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TRADE LIBERALIZATION AND LABOUR MARKET DISRUPTION

by

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approaches to tariff reform purely in terms of the short-run. No attempt has been made to estimate the long-term benefit.[18] An approach to trade liberalization which exempted the sectors with the highest levels of protection would increase the dispersion of the tariff rates. It seems likely that such a development would inhibit improvements in long-run resource allocation. Rather than interpreting our results as support for exemptions, we prefer to think of them as indicating the short-run manageability of a wide variety of approaches. Even in the tops-down approach with no exemptions where the tariffs on TCF and MV are cut quite sharply, we found no evidence that serious labour market disruption would result.

18. While it would be of interest to estimate the long-term benefits, that there would be such benefits is not a controversial proposition. As presently operating, ORANI does not incorporate economies of scale or intra-industry specialization. Therefore, it is not a suitable vehicle for estimating the long-run benefits of tariff reform, see Dixon (1978).

TRADE LIBERALIZATION AND LABOUR MARKET DISRUPTION[1]

by

Peter B. Dixon, B.R. Parmenter and Alan A. Powell

1. Introduction

This paper provides an illustration of how general equilibrium models are being used in analyses of adjustment processes in industrially advanced countries. We use the ORANI model[2] to examine some of the adjustments which could be expected in Australia following a 25 percent reduction in protection.

Australia has a large number of tariffs and quotas protecting its import-competing sector (mainly manufacturing). Nominal rates of protection for some industries are very high: 69 per cent for clothing, 57 per cent for footwear and 49 per cent for motor vehicles (see column 2 of Table 2).[3] A

1. In preparing this paper, the authors have benefitted from the advice and assistance of Dean Parham, Peter Higgs, Tony Lawson, Russell Rimmer, Dennis Sams, Elhanan Helpman and Colin Kendrick.

2. ORANI is fully described in Dixon, Parmenter, Sutton and Vincent (1982), cited hereafter as DPSV (1982). Operational versions of ORANI have been available since 1977. The model is used in Australia by university research groups and several government agencies. Applications have included analyses of the effects on industries, occupations and regions of (i) changes in tariffs, (ii) the exploitation for export of mineral resources, (iii) changes in world commodity prices, (iv) changes in the exchange rate, (v) changes in the pricing policy for domestic crude oil, (vi) subsidies to ailing industries, (vii) the movement towards equal pay for women, (viii) changes in the costs of employing labour, (ix) the adoption of Keynesian demand stimulation policies and (x) the adoption of home-price schemes for agricultural export commodities. Summaries of some of these applications and references to relevant papers are given in DPSV (1982, section 50).

variety of explanations can be offered for Australian protectionism. For example, in the early part of the twentieth century, it was believed that since Australia had a labour-scarce economy, trade restrictions would increase real wages.[4] High real wages were thought to be essential for attracting immigrants from Europe. Immigrants and a larger population were desired for security reasons. A second security-based argument for protection has stressed the need for self sufficiency as a preparation for isolation from foreign suppliers during war. Finally, the infant industries argument has had enthusiastic Australian adherents.

Now, however, it is recognized that security depends on neither population size nor self sufficiency; that high real wages require highly productive, internationally competitive industries; that sheltered infants often fail to prosper and that protectionism has given Australia an inefficient, inflexible manufacturing sector. Nevertheless, there is little popular support for anti-protection policies.

Resistance to tariff reform in Australia arises mainly from fear of the structural consequences. Politicians feel locked into the present industrial structure. It is argued that a time of high unemployment is unsuitable for implementing tariff reforms.[5] The underlying assumption is that even modest rates of tariff reduction would cause significant numbers of people in

3. These rates were calculated for 1980/1 by the Industries Assistance Commission (IAC). The IAC advises the Australian Government on protection policy. The rates are output-weighted averages of the rates applying to the many subcommodities included in each commodity group. An attempt has been made to include the effects of quantitative restrictions. Thus, in this paper we use the words tariff and protection interchangeably. The tariffs to which we refer include the tariff-equivalents of quantitative restrictions.

