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ABSTRACT

Adjustment is an ongoing process by which factors of reallocated to equalize their returns in different uses. Adjustment occurs though market mechanisms or intrafirm reallocation of resources as a result of changes in terms of trade, government policies, resource availability, technological change etc.. These changes alter production opportunities and production, transaction and information costs, and consequently modify production functions, organizational design, etc..

In this paper we define adjustment (section II); review empirical estimates of the extent of adjustment in Canada and abroad (section III); review selected features of the trade policy and adjustment context of relevance for policy formulation among which: slow growth, a shift to services, a shift to the Pacific Rim, the internationalization of production, investment distribution communications the growing use of NTB's, changes in foreign direct investment patterns, intrafirm and intraindustry trade, interregional trade flows, differences in micro economic adjustment processes of adjustment as between subsidiaries and Canadian companies (section IV); examine methodologies and results of studies of the impact of trade liberalization on jobs (section V); and review the R. Harris general equilibrium model (section VI).

Our conclusion emphasizes the importance of harmonizing commercial and domestic policies dealing with adjustment (section VII). We close with a bibliography of relevant publications.
RESUME

Le redéploiement industriel est un processus continu de réaffectation des facteurs afin d'égaliser leurs rendements dans diverses utilisations possibles. Effectué via le marché ou au sein de l'entreprise à la suite de changements dans les termes d'échange, les politiques gouvernementales, la disponibilité de ressources naturelles, le changement technologique, les changements dans les préférences des consommateurs, etc., le redéploiement industriel implique des changements dans les possibilités de production, dans les coûts de production de transaction et d'information, d'où des changements de fonctions de production, de design organisationnel, etc..

Dans ce texte, nous définissons le concept de redéploiement (section II); passons en revue des études empiriques de son ampleur au Canada et ailleurs (section III); énumérons des éléments importants que les politiques de redéploiement industriel doivent refléter dont : la croissance lente, la mutation de l'activité économique vers les services, le dynamisme des pays du Bassin du Pacifique, l'internationalisation et l'intégration de la production de l'investissement de la distribution, l'utilisation croissante des barrières non-tarifaires, les changements dans les patterns d'investissement direct étranger, la croissance du commerce intra-firme et intra-industrie, les changements dans les flux de commerce interrégionaux, les différences de comportement des succursales et des firmes autochtones face au redéploiement, etc. (section IV).
Nous examinons ensuite les méthodes et les résultats d'études de l'impact de la libéralisation du commerce sur l'emploi (section V), dont l'utilisation d'un modèle d'équilibre général par R. Harris que nous commentons (section VI). Notre conclusion met en lumière l'importance d'étudier conjointement les politiques commerciales et les politiques domestiques pour favoriser le redéploiement industriel (section VII). Suit une bibliographie sur les lectures pertinentes.
Selected Quotations*

1) "Empirical work indicates that structural changes in the Canadian economy /caused by bilateral or multilateral trade liberalization/ could be large and extensive... many public policy issues revolve around the process of adjusting to a change in the bilateral trade relationship. Moreover, factors such as the labour adjustment process, labour market operations, regional economic structure, technology performance, other non-production aspects of corporate behaviour, and intracorporate trade can not only affect the process, time frame and costs of economic adjustment, but may also affect significantly the degree to which the potential long-run benefits are realized".

2) Societal "models" of innovation can be assessed with respect to...how they organize the supply of local public goods, how they encourage experimentation and how they respond to the income redistributions arising from technical change.
Drawing on A. Hirshman's work two...models can be identified. In the first, the social change...occurs mostly through mechanisms of exit, a decentralized process in which resources vote with their feet and in which...income shifts serve to encourage experimentation, reward the growth of winners, and assure the (eventual) disappearance of losers. The second ideal type relies mainly on voice: change is induced through consensus and through the conscious societal weighting of interests and options, buttressed by mechanisms for redistributing income between winners and losers.
H. Ergas, "Why do Some Countries Innovate more than Others?" Centre for European Policy Studies, p. 34.

* These quotations were selected to identify issues which will be addressed in this paper.
I INTRODUCTION—WHAT AND WHY?
This discussion paper presents definitions and concepts of adjustment, it reviews estimates of the extent of structural adjustment, outlines features of the current economic context relevant to adjustment and discusses studies of the impact of trade liberalization on adjustment.

No attempt is made in this initial paper to present a thorough review of context, causes, processes, private and social costs and benefits, time frame, effects and related private and public sector policies relevant to adjustment in Canada.\(^1\,2\)

Forthcoming papers will examine other aspects of adjustment i.e.:
a) cyclical and structural; b) short-term versus medium-term processes; c) economy-wide versus sectoral, versus firm, versus plant-level approaches; d) intersectoral and intrasectoral patterns; e) capital versus labour adjustment; f) national versus regional versus city and town adjustment; g) international comparisons; h) the role of MNE’s and subsidiaries in the adjustment process; i) types of technologies and their adjustment impacts; etc.

II DEFINITIONS AND CONCEPTS OF ADJUSTMENT
Adjustment can be viewed as the ongoing process by which factors are reallocated to equalize factor rewards in alternative uses. This involves the reorganization of resources within and between firms and industries and hence regions, through market mechanisms or internally, as a result of changes in external terms of trade, government policies, scale effects, changes in resource availability, technological change, changes in consumer tastes, prices and incomes etc... These changes alter the production opportunities, production transaction and information costs, and consequently set in motion forces that change production functions, organizational design, etc.

Causes of adjustment can be characterized into demand side versus supply side changes, external versus internal, temporary versus permanent, cyclical versus structural, all of which give rise to different adjustment problems and the need for different policies. It is important to distinguish between: a) an autonomous micro-level change in the competitive position of a firm or industry relative to other domestic firms or industries and those in foreign countries caused by an innovation in a product service or process, and b) a change in the competitive position of a firm or an industry in one country relative to its
competitors in other countries as a result of a macro-economic change in tariffs or fluctuations in the exchange rate. 3

The extent and nature of adjustment resulting from trade liberalization is much influenced by the shape and location of firm and plant production functions at home and abroad, by the position of firms on and relative to those production functions, by institutional (i.e. government involvement) and or market features, and by the impact of trade liberalization on these. 4 We shall be reviewing available studies of the trade liberalization impacts but shall not attempt to go beyond that in this paper. It is hoped that the review will help to formulate improved methodologies for the study of adjustment.

III STRUCTURAL CHANGE AND ADJUSTMENT IN CANADA—A BRIEF QUANTITATIVE OVERVIEW

1) An International Comparison of Changes in Trade Structures
One indication of the extent and pace of change in Canada's trade structure is provided by Pearson and Salembier. 5 They examined changes in the composition of trade and computed the sum of the share changes without regard to sign for individual products between an initial and terminal year. A value of zero for the index would indicate no change in production share between initial and terminal years, a value of 2 would indicate maximum change.

COMPARATIVE CHANGES IN TRADE STRUCTURE
1960-1977

<table>
<thead>
<tr>
<th></th>
<th>Canada</th>
<th>France</th>
<th>Germany</th>
<th>Japana</th>
<th>UK</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficients of Structural Changeb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Exports</td>
<td>.73</td>
<td>.31</td>
<td>.21</td>
<td>.49</td>
<td>.20</td>
<td>.22</td>
</tr>
<tr>
<td>Total Imports</td>
<td>.30</td>
<td>.48</td>
<td>.57</td>
<td>.53</td>
<td>.62</td>
<td>.76</td>
</tr>
<tr>
<td>Total Non-Fuel Imports</td>
<td>.32</td>
<td>.55</td>
<td>.51</td>
<td>.25</td>
<td>.67</td>
<td>.65</td>
</tr>
<tr>
<td>Manufactures Imports (2-digit SITC)</td>
<td>.27</td>
<td>.29</td>
<td>.23</td>
<td>.10</td>
<td>.31</td>
<td>.32</td>
</tr>
</tbody>
</table>

b Sum of absolute values of share change of ith commodity group, one—and two-digit SITC levels.
Source, Pearson and Salembier, op cit.

According to this measure Canada experienced most change in its export structures. Results indicate that in the USA, France, Germany and the UK, the structure of exports was more stable than the structure of total imports or
imports excluding fuel. In Canada and Japan, there was less substantial change in non fuel import structures than in the other countries.

At this aggregated level, the USA experienced the greatest change in its total import structure and Canada experienced less change than the USA, France or the UK.

Once fuel imports are excluded, the USA and the UK suffered the greatest structural change in imports and Japan and Canada the least. It would be useful to measure the extent of adjustment pressure distinct from the degree of responsiveness of the economies or factors of production in understanding the adjustment process and developing policies. The measures currently available do not do so.

