NEW THEORIES OF TRADE AND THE PATTERN OF GLOBAL SPECIALISATION

by

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Preface

This study on "New theories of trade and the pattern of global specialisation", has been prepared for the research project on "Adjustment to structural change in manufacturing: A North-South perspective" undertaken under the umbrella of the ILO's International Division of Labour Programme. Its author is Richard Harris, Professor of Economics at Queen's University, Kingston, Canada.

The structure of world production and trade changes continuously, opening up new job opportunities and threatening existing ones. This process of change causes considerable adjustment problems affecting the lives of millions of workers and their families in both industrialised and developing countries. In view of their potentially far-reaching consequences these changes need to be analysed in depth. Critical issues should be identified in time. The different options (and their consequences) open to policy-makers and other concerned parties must also be examined. These are the principal concerns of the research undertaken by the ILO's International Division of Labour Programme.

In this situation of constant change, where causes and effects are often hard to separate, it is not easy to guess what the future will bring. Certain trends may be discernible but many uncertainties remain. It is particularly important - but often very hard - to recognise which changes are cyclical and which structural. To what extent is unused capacity and unemployment in a particular industry related to low overall demand and to what extent are long-term structural factors at work?

The developing countries play an important role in the process of structural change. Their share of world manufactured production and trade has increased in the last few decades. So far, most of this greater share originates in few countries only (the newly industrialising countries - NICs). At first, developing country exports tended to be concentrated in industries using little capital and relatively simple technology. Gradually, however, the range of their exports expanded and came to include steel, ships, machine tools, colour TVs, videotape recorders, petrochemicals, arms and aircraft.

In more recent years, protectionism and the use of new technologies have tended to slow down the advance of developing countries exports in certain product areas. This has allowed industrialised countries to regain ground in some "traditional" industries. But it has also encouraged developing country exporters to accelerate their move into the production and export of more sophisticated products. A situation appears to be emerging in which most industrial goods using mature technologies can be produced in a large number of (industrialised and newly industrialising) countries. Sectors that use and generate the very latest technologies are exceptions.

Capital has become increasingly internationally mobile and this has contributed to an acceleration of structural change. It has also made labour adjustments more difficult. Capital can be moved by telex, but people move more slowly. Workers need to adjust to changing circumstances, to be trained and retrained. But this takes time. It is therefore essential that the social partners and workers in particular are aware at an early stage of the scope and the consequences of the structural changes taking place and expected to take place. This will allow them to take timely action to reduce individual and social risk and the costs that these entail.
This research project takes as its point of departure the growing similarity among the issues related to industrial adjustment in industrialised countries, and those related to industrialisation in the more advanced developing countries. Two operational questions that the project tries to answer are: (1) to what extent has industry relocated from North to South; and (2) to what extent is this trend currently being arrested or reversed? It looks for the causes and consequences of this relocation process and attempts, through a comparison of four different sectors, to come up with general conclusions.

The project is organised at three levels:

1. **Global studies** on clothing, steel, automobiles and aircraft ask to which extent the industry has relocated, whether in more recent times this trend is being reversed, and what the underlying causes of the relocation process are. The four sectors chosen represent a wide range of industry characteristics: some are dominated by small and medium enterprises, others have predominantly multinational or public ownership; some use more labour intensive, others more capital or high-tech intensive methods of production; some are stagnating, others expanding. It is hoped that by taking industries which differ from each other in these respects (and so reflect the heterogeneous situation prevailing in many other industries) some more universally valid conclusions will emerge.

2. **Selected case studies**, focusing on the situation in one sector in one country, provide examples of how adjustment — successful or unsuccessful — has taken place in concrete cases. These studies compare different business strategies in the same sector; ask how workers have reacted to different strategies; and to what extent government policies have helped or hindered the adjustment process.

3. **Conceptual studies**

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This study reviews the theoretical developments of the last 20 years regarding the International Division of Labour in manufacturing products, and the pattern of specialisation across countries. In particular it discusses the new theoretical developments in the neo-technology and market structure views of trade and specialisation which provide an alternative framework for examining the traditional issues of patterns of specialisation and adjustment. The final part considers the relation between these new developments and issues of trade and industrial policy.

The perspective offered by international trade theory is considerably richer than it was a decade ago. Increased emphasis on the mobility of capital, the national and multi-plant corporations, the role of oligopolistic competition, and production of new technologies has radically transformed traditional trade theory with its emphasis based on comparative advantage based on unchanged technology and resources.

A number of key factors must be considered to explain trade in manufactures. These include the strategies of global enterprises and competition between low- and high-wage countries, as well as activist government industrial policies and technological innovation. High mobility of skilled labour and the political-economic infrastructure surrounding an industry are other relevant factors. Ultimately, trade flows are becoming increasingly shaped by the on-going tension between the globalisation of the
Periods of significant savings-investment imbalances alter patterns of specialisation in production, and as a result these patterns may not be indicative of longer term production and trade patterns under balanced trade. Moreover, the resulting potential instability adds uncertainty to long-term investments in both physical and human capital.

In conclusion, the author argues, the concept of Comparative Advantage, while still valid, is less clear than it once was as a useful guide to policy. Technological change, scale economies and the dynamics of Savings and Investment flows in a world of mobile financial capital all render the concept of Comparative Advantage considerably muddled. His second conclusion is that the pattern of trade and specialisation is more crucially dependent on technology and the actions of individual firms than traditionally emphasised. In other words, the world distribution of physical resources is less important than the technical and entrepreneurial know-how in the modern economy.

As their name indicates, working papers are an intermediate form of presenting research findings. Any comments provoked by this paper are therefore most welcome.

Gijsbert van Liemt
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1.0 Introduction

The purpose of this paper is to review the theoretical developments of the last twenty years which address the old questions of the division of labour internationally, and the pattern of specialization in production across countries in the global trading system. While neither the question nor the answers are new, the perspective offered by international trade theory is considerably richer now than it was only a decade ago. Increased emphasis on the mobility of capital, the role of information, the multinational and multi-plant corporation, the role of oligopolistic competition, and competition in the production of new technologies has radically transformed traditional trade theory with its emphasis on comparative advantage based on unchanged technology and resources. It is too early to conclude that a consensus has been reached within the economics profession as to what the appropriate form of the new paradigm should be, but it is clear that it will contain elements of all of the above factors.

It is not surprising that the developments in trading patterns over the last decade have been largely responsible for the interest in these new theories. Increased volumes of trade accompanied by trade liberalization has been a trend going on for more than three decades. At the same time the 1980's brought forth a host of new pressures on the global trading system. To mention only a few is the trend towards increased production in the newly industrializing countries and developing countries of traditional manufactured goods. This trend has resulted in large job losses in the manufacturing industries of many of the industrialized countries and has been responsible for much of the protectionism which has emerged in these countries since the 1960's, but more significantly in the last ten years. At
the same time technological progress has made many skills obsolete, and increased the demand for many new skills. New industries, new firms, and new social values are emerging as a result of the technological developments of the last ten years in many areas, but most significant perhaps is the computer-micro electronics-information revolution. This revolution is far from over and the structural change which it is inducing is no more profound and far-reaching than in the pattern of international trade and specialization.

The principal purpose of this essay is threefold. First to review the theoretical developments in international economics which pertain to the 'traditional' view of comparative advantage. Second to review those new theoretical developments in the neo-technology and market structure view of trade and specialization which provide an alternative framework for examining the traditional issues of patterns of specialization and adjustment. Third to discuss issues of trade and industrial policy as they relate to the topics discussed in the first two sections, and in particular the adjustment issues as viewed within these alternative frameworks.

2.0 North-South trade in manufactures: an overview

In this section a framework for looking at world trade, investment and industrial competition is presented. The framework builds upon the insights of the neo-technology view of trade and some empirical generalizations about current economic trends. Its intention is relatively modest in that it seeks to bring a coherent view of overall patterns of world trade, and is thus proposed in the spirit of organizing a perspective on trade, technology and adjustment rather than providing a testable theory in the traditional scientific use of the term 'theory'.
In the current stage of world economic development it is sensible to think of three sets of major national actors. One, the major industrialized trading blocs, consisting of Japan, the European Common Market, and the United States. Two, the newly industrializing countries (NIC's), including possibly some of the current LDC's who could make the jump to industrialization in the next decade. The last group consists of the LDC's, although it might prove useful to divide them into petroleum and non-petroleum exporting countries.\(^1\) Of the many features of the current economic scene it is useful to focus attention on three of these.

One, the continuing pace of technological change renewed with the developments in micro electronics in particular. The latter developments are important in two respects. First, they provide the impetus for continued product and process innovation as applications of the 'computer on a chip' technology are developed. Second, they reduce the unskilled and semi-skilled jobs in a wide variety of manufacturing and service industries. This makes possible, for example, the introduction of computer based flexible manufacturing processes which may simultaneously reduce the importance of scale economies in many industries, and at the same time make it possible to produce less standardized goods more suited to individual user needs in a variety of industrial and consumer areas.

\(^1\)For the purposes of brevity I shall omit any reference to the communist bloc countries, although they clearly may play in the future an increasingly important role in trade amongst other non-communist countries, particularly in light of 'glasnost' in the Soviet Union.

Throughout the paper the terms North and South will be used in the traditional sense of the major industrialized western countries constituting the North and the non-communist NIC's and LDC's constituting the South. These generic labels are much less useful than they once were with the connotation often being one of a permanent state of asymmetric development. For better or worse the label has stuck in the literature.
The second major feature of the current world situation is the relative price structure of goods and factors now, as opposed to twenty-five years ago and the continuing trend in that price structure. Wage rates among the major industrialized nations are much closer than they were two decades ago. Wages in Japan, correcting for exchange rate differences, are similar to those in the U.S., but continue to rise. On the other hand, the wages in most NIC's and all LDC's remain at dramatically lower levels in all skill categories. Given the extreme mobility of capital this creates strong economic pressures to shift production toward low wage countries. These wage differences existed a quarter century ago as well, but generally the level of economic development and political stability of these countries was sufficiently low, and transport and communications costs were such as to preclude them as viable bases for production. While capital costs have exhibited no significant trends, if world economic growth continues, and in particular if the developing countries start to attain growth rates comparable to the NIC's, there is bound to be pressure on the supplies of primary commodities. This means that the prices of these commodities may increase, tempered by the pace of innovation which seeks to reduce the raw material demands of industrial production.

The third feature of current world developments is a political one. The major problem is that for most national governments, the level of world economic integration attained since World War II has reduced considerably the power of individual governments to control economic events within their own boundaries. One of the many types of political responses this had invoked is
a resort by governments to increased intervention in industrial development. In many cases, the attempt to intervene in industrial development has put governments on a collision course with the multinationals. Governments would like to retain the employment base of existing industries, while multinationals would like to move the location of production in response to factor price differences. More problematic is the 'mercantilist' aspects of industrial development policies. The intervention in industrial markets of each country puts governments in direct confrontation with each other. This in turn means that because the players are both large and few, there is strategic gaming between nations and the potential costs of conflict are large. Nevertheless it is sensible to assume that governments of the major industrialized nations will play an active role in a wide range of industries through a myriad of industrial policies, which seek to promote national interest.

With these observations in mind, it is possible to begin fleshing out a picture of 'world trade'. The task is to explain trade in manufactures. Trade in raw materials is relatively straightforward and for the sake of brevity will be omitted. There are a number of key factors here — global enterprises, activist government industrial policies, technological innovation, and competition between low wage and high wage countries.

The sources of innovation are no longer concentrated in the United States alone. Major industrial innovations are forthcoming from both private

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2 Previous statistical documentation on industrial support across countries is difficult, both because of differences in reporting conventions and institutional differences between the price setting mechanisms. Evidence in support of fairly extensive use of industrial subsidies in a number of countries is provided in Warnecke et al (1978), and OECD (1975).
and government research and development facilities in each of the major industrial trading blocs. In the early part of this century Schumpeter proposed a theory for closed economies in which he argued that competition between monopolists and oligopolists over the innovation and introduction of new products was a major engine of growth for capitalist economies. Some of Schumpeter's insights are pertinent to present affairs. The race for new technology is hampered by the ability of any firm to retain the property rights to the technology, and governments may be discouraged by the 'leakage' through multinationals, exports of high technology products and other channels. Both firms and governments attempt to slow down the diffusion of new technology to other countries and competitors. This is an old policy—one attempted by the British government for example in the early 19th Century in an attempt to retain their lead in textiles. Ultimately it turned out to be futile. Nevertheless, if the innovating country could lengthen the imitation and diffusion lag to other countries, it could benefit over the short and medium term. From a world perspective the attempts to halt the diffusion of new technology is harmful. The benefit to the innovating country is at the expense of other nations. The debate over intellectual property rights within the GATT is a result of these conflicts between national and international interest in the transfer of technology. National governments clearly have an incentive, particularly on short-run employment grounds, to attempt to retain the technological lead within their own boundaries.

See Schumpeter (1934).

