

## **What use is the Neo-Classical Theory of International Trade?**

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International economic policy is now more under the sway of orthodox economics than it has ever been. The main international economic institutions, the IMF, the World Bank, the WTO, and the major developed economies are unremitting advocates of free trade and impose their views on the developing countries. And the developing countries, whose attempts at economic development through protection have mostly failed, are on the whole inclined to accept these views. Over the last twenty years economic policy in these countries has more and more come to be formulated by orthodox neo-classical economists, often described in the press as “reformers”, who advocate more reliance on markets and less protection against imports.

Yet economic performance around the world has not been better over the last twenty years than it was in the earlier period of the 1950s, -60s and -70s. On the contrary, it has mostly been worse, the main exceptions being a few East Asian economies, including China, that have not on the whole been notable for the freedom of their markets or external trade, and, over the last ten years, the US. Economic growth rates of the world as a whole in the later period have been well below the rates of the earlier period. Income inequalities within countries have increased almost everywhere, except in the East Asian economies mentioned and possibly a few West European economies with large social protection systems. In Latin America, where liberalisation has been pursued with the most earnest, the bulk of the population appears to be worse off than it was twenty years ago. Unemployment rates seem to have increased in most countries, except the successful East Asian economies and the US, and has become a major concern in the West European countries that have done best in containing income inequalities. International financial crises, if not more frequent than before, are severer and especially damaging to the developing countries. They include the debt crisis of the 1980s, the “peso” crisis of 1994-95, the East Asia crisis that began in 1997 and the present problems of Brazil and several other Latin American countries.

The notable exception in recent years to this deterioration has been the US, which has grown continuously over the last ten years and reduced its unemployment to the rates of the 1960s. Its success, though, is no evidence of the advantages of freer trade. The view popularised by some economists and the media, that it somehow indicates productivity growth caused by the freer markets and restructuring of firms, has no independent

empirical support. If it were correct, productivity in the US would have been rising exceptionally fast, and would, therefore, be exceptionally high now. Yet detailed comparisons with other developed countries do not show productivity in the US to be especially high.<sup>1</sup> In contrast, the countries that are supposedly the greatest laggards in restructuring their firms, Germany and Japan, are consistently successful exporters and run large trade surpluses. Which means that production in the US has risen, not by some unusual acceleration of productivity, but in the usual way, through investment. Since the saving rate of the US has always been low by the standards of the developed countries and is now zero, it means that the investment has been financed by the rest of the world. This is apparent from the US balance of payments, which shows that the net inflow of capital to the US each year since the mid-1980s has, on average, been several times greater than the total gross inflow to the developing countries.<sup>2</sup> Moreover, many developing countries are net exporters of capital to the US. To this must be added the great gains to the US from terms of trade movements in recent years, which have been mostly at the expense of the developing countries. For these developing countries, in particular, the economic performance of the US is not evidence that they will benefit from free trade.

A detached non-economist, observing that economic performance has been deteriorating around most of the world, might ask whether the theories by which economic policies are made might not be at fault. If the theories of international trade were expounded to him he would also be astonished by how little they explain and by how often they conflict with reality. And he would wonder how the main conclusions of the theories, that free trade is in some sense optimal, can be so confidently asserted when the empirical evidence is so much against the theories themselves. In a natural science a theory is not accepted until it has been tested empirically and, when the wellbeing of people can be seriously affected, notably in medicine, procedures and products are tested to ensure their efficacy and to ascertain their side-effects before they can be used. Economics is different: the optimality of free trade asserted by neo-classical trade theory is inherently untestable, being a comparison between the welfare of people in two alternative states; theories of international trade either conflict with reality or take forms that are too general to be tested, and side effects are rarely acknowledged. Nevertheless, the economist can give, even impose, advice on the basis of these theories, though it affects whole countries.

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<sup>1</sup> A typical case: none of the US car manufacturers can equal Japanese productivity, though Ford is said to be catching up. See, 'Ford Narrows Productivity Gap' in the *New York Times*, June 18, 1999. p.C6.

<sup>2</sup> The annual average net inflow from 1984 to 1996 was \$115 billion. In 1997 it was \$150 billion and in 1998 it was \$230 billion.

The purpose of this article is to show that the non-economist's doubts are justified. It is in two parts. The first describes some of the failures of orthodox neo-classical theories of international trade to predict or describe the patterns of trade around the world and the consequences of applying policies that derive from them, and it shows that these failures are the consequences of unsound reasoning and incoherence in the theories. The second part, to appear in a later issue of this Journal, is intended to show that a simpler and more realistic approach to constructing a theory accommodates and explains the phenomena that neo-classical theory can not.

## **The Heckscher-Ohlin Theory**

### **I. The Formal Theory**

The H-O theory asserts that a country's trade is primarily determined by its endowments of factors. In formal terms, it assumes a given set of goods and a given set of factors and that the output of each good is determined by a production function whose arguments are the quantities of factors needed. The theory commonly assumes that returns to scale are constant and that production functions are the same in all countries, assumptions that can be taken literally, though their purpose is to see how much can be explained or predicted by factor endowments alone. At any time, each country is endowed with specific quantities of each factor and equilibrium occurs in free trade when consumers maximise their welfare, given the prices of goods and their incomes from factor earnings, while competition ensures that the distribution of production between countries and the allocation of factors within them are such as to minimise cost. With suitable assumptions about the forms of consumer preferences and production functions, the theory, stated in such formal terms, leads to the conclusion that equilibrium is Pareto optimal.

This raises two problems. The first is a problem of method. To be useful, the theory must be tested empirically but, stated in such formal terms, it is too general to yield any specific explanation or prediction about the pattern of trade or the prices of factors. It is also too complicated to use empirically to calculate or predict these things; just the trade of a few major economies, involving large numbers of goods, is enough for the compilation of data on factor endowments and estimations of production functions to be practically impossible, even assuming away the complications of consumer preferences and the relations between consumer incomes and factor prices. Consequently, the theory has never been applied empirically in its general form to explaining world trade, or even the trade of a few countries, and in that form, it remains an abstraction.

