OECD Economics Department Working Papers No. 58

Empirical Research on Trade Liberalisation with Imperfect Competition: A Survey

J. David Richardson

https://dx.doi.org/10.1787/576532716180

OECD

General Distribution

OECD

DEPARTMENT OF ECONOMICS AND STATISTICS

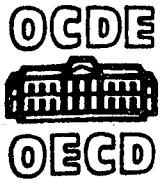
WORKING PAPERS

No. 58: EMPIRICAL RESEARCH ON TRADE LIBERALISATION WITH IMPERFECT COMPETITION: A SURVEY

by

J. David Richardson

November 1988



GENERAL DISTRIBUTION

ECONOMICS AND STATISTICS DEPARTMENT

WORKING PAPERS

This series of Working Papers is designed to make available, to a wider readership, selected studies which the Department has prepared for use within OECD. Authorship is generally collective, but main individual authors are named.

Comment on the Papers is invited, and may be sent to OECD, Department of Economics and Statistics, 2 rue André Pascal, 75775 Paris Cedex 16, France. Additional copies of the Papers on a limited basis can be forwarded on request.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

16363

Orthodox trade theory rests on a number of unrealistic assumptions which include, among others, constant returns to scale in production and perfect competition in product and factor markets. This has led many commentators to express strong skepticism about the policy conclusions flowing from the orthodox framework. In response to these concerns, a rapidly-growing literature has developed over the past decade which incorporates more realistic features of the trading system such as imperfect competition, increasing returns to scale and product differentiation.

This paper presents a review of the empirical research on the "new trade" theories. Section II outlines briefly the theoretical framework for the empirical research. The results from a series of partial and general equilibrium studies are surveyed in Section III. The final section suggests some directions for future work in this area.

* * *

La théorie traditionnelle de l'échange international repose sur un certain nombre d'hypothèses irréalistes telles que, par exemple, les rendements constants à l'échelle au niveau de la production et la concurrence parfaite sur les marchés des produits et des facteurs. Ceci a motivé de nombreux commentateurs à exprimer de fortes réserves quant aux conclusions pour la politique économique tirées des modèles basés sur la théorie traditionnelle. Devant ces inquiétudes, une littérature foisonnante s'est développée au cours de la dernière décennie, incorporant des caractéristiques plus réalistes du système des échanges internationaux, telles la concurrence imparfaite, les rendements croissants à l'échelle et la différenciation des produits.

Ce texte présente un survol de la recherche empirique portant sur les "nouvelles théories" relatives aux échanges. La Section II décrit brièvement le cadre théorique servant d'assise à la recherche empirique. Les résultats d'une série d'études basées soit sur l'équilibre partiel ou l'équilibre général sont présentées dans la Section III. La dernière section esquisse certaines avenues de recherche pouvant faire l'objet de travaux futurs dans ce domaine.

EMPIRICAL RESEARCH ON TRADE LIBERALISATION WITH IMPERFECT COMPETITION: A SURVEY

by

J. David Richardson

November 1988

The author is Professor of Economics at the University of Wisconsin-Madison. He wrote this paper as Consultant to the Economics and Statistics Department. The views expressed are not necessarily those of the OECD or of the governments of its Member countries. He is grateful for comments on an earlier draft from Richard E. Baldwin, Alan V. Deardorff, François Delorme, Gene M. Grossman, David Henderson, James A. Levinsohn, John P. Martin, Jeffrey R. Shafer, Kumi Shigehara, Barbara J. Spencer, and participants in a July 1988 seminar at the Organisation for Economic Cooperation and Development. In addition, the following have suggested or supplied helpful references: Robert C. Feenstra, Mark Horridge, John Lester, John Whalley, and Randall Wigle. None of these colleagues should share responsibility for criticism of this paper, but the author is only too happy to share with them any credit it may receive.

EMPIRICAL RESEARCH ON TRADE LIBERALISATION WITH IMPERFECT COMPETITION: A SURVEY

TABLE OF CONTENTS

EMPIRICAL RESEARCH ON TRADE LIBERALISATION WITH IMPERFECT COMPETITION: A SURVEY

I. INTRODUCTION, OVERVIEW AND CONCLUSIONS

1. The theory of trade policy has changed markedly in the past ten years or so. One of the fundamental reasons is that the international trading environment itself has changed.

2. Imperfectly competitive behaviour seems increasingly relevant and perfect competition less so. Technological advantage, scale economies, and multinational corporations appear to be playing growing roles in international trade. Governments own some of these multinationals and champion others, often pitting themselves against each other as competitive promoters and defenders of their own firms. Equilibrium in global markets seems often to be determined by small numbers of large strategically self-conscious agents (firms and governments), not by large numbers of small agents competing at arms length. Such oligopolistic equilibria have a different character than perfectly competitive equilibria, and respond to government policy initiatives differently.

3. In part these changes are a reflection of the changing composition of trade, as documented, for example, by OECD (1987b). As a share of total trade and production for 14 large OECD countries, resource- and labour-intensive commodities have been shrinking steadily, and science-based, scale-intensive and differentiated commodities have been growing; "intra-industry" trade has jumped dramatically in the 1980s after remaining constant during the 1970s.

4. One of the most important reasons for the present survey of early empirical research under imperfect competition is that it is necessarily an empirical question whether or not an economy gains from trade liberalisation in this case.

5. Section II of the survey discusses the theoretical background for the empirical research in three ways: verbally, algebraically and graphically. The algebra and graphics are admittedly stylised, and the examples discussed are hypothetical. Yet the style aims for clarity and accessibility, and the purpose is to distil a set of key elements that underlie the effects of trade policy under imperfect competition. More sophisticated and detailed theoretical surveys exist in Helpman (1984), Krugman (1986, 1986a,b) and Markusen (1985).

6. The elements from Section II are joined in various combinations in the more relevant and less stylised empirical work surveyed in Section III. Indeed, the purpose of Section II is to allow decomposition and comprehension of the empirical results of Section III. The elements are building blocks; the empirical studies are based on models which are still only approximations to reality, but approximations that depend at least on data and generalised wisdom on how the economy works.

7. In this spirit, Section IV completes the survey with some directions for building better models -- more interesting, more practical and more useful for private decision-making and the assessment of policy.

8. The most important conclusion from the research surveyed is that simultaneous reduction of barriers to international and internal competition creates sizeable and mutually reinforcing increases in an economy's real income. There are exceptions, however. Such benefits are not virtually "guaranteed", in the way that they are in traditional textbook models of market economies with undistorted, perfect competition. Exceptions notwithstanding, the presumption is that trade liberalisation still generates significant gains under imperfect competition with scale economies. The gains could be two to three times the size of those estimated under traditional assumptions.

9. Although there are sizeable estimated gains, these studies suggest that trade liberalisation can cause significant adjustment costs arising from temporary and involuntary unemployment of resources -- probably on firms and workers most heavily, but possibly also on entire industrial sectors and important trading partners. This research does not therefore support the blithe dismissal of adjustment pressure that is often justified by the belief that adjustment takes place primarily among product lines. In that case, its burden would be light, focused on specialisation within firms and two-way intra-industry trade. Such effects are certainly there in the estimates, but so also are forced exits of marginal firms, moderately large stimuli for workers to move from sector to sector, and moderately sharp changes in trading patterns among traditional trading partners.

10. The most important research question for the future is whether these conclusions will continue to hold in the more refined extensions of empirical research that are discussed in Section IV, and if so, how policy should be shaped in their light.

II. THEORETICAL BACKGROUND

11. Both theory and empirical research on trade policy under imperfect competition have borrowed heavily from the literature on industrial organisation. It is useful first to summarise some partial- and general-equilibrium thinking about industrial organisation, and then to show how trade policy matters in the typical empirical study.

A. Microeconomic structure

12. Most empirical studies of trade policy under imperfect competition use a very straightforward, yet very flexible, model of firm and industry behaviour. Rodrik (1988, Part IV) is a good example, quite parallel to the treatment here. The model includes many realistic features, and also many familiar and robust economic relationships. For example, a sensible firm will keep on producing and marketing a product until the extra revenue it earns from selling another unit just covers the extra cost of producing it. This familiar equality between "marginal revenue" and "marginal cost" reveals a realistic kind of mark-up pricing, after some algebraic manipulation:

$$\frac{p - c}{p} = \frac{1}{e}; \qquad [1]$$

where p and c are the product's price and marginal cost, and where e is the elasticity (responsiveness) of demand that a firm perceives when it changes its price (defined positively) (1). Sensible firms will charge a mark-up over marginal cost (p - c), which when expressed as a proportion of price, is simply the reciprocal of the perceived demand elasticity. Elasticity governs market power. A firm facing an elasticity of two will mark up price so that it doubles marginal cost. One facing an elasticity of three will mark up price 50 per cent above marginal cost. Perfect competitors facing infinitely elastic demand will enjoy no market power and no mark-up, but will be induced to price at exactly marginal cost (including of course the marginal cost of management, risk-bearing and other entrepreneurial activity).

13. In imperfectly competitive settings, the first interesting question is how one firm's market power depends on the actions of its rivals. This can even be measured, and provides a first index of imperfect competition for empirical purposes. For example, suppose that n similar rival firms sell q units each of the same product in the same market. Then the total amount sold (nq) will in equilibrium be willingly purchased by buyers according to a market demand schedule:

$$nq = A - Bp \qquad [2]$$

where A and B can be considered constants. This market demand schedule has its own elasticity E, which can be shown to equal the reciprocal of A/Bp - 1 (2).

14. E, the market demand elasticity, will not in general be equal to e, each firm's perceived demand elasticity. It is helpful to see their relationship and the interdependence of each firm's market power along a continuum ordered by an "imperfection weight" w:

$$\frac{1}{e} = w(\frac{1}{E}). \qquad [3]$$

At one extreme, for perfectly competitive firms, w = 0; imperfect competition plays no role, and firms are independent. At the other extreme, for a monopolist, w = 1, and e is E. For a tight collusion of n firms, acting as if they were one to maximize joint profits, w also = 1, and each firm faces an e that is equal to E. With less intensely collusive competition, w falls between 0 and 1, and each firm's market power depends moderately on that of its rivals. When w is empirically estimated (see Bresnahan (1987)), it serves as one measure of the imperfection of competition.

15. A very important intermediate degree of imperfect competition is called Cournot competition. It is a useful empirical reference point, in which w equals each firm's share of the overall market (w = q/nq = 1/n, and hence e = nE). Cournot competition emerges when each firm perceives as given the outputs of its rivals and then optimally decides on its own output (3). "Cournot pricing", often encountered in empirical studies, is marking up price above marginal cost by the reciprocal of nE, the product of a firm's market share and the overall market elasticity.

16. The intensity of competition, measured by w, is one important dimension of imperfect competition. A second is excess profits -- profits above the

normal amount necessary to keep entrepreneurial resources committed. Unhindered ("free") entry and exit of firms drives excess profit rates per unit of output, r, close to zero in the long run (4). In that case, the market structure is described as "monopolistically competitive". If n cannot vary, but is fixed by barriers to entry (or exit), then r is variable, and the market structure is called oligopolistic.

17. The excess profit rate r is defined more precisely as the proportion by which price lies above average cost per unit of product. Average cost is the sum of variable (c) and fixed cost (f). Empirical studies often assume constant variable cost per unit, making:

$$r = \frac{p - c - f/q}{p}. \qquad [4]$$

when free entry and exit drive excess profits to zero, [4] implies that $(p-c)/p = f/pq$. In this case, a firm's mark-up over marginal cost from equation [1] is not arbitrary, but necessary to pay fixed cost per dollar of output. Market power is then merely the power to pay off one's fixed commitments to operate -- legal incorporation and retainer fees, plant construction and maintenance, market research, licensing, and so on. Sometimes a finer distinction is made between "sunk" fixed costs, like initial incorporation and irrecoverable construction costs, and "recurrent" fixed costs, like retainer fees and plant maintenance. Sunk fixed costs are paid once, and will be spread over as many periods as a product is produced; recurrent fixed costs are paid every period (5).

18. Built into [4], and into the definition of average cost, is increasing returns to scale, in this case the ability to spread fixed costs thinner and thinner over larger and larger outputs. The sector described by equations [1] to [4] is in fact a type of natural monopoly. On the face of it, it would be wasteful for a duopoly to use up resources worth 2f when a monopoly would require only f to supply the whole market.