Lazonick (1980) provides an excellent discussion of the British textile industry's attempt to prevent the technology transfer.
The gains to participating in a race to develop new technology come from the potential rents to innovation. In one case, the innovation makes possible the production of a new product, or a new means of producing an old product at a lower cost which either changes the condition of competition in an existing world industry, or opens a completely new market. The new product confers a monopoly upon the innovating firm. Rents are earned if imitation by competitors is technically difficult, or impeded by other means. Innovation which is protected against imitation, perhaps by entry barriers in the post-innovation market may yield substantial quasi-rents. Of course, the whole process is subject to great uncertainty. A firm never knows when its apparent lead may vanish due to a technological development in some hitherto unrelated industry. The shift from mechanical to electronic watches was a classic example of such a situation. Nevertheless, the rewards can be great to winning an innovation race if it imparts transitory monopoly power to the firm.

To summarize, given the high level of technological opportunism afforded by new scientific developments most nations are unlikely to cease in their efforts to engage in technology races. There will be industries where the degree of scale economies, or the dynamic aspects of competition, will necessarily mean that only a few firms in a few countries will survive in the competition.

What role will governments play? In the absence of intervention, there is certainly every possibility that production will occur in locations other than the country in which the initial innovation takes place. A useful working assumption is that for industries which are provided substantial government support in the R&D process it would prove politically impossible
to move a domestic based firm abroad. Thus, for very large scale industries, the major industrial country which innovates first will also be the location of production of that product until successful imitation occurs. The aircraft industry is an excellent example. The two major firms in the production of commercial airlines are Boeing in the U.S., and Airbus in Europe. Both are government supported to a significant degree and scale economies in the industry are quite large relative to market demand.

What is the impact of these technology races for trade in new or 'high technology' products? Products in which there are either very large scale economies in the R&D process, or in the production and marketing process, are those which one or more of the major industrial nations are likely to be the major exporters.

In products for which scale economies of production are unimportant, the technology race is likely to occur in both oligopolistic and competitive industries. The transfer of technology between firms is fairly rapid, and the ultimate location of production is dictated in many cases on grounds of cost, labour market conditions and protectionist policies of the large consuming nations. In other cases, production location will be dictated by a necessity to be near the customer. In some industries characterized by product differentiation, small scale, flexible manufacturing systems are likely to prove best suited to local markets. In products such as these, the technological innovation is likely to actually reduce trade in final goods. Instead production will be suited to local markets — the trade in goods will be replaced by trade in technology. Multinationals and other technology transfer devices should prove to be important in this process of
globalization, although impediments are still present.  

Trade in middle technology industrial products associated with the traditional 'smokestack' industries is characterized by the sale of an established product, usually, but not always, with standardized methods of production subject to significant scale economies. Traditional industries such as steel, autos, heavy machinery, and electrical equipment come to mind. These industries have been, and continue to be, subject to two main trends. One, technical change which reduces, or increases the scale required for efficient production, and at the same time has the potential for reducing the labour requirements of the production process through automation. Two, strong pressure to move production locations to lower wage countries in order to reduce labour costs, and increase cost competitiveness. Consider the latter set of factors first.

High real wages provide powerful incentives for firms to hasten the automation process. In autos, for example, it would mean a much faster move to full scale robotic plants than would otherwise occur. The negative employment consequences of protection, given the existence of labour displacing technology, may be more adverse than an alternative adjustment process which would keep wages down, and employment up, at least over the medium term. The scale bias of innovation in these industries could prove to be either the salvation or damnation of the industry as far as the major industrial nations are concerned. With the development of Computer Aided Design, Computer Aided Manufacturing (CAD/CAM) technology and flexible manufacturing processes there is a tension between innovation which reduces

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5 A good discussion of the limitations on globalization of industry is Yves Doz (1987).
scale economies and innovation which increases scale in both new and existing products. Steel is an obvious example where technological change is changing the whole face of the industry because it has reduced the need for large scale operations. In the technology race, large scale enterprises have an incentive to produce large-scale biased innovation, because it is they who will benefit by maintaining entry barriers. Consumers of the product, and firms who would like to enter the market but cannot overcome the existing size barriers, would tend to favor innovations which result in reductions in scale. On a national level there are obvious analogies. The big industrial nations will be interested in large scale biased, high technology innovation, because it gives them an obvious advantage in capturing world market share with their large markets and resources.

In the traditional 'middle technology' industries, if large scale, standardized production remains significant in these industries, and provided labour costs remain a significant share of total production costs, then there are strong forces dictating the movement of production to low wage locations. However to the extent that both labour inputs and scale can be simultaneously reduced, there is a case that production will stay located close to the market it serves. The flexibility to product differentiate and produce customized products without cost disadvantage will make proximity of production to the buyer very important. This in turn means that product differentiated industries with flexible production methods are likely to remain relatively immune from import competition. While certain parts of the steel and machine tool industries provide examples of where this type of reduction in scale of traditional industry is occurring, other examples do not jump to mind. Standardized production and cost competition continue to
dominate a number of 'middle product' industries. To the extent this is the case the pressures to move production to low wage locations remain strong.

The absolute size of the existing NIC's and the rate of emergence of new NIC's will, however, prove important as a limiting factor in the tendency of industry to shift from the IC's to the NIC's in many middle and low skill areas. Currently, the NIC's account for a very small fraction of world trade, and although this share is likely to increase, constraints on the growth rate of NIC's will limit their impact on world trade in the medium term. In some of the NIC's they are already running into labour shortages. Thus in the process of a tendency toward equilibrium the key parameters are the rate at which these industries can be absorbed in the NIC's, and pace of reduction in real wages in the IC's. Furthermore, there is some significant wage equalization yet to occur between the IC's themselves. Perhaps the greatest uncertainty is the extent to which technical change may reverse or exaggerate these trends. More certain, however, is that as imports from these countries increase to the IC's, there will be strong pressure to provide protection for the IC's domestic industries. This has already taken place in a number of industries such as motorcycles, steel, and autos and could happen in others.

Ultimately, the NIC's will become IC's and the process of economic development will open a new chapter on world trade. Amongst existing IC's there will be considerable competition to gain access to these new markets. This process continues to occur at a relatively fast pace. The "new-NIC's" by some definitions now includes China and India. It was only a few years

\footnote{See Wall Street Journal, 'Labour Shortage Crimps Economy's Rise', January 12, 1984.}
ago these countries were officially classified as "Low-income countries" by the World Bank.

Having identified the 'stylized-facts', or more accurately stylized trends, it remains to provide a theoretical framework which both accommodates and explains these observations. In the following sections we review old and new approaches to these explaining trade in manufactured goods.

3.0 Traditional trade theories: static approaches and evidence

The purpose of this section is to review traditional theories of trade, and some of the important extensions of those theories. This is necessary to understand how certain positions come to be held by various policy makers, and how empirical departures from orthodox theory tend to be incorporated within the standard paradigm of economic theory.

3.1 Ricardian comparative advantage

The classic theory of international trade is based upon the doctrine of comparative advantage associated with the name of Ricardo as he developed the theory in the 19th Century. In Ricardo's simplified framework all commodities which could be traded are thought of as being produced by a single factor of production, which we shall refer to as labour. There was no reason to assume that countries had equal absolute advantage in producing the same commodity defined as equal technical efficiency in the use of labour inputs. Ricardo demonstrated that, given similar demand conditions between countries each country would export that commodity in which it had a comparative advantage. A country has a comparative advantage if its real

\footnote{Ricardo (1911).}
labour cost is lower relative to other countries in the same commodity. The theory of comparative advantage was a major achievement of the classical economists.  

Ricardian theory is important in the development of trade theories as it allowed for differences in technology across countries, and thus productivities, and yet was able to demonstrate that trade would occur in predictable ways. A corollary of the theory of comparative advantage is the famous gains from trade theorem which states that through international exchange all countries could raise their income levels relative to the no-trade alternative. Ricardian theory was also responsible for introducing the chain of comparative advantage as an analytical concept used in the explanation of the commodity composition of trade. Thus in looking at which commodities would be exported or imported by a given country, one need only look at the ranking of commodities by their position in the chain, based in the Ricardian theory on relative labour productivity. Most subsequent theories of trade have attempted to provide a similar concept of the commodity composition of trade, but with limited success. While there was some empirical testing of this theory it is now widely regarded as too simplistic to be useful as providing an explanation of modern trade patterns.

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8 See Caves and Jones (1973) Chapter 7 for an exposition of the Ricardian theory of comparative advantage and the role of comparative cost.

9 Deardorff (1985), pp.476-478 discusses the tests of the Ricardian model. It should be noted that international comparison studies of labour productivity, use as an analytical framework, the Ricardian theory broadly interpreted to include a number of factors explaining technology differences between countries.
3.2 Factor proportions theory

The Ricardian analysis was extended in a number of directions during the first half of this century. Many felt that the assumption of a single factor of production, and technology which differs between countries was inappropriate for a static or long run theory of trade. In the Heckscher-Ohlin\(^{10}\) version of the theory both of these assumptions were dropped. By assuming identical technologies in all countries any significance in lags in the international transmission of technology were removed. The major advantage of the newer theory was its ability to handle many factors of production giving it greater apparent empirical content. In the Heckscher-Ohlin model the concept of relative factor proportions replaces the concept of comparative cost. The major prediction of the factor proportions version of comparative advantage theory is that a country will export those commodities which use relatively more of its abundant factor.\(^{11}\)

Leontief's early tests of the theory on U.S. data were based on a two factor, labour and capital, version of the FP model.\(^{12}\) The failure of the theory, or the 'Leontief Paradox', led to a search for a more general version of the FP model which explicitly handled many goods and many factors. This version, developed in the 1960s and 1970s also tried to develop a concept of a 'chain of comparative advantage' analogous to the Ricardian model. The idea is that industries can be ranked in some order based use of the abundant

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\(^{10}\) Heckscher (1919) and Ohlin (1933).

\(^{11}\) The factor proportions model was first set out for the case of two factors of production by Heckscher (1919) and Ohlin (1933). Caves and Jones (1973), Chapters 8 and 9, gives an excellent exposition. The problems of extending the theory to more than two factors will be covered below in the discussion of the factor content of trade.

factor, with those higher on the chain afforded a more prominent position in export potential. There are some logical difficulties though with exactly which industry is where in the chain, and this led to the idea of the 'factor content' of trade.\textsuperscript{13} The basic idea underlying this concept is that by trading in goods, a nation is actually indirectly trading the services of its factors of production. Thus a capital rich country exports its 'capital services' by selling capital intensive goods. Any pattern of trade in goods has an implied pattern of trade in factor services, even though the factors themselves, by assumption, stay fixed in the country of origin. With this extension the principle prediction of the theory is that a nation's trade in factor services will be such that the country will export those factor services in which it is relatively abundant, and import those services in which it is poorly endowed. The chain of comparative advantage is expressed in terms of factors rather than goods; factors can be ranked in order with those high on the chain of relative abundance to those lower on the chain. Goods trade will be related to the factor content chain through identification of the intensity of factor use of goods (industries).

3.3 Policy implications of FP theory

There are two general policy implications which follow from the FP model, but which also follow from any model of international trade in which technology is taken as exogenous, all markets are competitive, and resources are fully employed. These propositions form the cornerstone of the neoclassical theory of commercial policy. The first is the famous gains from trade theorem mentioned previously, which states that free trade is better

\textsuperscript{13} Vanek (1968) was one of the first to explicitly identify this concept when there are many goods and factors.

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than no trade. Trade is nationally advantageous in the sense that the gainers from free trade could compensate the losers, and all would be better off with higher real incomes. The other proposition of interest is the impact of tariffs on trade and national welfare. First, a situation in which all countries unilaterally impose tariffs against each other results in all countries being worse off; on the other hand if one country (foreign) insists on keeping its tariff barriers up, it is generally the case that the best response by the other country (home) is to keep its own tariffs up; this is known as the optimal tariff argument. The impact of these propositions has been profound. They are intellectual cornerstones for both free trade and protectionist stances taken by various countries at different points in time. The policy thrust of the FP model, though, is sometimes carried beyond these basic propositions.

It is generally recognized that governments intervene in the economy in a variety of ways, including tax and expenditure policies, which affect the relative fortunes of industries. The question arises whether some industries should be encouraged or not. One policy stance is that as a rule of thumb industries in which a nation has a comparative advantage should, in some average sense, be the favored ones. It is difficult to find an intellectual defense of this position since it doesn't follow directly from the assumptions of the theory. Furthermore, it clearly has a mercantilist flavor to it, which rubs free trade economists the wrong way. It is a position though which is actively pursued in economic development policy in numerous countries. The argument runs that it is better to promote export industries than import competing industries, either because of the need to earn foreign exchange, or because export industries use resources more efficiently than
import competing industries. There is certainly something reasonable sounding about these arguments and they can be defended on a variety of 'second-best' arguments. The FP model can be used to derive some very strong policy implications as to the longer term effects, on trade and economic structure, of policy. By changing the relative quantities of factor endowments over time, a nation's chain of comparative advantage will be altered on the basis of the FP model. A non-interventionist position is that these long run changes in factor endowments, such as changes in the stock of capital through saving, are governed by the same market forces which dictate any decision to buy or sell. Consequently, the best that can be done by governments is to leave well enough alone. A contrary position, which has many adherents, is that there is nothing sacred about the market determined long run allocation of investment. Principally, there are imperfections in the markets for physical and human capital which make intervention in the form of policies to affect saving, education and job training desirable. These policies should be chosen so that the long run economic structure which emerges is the one leading to the maximum social and economic benefit, to both current and future generation. For open economies this is essentially a view of 'engineering' long run comparative advantage.