The second problem is that the basic assertion of the H-O theory is normally held to be, “a country exports the goods that use relatively intensively the factors with which it is relatively abundantly endowed”, and, to be meaningful, the assertion needs two assumptions. One is that there is a consistent definition of relative abundance and relative intensity, i.e. rankings of factor endowments and intensities. For instance, the relative abundance of two factors in two countries is measured by comparing the proportion in one country of the endowment of one factor relative to the endowment of the other with the proportion in the other country. Then relative abundance is unambiguous; if one country is relatively abundant in one factor, the same procedure shows that the other country is relatively abundant in the other. But, if the factors are more than two, one country may be relatively abundantly endowed with one factor if it is taken as a proportion to a second factor, but the other country may be relatively abundant with the first factor if the proportion is taken relative to a third. The second assumption for the basic assertion to be meaningful is that there are no factor reversals, i.e. any ranking of factor intensities does not change with the prices of goods.

The basic assertion, as given above, cannot be dismissed as a sign of a lack of rigour, a popular simplification, a didactic device or any other departure from the correct theory. It is important because it implies, in practice, that the factors with which a country is relatively well endowed are easily determined and, therefore, that its trade and the effects of the trade on factor prices are predictable, in broad terms at least. Both Heckscher and Ohlin, the original formulators of the theory, regarded it in this way, as is obvious from their use of examples. Similarly, when Leontief tried to measure the relative capital and labour intensities of US exports and import competing industries, it was thought obvious that the US had larger amounts of capital per head than Europe. Developing countries are commonly taken to be labour abundant, unless a large part of their income comes from some mineral resource, such as oil. The appeal of the H-O theory, as compared to other neo-classical theories that lead to the conclusion that free trade is Pareto optimal, lies in this ease of interpretation.

A ranking of factor endowments and intensities can be assured in two ways. The more common is to assume two factors and no factor reversals. This is standard fare in textbooks and in theoretical and empirical work on international trade. Some of the most important conclusions of trade theory depend on it. For example, the Stolper-Samuelson theorem, according to which the price of the relatively scarce factor in a country is lower relative to the prices of all goods in free trade than it is in autarky,

holds for two factors but not for more.<sup>3</sup> Alternatively, a ranking of factor endowments can be assured by comparison with a scale common to all countries, the only obvious one being the total of the endowments of all countries of each factor. Vanek shows that, ranking each country's factors according to their shares in the total of all countries, the exports of any country will, in the aggregate, use more of the factors with which the country is relatively well endowed than do its imports, provided all countries have the same factor prices. Since the conclusion is confined to aggregate exports, a country may export some goods that use relatively intensively factors with which the country is not well endowed.

Because relative factor abundance is always defined in it, the case of two factors is not simply a didactic simplification of the general case. So the economist must choose between taking it literally as the basis of the theory or, if he wants to avoid the loss of generality, reverting to more factors. The former is the more common choice, but its conclusions conflict with reality and have, consequently, given rise to much discussion and empirical work, some of which is the subject of this article. These conflicts do not necessarily arise with the alternative choice of more than two factors, but then, either the inability to make any general statement about trade must be accepted or factor prices must be assumed equal in all countries to allow the use of Vanek's result, on the assumption that factor endowments in all countries and production functions for all goods can be estimated.

## II. Two Factors

### *The Leontief Paradox*

The theory failed its first and most obvious test. The US had more capital per head than any other country in the early years after World War II, but its import competing goods were discovered to be made using more capital than its exports, the Leontief Paradox. Many objections were raised regarding the method and data, but improvements have not yielded results that support the theory. Some economists do not accept the validity these calculations and others, such as Krugman and Obstfeld<sup>4</sup>, believe that the H-O theory must be abandoned to allow for differences in productivity between countries.<sup>5</sup> But many economists accept Leontief's results and try to account for them with modifications of the theory. Two modifications have been proposed that keep the number of factors at two.

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<sup>3</sup> Chipman. Section 3.6.

<sup>4</sup> This paper refers often to the textbook by Krugman and Obstfeld because it is one of the most widely used textbooks on international economics and representative of neo-classical theory.

<sup>5</sup> Krugman and Obstfeld.

The first was proposed by Leontief himself, who argued that labour should not be measured in terms of man-hours and that qualitative differences should be allowed for. A US worker had to be considered the equivalent of more than one foreign worker and, if he were considered the equivalent of three, the US was, contrary to appearances, labour abundant. Although many economists thought the idea had merit, they balked at the number three, a superiority of 25-30 per cent seemed reasonable, but not 200 per cent. Besides, it might make the theory less plausible to other countries. Leontief's argument also had the drawback of putting in question all measurements of factors; if labour could not be measured simply, why should it not be the same for capital or land? His modification would have rendered the theory excessively elastic and has not become orthodox.

The second modification was to assume factor reversal. It was widely accepted for a while, but empirical evidence for it has been hard to find. Besides it, too, threatens to make the theory useless; if factor reversals are common enough to yield the Leontief Paradox for the biggest trade account of the world, the basic assertion of the theory cannot even be made as a probability.

### ***Factor Price Equalisation***

A second test is afforded by the theory's predictions of the effects of trade on factor prices. According to the theory, trade will, in each country, raise the prices of the abundant factors relative to the prices of goods. For developing countries this means a rise in the earnings of labour. Samuelson, however, showed that, with two factors, the prices would be the same in all countries that did not specialise in one good. What had seemed to be an encouraging prediction for the developing countries had turned into a problem for the theory.

The obvious way to avoid factor price equalisation is to see, if factor prices are not equalised, whether the countries do not specialise, which is to say to check if the conditions for equalisation hold. Although developing countries may be regarded as specialising in a few goods each, it fails for the European countries in the 1950s and 1960s and Japan in the 1960s and 1970s, which did not seem to specialise to the extent required and yet had lower wage rates than the US.