4. This argument was formalized by Stolper and Samuelson (1941).

5. See for example, Crawford (1979, p. 10.35).

TABLE 4

Projected Short-run Changes in Employment by Occupation Resulting from Four Different Approaches to Securing a 25 per cent Increase in the Trade Liberalization Index[a]
(Main losing occupations only)

Occupation[b]	Approach 1	2	3	4
	No industries exempted from tariff cuts		Industries in the textiles, clothing, footwear and motor vehicles sectors exempted	
	25% across the board cut in protection	'tops down' tariff cut to a 31.17% benchmark	75.85% across the board cut in protection	'tops down' tariff cut to a 3.17% benchmark
40.7/8A Spinners, Weavers, Knitters	-2.61	-3.88	1.41	1.35
41.7/8B Tailors, Cutters, etc.	-2.03	-4.71	0.80	0.79
42.7/8C Leather, Shoe, Tradesmen	-2.15	-5.01	0.46	0.38
47.7/8H Metal & Elec. Work. n.e.c.	-0.37	-0.70	0.29	0.16
56.7/8Q Process Workers, n.e.c.	-0.49	-0.37	-0.94	-1.11
67.9F Launderers, Dry Cleaners	-0.37	-0.98	0.24	0.21

(a) Projections are generated from the ORANI 78 model in standard short-run mode using 1974/5 input-output data and 1980/81 tariff rates (see Table 2). All projections are percentage changes.

(b) In only 6 of the 72 occupations included in the computations was the reduction in employment more than 0.5 per cent in any of the four simulations. These 6 occupations (ORANI numbers 40, 41, 42, 47, 56 and 67) are listed in the table. The code following the period (e.g., 7/8A in line 1 is the official census occupation code as set out in Australian Bureau of Statistics, 1976 Population Census Information Paper, No.9(iii), Catalogue No.2114.0 (Canberra). Results for all occupations are in the appendix available from the authors. The complete list of occupations is given in Occupation Classification Extract, ABS, Catalogue No.2114.0.

apparent from Table 4. Employment for most of our 72 occupations is surprisingly well spread across industries. Thus for most occupations, employment prospects are only weakly related to changes in the industrial composition of economic activity. Apart from the six occupations listed in the body of Table 4, no occupation was projected in any of the four ORANI simulations to suffer a decline in employment of more than 0.5 per cent. Only the textile-related occupations (40-42 and 67) exhibit a high degree of concentration in industries which are vulnerable to tariff cuts. Thus, when the textile industries are exempt from tariff cuts, our index d becomes very small.

5. Conclusion

In this paper we have analysed four approaches to tariff reform in Australia. Our results suggest that over a two year period, tariff reductions could be expected to increase aggregate employment, reduce inflation, improve the balance of trade and cause very little disruption in the labour market.

Perhaps our most interesting finding is that the two-year effects of tariff reductions are most favourable when the TCF and MV sectors are exempted. This provides a rationale for the Government's special treatment of these sectors. However, two points should be emphasized. First, if there is to be a substantial liberalization of Australia's trade policies, these sectors cannot remain exempted. They account for too much of Australia's total protection. With the exemptions, a 25 per cent overall tariff cut requires that protection for the non-exempt sectors be eliminated almost entirely. It would be impossible to move much beyond a twenty-five per cent tariff cut if the exemptions were maintained. Second, we have compared the effects of the different

particular occupations and regions to be thrown out of work in a situation where alternative jobs would be hard to find. Of course, such arguments are put most persistently by representatives of highly protected industries and associated trade unions. The calculations to be presented in this paper suggest that structural adjustments following from a 25 per cent reduction in protection would cause no more than minor disruption of the labour market.

The paper is organized as follows. In section 2, we describe a measure of labour market disruption. This measure provides a basis for comparing the costliness of different tariff cutting or trade liberalizing packages. What it does not do is give any indication of how much tariff cutting is involved in any particular package. For example, if we make a 15 per cent cut in the tariff on footwear and a 30 per cent cut in the tariff on cars, is this a bigger or smaller reduction in overall protection than a 35 per cent cut in the footwear tariff combined with a 10 per cent cut in the car tariff? In section 3, we propose a measure of trade liberalization: that is, we propose a way of making a weighted average of the different tariff cuts in a given package to arrive at a figure for the associated overall level of trade liberalization. In section 4, we use the ORANI model to compare the levels of labour market disruption for four different tariff cutting packages. The packages are chosen to give the same degree of trade liberalization, namely 25 per cent. Thus the comparison across packages indicates how we might minimize disruption per unit of trade liberalization. Section 5 contains concluding remarks.