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14 The 'second-best' argument for a policy hinges on the proposition that the main purpose of the policy is to correct for distortions or inefficiencies created by other policies. Corden (1974) surveys the second-best argument for promoting export industries.

15 The intellectual defense of this position is grounded in what has come to be known as the "Market Failures" doctrine. An early statement of market failures is Bator (1958). Kenneth Arrow has often been described as one of the proponents of Market Failure theory. See Arrow (1968) for one statement. The major critics of this approach are the "Chicago School" of economists, and the Buchanan-Tullock public choice criticism. It is not my intention to review this debate. Boadway (1981) gives a summary of the various positions and references.
There are three potential difficulties with these long run strategies, accepting the logical implications of the FP model as correct. One is that the period of building up a stock of one factor, involves an investment of current resources and hence postponement of consumption. Thus, an effort to create comparative advantage by factor accumulation involves a cost. This must be kept in mind when undertaking any policy involving potential long term gains by expenditure on current resources. Two, the attempt to build up comparative advantage in a particular area will only be successful if the factor accumulation occurs relative to other countries. In a two country world, if both countries attempted the same strategy within the FP framework, the initial structure of comparative advantage would be perpetuated, and the main effect would be to lower the price of those goods which intensively use the accumulated factor. Three, in any long run perspective, uncertain changes in tastes, technology, and resource endowments are a strong likelihood. These changes necessarily create unanticipated changes in the structure of comparative advantage. Deliberate policy attempts to change the future structure of national comparative advantage must be prepared to deal with the risk that the policy will be ineffectual, either because the goal itself becomes infeasible, and/or because the goal becomes less valuable socially. An example would be failure of an attempt to develop a particular resource export market because of the sudden discovery in a foreign country of lower cost deposits of the resource.
3.4 Capital mobility and the FP theory

In the classic Heckscher-Ohlin model of trade, all factors of production are treated as immobile between countries; that is trade takes place in goods but not in factors. From the standpoint of constructing a theory of trade in goods there is a fundamental difference in predictions about trade with capital mobile, as opposed to immobile. Mundell, in a classic contribution to the theory of international trade, showed that with all other assumptions remaining the same, allowing trade in a single factor of production such as capital, has the effect of making trade in factors a substitute for trade in goods. Thus, capital movements replace movements in goods.\(^{16}\) The first issue to address is whether capital is mobile within a time period comparable to that in which goods are traded. Obviously, there are substantial differences across industries and across countries. In some industries, physical capital is literally on skates - oil rigs, for example, or heavy construction equipment. In other industries, capital is long lived, and both location and industry specific; this has the effect of making capital immobile both across industries and across countries. This version of the Heckscher-Ohlin model is quite popular nowadays. On the other hand many types of capital, equipment and machinery, for example, are certainly mobile within a time period comparable to that over which contracts in international trade are binding.\(^{17}\)

If one accepts capital mobility as the relevant empirical assumption,

\(^{16}\)See Mundell (1957).

\(^{17}\)In the economics literature, there is remarkably little econometric evidence on capital versus goods mobility over short time horizons. In a long-run perspective, which is perhaps how FP theory ought to be interpreted, capital services are necessarily mobile because the capital goods generating the services are almost always traded.
how does this affect comparative advantage theory? Suppose that an empirical study of trade for a particular country identifies that country as being about neutral in its endowment of capital. That is the country is presumed to have neither a comparative advantage or disadvantage in capital intensive industries. Is there any reason to suspect this result is the outcome of artificial assumptions about capital immobility? The contrary case might be that we observe industries which are capital intensive, but are neither net exporters or importers, because the movement of capital into these industries has substituted for imports of goods whose production is capital intensive. Thus, were capital actually immobile as the FP-CAV theory assumes, the result should be that the observed capital intensive sectors would be net importers, and thus even further down the chain of comparative advantage than a study of trade patterns would suggest.

The policy significance of this last observation is quite important if economic policy is based on some notion of the chain of comparative advantage. Policy directed towards capital accumulation, versus other types of factor augmentation, based on a perception of the ranking of factors within the chain could be seriously misdirected. Attempts to induce investment in a particular sector in an effort to turn a marginal net importing but capital intensive industry into a net exporter, on the grounds that with more capital available CAV would shift in favor of that industry, could involve more resources than it would take to turn a skill intensive industry for example into a net exporter. At the same time, there is the more obvious problem as to the questionable logic in treating capital as internationally immobile, when it is in fact mobile.
4.0 Dynamic implications of the neoclassical trade model

Traditional theories of international trade usually assume that trade is balanced, and what emerges from this assumption are two implications. First, a clear connection between commodity exports and the concept of comparative advantage, and second a complete omission of international transactions motivated by differences between saving and investment behavior across countries. There have been a number of theoretical developments over the years including dynamics and capital mobility; some of these are reviewed in Smith (1984) and Ruffin (1984). Additional material pertinent to trade between the industrialized and developing countries is reviewed in Findlay (1984). The substantial macroeconomic imbalances of the 1980's between the major industrialized countries has brought renewed interest to trade which results from savings-investment imbalances. The arithmetic of international transactions implies that a country in which total savings fall short of total investment will necessarily import more than it exports and vice-versa for countries with savings in excess of total investment.\(^\text{18}\)

The reason for drawing attention to this accounting identity is that in a world with integrated capital markets, so that external borrowing and lending is possible to accommodate differences between national savings and investment, much of the volume of trade is accounted for by these savings-investment differences, and not by the degree of differences between countries as indicated by comparative advantage calculations. Not only is the volume of trade unrelated to differences in technology or factor endowments across countries, but in addition the commodity composition of

\(^{18}\)This does not include a correction for income earned on foreign assets, which appears as a positive item in the current account balance.
trade will be affected to such a degree that its relationship to patterns of comparative advantage will be significantly distorted relative to the case of balanced trade.

Consider a country which under balanced trade enjoys a comparative advantage in steel production, say due to abundant coal resources, and highly skilled labour necessary as an input to steel production. Under these conditions steel will be an exportable. Suppose that the current macroeconomic situation is such that the country has a substantial deficit of savings over investment. The country is thus a net importer of foreign goods, matched by exports of financial claims against that country's future income. It now becomes necessary to look at patterns of production versus consumption by commodity within the country. It is possible that steel consumption will exceed steel production in which case the country becomes a net importer of steel. Holding the relative prices of steel to other importables and exportables constant at their balanced trade values will mean however that the pattern of production based on comparative advantage will not have changed. If however the relative producer prices of steel versus other produced goods changes as a result of the saving-investment imbalance the apparent pattern of production may no longer reflect 'true', or long run comparative advantage based on balanced trade. The reason this may occur is straightforward and commonplace. Savings–investment imbalances are closely associated with changes in the real exchange rate, and indeed in the volatility of the real exchange rate, where the real exchange rate is defined

\[ 19 \text{ Strictly speaking having a comparative in steel advantage means that the autarchic price of steel relative to other goods will be less than the world free trade price of steel.} \]
as the ratio of tradeables to non-tradeables prices. As different tradeables use different input ratios of non-tradeables, a rise in the relative price of non-tradeables will reduce the competitiveness of some sectors relatively more. In the example considered imagine that steel is an intensive user of non-tradeables relative to other tradeable goods. A real exchange rate appreciation, meaning a rise in the relative price of tradeables to non-tradeables would mean that the production of steel would decrease or increase relatively less than the increase in the production of other tradeables. Consequently the pattern of production in presence of the saving-investment imbalance may not correspond to the true pattern of comparative advantage. Revealed comparative advantage studies are therefore likely to be quite unreliable in providing an accurate picture of a country's long run comparative advantage. Indeed the usefulness of the concept of comparative advantage becomes questionable.

In other circumstances a different problem emerges. On balance suppose there is an excess of investment over savings, thus requiring external lending. An important commodity classification emerges between capital and consumer goods in the presence of national savings-investment gaps. One possibility is that a consumption boom is occurring causing savings to fall short of investment, and thus both consumer and capital goods are imported. However relative to consumer goods, it might appear the country has a comparative disadvantage in capital good production. The identification

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23. Recent history has shown that fairly major swings in the current account can occur fairly rapidly among the developing counties. The World Development Report 1988, Table 1.5 reports that the developing country exporters of manufacturers over 1973-1983 ran current account deficits, and in 1986 and 1987 ran significant current account surpluses, no doubt in part mirroring the U.S. trade deficit.
problem though lies with the nature of demand. When savings are low consumption is high, and demand for consumer goods is high. This demand can actually drive up the relative price of consumer goods over capital goods to the point at which revealed production indicates a comparative advantage in consumer goods, even though were trade balanced with savings equal to investment, the relative composition of demand would change such that the country was a net exporter of capital goods. What is happening is that shifts in demand caused by the nature of the imbalance between savings and investment are such as to cause production patterns different than those that would be predicted by comparative advantage alone. 21

For countries experiencing high growth and investment booms, production tends to shift toward capital goods, thus 'revealing', possibly incorrectly, a comparative advantage in capital goods production. In summary patterns of specialization in production during periods of significant savings-investment imbalances may not be indicative of longer term production and trade patterns

21 Traditional trade theory works with a demand side model in which tastes aggregated across consumer and investment goods are identical across countries and all goods, and both capital and consumer goods have unitary income elasticities of demand. Under this assumption a savings-investment deficit in a country at unchanged relative prices increases proportionately the demand for both consumer and capital goods leaving the pattern of production, but not trade, unchanged. Clearly however if the savings-investment deficit results in a change in the demand for consumer goods relative to investment goods, then the pattern of production and relative prices will change. Normally one would expect such a change in the composition of demand depending upon whether the initial cause of the savings-investment gap was a consumption boom lowering savings, or an investment boom raising investment.

It seems that much of the disagreement between observers of the U.S trade deficit is whether it was caused by a boom in consumption or a 'supply side' initiated boom in investment. Those holding the former view may be justified in their belief that the U.S. has not lost its true comparative advantage in the production of capital goods. Recent trends in U.S. commodity exports are consistent with this view.
under balanced trade. This occurs both because of the impact of these imbalances on real exchange rates and the composition of demand.

The bottom line may well be that savings-investment imbalances across countries is what is driving trade volumes and patterns of specialization, and not traditional arguments about the sources of comparative advantage. Unfortunately there is no decisive empirical evidence on whether this view is correct or not. However it is worth considering the implications this view has for adjustment and trade policy issues. These will be taken up in section 7.

5.0 Neotechnology approaches to North-South trade

It was clear to those concerned with the empirical study of international trade and business during the 1960's that the conventional theory of international trade was sadly lacking in its ability to explain the developments in the years following World War II. The dominance of the U.S. in higher technology exports plus the 'Leontief Paradox' led to searches by some for an alternative theory of trade based on patterns of technological change and the role of new products.

In response to this state of affairs there was a development in the empirical analysis of international trade patterns by those who were not content with the predictions of the comparative advantage model. This development was very 'data oriented' and occurred mostly outside the mainstream of international trade theory, where the emphasis remained upon the theoretical development of the traditional model. The empirical puzzle was to explain the pattern of trade in manufactured products which defied easy explanation based on the factor proportions model.

Numerous writers attempted to resolve these 'puzzles' by focusing on a
collection of factors we shall loosely refer to as 'technology factors'. The propositions which emerged did not really qualify as 'theories', at least by economists' standards, but rather as empirical generalizations about the nature of world trade. Two of the more prominent approaches were Posner's (1961) 'technology gap' model and Vernon's (1966) product cycle model.

5.1 The technology gap model

The basic technology gap model starts with the hypothesis that a particular country, usually assumed to be the United States, enjoys an advantage in the development of new products and processes. Furthermore there is a lag between the date of innovation or invention and the date at which the product can be imitated in other countries. The 'gap' leads to high technology exports by the U.S. The major weakness of this theory was that it offered no convincing explanation of why the U.S. should be the innovating country, and why imitation could not occur in countries where production costs were obviously lower. While relatively crude the technology gap model is the genesis for much recent theorizing on so called 'North-South' models which will be taken up in section 5.3.

