structure of American Trade: Further Theoretical and Empirical Analysis", *Review of Economics and Statistics*, 38: 386–407 (November 1956); Romney Robinson, "Factor Proportions and Comparative Advantage: Part I and II", *Quarterly Journal of Economics*, 70: 169–192 (May 1956), and 70: 346–363 (August 1956); R. W. Jones, "Factor Proportions and the Heckscher–Ohlin Theorem", *Review of Economic Studies*, 24: 1–10 (1956–57); P. T. Ellsworth, "The Structure of American Foreign Trade: A New View Examined", *Review of Economics and Statistics*, 36: 279–285 (August 1954); Boris C. Swerling, "Capital Shortage and Labor Surplus in the United States?", *Review of Economics and Statistics*, 36: 286–289, (August 1954); S. Valavanis-Vail, "Leontief's Scarce Factor Paradox", *Journal of Political Economy*, 62: 523–528 (December 1954); A. J. Brown, "Professor Leontief and the Pattern of World Trade", *Yorkshire Bulletin of Economic and Social Research*, 9: 63–75 (November 1957); M. A. Diab, *The United States Capital Position and the Structure of Its Foreign Trade* (Amsterdam, 1956); Eric Hoffmeyer, "The Leontief Paradox Critically Examined", *Manchester School*, 26: 160–179 (May 1958).

It is true, as Richard Caves has concluded, that the factor proportion account has not had a full-scale testing and that "someday a super-charged economist with supersonic calculating equipment backed by a supersaturated foundation will perform this task".<sup>6</sup> However, the empirical findings can hardly be rejected on purely statistical grounds. The inconclusiveness of these tests necessarily gives rise to uneasiness.

A further cause for dissatisfaction is that the factor proportions analysis cannot possibly explain *intraregional* trade because, by definition, a region has homogeneous factor proportions.<sup>7</sup> Intraregional trade (which to some extent may mean international trade since there may be several countries within a region) must thus be explained by reference to other relationships, such as economies of scale, transport costs, etc. As intraregional trade may be more intensive than inter-regional trade, one is tempted to draw the conclusion that these other relationships—whatever they may be—are more important than factor proportions.

As a matter of fact, there are a variety of reasons why factor proportions may not be so decisive for the pattern of comparative advantages as currently assumed. We have already noted that there exist other important relationships, i.e., those creating intraregional trade. These relationships may be strong enough to render interregional differences in factor proportions of secondary importance. If this is the case, it is unrewarding to single out factor proportions for special attention in a theoretical simplification.

Furthermore, it is possible that differences in factor proportions do not have any effect on relative commodity prices so that the other forces, mentioned above, thus have free play. Goods may not differ in factor intensity in the same way at all relative factor prices. There may be reversals in factor intensities so that a labor-intensive good at one set of relative factor proportions is capital-intensive at another set. The more often factor intensities reverse themselves, the less effect on relative commodity prices will be exerted by differences in factor proportions. In the extreme case, where no goods could be distinguished with respect to their factor intensity, factor proportions would have no effect at all on relative commodity prices.<sup>8</sup>

The possibilities of classing products according to their factor intensity and countries according to their factor abundance are probably

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<sup>6</sup> R. E. Caves, *Trade and Economic Structure. Models and Methods*, Harvard Economic Studies, Vol. CXV (Cambridge, Mass., 1960), p. 282.

<sup>7</sup> This is Ohlin's definition. See *Interregional and International Trade*, p. 9.

<sup>8</sup> See also Chapter IV.

overestimated out of all proportion, particularly in a multi-factor, multi-product world. Capital is stored-up labor and labor is stored-up capital. The introduction of factor categories, such as "technical labor", i.e., capital-intensive labor, is a gimmick which, when its superficial advantages are more closely examined, turns out to rob the factor proportions theorem of all meaningfulness. Leontief made a gallant attempt to save the factor proportions explanation. He argued that the U.S. is relatively labor-abundant. Superior physical effectiveness of American labor meant, according to Leontief, that *per unit of labor input* there was little capital in the U.S. But this alleged physical effectiveness—which should not be mixed up with high productivity *per worker* resulting from a large quantity of capital *per worker*—might, in its turn, be due to capital-intensive education and medical care.

Against this background, we shall search for a new basic principle to explain the pattern of trade and location. Our contention that the importance of differences in factor proportions has been overestimated does not imply, however, that such differences are unimportant. This will be evident from our subsequent discussion of the principles of trade in, on the one hand, primary products, and, on the other hand, manufactures.

#### *Trade in primary products*

We shall retain the factor proportions approach in our analysis of trade in primary products. A country abundantly supplied with a natural resource will be assumed to have a comparative advantage in the exploitation of the resource. As already pointed out, the scattered observations on the nature of comparative advantages, which preceded the full-fledged Heckscher–Ohlin factor proportions theory, allotted a strategic rôle in the formation of the trade pattern only to *land endowments*. Capital and labor endowments were not referred to. Thus, it is in harmony with both the Heckscher–Ohlin theory and earlier theory that we use the factor proportions approach in the analysis of trade in primary products.

It is probable that the factor proportions theorem has gained such wide acceptance only because a pattern of trade in primary products, dictated by differences in natural resource endowments, is so plausible. By a suspect analogy, trade in manufactures has been treated as if governed by differences in capital and labor endowments. Explanations of the factor proportions account always begin with a persuasive asser-



tion that the natural-resource-abundant countries export natural-resource-intensive products. We shall now accept this statement but reject its analogous application to the pattern of trade in manufactures.

### *Trade in manufactures*

Among all non-primary products, a country has a range of potential exports. This range of exportable products is determined by *internal demand*. *It is a necessary, but not a sufficient, condition that a product be consumed (or invested) in the home country for this product to be a potential export product.* This is our basic proposition.

For a product to be consumed (or invested) in a country, there must be a demand for the product at the ruling world market prices. However, in order to make our proposition as meaningful as we can, we want to make the range of potential exports of a country as narrow as possible. Unfortunately, it is not possible, without loss of precision, to adopt a weaker criterion than that there must be a demand at ruling prices. Nonetheless, the reasons—which will be set forth below—why we believe our basic proportion to be correct will enable us to handle intuitively a weaker criterion which will make the range of potential exports of a country narrower. It is really what we may refer to as “representative demand” that is necessary for a good to be a potential export product. It will be evident that, although, for instance, the demand for Cadillacs in Saudi-Arabia is not totally absent, this kind of unrepresentative demand is not sufficient to turn luxury cars into potential export products for Saudi-Arabia. The meaning of “representative demand” is deplorably loose but may be better understood from our subsequent discussion.

In our proposition we also speak of demand in the “home country”. The following inquiry into the reasons why we believe our proposition to be valid will also clarify what we mean more precisely with “home country”. It will become evident that an expression such as “market area” might be more exact. But as it would also be more artificial in an international trade theory context, “country” has been preferred. Furthermore, there are forces, both cultural and economic, which tend to make “country” and “market area” interchangeable concepts.

We shall now advance various reasons why we believe our proposition to be valid. These reasons will prove to be variations on the same general theme, namely, unfamiliarity with foreign markets as compared with the domestic market.

*Firstly*, the decision to take up production of any particular good is likely to be generated by clearly discernible economic needs. In a world of imperfect knowledge, entrepreneurs will react to profit opportunities of which they are aware. These would tend to arise from *domestic* needs. Perhaps a need that an entrepreneur has himself experienced has provided the idea on which his entrepreneurship is based.

As a successful firm grows, the local market becomes insufficient for further expansion. The trade horizon of the firm is gradually lifted. But, only after what has probably been a considerable period of producing for the domestic market will the entrepreneur become aware of the profit opportunities offered by producing for foreign countries. The export market will not be entered until then. However, once this stage is reached there is nothing to prevent exports from constituting a larger—and even substantially larger—share of total sales than that absorbed by the home market. The smaller the home country is, the larger, *ceteris paribus*, the share of exports of total production is likely to be. Frontiers are arbitrarily-drawn lines that we cross when the trade horizon is lifted, and the smaller the country is the sooner these lines will be crossed. Whatever the percentage share of exports, and this is what we want to emphasize, export is the end, not the beginning, of a typical market expansion path. *International trade is really nothing but an extension across national frontiers of a country's own web of economic activity.*

*Secondly*, to the extent that production of a good is based on invention, we have an additional reason to believe that home market demand is necessary. An invention is, in itself, most likely to have been the outcome of an effort to solve some problem which has been acute in one's own environment. The exploitation of the invention will then, in its first phase, automatically be geared to the home market.

A. P. Usher, in his *A History of Mechanical Inventions*,<sup>9</sup> addresses himself to the question of how inventions are made.<sup>1</sup> This discussion is of great interest for our present purposes. Usher rejects the *transcendentist* approach which describes inventions as the outcome of occasional inspirational insights of great men. Such a theory can possibly serve as a basis for a fascinating essayistic interpretation of isolated phenomena along the road of great inventions. However, it is entirely incapable of analyzing what seems essentially to be a process where insights are accumulated and synthesized.

At the other extreme, we have the *mechanistic* theory of invention. Here, the

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<sup>9</sup> Revised ed. (Cambridge, Mass., 1954).

<sup>1</sup> Usher, Chap. IV, particularly pp. 60–69.

importance of the individual effort has faded. The inventive process is unfolded under the stresses of necessity. The individual is merely an instrument in a predetermined sequence of events.

Making use of elements from both these theories, but being particularly influenced by the mechanistic approach, Usher presents his own theory of the *cumulative synthesis*. The whole process of technological progress is made up of any number of interrelated sequences of cumulative insights maturing into a synthesis or invention which—in its turn—serves as a basis for the continuance of the process. But the process is not mechanistically determined. The acts of insight and syntheses are not an automatic response with the individual as a mere instrument.

Usher distinguishes between four stages in the sequence leading up to an invention: (1) the perception of a problem; (2) the setting of the stage by bringing together whatever material is essential for a solution; (3) the act of insight; and (4) the critical revision when the new solution is tried out for complete mastery.

This theory of invention lends support to our argument that it is a country's *own* needs which are the mother not only of innovation but also of invention. It must be difficult to become aware of problems and to set the stage for their solution when they do not form part of the inventor's environment. Whether the invention is the product of a one-man effort, as was typical in the old days, or the outcome of institutionalized teamwork in research laboratories, seems to be immaterial in this respect. Research projects as well as one-man efforts, aimed at inventions for commercial exploitation, are likely to be planned for the most obvious needs—the domestic ones. The resulting products will suit the needs of the home market and will only gradually be tried on the export markets.

Whether it is a question of "critical revision" of an invention or product development work in general, it must be carried out in close contact with the market. This gives us a third reason to believe that there must be a home market for an export good, whether it is a consumer good or a capital good. If, for some odd reason, an entrepreneur decided to cater for a demand which did not exist at home, he would probably be unsuccessful as he would not have easy access to crucial information which must be funnelled back and forth between producers and consumers. The trial-and-error period which a new product must almost inevitably go through on the market will be the more embarrassing cost-wise, the less intimate knowledge the producer has of the conditions under which his product will have to be used. And, if there is no home demand, the producer will be completely unfamiliar with such condi-

tions. The title essay in *The Ugly American*<sup>2</sup> gives a dramatic account of a fine engineering job, the success of which clearly depended upon intimate contact between producer and market. In a technical sense, it may be possible to solve all problems without such close contact. But, although an entrepreneur lacking testing ground at home may be able to secure necessary information, he would incur additional costs which might be destructive for his effort to achieve the necessary *comparative* advantage. From this standpoint, it may be imperative to begin the expansion path at home. It should be easy to find examples of how producers have sold, or tried to sell, their commodities on markets with which they were not familiar and failed because of the difficulties in adapting to different circumstances. Only if operations are moved to the foreign market can this obstacle be by-passed; but such action comes late on an expansion path and, when it comes, the marketing of the product will no longer be foreign trade.

We have now given three reasons which lend support to the assertion that a particular good will not be produced at a comparative advantage unless there is a domestic market for the good. We have argued (1) that it is unlikely that an entrepreneur will ever think of satisfying a need that does not exist at home; (2) that, even if this alien need was seen, the basically correct product to fill it might not be conceived of; and (3) that, even if the basically correct product was conceived of, it is still improbable that the product could be finally adapted to unfamiliar conditions without prohibitive costs being incurred. In all, what our arguments amount to is the proposition that production functions are not identical in all countries, but that *the production functions of goods demanded at home are the relatively most advantageous ones*. The necessity of "the support of the home market" is probably stressed by active businessmen as a reflection of the importance of relationships emphasized here.

According to the logic of the reasons we have given in support of our proposition, it is possible to state that exceptions to our proposition are likely to occur in those cases (1) where it is easy to become aware of the foreign demand in spite of the non-existence of home demand for the product; (2) where the product as such is available without inventive effort; and (3) where no or little product development work is needed.

It might be suspected that Japanese foreign trade contained so many

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<sup>2</sup> W. J. Lederer and E. Burdick, *The Ugly American* (London, 1959).

exceptions to the rule that the latter's value was seriously threatened. However, it is easy to become a victim of popular misconceptions about Japanese foreign trade. Passages in W. W. Lockwood's renowned book, *The Economic Development of Japan*,<sup>3</sup> reveal that Japan, in fact, does not constitute an exception but an excellent empirical illustration of our proposition and its meaning. Lockwood is anxious to stress that the (not uncommon) belief that Japan should have built up extensive export industries not producing for the home market is a fallacy. In fact, no category of products seems to have been exported without also having an internal market. The whole of Chapters 6 and 7 are of interest to us in this connection. Three quotations might, however, be sufficient: "Sometimes, indeed, the growth of Japanese industry . . . is attributed mainly to the expansion of overseas demand. This is a misconception, as emphasized earlier, and fails to offer any intelligible explanation of the substance and breadth of Japanese economic development"<sup>4</sup>; "The home demand for Japanese manufactures thus absorbed continuously most of the output of industry . . . It developed *pari passu* with the expansion of overseas trade"<sup>5</sup>; "In general, as we have seen, Japan tended to export manufactures of the same general type as those used extensively by her own people."<sup>6</sup>

Having determined the range of potential exports of a country, we now wish to determine the *range of potential imports* of a country. The range of these products is more indisputable. It is self-evident that *internal demand determines which products may be imported*. It should be observed that, in this case, demand does not, of course, need to be representative. All products for which there is a demand at going prices are potential import products.

We thus find that *the range of potential exports is identical to, or included in, the range of potential imports*.

*Some further observations on the pattern of trade in primary products and a note on foreign entrepreneurship*

Before we proceed to consider trade in manufactures more carefully, it might be interesting to stop for a while and investigate why a country

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<sup>3</sup> Princeton, 1954.

<sup>4</sup> Lockwood, p. 364.

<sup>5</sup> Lockwood, p. 369.

<sup>6</sup> Lockwood, p. 373.

may export—but not, of course, import—a primary product without there existing any home demand.

An important condition for relative natural-resource endowments to dictate the pattern of trade in primary products is fulfilled in that such products undoubtedly use up relatively much of the natural resource factor at all relative factor prices. Whether manufactures can be classified according to their factor intensity has been questioned above.

The fact that primary products are natural-resource-intensive makes relative factor proportions of prime importance for the prices of primary products. This carries the additional implication that, because of a strikingly high pre-trade price in natural-resource-scarce countries, foreign demand is easy to become aware of. However, the need for these primary materials is—by virtue of their basic nature in the productive process and because of the large quantities needed—usually self-evident under any circumstances. Furthermore, primary products are often available without particular inventive effort being necessary and their qualitative homogeneity eliminates product development work.

In combination, these facts mean that the forces to which we have attributed great importance in our definition of the potentially possible exports of manufactures obviously cannot exert the same strong influence on trade in primary products. There are likely to be less international differences in production functions as regards primary products than as regards manufactures. And since primary products are characterized by a particular factor intensity, it is clear that the factor proportions theorem is pertinent to trade in primary products. Thus, we must have different explanations for trade in manufactures and for trade in raw materials.

However, it is extremely interesting to note that, even in the case of raw-material exports without the support of a market in the exporting country, *it seldom seems to be entrepreneurs of the exporting country who have taken up production and sought sales outlets on the export market*. Instead, the domination of foreign entrepreneurs recruited from the *importing* country is a typical feature. Even in a country like Sweden, somewhat late in the Industrial Revolution, the initial exploitation of forest resources in the latter half of the nineteenth century was to a considerable extent carried out by foreigners.<sup>7</sup> Singer has called the

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<sup>7</sup> Eli F. Heckscher, *An Economic History of Sweden*, Harvard Economic Studies, Vol. XCV, translated by Göran Ohlin (Cambridge, Mass., 1954), p. 210.

raw-material sector of underdeveloped countries "foreign sectors".<sup>8</sup> *From the point of view of entrepreneurs, it is domestic demand, i.e., demand in their home country—the importing country—which has stimulated production.* This suggests that, even in the case of raw materials, the various pre-requisites for export production implied in our proposition exert a strong influence. *If entrepreneurship could not move internationally, it is quite possible that our proposition could be applied to trade in primary products as well as manufactures.*

In our model for u-countries, we had occasion to work with the assumption that foreign entrepreneurship will establish raw-material sectors in these countries in cases where domestic entrepreneurs did not engage in such production. We are now in a position to provide an explanation of the mechanism inherent in this assumption. Foreign entrepreneurs will come in to exploit raw-material resources, the utilization of which by domestic entrepreneurs is totally absent, or is proceeding at too slow a rate, because of non-existent domestic demand. They will be attracted by profit opportunities which, owing to the differences in natural-resource endowments, are high enough to overcome the inertia produced by the existence of more familiar alternatives in their home country. This inertia keeps them, however, from entering into other lines of production in u-countries where the profit opportunities are more obscure. Thus, it may well be that differences in natural-resource endowments dictate the pattern of trade in primary products only through their effect on international movements of entrepreneurship, in the absence of which production functions would be too different for the factor proportions explanation to be relevant. One should expect that, *if relative factor proportions were as important in manufacturing industry as in the production of primary goods, the international flow of entrepreneurship into manufacturing industry in u-countries to produce for one's own home market would, with the great differences in the endowment of resources, be as marked as the actual flow into raw-material exploitation.* However, international movements of entrepreneurship in manufacturing industry usually take the form of establishing sales organizations, assembly plants, etc., to increase exports from the home country to foreign markets with a similar demand structure. Perhaps in a study of international flows of entrepreneurship the most significant feature to be explored is to which countries entrepreneurship does *not* flow.