A second way is to assume factor reversals, which remove the one-to-one correspondence between the prices of factors and goods that leads to factor price equalisation. Then countries can trade goods at the same prices and yet have different factor prices. But the same objection holds as before,

is one to assume that factor reversals are so common as to cover most trade between Europe, Japan and the US?

A third way, put forward by Krugman and Obstfeld<sup>6</sup>, among others, is to assume that production functions are not the same in all countries. It is a modification that some economists avoid because it eliminates the H-O theory itself, since the argument leading to the basic assertion relating exports to factor endowments requires that production functions be the same.

A fourth way, also put forward by Krugman and Obstfeld, Ohlin and others<sup>7</sup>, is to attribute differences in factor prices between countries, at least partly, to trade restrictions and transport costs. To be plausible it must explain how the relatively small differences in prices attributable to trade barriers and transport costs can cause such big differences in income as, for instance, between Brazil and the US. It must also establish that the price differences that do exist can be ascribed to these causes, and then explain why developing countries should inflict this on themselves since it is they who have the most trade barriers, points to be discussed later.

A fifth way, analogous to Leontief's attempt to explain his Paradox, is to argue that appearances are misleading and that factor prices are equalised, but most of what is taken to be wage is actually earnings on capital invested in the workers, human capital. This interpretation of wages was devised by Gary Becker. Since workers with similar skills earn differently in different countries, Becker takes the interpretation further to the worker's birth, saying:

'The term  $x$  represents the earnings of a person that are unrelated to human capital invested in him, and are presumably, therefore, largely independent of his current choices. Particularly in developed economies but perhaps in most, there is sufficient investment in education, training, informal learning, health and just plain child rearing that the earnings unrelated to investment in human capital are a small part of the total. Indeed, in the developmental approaches to child rearing, all the earnings of a person are ultimately attributed to different kinds of investment made in him. Consequently, there is a considerable justification for the assumption that  $x$  is small and can be neglected, an assumption we make in this paper.'

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<sup>6</sup> Krugman and Obstfeld. Op. cit. p.76

<sup>7</sup> Krugman and Obstfeld. Op. cit. p.76-7. Ohlin. Op. cit.

The superiority, in this sense, of the worker of the developed country is not genetic, but it starts from birth, or perhaps conception, and is passed on to the offspring.

### **III. More Than Three Factors**

Both the Leontief Paradox and factor price equalisation can be avoided by assuming that the number of factors is greater than two, at the cost of not having a verifiable theory. This is done in several ways, e.g. by assuming that the factors are labour, capital and land. Then the argument goes, the US is abundant in land and exports land intensive goods, i.e. agricultural products. Alternatively, the US exports technology intensive goods and technology should be considered a factor. Or skills are a form of capital and US exports have a higher average of labour skills, measured in terms of years of education, per unit of output than its import competing industries. These various factors do not need to be examined individually, because they still fail to explain US trade.

If factor prices are not equalised around the world, the US cannot, according to the theory, at the same time export capital intensive, labour intensive, land intensive and skill or technology intensive goods, although that is what it does. Alternatively, assuming that factor prices are equalised gives the possibility that the US exports various goods that use different factors relatively intensively as long as its exports in the aggregate use the relatively abundant factor relatively intensively. The justification could be that factor prices are approximately equal in Europe, Japan and the US, the economies that account for most of the world's trade, and, hence, that Vanek's result is likely to be roughly true. But if the abundant factor in the US is capital the Leontief Paradox remains, since its calculations of factor use were done for aggregate exports and import competing industries. And if some other factor is more abundant in the US the H-O theory can say nothing about the pattern of trade until the amounts of each factor in all the countries have been measured and added, an unlikely exercise given the complications of quantifying technology, education, different types of land and so on.

Finally, factor price equalisation can be escaped by assuming that the number of factors is greater than the number of goods. If the number is smaller factor prices can be assumed to equalise and if factors outnumber goods, the chances of factor price equalisation are zero. The disadvantage is that, if the number of goods is large, so is the number of factors. Then making comparisons of relative factor endowments and estimating production functions may become overwhelming. For example, if the number of factors is only 10, the number of relative factor intensities



becomes 9!, i.e. 362,880. Even if only a fraction of them need to be calculated, they must be calculated for all countries.

#### **IV. What is a Factor?**

The naïve non-economist to whom the H-O theory has been explained might want to see the list of factors that determine trade and would find it odd that there is no official list. He would also find it odd that the reason is not that different schools of thought put forward competing lists, but that economists do not think it necessary to specify the factors exhaustively. The non-economist would think that the theory can only be held to explain trade if the goods or groups of goods and the factors have been specified, but economists prefer to leave the choice of factors open. Books and papers in international trade often assume two factors, variously labelled land and labour or capital and labour, but they also add factors, like human capital or technology, or subdivide factors into different types of land, capital or labour. He would find it still odder that no economists have decided whether the number of factors is greater or less than the number of goods, although that determines what the range of relative prices of goods can be and whether factor prices will be equalised or not. Instead, economists prefer to treat this as a matter of choice.

One answer to the non-economist might be that definitive specification of factors is unnecessary, that the goods and factors should be specified according to the problem at hand. This seems to have been the view of Ohlin, whose book discusses the questions of defining and identifying factors at length. No economist since then seems to have devoted that much effort to these questions. Ohlin talked of factors and sub-factors. According to him, labour can be divided into three sub-factors “in most cases”<sup>8</sup>, though if a “few engineers have a special knowledge of a particular technical process” they might be considered a separate sub-factor.<sup>9</sup> But he adds that it may be necessary to reckon with a much greater number of factors “because of soil, climate, wind, humidity, or surface...”<sup>10</sup>, to which can be added that a sub-factor like mineral deposits must be further sub-divided according to the mineral, e.g. copper, iron, bauxite, oil and so on.

But this answer prevents any ranking of factor endowments. If the factors can be sub-divided arbitrarily, what is being compared with what? If the numerators are changed, so are the denominators. Because of this Ohlin repeatedly lapses into explaining trade by the abundance, not the relative

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<sup>8</sup> Ohlin. *Op. cit.* p.51.