5.2 The product cycle theory of international trade

The product cycle model attempts to explain in greater detail than the technology gap theory what factors are responsible for one country to be the innovator and what factors represent significant hurdles to imitation. It does so by adopting the concept of a 'product cycle' from marketing theory. Any particular good goes through a cycle from the date of its introduction to its ultimate demise, or mature phase. In the early phase of the product cycle the good tends to be produced in relatively small volumes in
specialized plants. On the demand size the good tends to be purchased by high income consumers, and the demand tends to be price inelastic. The product tends to be highly differentiated and tailored to individual consumer needs. Likewise, production tends to be done in small batch lots with considerable use of highly skilled labour necessary in these circumstances. If the good turns out to be successful, more and more individuals will adopt it, and larger scale methods of production will be adopted. These methods of production will tend to be capital intensive and yield lower costs of production. The lower costs translate into lower prices, and more and more consumers tend to adopt the good, moving from high income to middle income users. At this point competition among suppliers breaks out, because the technology of production of the product or process has is capable of imitation by other firms. This middle phase of the product cycle is also characterized by some degree of production differentiation as different firms try to capture different market segments by competing on variety and quality differences. If the imitation lag is long then the initial innovating firm will earn substantial monopoly profits. The final stage of the product cycle is the mature phase in which the product is produced for the mass market. At this point product differentiation across varieties of the good is reduced, the product becomes standardized in terms of its characteristics, and is produced in large scale, highly capital intensive plants. The skill levels required of labour in these plants is generally low because of the extreme division of labour allowed by product standardization. The state of industry competition at this stage will either be competitive or non-collusive oligopolistic, and price rather than quality competition will be the rule.

Of all countries in the immediate post-war period the United States
seemed to be responsible for most of the product innovation. This was for a number of reasons suggested by, or at least consistent with, product cycle theory. First, the U.S. was well endowed with capital, and R&D tended to be a capital intensive process in many industries. Second, the U.S. had a high percentage of world's skilled engineers and scientists; this was not only a result of the training acquired by many in the military during World War II, but also due to the immigration policies of the U.S. and, perhaps most importantly, the widespread and high levels of education throughout the U.S. The U.S. generally had one of the best educated work forces in the world. Thus for a variety of reasons, the innovation phase tended to occur within the U.S. The large high income U.S. market also provided a natural 'testing ground' for these products. As the product entered the middle phase the international demand for the product grew as world consumers became aware of the product and its uses. U.S. companies would begin to serve this market by first exporting. However as demand grew, and given the tax and tariff policies of many of these countries, together with some reluctance to transfer the technology to third parties, it soon proved desirable to transfer production abroad by foreign direct investment. This transfer tended to be concentrated at first on Europe and other industrialized countries where market size and skill levels of the work force were commensurate with the middle phase of the product cycle. Much of the high technology end of the production of components stayed in the U.S., as did the R&D process. Market structure at this stage tended to be oligopolistic with competition among a few competing U.S. multinationals.

Technological know-how cannot be suppressed indefinitely, and eventually imitators appear both at home and abroad. In the mature phase large scale
standardized production occurs on a world-wide scale. From the international perspective it was natural that, given the low skill requirements in this phase, production would be transferred increasingly to low wage/low skill countries. Ultimately the product cycle theory of trade predicted that the U.S. would cease to export product entirely, and would become an importer from the low wage countries.

An important part of the theory is in its explanation of why the U.S. remains a high income country and other countries remain in relative, although not in absolute, terms lower income countries. Three factors are at work. First, the U.S. must retain its role as the world product innovator. This in turn requires that the U.S. labour force have a high level of human capital and thus earns rents on their innovative capacity. Furthermore, the U.S. through the influence of market forces must naturally do a large amount of industrial R&D, and to face more or less an inexhaustible set of technological opportunities which allows the stream of innovations to continue. Two, the imitation lags by foreign competitors remain substantial so that this allows U.S. factors of production to earn significant quasi-rents in the initial and middle phases of the product cycle. Three, market forces must be such that firms in other countries do not successfully compete with U.S. firms in the technological race.

Vernon had a number of answers as to why foreign firms did not compete in the technology race. One, the necessary capital and human resources for R&D were simply not available in other countries. Two, high industrial wage levels in the U.S. meant that U.S. firms had a greater incentive to produce and adopt labour saving process innovations, than foreign firms. Three, the concentrated industrial structures of these industries in the early phases of
the product cycle meant the presence of substantial entry barriers both to domestic and foreign firms. Given that foreign firms faced less well-developed capital markets than the U.S., it was very difficult for them to raise capital, at terms similar to firms in the U.S., that would allow them to successfully enter the industry.

5.3 New theoretical developments on the North-South/product cycle model of trade:

The 1980's witnessed a significant increase in theoretical work on so called 'North-South' models of trade which emphasized the wage gap between the industrialized North and industrializing South and the resulting pattern of trade between new and old products as popularized in Vernon's product cycle theory. The models all use some stylized description of technological innovation in the North and diffusion of the technology to the South. Krugman's (1979) model was the pioneering piece in this literature, and subsequent contributions elaborate upon the themes developed in that paper. Important contributions include Dollar (1986), Feenstra and Judd (1982) and Findlay (1978).

Without going into the technical details of the models in this literature the results are basically a confirmation of those already expressed in the less formal literature on the product cycle. The rate of innovation, and the rate of international diffusion of technology from North to South are the key determinants of the income gap between the North and South. Increased protection in the North generally has the effect of shifting the terms of trade in favor of the North, and increasing the rate of innovation provided it is driven by a period of monopoly or patent protected profits. Northern protection also reduces the efficiency of world
production, but raises income in the North and reduces it in the South. It is possible that the increased innovation effect of Northern protection is sufficiently strong that it actually raises world economic growth relative to the no-protection scenario. Of course a superior policy is subsidization of innovation expenditures, without protection.

The other feature the models emphasize is the rate of international technological diffusion. Anything which increases this rate is obviously world welfare improving, but generally has the effect of raising South's income, and sometimes reducing North's income. In fact the latter outcome seems to happen more often than not in most of the models. It thus appears that some of the stories about Northern exploitation of the developing countries have a firmer analytical foundation in neoclassical economic theory than the conventional wisdom would have us believe.22

The trade patterns in these models are largely pre-ordained by assumption. The innovating North exports high technology products and the laggard South exports old standardized manufactured goods. Interesting questions emerge about what happens if the pattern of innovation changes. It is not too difficult to see that by increased innovation in the South, the income gap narrows, and the pattern of trade becomes less skewed.

5.4 Post-product cycle?

What of the product cycle in the 1980's? A number of the pre-conditions of the product cycle began to disappear in the 1970's. First, the large European and Japanese markets made it possible for new product introduction to take place there as well as in the U.S. The high savings

rates of these countries and the integration of world capital markets made the capital market barriers substantially less formidable to entrants from these countries. Both Europe and Japan fostered, through a variety of means, both a highly skilled work force and a significant industrial R&D establishment.

Vernon (1979), in observing the period (1968-1978), emphasizes changing roles played by multinationals. The U.S. multinational firm itself proved to be a major reason the product cycle theory no longer explained trade patterns. It had been traditional to think of multinationals as being associated with one particular country — in most cases the U.S., but increasingly from Germany, France and Japan. As the multinationals grew, and extended production and sales around the globe, there began an inevitable change in the perception of the management of these firms. Rather than viewing themselves as creatures of the U.S. (or other countries) market system, they view themselves as part of an integrated world economy. All decisions were taken with an eye to maximizing the overall economic efficiency of the world firm. This meant locating production, sales, R&D, and management wherever profitable opportunity, and the constraints of competition dictated. The development of the multi-division form of corporate organization assisted greatly in this development. In addition modern technology reduced the information and communication problem of multinationals to the point where it was possible to actually run a firm with day-to-day monitoring of the activities of globally dispersed divisions.

This re-orientation of the multinational firm was, and continues, to have profound effects. With the global perspective of these firms, the transfer of technology to other countries proceeded much faster than in
earlier decades. Both the introduction of the product and its production now jumped almost immediately to the European market, even if the original innovation took place in the U.S. By the late 1970's innovation in Japan and Europe preceded that in the U.S. The firm is no longer subject to the wishes of any single government, or bound by the constraints of any single national labour or capital market. Furthermore, because these firms are multi-plant and often horizontally diversified, a significant portion of international trade in goods was conducted entirely by non-market means; this in turn implies that traditional tax and tariff instruments proved to be increasingly less effective as a means of controlling international trade.

During the 1970's another very significant development took place — this was the emergence of high growth developing nations; Taiwan, Singapore, South Korea, Hong Kong, Brazil, Mexico and India, among others, all began to acquire 'traditional' manufacturing capacity.\(^{23}\) These countries are now referred to as the Newly Industrializing Countries, or NIC's, to distinguish them from the LDC's, and the Industrialized Countries (IC's). They first found their niche in goods associated with the mature phase of the product cycle. These were the labour intensive industries characterized with low scale economies, low capital requirements and standardized production methods. They cover such products as textiles, clothing, shoes, toys, and manual assembly of electronics. The low wages in these countries, together with an organized and hard-working labour force, made them the natural location for these industries. Import competition within the IC's in traditional industries is largely from these nations. However, with the

\(^{23}\) For documentation on the growth of the NIC's and their relative importance in world trade see Balassa (1982) and Reynolds (1986).
growth in income and skill levels, and moderate degrees of political stability, the NIC's became natural candidates for some of the large scale economy-standardized products of the middle phase of the product cycle.\(^{24}\) Vernon has argued that the multinationals will increasingly be drawn to these countries as a location of production for products in this phase, provided raw material and transport cost problems do not dictate location elsewhere. More recently the NIC's have become producers of high skill-high technology goods which compete directly with the same goods from the IC's, completely upsetting the predictions of the early product cycle model. The evolution of the NIC's thus ultimately provided another contradiction to the predictions of the original product cycle theory.

5.5 Tests of the neo-technology theories

The technology theories of trade, while an active area of research in the 1980's on the theoretical level, have not been the subject of a great deal of new empirical testing. Perhaps surprisingly more effort has gone into refined testing of the factor proportions model of trade. The evidence and literature up until 1982 is surveyed in Deardorff (1985). As pointed out in that survey the evidence supporting the FP model is hardly conclusive, but in Deardorff's opinion could not be taken as a decisive rejection of the theory. Since then the most comprehensive and consistent work on the subject is that by Leamer and his co-workers on multi country-multi factor data sets. This research program is summarized in the 1987 paper by Bowen, Leamer and Sveikauskas. The basic conclusion of this recent work is that the data does not support the factor proportions model, or more specifically the

\(^{24}\)See Vernon (1979).
Heckscher-Ohlin-Vanek model of international trade, and further the data supports the hypothesis of differences across countries in technology. It would seem that the time is finally appropriate to give up on the factor proportions model and to go ahead with further testing of the technology theories.

Testing of technology models such as that associated with Posner or Vernon however remains as mired in lack of data and theoretical precision as it was almost twenty-five years ago. A fairly recent study by Sveikauskas (1983) proceeds in the tradition of assuming identical technology world-wide in looking at U.S. trade, but finds that science and technology as factor inputs are considerably more significant than either occupational skills or capital intensity in explaining U.S. trade. The significance of this study is that the detail in the data set is much better than in earlier studies. The conclusion though is interesting in that the inputs he identifies as significant are in contrast to the human capital and skill variables many commentators thought would rescue the factor proportions model from the criticisms of the technology theories. Additional evidence in favor of the product cycle model in particular is provided by Bowen (1985). In summary the conclusion one can draw from surveying this literature is that the technology view of trade in manufactured products stands up better than any other proposed theory of trade, and the orthodox factor proportions model is consistently rejected by the data in dealing with manufactured trade.
6.0 Market Structure: scale economies, product differentiation and entry deterrence as determinants of trade patterns

Within the last five years international trade theorists have worked considerably at integrating traditional industrial organization concepts of market structure into a model of international trade. This probably is the most prominent theoretical development in international trade theory in the last two decades and is distinct from the neo-technology theories. It is not my intention to review all of that literature, a large part of it now referred to as 'Strategic Trade Theory', but to discuss the basic highlights. Surveys representing different views of the subject are provided in Helpman and Krugman (1985) and Venables (1985). In my own comments I will restrict my attention to the implications of this theory for trade in manufactured goods. From a theoretical-logical perspective these 'market structure' models of trade are particularly impressive because of their coherent general equilibrium structure. They are also viewed by many as more plausibly in conformity with market structures observed in manufacturing than the traditional perfect competition model.

The effect of introducing static entry barriers to a trade model is first discussed. Attention is focused on three traditional entry barriers: scale economies internal to the firm, product differentiation and absolute capital requirements. Dynamic entry barriers and competition are then taken up, including preemptive investment, learning curve competitions, and R&D races.

6.1 Scale economies

One of the standard arguments against protection is that it inhibits the achievement of scale economies by firms within the country. It is useful by starting with the important observation that economies of scale are an
important reason for trade between countries that are otherwise identical. The reason is simply the gains from specialization that can be achieved by having countries completely specialize in the production of a separate set of commodities. The other observation is that conditions of perfect competition are not compatible with significant firm level scale economies; monopoly, or some other form of imperfectly competitive market structure is the 'natural' outcome of free market forces. Some critics of the neo-classical perfect competition model take this observation as sufficient to justify intervention in the market. They are given additional ammunition with the following observation. Depending upon the nature of the market structure, trade is not necessarily mutually beneficial with significant scale economies in production, assuming all firms and countries have access to the same 'best practice' technology. Unfortunately, theory tells us little about those circumstances in which one country may actually be made worse off through international trade. The basic idea is that if the world market will only support one firm, the country which ends up with the monopolist may benefit at the expense of the country which does not end up with the monopolist. 25

These observations on trade and imperfect competition due to scale economies are two important examples of many such propositions in the field. Existing theory tends to present a list of possible cases rather than providing any definitive answer. Ultimately, it is important to resort to empirical evaluation of the relevant forces at work.