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<sup>8</sup> Hans W. Singer, "The Distribution of Gains between Investing and Borrowing Countries", *American Economic Review*, 40: 473-485 (May 1950).

*Between which countries is trade in manufactures potentially most intensive?*

It is evident that, with respect to trade in manufactures, the most important step now is to transfer our attention from the determinants of potential trade to the determinants of *actual* trade. However, to acquaint ourselves with all the problems involved in taking this step, we must first solve another, almost equally interesting, problem, i.e., we must ascertain among which trading partners trade could be potentially most intensive.

By "intensive" we do not mean simply the volume of trade. The absolute size of trade is naturally dominated by the size of the trading partners. In order to measure the intensity of trade, we thus have to eliminate the influence exerted by the size of the countries. The method we shall use in an empirical excursus, annexed to this chapter, is to calculate the *propensities* of countries to import from each other.<sup>9</sup>

*The more similar the demand structures of two countries, the more intensive, potentially, is the trade between these two countries.* If two countries have exactly the same demand structures, *all* the exportables and importables of the one country are also the exportables and importables of the other country.

To determine *which types* of countries may be able to develop intensive trade among themselves, we first have to ascertain which forces determine the demand structures.

A whole array of forces influences the demand structure of a country. We shall, however, argue that the level of average income is the most important single factor and that it has, in fact, a dominating influence on the structure of demand. If this is the case, *similarity of average income levels could be used as an index of similarity of demand structures.* The modal or median incomes are likely to be more representative than the arithmetic mean of the average income, particularly in countries with a pronounced skewness in the distribution of income (such as Kuwait). In a statistical test, modal and median incomes would, however, probably be difficult to find. We shall thus in the following speak of the per capita income, i.e., the arithmetic mean.

We shall try to show that there is a strong relationship between the level of per capita income, on the one hand, and the types of consumer goods and also capital goods demanded, on the other hand.

Let us first consider consumer goods. At higher incomes, products of

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<sup>9</sup> See pp. 110 ff.



different kinds, although filling the same basic needs, are likely to replace less sophisticated types of products; furthermore, products filling new needs are added. Such "qualitative changes" in demand are probably very common. Only part of the higher incomes will be expressed in purely quantitative changes in demand. By "quantitative" we mean a change in the volume of demand for the same product. A "qualitative" change is an alteration in the nature of the product.

Qualitative product differences are not well brought out in empirical studies of consumer behavior along the lines first followed by Engel.<sup>1</sup> The qualitative factor is submerged by taking broad groups of goods such as "food" and "clothing". Even if we are specific enough to study changes in demand for a product like toasters, we shall not discern important changes from lower to higher qualities involving extensive alterations in the product as such. The larger the group of commodities we take, the more likely it will be that the income elasticity at all levels of income is in the neighborhood of unity. The income elasticity of demand for aggregate production is necessarily always unity in the long run when Say's law holds, and is very close to unity in the short run. But the more we divide total production into subgroups, the greater will be the variations in income elasticity. If we classify goods in accordance with precise quality specifications, income elasticity with respect to each class of these goods may change within a small income interval from infinitely positive to infinitely negative. In such cases, small differences in income levels may produce substantial differences in the structure of demand. Outside the income interval there is no demand for the product on the home market; outside an even narrower income range there is no "representative demand". In studies of Engel's law, the qualitative aspect is brought to the surface only indirectly when it is explained why, for instance, the proportion of food expenditures has not, as expected, decreased with rising incomes. The reason given is that food *processing* has been carried farther and changed the character of the commodity group.

As far as our study is concerned, when we compare demand structures it is necessary to define goods by specifying quality. Even minor qualitative differences in goods serving the same basic needs may be

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<sup>1</sup> For such studies see, e.g., G. J. Stigler, "The Early History of Empirical Studies of Consumer Behaviour", *Journal of Political Economy*, 62: 95-113 (April 1954); H. S. Houthakker, "An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law", *Econometrica*, 25: 532-551 (October 1957).

sufficient to introduce into the demand structure of one country some significant differences compared with that of another country.

The differences in consumer demand caused by per capita income differences should not, however, be exaggerated. Uneven income distribution in a country widens the range of potential exports and imports and results, *ceteris paribus*, in there being a greater overlapping of demands between countries with different per capita incomes than would be the case if incomes were more evenly distributed. High-income-earners in a poor country may demand the same goods as low-income-earners in a rich country.

We shall now take up the question of the composition of demand for capital goods. There is not the same relationship between per capita incomes and the demand for capital goods as there is between per capita incomes and consumer demand. The income elasticity of capital goods is not a meaningful concept. Nevertheless, there is another relationship between per capita incomes and the demand for capital goods which makes it useful to link them together. Per capita income is to a large extent determined by the existing stock of capital goods. The relative amount of capital also determines the qualitative composition of the demand for new capital goods. A capital-abundant country, i.e., a country which, with some likelihood, finds itself on a high level of per capita income, demands more sophisticated capital equipment than a capital-scarce country. Although there is no direct causal relationship, we might thus expect that the differences in the level of per capita incomes would tell us at least something about what differences there will be in the structure of demand for capital goods.

It is probable that the technical possibilities for qualitative variations in capital goods are at least as great as for consumer goods. But why should a capital good of lower quality ever be chosen? It is clear that people on relatively lower per capita income levels select lower qualities of consumer goods in order to be able to diversify their consumption within their given budget. Similarly, the reason for selecting relatively lower quality capital goods in a capital-scarce country is that it is a means of spreading the available capital more evenly.

From the marginalist approach, we know that capital should be spread evenly. In a capital-scarce country this means thinly in comparison with the thick layer of capital in a capital-abundant country. However, "thinly" need not mean "of a lower quality". The marginalist theorem of factor combination is applicable only when we are concerned with capital of a homogeneous quality. It is clear that if a group of 100 workers has 100 hammers, it is rational for

each worker to have one hammer and not one worker to have 100 hammers and the rest no hammers. But it does *not* necessarily follow that we should not give *one* worker an electric hammer (in use perhaps by every worker in a more capital-abundant country and assumed to cost as much as 100 ordinary hammers) and give the other workers no hammers. With different qualities of capital goods, it would, if we prefer to maximize total output rather than employment of labor, be rational to spread capital unevenly if overall productivity thereby increases.

There are also other reasons why capital in capital-scarce countries might not be spread evenly. In the literature on economic development, there has been an extensive discussion as to whether underdeveloped countries should or should not fashion their own less advanced technology in such a way as to enable them to spread their capital more evenly. We shall not go through this literature in any detail as that would entail too great a digression.<sup>2</sup> However, we can find certain arguments there with a bearing on our present problem. It has been said, for instance, that managerial skill might be still more scarce than capital and that, by spreading capital thinly, this resource might be wasted. Furthermore, it has been argued that capital-intensive technology creates profits which provide savings for sustained capital accumulation and growth. The point has also been made that capital-intensive equipment can stimulate management and labor to better performances and help to break the fetters of the past. These two last arguments are in conflict with the allocative approach of marginalism.

To the extent such considerations have influenced, or will influence, the demand for capital goods, and to the extent the use of superior

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<sup>2</sup> See H. G. Aubrey, "Small Industry in Economic Development", *Social Research*, 18: 269-312 (September 1951); A. Gerschenkron, "Economic Backwardness in Historical Perspective", in *The Progress of Underdeveloped Areas*, ed. B. F. Hoeslitz for the Norman Wait Harris Memorial Foundation (Chicago, 1952); S. Kuznets, "Toward a Theory of Economic Growth", in *National Policy for Economic Welfare at Home and Abroad*, ed. R. Lekachman (New York, 1955) pp. 12-78 and 93-99; F. A. Hayek's comment on Kuznets, *ibid.*, pp. 85-89; W. Galenson and H. Leibenstein, "Investment Criteria, Productivity and Economic Development", *Quarterly Journal of Economics*, 69: 343-370 (August 1955); Henry J. Bruton, "Growth Models and Underdeveloped Economies", *Journal of Political Economy*, 63: 322-336 (August 1955); J. Tinbergen, "Choice of Technology in Industrial Planning", *Bulletin on Industrialization and Productivity*, 1: 24-33 (April 1958, United Nations Department of Economic and Social Affairs); International Labour Office, "Some Aspects of Investment Policy in Underdeveloped Countries", *International Labour Review*, 77: 381-416 (May 1958); *idem*, "Production Techniques and Employment Creation in Underdeveloped Countries", *International Labour Review*, 78: 121-150 (August 1958). The earlier literature referred to is discussed by C. P. Kindleberger in *Economic Development* (New York, 1958), chap. 10. The United Nations *Bulletin on Industrialization and Productivity*, 1: 5-23 (April 1958), reviews in an interesting way the various recommendations on the present problem made by the United Nations Technical Assistance Administration experts.

quality capital goods compensates the loss from unemployment of labor, the qualitative differences in capital goods would be less pronounced at different per capita income levels than we might expect. The main differences among countries would be in the quantities of capital goods, because the latest techniques would be adopted in most countries.

Casual empiricism suggests, however, what could probably be confirmed through a more careful investigation, namely, that relative capital scarcity is expressed in the use of relatively low quality capital goods rather than in the existence of a relatively low number of capital goods of the highest quality. If full employment obtains in a capital-scarce country, this implies that capital goods of lower quality must be in use.

Nonetheless, there will certainly be many overlapping demands in capital goods. To begin with, there are not infinite opportunities for qualitative variations. Furthermore, there is a particular reason why unadvanced techniques should be used in capital-abundant countries, i.e., that implied by differences in capacity use of capital goods. The type of capital goods that it is rational to employ in capital-abundant countries for low-capacity use (such as hobby or reserve equipment) might be economically appropriate for high-capacity use in a capital-scarce country. This will probably create a substantial amount of overlapping demand for capital goods.

Although it is clear that other factors, such as language, culture, religion, and climate, influence the demand structure, we shall work with the hypothesis that the scope for trade is potentially greatest between countries with the same per capita income levels. From this, it follows that *per capita income differences are a potential obstacle* to trade. Goods in the production of which the one country has a comparative advantage are not demanded in the other country, and vice versa. When per capita income differences reach a certain magnitude, trade can only take place in certain qualitatively homogeneous products. Only in such products can there be overlapping demands.

Support for this hypothesis is forthcoming from practical experience. When assessing the market prospects of a foreign area, businessmen devote considerable attention to the per capita income level (and thus not only to total income, which determines the market potential in another sense).

In the literature there is also an interesting, but unfortunately neglected, paper expressing the same thoughts as those we advance:

“a country with a large internal market for low-quality goods is more likely to compete successfully in countries with a demand for similar goods than one

whose internal markets are mainly in goods of higher quality, because less adaptation of production processes to export requirements will be needed in the former case", and "Japan's success [in foreign trade] was greatly due to the low purchasing power of the population in the European colonies and semi-colonies".<sup>8</sup>

*A diagrammatic summary of the principles for trade in manufacture*

The essence of our argument can be embodied in a simple diagram, which can be of some use to us in the continuation of our analysis.

On the horizontal axis in Figure 5 we measure per capita income ( $y$ ), on the vertical axis we measure in ordinal numbers the degree of "quality" or "sophistication" of each product demanded and of demand as a whole ( $q^\circ$ ). The more complex, elaborated, refined or luxurious the products demanded, the higher will be this degree.

The higher the per capita income, the higher will be the degree of quality characterizing the demand structure as a whole. The line  $OP$  is intended to represent this relationship.

However, opportunities for qualitative variations of single products are not unlimited. This means that, although we have a smooth curve for the relationship between per capita income and the qualitative degree of demand as a whole, we have step functions for single products. Thus, the average quality of demand will be composed of different qualitative degrees of the various products. Furthermore, as the distribution of income can be expected to be unequal, consumer products of different qualities will be demanded in one and the same country. Similarly, because of differences in capacity use, capital goods of different qualities will be used in one and the same country.

Both these features may be included in our diagram by letting a given per capita income be represented by a range of qualitative degrees of demand around the average degree on  $OP$ . Thus, for country I in Figure 5, the various products demanded will lie within a qualitative range of, say,  $a-e$ , with  $b$  as the average. For country II, the range is  $c-g$ , with  $f$  as the average. These ranges represent the potential export and import products of country I and II, respectively.

The qualitative range  $c-e$  is common to the two countries. The overlapping demands in the two countries must relate to products whose

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<sup>8</sup> H. Frankel, "Industrialisation of Agricultural Countries and the Possibilities of A New International Division of Labour", *Economic Journal*, 53: 188-201 (June-September 1943). Quotations from pp. 188 and 189.

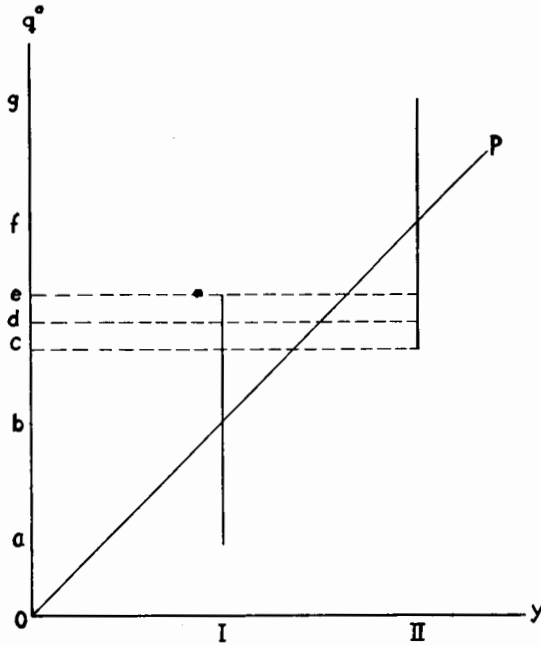


Fig. 5.

quality falls within this range, and it is in such products that trade may take place between these two countries. Country II has no demand for products of a lower quality than  $c$  and can thus neither import nor export such manufactures. Country I has no demand for products of a higher quality than  $e$  and can thus neither import nor export such manufactures.

If we had introduced "representative demand" as a further determinant of potential export products, the ranges  $a-e$  and  $c-g$  would be narrower for export products. The range of potential import products cannot, of course, be narrowed in this fashion. As long as there is a demand at going prices, a product is a potential import product.

*Potential intensity of trade in manufactures according to the factor proportions theorem*

The effects of per capita income differences never enter into the factor proportions explanation of trade flows. However, to the extent there is some relationship between capital and labor proportions and per capita incomes, it should be possible to *deduce* some connections

between per capita incomes and the pattern of trade as it emerges according to the Heckscher–Ohlin approach.

There seems to be an unequivocal relationship between factor proportions and per capita incomes, i.e., the more capital per head in the economy, the higher per capita incomes.

Thus, differences in factor proportions create both trade and per capita income differences. Although there is no causal relationship between per capita income differences and trade, *the Heckscher–Ohlin theory implies that trade between countries on different income levels is most intensive*. In the following passage, Ohlin sums up the effects on trade of increasing differences in the supply of factors. 1/5

“The increased prices of the relatively cheap factors will call forth a still greater quantity of them, although they were already plentifully supplied. The reduced relative prices of the scantily existing factors will probably reduce their quantity. Evidently the outcome is *greater unevenness internationally as to the factor equipment, and a strengthening of the tendency to trade*. In so far as the existing differences in factor supply are increased, the character of trade will remain about the same, *but it will be of greater volume*. The division of production between the various countries will be carried further.”<sup>4</sup>

This conclusion, based on the factor proportions account, is in complete contradiction to our own argument. With us, differences in capital/labor proportions are a potential obstacle to trade in manufactures. An increasingly labor-abundant country will experience a fall in per capita incomes. An increasingly capital-abundant country will have rising incomes. The demand structures in two such countries will become more and more different. The nature of their trade will change and the potential scope for trade in manufactures will shrink.

#### *Potential trade versus actual trade*

Having ascertained which goods *may* be traded, we must now investigate what the moving forces are that make trade *actually* take place. We must find out why countries are able to achieve comparative advantages. If there are no such trade-creating forces, there will be no actual trade, no matter how big the scope for trade is potentially.

In our analysis of trade in primary products we made no use of the concept of “potential trade”. We were able to make a more direct

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<sup>4</sup> B. Ohlin, *Interregional and International Trade*, p. 119 (italics in original to “equipment”).

approach. We may now simply reiterate that the moving force behind trade in primary products is price differences caused by differences in relative endowments of natural resources.

We shall thus concentrate on finding the forces creating trade in manufactures. In this connection, we may first observe that a country can hardly export all its exportables. A certain proportion of them will—to make trade a two-way flow—be imported.<sup>5</sup> Changes in cost levels and incomes, brought about by either measures of monetary and fiscal policy or exchange rate variations, will take place to balance actual exports and imports.

Let us first discuss trade among countries with identical per capita incomes. In these countries, all the exportables and importables of one country are also the exportables and importables of another country. The potential scope for trade is in this case maximal. Nonetheless, actual trade among these countries may be minimal. Goods in the production of which the one country has its most advantageous production functions tend to be the goods in the production of which the other country also has its most advantageous production functions. What are actually the forces giving rise to comparative advantages between countries on similar per capita income levels? The answer is simple: the same forces that give rise to trade *within* each of the countries create trade between them. There is no difference between trade among countries with the same per capita incomes and trade within a country. We thus have only *one theory of trade* for growth countries and not different theories for international-domestic, or interregional-intraregional trade.

When the entrepreneurs raise their trade horizons and meet each other on the international market, it is quite possible that they will discover that they can extend their market expansion paths into each other's territory while competing only with substitute and not with identical goods. The almost unlimited scope for product differentiation—real or advertized—could, in combination with the seemingly unrestricted buyer idiosyncrasies, make possible flourishing trade in what is virtually the same commodity. Ships bringing European beer to Milwaukee take American beer to Europe. The strong elements of *monopolistic competition* should be incorporated into trade theory as a trade-creating force.

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<sup>5</sup> If we make far-reaching use of "representative demand" as a factor determining the range of potential exports, a country may export all its exportables and import goods with unrepresentative demand. This can be seen in Figure 5.