<sup>9</sup> Ohlin. *Op. cit.* p.64.

<sup>10</sup> Ohlin. *Op. cit.* p.55.

abundance, of factors. His argument for the basic assertion of the H-O theory consists entirely of examples and nearly all of them concern various types of land: Swedish forests, Swedish iron ore, American wheat-lands, British coal in the nineteenth century and so on. Compared to what these factors are relatively abundant is not specified. Even when Ohlin ventures to examples in industry, such as the number of chemists in Germany in the late nineteenth century or of jewellers in Pforzheim in the sixteenth, he states them in terms of absolute numbers or implicit comparisons with numbers in other countries or regions, not in terms of comparisons with the amounts of other factors.

The conclusion to be drawn is that the H-O theory is practically impossible to verify. Examples, such as those given by Ohlin, are not evidence. That the area under forest in Sweden, the area under wheat in America and the number of jewellers in Pforzheim are large and therefore likely to be large relative to the amounts of other factors is not enough. It is no different to the reasoning of the economist who asserts that the H-O theory is valuable, despite its shortcomings, because it explains why Kuwait exports oil.<sup>11</sup> The evidence needed is twofold: firstly, amounts of factors that are not necessarily large compared to the amounts in other countries but are large relative to the amounts of other factors in the same country; secondly, calculations of the factor intensities of goods, including direct and indirect inputs. Such evidence is difficult to find; the calculation of the intensities of capital and labour use in exports and import competing industries in the US that revealed the Leontief Paradox required an input-output table for the US economy. But it was made easier because there was no need to compare capital per head in the US with the ratio in other countries; the consensus was that the US was capital abundant in the sense of the theory. As soon as the theory moves away from the basic two or three factors, neither the international comparisons of relative factor abundance nor the calculations of factors are likely to be feasible.

## **Haberler's Representation of International Trade**

### **I. More General, Less Specific**

A general representation of international trade, devised by Haberler, assumes production possibility sets of countries to be convex and uses opportunity costs, or marginal rates of substitution between goods along the boundaries, or frontiers or transformation curves.<sup>12</sup> It is

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<sup>11</sup> Mannur, H. G. *International Economics* Vikas Publishing House, New Delhi. 1995.

<sup>12</sup> Haberler. p.175.

general in the sense that it includes not only the H-O theory and any other theory with a neo-classical representation of production, but also the classical theory of Ricardo. In particular, it allows for factor endowments with production functions that differ from country to country. By the same token, it avoids specifics, it presupposes no particular explanation of the opportunity cost. Nevertheless, it leads to the desired conclusion that free trade is optimal. As Meade puts it in his book, "Trade and Welfare", 'As a formal proof of the case for free trade there is really nothing to be added ...'.<sup>13</sup>

The generality and lack of specifics account for its appeal for the neo-classical theory of trade. In leaving open what determines opportunity costs or marginal rates of substitution, Haberler's representation avoids the comparisons with reality that bedevil specific theories. How the H-O theory fares in such comparisons has just been discussed. Ricardo's theory, though taught as a normal part of international economic theory, is not accepted by most economists because it rests on the assumption that costs and outputs are determined solely by labour inputs. Haberler's representation lets proponents of neo-classical trade theory both draw general conclusions about the benefits of free trade and escape the frustrations of not being able to answer questions, such as what the pattern of trade and the costs of factors will be. For someone who wants to explain the pattern of trade this is of no use, which seems to be why Ohlin said of it, "such a reasoning explains very little, unless connected with a mutual interdependence price system and is as different from the doctrine of comparative cost as anything can be."<sup>14</sup>

Despite Ohlin's strictures, Haberler's representation is used often and, consequently, further discussion here of neo-classical trade theory must refer to it. For instance, Meade used it as the basis for his book precisely because he wished to avoid specifics about what goods countries in reality import and export or how their factor prices might be affected. He enters into specifics only when he needs to discuss income distribution, in Chapter XVIII, and factor movements later on. Krugman and Obstfeld escape to the Haberler representation from the Heckscher-Ohlin theory, which they abandon because of the Leontief Paradox. They term it a Ricardian approach because differences in productivity between countries are taken as given. The following discussion of neo-classical trade theory switches between the Haberler representation and the H-O theory as the need arises.

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<sup>13</sup> Meade. Op. cit. p.142.

<sup>14</sup> Ohlin. Op. cit. p.8 footnote.

## II. Trade Barriers

### *Income Distribution*

General though Haberler's representation may appear to be and however widely used, its conclusion about the optimality of free trade is not borne out in practice; trade is not and rarely has been free. Dani Rodrik, a neo-classical economist who distinguishes himself by confronting the problem squarely and not fudging the answers, says, 'Perhaps no other area of economics displays such a gap between what policy-makers practice and what economists preach as does international trade. The superiority of free trade is one of the profession's most cherished beliefs, yet international trade is rarely free.'<sup>15</sup>

At bottom, the problem is that the only things trade barriers do of which neo-classical trade theory admits are change the distribution of income and change the terms of trade. The latter is assumed to be rarely possible; it is ignored by Rodrik and will be ignored here. But trade barriers are a bad way of changing the distribution of income. Consequently, as Rodrik concludes, the models devised to explain them are 'highly specific'<sup>16</sup>, meaning that each uses assumptions suited only to specific countries, products or circumstances. Since interference with free trade is 'essentially a universal phenomenon'<sup>17</sup>, they do not make for a satisfactory explanation. He also points out that the models show no plausible reason, other than the revenue yielded by import duties, why it should result in barriers against imports rather than in export promotion.<sup>18</sup> Yet tariffs persist in countries that do not need the revenue. Rodrik could have added that developed countries have shifted more to the use of quotas and voluntary export restraints, which bring in no revenue and can raise the prices of imports; they want the protection even when the cost to them rises.

### *What Does History Say?*

If, however, the distribution of income is not the only motive for not letting trade be free, no convincing explanation compatible with neo-classical trade theory may be possible. Some grounds for believing that this is so are given by Rodrik's survey of the models devised to provide explanations of why trade is not free. Though succinct, it seems to leave nothing of consequence to be added and yet he has to conclude that protection is still a puzzle.