The emphasis on scale and imperfect competition in the examination of

25 Helpman and Krugman (1985) cover this possibility in their discussion of the gains from trade with monopoly and scale economies, drawing on earlier work by Markusen and Melvin (1981).
commercial policy has led to a number of important observations. One due to Eastman and Stykolt (1960) is that the tariff may, by protecting firms from foreign competition, encourage domestic oligopolistic pricing practices which in turn induces operation at inefficient plant scales. Related is the tendency for protected firms to produce a too highly diversified product mix within the plant, with short production runs and high cost per product.

With respect to the effect of protection on exporting, the principal observation is that by restricting market size the foreign tariff may prevent the firm in the small country from achieving a size significantly large to compete effectively with firms in the foreign market. It is surprising that one hears this argument today used even with respect to some of the largest firms from the largest countries. At the theoretical level it is fairly easy to demonstrate the logical possibility of this type of effect. Even a low cost country can be effectively impeded from developing an export base in the presence of suitable restrictions on foreign market access. Indeed it is logically possible for the pattern of trade to be reversed by protection of industries subject to significant scale economies.²⁶

The empirical significance of scale economies remains problematic. One can find statements supporting almost any position you would like to take.²⁷ I will not review this debate here. In a 1985 study²⁸ I looked at this issue

²⁶ This argument was reviewed by Ethier (1982) in the case of scale economies which are external to the industry but internal to the nation. The same case can be made with imperfect competition and scale economies internal to the firm.
²⁷ The literature is surveyed in Harris (1984), Chapter 3, and references are provided to the literature up until 1983.
²⁸ See Harris (1985).
and came to the conclusion that scale economies were still highly significant. Although flexible manufacturing systems may reduce economies achievable from longer production runs on a given product, the absolute capital requirements necessary for introducing a flexible manufacturing system could conceivably increase economies to the total volume of production within a plant (plant level scale economies). The jury is still out on this particular debate. Most economists have focused on scale economies in production on a single product line. The 'information' revolution, though, has reduced considerably the cost of non-market coordination. This means that firms will now coordinate activities through internal organization which were previously conducted through market transactions. An increasing trend toward vertical and horizontal integration may occur, with an increase in the size of the most efficient firm. The work by Williamson and others on the structure of the firm organization clearly point in that direction.29 While not taking any of this evidence as conclusive, it is important not to dismiss the possibility that scale economies in distribution, marketing management and R&D may well be increasing.30

The scale economies argument, though, can be pushed in other directions. Particularly troublesome for exporting sectors is that scale economies may create entry barriers in export markets. Indeed, this is just the first example of the entry barrier methodology playing a two-sided role. If scale

29See Williamson (1975).

30Less controversial is the statistical work on the effect of protection on scale intensive industries. A string of studies, beginning with the work of Eastman and Stykolt (1967) for Canada, document the small scale bias and industry concentration induced by protection of small country industrial goods markets.
economies in any given industry are quite significant, then at least in the short run it may be very difficult for a firm from a small market base, given the reduction in tariff barriers, to enter a foreign market.  

For those industries for which scale economies are so significant that the world industry is highly concentrated determining the pattern of international specialization is particularly difficult. It is doubtful whether many smaller open economies would even have such industries in the absence of government intervention unless there were strong reasons along comparative advantage lines for this to be the case. The opening of markets on a global or even regional scale can lead to a firm from even the smallest economies gaining world market share, particularly if it were a firm which prior to liberalization used high priced tariff protected intermediate inputs. On the other hand low costs can be an important factor in scale intensive industries, vis-a-vis competition with high wage cost countries. Even though many modern industries in which scale economies are prominent are also capital intensive, labour costs are often greater than fifty percent of total costs. Furthermore the nature of these costs is such that the wage costs are relatively more important in marginal variable costs than in total costs. A low wage competitor, by having lower marginal costs can easily cut price as a viable competitive strategy. Therefore even though scale is important, because capital costs are sunk, low wages are even more important than they would be in industries not subject to sunk capital costs. The net result is that it is feasible for a low-wage small country exporter to capture significant market share in a high-wage large country market, in an

31 The theoretical argument underlying this idea is spelled out in Harris(1988).
absence of protection of that market. This argument seems to fit well with the facts on the success of the NIC's in traditional large scale/sunk cost industries such as steel and autos.

In summary the theoretical conclusions one can draw relating scale and trade patterns are few. Trade in these instances is often theoretically indeterminate, providing possible reasons why government interventions in such industries are likely to remain important.

6.2 Product differentiation

In industries where the product is not standardized and product differentiation is the key to competition, this creates yet another reason to trade. Different countries can specialize in particular lines of products, thus realizing intra-industry gains from specialization. The Chamberlinian model of competition provides a theory which focuses on the positive welfare effects of an increased product variety. There is general agreement that trade between countries is beneficial because it increases the product variety available to consumers.\(^{32}\) On the export side, product differentiation opens up the prospect for entering foreign markets through a strategy of non-price competition and meeting selected market niches. Scale economies are less of a barrier and competing through selection of product niches is an important channel by which a country may export successfully.

\(^{32}\) Tariffs may be welfare improving in industries characterized by genuine product differentiation because of an under-supply in product differentiated industries relative to non-differentiated industries in a free trade equilibrium. Tariffs increase the number of varieties produced in the differentiated sector by raising profits in that sector and inducing entry. This argument is regarded as an intellectual curiosity at present by most applied economists. If under-supply of varieties were a serious problem then subsidy of entry costs for new varieties would be a preferable policy to protection.
Probably the most developed area in the 'new trade theory' are those models dealing with product differentiation. The basic thrust of this literature is two-fold; first, the welfare implications of protection and second, the pattern of trade. The welfare results are largely in line with basic partial equilibrium intuition. On the pattern of trade the most important result relates to two-way or intra-industry trade. It has been established that countries which are virtually identical will have substantial two-way trade in the same commodity class. Furthermore Helpman proved that given the existence of differences in factor endowments, there will exist both intra-industry and inter-industry trade motivated by traditional Heckscher-Ohlin factors. In addition country size is an important determinant of trade patterns within these models. Basically the results show that given differences in factor intensities between differentiated and non-differentiated goods, the larger country will tend to export differentiated goods in exchange for imports of non-differentiated goods.

What is interesting however is that the volume of trade is greatest between countries with the most similar factor endowments and similar size, and that most of this trade is intra-industry trade. This is an extremely important result because it is consistent with a wide body of evidence generated from the 'gravity' models of international trade.

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33 Most of the Helpman-Krugman (1985) book is concerned with the positive implications for trade patterns of product differentiation within the Chamberlinian model of industry competition.

34 This result is discussed at length in Helpman and Krugman (1986).

35 The gravity models are reviewed by Deardorff (1985). The basic proposition underlying these 'models' is that in looking at trade flows, trade occurs
The implications of the 'new trade theory models' for trade between the industrialized and developed countries has yet to be worked out in formal models. The suggestion of the literature though is that to the extent the IC's and the LDC's have significant differences in factor endowments most of this trade should be inter-industry rather than intra-industry. This in turn implies an emphasis on developed country imports of homogeneous products, and exports of differentiated goods. On first pass this seems a sensible result, but it is not clear that it is consistent with the facts. First, a great deal of intra-industry trade is intra-firm trade in components. This simply doesn't fit in with models based on differentiation at the final consumer good level. The large amount of trade in components is more compatible with a model based on differentiation at the intermediate good level. Secondly, international wage differentials weigh heavily in a world of mobile capital and technology on the location decisions of all industry. There seems no theoretical reason why the LDC's with lower wage costs shouldn't export differentiated products, both at the final and intermediate products level.

An observation made by Krugman (1981) is the possibility that liberalization of intra-industry trade involves less dislocation of specific factors of production than inter-industry trade. Hence the social adjustment costs to liberalizing intra-industry trade may be much less than to inter-industry trade. This carries the implication that liberalizing inter-industry North-South trade will be fraught with adjustment difficulties relative to North-North intra-industry trade. While Krugman's observation may have been relevant to intra EEC trade, I am not convinced it is of much between countries which are either geographically proximate to each other, or countries which have similar income levels.
empirical significance in North-South manufactures trade where dramatic wage differentials persist. Even were most North-South trade intra-industry, given the mobility of capital the North would face difficult adjustment problems in most industries where technological advantage wasn't great.

In summary the existing static product differentiation literature is of more relevance to developed country trade than to developed-developing country trade. Furthermore the stylized assumptions of this theory are too specific yet to be of much interest to a great deal of observed trade. However future integration of this literature with the technology literature may prove to be extremely valuable.

It is interesting that the traditional industrial organization literature on closed economies focuses not on the positive welfare aspects of product differentiation, but instead on the observed positive correlation across industries of high product differentiation with high concentration.36 Often we observe a number of full line oligopolies, each competing with one another through brand competition. In some cases, it is asserted that wasteful brand proliferation and image creation is what occurs. Closely related is the role of advertising as an entry barrier. By creating differentiation in the eyes of the consumer, entry barriers are created to new firms. If one accepts product differentiation and advertising as an entry barrier which leads to concentration and high profits, the implications for trade are different than the product variety perspective.

First, a tariff may induce wasteful product differentiation by fostering collusion on prices and encourage non-price competition among protected

36 Scherer (1980), Chapter 14 surveys the entry barriers literature on product differentiation and advertising.
oligopolists. A reduction in protection in these instances could have a positive effect on the cost efficiency of production and in lower consumer prices. On the export side, the problem is quite different. A significant barrier to a firm entering a foreign market could be the product differentiation of foreign based competitors. In particular, brand loyalty created by large scale advertising or large fixed costs associated with providing a full line of competing products, may impede entry into a concentrated foreign industry. Alternatively, the ability to product differentiate may facilitate entry; entry prospects will be enhanced by the ability to price compete given a reduction in foreign barriers and the possibility of finding a product niche. The possibility of world market concentration, achieved through defensive product differentiation and advertising by incumbent firms means that to successfully export, a firm must overcome these barriers. As in the case of scale economies, this may create problems in the adjustment to liberalized trade. On the other hand, the possibility of non-price competition through product differentiation may actually reduce the problems in successfully exporting.

The industrial organization perspective suggests that since product differentiation is one of the most important entry barriers, trade patterns may well reflect the success with which incumbent firms can prevent new entry, even in the face of significant cost advantages to new entrants. The implication is that one would expect to see in product differentiated industries global firms, exploiting their incumbent advantages on a global scale, or large firms from whatever national base exporting worldwide irrespective of the comparative advantage basis for that industry's existence within the home country. The pattern of trade will reflect the production
location decisions of these incumbent firms. Location in turn will be based on a combination of factors, including least cost production, importance of proximity to customers, and protection. The problem for the smaller developing country firm is in overcoming the advantage incumbent firms have in such an industry. In the absence of foreign direct investment by an established multinational, one would tend to expect the developing countries to reveal a comparative disadvantage in such industries.

6.3 Absolute capital requirements

A major entry barrier in many studies of market structure is the absolute size of capital requirements for an efficient size firm in the industry. This barrier is distinct from scale economies and is motivated by the observation that capital markets for industrial firms are imperfect. Capital markets are imperfect in that existing firms have a lower cost of capital than a new entrant on external borrowing, and have recourse to greater internal financial resources than a new entrant, who would typically have to raise most of the necessary financial capital through external borrowing. The presence of this capital market imperfection means that, other things being equal, smaller firms are at a disadvantage relative to larger firms. The theoretical rationales for these imperfections are not well understood. Undoubtedly, the risk element of entry into a concentrated industry plays an important role. There is substantial evidence of the risk to entry and how this affects the cost of capital to new firms.37

The implications of this capital market imperfection in open economy

37 Scherer (1980) pages 104-108 surveys the evidence on capital market imperfections related to firm size. He also cites studies pertaining to the risk of entry.
context remain to be fully understood. One observation is that it helps explain the presence of multinationals in concentrated industries. The multinational, by having recourse to corporate financial resources, is not dependent upon the capital market of any one country. In general most of the comments made with respect to entry barriers in the product differentiated industries are also relevant in this instance.

6.4 Industrial organization and barriers to export

In the discussion of the three static barriers to entry, it was noted that each may constitute a barrier to export for a firm attempting to enter the oligopolistic foreign market. Thus as trade barriers are reduced, some firms may have an opportunity to export, but that opportunity may be significantly hampered. There is a parallel argument on the import side; large firms from large countries may find it relatively easy to penetrate the domestic market of a small economy even if at a cost disadvantage. The evidence which exists on this question is sparse.\(^{38}\) The conclusion of these studies, though, is more or less in conformity with the view just expressed. Firms from small countries have difficulty establishing an export market in industries which are relatively concentrated, either due to scale economy or product differentiation barriers. Perhaps more telling are the case studies reported in the export marketing literature. There are numerous tales of small firms who attempted to establish an export market but simply gave up.