2. A Measure of Labour Market Disruption

Since short run employment worries are the main impediment to the commencement of a program of gradual tariff reform in Australia, we concentrate on labour market disruption.[6] Our interest is in the numbers of people who lose their jobs and who are not likely to find other jobs commensurate with their qualifications within a reasonable time. Thus we emphasize the occupational dimension.[7] We reason that a loss of a job is not socially costly if a vacancy is created in the same, or a closely related, occupation. The measure of labour market disruption we have chosen is the net[8] number of persons required to change occupation or face unemployment as the result of the simulated cut in tariffs. We express this number of persons as a percentage of the workforce. Algebraically, we have

$$d = 100(\sum_{i=1}^{M} A_i \Delta N_i)/N , \qquad (1)$$

where d is the measure of disruption, ΔN_i is the change in the number of jobs in occuption i caused by the reductions in tariffs, N is total employment,

6. For econometric evidence of the importance of short-run employment concerns in determining approaches to tariff reform in the U.S., see Cheh (1974) and Bale (1977). A related study for the case of Australia is Anderson (1980).

7. This contrasts with Baldwin et al. (1980), Cline et al. (1978), and Whalley and Wigle (1983) all of whom relate adjustment costs to changes in employment prospects by industry rather than occupation.

8. Assume that the tariff cut reduces the total number of jobs for carpenters from 1000 to 980 but that it also causes 25 of the initially employed carpenters to be left without jobs as carpenters. This would happen if five of the carpentry jobs created in the industries benefitting from the tariff cut were filled by initially unemployed carpenters. We record the disruption as the net loss of carpentry jobs, i.e., 20 jobs not 25. In using a net measure, we have followed Baldwin et al. (1980) rather than Bale (1976), Cline et al. (1978), and Whalley and Wigle (1983). These latter writers do not reduce the job losses of the initially employed by the job gains of the initially unemployed in calculating adjustment costs.

motor vehicles which explains why reductions in the tariffs on these products have low or even negative employment-creating effects. At the other extreme we have import/domestic substitution elasticities of .34 and .5 for commodities 56 and 33. Consequently, tariff cuts for these commodities are shown in Column 3 of Table 2 to have the largest employment creating effects per unit of trade liberalization. Effect (a) depends on the nature of the commodity on which the tariff cut is made, whether or not it is mainly an input (direct or indirect) to consumption. Tariff cuts which primarily affect the cost of capital goods or the cost of government services will not have a sharp stimulatory effect on employment in short-run ORANI simulations. Consequently, in Column 3 of Table 2, we find that cuts in the tariffs on electronic equipment (commodity 73) and signs and writing equipment (commodity 82) have very modest employment creating effects despite having average values (namely 2.0 in both cases) for their import/domestic substitution elasticities. Motor vehicles (68) is another commodity for which a significant share of the price-reducing effects of a tariff cut affects the capital goods price index rather than the consumer price index. This is why in Table 1 we find smaller reductions in the CPI in the two simulations with no exemptions than in the two with exemptions. This in turn explains the comparatively strong performance of the export-oriented agricultural and mining sectors in the simulations where the exemptions are allowed.

We come, finally, to the comparison across simulations of the results for the labour market disruption index, d. Why do we find in Table 1 that d is very much larger in the simulations where there are no exemptions than in those where there are exemptions? One reason is that the overall employment gains are larger when there are exemptions. The main reason, however, is

From Column 3, it becomes clear why the aggregate employment gains are higher in the simulations where exemptions are allowed than in those where there are no exemptions. The employment generating effects of reductions in the motor-vehicle tariff per unit of trade liberalization are very small and are negative in the case of footwear. In the two simulations where there are no exemptions, 51.6 and 76.9 per cent of the total trade liberalizations are used up by cuts in the motor vehicle and footwear tariffs. Where exemptions are allowed, the 25 per cent trade liberalizations are achieved mainly by sharp tariff cuts in the "all other commodities" category. These tariff cuts are about eight times more employment creating per unit of trade liberalization than cuts in the tariff on motor vehicles.