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<sup>15</sup> Rodrik, Dani. p.i of Non-Technical Summary.

<sup>16</sup> Rodrik. Op. cit.

<sup>17</sup> Rodrik. Op. cit.

<sup>18</sup> Rodrik. Op. cit.

It is less of a puzzle when the problem is recognised to be broader than Rodrik's statement quoted above seems to imply, for the statement refers neither to history nor to the motives, other than redistributing income, that have been given for protection. History does not support the belief that protection has much to do with income distribution. Only two economies have developed on free trade, Britain and Hong Kong; the former happened to be the first country to industrialise and became a zealous proponent of free trade, while the latter's circumstances were too peculiar to be a guide to others. Textbooks usually mention that particular countries have had protection in their pasts, for instance Krugman and Obstfeld, referring to Germany, Japan and the US, say, 'it is a historic fact that the world's three largest market economies had begun their industrialization behind trade barriers.'<sup>19</sup> But their candour does not go so far as to mention that the list of countries that industrialised without trade barriers has only two entries.

The contrast between Portugal and Prussia in the nineteenth century illustrates the point. When the Portuguese authorities attempted to protect the local textile industry against British imports and to interfere with the British businesses in the country, they received from Palmerston, the British Foreign Secretary and a doctrinaire free trader, a series of stern lectures on comparative advantages and the benefits of free trade. Eventually British gunboats ensured that British interests and free trade were respected. Palmerston was equally stern in admonishing Prussia to abide by free trade when it resorted to protection, but Prussia was militarily stronger than Portugal and he was too astute to use gunboats there. Prussia, and under its leadership, Germany had, by the start of the First World War, become the largest and most advanced economy on the continent of Europe and rival to Britain. Portugal remained economically backward until the European Union recently began to subsidise its development.

Even the present relative freedom of trade among the developed countries is evidence that the purpose of trade barriers is more than the redistribution of income. Trade among the countries of West Europe and North America only became moderately free after West Europe had recovered from World War II. The Kennedy Round of trade negotiations took place in the 1960s and the Tokyo Round in the 1970s. By then all these countries were prosperous as never before and Japan had become an industrial power. Trade within West Europe was liberalised in parallel, starting with the Treaty of Rome and going through several stages: the Common Market of seven countries, the European Free Trade Area of six countries, the European Community and now the Union, with smaller steps

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<sup>19</sup> Krugman and Obstfeld. Op. cit. p.257.

within each stage. The long time it took is hard to explain in terms of income redistribution. West Europe and North America were committed to free trade, as evident from the way they had set up the G.A.T.T., whose rules ensured that change could only be towards that end, and from their repeated negotiations with the stated intention to reduce, and prevent increases in, trade barriers. Hence, the advocates of free trade must have been in the ascendant, so why was progress so slow?

*The Stated Motive for Trade Barriers: Unemployment*

The motives that those who make or carry out policy put forward for trade barriers must also be considered, and they are not often the redistribution of income. Apparently unambiguous cases like the English Corn Laws, which Ricardo criticised for protecting the incomes of landlords at the expense of industrialists, are not common. Parts of the European Common Agricultural Policy, of Japanese controls over rice imports and of US farm support some years ago have been, explicitly or not, means of protecting the incomes of agricultural populations, but they have also had other motives, such as preventing unemployment or keeping the countryside populated. The Corn Laws, moreover, are only made to appear straightforward nowadays by overlooking the rural unemployment caused by their repeal, though in Ricardo's day few people deemed unemployment to be a consideration.

Most often the motives given are the prevention of unemployment and some version of the infant industry argument, neither of which can be accommodated by neo-classical trade theory since both are departures from the assumption of efficiency. A proponent of the theory might maintain the unemployment caused by trade is simply one form of the income redistribution that trade causes. If imports of some products grow rapidly and cause unemployment by displacing domestic production, the creation of new jobs removing the unemployment is a move along the production frontier of the economy. He acknowledges that the unemployment might cause suffering (so did the G.A.T.T. with its provisions regarding market disruption and the US by imposing voluntary export restraints on Japan) but he claims it is transitory and believes that the succession, from 1960 to the present, of "arrangements" restricting the textile exports of developing countries to developed countries is not to be considered the norm.

Though common, this interpretation of unemployment conflicts with the changes that actually occur in such a situation. If imports of textiles or motor cars grow rapidly and domestic textile mills or Chrysler are closed, their workers lose their jobs. As far as neo-classical theory can describe it, these workers find new jobs as the economy's endowment of

capital is reallocated. In reality, the capital equipment of the textile mills or Chrysler falls idle and new equipment has to be created to remove the unemployment. Old capital stock is destroyed, new stock is created and the latter presupposes investment and saving.

Several alternatives are then possible. One is that the new jobs are created quickly and the investment per head is the same as before. Then the value of the country's capital stock might remain unchanged and may give the appearance of the reallocation of an initial endowment. A second is that the new jobs are created with more investment per head, perhaps because the country moves from a labour intensive activity to a more capital intensive one. Then the value added per worker and GNP rise because the capital stock has risen.

A third possibility is that investment does not suffice to absorb the unemployment; old capital stock lies idle while not enough new capital stock is created. Unemployment can not as a rule be assumed away; it obviously exists, can persist and may be too great to be ignored, as shown by the present rates in Europe and the rates in the US for most of the time from 1960 to 1990. It cannot be supposed different and, hence, transitory merely because it has been caused by the rapid growth of imports. In particular, the aftermath of trade liberalisation in developing countries is usually the closure of firms, a rise in unemployment and a lasting fall in investment. Whether or not the closed firms were so inefficient as to have reduced real income by their operations, for which no *a priori* assumption can be made either way, their capital stock cannot be said to have been reallocated to more efficient use unless the equipment is actually put to use. Usually it lies idle.