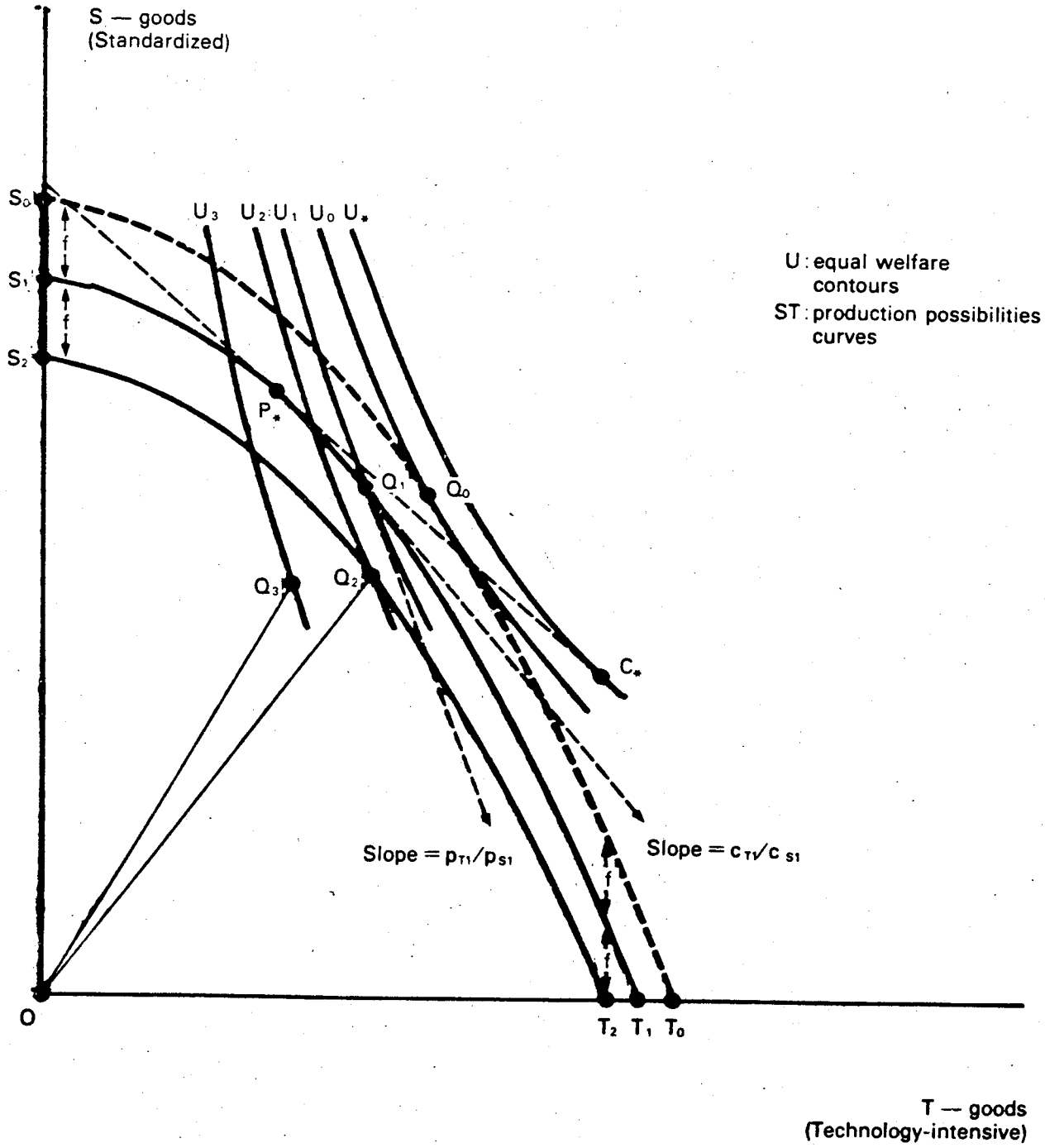
B. General equilibrium structure and trade policy

19. International trade and trade policy affect this imperfectly competitive behaviour in numerous ways. Three of the most important for policy debate and empirical work can be illustrated in a very simple generalisation of the behaviour to the whole economy. Trade policy has potential to alleviate an economy's welfare losses from: i) distortionary pricing above marginal cost; ii) wasteful duplication of facilities or firms whose fixed costs cause a sector's average costs to be unduly high; iii) exploitative income transfers to foreign firms charging excess profits.

20. The diagram below is admittedly stylised. But it clearly captures many of the significant contentious issues in trade policy under imperfect competition, and it reveals the most important ways that empirical models have attempted to quantify their importance. The diagram is in fact the foundation for empirical estimates used by the Canadian Government in negotiating the pending Canada-U.S. Free Trade Agreement, and in convincing the Canadian public of its benefits (Canada (1988)).

FIGURE 1

A STYLIZED ECONOMY UNDER IMPERFECT COMPETITION



21. Figure 1 illustrates overall equilibrium for a hypothetical economy with one perfectly competitive sector, producing standardized goods (S), and a second imperfectly competitive sector, producing technology-intensive goods (T). The T sector fits equations [1] to [4] above. Figure 1 can be taken initially to illustrate prohibitive trade barriers and a closed economy. (Markusen (1985) provides a similar treatment.)

22. In order to produce even the first unit of T-goods, a fixed cost of f must be borne. Resources that could have produced S_0S_1 of standardized goods must be diverted say, to a research laboratory for T. The economy's production possibilities curve $S_0S_1T_1$ lies uniformly inside of a reference curve that would pertain without fixed costs, S_0T_0 (6). Furthermore, if two firms compete to set up research laboratories in order to produce T goods, the economy's production possibility curve would lie even lower: $S_0S_2T_2$. The second research laboratory may involve a social waste of resources equal to f (7). And the second firm's entry into the T market is arguably an example of inefficient entry.

23. Since imperfectly competitive firms mark up price above marginal cost, equilibrium is illustrated in Figure 1 by a point like Q_1 for monopolistic market structure, and Q_2 for a duopoly. Buyers determine purchases at Q_1 so that their satisfaction from the last dollar's worth of each good bought is equal -- illustrated by tangency between the relative price line p_{T1}/p_{S1} and the equal-welfare curve U_1. Imperfectly competitive mark-ups at Q_1 or Q_2 make the relative price of T goods higher than the relative marginal cost of T goods, c_T/c_S, which is what the slope of the production possibilities curve represents. The wedge between the two dashed lines at Q_1 represents a wasteful price distortion.

24. Finally, it is quite possible, for example at Q_2, that both firms are earning excess profits (8). But both may be paying a portion of those excess profits to a foreign patent holder whose innovation the two research laboratories are implementing. In that case there is a transfer of excess profits abroad, and the economy's real income, $0Q_3$, is less than its real output $0Q_2$.

25. Q_0 is a hypothetical reference point that locates the competitive equilibrium for this economy in the absence of any fixed costs. At least f of fixed costs is, however, an assumed fact of life, and the fundamental cause of imperfect competition. Thus, the best the economy could hope to do is attain the equilibrium (undrawn) on $S_0S_1T_1$ that is just tangent to an equal welfare contour like U_0, but below it and above U_1.

26. Relative to that "best" equilibrium, imperfect competition in this stylised economy can reduce welfare for three reasons. Price distortions can reduce welfare to U_1. Inefficient entry of a second T firm seeking excess profits can create unduly small-scale production and high average cost, reducing welfare further to U_2. And net payments of excess profits to imperfect competitors abroad can reduce welfare still further to U_3.

27. Now we can identify some extra potential gains from trade for an economy with imperfect competition. Liberalisation that opens this particular economy to trade has all its normal benefits and more. Freer trade normally allows an economy to increase welfare to, say, U_* by shifting production to a

point like P_* and consumption to a point like C_*, with exports of S and imports of T respectively equal to the vertical and horizontal distances between P_* and C_*. But freer trade in this case also: i) reduces imperfectly competitive price distortions, as every domestic firm is forced to compete against new foreign rivals; ii) "rationalizes" the domestic industry by forcing exit of inefficient firms that drive up average costs; iii) reduces transfers of excess profits abroad. The economy's gains from freer trade, counting its effects on imperfect competition, are more like the difference between U_3 and U_* than between U_0 and U_*.

28. This accounting, however, is one-sided. It neglects to convey that most imperfectly competitive behaviour is a two-edged sword. It can "cut" in favour of an economy as well as against it. Contrary to the impression conveyed by Figure 1, trade liberalisation under imperfect competition is not guaranteed to produce extra benefits, either in theory or in practice. A simple alteration in the figure to make the economy an inherent exporter of T goods, instead of an importer, would show that: i) mark-up pricing on imperfectly competitive exports can capture the same benefits as the classic optimal tariff under perfect competition; ii) having two dominant producers that have already sunk 2f of fixed costs in an export market (Boeing and McDonnell-Douglas?) can deter entry by a foreign competitor (Airbus?) that could potentially reduce the exporter's national welfare -- see Krugman (1987, pp. 135-36); and iii) an economy's imperfectly competitive firms may, on balance, be collectors of excess profits on exports, which enhance its welfare. In this altered scenario, trade liberalisation may reduce and even reverse the standard gains from trade. Trade liberalisation may be detrimental to an economy, not beneficial, with imperfect competition.

29. Some of the elements in this fuller accounting, especially iii), are of course transfers from one economy to another. Thus, from the viewpoint of all trading economies together, they are neither a gain nor a loss. Other elements, though, especially i) and ii), apply at the global level as well: trade liberalisation can be an effective instrument for disciplining distortionary forces and economising on fixed resource costs.

30. Global effects notwithstanding, we can draw an important conclusion about imperfectly competitive environments. From a national viewpoint, it is necessarily an empirical question whether there are gains from trade policy or losses. We will turn to research that attempts to answer that question after completing our inventory of additional trade policy considerations arising out of imperfect competition.

C. Some additional considerations

31. Evaluators of any trade policy initiative under imperfect competition need to weigh its effects on i) price distortions, ii) sectoral rationalisation, and iii) profit transfers, as discussed above. In addition, evaluations need to be concerned with several other unique features.

1. Adjustment costs and trade patterns

32. Trade policy under imperfect competition due to scale economies can cause much more dramatic, discontinuous changes in trade, production and market structure than under perfect competition with zero fixed costs.

Rationalization will usually imply that some plants or firms shut down, not just that they shrink. It may imply that a country loses all firms and production in a given sector (9). For example, in Figure 1, a slight flattening of the dashed line P_*C_*, equivalent to a small drop in world prices of technology-intensive goods, will cause the ideal production point to jump discontinuously from near P_* to S_0, without traversing intermediate points of incomplete specialisation. Both exports of S and imports of T would nearly double. Very little increase in welfare would result, but the T-industry would vanish. A very small, not very costly import barrier could then cause the industry to re-appear suddenly. That suddenness is precisely the point: trade and trade policy could in some cases have very powerful effects on the sectoral composition of a country's production and employment under imperfect competition, without necessarily affecting its long-run welfare much (10). But in the short run, obviously, welfare could decline if firms became suddenly insolvent, capacity became temporarily unproductive, and employees faced long dislocation and the need to move or retrain.

33. Harris (1985, pp. 165-166) and Wonnacott (1987, pp. 33-40) summarise this concern and provide some evidence. Other commentators, however, discount the concern. They suggest that what happens instead is that rationalization causes each country's firms to specialise on narrowly defined varieties of a product, so that any dramatic changes in production and trade are of an "intra-industry" sort. A country may indeed cease producing large automobiles, but dramatically increase its production and export of intermediate-sized models. Short-term adjustment costs will be minimal because the same firms produce both varieties of auto, each of which uses very similar plants, machinery, workers and techniques (11).

2. Product variety

34. Product variety is important in its own right. Rationalization across different varieties of similar products is a unique potential gain from trade liberalisation under imperfect competition (Helpman (1984, pp. 355-362)). One benefit is availability. Trade liberalisation may make certain varieties of a product available for the first time, a clear welfare gain. A related benefit is continuity. Trade liberalisation may make choices possible along a continuum of quality and performance characteristics, whereas gaps exist without it. "Just the right lathe" or "the perfect truck" for our route structure may have been unavailable or unduly expensive because of trade barriers. Continuity in turn can heighten the desirable competitive discipline provided by close substitutes for a product (12).

35. There is a possibility, however, that trade liberalisation might reduce variety. This possibility is most pronounced when each firm produces a set of varieties that do not "overlap" significantly with those of other firms (13). Gains from increased varieties of foreign products should then be weighed against any losses from reduced varieties of domestic products caused by exit of domestic firms. The latter could possibly outweigh the former.

36. In general, however, it seems likely that trade liberalisation will increase the "supply of variety" for all buyers. In fact, entirely new varieties may spring up, as global market sales of a new variety may be large enough to cover its fixed costs (f), but sub-global sales are not.

37. Finally, as implied by the examples above, variety is no frivolity. It is arguably more important to firms in purchases of capital equipment and intermediate components than to consumers. To increase variety in producer goods actually increases productivity and lowers resource costs.

3. Indirect cost effects

38. Trade liberalisation reduces resource costs by increasing the availability and lowering the price of imported intermediate and capital goods. Both of these effects can be discussed in perfectly competitive analysis. Imperfectly competitive behaviour adds new considerations. Fixed costs themselves (f) may be reduced by importing research and development, legal and financial services, capital equipment, and so on. Fixed costs may become an irrelevant fact of life if production becomes specialised (for example at S_0 in Figure 1). Entry may be encouraged when marginal costs (c) are reduced by cheaper imported inputs. Entry will in turn generally increase the perceived demand elasticities of incumbent firms (e) and reduce the price distortions caused by their mark-up pricing.

4. Demand-side effects

39. Almost all trade policy alters demand curves. But such alterations have greater significance for imperfectly competitive behaviour than for perfect competition. Mere rotation of the market or perceived demand curves around an equilibrium point will change imperfectly competitive behaviour and the equilibrium -- even if no conventional "shift" occurs (Bresnahan (1987, pp. 38-39)). Changes in tariffs will usually change the elasticity of the market demand curve (E), and hence change the size of mark-ups and price distortions. Changes in quotas can have even more drastic effects, causing market demand curves to become undefined ("vertical") over certain ranges. Voluntary restraint arrangements (VRAs) that prescribe market shares (such as in steel for many countries and in autos for some) can alter the power relationships among rivals dictated by equation [3]. By implicitly guaranteeing market share, they can convert moderate competition into a tight collusion with no competition at all (w can fall to zero) (14). Mark-ups would rise and price distortions would become worse.

40. Integrative trade liberalisation -- for example, liberalisation that turns two separated national markets, with different firms competing in each, into one integrated common market -- almost certainly increases welfare (Smith and Venables (1988), Markusen and Venables (1988)). Even if overall market elasticity E remains the same from adding together two demand curves like equation [2], the new presence of n_1+n_2 firms instead of n_1 or n_2 puts pressure on perceived elasticities (e) to rise, with consequently smaller mark-ups and price distortions.

41. Among almost all of these additional features of imperfect competition can be found reasons for a country's trade liberalisation and reasons for its trade-policy activism. Which dominate and when is the necessarily empirical question to which we now turn.

