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## Twentieth Century Landmarks in the Economics of International Trade \*\*

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### 1. Introduction

Landmarks are easy to identify because by definition they are conspicuous features. But the task of selecting the most important ones among them in a branch of economic science which saw a tremendously fruitful century is not an easy one. In carrying out this exercise, I have made use of two standards. First of all, the finding or paradigm in question must represent a breakthrough, a leap which significantly increased the stock of knowledge that was available till then. Secondly, it could justifiably claim to have had a significant influence at the scientific and/or policy level. The eleven contributions briefly sketched in this paper meet those two standards.

Passage of time usually gives us a better perspective of ideas and events. From the vantage point of the end of the 20th century, it is easier to evaluate the importance of the theoretical and empirical contributions which appeared early on in the century. After all, the major ones have stood the test of time. But as the overview nears the *fin du siècle* one is forced to rely more heavily on one's own judgement in choosing among the paradigms vying with each other for attention. But a careful evaluation along

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\*\* Germán Calfat, Arvind Panagariya, Joe Tharakan and Jacques-François Thisse were of help to me in revisiting some of the landmarks of the economics of international trade. But the choice as to which landmarks are worth revisiting, was ultimately mine alone.

the lines of the criteria mentioned above suggests that the choices made here among the latter-day findings also stand a good chance of becoming durable ones.

Ascribing ownership of ideas to authors is sometimes easy. But often it is a delicate and difficult task. Some of the important advances described in this paper could be easily attributed to a single author or a group of core authors. But in other cases, they represent a line of thought which developed over a period of time and which went through considerable mutation. As a rule I have chosen to give prominence to the author(s) who triggered the chain of reasoning. But this was not easy either. In some instances, the breakthrough originated in the form of a generic model developed by one or more authors, and which contained the potential for extension to different branches of economics. Then other economists have used the concepts and tools from such generic models to engineer highly significant advances in the field of international trade. It has not been always possible to give credit to all the authors involved as one would have liked to do.

What is called the "pure" (or "real" as distinct from the "monetary") theory of international trade consists basically of answering three sets of questions. First, how can we explain the pattern of international trade and specialization? Second, what are the global welfare implications of trade? Third, how does trade affect the allocation of resources and distribution of income in the trading countries? Inevitably, the major advances selected for review in this article are in one way or other related to these problems.

The nature of scientific discovery is a controversial and fascinating topic - a subject to which we will briefly return in the last section of this paper as we speculate about the shape of things to come. Albert Einstein believed that "the human mind has to first construct forms, independently, before we can find them in things". Jan Tinbergen argued that "checking every theory by observation and measurement would imbue the researcher with a due sense of proportion". As the major breakthroughs in the economics of international trade show, both theoretical reasoning and empirical analysis led to remarkable contributions in this field during the course of the 20th century.

## 2. Landmarks of the 20th Century

### A. The Heckscher-Ohlin Theorem

The 20th century was still very young when Professor Eli Heckscher published, in Swedish, a path-breaking article in a 1919 issue of *Ekonomisk Tidskrift*. More than 30 years elapsed before that article was translated into English and appeared in 1950 under the title, "The Effect of Foreign Trade on the Distribution of Income". In a pivotal part of this article, he argued that, "a difference in the relative scarcity of the factors of production between one country and another is ... a necessary condition for a difference in comparative costs and consequently for international trade. A further indispensable condition is that the proportions in which the factors of production are combined shall not be the same for one commodity as for another" (Heckscher 1950, p. 272-300). But long before Heckscher's article became accessible to the non-Swedish speaking public, the essential ideas contained in them were further developed and elaborated in English by another famous Swedish economist (Heckscher's student and a latter day Nobel laureate) Professor Bertil Ohlin. It is mainly through the writings of Ohlin (1933), and further technical contributions made by Professor Samuelson (another Nobel laureate) of M.I.T., that one of the most influential paradigms in international trade theory - the factor proportions theory or the so-called Heckscher-Ohlin theory - grew into its full-fledged form.

At the very core of the static version of the Heckscher-Ohlin theorem is the simple sounding proposition that the commodity composition of trade between countries will be determined mainly by the concordance of the factor endowment of the trading countries with the relative factor intensities of the products traded. In other words, a country with high endowment of labour relative to capital, will export labour intensive products to a country with a high endowment of capital relative to labour, and vice versa.

What explains the power and the influence of the Heckscher-Ohlin theory? In his celebrated book, *An Inquiry into the Nature and Causes of the Wealth of Nations*, Adam Smith (1776) had already shown that countries specializing according to absolute advantage stand to gain mutually by entering into trade with each other. In his book, *On the Principles of Political Economy of Taxation*, David Ricardo (1817) came up with another truly

astounding finding. He showed that even if a country did not possess any absolute advantage, that country and its trading partner can gain if both countries specialize and trade according to their *comparative* advantage. What mattered is that before trade the two countries had different relative price ratios. The direction of trade, and the gains from trade, arose from differences in opportunity costs of the products. The Heckscher-Ohlin theorem explained the reasons behind comparative advantage in terms of factors of production: labour *and* capital. Further, the welfare implications of the theorem which postulated free trade as one of its necessary conditions, provided a powerful argument against protectionism. Some politicians and many lobby groups might rail against trade liberalization. But the idea of free trade has slowly gained increasing acceptance in policy making circles. The average import tariffs in the immediate post World War II period was around 40%. Now it is less than 5 per cent. While the arguments derived from the Heckscher-Ohlin theory can take some credit for this development, the fact remains that in the case of North-South trade especially, it is the liberalization along the lines indicated by the Heckscher-Ohlin theory which faces considerable political hostility. The reasons for this will become clear as we review further developments in the trade theory.