Proper understanding of the adjustment process calls for going beyond aggregated measurement of change in export and import structures into measurement of sectoral, regional, and employment structures change within countries. Further studies would call for identification of the causes of such structural change i.e., whether the change is induced by trade, by technological change, etc.

2) **Domestic Intersectoral Structural Change**

Preliminary results of a DRIE examination of historical structural movements in product and factor markets provide little indication of fundamental structural change at an aggregate level, but some indication of structural adjustment at a more disaggregated level.

An examination of the intersectoral composition of constant $ GDP from 1948 to 1979 indicates little structural change except for the primary sector which has declined in relative importance. In 1948, the service sector (commercial plus non-commercial) accounted for 60.2% of total GDP, a percentage which had risen to 66.2% by 1982. Manufacturing which accounted for 21.9% of constant $ GDP in 1948 accounted for 21.6% in 1981 and 19.9% in 1982, a result influenced by cyclical considerations. Structural decline is evident in the primary sector which accounted for 10.1% of constant $ GDP in 1948 and only 6.1% by 1981.

An examination of the intersectoral composition of constant $ value added at a greater level of disaggregation (177 industries) indicates significant but not extremely pronounced structural change. The commercial service sector percentage of constant $ value added went from 44.9% in 1961 to 51.2% in 1979;
manufacturing share went from 21.4% in 1961 to 21.6% in 1979; and the primary sector went from 11.3% in 1961 to 7.0% in 1979.

An examination of the composition of employment indicates much more substantive adjustment than does analysis in GDP or value added.

The service sector (commercial plus non-commercial) which accounted for 44% of total employment in 1946 accounted for 70% in 1982; manufacturing went from 23.7% down to 16.6% and the primary sector diminished significantly from 30% to 7% of total employment over the same time period.

Preliminary analysis of the adjustment question at DRIE made use of an aggregated summary measure or structural adjustment utilized by the United Nations to measure the extent of structural change. The structural index is as follows: \[ I = \frac{0.5}{C} \sum \left| \frac{A_{i1} - A_{i2}}{A_{i2}} \right| \] where \( A_{i1} \) and \( A_{i2} \) are percentage shares of output or employment in sector \( i \) in periods 1 and 2. These computations have been performed at both the 12 and 177 sector levels.

Use of this index in calculations utilizing successive years to get at the rate of change of structural change at the total economy level indicate no acceleration in the rate of structural change at the 12 sector level but significant modification at the 177 sector level with an acceleration in structural change during the 1970's relative to the 1960's, and an upward trend in the extent of structural change from 1965 on. Computation of the structural index indicates a slight upward turn in the rate of change in the service sector value added structure. It also indicates that the manufacturing sector is changing faster than services with a slight acceleration over the 1970's. Note that this measure of structural change reflects cyclical effects which a proper measure should attempt to abstract from.

A computation of the index in both Canada and the USA for total output at the 33 sector level over the period 1961-1979 indicates a higher level of structural change in Canada than in the USA but no growing divergence in the rates of structural change. There was a significant increase in the USA index from 1973 to 1975. This reflected oil price deregulation and recession and was not felt then in Canada given Canada's approach to oil pricing. Updating would probably indicate growing divergence.

These preliminary results would seem to indicate no long run trend towards acceleration in structural change in the Canadian or American service sector. A similar conclusion seems to arise from an examination of the index of
manufacturing output which increased to 12.7% in Canada and 9.4% in the USA between 1961 and 1979. Somewhat similar results also obtained from an examination of changes in the total employment structure, with structural changes being more significant in Canada than in the USA but with both countries displaying an increase in the rate at which the structural distribution of employment is changing. It also appears that the Canadian and USA industrial distribution of output and input are converging over time. It would seem that there may be more cyclical movement and less secular change in the USA industrial structure than in Canada.

A number of countries and large firms make use of strategic matrices to provide insights into structural change in domestic economies. One such internal DRIE exercise involved the examination of a number of key indicators of the relative competitiveness of Canadian industry sectors from 1970 to 1980 and their relationship to the dynamics of world market growth in the same sectors.

Profitability (average of profit after tax on equity), market share, and growth in trade shares were utilized to rank 57 industries according to competitiveness. Industries exhibiting weak world growth rates and weak competitiveness could be considered as industries having relatively more severe adjustment problems. Among industries in that category were: miscellaneous non-metal mines, hardware and tools, miscellaneous wood products, shipbuilding and repair, miscellaneous transportation, rubber product, leather products, synthetic textiles, agricultural complements, cotton and woolen mills, hosiery mills, iron foundries, clay products and miscellaneous furniture and fixtures. That adjustment problems are pronounced in food products, metals, industrial chemicals, petrochemicals, autos, rail and urban transit, shipbuilding and primary resources processing also appears to any interested analyst.7

Further disaggregation, comparisons with other countries, and analysis of the strength, weaknesses and strategies of firms in these sectors, even if only provided as information, would be useful to policy formulation on adjustment in Canada.

IV SELECTED FEATURES OF THE TRADE POLICY AND ADJUSTMENT CONTEXT OF RELEVANCE FOR POLICY FORMULATION IN CANADA
Policy formulation to facilitate adjustment to trade liberalization in Canada requires thorough knowledge of the international and domestic context within
which it is occurring and consideration of special features of Canadian trade
patterns and its domestic economy. We shall select and review here some
features considered relevant to a diagnosis of the Canadian adjustment
problem.  

1) The macro context

The macro-economic context we have recently experienced and which will
characterize the Canadian, American and other economies, is of relevance, for
the extent and nature of adjustment problems, and the efficacy of different
policies to deal with them are directly affected by the macro-economic context.
We have written elsewhere that recent back to back recessions, and a context
of narrowly based and weak expansions for the remainder of the 1980's have left
and will leave Canadian firms with accumulated adjustment problems and weak
incentives to invest in order to restructure and adapt. Participants at the Bonn
summit describe 1984 as the peak growth year of the 1980's; should that be
accurate, the adjustment challenge for Canada is formidable for slow growth
makes for less incentive to adjust, a result which in turn makes higher growth
more difficult to obtain.

The quite strong but now faltering budget deficit-tax cut driven trade
deficit ridden–USA expansion from which Canada has benefitted through export
led growth has masked the underlying structural adjustment problems in Canada.
One can anticipate that the impending USA slowdown with its accompanying
devaluation in the USA dollar will bring to the fore significant and accumulated
adjustment problems for Canada, i.e., in pulp and paper as the Canadian dollar
appreciates relatively to the USA dollar and falls relative to other currencies.
However, although export elasticities for Canadian primary and many secondary
products are low, devaluation should enhance export performance offshore and
provide some scope for adjustment. Impacts will differ depending upon
whether the devaluation is smooth or rapid, and policy or market led. The
volatility of exchange rates and partly related changes in the terms of trade for
primary products have imposed significant adjustment costs on externally
oriented and related sectors of the Canadian economy. Exchange rate variations
have in the recent past swamped trade liberalization and technology as a cause
of adjustment problems. These short term exchange rate variations render
difficult a proper diagnosis of structural adjustment and the formulation of
micro-structural adjustment policies.
2) The shift to services

Another feature of the world economic environment relevant to Canada's adjustment problems is a shift in the composition of trade and production from resources (excluding oil) to certain manufacturing sectors and to services as a result of changes in incomes, prices, technology, consumer tastes etc.

The technological changes in products adverse to demand for the output of many industries in Canada's primary sector, and the deteriorated terms of trade they face have significant implications for industrial–regional–adjustment problems and policies in Canada.

The shift in resources to services is also a modification of significance to adjustment in Canada. Although poorly understood and little researched (witness the difficulty of obtaining disaggregated data on trade in services) services are on proposed multilateral trade negotiations agendas and a proper understanding of their role in trade and implications for adjustment is necessary to adjustment of Canada's economic activities to new realities.

Service inputs in terms of engineering, research, marketing, computer programming software design...have grown relative to physical and materials inputs in manufacturing. More appropriate measurement of the service components in manufacturing would probably quickly dispell questions about the desindustrialization of advanced economies, if industrialization is understood to measure wealth created by the transformation of primary resources into goods as against service activities. The growing service specialization of many large firms has caused them to sell services and to bundle (i.e. to provide software incorporated in hardware and maintenance for hardware) what was for a time unbundled. Currently a lot of the services involving the generation, treatment, storage, and transmission of information are being subcontracted to small and medium sized firms. That contracting out process, and the incubation and launching of many small and medium sized firms by larger firms is proceeding along with the internalization of services. The role of entry and exit of both domestic and foreign owned firms in different industries is important to an understanding of the adjustment process both within and between the primary, secondary and tertiary sectors.