Another form of supporting evidence is provided by the studies on trade

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\(^{38}\)Caves (1983) review the evidence on export performance and industry characteristics.
patterns and market structure variables. In these studies there is often an attempt to control for static entry barriers, such as scale economies and product differentiation. There are numerous studies on 1960s data which show that small countries have 'comparative disadvantage' in scale economy industries. This is consistent with the hypothesis that entry barriers to export are present in scale economy industries which prohibit entry by small domestic firms. It is also consistent with the hypothesis that these industries are precisely those facing the largest tariff and non-tariff barriers to trade. Large countries can overcome these barriers by relying on their domestic market alone to realize scale economies and, thus, capture the export market. Unfortunately, the studies cited do not adequately discriminate between the two hypotheses.

A different argument might well hinge on the presence of barriers to export in particular, as opposed to barriers to entry in general. Thus, there might well exist economies of scale to export because of the presence of fixed costs in acquiring the necessary information to market abroad, and setting up necessary foreign distribution networks. Both types of barriers could, in principle, be circumvented by resorting to specialized 'export marketing' firms who spread these costs over a large number of exporters. Indeed, we observe this to be the case in a number of industries. In foreign industries which are concentrated however, this type of strategy is unlikely to work. First, the number of firms who could potentially enter the industry is small. Furthermore, the information and distribution networks are likely to be highly specialized to the particular industry. In many cases, the

39 See Hufbauer (1970) and Gruber et. al. (1967).
information may be product and competitor specific. This, in turn, means the scale economies to exporting cannot be overcome by export marketing firms in these industries. Jointly, the arguments suggest that if scale economies exist in exporting per se, they are most likely to constitute an effective barrier in those industries which are characterized by a small number of sellers. The positive association found between foreign concentration, entry barriers, and economies to scale in exporting all tend to reinforce each other.

6.5 Dynamic theories of market structure and trade

The static entry barriers approach to market structure has long been recognized as woefully inadequate. Much of the time, the theory ends up trying to incorporate a dynamic factor in a relatively ad hoc way. Empirical investigation of hypotheses suggested by the theory of entry barriers has tended to concentrate on the 'static' approach because of a lack of adequate time series data covering individual firms. In recent years though, the field of industrial organization has been most active in terms of a development of a more complete dynamic theory and serious attempts to test the hypotheses suggested. In this section we explore some of the implications of these theories for international trade.

The dynamic entry barrier approach emphasizes the importance of being first. In the trade area, it has tended to be applied to potential export oriented growth industries, or firms. In any particular country an 'industry' can often be one or two firms. Tailoring trade and industrial policy to deal with this fact, in general, means a shift of policy which focuses on industries, to one which focuses on firms. The discussion will focus on three important aspects of dynamics in determination of market
structures: preemptive large scale investment, firm specific learning economies, and investment in R&D.

6.6 Preemptive large scale investment

The advantages conferred upon the large size firm, relative to its competitors, led to the theory of strategic dynamic preemptive investment. The basic idea is that a firm, by being the first to expand by investing in fixed and irreversible firm specific capital, puts its competitors at a disadvantage. These competitors observe the large competitor and thus refrain from taking an action, such as expanding productive capacity, they would have taken had the other firm not beat them to it. The strategic 'threat' posed by the other firm is only believable, or credible, to the extent that the action taken results in costs to the firm which are genuinely 'sunk'; i.e., irrecoverable. Another way to state the argument is to recognize the strategic importance of 'burning one's bridges'. A basic precondition for this type of strategy to work is some type of indivisibility, such as scale economies in production or R&D, which keeps the competition limited to a few firms; thus the market structure, at best, is competitively oligopolistic.

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40 The original contribution to this literature is the paper of Eaton and Lipsey (1979).
41 The Alcoa case in U.S. antitrust is one of the most preeminent examples apparently conforming to this theory. In practical terms, the theory predicts the basic competition is over the timing of creating productive capacity to serve a future market. While there are great benefits to being first, there are also great costs. Market conditions and technology can change sufficiently rapidly so as to obsolete the initial investment. Being second allows one to profit from others mistakes. Nevertheless, an aggressive preemptive strategy by incumbents is often thought to dominate the more conservative 'second mover' strategy; consequently preemption is an important factor in explaining firm behavior and industry structure.
This theory of market structure has a number of implications in the context of international trade. First, consider the problem of firms attempting to enter the export market as foreign trade barriers are reduced. Foreign incumbents in those industries, faced with removal of protection, may engage in defensive preemptive investment against foreign entrants. There is every reason to believe the incumbents have the incentive to preempt, and will be reasonably successful in those industries where costs can be sunk for relatively long periods by investment in real capital. Heavily mechanized-strong scale economy industries, where the resale value of the equipment would be low, would be the natural candidates. At the same time, lower domestic levels of protection would cause import competing firms to attempt the same strategy. This is unfortunate because it perpetuates an inefficient industrial structure and actually causes inefficient and excessive investment within the industry. On the export side though, it does suggest that entry barriers could actually go up against potential export firms in response to the reduction in tariffs. This could lengthen the adjustment period following a tariff reduction, and in some cases, perhaps eliminate the prospects of establishing an export market in what appears to be an 'unprotected' market.

A more popular application of the preemption theory is with regard to a competitive national industrial policies and has become known as 'strategic trade policy'. A strategic trade policy means that a government uses their

42 Brander and Spencer (1983) provide a formal model illustrating the effects referred to in this paragraph. Eaton and Grossman (1983) provide a general model which covering those instances in which strategic industrial policy effective or not. The strategic trade policy literature is reviewed in Richardson (1986).
subsidy policies in oligopolistic industries in an attempt to strategically preempt other nations' firms in capturing market share. If successful, it's a great policy -- the winning country shares in the monopoly rents and the cost of the subsidy is more than justified. A more likely outcome though, is that everyone attempts to capture market share by subsidizing and the net result is that all lose with the world industry as a whole characterized by substantial over investment. Similar to the optimal tariff argument the result is that under certain circumstances it can be advantageous for one country to subsidize exports, given that everyone else does as well. The conditions for this to hold amount to being sure that no one country has a clear head start, and the countries contemplating subsidy have some market power so their subsidy policy has an important effect on the firm's sales. It is clearly an argument which can be used to justify 'export' protectionism. There are a number of problems with the practical relevance of the argument. Probably the most significant is the presumed degree of information required of the government bureaucrats involved with administering the program. Second, the whole story only makes sense if there are real monopoly rents to be re-distributed. This is empirically questionable at best, and even if such rents exist were they to persist over the longer run they would tend to attract entry. In my view the 'new trade theory' does not provide a legitimate defense of protectionist arguments.\textsuperscript{43} Richardson (1986) comes to similar conclusions.
6.7 Competition on the learning curve

A similar notion of preemptive competition, to that motivated by large scale productive investment, is grounded in the concept of dynamic scale economies which arise through the presence of learning-by-doing effects in the production process. The learning curve is an empirical summary of these effects whereby it is postulated that unit costs of production decline with cumulative output. There is a substantial body of empirical evidence documenting the existence of a learning curve effect in many industries. Economists have been troubled in the source of the cost reductions. Their basic idea is that as a production of certain 'new' product begins in the plant, the labour and management of the plant takes time to discover the most efficient production methods; related is the existence of a 'learning-by-doing' effect on any given task on the production line. In order for the learning curve to be an important competitive mechanism, the learning effects must remain with the firm; i.e., not be easily portable to other competing firms. It is believed that portability of learning between firms in many cases is low or at least subject to long lags.

Successful exploitation of the learning curve occurs if a firm, by getting down the learning curve first, gets ahead in the race to achieve lowest cost. By keeping prices close to cost, the leader in the race will deter the competition from continuing. It is an ideal form of preemptive 'investment' because there is absolutely no doubt about the fact that the

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44 Porter (1980), pages 15-17 provides a concise summary of the strategic possibilities a learning curve presents to a firm, as does Scherer (1980), pages 251-252, and both cite the relevant empirical literature. More recently Baldwin and Krugman (1988) present evidence on the learning curve and present a normative application in the context of strategic trade policy.
winner is at a competitive advantage. A learning curve strategy tends to emphasize price competition relatively early after the introduction of the product, rather than competition through product differentiation. Lower prices mean higher sales; higher sales mean faster learning and lower future costs. It can even be rational to price well below cost in the early phases of production. The payoff is future monopoly rents if the strategy is successful.

6.8 Technology races

It is clear that a conceptual framework which involves imperfect competition and entry barriers is essential to understanding the process of technological innovation. Many studies following Schumpeter (1911) have shown that economic factors play an enormously important, if not an overwhelming, role in the determination of the rate of technological progress. Competitive theories in which rents to innovation do not exist are woefully inadequate. As remarked in previous section 5 an important role has been attributed to technological innovation as one of the empirical determinants of trade in manufactured goods. An integration of technology theories of trade with the Schumpeterian perspective on market structure and innovation remains incomplete but the outlines of such a theory are clear. Of critical importance is the role of innovation as a temporary entry barrier to potential imitators. The Schumpeterian theory thus provides explanations of who innovates and when, and how the process of technological imitation occurs. The existence of exogenous and endogenous entry barriers in many

45 An excellent survey of the empirical literature on market structure and innovation is Kamien and Schwartz (1982, chaps. 2 and 3). Unfortunately, virtually all of this literature deals with the closed economy.
industries provides the means by which firms capture the quasi-rents from successful R&D. At the same time, technological progress affects the nature of entry barriers, and thus market structure in the long run is endogenous.

The technology diffusion and transfer literature offers some general conclusions about the speed of the imitation and the extent to which new technology is appropriable by the innovating firm. Generally, the conclusion is that the diffusion process is far from instantaneous. Imitation can be quite slow, and the "first in" on a particular class of innovations in either product or process invention can capture a large amount of the total social benefits to an innovation. Within national markets, the diffusion process has both public good and private good aspects. There is some evidence that industrial innovation is biased toward those innovations which cannot be easily imitated, as one would expect, and also some evidence that speed of diffusion is positively related to the competitiveness of the industry.46

Empirical observations on market structure and innovation have led to some theoretical models of Schumpeterian competition over product and process innovation among oligopolist firms. These models have given a much clearer picture of the forces at work.47 This body of theory, in general terms, has predictions which are generally consistent with the empirical observations made above. They start with the assumption that the race to innovate is a genuine competition and that at least over the short term the benefits to the


47 This theoretical literature is surveyed by Dasgupta (1982).
technology are proprietary. In the longer term, monopoly rents from being the sole provider of the product or process will be eroded by the introduction of new products and processes, including successful imitations.

An important part of the theory is the presence of either static or dynamic entry barriers in the post-innovation phase of the competition. These barriers allow the winners of the technology race to protect their market over the medium to short run and to collect revenues which not only cover product development costs but also provide above-normal rates of return on total investment. An important and related observation is that the technological competition tends to be pre-emptive and contain elements of irreversibility. Thus, if one firm gets ahead, there is a strong likelihood it will retain that lead for a considerable period through its ability to preempt subsequent competitors. Investment in R&D thus creates entry barriers and leads to concentration. The evidence supports the hypothesis that success in innovation is intertemporally correlated - "success breeds success." Thus, being successful today raises the probability of success in the future. The presence of entry barriers creates substantial lags in the process of competing down quasi-rents to successful initial innovators. The existence of the lags means that new entrants in a Schumpeterian race are most likely to succeed by getting into an area where established firms do not have significant advantages.

How can these theories be applied to the global economy? First, it should be noted that if all sales are in the export market, the primary national social benefit of the Schumpeterian competition is not an advance in

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48 The "success breeds success" hypothesis is due to Phillips (1966). Kamien and Schwartz (1982, pp. 72-75) review the evidence on this hypothesis.
the pace of introduction of new products or processes, but rather a share in
the quasi-rents which are earned by participating in the race. An open
economy can, of course, enjoy the consumption benefits of the advance in the
pace of innovation by importing, without participating in the Schumpeterian
competition. The existence of entry barriers and the dynamic nature of the
competition means that import prices include quasi-rents which persist even
in the long run. A country with ownership of a firm that participates in
such a race will share in these rents if it achieves a degree of success
which is in accordance with the industry average. Losing in any particular
race means a transfer of wealth to the winners through high product prices —
an unavoidable but necessary transfer. Finally, the pre-emptive nature of
the competition has the consequence that a country which refrains from
competing early has substantially reduced chances of competing later on.
This induces a technology gap which was emphasized in the technology based
view of trade. A concentration of successful innovators within one nation
leads to higher national income and a trade surplus in high technology
products for a considerable period.

In a Schumpeterian competition, the technology gap is endogenously
determined by a relative success of firms in different countries. To the
extent that the gap is narrowed, wages should tend to be more equal across
countries. This does not, however, reduce the significance of industrial R&D
for national income levels, given the existence of world Schumpeterian
competition and assuming non-appropriable technology. Any country which
fails to participate by investing in R&D will necessarily produce the low
technology goods; these, in turn, will pay lower wages and, hence, lead to
lower relative national incomes in the long run. An alternative strategy is
to invest in technology transfer hoping to benefit by using technology developed elsewhere to develop a superior product or process. This 'second mover' strategy may well be successful but it too requires substantial resources devoted to product development.