### B. Stolper-Samuelson Theorem and Samuelson's Factor Price Equalization

Although the theory of comparative advantage showed that both (all) trading nations gain under free trade, casual observation suggests that there are "winners" and "losers" within the countries concerned, as trade is liberalized. Wolfgang Stolper and Paul Samuelson (1941) proved that under certain assumptions, trade does split a country into clear "winners" and "losers". The assumptions used in this two country - two factor - two goods ( $2 \times 2 \times 2$ ) model are similar to those used in the Heckscher-Ohlin theorem. In addition they assume that the opening of trade raises the relative price of one of the goods. Armed with those assumptions, Stolper and Samuelson were able to show that moving from autarky to free trade clearly raises the returns to the factor used intensively in the rising-price industry and lowers the returns to the factor used intensively in the falling-price industry, regardless of which good the sellers of the two factors prefer to consume. The last part of this finding has important income-distribution implications. In fact it holds that the opening of trade must enable one of the two factors to buy more of ei-

ther good, and it will make the other factor poorer in its ability to buy either good. Thus Stolper-Samuelson theorem links international trade to domestic distribution of income.

More surprising theoretical findings were under way. Professor Samuelson (1948; 1949) published two papers which showed that under certain highly restrictive assumptions, free trade would equalize factor prices completely throughout the world. It implies that labourers will end up earning the same wage rate in all countries, even in the absence of labour migration between countries, but on condition that free trade is allowed. In other words, the factor content in the goods (and services) being traded will have similar effect as labour migration. Samuelson (1949) himself noted that "it would be folly to come to any startling conclusions on the basis of so simplified a model and such abstract reasoning". But he went on to add poignantly that "strong simple cases often point the way to an element of truth present in a complex situation". The large amount of literature that developed around the two publications made explicit the whole range of assumptions - some of them clearly unrealistic - that are required for the validity of factor price equalization. Nevertheless, the often heard concern about the decline of real wages in the industrialized countries is implicitly (and sometimes explicitly) related to a possible tendency suggested by the above findings.

### C. The Leontief Paradox

As we saw earlier, the central proposition of the Heckscher-Ohlin theory is that a country tends to export those goods which use intensively the country's abundant factor and to import goods which use intensively the country's scarce factor. This proposition was put to an empirical test by Wassily Leontief (1953) (who later won the Nobel Prize). Leontief computed the ratios of capital stock to the number of workers in the U.S. export, and import-competing industries for the year 1947. As the United States was assumed to be more capital abundant than its trading partners, the Heckscher-Ohlin theory predicted that capital intensity of the U.S. exports would be higher than the capital intensity of the U.S. imports (proxied by the U.S. import-competing industries). But to the astonishment of Leontief and everyone else, the results showed that the opposite was the case.

Leontief's findings immediately attracted widespread attention and triggered considerable amount of theoretical and empirical research. One

stream of that research attempted to test the validity of the paradox and/or reconcile Leontief's findings with the H-O theorem. Among the well-known contributions in this area, those made by Leamer (see especially, 1984) are worth special mention. Another branch of the post-Leontief paradox literature started to propose alternative explanations for comparative advantage. These included human capital endowments, natural resources, factor intensity reversals, technology gap trade, preference similarities, economies of scale, etc. This literature is vast and can neither be summed up here, nor its authors given the credit they so richly deserve. It is the fact that Leontief's findings set off an extensive, and enriching search for alternative theories, rather than its empirical contents which makes the "paradox" a landmark in the economics of international trade.

#### D. Intra-Industry Trade: Verdoorn's Findings: Grubel and Lloyd Measures

Professor Verdoorn (1960) found that specialization and trade subsequent to the formation of the Benelux customs union took place more *within* rather than *between* industries. The importance of this finding took time to sink in. Balassa (1963) and Kojma (1964) found intra-industry trade to be important. During the late 1960s and early 1970s, the contributions of Grubel and Lloyd (1975), particularly in terms of the measurement methodology concerning intra-industry trade attracted increasing attention to this phenomenon. When empirical research showed that most of the international trade in manufactures between advanced countries was of intra-industry nature, the need to re-examine some aspects of the traditional Heckscher-Ohlin theory of comparative advantage became clear. The real significance of the above finding consisted of the fact that within the narrow confines of the Heckscher-Ohlin world, there was no room for intra-industry trade (IIT), i.e. the simultaneous exports and imports by countries, of products which are very close substitutes for each other in terms of factor inputs.

Like the Leontief paradox, the intra-industry trade analysis is a clear case where an unexpected empirical finding triggered important further contributions including an outpouring of additional empirical investigations and significant theoretical contributions (See Greenaway and Milner, 1986, for an overview of the earlier contributions). While empirical analysis made major contributions to our understanding of intra-in-