III. EMPIRICAL RESEARCH

A. Overview

42. The first thing that early empirical research has shown is that incorporating imperfectly competitive behaviour, especially when motivated by scale economies, can make a significant difference to estimated effects of trade policy on economic welfare, industrial structure, and adjustment. Table 1 summarises the studies discussed in Section C and Tables 3 and 4 below. The comparisons (small, moderate, large) are in every case with empirical research that assumes perfect competition and no fixed costs or scale economies. "Small" suggests little quantitative sensitivity to the inclusion of scale effects and imperfect competition; "large" suggests considerable sensitivity.

43. Table 2 further documents the importance of imperfect competition. It summarises the results of several empirical studies capable of answering the question, "How would results have changed if fixed costs had been zero and competition had been perfect?" (15). In every case the results are estimates of the effect of various kinds of trade liberalisation on the overall economic welfare of countries and regions. Economic welfare is defined as real income, a measure of the volume of goods and services that a given income can purchase, corresponding to the value of alternative U-curves in Figure 1.

44. The most important conclusion from Table 2 is that, on balance, trade liberalisation can have strong positive effects on economic welfare that are due in significant part to rationalisation of industrial structure and heightened market competitiveness. Cases in which the addition of imperfectly competitive behaviour shrinks or reverses the benefits from trade liberalisation appear to be the exception rather than the rule, especially under the assumption of free entry to and exit from economic activity.

45. Several other conclusions stand out in Tables 1, 3 and 4. The first is that what really matters are the fixed resource costs and underlying economies of scale in conjunction with the imperfect competition that they create. When fixed costs and scale economies are absent, as in Dixit (1988), empirical research finds little effect from pre-supposing imperfect competition alone. The second conclusion is that the quantitative importance of scale effects, fixed costs, and imperfect competition is greatest when there is free entry and exit. It is entry of new competitive firms, plants and product lines, and exit of uncompetitive firms, plants and product lines that creates the largest change in average resource productivity, and hence in economic welfare. The third conclusion is a result of the second. Estimated adjustment costs are not trivial, by comparison with those estimated under perfect competition. They range on average from moderate to severe, contrary to popular wisdom about the ease of adjusting intra-industry trade to policy innovations. These studies estimate significant pressures on workers to change industries and jobs, on firms to change outputs and activities, and on trading partners to change their trade patterns. The pressures nevertheless shrink toward levels of normal turnover and attrition if estimates are cumulated incrementally over five to ten-year phase-in periods. The fourth conclusion is the potential for what might be termed "scale diversion" in those studies that vary the scope of participation in trade liberalisation (Smith and Venables (1988), Digby,

Table 1

SUMMARY RESULTS

EMPIRICAL RESEARCH ON TRADE POLICY
UNDER IMPERFECT COMPETITION

Research	Size (a) of Effects on		
	Economic Welfare (b)	Market Structure (c)	Adjustment Stimuli (d)
Rodrik (1988)	moderate to large	moderate	moderate
Smith and Venables (1988)	moderate	moderate	moderate to large
Digby, Smith, and Venables (1988)	moderate	moderate	moderate to large
Dixit (1988)	small	small	moderate
Baldwin and Krugman (1988)	?	large	large
Owen (1983)	moderate	moderate	moderate
Cox and Harris (1985)	large	large	large
Canada (1988)	moderate	moderate	small
Brown and Stern (1988a,b)	small to moderate	small to moderate	small to moderate
Nguyen and Wigle (1988)	small to moderate	moderate	moderate

a) Approximate measure of responsiveness per "unit" of policy change (i.e. a rough elasticity).

b) Economic welfare effect of the policy change expressed as a percentage of the relevant sectoral or aggregate consumption.

c) Effects on costs, profits, number and size of firms.

d) Effects on a country's output mix across sectors and/or trade patterns across trading partners.

Source: Tables 3, 4 and text.

Table 2

WELFARE EFFECTS (a) OF TRADE POLICIES UNDER PERFECTLY AND IMPERFECTLY COMPETITIVE (b) ASSUMPTIONS (PERCENTAGE CHANGE IN REAL CONSUMPTION)

Study/ Experiment	Calculated Economic Welfare Impact Under		Effect on Calculation from
	Perfect Competition	Imperfect Competition	Imperfect Competition (c)
Brown and Stern (1988a), Canada-U.S. free trade area.			
Canada	-0.015	1.177	1.192
U.S.	0.045	0.027	-0.018
Rest of World	-0.005	-0.004	0.001
Harris (1984), unilateral Canadian liberalization, reciprocated Canadian liberalization, effects on Canada.			
Unilateral	0.0	4.1	4.1
Reciprocated	2.4	8.6	6.2
Rodrik (1988), (d) 10 percent loosening of import quotas, effects on Turkey.			
No entry/exit			
Autos	6.3	2.6	-3.7
Tires	2.9	0.6	-2.3
Electrical appliances	1.0	-0.5	-1.5
Free entry/exit			
Autos	6.3	5.2	-1.1
Tires	2.9	4.1	1.2
Electrical appliances	1.0	1.2	0.2
Smith and Venables (1988), (d) 2.5 percent cut in transport/transfer costs among EC members, effects on EC as a whole.			
No entry/exit			
Cement, lime, plaster	0.04	-0.10	-0.14
Pharmaceutical products	0.25	0.29	0.04
Artificial, synthetic fibres	0.91	0.99	0.08
Machine tools	0.56	0.84	0.28
Office machinery	0.59	0.88	0.29
Electric motors, generators	0.22	0.29	0.07
Electrical household appliances	0.49	0.64	0.14
Motor vehicles	0.62	0.83	0.21

Table 2 (continued)

Study/ Experiment	Calculated Economic Welfare Impact Under		Effect on Calculation from
	Perfect Competition	Imperfect Competition	Imperfect Competition (c)
Carpets, lineoleum	0.47	0.67	0.20
Footwear	0.27	0.35	0.08
Free entry/exit			
Cement, lime, plaster	0.04	0.64	0.60
Pharmaceutical products	0.25	0.30	0.05
Artificial, synthetic fibres	0.91	1.84	0.97
Machine tools	0.56	0.82	0.26
Office machinery	0.59	1.45	0.86
Electric motors, generators	0.22	0.29	0.07
Electrical household appliances	0.49	0.81	0.32
Motor vehicles	0.62	1.34	0.72
Carpets, linoleum	0.47	0.76	0.29
Footwear	0.27	0.40	0.13

a) Calculated change in economic welfare as a percentage of GNP or GDP, except for Rodrik (1988) and Smith and Venables (1988), where the calculated welfare effect is scaled by consumption within the industry indicated.

b) Version reflected in table. Brown and Stern (1988a): monopolistic competition. Harris (1984): non-product differentiation. Rodrik (1988): Cournot pricing. Smith and Venables (1988): Cournot pricing, varieties per firm constant.

c) Second column minus first column.

d) Column 1 estimates under perfect competition are especially rough approximations, by the authors' own admission, but useful for an order of magnitude.

Sources: Brown and Stern (1988a, Table 3), scaled by 1976 base GDPs implied by Deardorff and Stern (1986, Table 4.4, pp. 54-55): Canada--195 737; U.S. -- 1 737 250; Rest of World -- 3 020 124. Harris (1984, Table 2, p. 1 028). Rodrik (1988, Tables 5-7). Smith and Venables (1988, Table 3, p. 17).

Smith, and Venables (1988), Nguyen and Wigle (1988)). Estimated welfare gains for Canada and Italy, in particular, seem to be very sensitive to whether or not the developing countries and Greece, Spain, Portugal are fully integrated into the trade liberalisation.

46. The policy implications corresponding to these conclusions would seem to be that simultaneous reduction of barriers to international and internal competition creates sizeable and mutually reinforcing benefits, but at the expense of adjustment burdens, either across sectors or among trading partners, that cannot blithely be dismissed.

B. Empirical methods

1. Calibration/counterfactuals

47. All of the empirical research summarised in Tables 1 to 4 employs a method sometimes described as a calibration/counterfactual experiment, but which is in essence an empirical analog to comparative statics. The method is familiar from computable general equilibrium (CGE) studies (16), although applied here to partial equilibrium studies as well. The method begins with assumptions about economic behaviour (such as equations [1] to [4] above), and maintains them as true for purposes of empirical analysis. It then uses econometric estimates and industry case studies to measure key behavioural parameters. Since some parameters are subjective or have been estimated dubiously, there are always gaps. These can often be filled by assuming that the behaviour accurately describes a real period, and using this period's data as a benchmark along with measured parameters to infer the values of missing, subjective, or dubious parameters. This inference is called "calibration", and amounts to making the assumed behaviour and one period's data mutually consistent. The model's mechanics will in essence produce an equilibrium that matches reality for that one period. The counterfactual step is to change one (or more) of the parameters or date entries -- in this case trade policy -- and to calculate the new equilibrium that would have been generated by the model's mechanics. Values of variables in this new equilibrium are compared to their actual values and differences between them are taken to be estimates of the effects of trade policy (17). The similarity to comparative statics should be clear.

48. Calibration/counterfactual methods have compelling strengths, despite their simplicity, selective and judgmental use of data and econometric estimation, insistence on maintaining rather than testing hypotheses, and imprecise statistical robustness. In this case they complement the data with a flexible structure to describe imperfect competition generically. They impose sensible economic consistency on experimentation (that is, incentives are calculated and profitable opportunities are assumed to be seized). And they organise the interpretation of results around accepted descriptions of economic trends (although there are usually several such descriptions).

49. These strengths notwithstanding, calibration/counterfactual methods are more art than science. They provide less definitive results than the econometric, data-intensive methods that characterise modern empirical research in industrial organisation, surveyed by Bresnahan (1987). The intricacies and inadequacies of international and comparative national data for the moment preclude recourse to more sophisticated empirical methods in the study of trade policy.

2. Partial- and general-equilibrium approaches

50. The studies summarised in Tables 3 and 4 are respectively "partial equilibrium" and "general equilibrium" approaches. The latter take into account and estimate several potentially important economic effects that are neglected by the former (18). These effects always involve how one sector's trade policy changes prices or costs in other sectors, either through intermediate purchases, or through impacts on the whole economy's wages, rents, and costs of capital. For changes in trade policy within a single sector a small sub-set of sectors, as in Table 3, cross-sector and factor-price effects are arguably insignificant, and can be ignored. For across-the-board changes in trade policy, such as those underlying Table 4, cross-sector and factor-price effects are cumulatively large, and must be estimated.

51. The distinction, although important for many empirical purposes, turns out to be unimportant for purposes of this survey. Almost all conclusions about the special effects of trade policy under imperfect competition show up in both the partial equilibrium and general equilibrium empirical studies.

C. Distinctive features and conclusions

52. Although the studies of Tables 3 and 4 share a common structure and empirical method, each has distinctive features. Some of these features seem strengths to be emulated in future empirical research; others seem weaknesses to be avoided. Conclusions are, of course, sensitive to these distinctive features.

53. Rodrik (1988) is an especially clear and accessible introduction to the mainstream of empirical research on trade policy under imperfect competition. Its distinctive features are two-fold: i) its consideration of quotas (most of the other studies are predominantly about tariffs); and ii) its ability therefore to capture incentives and disincentives for rent seeking in addition to the standard effects. Rodrik is one of the few researchers to address the "integer problem" empirically, the potentially important observation that free entry and exit may not guarantee zero excess profits. When fixed costs are especially large, the marginal entrant may be deterred from entering, even though "free" to do so, because its anticipated share of the positive excess profits will not cover its large fixed costs. Making allowance for free entry with positive profits is presumably quite important in empirical research like Rodrik's on developing countries with small numbers of firms (19), or like Baldwin's and Krugman's (1987, 1988) on industries with unusually high fixed costs. They in fact adopt a similar approach.

54. Rodrik's results are noteworthy first for the large size of the estimated welfare effect. This may reflect his allowance for collusive (monopolistic) pricing. It may also signal that market-structure benefits of trade liberalisation are greater in developing countries, as are more conventional benefits. Rodrik's result also show clearly the way that welfare effects are larger with free entry (that promotes rationalisation) and collusion in the base period (which is weakened by international competition).

55. Smith and Venables (1988) is noteworthy first for its timely application to the European Community's intention to complete its internal

Table 3

GENERAL-EQUILIBRIUM: EMPIRICAL RESEARCH ON TRADE POLICY UNDER IMPERFECT COMPETITION

Research and policy change	Effects		
	Economic welfare (a)	Market structure	Sectoral structure or trade pattern
Rodrik (1988)			
Policy change: Unilateral loosening of Turkish import quotas by 10 per cent. Data base: various years, 1970s, early 1980s. Sector market: 3 sectors Turkey. Pricing rule: a) Cournot pricing b) Collusive joint profit-maximizing. Entry/exit: i. none; ii. free Product variety: differentiation by nation of supply. Morphology: static.	Proportional change: i. a) 0.9 Average b) 2.4 effect across ii. a) 3.5 three b) 6.9 sectors.	a) With fixed number of firms, profit sales rates fall by 2-3 percentage points. b) One firm exits each sector uniformly, leaving 2, 3 and 7 incumbents (respectively for autos, tires, and appliances), each of which increases output despite lower sectoral output.	a) Moderate adjustment pressure pressure. Output per firm falls 6-9 per cent under Cournot pricing, but only 2-3 per cent under collusive pricing. b) Moderate adjustment pressure One firm always exits. Most incumbent's outputs rise more than 10 per cent, up to 50 per cent (autos, collusive pricing).
Smith and Venables (1988)			
Policy change: a) 2.5 per cent cut in transport and transfer costs among EC members. b) a. subject to equalization of product prices among EC members. Data base: 1982. Sector/market: 10 sectors/5 EC markets, 1 rest-of-world market. Pricing rule: Cournot pricing (also Bertrand for illustration). Entry/exit: i. none; ii. free. Product variety: differentiation across firms and within (models), market segmentation due to transport and transfer costs. Morphology: static.	Proportional change: i. a) 0.57 Average b) 1.78 effect on EC across ii. a) 0.87 ten b) 2.66 sectors.	a) Average costs fall uniformly, up to 1 per cent without entry and up to 2.5 per cent (fibres, office machinery) with free entry. b) Average costs fall uniformly, up to 2.7 per cent (office, machinery) without entry, and as much as 9 (appliances) and 17 (motor vehicles) per cent with free entry. Significant exit takes place.	a) Modest sectoral adjustment pressure based on electrical household appliances (other sectors not given). National output rises as much as 6.4 per cent (Italy) or falls by as much as 4.9 (U.K.). Trade among EC members rose 22-25 per cent; imports from non-EC fall 6-8 per cent. b) Moderate secctoral adjustment pressure based on electrical household appliances (other sectors not given). National output rises as much as 20 per cent for smaller EC members, and falls as much as one per for Italy. Heavy adjustment pressure on firms because of significant exit.