The growth in the relative importance of services among other inputs in manufacturing, and the consequent and accompanying growth of MNE and intra-firm trade is making it difficult to measure services embodied in goods.
An understanding of the relative importance of these different developments is essential to proper understanding of the changing economic structure of Canada and underlies any attempt to improve the estimation of export and import equations in trade models.

J. McRae and C. Hodgins\textsuperscript{11} have emphasized the need to re-estimate import and export equations to take into account service attributes associated with or embodied (bundled) with goods, for these services constitute important product characteristics which make price quotations and price elasticities more diffuse and less decisive in determining market shares. More disaggregated (by product and at the sub-national level) efforts should take into consideration specific institutional and regulatory features surrounding transactions in addition to modelling for market mechanisms. After sale services are among factors now very relevant to sale of goods.

The approach to demand theory developed by K. Lancaster\textsuperscript{12} who suggested a focus on the physical and service related attributes or characteristics of goods, which characteristics create utility and add to their value, provides theoretical insights for understanding the adjustment process and guidelines for the reformulation of trade equations using hedonic price methods to estimate of the impacts of trade liberalization on the domestic economy.

Developments on this front call for improved data on services, perhaps along lines suggested by the Canadian Task Force on Trade in Services Background Report of 1982, where the following distinctions were made:

a. Services embodied (bundled) in the goods,
b. Services complementary to the transaction or exchange itself,
c. Knowledge, skills, information, franchising, rental, leasing, repairs and other service activities which substitute for the export of goods and are often accompanied by international direct investment.

In addition, agreement is necessary on whether meaningful additions to the principle of comparative advantage are necessary to accommodate the fact that the inputs required to produce services need not all be located in the same place.\textsuperscript{13} The role of technology and multinational enterprises in relevant to a proper examination of these questions.

3) The shift to the Pacific Rim
Other aspects of resource shifting fundamental to an understanding of the nature of Canada’s adjustment problems are: i) the slow shift in world economic activity to the Pacific Rim, ii) the south east Asian and particularly Japanese direct
investment in the USA to "feed" the north American market, and, iii) the steady but slow decline in the share of North America in world markets. These developments have important implications for adjustment, industrial, regional, commercial... policies in Canada.

4) Internationalization

Another feature of the international and domestic environment which is relevant to a proper diagnosis and policy formulation in the trade liberalization-adjustment area is the growing internationalization, the increasing global integration in production, investment, distribution, communications, transportation, capital markets etc.—as reflected among other phenomena by increasing intra-industry and intra-firm trade. A more detailed understanding of some of the causes and effects of growing internalization would be of assistance in the formulation of adjustment policies in Canada. Significant implications for adjustment flow from: a) technological change and cost reduction in telecommunications and transportation which are allowing management at a distance, frontier jumping through electronic information and funds transfer etc.; b) new CAD/CAM technologies which, associated with new telecommunications technologies are producing economies of scale and at the firm and plant level (economies of scope), thus reducing the importance of product economies of scale and as a consequence reducing the importance of the Eastman-Stykolt truncation of subsidiaries explanation of Canada's industrial structure and productivity; c) the greater ease of technological transfer through MNE's; etc.

If in fact internationalization of markets is to proceed and trade liberalization accompanied by world products, global communications systems and more efficient transportation is to occur, one would anticipate fundamental structural changes to appear as branch plant subsidiaries disappeared or evolved into world scale internationally competitive efficiency seeking specialized subsidiaries either via rationalization-integration or world product mandates, the former involving the subsidiary in the production of a component or product under assignment from the parent for the multinational firm as a whole, the latter involving responsibility for the R&D, product design, product engineering, production, marketing and distribution of a product and/or service. 14,15,16

Needless to say, the approach via world product mandates although limited in its potential spread in Canada and dangerous for it leaves the subsidiary very
specialized and subject to change in consumer and other producer preferences, is preferable, for it makes for knowledge and information based activities so necessary to innovation and growth.

An alternative strategy (one must fit the strategy to the product or service) is specialisation to local markets and particular niches through flexible design and manufacturing rather than specialization in highly differentiated products through standardization across world markets. This approach of specialization is based on market research and local knowledge and access to markets through direct investment or joint ventures. This approach would appear very relevant given the importance of the USA market for Canadian producers and the already advanced and proceeding integration of the Canadian and USA economies. The significant increase in Canadian direct investment in the USA (more on this later), the increasing establishment of Canadian subsidiaries in the USA, and the growing efforts of provinces to develop export marketing plans aimed at the USA market are all suggested and consistent with the latter development.

5) Non-Tariff Barriers (NTB's)
Another feature for the world economy relevant to Canada's adjustment problems, potentials and policies is: a) the increased use of trade and domestic policy measures to protect domestic producers and influence investment location decisions and b) the nature of the bilateral or multilateral rules and regulations which will influence the use of NTB's. Examples of standing and contingent protection are arrangements to manage trade in cotton textiles, synthetic textiles, clothing, footwear, autos, steel, agriculture (the USA has just announced it will grant new commodity bonuses on agricultural exports and establish an export promotion fund to help when USA exporters run into "barriers" or try to match "subsidized competition) supply management and import control mechanisms such as safeguards, VER's, OMA's subsidies etc. These developments and the growing threat of protectionism in the USA (one of the motives underlying the Canadian effort to negotiate trade liberalization bilaterally with the USA so as to avoid suffering from measures often aimed at offshore countries—the ambush effect) all need to be reviewed to help in the reformulation of Canada's adjustment policies.

It is important to analyze different adjustment policy packages given alternative approaches to: a) safeguards in term of time limitations, degressive
application and gradual phase out, undertakings by firms and monitoring, etc., b) procurement, etc., c) guidelines on national treatment, d) subsidiaries, e) use of tax expenditures, f) regulatory requirements, g) protection of intellectual property rights and rights of establishments etc.

6) Changes in foreign investment patterns

The nature and extent of adjustment in Canada is fundamentally influenced by the level and nature of international and domestic investment patterns.

Let us note here a few features of the foreign investment context to indicate the nature of some of its effects upon domestic adjustment.

Canada's share of the OECD flow of inward investment fell from 16% in the early 1960's to 3% in the late 1970's.

This situation is exactly the opposite of that experienced in the USA where the USA share of inward flows among OECD countries increased from 3% to 27% while the USA share of total outward flows of foreign direct investment declined from 61% to 29% while those of West Germany, the Netherlands, Japan and Canada increased.17

Much has been written about the short term speculative nature of some of the capital flows towards the USA which has now become a net borrower, and their relationship to USA budget and trade deficits, interest rates, and exchange rates. However, foreign takeovers of USA companies have increased substantially despite the recent strength of the USA dollar, with British acquisitions surpassing those of any other country in 1984. In numerical terms Canada followed Britain leading Sweden, France and Switzerland. Japan was sixth. Much of the takeover activity was in retail and distribution although Japanese investments are also in production.18

There has therefore been net disinvestment in Canada and as a consequence foreign control of Canadian industry outside agriculture and finance has fallen from 34% in 1974 to 26% in 1981.19

Calura annual reports show that between 1970 and 1980 the foreign share of the Canadian oil and gas industry decreased by almost 30%. The decrease in the agricultural sector was 7%, that in mining, manufacturing and retail trade 28%, 9% and 10%.20 R. Frazee of the Royal Bank of Canada noted that foreign investment accounted for 33% of net Canadian capital stock in 1961, 27% in 1971 and 23% in 1977.21 Between 1975 and 1982 USA direct investment in Canada increased by 67% while Canadian direct investment in the USA increased
by 225%. Today, as a per capita basis, Canadians have invested twice as much in the USA as Americans have invested in Canada.22

What this points to is an ongoing adjustment process which is North American in scope. Analysis of European, Japanese and South East Asian investment in North America would also add to the sombre picture of the USA adjusting positively with Canada lagging and accumulating adjustment problems.23

It should be noted that retained earnings are a very significant determinant of the availability of funds for investment. Retained earnings were approximately 40% of total foreign direct investment in the 1965/69 period; the figure has now risen to 75%. These sources of funds point to the importance of profitability (which in Canada fell to historical lows in the early 1980's and is now returning to pre-recession peaks) and other determinants of the investment climate as crucial to an understanding of adjustment problems and policies in Canada.