In still other cases, entrepreneurs might discover that they all cannot easily extend their market expansion paths into competitors' territory to share each other's markets. This need not imply that neither entrepreneur can gain an advantage. Instead, well-established entrepreneurs in one country might discover not only that they are unable to extend their trade path but also that they are being out-competed by foreign firms. Advantages in the processing of raw materials in ample supply, technological superiority, managerial skills and economies of scale are perhaps the most important reasons why identical relative prices would be a mere coincidence and why some producers will be able to gain the upper hand over other producers of the same product. These other producers face a need for adjustment. Product differentiation, adaptation to new lines of production and, conceivably, bankruptcy constitute different ways of adaptation.<sup>6</sup> In this way, there will be a selective process and flourishing trade just as on the domestic markets.

As concerns the forces creating trade between countries on different per capita income levels, it is plausible to expect that the same kind of process will be going on. One difference is, however, that the number of goods for which demand overlaps, and thus in which trade can be conducted, will be fewer.

Between countries on different per capita income levels there are also differences in the degree of representativeness of the demand for products having overlapping demands. Such differences are, through their effects on production functions, likely to be an additional trade-creating force. The more representative the demand for a good is, the more likely it is that this good will be an actual export good. This was hinted at earlier when we discussed the definition of the range of potential exports. In terms of Figure 5, our argument is that, although products falling within the whole of the range *c-e* could be exported by country I to country II, it is *likely* that country I will export products within the range *c-d*, this range being closer to the average demand in country I, i.e., more representative than in country II. For the same reason, *d-e* is more representative for country II than for country I and is thus likely to be exported from country II to country I. If we had made extensive use of the "representative demand" concept for potential exports, only those products falling within the ranges *c-d* and *d-e*, respectively, might have been potential exports. It should be noted

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<sup>6</sup> Carl Major Wright has studied problems of adjustment to the world market. See his *Economic Adaptation to A Changing World Market* (Copenhagen, 1939).

that although the range  $b-c$  is even more representative for country I, and  $e-f$  for country II, such commodities cannot be exported as there is no demand for them in the other country.

We have argued above that relative factor proportions—to the extent they influence relative commodity price structures at all—need not be reckoned with in respect to goods outside the overlapping demands. However, within the range of overlapping demands it is possible that the effects of differences in representative demand on production functions are not strong enough to make differences in factor proportions of no importance as far as relative commodity prices are concerned. To the extent a product for which there is a representative demand embodies relatively much of a factor in scant supply, these two forces will counteract each other. They may, in the reverse situation, strengthen each other. This argument about the possible trade-creating effects of differences in factor proportions could be distinguished from the factor proportions account in that this force would be only one of many and that it could create trade only in those products having overlapping demands, i.e., within the range of potential trade. No matter how big the differences in factor proportions and factor intensities are, trade will only be created if it is potentially possible.

We may conclude that the trade-creating forces are so strong, and the character of the process set in motion of such a nature, that a situation in which identical products are produced in all countries at identical prices, and not traded internationally, could in fact only be a coincidence—and this would be temporary. The conditions responsible for the situation would change under the impact of deliberate entrepreneurial efforts, time, growth, and transformation inherent in the processes analyzed in the preceding chapter. All this indicates that, in the absence of trade barriers, actual trade will approximate potential trade.

The *predictability* and the *stability* of the pattern of actual trade offer interesting problems. With regard to trade in primary products, we are able to predict how the various countries will specialize, and we know, furthermore, that the pattern of specialization is going to be stable. But the trade-creating forces which we have emphasized with respect to trade in manufactures would seem to give rise to a chance and volatile pattern of trade.

However, this is not so—at least not to any extreme degree. To begin with, the various advantages of processing domestic primary products in ample supply could be expected to introduce a predictable and continuous element in the pattern of actual trade. Sweden, for instance, has

for a long time exported paper and can be expected to continue as an exporter of this manufacture.

A position of technological superiority in the production of certain goods, the need for which cannot be deduced from per capita income levels as such, is also predictable. Certain countries or regions may have reason to pay special attention to the fulfilling of particular needs. These needs would be those which are peculiar to the country in question. It would not be astonishing if Finland could export ice-breakers, Sweden pulp- and paper-machinery or mining equipment, and Israel orange-juice machinery. It would, on the other hand, be surprising if the Eskimos could achieve a comparative advantage in the production of refrigerators or if the Polynesians could export swimming-suits.<sup>7</sup>

Furthermore, the concept of "representative demand" is useful not only in narrowing the range of potential exports, but also in predicting the pattern of actual trade between countries on unequal per capita incomes. Japan, for instance, might have been, or be, in a position where bicycles were exported and cars imported as the demand for cars was less representative than that for bicycles at the ruling per capita income level. The cars would be imported from countries where the demand for them is more representative, and the bicycles exported to countries where the demand for them is less representative. As regards the opportunities of predicting the pattern of trade, one advantage is that it is usually easy to determine which goods are representative of the demand structure at a given per capita income. It has proved difficult to distinguish capital- and labor-intensive products, i.e., to predict *a priori* the pattern of trade on the basis of the factor proportions account.

Although we have suggested some generalizations with respect to predictable regularities in the pattern of actual trade, we do not pretend to have a general explanation of the exact pattern of comparative advantages. We do not try to determine why the Germans export cameras and why the Belgians do not export cars. But we do know that the exact pattern of specialization must be limited by the potential trade under the given conditions. Of course, comparative advantages in manufactures can be explained in every instance, but in some of them only

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<sup>7</sup> For moral edification, it should be observed that—contrary to what lovers of Swedish films might suspect—in 1960 Sweden exported swimming-suits for 2 mill. Skr. and imported swimming-suits for 4.4 mill. Skr. Thus, even if the imports are bigger than the exports, demand cannot be too unrepresentative.

by having recourse to *ad hoc* arguments which are not operationally significant. The relatively low ambition of our theory in this respect as compared with the factor proportions account appears to be an advantage. To argue that the Swiss export watches and the Danes do not export cars because of differences in relative factor proportions seems precarious. And the contention that the Germans export chemicals because Germany is richly endowed with the factor of production "chemical engineers" is as possible as other circular arguments.

In cases where a comparative advantage is predictable, the pattern of trade should show considerable stability. But it might be expected that, in cases where a comparative advantage is not predictable beyond what is implied by our concept of potential trade, the pattern of specialization would be unstable. However, the pattern of specialization is likely to show stability over time even in these cases *once the pattern has begun to emerge*.

Through the division of labor, natural skills will develop and be strengthened in fields that have become typical of each country. An emerging pattern of trade will affect the future environment of inventors and innovators, the efforts of which will be channelled differently in the various countries. Economies of scale will assert themselves. Habit-forming brand advertising will cement the consumption pattern. These forces will gradually create a gap between what might originally have been almost identical prices and eventually make a fragile pattern of comparative advantages more substantial. The Swiss, for instance, have gradually established a virtual monopoly in the production of watches.

On the other hand, as a country grows and its per capita income increases, the demand structure of that country will change. As a consequence, the range of potential—and thus also actual—exports will change. This will introduce an element of gradual change in the pattern of specialization, a change whose nature we are, however, able to predict. If Japan has been an importer of cars and exporter of bicycles, she might, within a decade, export cars and import bicycles. Our models of trade and growth and stagnation help us to study how the pattern of trade changes over time and will thus also help us to determine how a certain pattern of trade *destroys itself* through the effects of trade on growth and stagnation.

As we see, there will thus be a pattern of trade which is (a) to some extent accidental, (b) not particularly unstable, and (c) gradually changing over time.

We have now determined the trade-creating forces. But there are not only trade-creating forces; there are also *trade-braking forces*. These will make actual trade smaller than potential trade. They will, moreover, also influence trade in primary products.

The most important trade-braking force might well be what we shall call the "*distance factor*". Entrepreneurs in the various corners of the world have not all lifted their trade horizons high enough to include all countries. Indeed, only a few of them might have advanced so far in the process of expansion that they have been able to lift their trade horizons above the home market. The distance factor will thus make actual trade decline with distance from what is potentially possible.

*Transport costs* could be included under the distance factor. But as there are psychological and many other reasons why the distance factor would, under all circumstances, be important, transport costs can be treated as a separate trade-braking force. Like the distance factor, transport costs will tend to decrease trade with distance.

Man-made trade obstacles (tariffs, etc.) have a trade-braking effect, too. In this case, there will not, however, be any such geographical regularity as that found when trade declines on account of the distance factor or transport costs.

There are thus both trade-creating and trade-braking forces. If we conclude that the trade-creating forces are strong enough to make all potential trade take place, then, within these limits, the amount of actual trade will depend upon the strength of the trade-braking forces.

#### *Between which countries is actual trade most intensive?*

*Potential* trade in manufactures is most intensive among countries with similar demand structures, i.e., countries with about the same per capita income levels. But among which countries will *actual* trade in both manufactures and primary products be most intensive?

Let us first try to determine the intensity of actual trade in manufactures only.

The trade-braking forces not only make actual trade smaller than potential trade; they also introduce distortions in the sense that countries with similar per capita income levels do not necessarily trade most intensively with each other.

The distance factor may, for instance, mean that entrepreneurs are not even aware of the market opportunities in some distant country although they have already established trading relations with a more

nearby country, irrespective of the scope for potential trade. There is a special instance of great importance where the distance factor should be expected to upset the pattern of actual trade intensities completely, i.e., that of the underdeveloped countries. In these countries, many domestic entrepreneurs have never raised their trade horizon very much above the local village market. Between such countries there could be hardly any foreign trade, no matter how similar the demand structures may be. The opportunities for trade between those countries with the greatest trading pre-requisites might thus remain completely unexploited. Trade may instead be dominated by more aggressively marketed imports from industrialized countries and, to some extent, consist of products less suitable than those obtainable elsewhere. Although the potential scope for imports from industrialized countries is relatively small, actual imports may thus be greater than from countries with the same income level.

But it is not only the trade-braking forces that will distort the intensity pattern. There are also various cultural and political affinities—or aversions—which will distort trade without reducing it. Similar language and cultural backgrounds could be expected to increase the intensity of trade among the Scandinavian countries, for instance.

We thus conclude that the pattern of actual trade in manufactures will not be as regular between countries having similar per capita income levels as the trade-creating forces would tend to make it. But even if this is so, per capita income levels are, of course, nonetheless an important determinant of the pattern of actual trade.

As concerns trade in primary products, we advance no presumption that countries with the same per capita income levels should trade more intensively with one another than with other countries. In the first place, two countries with equal income levels may have competitive natural-resource endowments. They would then tend to trade with each other less than with countries having complementary resource endowments. In the second place, the income elasticity of demand for a primary product may be such that a country on a lower or higher income level than the producing country buys relatively much of the primary product in question. This income elasticity argument has no bearing upon trade in manufactures as a manufactured product can be a potential export only within a narrow income range. But primary products are demanded over wide income ranges and they may be exported even if they are not demanded at home.

Trade in primary products will thus be still another distorting factor

if we want to ascertain the effects of per capita income similarity on the pattern of actual trade.

In spite of all these distortions, we shall, in an empirical excursus to this chapter, study the pattern of trade intensities. If we can isolate the effects of the outside disturbances, we shall be able to test our hypothesis that demand structures are an important determinant of the pattern of actual trade. We can also tell from empirical material how important similarity of demand structures—measured in terms of similarity of per capita income levels—is, compared with the array of other forces influencing the pattern of actual trade.

After the empirical excursus, we shall use our deductive results to conclude this study of the effects of trade on economic structure and welfare.

## EXCURSUS

# AN ATTEMPT TO STUDY OUR HYPOTHESIS EMPIRICALLY

In this excursus we shall, on the basis of trade and income statistics, construct a world-wide pattern of trade intensities. Such a pattern might, in its own right, be of interest as a new empirical device in the study of trading relations. The specific purpose for which we assemble the material is, however, to suggest a method of tracing the influence of differences and similarities in per capita incomes on the intensity of trade among various countries. It is unlikely that we should discover such an influence from these data without extensive statistical elaboration and analysis. We have already observed how the trade-braking forces, preferences, and trade in primary products will distort the intensity pattern. However, even if we cannot expect any easily-won conclusions from this statistical exercise, the material might provide a starting point for anybody who may wish to apply refined statistical methods in an attempt to isolate the effects of differences in per capita income levels on trade intensities. Such an attempt—which we shall not make—might hold the additional attraction of being a means of gauging the relative strength of the various forces which act upon the pattern of actual trade. Furthermore, the figures might be useful in a theory of international marketing in order to determine both which markets are at all exploitable and which markets are under-exploited under existing conditions.

### *The method of constructing a pattern of trade intensities*

If, for instance, Swedish trade with the U.S. happens to be absolutely bigger than with Belgium, this would hardly, from our point of view, be interesting. The U.S. is so much bigger than Belgium and, as size will affect the absolute volume of trade, it would hardly be surprising if Swedish trade with the U.S. were greater than with Belgium. To make comparisons among the intensities of—in this case—Swedish trade with various countries, we must find a way of reducing these countries to a



### Numerical example 1. *Pattern of trade*

GNP	Imports to	from	A	B	C	D	Total imports
10	A		—	1	1	2	4
50	B		1	—	5	10	16
50	C		1	5	—	10	16
100	D		2	10	10	—	22
Total imports			4	16	16	22	

*number of comparable units* and see how much Sweden trades *with each of these units*. If Sweden trades more with a U.S. unit than with a Belgian unit, its intensity of trade with the U.S. is greater than with Belgium.

The number of units of which each country will be assumed to consist is the number of dollars in the Gross National Product of the country. If we divide U.S. imports from Sweden by the U.S. GNP, we obtain a measurement of how much each dollar unit of the U.S. trades by Sweden. If we, likewise, divide Belgian imports from Sweden by the Belgian GNP, we obtain a measurement of how much one dollar unit of Belgium trades with Sweden.

When we divide with the respective GNPs we obtain, in fact, *the average propensities* of the various countries, in this case the U.S. and Belgium, to *import from a particular country*, in this case Sweden. To eliminate the influence of size, we shall thus leave the pattern of actual trade for a pattern of import propensities. In this latter matrix, we can read off the intensity of the trading relations of any country which is included in the matrix.

In two numerical examples, we shall show more in detail how we intend to proceed. Example 1 represents the pattern of trade between four countries. The matrix is so constructed that trade is directly proportional to the size of the trading partners. Country D, for instance, imports five times as much from B as from A (10 and 2, respectively) since B's GNP is five times that of A's.

Each row gives total imports to one country from other countries. Each column gives total imports to other countries from one country. The fact that total imports, say, to A from other countries (the figure 4 in A's row) is the same as total imports to other countries from A (the figure 4 in A's column) means, of course, that trade is in balance.

Numerical example 2. *Pattern of import propensities*

GNP	Propensity to import from in	A	B	C	D	Total
10	A	—	0.1	0.1	0.2	0.4
50	B	0.02	—	0.1	0.2	0.32
50	C	0.02	0.1	—	0.2	0.32
100	D	0.02	0.1	0.1	—	0.22
Total		0.06	0.3	0.3	0.6	

In a trade matrix like the one in our numerical example, where trade was assumed to be influenced only by differences in size, the propensity for every country to import from any one country will be equally great. This can be seen from our second numerical example, where we have calculated the import propensities on the basis of the trade matrix in example 1.

Every country has a propensity to import from A of 0.02, from B and C of 0.1 and from D of 0.2. This is the important feature of this matrix.

As we see from each row, the smaller the country, the higher is its total propensity to import. This, as we know, depends upon the fact that the smaller the country, the larger proportion of its total trade is foreign trade. If we divide the World into a sufficiently large number of countries, all trade would be foreign trade. If there were only one big country, all trade would be domestic trade. Although the propensity of a small country to import is high, the propensity of other countries to import from a small country is small. D's imports from A are only one-fifth of D's imports from B, but both trade figures are divided by the same GNP figure in order to calculate D's propensity to import from each of the two countries. Thus, D's propensity to import from the small country A is only one-fifth of D's propensity to import from B.

So as to make absolutely sure that the size factor has been eliminated and to see still more clearly how this is done, we could divide country D into two equally large parts called  $D_1$  and  $D_2$ . The total propensity to import of both  $D_1$  and  $D_2$  is higher than that of D. But this is only because the trade flow between  $D_1$  and  $D_2$  is now counted as foreign trade. As concerns the  $D_1$  and  $D_2$  trade with *other countries*, it is half that of D; but since the GNP of  $D_1$  and  $D_2$  are also half that of D, the propensity of both  $D_1$  and  $D_2$  to import from each of the other coun-

tries is exactly the same as that of D. Thus, with respect to the values in each column, the size of the importing country is immaterial.

### *The propensity matrix*

But, in the real world, it is not only the size of the trading countries that affects the pattern of trade. Thus, in a propensity matrix based on a real trade matrix, the column figures will not be identical. It is our contention that *one reason* why the column figures will not be identical is that countries are on different levels of per capita incomes.

In order to see whether the influence of per capita income differences can be easily determined, we shall now proceed to the construction of a propensity matrix based upon real trade figures.

However, to do this we must solve various purely statistical problems or, if we cannot solve them, at least point out their existence and insolubility.

To begin with, the income statistics are notoriously suspect. Nor are they made more reliable through being converted into the same monetary unit. It should also be remembered that the small per capita income differences between some of the countries to be included in our matrix are well within the margin of error and are, under all circumstances, insignificant. Secondly, per capita incomes—even if we had access to modal or median values—may not reflect the structure of demand very accurately if the distribution of income within the countries is very uneven. Italy is probably a case in point. The Italian per capita income is representative of neither the north nor the south. Thus, Italy may very well trade more with countries on somewhat higher and lower per capita income levels than with countries on the same per capita income level. However, we have to accept per capita incomes as the best available approximation of demand structures.

Thirdly, although trade statistics are usually considered to be reliable, we know that figures given by one country are often not congruent with the corresponding figures reported by another country. Imports to X from A, as reported by X, and exports from A to X, as reported by A, should be identical, but in practice often show a great discrepancy (even if both are calculated on an fob-basis). Statistical errors must explain these discrepancies. As we are interested in comparing the propensities of all other countries to import from one particular country, we run the risk of comparing import data calculated in a variety of ways by different countries. *To avoid this, we shall use exports to all other countries as reported by the one particular country.* To obtain country X's

marginal propensity to import from country A, we thus divide A's exports to X—instead of X's imports from A—by X's GNP.

Another statistical problem is that of transit trade. Such trade should be eliminated from our trade figures. However, we have made no attempt to do this. Thus, our results are distorted to the extent such trade exists and is included in the trade statistics we have used.