dustry trade, it soon came up against the difficult problem of "categorical aggregation", i.e., the grouping together under the same classification of "industry" or "commodity", products which have heterogeneous characteristics particularly in terms of factor intensity. Subsequent theoretical developments provided a way out of this morass and helped to advance the empirical analysis of IIT. We will briefly visit those theoretical developments in the section on "Imperfect Competition models of International Trade". Suffice it to say here that those developments suggested the distinction between horizontal intra-industry trade and vertical intra-industry trade. The former, based on the IIT models developed by Krugman (1979) and Lancaster (1980), which in turn relied on the conceptual breakthrough engineered by Dixit and Stiglitz (1977) and Lancaster (1979), are associated with preference diversity and decreasing average costs. Conventional wisdom holds that such IIT is likely to take place between countries with high, and similar income levels. The vertical intra-industry trade occurs between countries with different factor endowments. According to the models of Falvey (1981), and Falvey and Kierzkowski (1987); high "quality" varieties (assumed to require high capital intensity) are exported by countries with high capital endowment and "low quality varieties" which have low capital intensity are produced and exported by lower income, relatively labour abundant countries. Various methods have been used to measure vertical and horizontal IIT. The principal approach made use of so far has been unit value indices which measure the average price of a bundle of items from the same general product grouping (see for e.g. Greenaway, Hine and Milner, 1995). There are certain problems associated with the use of unit value indices. Nor should the possibility of horizontal IIT between countries with highly different factor endowments be neglected. Tharakan and Kerstens (1995) use indices other than unit values to distinguish between the vertical and the horizontal intra-industry trade. They also show that horizontal IIT generated by theory-consistent variables does exist in the "North-South" context. The measurement of Marginal Intra-Industry Trade (MIIT) has also attracted empirical attention as it is believed to be a better tool in analyzing factor market adjustments due to trade liberalization (see e.g. Hamilton and Kniest 1991, Brühlhart 1994).

In fact one of the important reasons why the intra-industry trade attracted considerable interest is the possible implication of such trade for factor market adjustment that is required as a result of trade liberalization. Mainly because of the relatively smooth adjustment experience of the European Common Market in the 1960s which is believed to have

been facilitated by the growth of intra-industry trade that followed the integration process, there is the belief that IIT generally entails less severe structural adjustment pressures than an expansion of inter-industry trade flows. But a careful review of the available empirical evidence leads this author to conclude that much stronger proof than what is currently available is required to accept such a position.

#### E. Towards a Generalized Theory of Distortions and Welfare: Meade's Insight and the Bhagwati-Ramaswami Hierarchy

In spite of the normative assumptions of perfect competition and free trade used in the trade theory, economists have been well aware of the "second best" nature of the real world where distortions such as factor market imperfections, product market imperfections, consumption imperfections and trade imperfections exist. An important stream of international trade theory literature has paid attention to this problem. It has dealt mainly with the welfare effect of such distortions and the appropriate policy responses they call for.

The domestic distortions created by inter-sectoral differences in wage rates caused by non-competing labour groups and their effect on welfare attracted most of the attention in this context for a very long time (for an analytical overview of the long term development of this particular aspect of the question see Irwin 1996, chapter 10). The crux of the problem is as follows: if relative prices are altered due to inter-industry differences in domestic wage rates arising from non-competing groups (say differences in labour union pressures) specialization would not take place according to comparative advantage and the predicted gains from trade may not materialize. This raises the question of some form of protection to shift labour from low-productivity industries to high-productivity industries. Taussig (1906), Manoilescu (1931), Ohlin (1931), Viner (1932) and Haberler (1950) had analyzed the question in the course of the first half of the 20th century.

Meade's (1955) classic contribution focused on the optimal conditions of domestic production and trade and examined whether cases of domestic "divergences" between marginal values and marginal costs might not be in part compensated by trade restrictions. His superb (and complex) reasoning viewed the problem in terms of the world welfare. He did not find protection to be the answer, and also noted that it will create a new

divergence unrelated to the original problem. Corden's (1957) significant contribution built on Meade's analysis in evaluating a production subsidy and an import tariff as means of protection. Hagen (1958) re-examined the question of the distortion caused by wage differentials and concluded that although protection which allows the existence of the import-competing manufacturing industry (which has to pay higher wages) will increase the real income of the economy, a subsidy combined with free trade will be a better solution.

The time was ripe for putting forward a simple, powerful and unifying principle of distortions and welfare which could also help to rank the policy options available in this context. The breakthrough, when it came, turned out to be the result of the research of two young economists, then working in New Delhi. In an article entitled "Domestic Distortions, Tariffs and the Theory of Optimum Subsidy", published in the *Journal of Political Economy*, Bhagwati and Ramaswami (1963) viewed the problem from the policy-relevant angle of domestic (rather than world-) welfare. The principle which they put forward for an optimum solution in cases of distortions was characterized by the equality of the foreign rate of transformation (FRT), the domestic rate of transformation (DRT) and the domestic rate of substitution in consumption (DRS), i.e.  $DRS=DRT=FRT$ . Bhagwati and Ramaswami showed that if there is a distortion (if the above equality does not hold), the Paretian First-best policy is to intervene with a tax (subsidy) at the point at which the distortion occurs. Further, they established, in terms of maximizing national income, a hierarchy of policy tools for correcting distortions. The first-best policy is an optimal employment subsidy to manufacturing; the second-best was an optimal production subsidy; and then came an optimal tariff. Harry Johnson (1965) rightly observed that "... to these two authors belongs the credit for reducing a mass of *ad hoc* arguments concerning tariffs to a simple application of second-best welfare theory".

While the central propositions of Bhagwati and Ramaswami (1963) are valid, Kemp and Nagishi (1969) subsequently demonstrated that the subsidiary proposition that a tariff which improves the free-trade equilibrium may not exist at all, was incorrect. Bhagwati, Ramaswami and Srinivasan (1969), while accepting this critique, have shown that the Kemp-Nagishi results are in fact special cases of one of the theorems in the theory of second-best. In a landmark article Bhagwati (1971) went on to unify the important body of literature on the welfare economics of trade into 7 major propositions which constitute a generalized theory of

distortion and welfare. These propositions also clearly demonstrated the duality relationships between policy rankings under market imperfections, and policy rankings to achieve noneconomic objectives. As such they remain highly relevant in the major, trade policy related debate that has developed especially after the tumultuous WTO session of Seattle in 1999. In addition, they provide useful general guidelines to policy makers at the national level, to evaluate the welfare effects of the protectionist demands which they persistently confront.