7) **Intra-firm and intra-industry trade**

Another very significant aspect of Canada's trade relations for the nature of the adjustment process and policies is the extent of intra-industry and intra-firm trade which is also related to foreign direct investment patterns.

In a previous article24 the author presented data on the extent of related party trade (i.e. imports by USA corporations from affiliates which have 5% or more of their voting stock owned by the parent corporation). In 1975, 60.1 per cent of total imports from Canada entered the USA through firms related by ownership to the supplier.

The details of this trade are significant and its extent indicates that the effects of trade liberalization would vary by sector, for adjustment would differ according to the extent of intra-industry and intra-firm trade. For example, in 1975 related party trade accounted for 41 per cent of cereal grain imports the USA received from Canada, 54 per cent of salted and treated vegetable imports, 86 per cent of beverages, 91.5 per cent of tobacco, 96 per cent of vegetable oils, 40 per cent of pulp and paper, over 40 per cent of textiles, fibres and other products, 57 per cent of chemical products, 74 per cent of pharmaceutical products, 95 per cent of synthetic resins, 58 per cent of petroleum and gas, 44 per cent of non-metallic minerals, 69 per cent of ceramic products, 96.5 per cent of transportation equipment and 57 per cent of optical, scientific and
professional instruments.

Another source of intra-firm trade is DRIE's Foreign Owned Subsidiaries Survey (FOSS). The FOSS generates data through an annual survey of approximately 300 large foreign owned subsidiaries, with assets over $500 million dollars. The survey indicates that MOFA intra-firm trade (defined as trade between firms related by ownership of 50% or more of the voting stock of one firm by another) varied from 67% in 1965 to 73% in 1973 to 79% in 1979 to 76% in 1981 on the import side. In 1981 the percentage of total trade which is intra-firm (MOFA) varied between 21% in food and beverages and 90% in transportation equipment.

On the export side, the situation is approximately the same, the percentage of total exports which represents intra-firm exports (MOFA) was 63% in 1965 73% in 1973, 80% in 1980 and 76% in 1981. (See Table I)

The existence of intra-firm trade which is closely related to foreign direct investment links is quite fundamental to an understanding of the adjustment process and to the development of appropriate policies to cope with rationalization from a Canadian perspective. It is important to understand the impact of intra-firm trade on the location of production (in Canada or in the USA), on specialization, on diversification, on access to marketing facilities and research and development activity.

Intra-firm trade is one aspect of vertical integration, a pattern experienced with the formation of the EEC. It is likely that intra-firm trade between Canada and the USA will continue to increase as a result of Tokyo round tariff cuts among other considerations, if non tariff barriers imposed by both the USA and Canada are not brought into full play, and the Quebec Shamrock summit leads to action.

Two way trade or trade overlap or intra-industry trade (ITT) is somewhat puzzling at first glance but basically involves the simultaneous export and import of products that are not perfect substitutes.

J.H. Bergstrand has computed ITT indexes which measure the ratio of trade overlap to total trade. He examined the extent and growth of ITT across the various industries composing Machinery and Transport Equipment between pairs of countries. He finds trade in manufactured products to be more intra-industry
### Table I

**Percentage of Exports to Parents and Affiliates**

*Abroad, all Reporting Corporations, by Industry, Annually, 1973 to 1981*

<table>
<thead>
<tr>
<th>INDUSTRY</th>
<th>1973</th>
<th>1981</th>
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<tr>
<td>Mining and Primary Metals</td>
<td>53.2</td>
<td>53.9</td>
</tr>
<tr>
<td>Gas and Oil</td>
<td>57.7</td>
<td>44.0</td>
</tr>
<tr>
<td>Machinery and Metal Fabricating</td>
<td>87.9</td>
<td>82.1</td>
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<tr>
<td>Transportation Equipment</td>
<td>93.3</td>
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<td>Electrical Products</td>
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<tr>
<td>Chemical Products</td>
<td>43.7</td>
<td>41.3</td>
</tr>
<tr>
<td>Chemical Products</td>
<td>53.3</td>
<td>70.7</td>
</tr>
<tr>
<td>Food and Beverage</td>
<td>42.8</td>
<td>21.6</td>
</tr>
<tr>
<td>Pulp and Paper</td>
<td>49.4</td>
<td>46.8</td>
</tr>
<tr>
<td>Other Manufacturing</td>
<td>65.0</td>
<td>46.0</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>43.1</td>
<td>86.4</td>
</tr>
<tr>
<td>Other Non-Manufacturing</td>
<td>66.7</td>
<td>47.1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>73.0</td>
<td>76.0</td>
</tr>
</tbody>
</table>

Source: Department of Industry, Trade and Commerce/Regional Economic Expansion, Foreign Owned Subsidiaries in Canada. (Various years) as presented by S. Moroz and G. Meredith, op. cit., p. 128.

than inter-industry and his empirical investigation suggests that the degree of increasing returns to scale and product differentiation and the extent of government induced trade liberalization are important in explaining ITT.

He computed ITT indexes from both actual trade flow data which are influenced by macro-economic factors as well as patterns of specialization and adjusted trade flows to reflect trade balances.

Bergstrand suggests that specialization and efficiency, avoidance of startup costs, acquired knowledge, government policies in the form of tariff and non tariff protection, selling and information costs, transportation costs (export of a commodity on the west coast and import of the identical commodity on the east coast) re-exports after minor processing, minor variations in products, and
differences in tastes, are all factors relevant in the explanation of the extent of intra-firm trade. He emphasized product diversity and increasing returns and trade liberalization. He also concluded that neither geographic adjacency of countries nor taste differences between pairs of countries lead to increase in the share of trade that is intra-industry.

His results which indicate that economies of scale measured by plant size and length of run deter two way investment and promote intra-industry trade, are particularly relevant to any attempt to examine the adjustment implications of trade liberalization in Canada. USA firms being larger than Canadian ones by and large, one obtains an explanation compatible with the results on foreign direct investment examined above. New technologies allowing for economies of scope would also possibly make for more foreign direct investment and less two way trade interregional trade flows.

8) Interregional Trade Flows are a necessary indicator of industrial adjustment problems and potentials in Canada. Previous studies\textsuperscript{26,27,28} have attempted to document another aspect relevant to an improved understanding of the structural adjustment process, by describing and analyzing domestic and American interregional trade. These studies (notwithstanding data limitations due to transhipments of goods, and the relative scarcity of data on interprovincial shipments as against provincial-state exports and imports) indicate that the growth in province state trade flows has been more pronounced than that in interprovincial trade since the mid 1970's, a pattern attributable in part to Tokyo round tariff cuts, foreign direct investment patterns, the extent of intra-firm trade, the demise of the National Policy in Geneva, etc...

The above referenced DRIE study also attempted to identify "dynamic" and "decliner" primary and secondary trade flows, according to whether the provincial average annual growth rate in exports lay more than 15% above or 15% below the national growth rate. For exports to and imports from the USA the national norm was calculated and the \pm 15\% criteria applied. For domestic interregional trade, the norm was based on total Canadian manufactured shipments, including re-exports.