In the foregoing the change in trade was taken to be the growth of imports, but taking it to be a change in prices instead, makes no difference. A change in prices is the more common presentation in textbooks because it is easier to depict in neo-classical trade theory, which mostly consists of comparative statics, and is not designed to deal with processes through time. The effect of a change in prices is depicted by a change in the tangent to the production frontier of the country. Less is produced of the good that becomes cheaper, more of that which becomes dearer and the previous remarks apply here too.

#### *The Stated Motives for Protection: Infant Industries*

The other main reason given for protection is the infant industry argument, taken in a broad sense to say that the competitiveness of an industry or a firm depends positively on past production in that and

related industries and firms. Like unemployment, it does not fit into the representation of production of the neo-classical theory of international trade. All the infant industry argument is intended to assert is that firms cannot become competitive without having been in operation for some time, that they need experience, their own and that of related activities, to improve. It does not mean that they necessarily become internationally competitive in time (they might, as often pointed out, simply remain inefficient) but they cannot become competitive otherwise. The condition is necessary, but not sufficient. The formulation can, no doubt, be improved, but some vagueness and generality are unavoidable since they reflect the present lack of understanding of how firms in developing countries function and what determines whether or not they become competitive.

In purely formal terms, the infant industry argument is generally accepted, but it is almost as generally opposed on supposedly practical grounds. The arguments against it are primarily that protection allows inefficient firms to be started as well as potentially competitive ones, that protection then becomes difficult to reduce, that the cost of misallocation of resources is high and so on. Their truth is borne out by experience; in few developing countries have industries established under protection become internationally competitive, reduction of protection has almost always been opposed by the owners and employees of the protected firms. When it happens it is the result of external pressures like a round of negotiations under the G.A.T.T. or conditions imposed by the World Bank or IMF, and, if protected firms take long to become efficient, the costs to the economy may be excessive.

But none of this leads to the conclusion that economists and institutions like the WTO, the World Bank and the IMF wish to reach, namely that the evidence demonstrates the superiority of free trade over protection as a way to industrialise. On the contrary, it still demonstrates the opposite. The conclusion they want would follow only if they could show that no country had industrialised with protection and that countries do industrialise with free trade. As pointed out earlier, neither is true. When economists, the World Bank and the IMF expatiate on the failures they do not dwell on the countries that have industrialised on free trade, since they are only eighteenth century Britain and modern Hong Kong, and protection that has been successful they present as having been modest, as against the conclusions of standard works, like those of Amsden and Wade, which describe at length how closely trade was controlled by the authorities and how misleading tariffs figures can be as indicators of protection and government activity.



Part of the reason for the opposition to the infant industry argument is that the neo-classical theory of trade cannot analyse it. Neo-classical trade theory represents a country's economy by a production frontier and trade by a point on a tangent to it, and what cannot be accommodated in this representation is precluded. The crucial element of the infant industry argument is that the efficiency or competitiveness of a firm depends on past output. Such a dependence, the so-called learning curve, has long been accepted in economics and is routinely used by long established firms to plan the production of complex products, the best known example being aircraft. Part of the infant industry argument is that newly established firms have analogous learning curves for simple products. Its inconvenience is that present costs are not just functions of present inputs and prices and, consequently, cannot be included in the neo-classical framework for analysing trade.

Another illustration of how something can be precluded by neo-classical theory is given by Krugman and Obstfeld, who raise the question, 'why not encourage both import substitution and exports?'<sup>20</sup> Their answer is that either course draws resources from the other, both are moves along the production frontier, but in opposite directions. Given the assumption that the economy is at a point on a production frontier and can only move along it, they are right. But the practice has been used repeatedly and successfully on a large scale in Japan and Korea, among others. For example, firms were able to establish themselves in export markets by cross-subsidising their exports from profits from domestic sales. A well established fact, one, moreover, widely acknowledged and associated with success, is precluded by *a priori* reasoning.

A further aspect of the opposition to the infant industry argument is that it imposes difficult obligations on economists. What the many failures show is how hard it is to succeed. At the same time, the failures of free trade show that protection is essential. Hence, the advice developing countries need is how to create conditions for protection to foster infant industries that become competitive. Little advice of this sort is transmitted by development economists or international organisations, although the institutions and policies that led to the successes of Japan, Korea and Taiwan have been much studied. Perhaps this is partly ideological, a preference for propagating free markets. But the study of policies and institutions in the concrete, as opposed to the abstraction of economic theory, is hard and often inglorious work. The formulation of advice adapted to the needs of a specific country and the effort and patience needed to apply it and, almost always, to improve it in the light of experience are even

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<sup>20</sup> Krugman and Obstfeld. Op. cit. p.259.

harder and earn still less glory. Naturally economists and some international organisations prefer simple prescriptions, such as the removal of trade barriers, come what may.

Lacking the framework for discussing infant industries, neo-classical trade theory is an obstacle to understanding what makes for successful industrialisation. Thus Krugman and Obstfeld argue that private investors in developed countries do not need government help even for investments whose returns 'lie far in the future'. So, if markets are allowed to function properly there is no reason why the same should not be true for developing countries. Yet market liberalisation in developing countries is almost always followed by a lasting fall in investment.<sup>21</sup> The question that should be asked is why do entrepreneurs in developing countries hesitate to invest when markets are free? Again, through *a priori* reasoning economists make one of the most important problems of developing countries vanish.

The point is illustrated by the example they give, 'The US biotechnology industry, which attracted hundreds of millions of dollars of capital years before it made even a single commercial sale'.<sup>22</sup> What concerns an entrepreneur setting up a manufacturing firm in a developing country is that he will have to compete with imports that will have been coming in before he starts and that he may need time for his firm to be able to compete with them. Obviously the biotechnology firms of the example did not have this concern.