#### F. Preferential Trade Liberalization: From Viner's Theory of Customs Unions to the Second Wave of Integration Theories

While multilateral trade liberalization was in the process of making progress in the post World War II period, another form of more selective trade liberalization was outflanking it. This consisted of preferential trade arrangements (PTAs) which are often referred to in the literature as regional trade arrangements (RTAs). Preferential trade liberalization consists of the process which reduces economic barriers between a group of countries (often, though not necessarily, of the same region), but not between those countries and the rest of the world. They could take the form of a free trade area (free trade between members), customs union (free trade between members and a common external tariff), common market (customs union plus the free movement of factors of production), or an economic union (common market plus the harmonization of all economic policies). PTAs are not new. But towards the last part of the 20th century, they really started to proliferate. Laird (1999) reports that by mid-1998, there were 102 such agreements in force, compared to 40 in 1990! By the middle of the 20th century, economists had already developed certain important tools to appraise the welfare effects of PTAs. The advent of the "new" wave of preferential arrangements was matched by the emergence of a second generation of integration theories which skillfully incorporated some of the new developments in trade-related theories and came up with new insights and tools of analysis. Panagariya (2000) provides a comprehensive single source synthesizing and rigorously evaluating the large body of literature covering the old and new themes in this field. In spite of the large scope and the complexity of the stock of literature that has developed around the theme, the crucial contributions can be somewhat arbitrarily grouped around two important questions: (a) What are the welfare implications of preferential trade liberalization to PTA members? (b) What is the relationship between prefer-

ential trade liberalization and multilateral trade liberalization? But such a streamlining inevitably leads to some loss in conveying the richness of the findings. In addition, a compact presentation such as this one has to leave out some of the important nuances in the findings, which are specific to the *type of PTA* considered.

Following the publication of Jacob Viner's (1950) *The Customs Union Issue*, much attention came to be focused on the Vinerian comparative static effects of trade creation and trade diversion. But economists such as Meade (1955), Gehrels (1956-57) and Lipsey (1957) called attention to the fragility of the assumptions underlying the above concepts and the problems connected with their use. An important point that emerged was that the benefits (costs) of preferential trade liberalization depend not only on the extent of trade creation (trade diversion), but also on the magnitude by which costs are reduced (increased) in each unit of newly created (diverted) trade. While these and other important additional contributions have nuanced the comparative static effect concepts, calculation of the magnitude of trade creation and trade diversion, often supplemented by estimates of dynamic effects such as economies of scale, efficiency improvement and investment creation have often served as convenient tools for policy makers arguing in favour of (and less often, against) PTAs.

The second wave of integration theories has brought forth more ingenious - and more contested - ideas. According to Ethier (1998), non-discriminatory trade liberalization, by making geographic distance more important relative to trade barriers, might be expected to cause a country's trade to become more regional. Transport costs have also more directly entered into the argument. Since most of the PTAs are in fact regional in nature, the transport cost between member states could be low. Hence, some economists (e.g. Krugman 1993) have argued that the proximity of the PTA partners will minimize trade diversion. By incorporating transport costs into their simulation model, Frankel, Stein and Weir (1995) develop (under restrictive assumptions) some scenarios in which PTAs consisting of proximate members ("natural blocs") lead to the same outcome as global free trade. But this line of argument in favour of some degree of trade preferences along "natural continental lines" has come up against robust rebuttal. One of the criticisms is that it ignores the "revenue transfer effect" of PTAs. Bhagwati and Panagariya (1996) show that given lower imports from a distant partner in a scenario of initial non-discriminatory tariff, a preference to that country will lead to a

smaller transfer of tariff revenue than to the proximate one which supplies higher imports. Panagariya (1998) makes the point that the benefit from trade in general, and particularly of preferential trade between trading partners, depends on the differences in costs, irrespective of the sources of these differences.

The development of endogenous trade policy models (which we will see in more detail later) has been of help in analyzing some important questions concerning PTAs. At least two of them need to be mentioned here: Do trade-diverting or trade-creating PTAs have a better chance of getting formed? Secondly, once a PTA is formed, will the (common) external tariffs tend to increase or decrease? Concerning the first question, the findings of Grossman and Helpman (1994, 1995) suggest that in cases where there is a relative balance in the potential trade between the partner countries, a trade-diverting PTA is more likely. Krishna (1998) who analyzed the question within an imperfect competition framework (using a Cournot oligopoly model) reaches a similar finding. The second question has yielded divergent answers. In a Krugman (1991) model, as the world is consolidated into fewer and fewer symmetric blocs, the market power of each bloc, and its external tariff rises. But Bond and Syropoulos (1996) find that this result is not inevitable.