Finally, we have to decide whether we want to calculate import propensities in respect to total trade or only to trade in manufactures. Unfortunately, however, the calculation of import propensities from a matrix of trade covering only manufactures is not of very much help to us. An industrialized country may import more manufactures from another industrialized country on a different income level than it does from a primarily raw-material-exporting country on the same per capita income level. As trade must tend to be balanced, exports of primary products necessarily affect the volume of manufactures that a country may export. In these circumstances, we have chosen to calculate import propensities from a matrix of total trade.<sup>1</sup>

Our first matrix, which has not been reproduced here, gives the flows of total trade in 1958 between 32 countries outside the communist bloc with different per capita income levels. In this matrix, every column states what a particular country exported to each of the other 31 countries. Every row indicates how much each country exported to the particular country. In other words, the U.S. column, for instance, gives us the U.S. exports to each of the other countries, whereas the U.S. row gives us the exports of each of the other countries to the U.S.

The data have been compiled from the U.N. publication "Direction of International Trade", Statistical Papers, Series T, Vol. X, No. 8. It should be noted that, according to our source, only "a small portion" of U.S. military aid is included in the U.S. export figures.<sup>2</sup>

In some cases, no exports are reported from a particular country to one, or some, of the other 31 countries. We have in these instances tried to obtain figures for imports to these various countries from the particular country. As the import figures might be calculated on a cif-basis, they might be higher than the export figures they are intended to

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<sup>1</sup> An attempt to calculate propensities from a matrix of trade in SITC groups 5-8 (manufactures) has been made. The only principal difference that emerged was that—as we should expect—the intensity of all countries to trade with low-income countries (raw-material exporters) was lower.

<sup>2</sup> Op. cit., p. 60 (New York, 1959).

substitute. In some cases, it has proved impossible to obtain figures even in this fashion. Usually, the probable explanation is that no significant amount of trade has taken place between the countries concerned.

From the trade matrix, we have constructed an import propensity matrix, reproduced here as Matrix 1. To construct the propensity matrix, the row figures of the trade matrix (i.e., exports from other countries to the country of that row) have been divided by the GNP of the country of that row. All figures in, say, the U.S. row have thus been divided by the U.S. GNP. The reason why we divide, for instance, Canadian exports to the U.S. by the U.S. GNP is that Canadian exports to the U.S. should, but for statistical discrepancies, be the same as U.S. imports from Canada. When we divide all figures in the U.S. row by the U.S. GNP, we thus obtain the U.S. propensities to import from each of the other countries. And in the U.S. column we obtain the propensity of each of the other countries to import from the U.S.

Two dots indicate that no figures are available for trade between the two countries, i.e., the import propensity is probably zero. In cases where the propensity value is calculated not from an export figure, but from an import figure, this has been indicated. It should be noted that, to avoid a considerable number of cumbersome zeros, each propensity value has been multiplied by 1,000. Our matrix is thus not a matrix of propensities to import in relation to each dollar, but to each 1,000 dollars, in the GNP.

The GNP figures which have been used in our calculations of import propensities—as well as the per capita income, or per capita product, figures which will be used below—are published in Foreign Aid Program, U.S. Senate Document 52, 85th Congress, 1st Session, pp. 299–340. They are prepared by the Office of Statistics and Reports, International Cooperation Administration. One disadvantage is that this material dates from 1955. It does thus not originate from the same year as our trade statistics. GNP figures, expressed in national currencies, are available for later years, but our using them would involve the complication of our having to convert them into a single currency. In these circumstances, we have preferred to use somewhat older figures, particularly as their nature is such that changes cannot, over this period of three years, have been very significant. The motivation behind our using the latest available trade statistics is that it is felt that there has been both a gradual freeing of world trade and a gradual improvement in the collection of data, at least in some of the countries concerned.

It is the columns in the propensity matrix which interest us. In order

to study the intensity of trading relations, we must compare, for each country at a time, the propensities of every other country to import from the country being considered, i.e., to compare the values within each separate column. If our hypothesis—that per capita income differences influence the pattern of trade—is to be upheld in our empirical material without further statistical elaboration, each value in a particular column should, on the whole, be higher, the more similar the per capita income of the country in the row is to the per capita income of the particular country in the column. In the matrix, we have arranged the countries according to their per capita products. This means that as we approach the northwest-southeast diagonal of the matrix from above or from below, the propensities should increase. In a three-dimensional geometrical representation of our matrix, the diagonal should function as a *ridge*. We should descend when we move from the diagonal in a column as the trading partners then become increasingly different from the column country.

In order to make the data in the propensity matrix visually apparent, the values given in the columns of the various countries can be plotted in diagrams. On the horizontal axes we measure GNP per capita and on the vertical axes we measure the propensities of other countries to import from the particular countries to which the diagrams refer. The scale on the vertical axes must differ from country to country since the propensities of other countries to import from a particular country depends, to a large extent, on the size of this country. A vertical line can be drawn in the diagrams to indicate the GNP per capita of the column country. In each diagram there will be a number of points, one for each importing country. The closer to the vertical line a point is (assuming no other factors influence trade relationships than per capita incomes), the higher up it should be. These points should thus tend to trace out a curve reaching its maximum at the point closest to the vertical line. One of the characteristics of the geometrical shape of this hypothetical curve is that it is the inverse of the hypothetical curve of the factor proportions account.

In order to decrease the number of observations, thereby making the diagrams more easy to interpret, we have calculated class means. The U.S. and Canada, both having per capita incomes extremely different from all other countries, have formed one class each. Thus for these two countries their propensity values are the class mean values. The remaining 30 countries have been divided into six classes, each consisting of five countries. Each particular country (excluding the U.S. and

Canada), the trading relations of which the means are intended to sum up, must of course itself belong to a five-country class. The means of this class have, in each instance, been calculated from the values of the other four countries. We thus have a number of four-country classes. The means are unweighted. In cases where no trade is reported in the statistics, we have assumed that there has been no trade.

For the U.S. and Canada we thus have seven mean values. For the other countries we have eight mean values. These mean values can be plotted in the diagrams above the average per capita income of the class. Mean values of the class to which the diagram country itself belongs are, for simplicity, best plotted above the average per capita income of the whole five-country group.

In Diagrams 1 and 2, we have plotted the propensities of other countries to import from Sweden and India, i.e., the values in columns 6 and 31. Each dot in the diagrams has a number which refers to the number of that country in the propensity matrix. The regression means have also been plotted, and they have been connected so as to give a picture of the relationship between similarity in per capita income and trade intensity. In order to indicate the special character of the U.S. and Canada figures, these have been connected with the proper mean values by dashed lines.

In Diagrams 3-14 we have plotted the propensities of other countries to import from the U.S., Canada, New Zealand, France, the U.K., West Germany, Israel, Italy, Brazil, Japan, Portugal, and Pakistan. In order to make possible a smaller scale of reproduction, the dots have been unnumbered in these diagrams. We have tried to construct diagrams for a couple of countries in each five-country group plus, of course, for the U.S. and Canada. It has been deemed unnecessary to reproduce the diagrams of all countries. The visual impression which can be gained from these 14 diagrams conveys an accurate idea of what can—and cannot—be achieved through this type of analysis.

#### *Concluding comment*

As has already been pointed out, this statistical investigation has been made so as to suggest in principle an interesting method of testing our hypothesis rather than so as to actually test it. We have made a minimum of effort to isolate the effects of per capita income differences on trade in manufactures. Nonetheless, the diagrams seem to indicate that our hypothesis cannot be rejected off-hand and that a full-fledged econometric investigation could be worth-while.

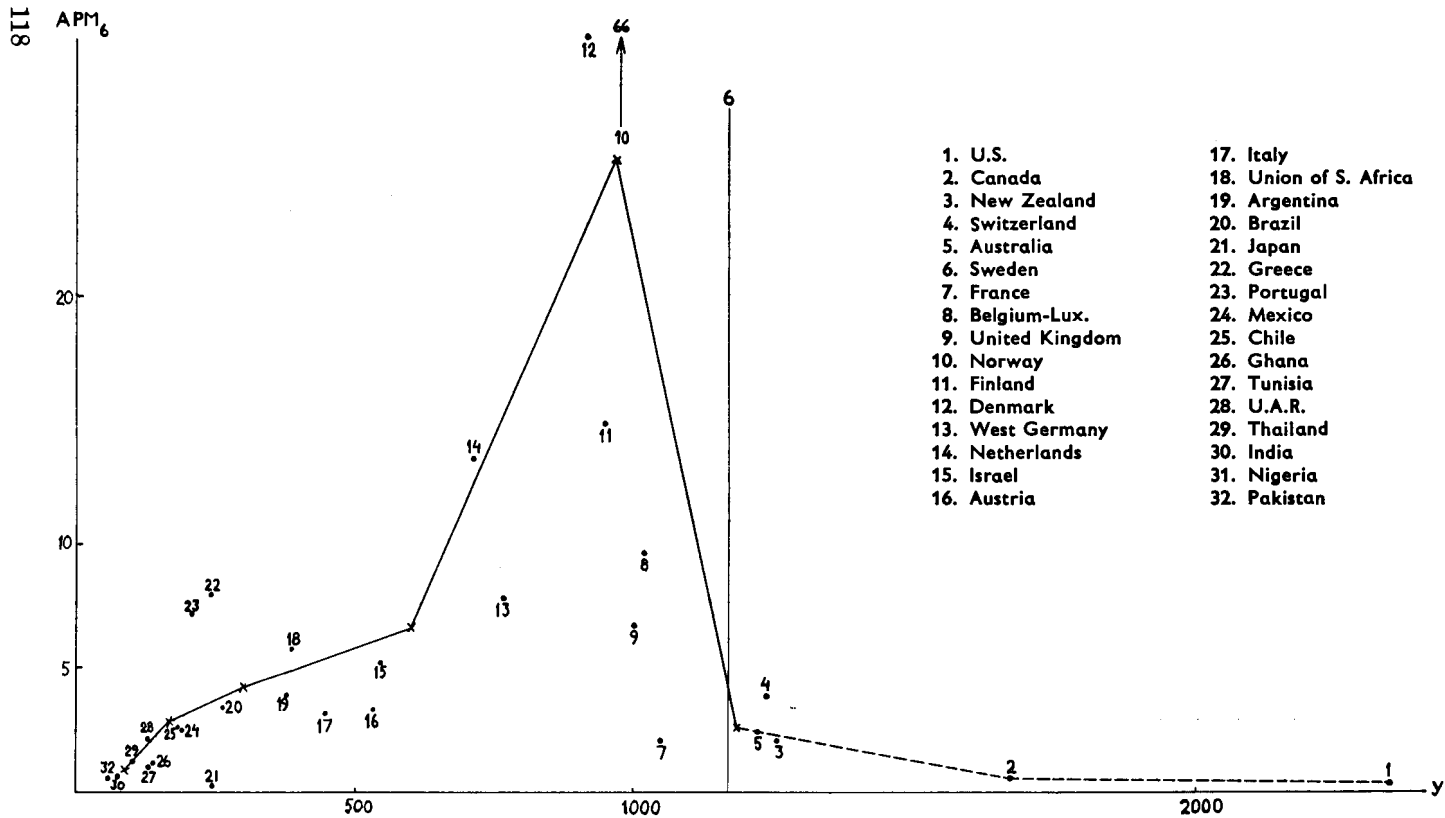


Diagram 1. The average propensities of each country to import from Sweden.



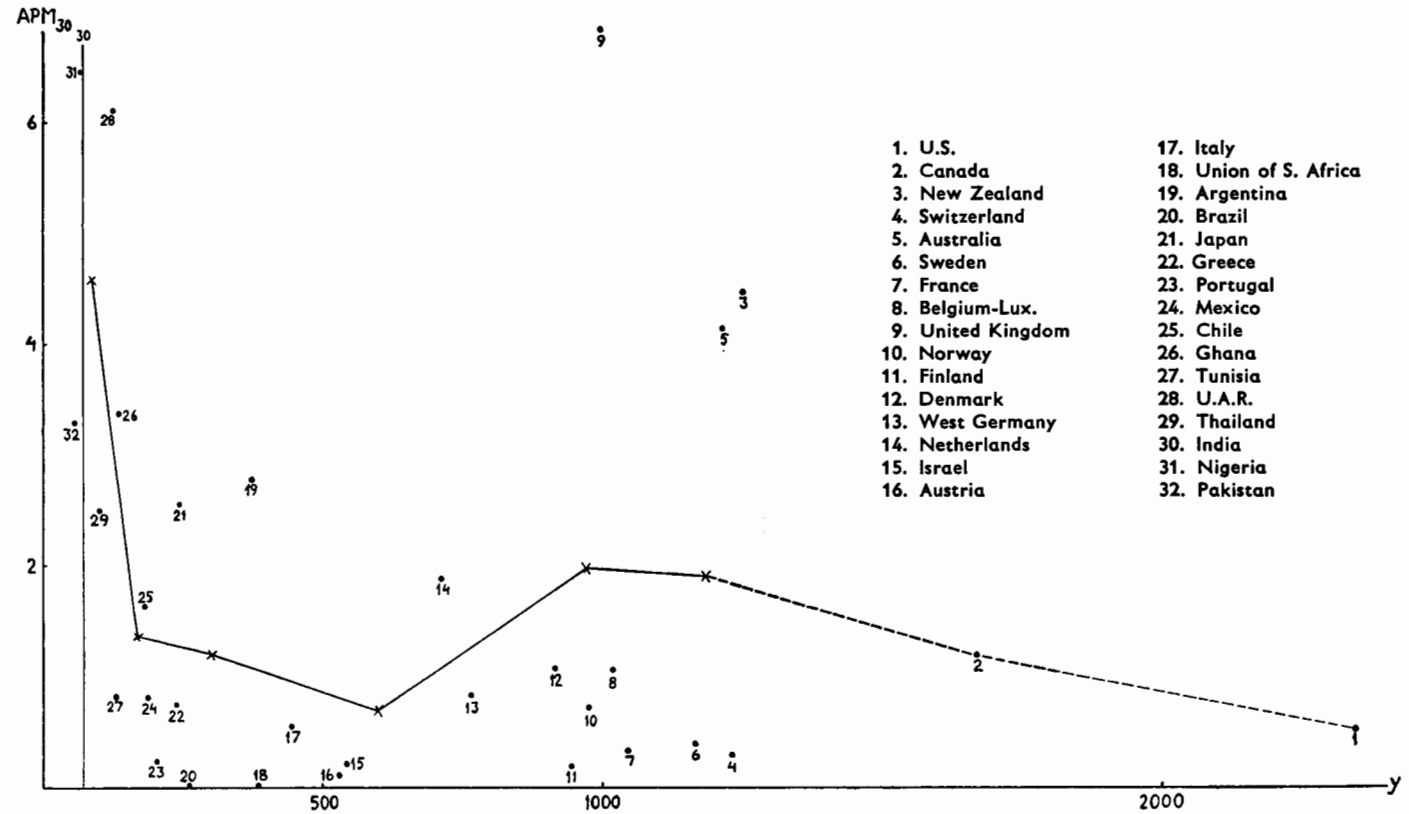


Diagram 2. The average propensities of each country to import from India.

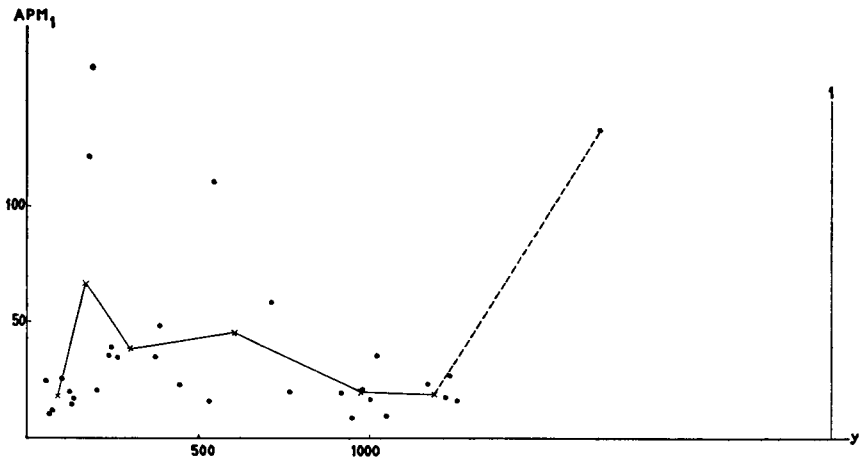


Diagram 3. The average propensities of each country to import from the U.S.

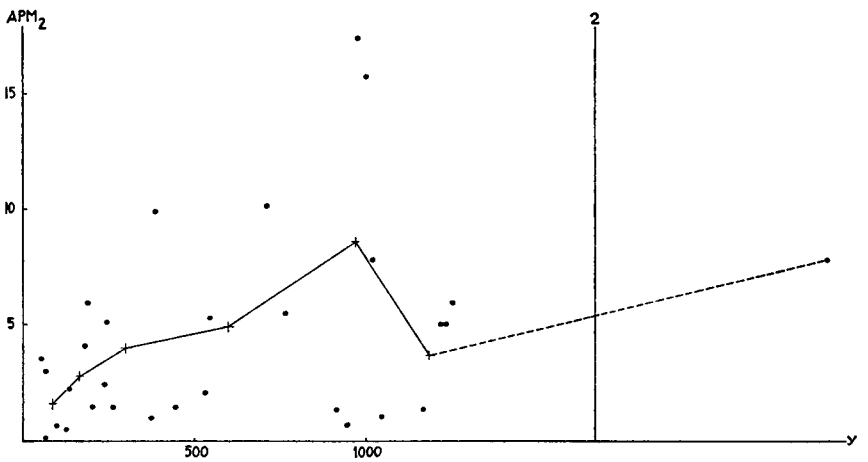


Diagram 4. The average propensities of each country to import from Canada.

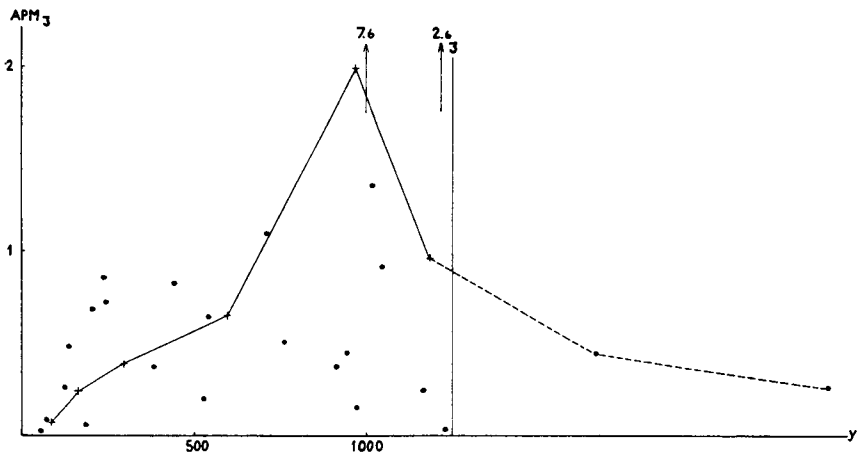


Diagram 5. The average propensities of each country to import from New Zealand.