Two factors are important in explaining the employment-creating effects per unit of trade liberalization of a cut in a particular tariff: (a) the extent to which the tariff cut reduces the CPI and money wages per unit of trade liberalization thereby creating jobs in the export-oriented sectors and (b) the extent to which there are offsetting employment losses in the directly affected import competing industry. Effect (b) depends mainly on the elasticity of substitution between the imported product on which the tariff is reduced and the competing domestic product.[17] If this elasticity is high, then the tariff cut allows a sharp increase in the import share of the domestic market. With a low elasticity, a tariff cut will lead to comparatively little increase in the import share and little loss of employment in the domestic industry. By far the largest values for the import/domestic substitution elasticities in the ORANI parameter file are 6.8 for footwear and 5.0 for

17. These are sometimes known as Armington elasticities in recognition of the contributions of Armington (1969 and 1970). The estimates used in ORANI are described in DPSV (1982, section 29.1).

$$A_i = -1 \text{ if } \Delta N_i < 0$$
$$= 0 \text{ if } \Delta N_i \geq 0 ,$$

and M is the number of occupations. In the ORANI simulations to be reported in section 4, M is 72.

There are a number of facets of the labour market disruption measure, (1), which need to be kept in mind when interpreting results. The first is that it is not a measure of the number of people required to change firms, regions or industries. Some reallocation of people among firms, regions and industries is inevitable as a result of tariff cuts. A great deal of mobility of this type is evident in the day to day working of the labour market quite apart from any influences that might be ascribed to changes in protection.[9] It would, however, have been of interest to estimate the number of workers who would be required to change not only their occupation, but their place of residence, in order to remain in employment. Some general idea of the orders of magnitude involved can be obtained from work by the Industries Assistance Commission (1981, p. 65). Their results show that only a very modest degree of geographical mobility is required when tariffs are cut by amounts commonly discussed in policy circles.

A further qualification concerns the level of disaggregation by occupation. We have worked at the level of 72 occupations because this is about as fine as one can go with any degree of confidence on the basis of Census data. Thus we have guarded as much as possible against underestimating the degree of occupational disruption associated with tariff changes. Nevertheless, even with the fine occupational classification we have chosen, it is possible that we may miss important sub-occupational shifts in the composition of the demand

9. See, for example, Industries Assistance Commission (1976).

for labour.

3. A Measure of Trade Liberalization

We measure the percentage reduction in protection or the move towards trade liberalization by

$$t = \sum_{i=1}^{N} W_i t_i \, , \tag{2}$$

where t is the measure of trade liberalization, t_i is the percentage cut in the ith tariff, the W_i are nonnegative weights summing to one, and N is the number of commodities. In the ORANI simulations to be reported in section 4, N is 115.

Formula (2) implies that if all tariffs are reduced by 25 per cent, then we have a 25 per cent trade liberalization, i.e., t = 25. To use (2) when we have non-uniform shifts in the tariffs, it is necessary to specify the weights, W_i.

Our derivation of the W_i's starts with the equation

$$T = \sum_{i=1}^{N} V_i T_i \, , \tag{3}$$

where T is the average tariff rate, T_i is the tariff on good i, and the V_i are a set of nonnegative weights summing to one.

Equation (2) is the percentage-change version of (3): t is the percentage change in T, t_i is the percentage change in T_i and

$$W_i = (V_i T_i)/T \, . \tag{4}$$

Thus, our problem of specifying the W_i's will be solved if we can specify the

industry. Whereas all four simulations show similar increases in employment in the export-oriented agricultural and mining sectors, the results in the import-competing sectors are quite different. With no exemptions, there are sharp reductions in employment prospects in TCF and MV, especially with the tops-down approach. When exemptions are allowed, the TCF and MV sectors actually gain from the tariff cuts via the general reductions in costs. Employment losses are shifted to the rest of the import competing industries: wood, paper, printing, chemicals and other manufacturing.