Table 3 (continued)

GENERAL-EQUILIBRIUM: EMPIRICAL RESEARCH ON TRADE POLICY UNDER IMPERFECT COMPETITION

Research and policy change	Effects		
	Economic welfare (a)	Market structure	Sectoral structure or trade pattern
Digby, Smith and Venables (1988)			
Policy change:	Proportional change:		
Removal of Japanese VERs		a) Prices decline almost 1 per cent on average for non-Japanese firms, 8 per cent Mark-ups decline accordingly. But average costs rise almost 1 per cent for non-Japanese firms, and profits fall accordingly.	a) Moderate adjustment pressure. Non-Japanese firms lose 4-9 per cent of previous sales; Japanese firms gain 57 per over previous sales.
a) in Britain	a) 2.1 (Britain)		
b) in all EC members.	b) 2.0 (Britain) 2.5 (France) -0.9 (Canada) 4.2 (Italy) 2.5 (Japan)	b) Prices decline up to 2 per cent on average for non-Japanese firms, and 26 (France) and 52 (Italy) per cent for Japanese. Markups decline accordingly. But average costs rise up to 2 per cent for non-Japanese firms and profits fall accordingly.	b) Moderate to heavy adjustment pressure. Non-Japanese firms lose 4-22 per cent of previous sales; Japanese sales increase six-fold (France) and more than 100-fold (Italy).
Data base: 1985.			
Sector/market: passenger automobiles/5 EC markets, Japan, 1 rest-of-world market.			
Pricing rule: Cournot pricing modified for VER.			
Entry/exit: none.			
Product variety: differentiation across firms and within (models), market segmentation due to transport and transfer costs.			
Morphology: static.			
Dixit (1988)			
Policy change:	Proportional change:		
Replace $100 U.S. tariff with optimal tariff and/or production subsidy.	1979: 0.14 (optimal tariff of $570 with zero subsidy).	1979: U.S. profits rise at most 23 per cent; Japanese profits fall at most 33 per cent.	1979: U.S. auto sales rise at most 11 per cent (0.9 mil. units); Japanese exports fall at most 18 per cent (0.3 mil units).
Data base: 1979, 1980.	0.55 (optimal tariff of $408 with optimal subsidy).		
Sector/market: U.S. passenger autos.			
Pricing rule: variable mark up over marginal cost.			
Entry/exit: none.			
Product variety: differentiation by nation of supply.	1980: 0.03 (optimal tariff of $298 with zero subsidy).	1980: U.S. profits rise at most 12 per cent; Japanese profits fall at most 16 per cent.	1980: U.S. auto sales rise at most 6 per cent (0.4 mil. units); Japanese exports fall at most 8 per cent (0.2 mil. units).
Morphology: static.	0.14 (optimal tariff of $211 with optimal subsidy).		

Table 3 (continued)

GENERAL-EQUILIBRIUM: EMPIRICAL RESEARCH ON TRADE POLICY UNDER IMPERFECT COMPETITION

Research and policy change	Effects		
	Economic welfare (a)	Market structure	Sectoral structure or trade pattern
Baldwin and Krugman (1988)			
Policy change:	Proportional change:		
a) Removal of alleged Japanese closure of internal market (approximated by 27 per cent tariff).	a) > 0 (U.S.) > 0 (Japan)	a) Number of firms falls from 9 (6 U.S., 3J) to 7 (all U.S.); average output per firm rises; average cost falls.	a) Extreme adjustment pressure. Japanese firms never start to become competitive; equilibrium production and
b) Retaliatory U.S. closure of internal market (trade war, approximated by 100 per cent tariffs in each).	b) > 0 (U.S.) > 0 (Japan)	b) Number of firms rises from 9 (6 U.S., 3J) to 12 (7 U.S., 5J); averge output per firm falls; average cost rises.	b) Moderate adjustment pressure compared to base case. Japanese firms lose 0.19 share of sales in U.S.; U.S. firms lose 0.14 share of sales in Japan.
Data base: 1976-84.			
Sector/market: 16K RAM chips in U.S. and Japan.			
Pricing rule: markup over marginal cost pricing. **Entry/exit:** free. **Product variety:** none, homogeneous products, but market segmentation due to transport costs and policy. **Morphology:** dynamic -- two-stage competition in capacity, then price (Bertrand).			
Owen (1983)			
Policy change:	Proportional change:	Average costs fall	Intra-EC -- trade assumed to rise 40-50 per cent.
Formation/expansion of EEC.	2.0 Average effect to on EEC across 2.5 three sectors.	1.8-2.3 1.5-2.0 0.0-0.1 per cent for washing machines, autos, and trucks, respectively.	Extreme adjustment pressure on marginal firms that exit.
Data base: 1976-84.		Marginal firms exit in significant numbers (washing machines, Italy).	
Sector/market: 3 sectors/4 countries.			
Pricing rule: variable markup over marginal cost. **Entry/exit:** free. **Product variety:** differentiation by nation of supply. **Morphology:** implicitly dynamic, static sales competition based on continuous competition in capacity formation.			

a) Economic welfare effect of the policy change expressed as a percentage of sectoral consumption. Average effects across sectors of multi-sectoral studies are not weighted. Baldwin and Krugman (1988) figures could not be computed on a comparable basis given data limitation.

Sources of numerical calculations are available from the author on request.

Table 4

GENERAL-EQUILIBRIUM

EMPIRICAL RESEARCH ON TRADE POLICY UNDER IMPERFECT COMPETITION

Research and policy change	Effects		
	Economic welfare (a)	Market structure	Sectoral structure or trade pattern
Cox and Harris (1985)			
Policy change: **Eliminate tariffs and selected NTBs** **a) of Canada (unilateral)** **b) of Canada and world (multilateral)** **Data base: 1976** **Sectors: 29** **Primary factors: 2** **Regions: 2** **Pricing rules: in 20 manufacturing sectors, weighted average of: i) collusive pricing at landed tariff-inclusive) world price, and ii) monopolistic competitive pricing; competitive in nine sectors.** **Entry/exit: free** **Product variety: differentiation by nation of supply.**	Proportional change: a) 4.1 (Canada) b) 8.6 (Canada)	Averrage output per firm: a) rises 41 per cent b) rises 67 per cent	Considerable adjustment pressure. 4-6 per cent of workers are forced to change their industry of employment. As many as half of the firms in a sector exit. Trade volumes, both imports and exports grow on average 50 per cent (unilateral liberalisation) to 90 per cent (multilateral liberalisation).
Canada (1988)			
Policy change: **Eliminate tariffs and selected NTBs on bilateral Canada-U.S. trade only.** **Data base: 1981 but 1987 trade barriers.** **Sectors: 88** **Primary factors: 2** **Regions: 3**	Proportional change: 2.5 (Canada)	Average costs (manufacturing) fall roughly 10 per cent	Little adjustment pressure. Only 1.3 per cent of workers are forced to change their industry of employment. Trade volume, both exports and imports, rises 16 per cent with the U.S. and 6 per cent with the rest of the world.

Table 4 continued

Research and policy change	Effects		
	Economic welfare (a)	Market structure	Sectoral structure or trade pattern
Canada (1988) continued Pricing rules: collusive at landed (tariff-inclusive) world price for import-competitive manufactures (60 per cent); average-cost, contestable markets pricing for export-oriented manufactures; competitive otherwise. Entry/exit: free for import-competitive manufactures; none for export-oriented manufactures. Product variety: differentiation by nation of supply.			
Brown and Stern (1988b) Policy change: Eliminate tariffs on bilateral Canada-U.S. trade only. Data base: 1976, but post-Tokyo Round tariff rates. Sectors: 29 Primary factors: 2 Regions: 4 Pricing rules: competitive, monopolistically competitive, Cournot, varying judgmentally across sectors. Entry/exit: free or none, varying judgmentally across sectors Product variety: differentiation by firm only.	Proportional change: 1.1 (Canada) 0.1 (United States) -0.0 (Rest of World)	Average size of firm: Canada: grows modestly (4 to 20 per cent) in only 4/24 sectors, and falls sharply (35 per cent) in textiles. Otherwise little change. U.S.: little change, with slightly more than 1 per cent growth in paper products and electrical machinery, and 4 per cent growth in textiles.	Modest adjustment pressure in Canada, little in the United States. Employment changes in Canada are greater than 1 per cent in 22/29 sectors, greater than 5 per cent in 13/29, and greater than 10 per cent in 8/29. Employment changes in the U.S. are greater than 1 per cent in 4/29 sectors. (Note: sectoral output parallels employment because factor prices were little changed.) Large changes in bilateral trade. Canadian imports from U.S. rise more than 25 per cent in 20/22 tradeables sectors, and more than 50 per cent in 11/22. Rest of world imports from Canada and U.S. fall in aggregate by roughly the rise in each country's bilateral imports.

Table 4 continued

Research and policy change	Effects		
	Economic welfare (a)	Market structure	Sectoral structure or trade pattern
Nguyen and Wigle (1988			
Policy change: Eliminate tariffs and selected NTBs a) among all regions b) among DCs only Data base: 1977 (?) Sectors: 6 Primary factors: 2 Regions: 8 Pricing rules: virtually monopolistically competitive in manufacturing, competitive otherwise. Entry/exit: free Product variety: differentiation by nation of supply.	Proportional change: a) 1.5 (large DCs) 0.7 (small DCs) -0.0 (others) b) -0.2 (large DCs) 0.3 (small DCs) 2.9 (others	Average size of firm (manufactures) a) Grows modestly (large DCs). Falls sharply (Canada). Falls modestly (small DCs) b) Grows modestly (large DCs). Grows sharply (Canada). Falls modestly (LDCs and NICs, except machinery and transport grows sharply in LDCs). Average number of firms: (manufactures) Approximate negative of trends in average size.	Modest adjustment pressure. Modest changes (below 10 per cent) in output of manufacturing sectors in almost all regions. Average size and number of firms vary negatively and have quantitatively offsetting effects.

a) Economic welfare effect of the policy change expressed as a percentage of GNP, GDP, or aggregate spending.

Sources of numerical calculations are available from the author on request.

market by 1992 (20). It is unique among the studies summarised in embodying the potential gains from increased product variety when trade is liberalised. This is accomplished in essence by allowing firms free entry and exit not only among product categories, but among "models" within a product category. Fixed costs, which depend on the number of models produced, may be spread not only across large volumes of a given model (standard scale economies), but across models as well (an illustration of one kind of "economies of scope"). On average, this flexibility enhances ways that average fixed costs can be reduced, and Smith and Venables show somewhat larger welfare gains from trade liberalisation with product (model) differentiation than without. Finally, their study allows a better tentative assessment that others of the important question of "market segmentation" -- how to define the market demand in equation [2] above. Most of the other studies merely assume either that [2] describes a national demand curve and use corresponding estimates of its parameters, or that [2] describes a global market, with quite different estimated parameters. Smith and Venables, as well as Brown and Stern (1988a), do calculations both ways, and show that the results are quantitatively very sensitive to the question. The roughly 2 per cent increase in EC welfare that Smith and Venables estimate from completion of the EC's internal market can also be taken as a measure of sensitivity to the assumption of market segmentation. That makes market segmentation an important issue for ongoing research, rather than mere assumption (21).

56. Digby, Smith and Venables (1988) is unique for including a simple way of analysing voluntary export restraints (VERs) in the context of intermediate (Cournot) competition. It also illustrates the potential for perverse effects from trade liberalisation via product variety; it concludes very cautiously (pp. 19-20) that removing Japanese auto VERs for Britain reduces the number of British models produced and exported to Europe -- so much so that EC welfare declines very slightly, although British welfare increases.

57. These studies are also notable for their estimates of moderately large adjustment pressures: the simulations point to significant exit of firms and significant changes in trade patterns. Yet the burden of such adjustment may not be overwhelming if trade liberalisation is phased in over five- to ten-year periods, as is often the case. Then the magnitude of the required adjustment per year during the transition is not that much greater than normal consolidation/merger rates for firms or job-move/attrition rates for workers.

58. Dixit's (1988) study is unique in assuming only imperfectly competitive behaviour, and not (necessarily) increasing returns to scale, hence allowing an assessment of how one contributes independent of the other. By incorporating the potential for an explicit pro-competition policy (e.g. anti-trust), proxied by a production subsidy, Dixit is able to demonstrate the important and familiar point that international trade policy is often a second-best way of accomplishing a government's goals. In the presence of an optimal pro-competition policy, there are only small remaining imperfectly competitive gains to capture by trade policy, in the neighbourhood of one-tenth to one-thirtieth of 1 per cent of consumption (22)! Finally, Dixit's study is distinctive in observing why excess profits may exist in reality, but be hard to detect empirically. Excess "profits" may be disguised in a sector's above-average wages and salaries compared with other sectors, and insulated by labour market barriers. Dixit shows that the larger are such disguised profits, the larger is the scope for active trade policy to create

significant welfare gains. In a hypothetical extreme where half of labour compensation is disguised excess profits, Dixit's estimated gains to optimal pro-competition policy grow to 3 per cent of consumption, and the estimated gains from optimal tariffs increase several times over. But these tariff gains are still well below one-half of 1 per cent. The important message is that empirical estimates are quite sensitive to the amount of "rent" reflected in factor costs. Other studies, in contrast to Dixit's, tend to take wage or cost data to reflect genuine resource costs, without any imperfectly competitive rent component.