In an open economy framework, an important social return to R&D is in the form of super-normal profits on equity but a great deal of it may be in the form of higher wages to domestic labour. How can labour capture some of these quasi-rents? If the labour market is competitive, with an inelastic supply curve of labour to the successfully innovating firm, then as the firm's product demand curve shifts outward the equilibrium wage will be driven up. Suppose, for example, that the supply curve of labour is completely inelastic, labour is used in fixed proportions with other inputs, and these other inputs are in elastic supply to the firm. A shift in a monopolist's demand curve to the right will cause a large fraction of the increase in revenue to accrue in the form of higher wages to labour. A number of factors contribute to an inelasticity of supply of labour in the short run, including immobility of firms and workers and lags in the supply response of skilled workers to changes in industry demand. The competitive labour market assumption, though, is a far from accurate view of the situation. In most technologically progressive industries, workers acquire on-the-job skills and experience which make them more productive within the firm than in alternative employment. At the same time, this makes them more productive than a new worker to the firm's work force. Labour becomes a quasi-fixed factor and the relationship between the firm and its workers can be described as a situation of bilateral monopoly. Both groups have considerable bargaining power, as the monopoly power of the firm is
transferred to some extent to its workers. This, in turn, means that labour captures a significant fraction of the firm's revenues over non-labour costs.49

A successful Schumpeterian firm can attempt to avoid paying labour any "rents" by shifting the location of production. This type of policy is at best a short-run solution. Unless there are no worker-specific learning effects, so that inexperienced workers with comparable initial skills can carry out the production activities in any alternative location, the firm's production workers will likely acquire some of the firm's rents.

The distribution of world labour income, therefore, depends not only upon the distribution of factor endowments, including the endowments of human capital, but also on the distribution of successful Schumpeterian firms across countries who produce for the world market. All major industrial countries undoubtedly have some of these firms. Factors explaining relative success are suggested by the trade and technology literature. These include investment in industrial R&D and the level of human capital in the labour force.

Governments clearly have incentives to create barriers to firm mobility in these industries. If the successful firm can move its production facilities abroad, the country will lose a source of income and employment. At the same time, governments have incentives to foster the development of potential domestic Schumpeterian monopolists by a variety of policies.

49There is some corroboration for this in U.S. studies on the relation between industrial concentration and wages. The evidence indicates a positive correlation between quality of workers and industry concentration, although the direction of causation remains uncertain. The evidence is summarized by Scherer (1980, pp. 258-62).
including the subsidization of industrial R&D. The conventional wisdom is that the South has a comparative disadvantage in new technology industries, first because it lacks the underlying factor endowments necessary for successful innovation, and second because it faces substantial entry barriers in the form of large Northern competitors and protectionist policies in the North. While relevant in the past the factor endowment argument is clearly becoming less relevant in the 1980's with increased skills and scientific capacity in the South. The entry barriers argument though remains intact. The Schumpeterian perspective does offer considerable hope to the South in that Northern monopoly power is only temporary. As scientific developments create the base for new innovations the new firms can be located anywhere where the scientific and entrepreneurial capacity exists. Thus the potential for new firms emerging in the South based on high-technology is probably greater than it once was. The major future barrier to Southern entry may well turn out to be protection in the North.

7.0 North-South trade, adjustment problems and trade-industrial policy

In this section the implications of the previous sections outlining theoretical perspectives on trade in manufactured products, for adjustment in North-South manufacturing is examined from a variety of perspectives. It is clear there are many sources of structural change in manufacturing. Different theories of trade and specialization tend however to focus on different aspects of 'the adjustment problem'. The evidence on structural adjustment for industrialized countries is reviewed in Renshaw (1986). The

50The World Development Report 1987 surveys the North-South adjustment issues with respect to trade and trade policy and the sources of structural change affecting manufacturing in both regions.
World Bank Annual Reports cover the same territory in the developing countries. As is well known the evidence on the ability of most economies to cope with adjustment is not overly encouraging. Attempting to provide a theoretical framework in which to examine this type of evidence is difficult because international trade theorists have for the most part avoided dealing with unemployment as a 'structural' condition. The standard intellectual division between real trade theory and international macroeconomic theory has meant that the real side theory continues to deal with long run models in which all factor markets clear. Macroeconomic theory deals with aggregates and the short run. This particular intellectual division of labour has the unfortunate consequence that probably the most important problem of structural adjustment—unemployment—is one on which contemporary theory has little new to say. Nevertheless there is a good deal that can be said within a synthesis perspective on macroeconomic and microeconomic issues.

7.1 Mobility of human resources across skills, industries and regions

A basic conclusion of both theoretical and empirical work in the last decade on international trade, is that if the existing trends continue, with increased mobility of information and capital, narrowing of income differences between the older and the newer industrialized countries, and further economic integration on a global scale that the 'adjustment problem' currently faced by many countries in a variety of industries is likely to be more permanent than previously imagined. The pace of technological change will quite obviously impact on the magnitude of adjustment required, and its pattern across industries. Countries faced with the problem of a declining industry today, are quite likely to face the same problem again in the future, although in a different industry. The process of getting out of old
industries and into new ones however is rarely a smooth process. To make matters worse fluctuations in real exchange rates exacerbate the degree of competitiveness of one countries' industries relative to another country across the board, thus partially hiding the true 'long run' pattern of comparative advantage. Furthermore protection of an industry can significantly lengthen the economic life of an industry, far beyond what is economically efficient. For smaller countries with highly specialized patterns of production their problems are similar to those of specialized primary exporters. A loss of competitiveness in their major export sectors causes fairly immediate changes in policy, wage levels or exchange rates. The process of adjustment is essentially forced on them by external forces. The development of niche markets and the emergence of small scale flexible manufacturing systems should reduce the inherent necessity for small countries to specialize intensely and thus reduce the adjustment problem for them somewhat. For many small countries the major problem is resisting the political and bureaucratic pressures to develop the 'fad industry' of the moment. It is clear that all countries cannot develop export potential in the same set of industries; nevertheless the pressures for this type of industrial development are well documented.

The larger countries have a different set of problems in dealing with adjustment. First, protection is one feasible means of putting off the adjustment problem for large countries. Their market size is sufficient that by limiting imports the domestic industry can survive if not prosper. Secondly the export industries in large countries are sufficiently small as a percent of total economic activity, that problems for the export sectors are never as politically visible as those of the other sectors. Finally the
pattern and trends in the necessary economic adjustments are never as obvious in the larger countries. A less specialized industrial structure allows movement of workers between industries—particularly the younger more highly skilled workers. This internal adjustment option which is obviously the most useful response to a loss of comparative advantage in a particular industry gives the larger countries a considerable advantage in dealing with the adjustment problem. An integrated European Common Market with complete mobility of labour can obviously deal with structural adjustment much easier than a fragmented market with immobile factors of production.

In an era of on-going change in the pattern of international specialization in manufactured and service commodities, the design and choice of policy suggests there should be an emphasis on a) increasing market size within a single political jurisdiction to facilitate internal industrial and labour adjustment and b) increased emphasis on increasing the mobility of labour both across industries, occupations and across geography. Both of these factors for sometime have been the objective of so called 'positive adjustment policies'\(^{51}\); these policies have met with limited amounts of success across a number of countries. However market forces, independent of government interventions, have already, and will continue, to push firms and individuals into investment decisions which enhance mobility across industries and across skills. With respect to geography, economic integration of regions has proceeded rapidly in the post-war period forcing governments to react to, rather than anticipate, the pressures induced by such integration. Government policy promoting regional economic integration, and

\(^{51}\)For a survey of these policies and their relative success see Renshaw(1986).
thus mobility of human resources, can be an important component of policies dealing with structural change. The introduction of these policies, however, often meets with substantial resistance creating the 'political' problem of adjustment.

In the future the identification of industries with specific skills and locations may become blurred as firms and individuals acquire the ability to do a variety of tasks. Flexibility of the firm and the individual is a trait of considerable social and economic value. With modern manufacturing methods, workers' skills tend to be oriented towards specific tasks, but these tasks may be utilized in the production of a wide variety of commodities. Thus a robot-repair specialist can find employment in a television or an automobile part plant. Furthermore, many of these skills will be mobile across the tradeables-non-tradeables boundary thus facilitating the adjustment to shifts in real exchange rates. At the same time firms tend to be identified by the skills of their workers and management, and less by location of production and product specificity. The market will place a premium on those skills which are portable across a wide variety of uses. These developments suggest an increase in 'mobility' across conventional occupational-industrial barriers. It is possible therefore in future that the social costs of adjustment will be reduced.

Trade patterns are difficult to explain using the old criterion of comparative advantage rooted in specific locational advantages or factor abundance when mobility of people is high. Skilled labour and the political-economic infrastructure surrounding an industry therefore play an enhanced role in determining the location of production. On the other hand, even in the best of circumstances there are numerous factors limiting the
mobility of human resources and hence adjustment. The principal factors limiting adjustment are 1) the desire of many individuals to stay located in a given community through much of their working life, and 2) the desire of governments to maintain control over those factors affecting the economic welfare of their constituents and the promotion of nationalistic or regionalistic interests. Trade and industrial policy at the national level is therefore driven in part by the requirements to minimize adjustment in these two dimensions. Note that the desire to minimize these types of adjustment occur at the same time global forces promoting adjustment in other dimensions is occurring.

The net effect of these opposed forces will be an on-going tension between the globalization of the economy and the increased use of national policies to interfere or impede this tendency. A partial solution to the problem is for communities/regions to develop a highly diversified skill base so that adjustment on a commodity basis can be facilitated at a fairly local level. There are limitations to this process however, particularly given the existence of national monetary systems and thus unified exchange rates across a number of regions. Inevitably adjustment of labour by moving between communities and regions will have to take place, or alternatively adjustment is delayed by protection or subsidy policies which are put in place to preserve the existing allocation and number of jobs.

It is reasonable to expect cycles in this process of policy response to external shifts in comparative advantage, with the political agenda of a country being dominated by one type of force at one time, and another at another time. Thus during periods when the necessary adjustment can take place at the commodity level within given regions and communities, countries
will tend to be outward looking and interested in fostering an open climate in their trading relations with other countries. In other periods the adjustments required will go beyond the feasible shift of skills across activities within a region, and require a shift in labour across regions. In these periods countries tend to become protectionist, and either undertake the adjustment slowly, or not at all.

In summary therefore the argument is that a) adjustment to trade shocks is facilitated because of a more flexible system in dealing with the movement of skills and capital within regions but across economic activities; and b) more general adjustment of labour across regions and skills will be necessary however and this can be met through a combination of temporary protection, increased regional economic integration and the creation of more general skills within the labour force.

7.2 Industry structure and adjustment to liberalized trade

Theory provides no clear answer as to the pattern of adjustment to liberalized trade in industries with significant scale economies and entry barriers. Important issues the theoretical literature has largely avoided are the dynamics of entry and exit in response to reduced protection, and the impact of the liberalization on the size distribution of firms. Work by Owen (1983) is particularly interesting in this respect. He argues that in the case of the European Community the major type of adjustment in scale intensive industries is the exit of small scale fringe producers. Thus rather than a type of adjustment in which all firms of the same size become larger in response to the liberalization, the increased competition which results from a liberalization leads to exit of the fringe small scale producers, together with possibly some increase in scale by the larger
firms. Owen argues that the efficiency gains to liberalization are particularly large because of the high degree of inefficiency in the fringe portions of most industries. From the perspective of trade and specialization patterns across industrialized and industrializing countries this view of scale economies is important because it suggests an answer to the old puzzle of Graham as to how economic activity will be allocated across countries in the face of scale economies, but insignificant differences in technology or factor endowments. As economic integration proceeds national markets are merged into large regional markets. The new industrial organization will be more competitive, but at the same time will probably not accommodate the less efficient firms. Thus as exports from industrializing countries are absorbed the small inefficient firms in the import competing sectors will disappear through bankruptcy, exit or merger. The larger import competing firms have a good chance of surviving and become part of the new trading environment.

In summary, in the presence of scale economies, as the smaller firms are the inefficient firms, adjustment to liberalized trade involves an asymmetric adjustment pattern across the impacted industry. On average small firms exit and large firms expand. This in turn implies that the adjustment costs to liberalized trade are not as concentrated on an industry basis in a given country as one might have imagined. The major problem occurs in small countries which have no firms of sufficient size to compete in at a global level with large firms already reaping the benefits of scale economies. In these cases it is possible foreign competition, including predatory pricing

52 Hazeldine (1988) has made similar observations for Canadian manufacturing.
by large incumbents, would preclude the emergence of any firms from these countries in the absence of natural cost advantages. In these cases 'adjustment' to liberalized trade would involve elimination of the domestic industry, and clearly the threat that this might occur would raise significant political barriers to liberalization in these instances.

7.3 New patterns of specialization, adjustment and policies post-product cycle

The general conclusion of the new product cycle literature on adjustment goes little beyond what the old product cycle literature more or less said except with a new twist. New product cycle theory suggests that the asymmetry between North and South is likely to be reduced over time. This implies that as the South acquires advanced manufacturing capability some reversals in the traditional product cycle pattern may occur, with traditional industries relocating in the North. In terms of implications for the adjustment problems being felt in the North, they are reasonably straightforward.