Returning to Table 2, we now consider columns 3, 6, 9, 12 and 15. Here we are concerned with explaining the differences across our four simulations in the aggregate employment results (line 1 of Table 1). Columns 6, 9, 12 and 15 show the employment effects of the changes in the individual tariffs. For example, ORANI projects a 0.0378 per cent increase in total employment from a 25 per cent reduction in the tariff on commodity 31 (see line 2 of column 6); with a 33.2 per cent reduction in this tariff, the increase in employment is 0.0502 per cent (i.e., 0.0378 x 33.2 / 25, see line 2 of column 9). The totals in columns 6, 9, 12 and 15 are the aggregate employment results appearing in Table 1. The entries in column 3 were computed as:

$$\text{Column 3} = \left[\frac{\text{Column 6}}{25} \,/\, \text{Column 5}\right] \times 100 \, . \tag{9}$$

Column 3 is a measure of the employment gain associated with cuts in each tariff per unit of trade liberalization. For example, a one per cent reduction in the tariff on commodity 31 generates an increase in employment of (.0378/25) per cent while giving a 0.0149 per cent trade liberalization. Thus, the percentage employment gain from reducing tariff 31 per one per cent of trade liberalization is (.0378/25)/.0149 which equals .1015.

TABLE 3

Projected Short-run Effects on Employment in 13 Major Industry Groups of Four Different Approaches to Securing a 25 per cent Increase in the Trade Liberalization Index(a)

	Industry Group(b)	Approach 1	Approach 2	Approach 3	Approach 4
		No industries exempted from tariff cuts		Industries in the textiles, clothing, footwear and motor vehicles sectors exempted	
		25% across the board cut in protection	'tops down' tariff cut to a 31.17% benchmark	75.85% across the board cut in protection	'tops down' tariff cut to a 3.17% benchmark
1	Agriculture, Forestry, Fishing (1-11)	3.03	2.66	3.51	3.47
2	Mining (12-17)	3.28	2.82	3.89	3.85
3	Food Processing, Tobacco, Drink (18-29)	1.87	1.69	2.07	2.05
4	Textiles, Clothing, Footwear (30-39)	-2.96	-6.05	1.31	1.27
5	Wood, Paper, Printing (40-48)	0.07	0.24	-0.37	-0.26
6	Chemicals (49-56)	0.09	0.56	-0.94	-0.85
7	Construction & Related (57-62,77,87,88)	-0.11	-0.07	-0.18	-0.07
8	Metal, Non Fabricated & n.e.c. Metal Products (63-67)	1.99	1.81	2.10	1.86
9	Motor Vehicles, Parts (68)	-6.29	-10.42	2.67	2.67
10	Other Manufacturing (69-76, 78-83)	-0.25	0.27	-1.43	-1.67
11	Public Utilities (84-86)	0.42	0.31	0.58	0.54
12	Trade, Transport, Communication (89-97)	0.33	0.25	0.44	0.42
13	Finance, Other Services (98-113)	0.08	0.05	0.13	0.12

(a) Projections are generated from the ORANI 78 model in standard short-run mode using 1974/5 input-output data and 1980/81 tariff rates (see Table 2). All projections are percentage changes.

(b) Numbers in parentheses are the ORANI industry numbers included in the group. For the ORANI codes see DPSV (1982, Table 29.2).

V_i's.

Economic theory does not seem to give us any worthwhile guidance as to what weights should be used in defining the average tariff level.[10] One obvious candidate is import weights, i.e. we would define the V_i's according to

$$V_i = M_i/\Sigma_j M_j, \tag{5}$$

where M_j is the foreign currency value of imports of good j in some suitable base period. The well known problem with (5) is that we tend to get very low weights on very high tariffs. If the tariff on good i is sufficiently high to exclude imports entirely, then V_i is zero. A popular alternative to import weights in tariff averaging problems is output weights, i.e.,

$$V_i = X_i/\Sigma_j X_j, \tag{6}$$

where X_j is the value of output of good j. Scheme (6) avoids the problem of under-weighting prohibitive tariffs. On the other hand, it may allocate high weights to tariffs which barely restrict trade. For example, equation (6) might allocate a high weight to the tariff on "bread and cakes", a tariff whose removal would have close to zero effect on imports.