Table 2 provides a list of "dynamic" and "decliner" products between 1976 and 1981 for Quebec-USA exports. Similar tables are available for each province. Trade liberalization, either bilateral or multilateral, will make
<table>
<thead>
<tr>
<th>Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viande et préparation</td>
<td>Animaux vivants</td>
</tr>
<tr>
<td>Poissons frais et congelés</td>
<td>Prod. laitiers, œufs, miel</td>
</tr>
<tr>
<td>Poissons transformés</td>
<td>Sucre et préparation</td>
</tr>
<tr>
<td>Céréales, grains et farine</td>
<td>Cacao, café, thé</td>
</tr>
<tr>
<td>Fruits et préparation</td>
<td>Margarine</td>
</tr>
<tr>
<td>Noix</td>
<td>Provene</td>
</tr>
<tr>
<td>Légumes et préparation</td>
<td>Boissons</td>
</tr>
<tr>
<td>Aliments divers</td>
<td>Tabac</td>
</tr>
<tr>
<td>Textiles</td>
<td>Animaux</td>
</tr>
<tr>
<td>Bois travaillés</td>
<td>Produits de bois-bruts</td>
</tr>
<tr>
<td>Pâte de bois</td>
<td>Minéraux-métal</td>
</tr>
<tr>
<td>Fils et fils</td>
<td>Minerais non métal.-brut (sauf</td>
</tr>
<tr>
<td></td>
<td>huile et charbon)</td>
</tr>
<tr>
<td>Produits chimiques et organiques</td>
<td>Autres déchets</td>
</tr>
<tr>
<td>Engrais, prod. chimiques organiques</td>
<td>Cuir et préparation</td>
</tr>
<tr>
<td>Plastique, synthétique et caoutchouc</td>
<td>Caoutchouc, fabriqués</td>
</tr>
<tr>
<td>Produits pétrole et charbon</td>
<td>Fabriqués spéciaux</td>
</tr>
<tr>
<td>Fer, acier et alliage</td>
<td>Huiles, gras, etc.</td>
</tr>
<tr>
<td>Métaux non ferreux</td>
<td>Navires, bateaux</td>
</tr>
<tr>
<td>Métaux travaillés</td>
<td>Pneus</td>
</tr>
<tr>
<td>Produits de base non métalliques</td>
<td>Equipements sanitaires</td>
</tr>
<tr>
<td>Matières travaillées divers</td>
<td>Outils</td>
</tr>
<tr>
<td>Machinerie agricole</td>
<td>Vêtement</td>
</tr>
<tr>
<td>Matériel de voie ferrée</td>
<td>Chaussures</td>
</tr>
<tr>
<td>Avion</td>
<td>Montres et horloges</td>
</tr>
<tr>
<td>Autres véhicules</td>
<td>Ustensiles de cuisine</td>
</tr>
<tr>
<td>Communications et équip. reliés</td>
<td>Equipements ménagers divers</td>
</tr>
<tr>
<td>Air climatisé</td>
<td>Produits pharmaceutiques</td>
</tr>
<tr>
<td>Equipement de cuisine</td>
<td>Armes à feu, munitions</td>
</tr>
<tr>
<td>Plomberie</td>
<td>Autres produits finis</td>
</tr>
<tr>
<td>Equipement électrique divers</td>
<td>Transactions spéciales</td>
</tr>
<tr>
<td>Equipement de laboratoire et médical</td>
<td></td>
</tr>
<tr>
<td>Ameublement</td>
<td></td>
</tr>
<tr>
<td>Autres équipements</td>
<td></td>
</tr>
<tr>
<td>Machines de bureau</td>
<td></td>
</tr>
<tr>
<td>Bijoux et coutellerie</td>
<td></td>
</tr>
<tr>
<td>Jouets, jeux</td>
<td></td>
</tr>
<tr>
<td>Meubles ménagers</td>
<td></td>
</tr>
<tr>
<td>Fournitures médicales</td>
<td></td>
</tr>
<tr>
<td>Fournitures de bureau</td>
<td></td>
</tr>
<tr>
<td>Matériel, photo</td>
<td></td>
</tr>
<tr>
<td>Instruments de musique</td>
<td></td>
</tr>
<tr>
<td>Produits divers</td>
<td></td>
</tr>
<tr>
<td>Récipients</td>
<td></td>
</tr>
</tbody>
</table>

Source, P.P. Proulx, Redéploiement industriel, op. cit.
knowledge and understanding of the dynamics of interregional trade important for the proper formulation of adjustment policies at the provincial and national levels. One need not adhere to export base growth theories to observe that the origin and destination of trade flows within North America and with offshore countries can provide insights for the formulation of positive adjustment policies. Further research will involve an examination of import penetration by Quebec (and other provinces) in USA regional markets in light of import penetration from offshore to get better indications of Quebec (and other provinces) comparative advantage in the USA and hopefully better predict the adjustment implications of Canada-USA trade liberalization.

9) Micro-economic adjustment processes and adjustment by subsidiaries and Canadian companies

Whether or not one adheres to the truncation of subsidiaries explanation of the Canadian situation as formulated by Eastman and Stykolt, it is documented that the historically high cost situation and small market in Canada has given rise to unit costs disadvantages in a significant number of sectors.

A typical result of the high cost-small market situation has been the production of a wider variety of products (horizontal diversification) and a larger number of production activities (vertical diversification). This strategy allowed higher plant utilization and reduced fixed costs of production per unit, but, however, caused product specific diseconomies of scale. A recent study by D.C. MacCharles examined how subsidiaries and Canadian firms are adapting to the changing trade environment. MacCharles argues that the changing trade environment should give rise to increased specialization and economies of scale with more contracting out of minor product lines and intermediate goods. Such a result would be promising for Canada's small and medium sized firms. In his discussion, MacCharles associates scale economies and increasing exports, and scale and specialization and intra-industry trade.

The economics literature suggests that intra-industry trade should make for more efficient adjustment, a phenomenon of fundamental importance of Canada given the extent of intra-industry trade as mentioned above.

The traditional economics models suggests that there will be a movement from industries with increasing import penetration into industries with increasing export success and that this should give rise to increased import and diminished export propensities in industries with relative cost disadvantages (the reverse
being true in industries with cost advantages).

MacCharles indicates that subsidiaries dominate imports of manufactured goods and that subsidiaries trade primarily with affiliates. He points to a wholesaling role played by subsidiaries to a greater extent than is the case for Canadian firms hence the important role of subsidiaries in imports. He documents the fact that larger subsidiaries dominate Canada's international trade manufacturing goods.

The MacCharles results seem to indicate that subsidiaries are slower than their Canadian counterparts in adopting to the freer trade environment. World product mandates are not very prevalent, and subsidiaries are, according to MacCharles, continuing as small scale diversified import competing firms serving primarily domestic markets (tariff factories). MacCharles suggests that USA subsidiaries are diversifying rather than specializing and that this is the case much more than for Canadian firms.

Further knowledge of the adjustment strategies and practices of subsidiaries and Canadian firms to trade liberalization is essential. Is it not possible that the subsidiaries are adapting through product diversification and obtaining plant and firm scale economies through the use of CAD/CAM technologies (i.e., obtaining the economies of scope such technologies provide), while Canadian companies are pursuing product scale economies which are less relevant in the new technological and low tariff context where they lag in adopting new technologies? One should not generalize across all products, but an answer to such a question would be relevant to understanding the adjustment process and helpful in striking a balance between adjustment policies favoring the applications of micro-electronic semi-conductor based technologies and those favoring the production of high technology products.

The scale and specialization issue continues to preoccupy Canadian economists. The adjustment process to diversified trade and competition has been the object of many studies by J. Baldwin, P. Goreki, J. McVey and J. Crysdale.  

No attempt will be made here to summarize the extensive studies these authors have undertaken. What follows is a selection of observations allowing one to assess the state of our knowledge of certain aspects of the adjustment process.

Baldwin et al. recognize that plant scale economies might outweigh
product line economies and that as a consequence, diversity and product packing might be an optimal way to adopt to trade liberalization. This observation must be set against the prevalent view that trade liberalization should lengthen production runs and reduce the number of products per plant, a view consistent with the truncation hypothesis.

Baldwin et al. in their analysis of 108-135 industries from 1974 to 1979 with cross section regression analysis find that the length of production runs at the plant level increased substantially and that product diversity fell by several percentage points. They also observed that in 1974, Canadian owned manufacturing plants were more specialized than their similar sized USA counterparts but that this was less the case by 1979. But when they controlled for the number of commodities in each of the 167 four digit industries and for plant size, they concluded that USA plants were more specialized than Canadian plants.

They also found product diversity positively related to plant size but at a declining rate, an observation which prompted the conclusion that growth in market size flowing from trade liberalization will "solve" the product diversity problem. In other words, over some range plants grew larger by diversifying but eventually they expand through increasing production and specializing. I place solve within parentheses because I am not convinced that this conclusion takes into consideration the product diversification potential of new technologies although I do appreciate the importance of market size for efficiency. (The discussion of internationalization and niches in item III-4 above is also relevant to this question.)

Baldwin et al. conclude that trade variables had little direct impact on product diversity and length of product run, but did have effects via effects on plant size which is positively correlated to product diversity as mentioned above, a result also obtained by Bergstrand. Baldwin finds that the size of the Canadian market both domestically and in exports is a major determinant of relative plant scale, results which point to the importance of trade liberalization.

Baldwin et al. also observe that foreign investment has had no measurable impact on relative plant scale or on product diversity or on length of product run. They conclude, after comparing Canada-USA total factor productivity indexes corrected for both plant size and scale economies and assuming that individual plant sizes in an industry are distributed lognormally, that 1/3 of the
difference in the conventionally measured productivity gap can be accounted for.

There is evidence on all sides of the argument concerning the relationship between import competition and productivity growth. Some authors conclude that import competition has a positive and significant impact on labour productivity. Others find at best a weak, insignificant or ambiguous relationship. Still others have observed that protection has had a marked positive effect on productivity.