## **Capital Goods and Prices**

### **I. Production Frontiers and the Means of Production**

What prevents neo-classical trade theory from discussing unemployment, infant industries and investment is that the production frontiers these economists postulate do not distinguish between short and long term rates of substitution. Taking the simplest general formulation, the prices of goods are proportional to the marginal rates of substitution along the production frontier. In practice, that the price of a car is 30 times that of a buffalo does not mean that 30 buffaloes can be transformed into a car overnight. If it means anything related to movements along production frontiers, it means that reallocating resources to produce 30 fewer buffaloes, allows the production of one car more. This is a long run rate of substitution. Since cars are produced with capital goods and the economy is assumed to be at its production frontier, more capital goods have to be

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<sup>21</sup> Serven and Solimano.

<sup>22</sup> Krugman and Obstfeld. Op. cit. p.258.

acquired. (In the meantime the means of production of buffaloes are consumed or languish.) Being manufacturers, they must either be made locally or be imported, a decision that depends on the relative prices of the locally made and imported varieties. If production of these capital goods also uses manufactured capital goods, the prices of the former depend on the prices of the latter and so on. The upshot is that the production frontier is determined by the prices of goods.

Consequently, most of the reasoning of neo-classical trade theory fails. Short run marginal rates of substitution are not proportional to prices and the long run production frontier shifts with prices. The consequence can be escaped in three ways, none of which meets the needs of international economic theory. One is the escape used for the closed economy when confronted with the problems of measuring capital, of which this is an example, namely to resort to inter-temporal general equilibrium. Then, production frontiers have to be interpreted as inter-temporal and movements along them are comparisons of different inter-temporal equilibria, not movements from one to another. General equilibrium models of this kind with several countries appear not to exist, though, if any do or some were to be devised, their relevance to explaining observed patterns of trade and income and to policy recommendations for developing countries would need to be demonstrated. A second escape is the small country assumption. World prices for all goods are assumed to be given and then so is the production frontier. But the purpose of the theories of Ricardo and of Heckscher and Ohlin, to explain trade, is abandoned. The third escape is to assume that capital can be treated as a malleable substance i.e. to deny the problem. In this case the neo-classical theory of international trade can be preserved unchanged as an economic phantasy.

In the H-O theory the dependence of the production frontier on prices takes a special form, the dependence of the endowment of the factor, capital, on prices. The reasoning is the same as used for the production frontier. Capital goods are produced, hence their prices depend on the prices of factors, and they are factors, themselves. Hence the endowment of the factor, capital, depends on prices. Various attempts to find a way of measuring the stock of capital independently of prices have been tried without success and it is now accepted that it cannot be done.

## **II. The Balance of Payments**

The distinction between short and long run production frontiers requires that comparisons be regarded as changes over time. In contrast, most of neo-classical trade theory consists of comparative statics. But change includes changes in capital stock, at least its composition, if capital

is not assumed to be a malleable substance, and hence investment. Investment entails saving and, together, the two lead to the discussion of growth. Standard neo-classical trade theory has no place for these concepts. Krugman and Obstfeld, whose textbook is typical in this regard, have no reference to saving, investment or growth in the part of their book dealing with the theory of trade; all such references occur in the part dealing with the balance of payments. The book by Helpman and Krugman does not discuss the balance of payments, since its purpose is to explain how neo-classical theory with product differentiation and increasing returns can account for some of the phenomena that ordinary neo-classical theory cannot, and, therefore, has no references to these quantities either.

The non-economist might think it odd that precisely the part of international economics dealing with production should have no place for investment and saving, and that it cannot, therefore, be used to discuss the balance of payments, one component of which, the trade balance, is equal to the balance of saving and investment. The result is a dichotomy in international economic theory evident in every textbook on the subject; trade and the balance of payments are discussed separately with different concepts and assumptions and no part of the book provides a synthesis or even an indication of how the two can be united on a common set of concepts and assumptions.

One consequence of the dichotomy is that orthodox prescriptions for trade policy and for improving the balance of payments lead to stagnation rather than growth. Developing countries are more affected than the developed countries since they are more likely to pursue adjustment and stabilisation programmes prescribed by the World Bank and the IMF. Adjustment programmes commonly require countries to reduce trade barriers, if they have not done so already. Stabilisation programmes are intended to improve the balance of payments by reducing the trade deficit. The former are purportedly justified by the standard neo-classical trade theory; the latter by improvements that follow from reducing domestic absorption. The normal outcome is that some of the country's industries succumb to foreign competition, their capital stocks fall idle and are eventually lost. At the same time consumption and investment are restrained so the replacement of the lost jobs is deferred until investment recovers. Investment may recover slowly, if at all. For neo-classical trade theory the problem does not exist, as already pointed out; either "resources" are allocated more efficiently by a movement along the production frontier or investment is certain to take place, provided the markets are free and competitive. In reality, the increased competition from foreign producers may deter domestic investment, and in several

developing countries investment has declined following trade liberalisation and never recovered. Then the wealthy of the countries often prefer to take their money out, if they can, and, incidentally, finance the US trade deficit.

### **III. Prices and Comparative Advantages**

#### **Prices in Domestic and Export Markets**

One element of the notion of comparative advantages is that any set of relative prices of goods, at least over a broad range, can be reached by appropriate factor prices with competitive markets and all factors fully employed. (If the number of factors is smaller than the number of goods, the degrees of freedom of the prices of goods will normally be the number of factors. Moreover, not all countries produce all goods.) From this element follows the essential notion of comparative advantages, namely that equilibrium in free trade is reached through adjustment of factor prices until the relative prices of goods are the same in all countries, with all markets competitive and all factors fully employed.

This prerequisite, that relative prices of goods, transport costs and trade barriers aside, be the same in all countries, is contradicted by the evidence. For a long time this “law of one price between countries” seemed too obvious to need verification; it seemed obvious that, if markets are competitive, profit maximisation and arbitrage will prevent price disparities. Taking the same reasoning further leads to the stronger conclusion of “purchasing power parity for tradables in its absolute form”, namely that prices of tradable goods in different countries, compared at the going exchange rates, will be the same. But doubts began to arise when tests showed that purchasing power parity was not valid; comparisons of movements of price indices and exchange rates of different countries showed disparities that were too great to be explained by the characteristics of the indices, notably their inclusion of untradables and differences between countries in their composition.