The weighting scheme we have chosen explicitly recognizes the relative trade-restricting powers of the different tariffs. We define the V_i's according to[11]

10. See for example, Basevi (1971) who studied the problem of combining sub-commodity tariff rates to form commodity rates. An implication of his work is that there is no unique ideal weighting scheme, different schemes being ideal for different purposes. Only in the simplest models is it possible to give a tight theoretical justification for any particular scheme. See also Parmenter (1977).

11. We assume that $T_i > 0$ for all i. If in fact $T_i = 0$, it does no harm in interpreting (7) to assume instead that $T_i = \varepsilon$ where ε is an arbitrarily small positive number. Where $T_i = 0$, it is clear that $\eta_i = 0$.

$$V_i = (\eta_i/T_i)/\sum_j(\eta_j/T_j), \qquad (7)$$

where η_i is the elasticity of aggregate imports (valued in foreign currency) with respect to the tariff on good i. That is, η_i is the percentage by which total imports are restricted by a one per cent increase in the tariff on good i. $(100\eta_i/T_i)$ is the percentage by which total imports are restricted by a one percentage point increase in the tariff on good i. For example, if T_i is 30, then $(100\eta_i/T_i)$ is the percentage reduction in total imports caused by an increase in T_i from 30 to 31. Thus, in the region[12] of the existing rates (T_i, i = 1, ..., n), the (η_i/T_i)'s are indicators of the relative trade restricting powers per percentage point of the different tariffs.

To esimate the η_i's, we used the ORANI model. As will be apparent in section 4, ORANI can be run in various modes.[13] Here, we used the neoclassical short-run mode with exogenous total employment and balance of trade. In other words, we computed η_i by shocking the ORANI model with a one per cent increase in T_i and observing the short-run (about two years) response in total imports under the assumptions that (a) industries behave as if they are profit maximizing price takers working with neoclassical production functions with fixed availability of physical capital, (b) that real wages adjust so that the increase in T_i does not affect aggregate employment, and (c) aggregate absorption adjusts so that the increase in T_i does not affect the balance of trade.

It is not difficult to suggest alternative weighting schemes to (7) which also reflect trade restrictiveness. For example, we could replace the η_i's

12. The sizes of the η_i's depend on the T_i's. As we change the T_i's, we should re-evaluate the η_i's. In this paper, for purely practical reasons, we treat the η_i's as constants.