Successful PTAs tend to enlarge with time. If that tendency is irreversible, preferential trade liberalization could ultimately become global trade liberalization. Baldwin's (1994, 1995) "domino effect" theory, which combines elements of new economic geography and endogenous protection, has yielded interesting insights concerning this question. Geopolitical or ideological motives might be the primary reason for starting a PTA. But once a successful PTA comes into existence, political economy forces enter into action. Any "shock" (for example the 1992 EC Single Market project) which disturbs the equilibrium by increasing the relative profitability of the firms within the bloc will encourage the firms located outside the PTA to lobby their governments harder for entry. If open entry is assumed, the PTA can expand to cover the entire world unless the non-economic costs of entry rise faster than the benefits of entry. But is this "domino effect" irreversible? Apparently not. Once the bloc reaches a certain size, insiders will have incentives to block the entry of additional members. At least that is the message of the findings of Andriamanajara (1999). In other words, the path to a world-encompassing free trade area through an ever-expanding PTA is not a viable option.

With the discussion about the domino effect of PTAs, we have already moved into the realm of the relationship between preferential trade liberalization and multilateral trade liberalization. The crucial question here is, in Bhagwati's (1991) language, whether PTAs are "building blocks" or "stumbling blocks" to world-wide multilateral trade liberalization. Recent theoretical contributions (Levy 1997, Krishna 1998) suggest that PTAs are unlikely to play the former role. This statement has to be nuanced, of course. What Levy's (1997) median voter model, for example, shows is that the creation of a PTA will not make a previously infeasible multilateral liberalization feasible. But the answer to the opposite of that question (whether PTAs will make a previously feasible multilateral liberalization infeasible) is ambiguous.

It is evident that the second wave of integration theories has not come up with clear-cut answers to some of the important questions related to PTAs. But it has, together with the earlier contributions in this area, significantly extended our understanding of the intricacies of an increasingly important phenomenon. The concerns expressed in the policy-making circles about the delay in getting another round of multilateral trade negotiations started; the flurry of PTA agreements that followed the Seattle failure; the increasing realization of the need to find a multilateral solution to the complex problem of "rules of origin" - all these point to the practical importance of the theoretical work in this area.

#### **G. Outward-Orientation and Development: The Shift Towards the Krueger-Bhagwati-Srinivasan View**

The vast majority of the people of the world live in low-income countries. Many of those countries obtained political independence after the 2nd World War. For them and for other low-income countries such as those in South America, the question of rapid economic growth and development is of paramount importance. In this context, a momentous debate on whether outward-orientation (OD) or import substitution strategy (IS) is appropriate for growth emerged and raged on for decades. It was (and remains) a debate with high-profile policy relevance. It is also closely meshed with important strands of growth theory and international trade theory. We shall limit ourselves to mentioning some of the crucial developments related to the trade theory and policy.

Early on in the developments efforts, a clear preference for import substitution strategies acquired dominance in the major developing countries. With the hindsight of history, Anne Krueger (1993) attributes three reasons for this development: (a) the colonial and/or economic dominance experience of the past which left many developing countries wary of taking the international trade route to growth and development; (b) memories of the Great Depression which triggered widespread doubts about markets and their functioning in the developed and the developing countries; and (c) the experience of the Soviet Union's apparently successful rapid industrialization under an import substitution strategy. Earlier academic research also threw doubt on the wisdom of an outward oriented policy. For example there was "export pessimism" concerning the products exported by developing countries. There was the doubt whether much response to price incentives existed in the developing world. The belief that the key to development was the accumulation of capital investments in the manufacturing sector also contributed directly or indirectly to a stance in favour of an import substitution strategy (for an elaboration of the above points, see Krueger 1997).

The developing countries were right in being wary about following the colonial pattern of trade, which could be hardly called free trade. But following the import substitution strategy turned out to be counterproductive. Through a stream of articles, books and debates, a small group of economists argued for a shift towards outward orientation policies. From the traditional trade theoretic point of view they stressed the efficiency-enhancing role of free trade in a static context. Secondly, they underlined the importance of international trade from the perspective of growth accountancy and intertemporal efficiency and welfare. They called attention to the institutional requirements. They accepted the theoretical possibilities which could inversely relate growth to openness, but discounted that danger. A string of detailed, country-by-country empirical studies initiated by NBER and OECD (for detailed synthesis of these studies see Bhagwati 1978; Krueger 1978; Little, Scitovsky and Scott 1970) brought in supporting evidence. Tools of analysis such as cost-benefit techniques, effective protection measures, domestic costs, etc. developed by economists such as I.M.D. Little and James A. Mirrlees, Harry Johnson, W.M. Corden, Bela Balassa and others, were of considerable use in yielding meaningful insights in the empirical studies. In short, these studies highlighted the excessive and wasteful level of protection that prevailed in a number of countries which followed the IS strategy and how they failed to attain the objective.

The very high rate of growth obtained by the East Asian countries which in general had a lower level of protection than most other developing countries also gave strength to the arguments of the proponents of the outward orientation strategy.

But dissenting voices are still clearly audible (see for example, Rodrik 1999). The East Asian experience which was already the object of a cause and effect debate drew more attention with the crisis which those countries experienced in the 1990s and the potential for rapid recovery which most of them are showing. But all in all it could be said that by the turn of the century, the advocates of outward orientation clearly held the upper hand.

#### **H. Imperfect Competition: Conceptual Breakthrough by Dixit and Stiglitz; Lancaster. International Trade Model by Helpman and Krugman**

As we saw in section 4, in addition to the problems faced by the intra-industry trade analysis at the empirical level, there was another difficult problem to be resolved. This consisted of the lack of formal models cast within the framework of general equilibrium analysis integrating the essential ingredients of IIT which the early, piecemeal theorizing had suggested. The breakthrough came when the modelling of scale economies and preference diversity in a general equilibrium framework provided by Dixit and Stiglitz (1977) and Lancaster (1979) triggered the development of models generating intra-industry trade. Such models provided a solid theoretical basis for intra-industry trade (Krugman 1979, Lancaster 1979). They also made it possible to neatly combine IIT with traditional Heckscher-Ohlin inter-industry trade. Initial major contributions in this direction are concisely summed up in Helpman and Krugman (1985).