R.S. Saunders, while examining value added per worker data in Canada and the USA finds that productivity fell as foreign ownership increased. Caves et al. find a positive but weak relationship between foreign ownership and Canadian technical efficiency. The Wonnacott and Harris studies of trade liberalization either postulate or estimate significant increases in productivity following upon bilateral Canada-USA trade liberalization.

Much research remains to be done in explaining the current and potential Canada-USA efficiency gap and I would be inclined to look at concentration (recalculated as Baldwin did to take into account imports), foreign direct investment, R & D, and particularly human resources training and management practices for more thorough answers and guidance for adjustment strategies.

Baldwin et al. found that "birth rates" and death rates are very high in the average Canadian manufacturing industry and in the USA. It would therefore seem that smaller firms have been bearing a disproportionate amount of adjustment. They observe that the brunt of adjustment, good or bad, occurs through changing birth rates of new firms rather than through changing death rates. It also follows that Canadian-controlled firms are bearing the brunt of the adjustment good or bad. They also show a stronger tendency to exit by scrapping and to enter by new plants rather than attrition.

Baldwin et al. found that foreign firm entry and exit rates reacted little to growth in imports, exports and size of the domestic market. Foreign firms can use the intra-firm route to adjust product lines on a north American or worldwide basis, an opportunity not afforded Canadian firms except through more difficult processes involving foreign direct investment, etc...

Imports led to less firm entry either by the building of new plants or by acquisition by Canadian firms, a result adverse to adjustment following upon trade liberalization. Increased exports resulted in increased firm entry by Canadian firms and one would want to know more on the determinants of
localization of new plants i.e. in Canada or the USA in a freer trade north American context. For both foreign-owned and domestically-owned firms, exit is lower the greater the growth of imports, according to the Baldwin et al. results.

This brief and incomplete review of micro firm-plant adjustment processes points to the need for more information and debate of these results and issues by a broader circle of persons than has been the case, for fundamental decisions of trade liberalization and adjustment policies should be formulated as soon as possible.

V) TRADE IMPACTS ON JOBS: METHODOLOGIES AND RESULTS

Attempts to estimate the magnitude and costs of adjusting to trade liberalization usually fall into one of three categories: trade-employment balance studies, decomposition studies and labour tracking studies.

The interested reader should consult Pearson and Salembier and a recent Salembier publication for a thorough and systematic review. What follows draws directly from Salembier.

Salemberg defines employment dislocation as the sum of the increase in the number of workers leaving and decreases in the number of workers entering a firm or an industry as a result of a structural shift in labour demand.

a) Trade employment balance studies involve attempts to estimate the number of jobs associated with exports and the hypothetical number of jobs that would exist if imports were replaced by domestic production. Three different approaches can be identified:

i) some studies assume a balanced expansion of exports and imports and no change in commodity composition;

ii) others make use of general equilibrium model to estimate changes expected from prospective trade liberalization;

iii) others collect evidence on autonomous changes in trading patterns.

G. Salembier's discussion paper lists trade employment balance studies and analyses some of their characteristics.

These studies usually conclude that some job loss will occur in the short run. They usually identify localized impacts i.e. on certain regions, sectors, occupations and age-sex groups.

Many of these studies make use of a general equilibrium model to capture
the direct and indirect effects of trade policy changes including those on supplier industries. The fixed input coefficients implying lack of response to changes in input prices are a major drawback. Improvements are needed in estimates of normal labour attribution and the effects of productivity changes on job displacements.

b) A second group of studies are: decomposition studies which utilize a definitional identity where the growth rate of domestic employment by industry is by definition the sum of the growth rate of demand, labour productivity, and share of domestic output in consumption. These decomposition studies measure the employment levels that would have prevailed if imports or the ratio of imports to domestic consumption had remained constant. These studies are however plagued with methodological problems, for productivity growth and domestic demand growth are themselves related to imports and import penetration.

Normally these decomposition studies report that trade related employment changes are small relative to productivity and domestic demand related employment change.

G. Salembier also lists decomposition studies and their characteristics. Demand and productivity impacts usually exceed trade impacts in these studies.

One recent Canadian attempt was presented to a research symposium sponsored by the Royal Commission on the Economic Union and Development Prospects for Canada.39 Robertson and Grey decomposed employment change into change in domestic demand, exports, imports, and productivity change. They chose to examine and estimate the sources of employment change in selected import-competiting industries from 1967-1981 as may be seen from Table 3.

Their results indicate, along with most other such studies, that changes in domestic demand and productivity are the major factors which have influenced employment shifts in these industries hence the importance of analyzing determinants of productivity change. The authors do mention interrelationships between the explanatory factors as a problem. A comparison of their results with similar USA studies indicate, however, that employment in Canadian industry is more sensitive to changes in trade. The major methodological problem is the interaction term problem which attempts to cope with problems arising from rapid productivity growth in rapidly growing industries coexisting
with increased imports concentrated in slowly growing industries.

Table 3
Sources of Employment Growth
(Percent/Year)

<table>
<thead>
<tr>
<th>SiC Major Group</th>
<th>(1) Growth Rate (Total Employment)</th>
<th>(2) Domestic Demand (D/SHIP)</th>
<th>(3) Exports (X/SHIP)</th>
<th>(4) Imports (M/SHIP)</th>
<th>(5) Net Trade (M/SHIP - X/SHIP)</th>
<th>(6) Sum of (3) and (4)</th>
<th>(7) Productivity* (-tp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.03 - Rubber**</td>
<td>0.31</td>
<td>2.67</td>
<td>2.09</td>
<td>-2.82</td>
<td>-0.73</td>
<td>-3.55</td>
<td>-3.63</td>
</tr>
<tr>
<td>5.04 - Leather</td>
<td>-1.34</td>
<td>3.05</td>
<td>0.17</td>
<td>-3.18</td>
<td>-2.81</td>
<td>-5.99</td>
<td>-1.58</td>
</tr>
<tr>
<td>5.05 - Textiles</td>
<td>-0.78</td>
<td>5.08</td>
<td>0.49</td>
<td>-1.56</td>
<td>-1.08</td>
<td>-2.71</td>
<td>-4.71</td>
</tr>
<tr>
<td>5.06 - Knitting</td>
<td>-0.83</td>
<td>7.87</td>
<td>0.10</td>
<td>-5.20</td>
<td>-5.10</td>
<td>-3.60</td>
<td>-2.50</td>
</tr>
<tr>
<td>5.07 - Clothing</td>
<td>-0.22</td>
<td>2.72</td>
<td>0.52</td>
<td>1.07</td>
<td>0.55</td>
<td>-2.40</td>
<td>-2.40</td>
</tr>
<tr>
<td>5.09 - Furniture</td>
<td>1.49</td>
<td>3.05</td>
<td>0.89</td>
<td>-1.01</td>
<td>-0.12</td>
<td>-1.13</td>
<td>-1.13</td>
</tr>
<tr>
<td>5.12 - Primary Metals</td>
<td>0.68</td>
<td>2.51</td>
<td>2.57</td>
<td>-1.79</td>
<td>+0.31</td>
<td>-2.64</td>
<td>-2.64</td>
</tr>
<tr>
<td>5.13 - Metal</td>
<td>0.74</td>
<td>2.97</td>
<td>0.54</td>
<td>-0.75</td>
<td>-0.21</td>
<td>-1.96</td>
<td>-1.96</td>
</tr>
<tr>
<td>5.14 - Machinery</td>
<td>2.63</td>
<td>11.72</td>
<td>4.22</td>
<td>-0.62</td>
<td>5.10</td>
<td>-3.69</td>
<td>-3.69</td>
</tr>
<tr>
<td>5.15 - Transportation Equipment</td>
<td>1.44</td>
<td>5.68</td>
<td>7.92</td>
<td>-7.41</td>
<td>+0.50</td>
<td>-4.75</td>
<td>-4.75</td>
</tr>
<tr>
<td>5.16 - Electrical</td>
<td>0.27</td>
<td>5.40</td>
<td>1.69</td>
<td>-3.66</td>
<td>-1.97</td>
<td>-3.15</td>
<td>-3.15</td>
</tr>
<tr>
<td>5.19 - Chemical</td>
<td>1.41</td>
<td>4.84</td>
<td>1.96</td>
<td>2.70</td>
<td>-0.24</td>
<td>-3.18</td>
<td>-3.18</td>
</tr>
<tr>
<td>5.20 - Miscellaneous***</td>
<td>0.37</td>
<td>9.04</td>
<td>1.26</td>
<td>-6.25</td>
<td>-4.19</td>
<td>-3.09</td>
<td>-3.09</td>
</tr>
<tr>
<td>Total</td>
<td>0.65</td>
<td>5.62</td>
<td>2.68</td>
<td>-4.09</td>
<td>-1.41</td>
<td>3.56</td>
<td></td>
</tr>
</tbody>
</table>

*This is a forced figure based on the identity re = rd (D/SHIP) + re (X/SHIP) - rm (M/SHIP). sp, re, rd, tx, rm, and sp are annual average percentage changes in employment (E), domestic demand (D), exports (X), imports (M), and productivity (P). The ratios D/SHIP, X/SHIP, and M/SHIP are averages for 1967-1981. All figures are based on constant $1971.