59. Baldwin's and Krugman's distinctive contribution, in both their 1987 and 1988 studies is to capture some rudimentary dynamics of international competition, in which firms compete first to establish pre-emptive capacity or R & D necessary to build a product, and subsequently compete over price (in Bertrand fashion) or over market share. Their documentation makes it difficult to discern the independent contribution that this dynamic structure makes to their striking results in the (1988) paper, in which extreme Japanese import protection in 16K RAM chips is immensely successful, although welfare-reducing, export promotion. Essentially, Japanese market closure to imports allows it to displace the United States as the dominantly competitive world producer and exporter (23).

60. Owen's seminal (1983) study is implicitly dynamic in a similar way, since capacity is assumed subject to continuous replenishment and expansion. But Owen's theory and empirical method, while in the spirit of the more recent studies, are generally more primitive (24). His meticulous case studies, on the other hand, set a standard of sophistication that is unparalleled in the more recent research. Owen's other unique feature, in contrast to subsequent studies, is to treat asymmetries among "firms" (or plants) explicitly (25). In the simplest framework, he allows firms to differ in size only (q in equations [1] to [4]), but hence in average cost and profit also (see equation [4]). Unspecified barriers to competition are assumed to keep the large, low-cost, high-profit firms from displacing the small, high-cost, no-profit firms. Yet any reduction in these barriers, such as arising from the creation and expansion of the European Economic Community, exposes the small, marginal firms to losses and drives them out of business (marginal exporting firms, as well as marginal import competitors). That produces Owen's distinctive conclusion: trade liberalisation leads to significant consolidation through the extinction of marginal activities. Therein lies both his moderately large estimated welfare effects and his potentially serious estimated adjustment costs.

61. The studies by Richard Harris and David Cox, from which Canada (1988) with its supporting documentation (26) descends, are distinctive in being seminal for a number of the other general equilibrium studies. They, with Wigle (1988), have underlined the quantitative importance of the imperfectly competitive pricing behaviour discussed above. In particular, all employ a controversial form of collusive pricing described as "focal" or "Eastman-Stykolt" pricing, in addition to the more conventional forms of imperfectly competitive pricing that are employed by the other studies. Focal pricing embodies two characteristics that heighten the importance of imperfect competition for trade policy, and increase estimates of the welfare gains from trade liberalisation. One is that all domestic firms implicitly collude -- without any competitive deviation to undercut the average price of their

rivals. The second is that these firms set a price that is essentially equal to the world price plus any transport and transfer costs (including tariffs) between Canada and the "world". Most commentators agree that these characteristics prejudice the empirical research toward finding large benefits from trade liberalisation, especially when Canadian liberalisation is matched by its trading partners. Liberalisation directly and mechanically lowers the collusive focal price charged by all Canadian firms, rationalizing industries by forcing some firms to exit and incumbents to reduce mark-ups and increase scale by moving down their average cost curves (27). Corresponding to the estimated enhancement of benefits due to focal pricing is an accentuation of adjustment burdens in several of these studies.

62. Brown and Stern (1988a,b), Wigle (1988), and Markusen and Wigle (1987) all estimate smaller welfare effects and adjustment costs from very similar trade-policy experiments without recourse to focal pricing. But Brown and Stern are reluctant to view their own welfare calculations as more than approximate since their model embodies an indefinite wage distortion (rigidity), while nevertheless requiring long-run full employment, as do the other general equilibrium studies (28). There are two unique features to the Brown and Stern studies. Their (1988b) estimates rest on a sensible judgmental partitioning of sectors into five types, depending on the intensity of competition, on whether a sector's market demand is global or merely national and on whether there is free entry or not. Most of the other studies, including their (1988a) paper, assume a less realistic symmetry in these dimensions across all manufacturing sectors (29). Secondly, Brown and Stern highlight differences in the factor content of fixed and variable costs in rationalization, showing its potential importance for estimates of welfare change, and (implicitly) for adjustment burdens from trade liberalisation (30).

63. Nguyen and Wigle (1988) analyse global trade liberalisation in an adaptation of Whalley's (1985) model to imperfect competition. In doing so, it is not clear, however, whether they correct an apparent shortcoming of Whalley's model. The shortcoming appears to make terms-of-trade effects swamp other sources of welfare change. It arises from a failure to force the terms of trade to re-balance the trade balance after a change in trade policy, as is expected in theory and in long-run reality (31). In most cases, correcting this would appear greatly to reduce Whalley's estimated terms-of-trade impacts from trade policy and the corresponding welfare effects (Richardson (1986, p. 374)).

64. Some of the general equilibrium studies are distinctive in allowing productive capital to be mobile across borders, unlike traditional analysis. Documentation is inadequate to determine, however, how this assumption changes the estimated effects of trade policy under imperfect competition. The question is important and topical for the European Community today, for example, and for all regions that consider simultaneous liberalisation of trade and investment policies.

65. In addition to the representative studies highlighted above and in Tables 3 and 4, there are several more recent and/or provisional contributions that share the same methodology. Daltung, Eskeland and Norman (1987) is a partial equilibrium study of optimal policy for two Norwegian industries. Its skeptical assessment is based on unique attention to information shortcomings that undermine the efficacy of government policy, especially firms' incentives

to conceal and withhold information about their own costs. Lee (1987) is a general equilibrium study of Japanese trade and industrial policies. Its structure is conventional except for one important feature: two phases of the economy's response are estimated, a short-run phase in which capital resources are committed rigidly to their historic sector, and a long-run phase in which investment builds up capital in sectors in sectors where profit rates have risen and does not replenish it in sectors where profit rates have fallen. Finally, Horridge (1987a,b) and Cory and Horridge (1985) are careful and extensive studies of how hypothetical scale economies and imperfect competition could influence results from the widely used Australian CGE model, ORANI. The influence is usually considerable, but highly sensitive to various assumptions that are implemented quantitatively.

D. Closely related research

66. A number of recent papers estimate elements of the behavioural structure underlying the research summarised above. While all relate to trade policy, not all estimate its effects directly. Levinsohn (1987) and Feenstra and Levinsohn (1988), for example, develop techniques to discover which auto models are close substitutes for each other, and implement them for a sample of domestic and foreign models. Even though policy does not enter explicitly, they point out (1988, p. 1) that "... policy implications abound .. Would an oil import fee affect one firm more adversely than other firms? ... Will an import quota on Korean automobiles benefit domestic firms or are Japanese firms the primary beneficiaries?" A series of examples of indirectly relevant research is provided also in the industrial organisation tradition of empirical comparisons of summary measures of domestic competitive performance on the one hand (e.g. mark-ups) to international competitive exposure on the other (e.g. import shares) (32).

67. More directly tied to policy are papers that identify the quality upgrading that often accompanies quantitative trade barriers and attempt to estimate its welfare effects (33). Quality upgrading is merely one example of firms "entering" or exiting from models or varieties, as discussed above. Similarly tied to policy are papers that estimate the "pass-through" from a change in trade policy into domestic prices. Under many of the imperfectly competitive pricing rules described above, it can be shown that a rise in world prices will not pass point for point into higher domestic prices; only a fraction will pass through, and that fraction can be estimated. Furthermore, different pricing rules and imperfectly competitive behaviour generate different degrees of pass-through, so that pass-through estimates by industry can be used to make inferences about market structure (34).

68. Finally, two strands of research with very different behavioural mechanisms are nevertheless related to the research summarised in this paper. One is early research that assumes excess profits are passed on into wages above some normal level (Dickens and Lang (1988), Katz and Summers (1988)). It focuses on how inter-related labour markets might respond to trade policy, but has not yet been cast with adequate theoretical or empirical structure. The second is inter-temporal CGE research that is only recently being carried out for open economies (Eichengreen and Goulder (1988), Sachs and Boone (1988)), and has not yet examined trade policies. It has focused instead on taxes, tax reform, investment and capital flows.

IV. RESEARCH POTENTIAL

69. Until a few years ago, there was at best only a sparse body of empirical research on trade policy under imperfect competition. Recent research, the subject of this survey, represents a natural first step -- a set of projects that most economists would undertake first because of the ready availability of models, methods and data. More difficult, but presumably far more interesting research lies ahead. With some good fortune, it may prove definitive, practical and relevant to policy.

i) Empirical research would be valuable on elementary yet general and flexible models of dynamic imperfect competition, perhaps empirical analogs to the theoretical framework of Grossman and Helpman (1988a,b). In this work an economy's resources are allocated to research, intermediate producer goods, and final products, with the first two serving as inputs to the third and embodying a very natural form of learning-by-doing scale economies. To take another example, models in the fashion of Baldwin and Krugman (1988), might be refined to become models where fixed costs are (or are linked to) a "first-stage" international investment decision, behaviourally detailed, and where the rest of the behaviour describes "second-stage" output and pricing decisions. In both examples, the difference between "sunk" and "recurrent" fixed costs is crucial. As a result of such research, the independent effects of trade policy on research or investment decisions could be distilled, as could a refined view of how trade policy affects the usual variables "contingently" -- e.g. what happens when research is done or investments are made in response to the trade policy compared with a situation of no policy change. A dynamic project could be carried on profitably in empirical industry studies, and then possibly in a general equilibrium setting. Several researchers discussed in Section III already have rudimentary capability to calculate how trade policy affects international and sectoral investment.

ii) The size of overall markets, and the number and character of firms competing in each, have special influences on estimates of the effects of trade policy under imperfect competition, influences that they do not have in traditional approaches. Since size of market and density/character of competition are key aspects that differentiate global multilateral liberalisation from regional liberalisation (Canada-United States, 1992 in the EC), empirical models with imperfectly competitive structure ought to have a special role in evaluating the relative merits of global and alternative regional policy initiatives. Techniques from research in industrial organisation on the questions of "market definition", applied widely in anti-trust analysis (Bresnahan (1987, pp. 65 ff.); see also Scott (1982)), are the natural tools with which to start.

iii) One of the most politically relevant questions in trade liberalisation concerns the magnitude of transitional adjustment costs. Opinions vary, and theory can support several conclusions. Rationalisation that takes place among sectors may lead to heavy adjustment costs, especially under imperfect competition. Rationalisation that takes place within a sector, among varieties of differentiated products, may have minimal adjustment costs. Rationalisation that takes place among firms of varying productivity and diversification may have moderate adjustment costs that should not be ignored in empirical assessments of policy changes. A merging

of empirical research on structural adjustment and on trade policy under imperfect competition seems especially timely. It could, for example, throw light on how imperfect competition affects the speed and degree of industry down-sizing.

iv) A better marriage of empirical research on industrial organisation and on trade policy under imperfect competition seems equally timely. Modern industrial organisation methods are richer, more demanding, and more revealing than those employed in most of the research summarised in this paper, as revealed, for instance, in Bresnahan (1987) or in the useful survey in EC (1988, Chapters 6 and 7). The next steps seem to rest on data development, especially time-series and longitudinal data, and on imitating the more powerful and sophisticated methods already in use in industrial organisation (for example, duality relationships, as applied simply to international economic questions by Applebaum and Kohli (1979), Diewert (1983, 1985) and Fare, Logan and Lovell (1986)).

v) Empirical work on imperfect competition in open economies with asymmetric firms is needed, as is more empirical work with product differentiation and potential gains from variety. Product differentiation itself is both a reason for asymmetries and a competitive instrument among firms. The welfare effects of changes in variety and quality induced by policy are not yet clearly conceived or measured.

vi) How industrial structure, market competitiveness and trade policy affect macroeconomic performance is still undetermined. It is a question of great practical importance as well as research interest. Careful comparative studies of this question require a rich historical data base, one that is comparable across countries, and conceptual structuring beyond what has been done so far.

vii) Special data and measurement weaknesses confront empirical research under imperfect competition. Progress in measuring the following variables would be very valuable: a) cross -- fixed (sunk and recurrent), variable, marginal -- and their allocation across products, divisions, etc.; b) non-tariff barriers to trade, including policy barriers but also natural barriers such as transport costs, marketing costs, and other transfer costs.

70. The menu above seems diverse and full, yet also attractive, feasible and practical, given current models, methods and measurement. This survey may become quickly and happily obsolete!

NOTES

1. The elasticity of a firm's demand for units of its product, q, is the percentage change in quantity demanded for every percentage change in its price: $e \equiv (\Delta q/q) \div (\Delta p/p)$. Marginal revenue in this notation is defined as $\Delta(pq)$, which for small changes is approximately equal to $p(1-1/e)$. The mark-up expressed as a proportion of price is usually called the Lerner index of market power.

2. The elasticity of market demand, E, is the percentage change in market quantity demanded for every percentage change in market price: $E \equiv (\Delta nq/nq) \div (\Delta p/p)$, which $= (\Delta nq/\Delta p) \cdot (p/nq)$, which $= -B \cdot (p/A-Bp)$, which when defined positively $= 1/(A/Bp - 1)$.

3. If it is correct in its perceptions, when it sells an extra unit it will force the market price received by itself and all other firms to decline by 1/B. Hence it will perceive its own elasticity of demand, e, to be equal to $B \cdot p/q$, which is exactly equal to nE (see note 2). Bresnahan (1987, p. 13) summarises the evidence in support of the view that the degree of competition associated with Cournot assumptions is empirically relevant.

4. Zero may not be attained exactly if competition from the marginal entrant would make excess profits negative. This point is discussed further when Rodrik's (1988) work is described in Section III C.

5. The distinction is quite important for studying the dynamics of industrial structure, e.g. exactly when firms enter and exit an activity. But it has been less important in most early empirical research on trade policy under imperfect competition, which has focused on estimating differences in long-run equilibria consistent with different trade policies.

6. $S_0S_1T_1$ is also no longer uniformly bowed out from the origin, given the S_0S_1 segment, creating the flavour of the non-convex production possibilities curves that are often associated with economies of scale.