At the heart of the imperfect competition models is the proposition that international trade can result from the tendency of average unit costs to decline when output increases. Such economies of scale internal to the firm (as distinct from the external economies dependant on the size of the industry) induce firms to specialize and trade even in the absence of differences between countries in their resources and technology. The presence of economies of scale usually signifies imperfect competition. In the somewhat misleadingly labelled "monopolistic competition" version of the theory, an industry contains a number of firms all producing



differentiated products. If we assume a two country model, neither country is able to produce the full range of manufactured products by itself if the firms want to take advantage of economies of scale. These firms set out as individual monopolists, but additional firms enter a profitable industry till monopoly profits are competed away. Consequently the equilibrium is affected by the size of the market. International trade creates larger markets (compared to the situation in autarky) which will support a larger number of firms. Each of those firms will be able to produce at a larger scale, and consequently at a lower average cost. The industries which are characterised by economies of scale and product differentiation will resort to intra-industry trade. But at the same time inter-industry trade will take place between the same countries in industries where the factor endowment-factor intensity concordance criterion is applicable. In addition to the traditional gains from inter-industry trade, the scale based intra-industry trade will make it possible to offer consumers in both countries greater variety of products at lower prices. The income distribution effects of the imperfect competition models of trade are somewhat different from those of the Stolper-Samuelson theory. As will be recalled, according to the Stolper-Samuelson model, trade hurts the scarce factors and benefits the abundant factors. But in the imperfect competition model, under certain conditions, this need not be the case. In fact both factors could gain when trade liberalization leads to intra-industry trade.

The large amount of theoretical and empirical work that has followed the above-summed up work cannot be reviewed here. But the imperfect competition models of international trade are an integral part of most of the standard text books in international economics. They have also been influential in decisions concerning the liberalization of trade in manufactures between industrialized countries.

#### **I. Endogenous Growth and International Trade: The Contribution of Grossman and Helpman**

Growth theory has a long history. Even in the case of what has come to be known as the "new growth theory", it would be unwise to attribute parentage to a single author. Nevertheless, it is safe to say that Romer (1987, 1990) deserves considerable credit for the rigorous incorporation of R&D theories and imperfect competition into the growth framework. But the major effort to integrate the theory of international trade with the

theory of endogenous growth within a general equilibrium framework perspective came from Grossman and Helpman (1990, 1991). The crux of their reasoning could be summed up (in an oversimplified way) as follows.

For Grossman and Helpman technological progress is central to endogenous and long-run economic growth. It is the prospect of reaping economic rents in imperfectly competitive product markets that motivates firms and entrepreneurs to devote resources to R&D. But additions to knowledge cannot be always appropriated by its owners. Technological spillovers occur and they permit successive generations of researchers to bring about yet other technological breakthroughs at lower resource costs, thus counteracting any tendency for profits to fall. Productivity gains are in this way sustained in the long run. How is this linked to international trade? When there is technological competition between countries, comparative advantage evolves over time. Innovators in different countries help to produce better, different cheaper (varieties of) goods. Thus in this model, resources devoted to industrial research have a decisive role in determining the pattern of trade.

But the determination of resource allocation is a complex problem in itself. The answer to that question depends on a number of factors. History or initial conditions might play a role. In more general terms, the interaction between factor composition, country size and research experience determines resource allocation patterns in the long run. From this construct, Grossman and Helpman derive a number of observations of trade policy interest, particularly in relation to encouraging R&D.

In developing the North-South part of the above story, Grossman and Helpman give considerable importance to the product life cycle theory. According to them the South's imitation of Northern technologies accounts for most of the North-South trade in manufactures. Their general equilibrium perspective helps the authors to see positive, as well as negative effects of this on the Northern technology activity. If the increasing Southern imitation of the Northern technology leads to a diminution of the share of the innovative products produced in the North, the remaining producers' (expected) earnings will rise. This will lead to an increase in the inventive activity in the North. But Grossman and Helpman also work out scenarios under which an opposite effect might be the outcome.

The endogenous growth approach to international trade has captured the imagination of a number of researchers. The rigour of the analysis is remarkable. A certain number of empirical studies have already been undertaken. Many more "empirical encounters" will probably take place. But it is still too early to make a full and balanced appraisal of the real contribution made by this particular way of linking trade and growth.

#### J. Political Economy of Trade Protection: From the Early Insights of Krueger to Endogenous Trade Policy Models

Most economists do not seriously contest the superiority of free trade over protection. Yet in practice we find that policy makers in most countries use some form of trade protection. Further, it is not difficult to see that certain lobbying groups seek protection, and gain from it. How can these facts be reconciled within a trade theoretic framework?

In an article published in the *American Economic Review*, professor Anne Krueger (1974) provided interesting insights into this phenomenon in terms of the political economy of the rent-seeking activities defined as lobbying activities generated by the existence of policy interventions such as import quotas or licences which carry windfall profits to the successful lobbyist. Bhagwati and Srinivasan (1980) analyzed the phenomenon of revenue seeking, where tariffs resulted in revenues which were then sought by lobbies. Bhagwati (1982) called such activities *directly unproductive (DUP)* activities. There is an interesting nuance here which deserves to be stressed. While DUP activities are directly unproductive as they yield zero output, one cannot exclude the possibility that ultimately they can turn out to be welfare increasing when they are triggered by suboptimal policy intervention.