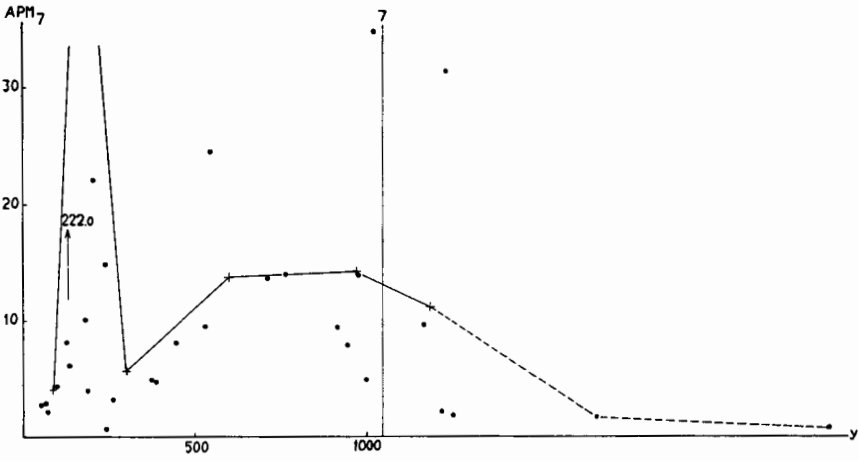


Diagram 6. The average propensities of each country to import from France.

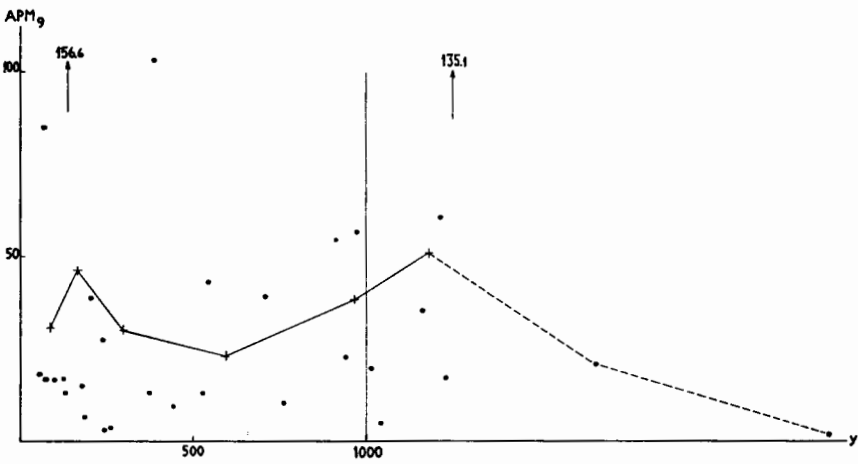


Diagram 7. The average propensities of each country to import from the U.K.

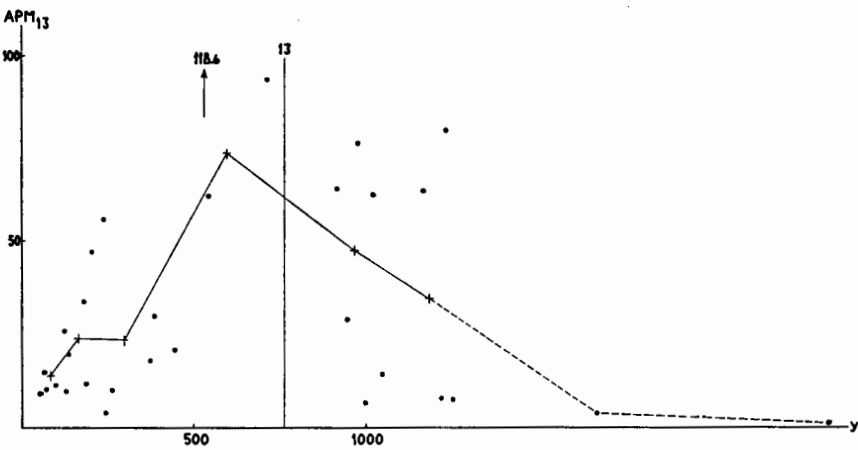


Diagram 8. The average propensities of each country to import from West Germany.

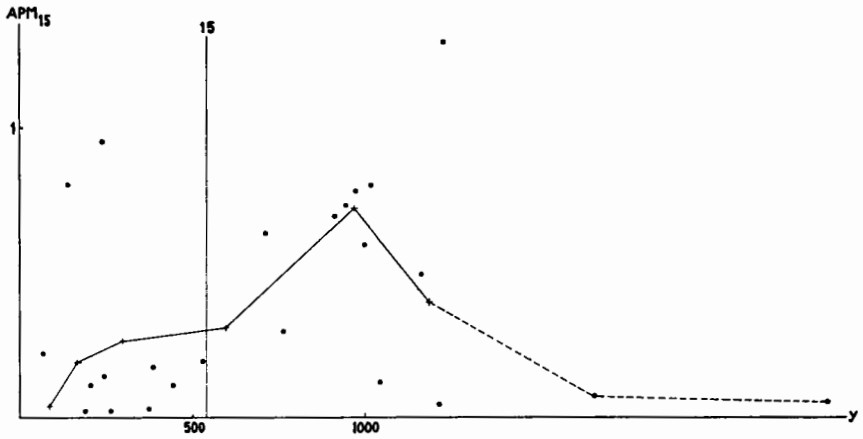


Diagram 9. The average propensities of each country to import from Israel.

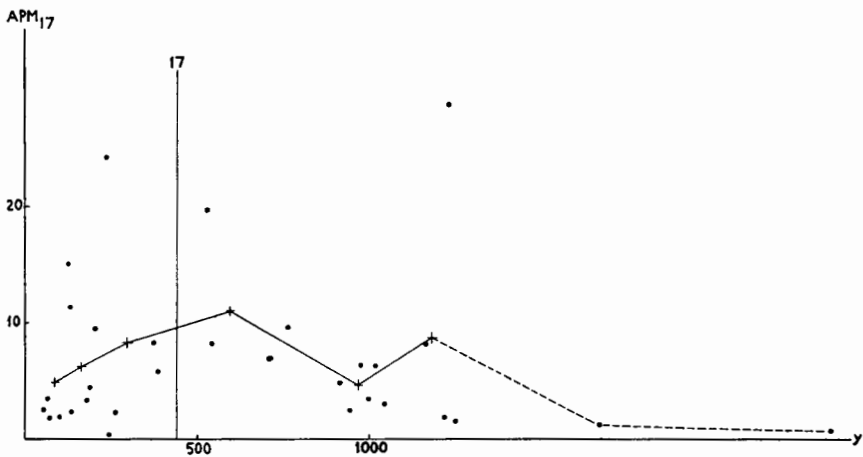


Diagram 10. The average propensities of each country to import from Italy.

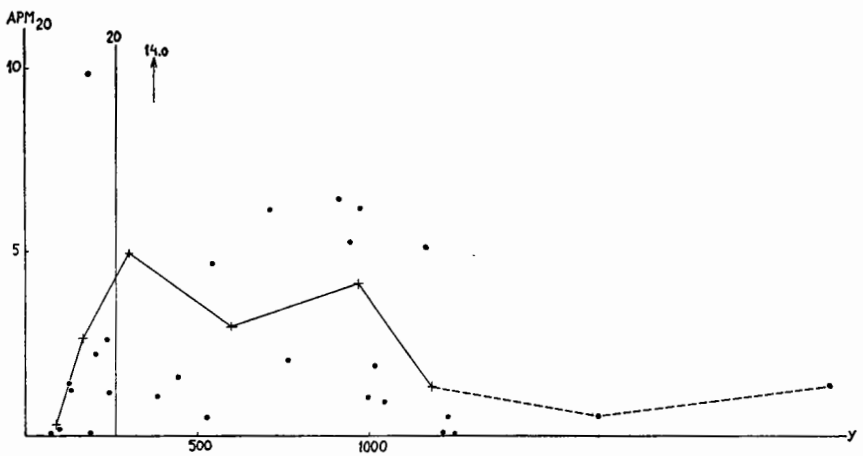


Diagram 11. The average propensities of each country to import from Brazil.

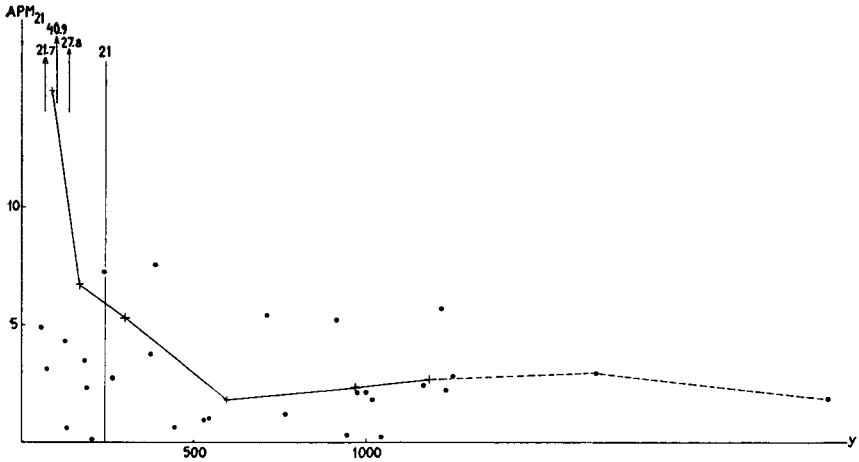


Diagram 12. The average propensities of each country to import from Japan.

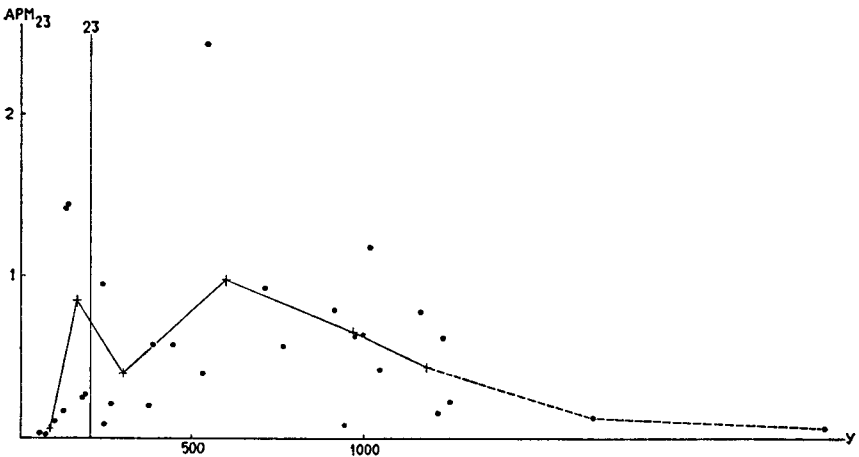


Diagram 13. The average propensities of each country to import from Portugal.

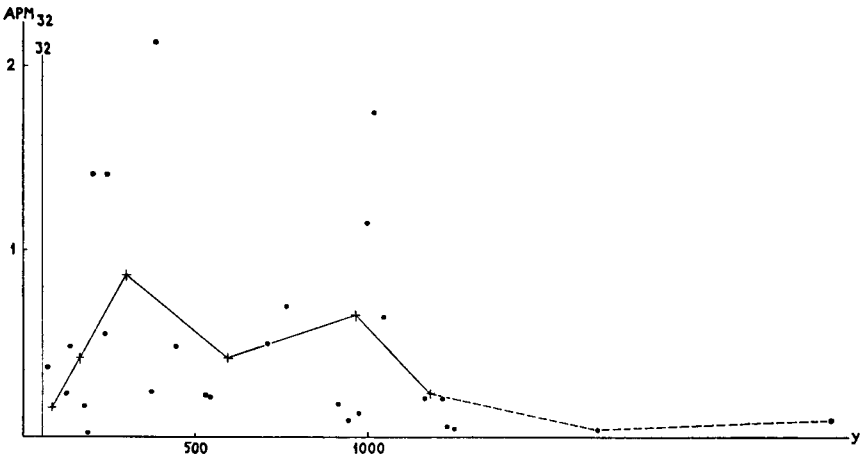


Diagram 14. The average propensities of each country to import from Pakistan.

## IV. EFFECTS OF TRADE ON FACTOR PRICES AND INCOME DISTRIBUTION

According to the factor proportions theorem, the reallocation of factors arising from the opening-up of trade tends to lead to an equalization of factor prices in the trading countries. If we reject the factor proportions account of trade in manufactures, we can no longer accept the factor cost equalization theorem.

It is, however, encouraging, and in no way embarrassing, to have a new basis for the analysis of the effects of trade on factor prices. The generalization that factor prices are the same, or tend to be the same, in all countries does not readily suggest itself from empirical material. After a discussion of the factor price equalization theorem, we shall proceed to the formulation of an alternative theory. This theory will cover the effects of trade on factor prices in growth countries. As regards u-countries, where there can be no reallocation, the problems of factor prices were analyzed in Chapter II.

### *The factor cost equalization theorem*

The factor cost equalization theorem was first formulated by Heckscher in 1919.<sup>1</sup> It was later taken up and made internationally known by Ohlin.<sup>2</sup> The essence of the argument is that, since a country will specialize in the production of goods using up much of its abundant resources, the demand for abundant factors will increase. For the opposite reason, the demand for scarce factors will fall. Relatively low factor prices will thus go up and relatively high factor prices will go down. There will be an equalization of factor prices.

The *extent* of this equalization has been much debated. Heckscher formulated his theory in terms of *complete* equalization. Ohlin spoke instead of a *tendency* to equalization. However, Ohlin's position was

<sup>1</sup> Eli F. Heckscher, "The Effect of Foreign Trade on the Distribution of Income", *Ekonomisk Tidskrift*, 21: 497-512 (1919). Translated from the Swedish by S. Laursen, this paper appears in *Readings in the Theory of International Trade*, pp. 272-300.

<sup>2</sup> B. Ohlin, *Handelns Teori* (Stockholm, 1924) and *Interregional and International Trade*, Harvard Economic Studies, Vol. XXXIX (Cambridge, Mass., 1933).

somewhat evasive. It was later criticized by Samuelson, who, in three papers, returned to Heckscher's idea.<sup>3</sup> The same findings had earlier been reached, but not published, by Lerner.<sup>4</sup>

The following assumptions in a two-country, two-commodity, two-factor model are made to prove that trade leads to the complete equalization of factor prices: perfect competition; no natural or man-made trade obstacles; the two goods differ in factor intensity at all relative factor prices; both countries produce a certain quantity of both goods; both factors are needed in the production of both goods; identical production functions in both countries; constant returns to scale; and diminishing marginal productivity.

The proof of the factor cost equalization theorem might be shown by the use of a geometrical construction introduced by Samuelson.<sup>5</sup>

On the horizontal axis to the right of the origin in Figure 6 we measure the ratio of labor to land ( $L/T$ ); on the vertical axis we measure the ratio of real wages to real rent or the marginal physical productivities of labor and land related to each other ( $W/R$ ); on the horizontal axis to the left of the origin we measure the relative price of the two commodities ( $P_f/P_c$ ). We call the two commodities food and clothing; food is land-intensive, clothing is labor-intensive. In the north-east quadrant we have two curves,  $FF$  and  $CC$ .  $FF$  tells us how the factors will be combined at each wage/rent ratio in the food industry.  $CC$  tells us the same thing with regard to the clothing industry.  $CC$  is wholly to the right of  $FF$ , which means that, at all relative factor prices, more labor in relation to land is used in clothing than in agriculture. Both curves decline to the right as we assume the law of diminishing returns to be in operation, i.e., if the labor/land ratio is increased, the wage/rent ratio falls.

There is a unique relationship between relative factor prices and relative commodity prices. The lower wages are in relation to rents, the lower will be the clothing/food price ratio. In other words, as wages decrease relatively, i.e., a downward movement on the vertical axis, the relative price of land-intensive food increases, this being represented by an outward movement on the horizontal axis to the left of the origin. In the north-west quadrant, we thus get a downward-outward sloping function like  $PP$ .

Under the assumptions made, all the three curves are identical in the two countries. If their factor proportions—or tastes—differ, the countries will,

<sup>3</sup> P. A. Samuelson, "International Trade and the Equalisation of Factor Prices", *Economic Journal*, 58: 163-184 (June 1948); *idem*, "International Factor-Price Equalisation Once Again", *Economic Journal*, 59: 181-197 (June 1949), and "Prices of Factors and Goods in General Equilibrium", *Review of Economic Studies*, 21: 1-20 (1953-54).

<sup>4</sup> Abba P. Lerner, in a paper prepared for a seminar at the London School of Economics in December 1933, published under the title "Factor Prices and International Trade", *Economica*, n.s. 19: 1-15 (February 1952).

<sup>5</sup> Figure 2 in the 1948 paper and the figure on p. 188 in the 1949 paper.

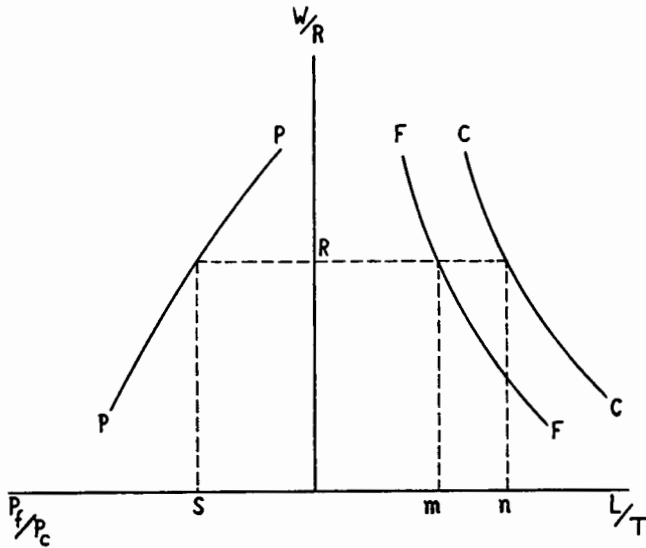


Fig. 6.

before trade, be operating at different points on the curves. But when trade is introduced there will be a common product price ratio at, say,  $S$ . We then find the wage/rent ratio compatible with  $S$ . This ratio  $R$  gives us, in its turn, the factor proportions in each industry, i.e.,  $m$  and  $n$ , respectively. The same industry has the same factor combination in both countries. The different overall factor proportions will be reflected in the different sizes of the industries, the capital-intensive industry being bigger in the capital-abundant country, and vice versa. Marginal productivities will be the same in both countries. If factor proportions differ, but tastes are assumed to be the same in both countries, the land-abundant country will have a pre-trade commodity price ratio to the right of  $S$  and a wage/rent ratio higher than  $R$ . The situation will, of course, be reversed for the labor-abundant country.