13. The different modes of the ORANI model are discussed in detail in DPSV (1982, especially sections 6, 23 and 44).

TABLE 2

Analysis of Employment Effects of Four Trade Liberalizing Policies

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ORANI commodity(a)			Across-the-board tariff cuts of 25% with no exemptions			Tops-down to 31.17% with no exemptions			Across-the-board tariff cuts of 75.85% with exemptions			Tops-down to 3.17% with exemptions		
	Initial tariff (T_i)(b)	Employment gain per unit liberalization(c)	Per cent tariff cut (t_i)	Per cent of total cut (W_i)(e)	Employment gain	Per cent tariff cut (t_i)	Per cent of total cut(g)	Employment gain	Per cent tariff cut (t_i)	Per cent of total cut(g)	Employment gain	Per cent tariff cut (t_i)	Per cent of total cut(g)	Employment gain
30. Prepared fibres*	0.35	(d)	25.0	.00	.0001	0	0	0	0	0	0	0	0	0
31. Man-made fibres, yarn*	46.67	.1015	25.0	1.49	.0378	33.2	1.98	.0502	0	0	0	0	0	0
32. Cotton, Silk, Flax*	33.20	.0666	25.0	2.06	.0343	6.1	0.50	.0084	0	0	0	0	0	0
33. Wool & Worsted Yarns*	35.54	.2720	25.0	0.05	.0034	12.3	0.02	.0017	0	0	0	0	0	0
34. Textile finishing*	56.93	(d)	25.0	0.00	.0000	45.3	0.00	.0000	0	0	0	0	0	0
35. Textile floor covers*	26.23	.0316	25.0	0.76	.0060	0	0	0	0	0	0	0	0	0
36. Textile prods. n.e.c.*	13.74	.0148	25.0	0.54	.0020	0	0	-0	0	0	0	0	0	0
37. Knitting mills*	53.81	.0242	25.0	4.44	.0269	42.1	7.47	.0453	0	0	0	0	0	0
38. Clothing*	68.65	.0102	25.0	6.05	.0154	54.6	13.21	.0336	0	0	0	0	0	0
39. Footwear*	56.63	-.0029	25.0	6.38	-.0047	45.0	11.48	-.0103	0	0	0	0	0	0
56. Oil & coal products	5.93	.2169	25.0	0.26	.0141	0	0	0	75.8	0.79	.0428	43.19	0.45	.0304
68. Motor vehs. & Parts*	48.76	.0024	25.0	45.27	.0271	36.1	65.37	.0391	0	0	0	0	0	0
73. Electronic equipment	22.20	.0201	25.0	4.59	.0231	0	0	0	75.8	13.92	.0700	84.82	15.57	.0784
74. Household appliances	21.83	.0171	25.0	3.13	.0134	0	0	0	75.8	9.49	.0406	84.57	10.59	.0453
80. Rubber products	28.58	.0496	25.0	1.08	.0134	0	0	0	75.8	3.27	.0406	88.21	3.81	.0473
81. Plastic products	22.54	.0250	25.0	2.11	.0132	0	0	0	75.8	6.40	.0400	85.06	7.18	.0449
82. Signs & writing equip.	16.93	.0100	25.0	0.16	.0004	0	0	0	75.8	0.49	.0012	80.10	0.51	.0013
83. Other manufacturing	17.96	.0763	25.0	0.75	.0143	0	0	0	75.8	2.27	.0433	81.24	2.44	.0464
All other commodities	11.26	.0197	25.0	20.84	.1028	0	0	0	75.8	63.19	.3117	71.32	59.45	.2681
Totals or averages	26.30(f)	0.0137	25.0	100	.34	25.0	100	.17	25.0	100	.59	25.0	100	.56

(a) ORANI distinguishes 115 commodities. Here we list only those of particular interest in the current simulations. Those which the government wishes to exempt from tariff cuts are marked with an asterisk(*).

(b) These are ad valorem rates calculated by the Industries Assistance Commission for 1980/1. They include an allowance for the effects of quantitative restrictions.

(c) See equation (9) and the associated text.

(d) Denominator is very close to zero.

(e) These are the weights used in formula (2) for calculating the extent of trade liberalization.

(f) This is the average tariff rate T computed according to equation (3) with the weights given by (7).

(g) Computed as $t_i W_i/25$.

0.32, 1.42 and 0.57. The largest value of the disruption index in Table 1 (namely, 0.14) is about a quarter of the value actually experienced in the first half of the seventies, and about 10 per cent of the value experienced in the last half of the sixties. If we further take into account the likelihood that the tariff reforms would not be implemented over night but would be phased in gradually, we see the potential for disruption involved in even the most disruptive of the four approaches seems well within the capacity of the workforce to absorb.

4.3 A Comparison of Four Approaches to Tariff Reductions

Table 2 contains information which will be useful in making comparisons across our four ORANI simulations. Column 1 lists the major import competing commodities including all those which have been singled out as exempt from tariff reductions (30-39 and 68). Column 2 lists the initial *ad valorem* rates of protection (T_i). Columns 4, 7, 10 and 13 show the percentage tariff cuts (t_i). In columns 5, 8, 11 and 14, we have recorded $t_i W_i/25$; i.e., we have shown the shares of the total trade liberalizations accounted for by the individual tariff cuts. Note that in column 5, these shares are simply the weights W_i from our trade liberalization index, (2).