The political economy of trade protection analysis has come a long way since its beginnings. Hillman (1982) developed the political function approach which used the premise that the authorities will use protective levels on the basis of political support motives. Hillman and Ursprung (1988) incorporated the foreign interest in the determination of a country's international trade policy into a model of political competition between candidates contesting for elective office. They envisaged foreign and domestic producer interests as expressing political support for a candidate via campaign contributions. The candidates in turn make

trade policy pronouncements to maximize political support from producer interests. Magee, Brock and Young (1989) attempted to develop the microfoundations of endogenous redistribution theory. They show within a general equilibrium framework, how lobbies and political parties interact to redistribute income through tariffs and trade restrictions. In this process, lobbying expenditures are the inputs and special-interest policies and wealth transfers are the outputs. Grossman and Helpman (1994) extended the analysis further. In their model, the government is concerned with campaign contributions and with the welfare of the average voter. The model also includes a set of organised special interest groups that care only about the welfare of their members. They do not see the contributions made by the interest groups so much as investments in the outcomes of elections, but more as a means to influence government policy. The central outcome of the Grossman-Helpman model is that the structure of trade protection is bound to reflect the outcome of a competition for political favours. Further, they derived an explicit formula for the structure of protection that will emerge in such a setting.

One particular strand of the political economy of trade protection analysis has assumed considerable importance in recent years. It deals with contingent protection, specially anti-dumping measures (for an overview, see Tharakan 1994). The reasons for this are evident. While tariffs are reduced or eliminated through successive multilateral trade negotiations, the quantitative restrictions are slated to be phased out, and the difficult problem of protection in the agricultural sector beginning to be tackled, the use of anti-dumping measures is proliferating spectacularly. The current WTO definition of "dumping" contains ambiguities and the anti-dumping measures are being used, in a number of cases as a protectionist tool. The political economy analysis of contingent protection has brought to wider attention the dangers posed by this form of unilateral, selective form of protection. It also brings together questions directly concerning firm strategies and trade policy decisions.

#### K. Reinventing Economic Geography: Trade and Space

What is new about the "new economic geography"? After all, economists like Hirschman (1958), Myrdal (1957) and Perroux (1955) had analyzed in depth the relationship between economic development and phenomena such as core and periphery, backward and forward linkages,

growth poles, etc. Geographers, urban economists, transport economists, location theorists and others have appraised the problem of location of production in space and the economic implications of distance and transaction costs. But the conceptual breakthrough in the imperfect competition analysis which took place in the last quarter of the 20th century triggered original ways of even more rigorously examining the problem of agglomeration and dispersion of workers and firms in national and international space (see Thisse 1995 for a succinct explanation of the inter-relationship between economics and geography). This in turn has added new dimensions to some branches of economics, including that of international trade.

As we have already seen, the imperfect competition models of international trade have stressed the importance of increasing returns to scale. Large markets tend to attract industries which yield scale economies. But what makes markets large? The presence of a large number of firms could do that, for example. Obviously, here we are in the realm of circular causation. Location of economic activity tends to become a reinforcing process.

It is convenient to distinguish, *à la* Baldwin (1999), between the vertically linked-industries model and the foot-loose labour models of economic geography. When imperfect competition is present, vertical linkages between upstream and downstream industries can be the driving force behind agglomeration. Faini (1984) built a two sector, two region model in which the existence of increasing returns to scale in the production of non-traded intermediate inputs was shown to give rise to a cumulative divergence of regional growth rates. It represented an attempt to integrate some of the earlier theoretical insights about the problem. In addition, it provided a framework within which the empirical pattern of exports and investment in both developed and underdeveloped regions can be explained.

The role of the linkages between upstream and downstream industries has been clarified more explicitly in later models. For example, Venables (1996) finds that a circular process leading to economic differentiation between *nations* can still be the outcome even under the assumption of international immobility of labour, if there are intermediate goods produced with economies of scale and if transport costs are important. Here, the demand emanating from a large manufacturing sector creates a large market for intermediate products. This in turn leads to a concentration of

intermediate production in that country. Economies of scale will transmit the cost advantage to the downstream production. This will, of course, further strengthen the countries' cost advantage.

Krugman's (1991) model (which was foreshadowed by Krugman 1980) in fact consists of generic set and illustrates the footloose-labour aspect version of the new geographic models. It assumes an economy consisting of a region with a perfectly competitive agricultural sector and an imperfectly competitive manufacturing sector. Farmers are assumed to be immobile while industrial workers spatially follow higher real wages. Firms producing manufacturing goods want to concentrate production geographically in order to reap international economies of scale, and to save on transport costs by being closer to markets and suppliers. But access to markets and suppliers would be best where other firms also locate. This circular process can create agglomerations. But given the assumed immobility of the agricultural labourers there could be also an incentive for the firms to locate in the regions with fewer local competitors.

Fujita (1988) developed a spatial version of the Dixit-Stiglitz Chamberlinian monopolistic competition model. He demonstrated that market processes based on price interactions alone can generate spatial agglomeration of economic activities. The welfare implications of monopolistically competitive equilibria were also analyzed in depth.