**Rubber is used rather than rubber and plastics as the employment series from 1966-1970 for rubber and plastics is not readily available.

***This category includes machinery, scientific and professional equipment, instruments and sporting goods.


The methods do not capture intersectoral differences in income elasticities, changes in relative prices and exchange rates, and the impact of new products and quality changes which cause substitution effects and which should be separated from income effect. In addition, indirect job losses through interindustry effects may be as large as direct job loss from whatever sources, effects that cannot be captured except through the use of detailed input-output models.

Lawrence employs an input-output model to estimate direct and indirect effects attributable to domestic use, exports and imports. He assumes the productivity growth rate in exports and domestic products are equal, a restrictive assumption. His input coefficients are fixed and he does not allow for interaction effects.
He concludes that the negative impact on employment between 1980-1982 is primarily due to price changes associated with the real appreciation of the USA $. Lawrence considers unemployment problems in USA manufacturing as largely cyclical and budget-deficit induced. He concludes that the trend in output and employment towards high tech industries and away from capital intensive and labor intensive industries is independent of foreign trade hence structural in nature, but reinforced by it.

G.M. Grossman uses a general equilibrium model and computes the elasticity of employment and wages with respect to the domestic price of imports. His methodology is somewhat analogous to conventional decomposition studies. He finds that the effects of import competition on jobs and earnings losses are relatively small.

c) The third and final method involves labour tracking studies in which a control group of workers if followed and their actual labour force experience is examined. Attempts are made to estimate the private and social adjustment costs.

Glen Jenkins studies are the most widely known labour tracking studies available in Canada. Proulx and Hollander review and comment upon the Jenkins and other studies. They point out that improved attempts to estimate the costs and benefits and particularly the employment implications of lowering tariffs or VER's or other NTB's would benefit from improvements suggested by C. Hamilton's study of the effects of non tariff barriers to trade on prices employment and imports in the swedish textiles and clothing industries. Proulx and Hollander indicate how estimation of the impacts of diminishing VER's on imports and the estimation of import demand elasticities necessitates estimates of cross elasticities between similar goods of different value, knowledge of the determinants of the level and changes in Canadian prices, hence examination of markups on imported/versus locally produced products. They suggest an examination of the Salter structure of plants within industries to capture efficiency differences as reflected by differences in variable costs per unit of production.

Price reductions following trade liberalization should give rise to plant closures when variable costs exceed price. This involves ranking plants by variable costs as a percentage of price or as a percentage of value added. This allows estimates of which plants might close and in addition allows an
examination of the regional impacts of trade liberalization when one takes into consideration the location of plants.

As summarized by Salembier labour tracking studies indicate among other results:
1. a high rate of return of employees to initial employers (Proulx and Hollander maintain that this a conclusion should be received with caution because some of the "closures" studied by Jenkins were only envisaged as short term closures);
2. that adjustment costs differ considerably by industry;
3. that higher adjustment costs are borne by older, more skilled and higher wage workers;
4. that the general level of economic activity is important in determining the duration of unemployment and the subsequent wage which both influence adjustment costs;
5. that workers not recalled suffered large real earnings loses not offset by UI or TAA in the USA.

The availability of CEIC's Longitudinal Labour Force File should allow interesting analyses of labour market adjustment mechanisms through labour force tracking studies.

The development of an early warning system and a monitoring system covering domestic structural adjustment in Canada would be useful. Labour tracking methodologies and the Department of CEIC's longitudinal labour force file would be useful for these purposes.

VI GENERAL EQUILIBRIUM ANALYSIS OF ADJUSTMENT AND TRADE LIBERALIZATION

Much of the recent discussion of trade liberalization and adjustment by Canadian economists has been with reference to the general equilibrium model and results recently published by R. Harris. His introduction of plant and product specific scale economies, imperfect competition, and product differentiation are appealing features relevant to studying the adjustment process. However, the comparative static, real versus nominal nature of the model, and the usual assumptions of full employment, nationally but not internationally mobile labour, homogeneous firms by industry and homogeneous factor inputs are significant limitations for purposes of studying adjustment.
It is interesting to note: that a) Harris' estimate of the annual gain to Canada from multilateral free trade with the rest of the world of around 8-10% of GNP, much of it due to increases in labour productivity (33%) and total factor productivity (10%) because of economies of scale, and b) his estimate of a 4% gain in GNP from unilateral free trade with the rest of the world, are comparable with the Wonnacott 1967 and 1975 estimates of the gains from Canada-USA free trade.  

The Wonnacott estimates of the net gain from a Canada-USA free trade agreement is 8.2%, results obtained by assuming that in the event of free trade with the USA, productivity in Canada would increase to USA levels (a 27% gap according to their estimates).

The December 1984 Cox-Harris paper presents an extension of the model to obtain "ballpark estimates" of the effects of Canada-USA sectoral free trade in textiles, steel, agricultural machinery, urban transportation equipment and chemicals. The December 1984 model is less that a full general equilibrium model as both USA and Rest of World are summarized by exogenous import supply curves and a set of export demand equations. Harris admits the possibility of trade diversion, a welcome development, and he indicates that his assumption that the home country is a price maker in its export markets but a price taker in its import markets is "problematic" (p. 5). He also indicates "that within a given sector there is a great deal of two way or "intra-industry trade", a phenomenon emphasized above. He presents his examination of sectoral free trade as "a sort of sectoral deregulation to get at the procompetitive efficiency effects of import competition", another aspect of the trade liberalization debate targeted above for more work.

The assumption of identical technologies and declining average costs in non competitive manufacturing industries with the attendant scale economies has received such attention that no comment will be make here.  

Suffice it to quote the Daly-Rao results obtained by applying a translog cost function which allows the derivation of scale economies that vary with output and factor prices. They conclude that Harris' scale economies have been "grossly exaggerated, that the maximum total factor productivity improvement in manufacturing resulting from Harris's estimated increase in manufacturing output of 25% is in the order of 3.8%, etc... It should be noted that Harris' initial OEC work drew his scale economy parameter from Fuss and Gupta.  

Daly and Rao estimate that neither
durable nor nondurable manufacturing as a whole exhibited scale economies during the 1957-1979 period.

Our emphasis earlier on new CAD/CAM technologies, flexible manufacturing and economies of scope also hopefully serve to identify the need for serious work in the area of scale and scope economies and trade liberalization impacts on productivity and adjustment.

In addition, our reference to Hazledine's work and our emphasis on the need for work and analysis of markup practices and estimates of cross elasticities between similar differently priced products also identifies a need to go beyond the Harris approach which uses a weighted average of the Negishi monopoly price and Eastman-Stylkolt world price plus tariff approaches.

Improved estimates of NTB's, some of which are being reestimated by Harris and S. Moroz of IRPP, and reestimation of export and import questions and price elasticities to reflect the introduction of non price determinants as suggested above also warrant further activity.49

The December 1984 article presents estimates for:
1) complete bilateral Canada USA free trade (100% bilateral reduction in all tariffs and NTB's including export subsidies—BFT;
2) sectoral free trade in the five sectors mentioned above assuming; mutual reduction of export subsidies—SFT(a);
3) sectoral free trade assuming neither country eliminates its export subsidy programs—SFT(b).

BFT give welfare gains of 9.0%, slightly larger than the 8.6% reported in the OEC study. Harris indicates that the larger number is clearly explained by the trade diversion effect of forming a free trade area between Canada and the USA (a 5% increase in the proportion of Canadian trade accounted for by the USA). Under BFT the estimated volume of trade increases by 98%.

SFT (a) increases real income by 1.5% of base GNP and even larger estimates are obtained if export subsidies are left. SFT requires a shift of about 2% in labour between sectors versus a 7% shift under BFT. Trade diversion effects under SFT are smaller than under BFT. Under BFT the 5 sectors run a trade deficit while under either form of SFT they run a trade surplus. Under BFT 45% of the firms in the 5 sectors are eliminated in long-run equilibrium. Under SFT only 7.17% of the firms are eliminated given the role of intra-industry adjustment.
Productivity gains are much more dramatic under BFT than SFT although positive in both cases. Under SFT the increase in production runs for the 5 sectors is on average 62%, producing larger scale and lower costs for remaining firms.