7. The statement is merely illustrative. The possibility of excessive research and development is easily demonstrated under imperfectly competitive behaviour. On the other hand, increased competition in producing research and development is often thought to increase its quantity and quality.

8. The ratio of average cost of T to S goods must lie between the slopes of the price line and the marginal cost line in this kind of model.

9. Whether it is firms, plants or product lines that disappear depends on whether fixed costs (f) are associated with firms, plants or product lines. The adjustment burdens are probably greatest for the first and least for the third, but only a little empirical research to my knowledge sheds light on this question. Both Owen (1983) and Baldwin and Gorecki (1985, 1986) find that scale economies associated with plants seem more important for many measures of economic performance

(e.g. bilateral trade balances, cost competitiveness) than those associated with firms and product lines. But their rich analyses also highlight many exceptions to this generalisation, and do not specifically address the issue of adjustment. The potential for sharper adjustment pressures is due to the reduced likelihood of diversified, non-specialised production in the presence of fixed costs. The point can be seen in Figure 2, a re-drawing of Figure 1, and can be easily generalised to more realistic settings with many sectors. In the absence of fixed costs, the country's production remains diversified for all price ratios between m_0 and m_0'. When fixed costs are f, the country remains diversified for a much narrower band of price ratios, between m_1 and m_1'; when fixed costs are 2f, the band is even narrower, between m_2 and m_2'.

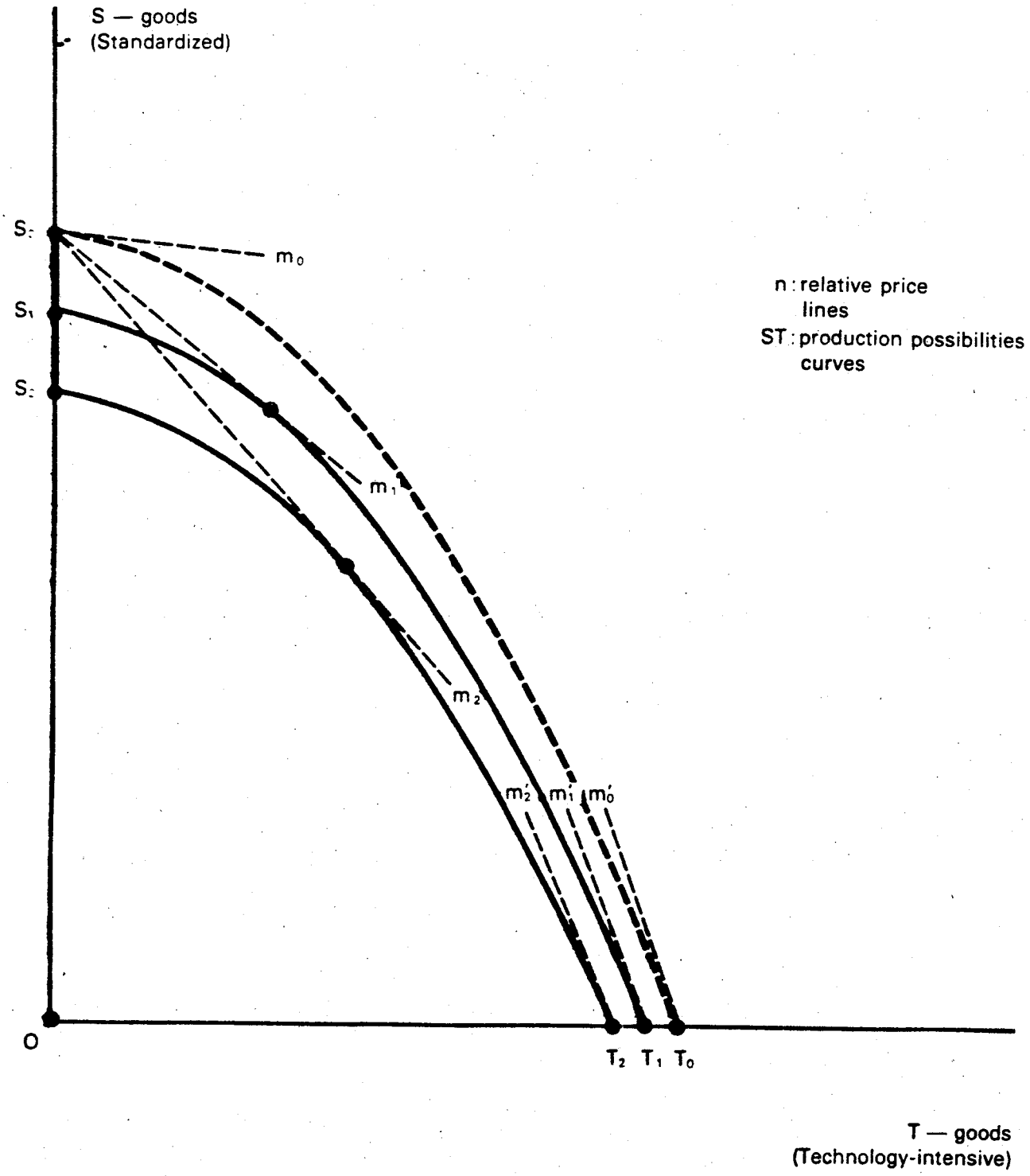
10. This is what the theoretical literature implies when it concludes that trade patterns and the distribution of industries among trading partners is "indeterminate" under scale economies and imperfect competition (see Krugman (1985, pp. 7-8, 23-24, 43), Helpman (1984, p. 359)). The factor content of trade is determinate however. The factor content is the bundle of labour, capital and other primary factor services embodied in exports and imports. This determinacy implies that long-run equilibrium differences among countries in factor rewards will not be affected much by volatility in production and trade patterns caused by imperfect competition. But short-run dislocation and adjustment may nevertheless be frequent, burdensome and welfare-reducing.

11. In Figure 1, if S and T were two varieties of a product with very similar production technologies, the curves ST would be virtually straight lines. Moving resources from one corner to the other would be very easy, especially within the same firm.

12. More precisely, new availability of a close substitute for the product with demand behaviour given by equations [1] and [2] will generally shift those functions in ways that increase their respective elasticities, e and E. This causes a decline in distortionary mark-ups, and a possible departure of marginal, inefficient firms that are no longer able to cover fixed costs out of reduced mark-ups (see the discussion of equation [4] above).

13. "Overlap" is defined by cross-price elasticities of demand. The condition is that buyers find alternative varieties of a given firm to be closer substitutes for each other than for competitors' varieties ("a Ford product of some kind is always better than a General Motors product of any kind"). Horridge (1987a, p. 50) describes this as a "split" pattern of tastes, in contrast to an "interleaved" pattern (small cars produced by any firm are closer substitutes for each other than for large cars, and similarly for large cars), in which trade liberalisation almost certainly increases variety. For further discussion, see Horridge (1987a, pp. 31-39), Digby, Smith and Venables (1988, pp. 20-24) and the pioneering work of Levinsohn (1987) and Feenstra and Levinsohn (1988), discussed in Section III.

FIGURE 2


S — goods
(Standardized)
S₀
S₁
S₂
m₀
m₁
m₂
m₂′
m₁′
m₀′
n : relative price lines
ST : production possibilities curves
O
T₂ T₁ T₀
T — goods
(Technology-intensive)

14. See Krishna (1985) for a discussion of this conclusion under Bertrand competition. Bertrand competition is an intermediate degree of imperfection in the sense of equation [3], where firms choose prices of differentiated product varieties under the perception that rivals' prices are given.

15. The comparisons are somewhat rough in several cases because perfectly competitive estimates were made in an admittedly crude way. This is especially true of Rodrik (1988) and Smith and Venables (1988).

16. Srinivasan and Whalley (1986) is a comparative survey of the most important CGE models applied to trade policy analysis.

17. Most of the studies in Tables 1 to 4 use the following procedure. Trade policy is taken to be either some change in international differences in prices (p), or in the properties of the market demand curve (equation [2]), in the case of quotas. Most studies rely on econometric estimates and industry data to measure the market demand behaviour reflected in equation [2]: average price, average quantity produced, market demand elasticity (E), etc. Then the behaviour summarised by equations [1] and [3] is "calibrated" in one of two ways. In the first, an assumption about inter-firm dependence (w) is made in [3], e.g. firms are collusive, or they are Cournot competitors, or ... Then the representative firm's perceived demand elasticity is inferred (i.e. e is inferred by [3] from an assumed w and an estimated E). Finally, the inferred e and measured price are used in [1] to infer marginal cost (c), which is often not easy to measure. When marginal cost is measurable, however, usually from engineering or econometric studies, a second way of calibrating is often adopted. The measured c and measured p are used in [1] to infer e, the firm's perceived demand elasticity. It in turn, combined with estimates of E, implies a value for the intensity of competition, w, "calibrating" it instead of assuming it, using equation [3]. Whichever method is used to establish c, e, and w, the values of marginal cost and prices can be used with equation [4]: either to infer fixed costs, f, given data on excess profits r or the assumption that they are zero (free entry and exit); or to infer excess profits r, given engineering or econometric estimates of fixed costs, f. Occasionally, the value of a hard-to-measure trade policy is itself inferred using these techniques, as in the work of Baldwin and Krugman (1987, 1988).

18. See Dixit and Grossman (1986), for example, in the context of trade policy under imperfect competition.

19. It appears, however, that Rodrik calibrates his model so that excess profits in the benchmark are exactly zero, and the number of existing base-period firms "just fits". Excess profits show up in his counterfactual equilibrium, and are thus wholly attributed to the effects of trade liberalisation. A more persuasive experiment might have been to assume that the benchmark featured the typical (average) "integer problem" in each industry -- that is, to assume that excess profits <u>did</u> exist in the base-period data, but at a level that would have been driven to zero by the entry of a firm exactly one-half the size of the representative incumbent firm. Harris (1988, p. 178) includes a graphical treatment of the "integer problem".

20. It is, in fact, discussed at length in EC (1988, Chapter 9).

21. The technical difference is that when equation [2] describes a national demand curve, its cross-price elasticities with respect to similar products in other national markets range from zero (the case of "market segmentation") to finite values. As such cross-price elasticities go to their limiting (infinitely large) values, however, nationality of sales no longer differentiates a product, and [2] must define a global market. See Brown (1987) and Brown and Stern (1988a).

22. Digby, Smith and Venables (1988, pp. 13-16, 18-19) ratify Dixit's point in a very similar way. They find that the welfare cost of VERs is two to three times as large as a tariff that has the same effect on production. It is worth noting in Dixit's study, however, that his hypothetical policies do have moderately large effects on profits and market shares -- measured by elasticities often above one. Thus, these may be effective mercantilistic transfer policies, however small their welfare effects, and may cause non-trivial adjustment pressures.

23. In fact, under free trade, Baldwin and Krugman estimate that there would be no Japanese producers at all! Richard Baldwin has written that this result is sensitive to the dynamic structure, and that Japanese firms would survive under free trade if learning-by-doing effects were only half as large as assumed. Although the two Baldwin and Krugman papers are the only genuinely dynamic approaches, they still allow no scope for an allegedly important dynamic linkage: the (external) benefits that spill over from one generation of semiconductors or aircraft onto another, thus increasing the power of trade policy for one generation of products to have "desirable" effects on several generations of products.

24. Even more so is the study by Hazledine and Wigington (1987), albeit also in the spirit of studies summarised in Tables 1 to 4. Their analysis aggregates firms into three national sub-groups, assumes that the Japanese are price leaders, and calculates the effect of removing Japanese VERs in the Canadian market for three mechanical rules of price parallelism: North American producers are assumed alternatively to lower their prices by one-half or one-quarter of the percentage by which Japanese producers lower theirs or not to react at all. Furthermore, Hazledine and Wigington simply assume target market shares that Japanese producers would desire without VERs (and also without the presence of Korean imports); from those assumptions, pricing behaviour follows quite straightforwardly through estimates of demand price elasticities.

25. Owen is properly agnostic on whether fixed costs and scale economies are associated with firms, plants or product lines, as discussed in note 9. "Firms" is the term used in the text above to maintain continuity, but very similar points are made by Owen with regard to "plants" and "product lines".

26. See Harris (1988), Létourneau, Lester and Robidoux (1988), and Lester (1987). Other studies by Harris and Cox include Harris (1984), Harris with Cox (1984), Cox and Harris (1985, 1986), and are summarised in Harris (1985).

27. In sensitivity tests of the model of Canada (1988), the Canada-U.S. free trade arrangements apparently predict Canadian rationalisation only when the weight on focal pricing, as opposed to conventional pricing, exceeds zero. See also Cory and Horridge (1985, pp. 60-61), who find extreme sensitivity of their results to the weight on focal pricing.

28. The assumed wage distortion in Brown's and Stern's model, however, would make it an ideal general equilibrium setting to sensitise empirical results to Dixit's concern that excess profits may be disguised in above-average wages. Dixit's concern is a strong conviction in research by Katz and Summers (1988) and Dickens and Lang (1988), discussed below.

29. The symmetric approach, however, does allow them to show (pp. 28-29) how sectoral output and employment effects, while small to modest under both perfect and imperfect competition, are several times larger under the latter. This suggests again the important possibility that adjustment pressures from trade liberalisation may be worse under imperfectly competitive than perfectly competitive market structures.

30. Its importance is only potential in their (1988b) study, however, since their estimated change in the relative price of capital to labour is minuscule. They lean toward fixed cost being largely capital cost. Harris has disagreed, interpreting the decline in labour to output ratios that he finds as firms approach minimum efficient scale, as indirect evidence of heavy labour content in fixed cost. The issue is obviously empirical, with physical capacity costs being heavily capital, and research and development being heavily labour. It illustrates how traditional questions about the inherent capital or labour intensity of one sector relative to another may depend on the scale of an average firm, plant, or production run, with "factor-intensive reversals" possibly taking place at different scales of operation.