Direct comparison of prices in several countries of certain goods by Isard in 1977 gave direct evidence against the “law of one price”. Isard compared the prices of five commodity groups, ceramic tiles, soap, steel bars, tyres and wallpaper, in Canada, Germany, Japan and the US. He found that unit values fluctuated erratically, but regressions of the ratios of unit values of US imports and exports showed significant dependence on exchange rates for Germany and Japan, though not for Canada. Since then a

number of studies have given similar results and have confirmed that similar price disparities are common among manufactures.<sup>23</sup>

The first question in assessing the consequences of the divergence of the actual behaviour of prices of goods from the “law of one price” as given earlier is, is it so great as to make the “law” untenable and, hence, to negate comparative advantages even as an approximation to reality? Since no obvious, extraneously given magnitude seems available as a criterion for deciding the question, a criterion can be devised from comparisons of the prices of different goods. For, if the prices of certain goods are fairly uniform from country to country, large price discrepancies are not inherent to international trade and should not, presumably, occur for other goods. So, if they do occur, the possibility exists that some other mechanism is at work.

Such uniformity is the case for many primary products and for products, like plywood, that are only slightly processed, but not for manufactures.<sup>24</sup> The daily quotation in business newspapers of prices of certain raw materials and the news on their movements usually presuppose that these prices are much the same around the world, even if the prices in long term contracts differ from spot prices. In contrast, the prices of most manufactures vary and are the reason for the differences in the movements of different countries’ price indices in the first place. Hence, if the theory of comparative advantages is to be preserved, some special reason must be found why prices of manufactures vary from country to country without invalidating the “law of one price”.

In the opinion of a number of economists such a special reason is to be found in product and brand differentiation, though, again, the evidence is against it. According to this opinion, the effect of differentiation is that similar goods are not perfect substitutes. Isard, for instance, says, ‘With widespread product diversification, most manufactured goods face finite elasticities of demand and are priced under conditions of imperfect competition’.<sup>25</sup> The argument, then, is that price differences between countries merely reflect product differentiation or differences of brand, and that the prices of two products that are similar but differentiated in some way may vary relative to each other.

In such broad terms the argument is insufficient. The assumption that elasticities are finite is not enough to reach a conclusion since it puts

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<sup>23</sup> Dornbusch, Krugman, Krugman (2), Marston, Yang.

<sup>24</sup> Yang.

<sup>25</sup> Isard (2). p.60.

no limit to what elasticities can be. For example, if the price elasticities of substitution between two goods is greater than one, their prices will be equal in equilibrium. The argument is, moreover, irrelevant if the same brands and models of goods are priced differently in different countries. This is the phenomenon that prompted Krugman's original paper<sup>26</sup>, which seeks an explanation as to why the prices in the US of BMW and Mercedes motor cars remained stable in dollar terms when the dollar rose to a peak of DM3.48 in early 1985 and then fell to MD1.50 in 1990. Krugman<sup>27</sup> also shows that the phenomenon was general in the sense that the US price index of imported manufactures moved almost exactly like the general US index of prices of manufactures, which can not be plausibly explained by the finiteness of price elasticities. Moreover, Marston's conclusion, that Japanese exporters tried to keep their dollar prices stable in the US, is consistent with Krugman's observations but not reconcilable with the elasticities argument.

The reason why the "law of one price between countries" fails for manufactures but holds for primary products appears to be that brand names are important in selling the former but not so for the latter. One of the two mechanisms that were believed to ensure that the "law" held under competition is profit maximisation, according to which a firm sells in whichever market offers the highest price. It assumes that the firm is indifferent to other considerations, notably market share. But that is not how firms with brand names behave. They regard market share as costly and difficult to acquire and not to be surrendered lightly. A firm that can not immediately increase its output is unlikely to shift a large part of its output from domestic to foreign sales since regaining the lost market share later will be costly and may be impossible.<sup>28</sup> It would, for the same reason, refrain from big price increases, which would equally be a surrender of market share.

The second mechanism, arbitrage, fails as well. It presupposes that the buyer is indifferent from whom he buys and the producer is indifferent as to who sells his goods. Consequently arbitrage with brand name products, though it does occur, is negligible. Producers are not indifferent as to who sells their products, because they have reputations to protect and guarantees and service agreements to fulfil. Buyers have corresponding motives for buying direct from the producer or from authorised dealers and retailers. Brand name goods sold at low prices outside the usual channels are often

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<sup>26</sup> Krugman

<sup>27</sup> Krugman (2).

<sup>28</sup> Krugman (2).

suspected of being counterfeit, having sub-standard components or of not being backed by guarantees and service.

### **Summary**

The argument of this article can be stated as follows. At present policies regarding international trade, in particular the advocacy of reduction of trade barriers, are formulated on the basis of neo-classical theories that have no empirical support. The theories are either in conflict with reality or do not yield conclusions that can be tested. The H-O theory with two factors is refuted by the Leontief Paradox and by the conclusion that factor prices must be equalised. It is also incapable of explaining why trade is so rarely free. Increasing the number of factors and allowing production functions to differ between countries enables neo-classical theory to escape this problem, but renders it incapable of making specific statements about the pattern of trade and the prices of factors. At its most general, following Haberler in representing economies as convex production sets, even factors are removed.

These problems are merely symptoms that the theories are fallacious. The main fallacy is to ignore that capital goods are produced and, hence, that a country's endowment of capital and its production frontier depend on their prices. The marginal relations on which the theories depend to determine prices and trade themselves depend on prices. But the theories are also fallacious in describing a world that does not exist. Prices of goods are not equal in different countries, even allowing for trade barriers and transport costs, though the markets in these countries may be competitive. It seems that markets do not behave in the way the theory supposes. The question arises, how much confidence do people put in these theories? No serious effort has been made to compile the list of factors that should figure in the H-O theory, or even to state whether they outnumber goods or not, although the answers are supposed to have important consequences. These are not indications of conviction, despite the zeal with which the policy consequences are preached.



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