There has been an enormous amount of literature devoted to the factor price equalization theory.<sup>6</sup> Much of the discussion has concerned the

<sup>6</sup> See J. Tinbergen, "The Equalisation of Factor Prices between Free-Trade Areas", *Metroeconomica*, 1: 39-47 (April 1949); J. E. Meade, "The Equalisation of Factor Prices: The Two-Country Two-Factor Three-Product Case", *Metroeconomica*, 2: 129-133 (December 1950); S. Laursen, "Production Functions and the Theory of International Trade", *American Economic Review*, 42: 540-557 (September 1952); L. W. McKenzie, "Equality of Factor Prices in World Trade", *Econometrica*, 23: 239-257 (July 1955); K. Lancaster, "The Heckscher-Ohlin Trade Model: A Geometric Treatment", *Economica*, n.s. 24: 19-39 (February 1957); A. H. Land and H. W. Kuhn, "Factor Endowments and Factor Prices", *Economica*, n.s. 26: 137-144 (May 1959).



nature of the assumptions necessary for factor price equalization. This has been so since the assumptions are extremely restrictive. In spite of their drawing some premature policy conclusions on the basis of their theorem, the original writers were well aware of this.<sup>7</sup> Many later writers have, however, emphatically stressed the limited value of the theorem in view of its restrictive assumptions.<sup>8</sup> Even if it is a difference in spirit rather than substance<sup>9</sup> between the proponents and the critics of the factor cost equalization theorem, there has very clearly been mounting dissatisfaction over the results achieved.

The bewildering growth of literature in this sphere, seemingly of little explanatory power, has led many of those who have bothered to form an opinion at all to the frustrated belief that one can say nothing about the effects of trade on factor prices; others, notably the text-book writers who do not dare to expose the profession to the uninformed, have taken refuge in the original Ohlin position—which is sufficiently vague to hide its empirical frailty—and soothed us into believing that there will, after all, be a tendency to factor price equalization. The other models have, or so we are told, only “pedagogic value”. The outcome of the prolonged discussion is taxonomic accounts summing up that trade may, depending upon the assumptions, affect factor prices in any direction.<sup>1</sup> Although not from one of the very latest contributions, the following quotation remains representative of the dispirited

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<sup>7</sup> See, e.g., Samuelson's 1949 paper, pp. 196–197.

<sup>8</sup> A demarcation between what constitutes elaboration and criticism is not easy to make. The following papers appear, however, to try to discredit rather than to modify or improve the factor cost equalization models: I. F. Pearce and S. F. James, “The Factor-Price Equalisation Myth”, *Review of Economic Studies*, 19: 111–120 (1951–52); I. F. Pearce, “A Note on Mr. Lerner's Paper”, *Economica*, n.s. 19: 16–18 (February 1952); Romney Robinson, “Factor Proportions and Comparative Advantage: Part I and II”, *Quarterly Journal of Economics*, 70: 169–192 (May 1956) and 70: 346–363 (August 1956); R. W. Jones, “Factor Proportions and the Heckscher–Ohlin Theorem”, *Review of Economic Studies*, 24: 1–10 (1956–57); Harry G. Johnson, “Factor Endowments, International Trade and Factor Prices”, *Manchester School*, 25: 270–283 (September 1957), reprinted in his *International Trade and Economic Growth*, pp. 17–30; Roy F. Harrod, “Factor-Price Relations Under Free Trade”, *Economic Journal*, 68: 245–255 (June 1958).

<sup>9</sup> See, e.g., P. A. Samuelson's reaction to the James-Pearce paper. [“A Comment on Factor Price Equalisation”, *Review of Economic Studies*, 19: 121–122 (1951–52).]

<sup>1</sup> J. N. Bhagwati, “Protection, Real Wages and Real Incomes”, *Economic Journal*, 69: 733–748 (December 1959). See particularly Table I, p. 740.

attitude among those who have decided not to pin their faith, for practical reasons, on the Ohlin conclusion:

“in economics it is often possible to specify the necessary conditions required for prices to move in one direction or the other. But this exercise is only useful if we are as a result enabled to make some estimate of the probability of the event. In this case there does not appear to be any such possibility”.<sup>2</sup>

### *Capital and labor prices under trade*

In the preceding chapter we argued that trade in manufactures is not governed by relative labor and capital proportions. Relative factor proportions could, it was pointed out, have no effect on relative commodity prices for one of two reasons: either manufactures do not differ in factor intensity, or other forces could have a still stronger influence than differences in relative factor proportions in the determination of relative commodity prices.

If manufactures do not differ in factor intensity, relative commodity prices will be completely independent of factor proportions. The function *PP* in Figure 6 would be a vertical line. Forces other than differences in factor proportions would create trade and there would not even be a tendency to an equalization of capital and labor prices. A capital-abundant country would have relatively high wages, and vice versa.

However, we do not know whether factor intensities reverse themselves. But, from our analysis in the preceding chapter, we are able to conclude that, even if there are such things as capital- and labor-intensive goods at all relative factor prices, there is a strong force which prevents countries from necessarily specializing in such a way that the exports of a capital-abundant country will be more capital-intensive than its import-competing goods, and vice versa. This force is international differences in production functions. *The production function of a good is more favorable in a country where the good is demanded than in a country where the good is not demanded.* The more representative the demand, the more favorable are production functions.

The reasons why this should be expected to be the case are the same as those which explain why a country is unlikely to be able to establish a comparative advantage in the production of a good which is not demanded internally. Technology and know-how, for instance, are likely to be inferior—and thus the production function less advantageous—in a country where the environment of the inventors and innovators is not conducive to the solution of the problems associated with the production

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<sup>2</sup> I. F. Pearce and S. F. James, “The Factor-Price Equalisation Myth”, p. 119.

of a particular product. The environment will not be conducive if there is no demand, or unrepresentative demand, for the product.

If production functions differ between countries for the above reasons, it may, to begin with, be impossible to distinguish between labor- and capital-intensive industries at all relative factor prices. But even if such a distinction can be made, a labor-abundant country may not be able to achieve a comparative advantage in the kind of labor-intensive products that are demanded in the capital-abundant country. Likewise, it may be impossible for a capital-abundant country to establish a comparative advantage in the production of such capital-intensive goods as are demanded in a labor-abundant country. The advantages that can be derived from the abundance of a certain factor may be more than neutralized by the disadvantages of using less advanced technology, i.e., of an inferior production function.

Differences in production functions of the kind we have suggested set an effective limit to specialization according to factor proportions. A capital-abundant country will tend to have comparative advantages in products not demanded in the labor-abundant country, and vice versa. No matter how labor-intensive an IBM machine may be, an Indian entrepreneur is, under present circumstances, unlikely to be able to establish a comparative advantage in the production of such machines.

There might be some specialization according to factor proportions in those goods for which demands overlap, assuming products differ in factor intensity. But there are so many other reasons, such as the economies of scale, why trade might not be dictated by factor proportions even in products for which there exist overlapping demands that, for simplicity, we may choose to ignore this possibility. We may then conclude that there will not even be a tendency to factor price equalization arising from trade in manufactures. A capital-abundant country will have high wages, and vice versa.

This can hardly be regarded as an empirically daring conclusion. Only to those who are indoctrinated with the factor cost equalization theorem could it seem provocative to conclude that a labor-abundant country, although it takes part in international trade, will have relatively low wages.

### *Trade and rents*

Specialization in the production of primary products should be expected to occur according to relative endowments of natural resources. This was the position taken in the previous chapter.

In consequence, rents on abundant natural resources should increase and rents on scarce resources should decrease. There will be an equalization of rents.

Assuming away natural and man-made trade obstacles and economies of scale, there would be a complete equalization of rents if it were not for yet another relationship, the effects of which have to be taken into account. What could influence rents is that the production of primary products might, in comparison with manufactures, be capital- or labor-intensive at all relative capital and labor prices.

For rents to be completely equalized, the quality of marginal resources must be identical in every country. But if the production of a primary product is labor-intensive at all relative capital and labor prices, a labor-abundant country will be able to expand production further than a capital-abundant country. It will go on expanding until the advantage of cheaper labor is exactly offset by the disadvantage of utilizing poorer land qualities, i.e., offset by higher rents. If a primary product is capital-intensive, production will be expanded further in a capital-abundant country.

In short, this means that rent equalization might not be complete. As a matter of fact, different capital and labor proportions may lead to a *disequalization* of rents. A primary product demanding much labor, for instance, may in the pre-trade situation be relatively expensive in a capital-abundant country even if this country is relatively natural-resource-abundant. The requirement for rent disequalization is that the advantage of cheaper rents does not offset the disadvantage of more expensive capital, if the primary product is relatively capital-intensive, or the disadvantage of more expensive labor, if the primary product is relatively labor-intensive.

The production of oil is probably relatively capital-intensive to such an extreme degree that, in the absence of factor movements, trade could well increase rent differences. The advantage of cheaper rents might not—if there had not been capital movements—have been great enough to offset the higher capital costs in a country like Saudi Arabia. Trade could easily have increased the probably already relatively high rents on oil wells in the U.S.

Between countries with the same capital/labor proportions there would—if we disregard economies of scale and trade obstacles—be complete rent equalization. But even if capital/labor proportions differ, it is likely that the extreme skewness in natural-resource endowments that is often found would create pre-trade rent differences of such a

magnitude that, when trade is opened up, a tendency to rent equalization could hardly be upset by capital and labor intensity differences.

Intuitively, it appears plausible that trade would lead to some rent equalization. It is quite possible that factor cost equalization models, in spite of their poor predictive power in general, have such a strong hold over the minds of economists because an equalization of rents from trade, although statistically elusive, appears to be so self-evident. The reason why, on the other hand, the factor cost equalization theorem has met with so much criticism is that international differences in labor and capital returns are so conspicuous. Only to the most sophisticated has it appeared natural that capital-abundant countries should not be expected to have higher wages than capital-scarce countries.

*Trade and income distribution: the effects of reallocation and growth*

After the birth of the "factor price equalization" hypothesis it became fashionable to state the effects of trade on the same factor category in different countries rather than on the various factor categories in the same country. As the title of Heckscher's original paper indicates,<sup>3</sup> the reverse was true of earlier literature, i.e., the usual approach was to study the effects on the distribution of income. However, a theory of trade and factor prices implies a theory of trade and income distribution, and vice versa.

The implications of the factor proportions analysis for the effects of trade on the distribution of income were first rigorously stated jointly by Stolper and Samuelson.<sup>4</sup> It was shown, in contrast to earlier theory, that, under the same assumptions necessary for factor price equalization, relatively scarce factors would lose not only relatively but also absolutely from the opening-up of trade. A relatively abundant factor, on the other hand, would gain both absolutely and relatively. The argument runs in the following fashion. In the capital-abundant country, the factors which are reallocated on the opening-up of trade will have a higher capital/labor ratio than the ratio in the shrinking labor-intensive industry and a lower ratio than in the expanding capital-intensive in-

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<sup>3</sup> "The Effect of Foreign Trade on the Distribution of Income."

<sup>4</sup> Wolfgang F. Stolper and Paul A. Samuelson, "Protection and Real Wages", *Review of Economic Studies*, 9: 58-73 (November 1941), reprinted in *Readings in the Theory of International Trade*, pp. 333-357.

dustry. Thus, reallocation will decrease the capital/labor ratio in *both* industries; the marginal productivity of labor will fall, whereas the marginal productivity of the abundant factor, capital, will rise.

However, our theory of the principles of trade leads us to a different conclusion. This can, of course, be understood already from our rejection of the factor price equalization theorem. Trade in manufactures alone should not be expected to change capital and labor shares in total income. As total income increases in consequence of reallocation, the absolute remunerations will increase.

Trade in primary products complicates the picture somewhat. Abundant natural resources are—as already pointed out—likely to obtain higher rents and to gain both absolutely and relatively. For the same reason, scarce natural resources are likely to lose. If a country has scarce natural resources, the fall in rents will give rise to relatively higher capital and labor shares in total income. If a country is natural-resource-abundant, higher rents must result in lower capital and labor shares. This does not imply, however, an absolute fall in capital and labor remunerations.

So far, we have discussed only the effects of *reallocation* on absolute and relative factor remunerations. However, as we emphasized in our analysis of trade and growth, the growth path of a country under trade is different from the growth path under autarchy. We shall now study the effects of trade on the distribution of income over time. If we assume that it is only the supply of capital that increases over time, we may draw at least one interesting conclusion. The fact that wages will increase faster than otherwise is noteworthy, but what is important to observe is that *over time even scarce natural resources may gain*. This is the case as there will be a more rapidly growing amount of resources cooperating with natural resources. As a consequence of a general increase in the level of rents, the rent of a natural resource which was lowered as a result of reallocation may well increase above what it would have been under autarchy.

Harrod's assertion that the land-owners have lost from the Repeal of the Corn Laws is thus not necessarily true.<sup>5</sup> Lower rents might have prevailed for only a limited period. It does not seem to be implausible that general free trade could stimulate growth to such an extent that even British land-owners, or their sons, could gain in the long run.

For the same reason, the growth effects which we have received from

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<sup>5</sup> See pp. 22–23.

our "free trade" with the sun have probably made even the candle-makers of the satirical M. Bastiat prosper.<sup>6</sup>

By neglecting the growth effects on the remuneration of scarce factors, the Stolper-Samuelson theorem is—even if it were relevant in other respects—of less use than might be thought. If applicable at all, it is valid unequivocally only at the time of reallocation. Even if it were true that scarce labor would lose from the opening-up of trade, advocates of the imposition of tariffs may soon have reason to regret their advice. Those who are not prepared to accept our alternative theory should, at least, resent welfare conclusions being drawn after an analysis of only the short-run effects. Even if we have no way of weighing long-run gains against short-run losses, such a downgrading of the long-run gains as that implied by the Stolper-Samuelson theory is completely arbitrary.

### *The classical theory of trade and income distribution*

It is interesting to compare our theory with the classical theory which preceded the Stolper-Samuelson analysis.<sup>7</sup> It was shown in this latter theorem that the conclusions of the classical theory did not follow from the factor proportions explanation of trade.

According to the classical theory, only specific factors involved in the production of goods put at a comparative disadvantage would lose from trade. A factor is specific if it is confined to one particular use and cannot be transferred to another. A specific factor is thus occupationally immobile.

Natural resources are occupationally immobile. As relative land endowments have always been supposed to dictate the pattern of trade in primary products, scarce land would be involved in the production of a commodity put at a comparative disadvantage. Scarce land would thus lose from trade. But—still according to the old theory—mobile factors such as capital and labor would not lose from trade.

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<sup>6</sup> Bastiat, Fr. *Sophismes économiques*, Nr. 7. Oeuvres complètes. Vol. 4 (Paris, 1854), reprinted in *Readings in Economics*, ed. P. A. Samuelson, R. L. Bishop and J. R. Coleman (New York, 1955), pp. 362-364.

<sup>7</sup> See C. F. Bastable, *The Theory of International Trade, With Some of Its Applications to Economic Policy* (4th ed., London, 1903), chap. VI; F. W. Taussig, *International Trade* (New York, 1927), chap. 6; G. Haberler, *The Theory of International Trade, With Its Applications to Commercial Policy*, translated by A. Stonier and F. Benham (London, 1936), pp. 189-198; B. Ohlin, *Interregional and International Trade*, pp. 42-45.

But why would the mobile factors not lose? Occupational mobility was shown by Stolper and Samuelson to be no guarantee for scarce factors against losses from trade. In their model there is no restriction of the mobility of labor and capital. There must be some element missing in the old theory.

From our theory, which—until we relax our assumption of given factor totals—yields the same results as the old theory, we are able to determine what has been left out of the classical theory. The reason why scarce labor and capital do not lose from the opening-up of trade in our model is that, even if there are labor- and capital-intensive manufactures, specialization according to relative factor proportions cannot occur. The classical theorists did not see that, if specialization according to factor proportions can take place, a scarce factor is as effectively trapped as it would be if it were occupationally immobile.

Furthermore, occupational immobility does not necessarily lead to losses for scarce factors any more than occupational mobility is a guarantee against losses. Occupational immobility only means that there are products which differ in factor intensity insofar as a good, in the production of which an immobile factor is employed, uses this factor relatively intensively at all factor prices. The existence of such products is, as we know, a necessary condition for scarce factors to lose from trade. But occupational immobility does not imply that there are no other obstacles to international specialization in consequence of relative factor endowments. Occupational immobility thus does not pose a sufficient condition for scarce factors to lose from the opening-up of trade. If primary products could not be exported without home demand, or, in other words, if production functions of primary products are not equal in all countries, rents would not be equalized.

#### *Income distribution between countries*

It is not only the effects of trade on income distribution *within* a country that constitute a problem, but also the effects of trade on income distribution *between* countries. Does our theory lead to the conclusion that international income inequalities will be smoothed out or does it imply *a theory of international income inequalities?*

In u-countries, per capita incomes will tend to the same level—the subsistence level—whether under trade or under autarchy. In growth countries, it would be only a coincidence if trade made per capita incomes more equal than would be the case under autarchy. However, since trade will stimulate growth in growth countries—but not in u-



countries—our theory leads to the important conclusion that *the per capita income gap as between u-countries and growth countries will grow faster under trade than under autarchy*. Such a conclusion does not seem to be contradicted by facts.

There is particularly one important assumption that has been made in our analysis of the effects of trade on growth countries and to which we should pay special attention in this connection. The assumption we have in mind is that growth must be neutral.<sup>8</sup> If growth is export-biased, the increase in capacity will not be reflected in a corresponding increase in income. Part or all of the growth gains will be transmitted abroad through a terms-of-trade deterioration. The income gap could then tend to be closed.