First, and probably foremost as the technological 'gap' between the industrialized and industrializing countries narrows, the pattern of specialization in world production will be less obvious in terms of national differences in technological capability. That in turn means the location of production will be more vulnerable to exchange rate effects, wage differentials, and protection and subsidy policies.

Second, is the impact of the income growth in the industrializing countries on exports from North. This income growth will in the long term be the most important economic impact of this process. For the North industrialized countries it will mean increased exports across a wide variety
of goods. It is also quite possible that patterns of comparative advantage based on more traditional locational specific advantages may re-emerge, with the re-establishment of traditional industries such as steel, textiles, and electronic goods assembly in many of the industrialized countries, as the capital intensity of production in the South increases.

Whether this occurs will of course hinge on policies adopted by a number of countries. For example the industrializing countries will face adjustment problems similar to those of the existing Western industrialized countries of the past two decades. As wages rise many of the industries which are highly important in the early phases of industrial development become non-competitive relative to either other industrializing countries, or even the developed countries themselves in some cases. The experience of Japan is illustrative of what is likely to happen. Rising wages, an appreciating exchange rate, and loss of competitiveness accompany the increased levels of real income as advanced industrialization proceeds. This will obviously raise the usual political and economic adjustment problems of declining industries in these countries.

In the older 'advanced-but-aged' economies of the North a whole different set of problems and opportunities emerge in this process. On the positive side the re-emergence of the old industrial regions is probable, as comparative advantage in traditional industries develops, or at least the comparative disadvantage of these industries is reduced. This mean that the political pressures for protectionist policies may be reduced in these sectors as wages and employment there increase. The problem of course is that the cycle of industrial birth and death never stops. For the old industrialized countries the previous permanent comparative advantage in the
'high technology' innovating sectors will be reduced and quite possible lost for some industries in some countries. As this process occurs their is renewed interest in the sources of innovation and policies which affect innovative activity. This is already happening in most of the OECD countries; education, basic research, and science policy are all lively topics of debate in these countries. At the same time protection of these sectors will become an issue; the grounds on which protection will be sought will undoubtedly emphasize the 'special' character and importance of the high technology sectors as engines of economic growth. But basically the old story will be re-told, with todays software specialists playing the role of skilled auto-assemblers a decade ago.

7.4 Technological change, structural adjustment and global specialization

An important theme of this paper is the importance of technological change in explaining the pattern of trade and adjustment in and between both developed and developing countries. A major structural adjustment problem as a consequence of global technological change is the decrease in the demand for particular skills. In a world with mobile technology any such development is felt universally, although its impact will depend on the degree to which any particular region is specialized in activities using that skill intensively. Such technological change has occurred routinely through the last two centuries, displacing blacksmiths, railroad steam engineers, stenographers and so on. For the purposes of this essay however the important observation is that because such a change does not originate with trade per se, and furthermore is global in scope, its impact will be more widely and immediately felt than was the case even a decade ago. Thus for example a new robot which displaces a type of auto-assembly work will
displace workers in this activity across all countries engaged in auto-assembly.

Trade enters the picture in two ways. First those whose skills are displaced will obviously resist the displacement. Successful attempts to resist adoption of the new technology will result in the country becoming non-competitive, which in turn means that if jobs are to be preserved protection from more efficient international producers must be put in place. As a viable policy option for preserving jobs this type of protection will only work in countries with large internal markets where the cost of the policy is widely diffused. Smaller exporting countries may therefore ultimately bear a significant burden of this type of policy through a deterioration in their terms of trade as the larger countries 'protect' jobs.

The second aspect of a global technological change of this type is that through a variety of side effects the international pattern of specialization may change fairly dramatically. When this occurs of course a number of adjustment pressures will take place in those countries losing economic activities. An important modern example is the use of Just-in-time inventory systems which have made it necessary for parts producers to locate closely to the final assembly stage. This has resulted in parts production or assembly production shifting location. When such shifts occur internationally trade patterns obviously shift, and adjustment is called for.

In summary technological change implies that major structural adjustment will still be necessary due to new technology creating new products and decreasing demands for old skills--this will now be felt on a global scale and will spill over into trade relations either because of the policy
response to the development or because it necessitates a new pattern of specialization of activities internationally.

7.5 Macro imbalances and the problem of structural adjustment

In section 4 it was argued that savings-investment imbalances across countries is one important factor driving trade volumes and patterns of specialization. This raises at least two significant problems. First, with respect to adjustment, the unfortunate problem of double adjustment can emerge. This happens because a country shifts from one pattern of specialization to another pattern of specialization as the savings-investment gap changes. Consequently an industry pressured by imports in one regime downsizes, and then has to re-expand as another regime emerges. This leads to significant adjustment costs in both directions.

To the extent that production pattern shifts and trade volumes change with these imbalances substantial problems exist in the conduct of trade policy. Trade policy becomes driven by short to medium term shifts in macroeconomic imbalances, rather than as a policy tool motivated by the quest for the longer term gains from trade and specialization. Objectivity in the administration of trade policy becomes less apparent as the concept of comparative advantage loses credibility in the face of large shifts in shorter term competitiveness. Indeed the problem becomes even more difficult if some industries become net exporters and then in a few months or few years later return to the status of import-competing, intensifying the calls for

53 Macro economic imbalances cause a host of political and economic problems for all countries. There is a large literature on this problem which is not my intention to review. Issues pertinent to North-South economic relations are discussed in the World Development Report, 1988, Part I, chapter 1.
Ambiguities in the concept of comparative advantage is not the root problem. Clearly gains from exchange are realized by having one country invest more than it saves and another country doing the opposite. Most of the trade and adjustment problems which arise indirectly as a consequence of international shifts in savings-investment patterns occur if the pattern of production required is presumed to be sufficiently permanent as to allow the necessary investment in human and physical capital. It is the potential instability in patterns of specialization across countries due to instabilities in savings and investment patterns which make long term investment in both physical and human capital uncertain. Macro economic imbalances will therefore contribute significantly to the problems of structural adjustment by creating instabilities such that longer term patterns of comparative advantage are not as apparent as they might be. Whether these imbalances will prove to be more or less important in the future is impossible to predict.

7.6 Preemptive industrial policy

In section 6 it was argued that in the presence of international oligopolistic competition governments have an incentive to undertake 'preemptive' actions in attempt to secure market share for their own domestic firms. The motivation behind these policies to attempt to get a larger share of monopoly or innovation rents typical of oligopolistic industries. The strategic trade policy literature has focused on this set of policy issues and the conclusions are mixed.  

Richardson (1985) provides an overview of the literature.
The idea behind a strategic trade policy is very simple. Through production or export subsidies a government can attempt to foster a winning firm which has a significant world market share in an internationally oligopolistic industry. The dynamics of this new infant industry argument and as compared to the old one is the 'hysteresis' of the market dynamics. With dynamic preemption, the long run equilibrium is not independent of the short run outcome. A firm which successfully preempts a competitor in the short run may retain the lead forever, given the dynamic irreversibility of investment. In the international context, a country which allows itself to be preempted may permanently lose an export market. The stark contrast between winning and being preempted means that all countries have a strong incentive to engage in protectionist type policies in these industries.

If all countries resort to protection though, the whole idea of getting access to the world market falls apart, and hence, also the case for subsidy. The risk of this type of preemptive strategy, when the vehicle for preemption is investment in productive capacity, is great. It can result in over capacity in the world industry. This in turn could lead to aggressive price cutting and the type of destructive competition observed in the 1930s in some industries. If the vehicle for preemption is the learning curve in production, the arguments for protection and subsidy are subject to the same general risks, although the logic is closer to the genuine infant industry argument. Protection in the early phases of the industry, if the domestic market is large, can directly contribute to increase sales, and hence, speed progress down the learning curve. In very small economies the domestic market may not be large enough and a subsidy on output would be the more effective instrument. If you're first, of course, you may be a winner. If
you're not first, what kind of risks are you running? Will your infant turn into an overweight loser?

It is clear that large countries, because of the size of their domestic markets, have an advantage in this type of competition given that protection by trading partners is probable. In the absence of protection by all concerned the competition is not so heavily stacked against the small country. Suppose then, a number of countries all start their own domestic firms down the learning curve about the same time aided with subsidy. Assuming they are all equally successful in sales, none should be at a cost advantage relative to the others because of the learning effect. Ultimately, they will all share in the world oligopoly. The risk present in learning curve competitions is that a firm pushing a particular product can be cut out of the market by some new product development - the 'leap frogging' effect. This is certainly a possibility. On the other hand, the existence of the learning curve effect in an established product means a new competing product faces a significant entry barrier. Video disc players are an example of a product which was effectively leap frogged by the introduction of low cost VCRs. Learning economies were claimed to be substantial in both cases.

Most of the problems associated with learning curve competitions are also present in R&D races. A major problem with focusing a policy on dynamic scale economies is the transient nature of the object being pursued. The policy must focus on the firm during a particular stage of its development. For industries in which continual product innovation is very important, targeting at the level of the firm may be necessary. In certain industries if there is a fairly clear case that the small economy has a good reason to compete, i.e., a factor cost advantage or expertise and technology in a
particular area, then policies which foster development of such industries may be justified.

The strategic trade policy literature has focused on those cases where large firms—small numbers competition is relevant, and therefore there exist rents to be shifted around. As Horstmann and Markusen (1987) demonstrate, in the presence of unrestricted entry, most of these results are irrelevant. In the context of the broader adjustment problem this literature offers a corollary lesson. Significant oligopoly power can seriously distort the allocation of resources. The existence of international oligopoly power invites governments to attempt to manipulate that power, much in the same way large countries have incentives to manipulate the terms of trade in their favor. The exercise of such power however distorts resource allocation internationally and invites retaliation. Therefore while such policies will no doubt be observed, particularly in the larger countries with a large domestic market as a fallback, there is little to recommend such policies on grounds of international welfare, or in most case, based on the national interest. What is called for is clearly a supra-national competition policy to preserve the benefits of competitive markets in all countries. As yet no such international institution fulfilling this function has been created, although most regional trading agreements contain elements of competition policy.

8.0 Conclusion

In this paper we have reviewed the theoretical developments in international trade theory over the last decade, and contrasted these with the orthodox models of comparative advantage used in most policy discussions pre-1985. In general the theories have moved a long way to accommodating the
global economic trends of the 1980's. Increased emphasis on factor mobility, technological change and transfer, and globalization of competition in imperfectly competitive industries are characteristics of the modern theory. There remain however a number of unresolved problems, particularly in attempting to provide a theoretical structure consistent with the continued industrial development in the NIC's and LDC's of the 1980's. First, the models are still not terribly strong at predicting which countries innovate, and the mechanism by which technological transfer occurs internationally. A large number of hypotheses have been proposed but none that is sufficiently simple to attract universal support. It may well be the process is simply too complex to be amenable to simplistic theorizing. Second the theories all are rather weak on the dynamics of the adjustment from developed to industrializing to industrialized country. Thus in explaining North-South structural change the theories tend to be adequate at describing trade between countries of given states of economic development, but not between countries, one of which is advancing rapidly. Finally, as noted in the text adjustment is particularly difficult to theorize about due to the lack of a coherent theory of unemployment.

In spite of these inadequacies economic theory does provide a synthesis framework in which trade in manufactures, and the on-going structural change in manufacturing countries and industries can be examined. Even with its inadequacies the synthesis is far from simplistic involving a global view of industries and firms buffeted by technological change, and economic uncertainty. In addition the policy environment is continually changing as a consequence of active government intervention in many industries.

The main lessons of the new trade theories are threefold. First, the
concept of comparative advantage while still valid is less clear than it once was as a useful guide to policy. Technological change, scale economies and the dynamics of savings-investment flows in a world of mobile financial capital all render the concept of comparative advantage considerably muddled. Second, the pattern of trade and specialization is more crucially dependent upon technology and the actions of individual firms than traditional theory emphasized. Or, to put it another way the world distribution of physical resources is less important than the technical and entrepreneurial know-how in the modern economy. Trade patterns simply reflect this reality. Third, the old lessons about beggar-thy-neighbor polices are just as true in the modern theory as they were in the traditional view of trade. Attempts by governments to subsidize or protect motivated by a desire to achieve gains at the expense of trading partners are bound to be self-defeating once those partners react.

Almost all theories of trade, both new and old, are consistent with the view that there is a realistic need to provide positive structural adjustment policies in traditional industries as a result of the continued industrial development in labor abundant countries. The crucial issue in the design of policy is therefore in choosing those policies which facilitate adjustment but at the same time achieve this with limited cost to one’s trading partners. Different trade theories suggest a difference in the emphasis placed on one aspect of adjustment versus another. All theories discussed in this paper however point out that it is difficult in an integrated world economy to find unilateral policy actions which do not have some unintended external consequences.
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| WEP 2-46/WP.10 | Employment and stabilisation in Mexico by L. Mertens, December 1986. |