31. The trade balance is determined by inter-temporal considerations in the long run, both in theory and (arguably) in reality, not by inter-sectoral differences nor by international barriers to trade. See Arndt and Richardson (1987) and McCulloch and Richardson (1986).

32. Richard Caves and his students have been constant contributors to this sort of research; Caves (1988) is a recent example. See also Baldwin and Gorecki (1985, 1986).

33. Anderson (1988), Aw and Roberts (1988), Boorstein and Feenstra (1987), Feenstra (1988).

34. See Feenstra (1987) for an illustration of this kind of work. Pass-through studies featuring imperfect competition have been much more abundant for exchange rates than for trade policy, however. Empirical illustrations are numerous, and the following are recent examples: Baldwin (1988a,b), Froot and Klemperer (1988), Harrison (1988), Knetter (1988) and Mann (1987).

BIBLIOGRAPHY

Anderson, James E. (1988), The Relative Inefficiency of Quotas, Cambridge, Massachusettes: The MIT Press.

Applebaum, E. and U.J.R. Kohli (1979), "Canada-United States Trade: Tests for the Small-Open Economy Hypothesis", Canadian Journal of Economics, 12(1), pp. 1-14.

Arndt, Sven W. and J. David Richardson (1987), Real-Financial Linkages Among Open Economies, Cambridge, Massachusetts: The MIT Press.

Aw, Bee Yan and Mark J. Roberts (1988), "Price and Quality Level Comparisons for U.S. Footwear Imports: An Application of Multilateral Index Numbers", in Feenstra (1988).

Baldwin, Richard E. (1988a), "Some Empirical Evidence on Hysteresis in Aggregate U.S. Import Prices", National Bureau of Economic Research Working Paper No. 2483, January.

Baldwin, Richard E. (1988b), "Hysteresis in Import Prices: the Beachhead Effect", National Bureau of Economic Research Working Paper No. 2545, March.

Baldwin, Richard E. (1988c), "Factor Market Barriers Are Trade Barriers: Gains from Trade in 1992", National Bureau of Economic Research Working Paper No. 2656, July.

Baldwin, Richard E. (1988d), "On Taking the Calibration Out of Calibration Studies", partially completed manuscript, July, work in progress.

Baldwin, Richard E. and Paul Krugman (1987), "Industrial Policy and International Competition in Wide-Bodied Jet Aircraft", manuscript, February, forthcoming in Baldwin (1988).

Baldwin, Richard E. and Paul Krugman (1988), "Market Access and International Competition: A Simulation Study of 16K Random Access Memories", in Feenstra (1988).

Baldwin, Robert E., ed. (1988), Trade Policy Issues and Empirical Analysis, Chicago: University of Chicago Press.

Baldwin, John R. and Paul Gorecki (1985), "The Relationship Between Trade and Tariff Patterns and the Efficiency of the Canadian Manufacturing Sector in the 1970s", in Whalley with Hill (1985).

Baldwin, John R. and Paul Gorecki (1986), The Role of Scale in Canada-US Productivity Differences, Toronto: University of Toronto Press. Volume 6 in the research program of the Royal Commission on the Economic Union and Development Prospects for Canada (the "Macdonald Commission").

Boorstein, Randi and Robert C. Feenstra (1987), "Quality Upgrading and Its Welfare Cost in U.S. Steel Imports, 1969-74", National Bureau of Economic Research Working Paper No. 2452, December.

Brander, James A. and Barbara J. Spencer (1986), "International Oligopoly and Asymmetric Labour Market Institutions", National Bureau of Economic Research Working Paper No. 2038, October.

Bresnahan, Timothy F. (1987), "Empirical Studies of Industries with Market Power", Stanford University, Center for Economic Policy Research, Publication No. 95, April, forthcoming in Schmalensee and Willig (1988).

Brown, Drusilla K. (1987), "Tariffs, the Terms of Trade, and National Product Differentiation", Journal of Policy Modelling, 9 (3), pp. 503-526.

Brown, Drusilla K. (1988), "Scale Economies in the U.S.-Canada Tariff Elimination: What Determines the Utilization Rate for Monopolistically Competitive Firms?", manuscript, August.

Brown, Drusilla K. and Robert M. Stern (1988a), "Computational Analysis of the U.S.-Canada Free Trade Agreement: The Role of Product Differentiation and Market Structure", manuscript, presented at an April 29-30 Conference on Trade Policies for International Competitiveness, Cambridge, Massachusetts, sponsored by the National Bureau of Economic Research.

Brown, Drusilla K. and Robert M. Stern (1988b), "Computable General-Equilibrium Estimates of the Gains from U.S.-Canadian Trade Liberalization", presented at a Lehigh University conference on Economic Aspects of Regional Trading Arrangements, Bethlehem, Pennsylvania, May 25-27, 1988.

Canada, Department of Finance, Fiscal Policy and Economic Analysis Branch (1988), The Canadian-U.S. Free Trade Agreement: An Economic Assessment, Ottawa.

Caves, Richard E. (1988), "Trade Exposure and Changing Structures of U.S. Manufacturing Industries", in A. Michael Spence and Heather A. Hazard eds. (1988), International Competitiveness, Cambridge, Massachusetts: Ballinger.

Corbo, Vittorio; Jaime de Melo; and James Tybout (1988), "The Effects of Trade Policy on Scale and Technical Efficiency: New Evidence from Chile", manuscript, May.

Cory, Peter and Mark Horridge (1985), "A Harris-Style Miniature Version of ORANI", IMPACT Research Centre Preliminary Working Paper No. OP-S4, June.

Cox, David and Richard G. Harris (1985), "Trade Liberalization and Industrial Organization: Some Estimates for Canada", Journal of Political Economy, 93 (February), pp. 115-145.

Cox, David and Richard G. Harris (1986), "A Quantitative Assessment of the Economic Impact on Canada of Sectoral Free Trade with the United States", Canadian Journal of Economics, 19 (August), pp. 377-394.

Daltung, Sonja; Gunnar Eskeland; and Victor Norman (1987), "Optimum Trade Policy Towards Imperfectly Competitive Industries: Two Norwegian Examples, Centre for Economic Policy Research Discussion Paper No. 218, London, December.

Deardorff, Alan V. and Robert M. Stern (1986), The Michigan Model of World Production and Trade, Cambridge, Massachusetts: The MIT Press.

Dickens, William T. and Kevin Lang (1988), "Why It Matters What We Trade", in William T. Dickens, ..., eds. (1988), The Dynamics of Trade and Employment.

Diewert, W. E. (1983), "The Measurement of Waste Within the Production Sector of an Open Economy", Scandinavian Journal of Economics, 85 (No. 2), pp. 159-179.

Diewert, W. E. (1985), "A Dynamic Approach to the Measurement of Waste in an Open Economy", Journal of International Economics, November, pp. 213-240.

Digby, Caroline; Alisdair Smith; and Anthony Venables (1988), "Counting the Cost of Voluntary Export Restrictions in the European Car Market", Centre for Economic Policy Research Discussion Paper No. 249, London, June.

Dixit, Avinash (1985), "The Cutting Edge of International Technological Competition", Institute for International Economic Studies Seminar Paper No. 342, Stockholm, November.

Dixit, Avinash (1987a), "Entry and Exit Decisions of Firms Under Fluctuating Real Exchange Rates", manuscript, October.

Dixit, Avinash (1987b), "Hysteresis, Import Penetration, and Exchange-Rate Pass-Through", manuscript, November.

Dixit, Avinash (1987c), "Tariffs and Subsidies Under Oligopoly: The Case of the U.S. Automobile Industry", in H. Kierzkowski, ed. Protection and Competition in International Trade, Oxford: Basil Blackwell.

Dixit, Avinash (1988), "Optimal Trade and Industrial Policies for the US Automobile Industry", in Feenstra (1988).

Dixit, Avinash and Gene M. Grossman (1986), "Targeted Export Promotion with Several Oligopolistic Industries", Journal of International Economics, 21 (November), pp. 233-249.

Eaton, Jonathan (1988), "Comment on 'Optimal Trade and Industries Policies'", in Feenstra (1988).

EC (European Communities), Commission of (1988), "The Economics of 1992", European Economy, No. 35 (March).

Eichengreen, Barry and Lawrence H. Goulder (1988), "Savings Promotion, Investment Promotion, and International Competitiveness", National Bureau of Economic Research Working Paper No. 2635, June.

Fare, Rolf; James Logan; and C.A. Knox Lovell (1986), "The Economics of Content Protection: A Dual Approach", manuscript, July.

Feenstra, Robert C. (1987), "Symmetric Pass-Through of Tariffs and Exchange Rates Under Imperfect Competition: An Empirical Test", National Bureau of Economic Research Working Paper No. 2543, December.

Feenstra, Robert C., ed. (1988), Empirical Methods for International Trade, Cambridge, Massachusetts: The MIT Press.

Feenstra, Robert C., (1988), "Quality Change Under Trade Restraints in Japanese Autos", forthcoming in the Quarterly Journal of Economics.

Froot, Kenneth A. and Paul Klemperer (1988), "Exchange Rate Pass-Through When Market Shares Matter", National Bureau of Economic Research Working Paper No. 2542, March.

Goto, Junichi (1985), "A General Equilibrium Analysis of Trade Restrictions Under Imperfect Competition: Theory and Some Evidence for the Automotive Trade", manuscript, July.

Grossman, Gene M. and Elhanan Helpman (1988a), "Product Development and International Trade", National Bureau of Economic Research Working Paper No. 2540, May.

Grossman, Gene M. and Elhanan Helpman (1988b), "Comparative Advantage and Long-Run Growth", manuscript, August.

Harris, Richard G. (1984), "Applied General Equilibrium Analysis of Small Open Economies with Scale Economies and Imperfect Competition", American Economic Review, 74 (December), pp. 1 016-1 032.

Harris, Richard G. (1985), "Summary of a Project on the General Equilibrium Evaluation of Canadian Trade Policy", in Whalley and Hill (1985).

Harris, Richard G. (1988), "A Guide to the GET [General Equilibrium Trade] Model", Working Paper, Department of Finance, Canada.

Harris, Richard G. with David Cox (1984), Trade, Industrial Policy and Canadian Manufacturing, Toronto: Ontario Economic Council.

Harrison, Ann (1988), "Exchange-Rate Pass-through and Imperfect Competition", manuscript, March.

Hazledine, Tim and Ian Wigington (1987), "Protection in the Canadian Automobile Market: Costs, Benefits, and Implications for Industrial Structure and Adjustment", in OECD (1987).

Helpman, Elhanan (1984), "Increasing Returns, Imperfect Markets, and Trade Theory", in R. W. Jones and P. B. Kenen, eds., Handbook of International Economics, Volume I, Amsterdam: North-Holland.

Helpman, Elhanan (1987), "Imperfect Competition and International Trade: Evidence from Fourteen Industrial Countries", Journal of the Japanese and International Economies, 1 (June), pp. 62-81.

Helpman, Elhanan and Paul R. Krugman (1985), Market Structure and Foreign Trade, Cambridge, Massachusetts: The MIT Press.

Horridge, Mark (1987a), "Increasing Returns to Scale and the Long Run Effects of a Tariff Reform", IMPACT Research Centre Preliminary Working Paper No. OP-62, August.

Horridge, Mark (1987b), The Longterm Costs of Protection: An Australian Computable General Equilibrium Model, unpublished doctoral dissertation, University of Melbourne.

Katz, Lawrence F. and Lawrence H. Summers (1988), "Can Inter-Industry Wage Differentials Justify Strategic Trade Policy", manuscript, April, presented at an April 29-30 Conference on Trade Policies for International Competitiveness, Cambridge, Massachusetts, sponsored by the National Bureau of Economic Research.

Knetter, Michael M. (1988), "Price Discrimination by U.S. and German Exporters", manuscript, March.

Kreinin, Mordechai; Stephen Martin; and Edmund J. Sheehy (1987), "Differential Response of U.S. Import Prices and Quantities to Exchange-Rate Adjustments", Weltwirtschaftliches Archiv, Band 123 (Heft 3), pp. 449-462.

Krishna, Kala (1985), "Trade Restrictions as Facilitating Practices", National Bureau of Economic Research Working Paper No. 1 546, January.

Krugman, Paul R. (1985), "Increasing Returns and the Theory of International Trade", National Bureau of Economic Research Working Paper No. 1 752, October.

Krugman, Paul R. (1986a), "Industrial Organization and International Trade", National Bureau of Economic Research Working paper No. 1 957, June, forthcoming in Schmalensee and Willig (1988).

Krugman, Paul R., ed. (1986b), Strategic Trade Policy and the New International Economics, Cambridge, Massachusetts: The MIT Press.

Lee, Hiro (1987), Imperfect Competition Industrial Policy, and Japan's Dynamic Comparative Advantage, manuscript, November, Ph.D. dissertation, University of California, Berkeley.

Lester, John (1987), "Un Survol des Etudes Empiriques sur la Libéralisation des Echanges Commerciaux", manuscript, April 24.

Létourneau, Raynald; John Lester; and Benoît Robidoux (1988), "L'impact de l'Accord de libre-échange canado-américain: une analyse d'équilibre général", manuscript, May 1988.

Levinsohn, James (1987), "Empirics of Taxes on Differentiated Products: The Case of Tariffs in the U.S. Automobile Industry", in Baldwin (1988).

Levinsohn, James and Robert Feenstra (1988), "Identifying the Competition," manuscript, May.

Mann, Catherine L. (1987), "Prices, Profit Margins, and Exchange Rates: After the Fall", manuscript, July.

Markusen, James R. (1985), "Canadian Gains from Trade in the Presence of Scale Economies and Imperfect Competition", in Whalley and Hill (1985).

Markusen, James R. and Anthony J. Venables (1988), "Trade Policy with Increasing Returns and Imperfect Competition: Contradictory Results from Competing Assumptions", Journal of International Economics, 24 (May), pp. 299-316.