Harris estimates that a 10% reduction in sectoral trade barriers yields a 4.31% welfare gain. A 5% reduction reduces the corresponding effects by one half of those obtained with a 10% reduction.

Harris' discussion of export subsidies is relevant to adjustment policies. Standard trade theory would suggest that the introduction of a trade subsidy by the USA would result in a transfer of income to consumers in Canada. Export subsidies by Canada (small price taking country) makes the domestic price of exports fall and the relative price of imports increase. The income transfer goes from Canada's tax payers to USA consumer (think of the fortunate New York passengers riding Bombardier products). Production shifts from the export sector to the import competing sector. With imperfect competition and scale economies (lower monopolistic price, and lowered average cost) Canada's efficiency gain from export subsidies can in principle outweigh the efficiency loses. The model gives the result that Canadian real income is higher if the USA does not remove its subsidies. The transfer from the USA treasury to Canadians is lost if the subsidies are removed.

Harris also concludes that the higher the initial level of USA export subsidies the smaller the sectoral rationalization effects. He does however caution readers "to take these results with a grain of salt," for he believes that the level of Canadian export subsidies he has used are too low, a conclusion which ongoing work at IRPP would question. Harris does however suggest one general conclusion to the effect that: "the small country in a bilateral sectoral trade negotiation has much less reason to be insistent upon the elimination of the export subsidies than does the large country", (p. 20).

I am left with the impression Whalley conveys that "Harris's estimates may be upward biased" and that impression, plus the earlier review of employment distortion studies leads to a tentative conclusion that the Tokyo Round effects, and current Quebec Shamrock efforts to limit the use of NTB's have left us with a situation where trade liberalization effects on adjustment are upon us and proceeding, and should be analyzed further at the sector and firm level in industrial organization studies.
That trade liberalization would have significant adjustment effects in certain sectors and regions and cities and towns in Canada is obvious given existing high tariffs and NTB's in many instances. This suggests that more of the economics research should go to linking trade and industrial organization questions, that more emphasis should be placed on sectoral and firm level studies of trade impacts on scale and scope economies, on diversification, on specialization, and that attention be given to analysis at the regional and provincial level.

R. Tremblay has applied the Harris model to examine regional impacts of trade liberalization. He indicates how the Harris results differ as between those obtained with an assumption of imperfect competition and increasing returns to scale (4 out of 20 sectors contract) and those obtained with a perfect competition and constant cost assumption where 9 out of 20 sectors contract after multilateral trade liberalization. Under the first scenario Ontario and Quebec win and all regional economies gain production. Under the second scenario, in relative terms, Ontario, the Prairies and the Atlantic Provinces marginally lose to British Columbia and to a lesser extent to Quebec. I would suspect that more thorough examination of the trade diversion effects would modify these results significantly.

J.E. Denis using Harris' results has estimated how bilateral trade liberalization leads to a growth in employment in "soft" sectors given the diversion effects, a result which is reversed by multilateral trade liberalization.

VII CONCLUDING COMMENTS

Capital and labour adjustment problems are determined among many factors by trade policies, macro policies, industrial and regional policies, and the adjustment experience observed is determined by a myriad of market and policy related impacts.

Of particular significance is the need to harmonize many policies and programs to deal with adjustment problems.

The following quote from J. Curtis makes the point very directly:

Trade policy not only has become a larger feature of international relations, in general, but also has come to include what traditionally were thought of as domestic policy issues and instruments...No
longer, then, are policies relating to the cost and availability of money, public spending, investment, industrial and regional development, agriculture, transportation, taxation, procurement, consumer and environmental protection, competition, technology, or manpower exclusively domestic in today's increasingly integrated world. Trade policy therefore, now has an increasingly vertical or structural focus compared to the broad, generalized rule-making focus of earlier years.

One should not be surprised, if this is an appropriate conclusion, that bilateral and or multilateral trade liberalization would prompt, particularly in the case of discussion with the USA, examination of the problems of harmonizing energy, transportation, communication and investment policies, demands or guaranteed access to Canadian gas, oil, hydroelectric and fresh water, Canadian content rules for the media and the press, greater congruence of exchange rates, tax policy, defence expenditures, to say nothing of monetary policy. . . 53

Response to this initial discussion paper in terms of suggestions concerning research priorities, hypotheses to test, methodologies, documentation, resource persons etc. are most welcome for the breadth and scope of the topic is such that efforts most now turn defining a coherent and manageable research strategy to clarify the nature of the adjustment process in Canada in light of its major causes among which bilateral Canada-USA and multilateral trade liberalization.
FOOTNOTES

Introduction

1. Interested readers should also consult A. Moroz and G.J. Meredith, Economic Effects of Trade Liberalization with the USA, Discussion Paper 8510 June 1985, IRPP, p. 144 for a very complementary review of many of the topics addressed in this paper.

2. See P.P. Proulx "Industrial Adjustment Policies for Canada", in L. Radebaugh and E. Fry, Canada-US Trade Relations, Brigham Young University, D.M. Kennedy Centre, Provo Utah 1985, pp. 83-111, for an earlier attempt to address some of these questions. Some work has been done on the technology aspects in a paper prepared for a quite different purpose. See P.P. Proulx "Domestiquer la technologie, Pourquoi, quelles technologies et comment?" in Policy Options November 1985, volume 6 number 9, pp. 37-40. An English version entitled "Domesticating Technology: Why, What, How?" is available upon request from IRPP-Montreal.


5. Pearson and Salembier, op. cit.


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8. See John M. Curtis, "Which Way Canadian Trade in a Changing World Economy", IRPP, January 1985, mimeo, for a more complete discussion of some of these issues.


10. See J. McRae and C. Hodgins, "The Contribution of Service Attributes to Trade Performance, IRPP report to DRIE, March 26, 1985 for discussion and assessment of export equations.


13. See A.V. Deardorff, "Comparative Advantage and International Trade and Investment in Services" who ". . . is left with the uneasy feeling that the Principle of Comparative Advantage may not be as robust as many, have thought, and R.W. Jones, A Comment on . . . who concludes that all that is needed is to "redefine inputs into quality adjusted units following upon models of international capital mobility and treating services in a way analogous to non traded goods. Papers presented at the 3rd annual workshop on US-Canadian Relations, Ann Arbor Michigan, October, 1984.


21. Speech, October 81, Canadian Club in Winnipeg.

23. Net flows of direct investment capital between Canada and all countries and between Canada and the USA were as follows according to Canadian Balance of International Payment SC67001 data:

<table>
<thead>
<tr>
<th>Year</th>
<th>All countries</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984p</td>
<td>+ 2380</td>
<td>-1253</td>
</tr>
<tr>
<td>1983p</td>
<td>+ 200</td>
<td>-2260</td>
</tr>
<tr>
<td>1982</td>
<td>- 900</td>
<td>-1613</td>
</tr>
<tr>
<td>1981</td>
<td>- 4400</td>
<td>-7225</td>
</tr>
<tr>
<td>1980</td>
<td>+ 800</td>
<td>-1938</td>
</tr>
<tr>
<td>1979</td>
<td></td>
<td>-981</td>
</tr>
</tbody>
</table>


\[
(1) \quad \text{IIT}_{ij} = \frac{X_{ik} - X_{ij}^{K}}{\left( X_{ik}^{K} + X_{ij}^{K} \right)}
\]

Where \( X_{ik}^{K} + X_{ij}^{K} \) is the value of the bilateral trade flow (measured cost-insurance-freight) from country i to country j (j to i) in industry k. For example, if the value of the trade flow in industry K from country i to j is matched by an identically sized flow from j to i, IIT in industry k is perfect and the index equals one. If country j exports none of the products in industry k back to country i, the IIT index equals zero.

26. P.P. Proulx and W.D. Shipman, Trade Relations between Quebec, New England and the Atlantic Provinces, forthcoming as a chapter in a book to be published by IRPP.


30. J. Baldwin, P. Gorecki, J. McVey and J. Crysdale,
   iii) "Trade, Tariffs, and Relative Plant Scale in Canadian Manufacturing


vi) "The Determinants of Small Plant Market Share in Canadian Manufacturing Industries in the 1970's, "forthcoming RESTAT."

vii) "The Measurement of Canada/US Productivity Differences in the Manufacturing Sector" a paper prepared for the John Deutsch Round Table on productivity.