Towards the end of the 20th century a number of contributions were being made which linked the "new economic geography" to trade. Here again, in a short article, it is difficult to give credit to all those who deserve it. Only some examples can be mentioned. Amiti (1998) examined, in a general equilibrium context, the relationship between the size of a country and the characteristics of the goods it produces and trades. She found that the tension between the "market access" effects and "production cost" effects determines the pattern of specialization and trade. Ricci (1999) has investigated the relationship between agglomeration and specialization, and the role of comparative versus absolute advantage. His model yields some interesting results. For example, he finds that agglomeration in one country reduces its specialization within the increasing returns to scale industry. Firms from *all* sectors are attracted to this location, but relatively more from the sector in which the country has a comparative disadvantage. Some (for e.g. Davis and Weinstein 1999) have attempted to empirically test the relative importance (compared to

the Heckscher-Ohlin model) of the new economic geography model in international specialization.

Surveying the field of "new economic geography and trade" one cannot escape the impression that it is still largely in the phase of demonstrating "special cases". But this may be changing. For example, Ottaviano, Tabuchi and Thisse (2000), using a different framework than the one that has become the hallmark of the fledgling orthodoxy in this field ("Dixit-Stiglitz, iceberg, evolution, and the computer") confirm the general trend of insights in this field, in addition to obtaining new results. The significance of this is that the main results in the literature may not depend on the specific modeling choices made. The above authors suggest that their findings might point to the existence of a whole class of models for which similar results might hold. In any case, there is no doubt that the new economic geography models of trade have contributed interesting insights. The geographical organisation of the economy is seen in these models as the outcome of opposing forces of agglomeration and dispersion, with the main concepts used being those of equilibrium and externalities. This is just as important to international trade theory as to some other branches of economics.

### 3. The Shape of Things to Come

What will be the major developments in the economics of international trade during the 21st century? In this area, there is of course no way to predict the future with an acceptable degree of accuracy. I shall first briefly present three reflections about the nature of discoveries in general, and then speculate a bit about the likely directions which this particular branch of economics is likely to take in the decades to come. The general reflections concern first the role of concepts and tools; secondly the role of hazard, and thirdly the problems posed by the changing nature of the world we live in.

In his unsettling book, *Imagined Worlds*, Freeman Dyson (1997) identifies two kinds of scientific revolutions: those driven by new tools and those driven by new concepts. Dyson argues that Thomas Kuhn (1970), in his famous book, *The Structure of Scientific Revolutions*, misled a whole generation of students and historians of science into believing that all scientific revolutions are concept-driven. According to Dyson, during the last

500 years, there were about 3 times as many tool-driven revolutions as concept-driven revolutions in exact sciences. The situation is clearly not the same in social sciences. Nevertheless, if we interpret the notion of tools broadly enough to include specific analytical approaches such as input-output analysis, numerical simulations, etc., the picture changes somewhat. Leontief's findings relied heavily on input-output methods. The new economic geography models often make use of numerical simulations. Further, the widespread access to an important modern tool - computer - has vastly extended the reach of scientific research in different areas including the economics of international trade. Nevertheless, I tend to believe that the concept-led revolutions are likely to retain the dominance they have displayed in the economics of international trade in the decades to come.

Discovery by hazard is a story that is very much entrenched in the history of science. There is, of course, the conventional distinction between the *process* of discovery and that of *proof*. The often heard claim is that logic and reason apply only to the latter, while discovery is a matter of chance. But this is not a view shared by all. After analyzing the history of some of the famous "chance discoveries", Root-Bernstein (1988) concluded that "... the record reveals that the discovery is not a fluke but the inevitable, if unforeseen, consequence of a rational and carefully planned line of inquiry initiated by a scientist". In other words, there must be a logic, or at least a set of strategies in discovery. Verdoorn's finding of intra-industry trade came out of a carefully planned line of inquiry, although the finding itself was unforeseen.

Pressing problems of the real world inevitably stimulate scientific inquiry. This is particularly true of economics. But the contents of the reality change over a period of time, changing the focus of attention of many researchers. The battle between the mercantilists and free traders were shifting in favour of the latter when David Ricardo came through with his astounding demonstration of comparative advantage. The persistence of protection triggered the highly rewarding studies on the political economy of protection.

To sum up: The future breakthroughs in the economics of international trade are likely to be mostly concept-driven; they will not be just chance findings but the result of carefully planned investigations, the results of which could turn out to be unforeseen; and finally, if the past is any guide, trade economists are likely to come up with remarkable findings

in their attempts to answer some of the crucial questions posed by the changing international economic environment. It is only about the last category that one can speculate a bit more specifically.

Some of the most important questions in the field concern the relationship between trade and development. It has attracted considerable research attention in the past and is likely to continue to do so in the future. The conflict between the proponents of new regionalism and multilateral trade liberalization still offers fruitful areas to be explored. New technology is creating new forms of trade which raises completely new questions. For example, do we need new techniques and insights in handling questions related to the developing e-commerce? In the post-Seattle world, the questions raised by the "civil-society" have attracted considerable attention. Culture, environment, human rights - while none of these are unfamiliar questions to trade economists, the way they handle them might in turn lead to new developments and findings. The spectacular proliferation of contingent protection measures foretells increased research and fruitful findings in that area. Imperfect competition analysis might find more realistic, and at the same time more tractable models to work with. The new economic geography is still in its infancy, and hence by definition more growth there is likely. International movement of factors of production has been much analyzed by economists. Nevertheless, the international movement of people, creation of networks which in themselves turn out to be important endowments are questions that will attract greater attention. The rapid growth of human capital in low income countries is creating patterns of trade which could not have been imagined even a decade ago. Its implications could be fascinating.

The above list is, of course, far from exhaustive. But it is indicative of the exciting vistas that open up for the young economists who choose to work on international trade problems.

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