Markusen, James R. and Randall Wigle (1987), "U.S.-Canada Free Trade: Effects on Welfare and Sectoral Output/Employment in the Short and Long Run", research report to the U.S. Department of Labor, Bureau of International Labor Affairs.

Markusen, James R. and Randall Wigle (1988), "Nash Equilibrium Tariffs for the U.S. and Canada: The Roles of Country Size, Scale Economies, and Capital Mobility", forthcoming in the Journal of Political Economy.

McCulloch, Rachel and J. David Richardson (1986), "U.S. Trade and the Dollar: Evaluating Current Policy Options", in Robert E. Baldwin and J. David Richardson, Current U.S. Trade Policy: Analysis, Agenda, and Administration, Cambridge, Massachusetts: National Bureau of Economic Research, NBER Conference Report.

Norton, R.D. (1986), "Industrial Policy and American Renewal", Journal of Economic Literature, 24 (March), pp. 1-40.

Nguyen, Trien T. and Randall M. Wigle (1988), "Trade Liberalization With Imperfect Competition: The Large and Small of It", manuscript, March.

OECD (Organisation for Economic Cooperation and Development) (1985), Costs and Benefits of Protection, Paris.

OECD (Organisation for Economic Cooperation and Development) (1987a), The Costs of Restricting Imports: The Automobile Industry, Paris.

OECD (Organisation for Economic Cooperation and Development) (1987b), Structural Adjustment and Economic Performance, Paris.

Owen, Nicholas (1983), Economies of Scale, Competitiveness, Trade Patterns and Trade Patterns Within the European Community, Oxford: Oxford University Press.

Richardson, J. David (1986), "Review" of Whalley (1985), Journal of International Economics, 21 (November), pp. 372-376.

Rodrik, Dani (1988), "Imperfect Competition, Scale Economies, and Trade Policy in Developing Countries", in Baldwin (1988).

Sachs, Jeffrey and Peter Boone (1988), "Japanese Structural Adjustment and the Balance of Payments", National Bureau of Economic Research Working Paper No. 2614, June.

Schmalensee, Richard and Robert Willig, eds. (1988), Handbook of Industrial Organization, Amsterdam: North-Holland.

Scott, J.T. (1982), "Multimarket Contact and Economic Performance", Review of Economics and Statistics, 64 (August), pp. 368-375.

Shea, Brian F. (1988), "The Canada-United States Free Trade Agreement: A Summary of Empirical Studies and an Industrial Profile of the Tariff Reductions", U.S. Department of Labor, Bureau of International Labor Affairs, Economic Discussion Paper No. 28, March.

Smith, Alisdair and Anthony Venables (1988), "Completing the Internal Market in the European Community: Some Industry Simulations", Centre for Economic Policy Research Discussion Paper Series No. 233, March.

Stern, Robert M.; Philip H. Trezise; and John Whalley, eds. (1987), Perspectives on a U.S.-Canadian Free Trade Agreement, Washington: The Brookins Institution.

Srinivasan, T. N. and John Whalley, eds. (1986), General Equilibrium Trade Policy Modeling, Cambridge, Massachusetts: The MIT Press.

Venables, Anthony J. (1985), "International Trade, Trade and Industrial Policy and Imperfect Competition: A Survey", Centre for Economic Policy Research Discussion Paper No. 74, London.

Venables, Anthony J. and Alisdair Smith (1986), "Trade and Industrial Policy Under Imperfect Competition", Economic Policy 3 (October), pp. 621-672.

Venables, Anthony J. and Alisdair Smith (1987), "Trade and Industrial Policy Under Imperfect Competition: Some Simulations for EEC Manufacturing", manuscript, September, presented at a September 17 Conference on Empirical Studies of Strategic Trade Policy, Cambridge, Massachusetts, sponsored by the National Bureau of Economic Research and the Centre for Economic Policy Research.

Whalley, John (1985), Trade Liberalization Among Major World Trading Areas, Cambridge, Massachusetts: The MIT Press.

Whalley, John and Roderick Hill (1985), Canada-United States Free Trade, Toronto: University of Toronto Press. Volume 11 in the research program of the Royal Commission on the Economic Union and Development Prospects for Canada (the "Macdonald Commission").

Wigle, Randall (1986), "Numerical Modeling of Global Trade Issues: Facing the Challenge from Punta del Este", manuscript, October, presented at a November 7 Workshop on Modeling and Analytical Issues in the New GATT Round, Washington, D.C., sponsored by the University of Western Ontario and University of Michigan.

Wigle, Randall (~~1987~~ 1988), "General Equilibrium Evaluation of Canada-U.S. Trade Liberalization in a Global Context", ~~forthcoming in the~~ Canadian Journal of Economics, ~~[illegible]~~ 21 (August), pp. 539 — 564.

Wonnacott, Paul (1987), The United States and Canada: The Quest for Free Trade, Washington: Institute for International Economics Policy Analyses in International Economics No. 16, March.

ECONOMICS AND STATISTICS DEPARTMENT
WORKING PAPERS

**

DEPARTEMENT DES AFFAIRES ECONOMIQUES ET STATISTIQUES
DOCUMENTS DE TRAVAIL

**

In April 1983, the Economics and Statistics Department initiated a new series of economic studies entitled ESD Working Papers.

The following titles have been circulated:

1. Use of Demand Elasticities in Estimating Energy Demand (out of print)
   Utilisation des Elasticités de la Demande dans l'Estimation de la Demande de l'Energie

   Axel Mittelstadt

2. Capital, Energy and Labour Substitution: the supply block in OECD medium-term models
   Substitution du Capital, de l'Energie et du Travail : le bloc de l'offre dans les modèls à moyen terme de l'OCDE (épuisé)

   Patrick Artus

3. Wage Formation in France: sectoral aspects (out of print)
   Formation des Salaires en France : aspects sectoriels

   Patrick Artus

4. Service Lives of Fixed Assets (out of print)
   Durée de Vie Utile des Actifs Fixes

   Derek Blades

5. Resource Prices and Macroeconomic Policies: Lessons from Two Oil Price Shocks
   Prix des Ressources Naturelles et Politique Macro-Economique : Les Enseignements de Deux Chocs Pétroliers (épuisé)

   John Llewellyn

6. Output Responsiveness and Inflation: An Aggregate Study
   Souplesse de la Production et Inflation : Etude Globale

   David T. Coe and Gerald Holtham

7. The Determinants of Exchange Rate Movements (out of print)
   Les Déterminants des Mouvements des Taux de Change (épuisé)

   Graham Hacche

8. Simulated Macroeconomic Effects of a Large Fall in Oil Prices (out of print)
   Simulation des Effets Macro-économiques d'une Forte Baisse des Prix Pétroliers

   Flemming Larsen and John Llewellyn

9. Medium-Term Financial Strategy: The Co-ordination of Fiscal Monetary Policy (out of print)
   Stratégie Financière à Moyen Terme : la Coordination des Politiques Monétaire et Budgétaire (épuisé)

   Jean-Claude Chouraqui and Robert Price

10. Price Dynamics and Industrial Structure: A Theoretical and Econometric Analysis (out of print)
    Dynamique des Prix et Structure Industrielle : Une analyse théorique économétrique (épuisé)

    David Encaoua (with collaboration from Paul Geroski and Riel Miller

11. Evidence on Income Distribution by Governments (out of print)
    L'Action Exercée par l'Etat sur la Redistribution du Revenu

    Peter Saunders

12. Labour Force Participation: An Analysis with Projections
    Taux d'Activité : Analyse et Projections

    James H. Chan-Lee

13. The Demand for Money and Velocity in Major OECD Countries (out of print)
    La Demande de Monnaie et la Vitesse de Circulation dans les Grands Pays de l'OCDE

    A. Blundell-Wignall, M. Rondoni and H. Ziegelschmidt

14. The Conduct of Monetary Policy in the Current Recovery
    La Conduite de la Politique Monétaire dans la Phase Actuelle de Reprise Economique

    Paul Atkinson and Jean-Claude Chouraqui

15. Structural Budget Deficits and Fiscal Stance
    Déficits Budgétaires Structurels et Orientation de la Politique Budgétaire

    Patrice Muller and Robert W.R. Price

16. Monetary Policy in the OECD Interlink Model
    La Politique Monétaire dans le Modèle Interlink

    A. Blundell-Wignall, M. Rondoni, H. Ziegelschmidt and J. Morgan

17. Real Gross Product in OECD Countries and Associated Purchasing Power Parities (out of print)
Produit Brut Réel et Parités de Pouvoir d'Achat dans les pays de l'OCDE (épuisé)

Peter Hill

18. The OECD Compatible Trade and Production Data Base (out of print)
Base de Données Compatibles sur le Commerce et la Production de l'OCDE

Derek Blades and Wendy Simpson

19. Nominal Wage Determination in Ten OECD Economies
Détermination des Salaires Nominaux dans Dix Economies de l'OCDE

David T. Coe and Francesco Gagliardi

20. Profits and Rates of Return in OECD Countries
Profits et Taux de Rendement dans les Pays Membres de l'OCDE

James H. Chan-Lee and Helen Sutch

21. Real Interest Rates and the Prospects for Durable Growth
Taux d'Intérêt Réels et Perspectives de Croissance Durable

Paul Atkinson and Jean-Claude Chouraqui

22. Energy Prices: Trends and Prospects
Les Prix de l'Energie : Evolution et Perspectives

Axel Mittelstadt

23. Changes in the Composition of Output and Employment
Changements dans la Composition de la Production et de l'Emploi

Axel Mittelstadt and Françoise Correia

24. Labour Market Flexibility and External Price Shocks
Flexibilité du Marché du Travail et Chocs Extérieurs sur les Prix

F. Klau and A. Mittelstadt

25. Discrepancies Between Imports and Exports in OECD Foreign Trade Statistics (out of print)
Ecart entre les Importations et les Exportations dans les Statistiques du Commerce Extérieur de l'OCDE

Derek Blades and Marina Ivanov

26. Aggregate Supply in Interlink: Model Specification and Empirical Results

John Helliwell, Peter Sturm, Peter Jarrett and Gérard Salou

27. Commodity Prices in Interlink

Gerry Holtham, Tapio Saavalainen, Paul Saunders and Helen Sutch

28. Exchange Rates and Real Long-Term Interest Rate Differentials: Evidence for Eighteen OECD Countries

    David T. Coe and Stephen S. Golub

29. Method of Calculating Effective Exchange Rates and Indicators of Competitiveness

    Martine Durand

30. Public Debt in a Medium-Term Context and its Implications for Fiscal Policy

    Jean-Claude Chouraqui, Brian Jones and Robert Bruce Montador

31. The OECD Compatible Trade and Production Data Base 1970-1983

    Anders Brodin and Derek Blades

32. The Formulation of Monetary Policy: A Reassessment in the Light of Recent Experience

    Paul Atkinson and Jean-Claude Chouraqui

33. Mécanismes de Transmission et Effets Macro-Economiques de la Politique Monétaire en France : les Principaux Enseignements Econométriques

    Marc-Olivier Strauss-Kahn

34. Pure Profit Rates and Tobin's q in Nine OECD Countries

    James H. Chan-Lee

35. Wealth and Inflation Effects in the Aggregate Consumption Function

    G.H. Holtham and H. Kato

36. The Government Household Transfer Data Base

    Rita Varley

37. Internationalisation of Financial Markets: Some Implications for Macroeconomic Policy and for the Allocation of Capital

    Mitsuhiro Fukao and Masaharu Hanazaki

38. Tracking the US External Deficit, 1980-1985: Experience with the OECD Interlink Model

    Pete Richardson

39. Monetary Policy in the Second Half of the 1980s: How Much Room For Manoeuvre?

    Kevin Clinton and Jean-Claude Chouraqui

40. Tax Reform in OECD Countries: Economic Rationale and Consequences
Bob Hagemann, Brian Jones and Bruce Montador

41. A Revised Supply Block for the Major Seven Countries in Interlink

Peter Jarrett and Raymond Torres

42. OECD Economic Activity and Non-Oil Commodity Prices: Reduced-Form Equations for INTERLINK

Gerald Holtham and Martine Durand

43. Import and Export Price Equations for Manufactures

Richard Herd

44. Price Determination in the Major Seven Country Models in INTERLINK

Ulrich Stiehler

45. International Investment-Income Determination in INTERLINK: Models for 23 OECD Countries and Six Non-OECD Regions

David T. Coe, Richard Herd and Marie-Christine Bonnefous

46. Recent Developments in OECD's International Macroeconomic Model

Pete Richardson

47. A Review of the Simulation Properties of OECD's INTERLINK Model

Pete Richardson

48. The Medium-Term Macro-Economic Strategy Revisited

Jean-Claude Chouraqui, Kevin Clinton and Robert Bruce Montador

49. Are Commodity Prices Leading Indicators of OECD Prices?

Martine Durand, Sveinbjörn Blöndal

50. Private Consumption, Inflation and the "Debt Neutrality Hypothesis" The case of Eight OECD Countries

Giuseppe Nicoletti

51. The Effects of Monetary Policy on the Real Sector: An overview of Empirical Evidence for Selected OECD Economies

Jean-Claude Chouraqui, Michael Driscoll and
Marc Olivier Strauss-Kahn

52. The So-Called "Non-Economic" Objectives of Agricultural Policy

L. Alan Winters

53. Alternative Solution Methods in Applied General Equilibrium Analysis

    Richard G. Harris

54. Tests of Total Factor Productivity Measurement

    A. Steven Englander

55. Quantifying the Economy-Wide Effects of Agricultural Policies: A General Equilibrium Approach

    Jean-Marc Burniaux, François Delorme, Ian Lienert, John P. Martin and Peter Hoeller

56. On Aggregation Methods of Purchasing Power Parities

    J.R. and M. Cuthbert

57. An International Sectoral Data Base for Thirteen OECD Countries

    F.J.M. Meyer-zu-Schlochtern