In our analysis of trade and growth countries, we simply assumed that the growth path under trade would be unaffected by terms-of-trade changes. Our analysis of the principles of trade contains no reason to believe that growth will be concentrated to the export sector or the import-competing sector, and consequently we assumed *neutral growth*. Potential exports and imports (when they are manufactures) are the same goods. A country is as likely to grow by replacing imports as by expanding export capacity. It may develop a new export product by successfully replacing a former import good, at the same time as a former export good becomes uncompetitive through the growth process.

The factor proportions approach, on the other hand, implies that growth would be *export-biased*. A capital-abundant country would, when accumulating more capital, come to expand its production of capital-intensive exports. Its demand for imported labor-intensive goods would increase since the country would become more uncompetitive in the production of such goods. A labor-abundant country, on the other hand, would not grow through accumulating more capital. It would instead decumulate capital since the price of capital would fall.<sup>9</sup> Its “growth” would come from terms-of-trade improvements. By means of this mechanism, differences in per capita incomes would decrease rather than increase under trade. In the taxonomic papers on growth transmission through trade, i.e., what we have referred to as the terms-of-trade models,<sup>1</sup> it has been observed that terms-of-trade shifts due to

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<sup>8</sup> See p. 62.

<sup>9</sup> There would be a decumulation of capital, at least if the supply curve of capital is positively sloped. B. Ohlin, *Interregional and International Trade*, pp. 118–121.

<sup>1</sup> See pp. 56–59.

economic growth could be in any direction. But this result has been reached only by not restricting, strangely enough, the taxonomy by applying the factor proportions principles of international division of labor. The special terms-of-trade model formulated by Bensusan-Butt, to which we have already referred,<sup>2</sup> applies the factor proportions theorem and reaches the more conformative result that international income inequalities will not be pronounced under trade and not widened by growth in some country. Myrdal has been particularly critical of trade theory because of its implication that trade reduced the international income gap.<sup>3</sup>

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<sup>2</sup> See p. 57 n.

<sup>3</sup> See his *Economic Theory and Under-developed Regions* (London, 1957), chap. 11. J. R. T. Hughes has made a formally correct but essentially unjustified attack on Myrdal for using factor cost equalization as synonymous with per capita income equalization [see "Foreign Trade and Balanced Growth: The Historical Framework", *American Economic Review*, 49: 331, note 1 (May 1959)]. A strong tendency toward factor price equalization can hardly take place without an equalization of per capita incomes, too.

## V. VARIOUS FURTHER IMPLICATIONS OF OUR THEORY OF TRADE AND PRODUCTION

In the previous chapter, we took our explanation of the principles of international specialization as a point of departure for a reformulation of the theory of trade and income distribution. In this chapter, we shall let our theory serve as a basis for various additional observations of a more or less interrelated nature. Because of the inconclusiveness of our empirical investigation, we shall also aim in this chapter at illustrating deductively the explanatory usefulness of our theory of the principles of trade. It is felt that our reformulation of the theory of trade and income distribution has already partly achieved this end. Let us now discuss the additional implications of our theory.

1. Contrary to what is commonly supposed on the basis of the theory of comparative advantages, all countries are not necessarily able to take part in international trade. Here, we do not have in mind an analytically trivial case where relative price structures happen to be identical. Instead we refer to the possibility that the demand structure of a certain country may be so different from that of other countries that there are no overlapping demands for manufactures. If this country has no primary products to export, it will not be able to participate in foreign trade at all. If the comparative disadvantage lies in goods not demanded at home and the comparative advantage in goods not demanded abroad, there can be no trade.

This case, which might give the impression of being unrealistic in the extreme, is, however, not without practical interest. It can help us to understand the workings of so-called "dual economies" and the almost completely isolated economic situation of some u-countries. A "dual economy" exists when, for various reasons, the capital-labor proportions in two regions of the same country, as in Italy, have become extremely different. According to the factor proportions account of trade, conditions for trade between the two regions would be excellent in such cases. According to our theory—and reality seems to support our conclusions

—the reverse would be the case. The fact that trading contacts can be so few between the two regions generates even greater differences and makes a vitalization of the inferior region extremely difficult. For the same reason, the growth stimulus u-countries can derive from developing export products is limited, since they can export little other than primary products to countries with high income levels. They become “raw material countries” although at least some of them are probably more labor- than land-abundant.

If the range of overlapping demands was not so limited, the damaging effects of the opening-up of trade on u-countries (as analyzed in Chapter II, A) would perhaps be still greater. Many handicrafts have a natural protection in that such products are not manufactured by industrial countries.

2. It is conventional to distinguish between the production of import substitutes and the production of exports, particularly when discussing the direction in which the development effort of underdeveloped countries should be made. However, this distinction is dangerous. It really cannot be applied to the whole field of manufactures. Potential exports and imports are—when they are manufactures—the same products. An *actual import* product today is a *potential export* product today and may be an *actual export* product tomorrow. In the same way, an actual export product today might be an actual import product tomorrow. If we take up the production of an import substitute among manufactures, we may convert a product from being a potential export product to being an actual export product. In fact, today’s actual imports may indicate which products it would be easiest to change into tomorrow’s actual exports. Hirschman, in his analysis of the rôle of imports in developing countries, pictures imports very aptly as isotopes carrying out free market research for prospective domestic entrepreneurs.<sup>1</sup> Imports of manufactures may thus help the entrepreneurs to become aware of the existence of what we have called a “representative demand” for a product.

The impossibility of distinguishing between export products and import substitutes in manufactures is closely related to our argument in the chapter on trade and factor prices that growth is not liable to be export-biased or import-biased but neutral, on balance.

3. The interaction of trade and factor movements constitutes an

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<sup>1</sup> A. O. Hirschman, *The Strategy of Economic Development* (New Haven, 1958), pp. 120–125.

interesting problem with regard to which the conclusions of current theory and our theory are contradictory.

Current theory assumes, as we shall do, firstly, that factor movements are under normal circumstances called forth by differences in factor rewards and, secondly, that factors move from regions where they are cheap to regions where they are dear. Factor movements thus tend to equalize factor prices. This means that movements of goods and factors have the same effect on factor prices, according to the Heckscher–Ohlin argument. As the volume of trade is a function of interregional differences in factor prices, this also means that factor movements diminish the scope for trade. If factor prices were completely equalized by factor movements, commodity movements would not take place.

Ohlin has pointed out an important additional feature. A movement of factors, such as that which took place in the earlier days from Europe to the U.S., will, through improved allocation, increase the total income of both regions taken together. Higher incomes tend to increase trade. However, according to Ohlin, “It is conceivable, but improbable, that this tendency should be stronger than the one just mentioned”.<sup>2</sup> Ohlin goes on to make the observation that, if the factor movements redistribute total income internationally so that it is more evenly divided between the regions, this would also tend to increase foreign trade. This purely statistical phenomenon is an old friend of ours from the numerical examples in our empirical excursus.

Taken together, the effects of factor movements on the volume of trade are thus rather indeterminate in the Heckscher–Ohlin world. The basic proposition is, however, that factor movements limit the scope for trade by making relative factor endowments more equal. In the case where factor movements have equalized factor prices completely, the “income effect” mentioned above can be disregarded, according to the factor proportions argument, since there would be no trade at all, no matter where income is or how high it is.

Our model yields the opposite results. Movements of natural resources, if they were conceivable, would, it is true, decrease the scope for trade. But those factor movements which can take place, i.e., labor and capital movements, will *tend to increase trade* by making factor endowments and per capita incomes more equal. When capital flows from i-countries to u-countries, or labor from u-countries to i-countries, forces are set

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<sup>2</sup> B. Ohlin, *Interregional and International Trade*, Harvard Economic Studies, Vol. XXXIX (Cambridge, Mass., 1933), p. 170.

into motion that make per capita incomes in these countries more similar and the range of tradable products broader. If not disturbed by protectionist measures, actual trade will increase. The fact that real income in the regions taken together increases, means that trade should increase even more. Our analysis of the interaction of trade and factor movements clearly shows the difference between the approach we use compared with the factor proportions argument.

4. So far, we have tried to explain the structural determinants and effects of the pattern of trade. However, we have not paid any attention to relative gains from the various trade flows. It should now be pointed out that a large volume of trade might not be the same as a large gain from trade for the participating countries. It is possible that the gains from trade in primary products are bigger than the gains from trade in manufactures.

This possibility is indicated by the much greater extent to which tariffs are imposed on manufactures as compared with primary products. If we could distinguish between capital- and labor-intensive manufactures, and if trade could take place according to factor proportions, the gains from importing certain manufactures would be so great that tariffs on, say, labor-intensive data-processing machinery from India would appear as misplaced as protective tariffs on, say, jute from the same country. On the basis of our theory, the chief characteristic of tariff structures should thus be expected to be freer trade in primary products than in manufactures. Widespread agricultural protection must be seen against the background of the political weight of a historically large agricultural class, military considerations, and the more even endowments of agricultural land than of other natural resources. Protection of other primary-producing industry regularly occurs in cases where a country *is* scarcely, but not very scarcely, supplied with a natural resource and *has been* abundantly supplied with this resource, at that time being blessed with the rise of certain vested interests which influence the future tariff policy.

Closely connected with the problem of relative gains from different kinds of trade flows is the practical question of which countries have the strongest economic motives for cooperating in customs unions or similar preferential arrangements. A union between countries with similar per capita income levels would hold out the greatest hope for an *expansion* of trade. This might seem to imply that countries with similar per capita income levels have the strongest motives for cooperating in customs unions. However, our theory also yields a counter-argument,

namely, that maximizing the volume of trade does not necessarily mean maximizing the gains from trade. The alternative would be to seek partners among producers of the natural-resource-intensive primary products, the opportunity costs of which are very high domestically. If, in the initial situation, we have no trade, this strategy might indeed be well-advised. It has been applied under colonialism when lack of entrepreneurs in the colonized countries prevented trade. However, it is probable that most primary products, just because their opportunity costs are so high, already enter our market duty-free. Under such circumstances, that kind of trade which has the highest welfare value is already at its maximum and cannot be expanded further. All we can then do is to try and expand trade in manufactures. On those grounds, we should be able to predict that economically-motivated attempts at integration usually take place between countries with similar per capita income levels. The politically-motivated Commonwealth preferences are, as we should expect, being eroded since the contracting parties feel that there are small prospects of expanding trade. At least one argument, advanced by the raw-material exporters within the Commonwealth, seems to be that they give preferences but receive no preferences on the duty-free raw-material imports of other Commonwealth countries.

According to the factor proportions argument, tariff structures cannot be expected to be built up so as to hit trade in manufactures to an unproportionally great extent. This is so since trade in primary products is no different from trade in manufactures from a welfare point of view and is thus equally susceptible to protectionist arguments. Protection of primary-producing industry is no more absurd than protection of manufacturing industry. Attempts at integration should be expected—in contradiction to facts—always to be directed at linking together countries with the most dissimilar factor endowments.

5. The great extent to which the range of tradable products may be limited has implications for the applicability of the purchasing power parity theory. We shall not go into any discussion as to the merits or demerits of this theory. What we shall do is to add the observation that only prices of tradable products could be expected to show any parity among trading partners. This means that the more different the per capita incomes between two countries, the less will be the probability of the exchange rates' reflecting the overall purchasing power of the two currencies. Should there be only a minimum of trade between two countries, the exchange rates need not have anything at all to do with purchasing power parities. In these instances, the exchange rates are,

of course, unsuitable for converting national income accounts into a single currency in order to make direct comparisons. Per capita income comparisons should, if possible, be made in physical terms in cases where the exchange rates do not correspond to the purchasing power parity.

In which countries would the exchange rate be above, respectively below, the purchasing power parity? To the extent countries with higher levels of income tend to have a comparative advantage with respect to most of the overlapping demands at the purchasing power parity exchange rate, the equilibrium exchange rate will make the cost-of-living appear higher in high-income countries. The reason why high-income countries may be competitive in most of the tradable products could be, in the first place, that the export opportunities in the low-income countries are poorly exploited or, in the second place, that overlapping demands are limited to capital goods, in the production of which a low-income country cannot establish a comparative advantage. A low-income country with easily-sold raw materials and few overlapping demands which could give rise to imports might, on the other hand, have an equilibrium exchange rate which made the country appear expensive.

Between countries with similar per capita incomes, exchange rates may, on the other hand, approximate purchasing power parities very well.

6. So far, we have analyzed the pattern of trade assuming that the countries find themselves on particular per capita income levels. We have touched only briefly on what happens when there are shifts in these levels. To gain additional insights into trade phenomena, we shall study this question in more detail.

We can distinguish between, on the one hand, a general growth process among growth countries combined with general stagnation among u-countries and, on the other hand, relative shifts in per capita income levels through the take-off in a low-income country or through different growth rates among growth countries.

As to the general growth and stagnation case, the following observation may be made.

A general upward movement among the growth countries will restructure trade in manufactures. Since the range of tradable products changes as demand changes, actual trade is likely to change. We can distinguish between expanding and declining commodity categories in world trade. An expanding commodity category is a category which is moving into the range of tradable commodities. The reverse charac-



terizes a declining commodity. The fact that countries are not all on the same level of income means that a commodity category on the decline in country A's trade may be expanding in country B's trade. For this reason, we are likely to not only expanding and declining commodity categories but also commodities which are stable in world trade, even during long periods. The irregularity in the level of per capita incomes as between countries can also give rise to a trend being reversed, so that a declining commodity becomes an expanding commodity category when new countries move up into the income range where the commodity is typically demanded.<sup>3</sup>

Tyszynski and Spiegelglas have made investigations into the structure of trade for various countries and have paid special attention to their shares of trade in expanding, stable and declining commodity groups.<sup>4</sup> However, they offer no explanation as to why commodity groups should differ in this respect. Although their commodity classes are so broad that they hide many conflicting movements within the various groups, it is interesting to observe that, in accordance with our expectation, groups such as automobiles and aircraft, industrial equipment and electrical goods have been expanding commodity classes, whereas such old products as textiles have been declining in world trade. It would, however, not be surprising if, for example, automobiles became a declining commodity during the next two decades. Only a rapid rise in incomes in today's underdeveloped countries could help trade in autos to keep its position in world trade in competition with newer products which—by means of a sustained process of growth in the industrialized countries—will move into the range of tradable goods consequently claiming increasing percentages of world trade.

To analyze the effects of relative shifts in per capita income might offer a more challenging problem. We categorize countries as *acting* or *reacting*. An acting country is growing faster than other countries. It might be moving ahead of the main group of countries or it might be catching up with this group. A reacting country is growing less rapidly than other countries. It may be lagging behind the main group of countries or in the process of having its lead lessened. If, for instance, country I grows faster than country II in Figure 5, country I would

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<sup>3</sup> Changes in the other direction, i.e., from expanding to declining, are the usual ones—at least as long as growth is not negative.

<sup>4</sup> H. Tyszynski, "World Trade in Manufactured Commodities, 1899-1950", *Manchester School*, 19: 272-304 (September 1951), and S. Spiegelglas, "World Exports of Manufactures 1956 vs. 1937", *Manchester School*, 27: 111-139 (May 1959).

be an acting country, catching up from behind, while country II would be a reacting country, losing its lead. The reason why a relatively stagnant country is reacting is because the movement of the acting country is making it necessary for it continually to adapt to changing circumstances. These are the "hazards of trade".

Of crucial importance for the way in which trade is affected by relative changes in income levels is the type of reaction experienced by reacting countries. The economies of reacting countries have not attracted any attention as a purely theoretical problem.<sup>5</sup> However, current economic events have, in various guises, prompted discussions concerning the problems of reacting. The dollar shortage, for instance, gave birth to models dealing with the international effects of the advancement of a leading country on countries left behind. Balogh and Hicks may be mentioned among those who have argued that the dollar shortage might have its explanation in the alleged rapid rise of productivity in the U.S.<sup>6</sup> An inability to adjust to structural changes should thus be reflected in payments difficulties. Hoffmeyer has constructed a dollar shortage model emphasizing most explicitly the importance of differences in patterns of reaction.<sup>7</sup>

It is not only the problems of lagging behind that have received attention but also those of losing a position of leadership. The consequences for the industrialized countries of an industrialization of the backward countries have, for instance, been a subject of reflection for the past century. The views have ranged from dark pessimism to bright optimism.<sup>8</sup> The dissimilarity of the views which have been advanced is due to differing assessments of "market-destroying effects" and "mar-

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<sup>5</sup> See, however, Carl Major Wright, *Economic Adaption to A Changing World Market* (Copenhagen, 1939).

<sup>6</sup> See, e.g., T. Balogh, "The United States and the World Economy", *Bulletin of the Oxford University Institute of Statistics*, 8: 309-323 (October 1946) and J. R. Hicks, "An Inaugural Lecture", *Oxford Economic Papers*, n.s. 5: 117-135 (June 1953).

<sup>7</sup> E. Hoffmeyer, *Dollar Shortage and the Structure of the U.S. Foreign Trade* (Copenhagen, 1958), chap. 5.

<sup>8</sup> For discussions of attitudes towards the trade implications of the industrialization of backward countries, see Hans Russenberger, *Die Auswirkungen der Industrialisierung von Agrarländern auf Industrie-Exportstaaten*, Veröffentlichungen der Handels-Hochschule St. Gallen, Reihe A, Heft. 20 (St. Gallen, 1949) and A. O. Hirschman, "Effects of Industrialization on the Markets of Industrial Countries", in *The Progress of Underdeveloped Areas*, ed. B. F. Hoselitz for the Norman Wait Harris Memorial Foundation (Chicago, 1952), pp. 270-283.

ket-creating effects". The old industrialized countries will be faced with new competitors and provided with new customers and the outcome will depend upon the pattern of reaction.

Whether a country is caught up or left behind, the possible reactions may be of four different kinds: a. induced innovation, imitation, and reallocation, b. price competition, c. unemployment, and d. protection.

The first form of reaction is an aggressive and positive one. It is easier to react in this fashion if the country is moving ahead, although slowly. The last three forms of reaction are negative. Price competition involves reduced rewards for some import-competing factors. However, as Haberler has pointed out, this does not imply a deteriorated overall economic situation. But, as factor prices may not be easily adjustable downwards, unemployment may arise. The likelihood of such a prospect in essentially stagnant economies made a free-trader like Keynes suggest protection as a possible second-best policy for the U.K. in the twenties.<sup>9</sup> It is interesting to note that the impact of trade on such reacting countries is not altogether different from that on u-countries.

In the following, we shall make some additional observations assuming that reactions, although there may be temporary difficulties, are on the whole positive.

In trade theory literature, there have been some discussions of the so-called "law of the declining importance of foreign trade". It has been suggested that the share of foreign trade in total income is bound to decrease in a growing country.<sup>1</sup> The basis for this belief is that the proportion of services tends to increase as national income grows and services are traded much less than goods.

On the basis of our theory of the principles of trade, there are some *a priori* arguments to make about this "law".

In the initial growing phase, when entrepreneurs raise their trade

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<sup>9</sup> See R. F. Harrod, *The Life of John Maynard Keynes* (London, 1952), pp. 424-427.

<sup>1</sup> The original proponent of the "Gesetz der fallenden Exportquote" was W. Sombart in *Die deutsche Volkswirtschaft im neunzehnten Jahrhundert* (Berlin, 1903), Chap. XIV. It has been discussed by, among others, A. O. Hirschman, *National Power and the Structure of Foreign Trade* (Berkeley and Los Angeles, 1945), pp. 146-151; H. Neisser and F. Modigliani, *National Incomes and International Trade. A Quantitative Analysis* (Urbana, 1953), Part 3; H. Bruton, "Growth Models and Underdeveloped Economies", *Journal of Political Economy*, 63: 330-336 (August 1955); E. Staley, *World Economic Development. Effects on Advanced Industrial Countries* (2nd ed., Montreal, 1945); Charles P. Kindleberger, *Economic Development* (New York, 1958), pp. 121-123.

horizons above the domestic market, there should be an *increase* in the share of foreign trade in GNP. This period could be rather long as the number of entrepreneurs coming into contact with the international markets will only gradually increase.

In assessing the effects of growth on the share of foreign trade in GNP, we have to consider whether the growing country is catching up with the majority of other countries or whether it is moving ahead of other countries. It might also, although growing, be in the process of being left behind or caught up.

A country surging ahead of other countries is isolating itself trade-wise. Its scope for trade decreases as its demand structure becomes increasingly different from that of the majority of other countries. The share of foreign trade in GNP should thus be expected to fall. On the other hand, a country which is catching up with the main trading countries should gain greater scope for trade since its demand structure will, to an increasing degree, correspond to the demand structures of other countries. A country which is being left behind becomes more isolated. Its trade should rise less than GNP. If the country is, instead, being caught up, its trade should increase more than GNP.

Even if it is empirically difficult to ascertain the shifts in the per capita income level of any one country in relation to the per capita income levels of the majority of countries, it is quite possible that a theory which emphasized exclusively these relationships in an explanation of the share of trade in GNP over time could achieve more explanatory power than a theory based solely on the arguments advanced in support of the law of the diminishing importance of trade.

In a comprehensive empirical investigation into the relationships between GNP and trade, it is concluded that, in the early stages of industrialization, the trade/income ratios have been apt to increase.<sup>2</sup> This is what we have predicted. As regards the continued changes in the trade/income ratio, the empirical evidence of the existence of any such a "law" of a declining ratio is not very strong and would perhaps not exist at all but for the trade-deflating effects of two world wars and a great depression. The Japanese propensity to trade has, for instance, always been on the increase, disregarding a small decrease during the worst years of the Great Depression and a drastic fall during World

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<sup>2</sup> Karl W. Deutsch and Alexander Eckstein, "National Industrialization and the Declining Share of the International Economic Sector, 1890-1959", *World Politics*, 13: 295 (January 1961).

War II.<sup>3</sup> The fact that the share of foreign trade in Japanese national income should increase could be predicted from our theory as Japan has been a “catching-up” country. U.S. foreign trade as a percentage of national income was, on the whole, falling up to World War II. Since then, it has been stable or increasing.<sup>4</sup> This might indicate that during the postwar period the U.S. is being caught up, while, up to the last war, the U.S. might have been isolating itself by moving ahead of other countries.

Whether there is any such relationship as a declining importance of foreign trade in a growing economy is not only interesting in itself. It also has some bearing upon the problem of which countries will trade most intensively among themselves. The propensity to import from a particular country may show a tendency to be higher, the lower the per capita income of the importing country.

We have made no reference to this possibility either in our theoretical discussion of which countries would trade most intensively, or in our analysis of the propensity values calculated in our empirical excursus. This is because we have felt that changes in the share of trade in total income could be explained more easily in terms of our theory than by reference to any such law of a declining importance of foreign trade. The curves traced out by the regression means in Diagrams 1–14 do not reveal any tendency for the trade intensity to be higher, the lower the per capita income level on which the importing country finds itself. To be sure, the U.S. propensity values are in most cases lower than the Canadian ones. But, for want of a more systematic tendency concerning the values of other countries, we believe that the relatively lower U.S. values are due rather to there being less suitable trading partners than to any law of a declining importance of foreign trade.

Instead of judging from the impression Diagrams 1–14 convey, another statistical method—yet untried—to determine the relationship between per capita income and the share of foreign trade in total income could be found. We have already observed that two world wars and a great depression must necessarily affect the data in a comparison of the import propensities of a given country through time. In order to avoid these disturbances, it is possible to compare import propensities of various countries in a given year.

However, for such a comparison to be made, it is necessary first of all

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<sup>3</sup> Deutsch-Eckstein, p. 285.

<sup>4</sup> Deutsch-Eckstein, p. 281.

to eliminate the size factor. From the empirical excursus, we know that a relatively small country tends to have a relatively high propensity to import, and vice versa. In order to eliminate the size factor, we shall calculate for each country the *hypothetical* propensity to import, i.e., the propensity to import which a country would have if it traded as intensively as a reference country which we may choose. The actual and the hypothetical propensities to import of the reference country are, of course, identical.

In order to calculate the hypothetical propensities to import, we begin by dividing a country into a number of comparable units, each unit being one dollar of the GNP of the country. Each unit purchases something from other units in the world including the other units of the country in question. We shall call the *average* purchase of a unit from each other unit  $m$ . The definition of  $m$  is thus  $m = M / (Y_w - 1)$ , where  $M$  is the total purchases made by the unit,  $Y_w$  is total world income (i.e., the total number of units), and  $Y_w - 1$  is thus the total number of *other* units.

From this equation, we obtain the following definition of the total purchases of one unit:  $M = m (Y_w - 1)$ . A country consists of  $Y_c$  units, where  $Y_c$  is the total GNP of the country. The total purchases of *all units of a country* are thus  $M_c = m Y_c (Y_w - 1)$ . But, to obtain the *total imports of the country*, we must deduct the purchases of all the units of the country from other units of the same country. The internal purchases of *one unit* are  $m (Y_c - 1)$  and the internal purchases of *all units* of a country are thus  $m Y_c (Y_c - 1)$ . If we deduct this expression from the total purchases of all units of a country, we obtain the *total imports of a country*, or:

$$(1) \quad M_{cf} = m Y_c (Y_w - 1) - m Y_c (Y_c - 1),$$

which can be simplified into:

$$(1a) \quad M_{cf} = m Y_c (Y_w - Y_c).$$

The economic meaning of this equation is that the total imports of a country equal the average purchases of each unit of the country from each other unit, times the number of units of which the country consists, times the number of foreign units.

So far the equation is only definitional. In order to use it for our purposes, we must calculate the value of  $m$  for a reference country. We do this by solving equation (1 a) for the reference country. We then

introduce this  $m$  value into the equation of each other country, putting the  $M_{cf}$  of each country in turn as the unknown. In this fashion, we obtain the hypothetical import value of each country, i.e., that import value of each country which would be equivalent to the actual import value of the reference country if only differences in size affected the relative import values of the various countries.

When we have calculated the hypothetical import value of each country, we may proceed to a calculation of the hypothetical propensities to import of each country. In order to calculate the hypothetical propensities to import, we divide the hypothetical import value of a country by its GNP. This means, in terms of our algebra, that we could derive the propensity value using the equation:

$$(2) \quad APM = m(Y_w - Y_c),$$

i.e., equation (1 a) divided by  $Y_c$ . The hypothetical import propensities of other countries can be obtained through a multiplication of the  $m$ -value of the reference country, the difference between the world-income and the income of the country concerned. The bigger the country, the smaller will be both this difference and the hypothetical propensity to import.<sup>5</sup>

Since equation (2) is a linear relation between  $APM$  and  $Y_c$ , it can be represented by a straight line. Let us measure GNP on the vertical axis and propensities to import on the horizontal axis. (For typographical convenience we measure the independent variable, i.e., the GNP figures, on the vertical axis, because these values cannot easily be compressed in a smaller scale.) In this space, we indicate the actual propensity to import and the GNP of the reference country. On the vertical axis, we mark a point for the total GNP of all countries combined. We draw a straight line from this point on the vertical axis through the point of the reference country. The hypothetical propensities to import will lie along this line. The line has a negative slope, indicating that the bigger the country, the smaller will be the hypothetical propensity to import. The line will have a zero  $x$ -value at the point specified because, if there were only one country, the hypothetical propensity to import must be zero as there can be no foreign trade. In other words, the expression  $Y_w - Y_c$  would be zero and hence  $M_{cf}$  must be zero.

We may use any country as a reference country by drawing a straight

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<sup>5</sup> The author is grateful to Mr. J. Palmstierna for assistance in developing this method of calculating hypothetical trade values and import propensities.

line from the point on the vertical axis through the actual propensity value of the particular reference country we choose.

In our space, we may now indicate the actual propensities to import of the various countries. An actual propensity to import left of the reference line indicates that the country in question trades less intensively than the reference country, and vice versa.

In Diagram 15 we have done this. The "world" has been assumed to consist of the 32 countries of Matrix 1 in the empirical excursus. The total GNP of this group of countries is US \$730.3 billions. The total propensities to import have been calculated through an addition of the row figures for each country in Matrix 1. (In this connection, it should be remembered that, in Matrix 1, each row figure had been multiplied by 1,000 to obtain more manageable numbers. The totals indicated in Diagram 15 are, however, the proper—i.e., unmultiplied—propensities to import.) The countries have been numbered in accordance with Matrix 1 and we have used Sweden as the reference country. The value of  $m$  is for Sweden 0.000294541.

Unfortunately, it is impossible to reproduce our diagram with an unbroken scale on the vertical axis. Large sections of the diagram between the U.K. and the U.S. GNPs and between the U.S. and the combined GNPs have had to be cut out. Thus, the reference line is also broken. This is a great disadvantage because it makes it impossible to select any reference country in the diagram and, with the help of a ruler, trace out the reference line of this country. However, as things are, it is not difficult to see with the help of the Swedish line how other reference lines would run. Only the U.S. line is difficult to draw by eye. To facilitate this, a point denoted  $P$  indicates where the U.S. reference line would enter the lower portion of our diagram. From this point, an almost vertical line—incidentally passing through the actual Indian point—could be drawn to the horizontal axis to obtain the full reference line of the U.S. in this section of the diagram.

This method of comparing trade intensities may be intrinsically interesting and useful in measuring the degree of participation of a country in foreign trade. The specific purpose we have in mind is, however, to obtain assistance so as to find out whether countries with lower per capita income levels trade more intensively than countries with higher per capita income levels.

With the aid of the Swedish reference line, we find that, out of 5 countries with *higher* per capita income levels, 2 trade *more* intensively than Sweden (countries 3 and 4). Out of 26 countries with *lower* per



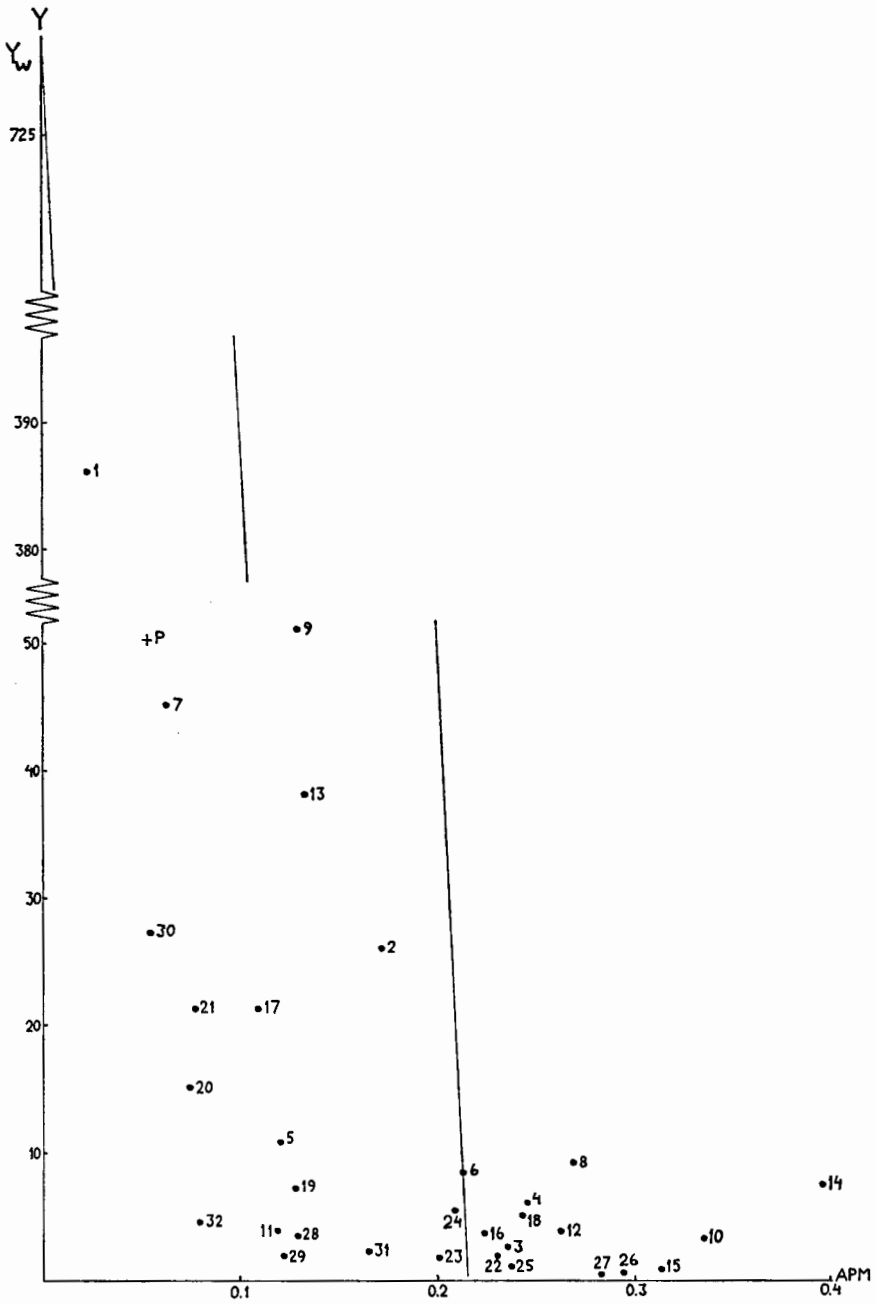


Diagram 15. The relative degree of participation in foreign trade of 32 countries.

capita income levels, 15 trade *less* intensively than Sweden (countries 7, 9, 11, 13, 17, 19, 20, 21, 23, 24, 28, 29, 30, 31, 32).

The conclusion must be that there is no tendency for countries with high per capita income levels to trade less intensively than countries with low per capita income levels.

We obtain the same results if we take other countries as reference countries. True, the U.S. trade intensity—together with the Indian one—is the lowest of all, but, for want of more systematic evidence to the contrary, it seems less far-fetched to explain this phenomenon by reference to the lack of suitable trading partners for the U.S. than to any “law of a declining importance of foreign trade”.

A more careful investigation would be necessary in order to determine which of the two theories of the behavior of propensities to trade over time is the superior one. However, it is clear from the beginning that the reversed trends are embarrassing for the “Gesetz der fallenden Exportquote”, whereas in our theory we would expect ups and downs on account of changes in the relative shifts in per capita income levels. Of course, the two theories do not invalidate each other. A combination of them would give rise to a complicated theory, but it might well be a theory of high explanatory value.

If we relate the imports of a country not to its GNP but to world imports, the share of a country in the process of catching up with the majority of other countries will show a tendency to increase. Not only is the GNP of the country becoming bigger in relation to that of all other countries combined, but—and analytically more interesting—the scope for trade of a catching-up country is growing. The Japanese share of world trade was continuously growing up to World War II. It is also probable that a country left behind will find itself with a lower share of world trade. It will become relatively smaller and more isolated tradewise. As concerns a country surging ahead of other countries, there are conflicting forces at play. On the one hand, such a country is becoming relatively bigger; on the other hand, it is becoming more isolated tradewise. For countries being caught up, there are also influences working in the opposite direction. They become relatively smaller but gain increased scope for trade.

In terms of expanding, stable, and declining groups of commodities, a country moving up from behind should increase its share of world trade in declining commodities. A country moving ahead should, on the other hand, gain ground in expanding commodities. We might in this way be able to explain a puzzling feature of Tyszynski's findings. To his own

surprise, Tyszynski discovered that Japan's greatest advances in foreign trade were in declining commodity categories. The U.S., on the other hand, gained ground almost exclusively in rapidly expanding groups.<sup>6</sup>

If it is still assumed that the slower growing countries react positively, are there grounds for expecting these countries to have payments difficulties of a structural nature needing monetary correction? If the reacting country is a relatively low-income country being left behind, the commodities in which the reacting country has a comparative advantage are liable to be those goods which are being eliminated from the range of overlapping demands. This is so as the eliminated goods are more representative of the demand structure of the lower-income reacting country than that of the higher-income acting country. Under these circumstances, there is likely to be pressure on the exchange rate of the reacting country and the new equilibrium rate of exchange of this country may be lower than the purchasing power parity rate.

The fact that the export goods of the low-income reacting country are those liable to be eliminated from the range of overlapping demands can be seen in Figure 5. If country II rises onto a somewhat higher per capita income level, the first goods to be eliminated from the range of overlapping demands are the actual export products of country I. At the same time, the actual export products of country II will—to the extent there are any overlapping demands at all—still be within the range of overlapping demands. This suggests that the adjustment process would be more painful for country I than for country II.

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<sup>6</sup> H. Tyszynski, "World Trade in Manufactured Commodities, 1899-1950", pp. 291-293.

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