If no exemptions are allowed, it is apparent from columns 5 and 8 that the tariff cuts are concentrated very heavily in the TCF and MV sectors. These sectors account for 67 per cent of the total trade liberalization in the across-the-board approach and 100 per cent with tops-down. On the other hand, if exemptions are allowed, TCF and MV account for none of the trade liberalizations (columns 11 and 14). The contrasting patterns of tariff cuts are clearly reflected in Table 3 which sets out ORANI results for employment by

with η_i^*'s where the η_i^*'s are the elasticities of total trade (imports plus exports) with respect to the tariff on good i. The η_i and η_i^*'s will be identical if we start from a position of balanced trade and insist that trade balance is maintained when we change T_i. Even where these conditions are not precisely met, ORANI indicates little difference between the η_i's and η_i^*'s. Similarily, the relative sizes of the η_i's are not very sensitive to changes in the mode of the ORANI simulation. Mainly, the η_i's reflect the rate of the tariff on good i, the quantity of imports of good i, the elasticity of substitution between the imported good i and the domestically produced substitute, and the share of imports in the domestic market for good i. Thus the weights V_i in (7) are not very sensitive to the underlying assumptions (short-run, neoclassical, exogenous employment, etc.) in the ORANI simulations used to compute the η_i's.

Having determined the V_i's, we can use (4) to compute the W_i's. More directly, we can combine (4), (7) and (3) to compute the W_i's by

$$W_i = \eta_i / \Sigma_j \eta_j \ . \tag{8}$$

(Table 2, column 5 shows W_i's used in the computations reported in section 4).

4. ORANI Simulations of the Effects of a 25 per cent Reduction in Protection

4.1 The Choice of Simulations

In the Australian discussion of tariff reform, two basic approaches can be distinguished : across-the-board and tops-down. Under the first of these approaches, all tariffs are cut by a uniform percentage. Under the second, all tariff rates greater than say α are cut to α while all tariffs below α are left unchanged. The value of α can be varied according to how much tariff cutting is desired. In 1982, the Government indicated that certain sectors, namely textiles, clothing and footwear (TCF), and motor vehicles (MV) should be exempt from any reductions in protection. Thus, we have four policy-relevant tariff reform strategies for analysis : across-the-board and tops-down with and without exemptions.

Economic theory suggests some conditions under which welfare (measured by aggregate consumer utility) is improved by either an across-the-board or tops-down reduction in protection.[14] These conditions seem undescriptive of the Australian economy. They rule out the existence of market imperfections and price distorting taxes apart from the tariffs. Even within their narrow scope of application, the trade theoretic theorems do not suggest an optimal approach to tariff reform. In addition, the welfare concept, aggregate utility, is far too abstract for use in policy discussions. In comparing various tariff cutting strategies, our approach is to recognize explicitly the most serious distortion in the Australian economy (namely, the rigidity of real wages and consequent unemployment) and to concentrate on the descriptive measures of labour market disruption and trade liberalization introduced in the last two sections.

Specifically, we use simulations with the ORANI model to compare the labour market disruptions caused by 25 per cent reductions in protection implemented by

(a) a 25 per cent across-the-board cut,

(b) a tops down cut to 31.17 per cent,

(c) a 75.85 per cent cut in all tariffs except those on the TCF and MV sectors, and

14. See for example Hatta (1977).

market for two year periods. Do values for d of between 0.02 and 0.14 imply that tariff cuts would cause severe disruption or little disruption?

Annual time series data are not available on occupational mobility; the periodic labour mobility surveys and the labour force surveys, moreover, are based on too small a sample to allow disaggregation to 72 occupations. We are left with the quinquennial Censuses. There are two obvious difficulties in using this source. In five years the observed value of the disruption index calculated from the beginning year to end year might be either greater than or less than the index calculated for any two year period within the intercensal interval. To take an extreme example, suppose that exactly one person were required to change his occupation during the first two years of the intercensal period. If during the last three years of the period he were required to change back to his original occupation, then the disruption index calculated from the Census data would be zero, whereas computations from the first two, or the last three years, would register a non-zero amount of disruption. Thus the Census data would tend to understate disruption over a two year period. On the other hand, if there exist steady trends in favor of some and against other occupations, a five year period would see a larger change in the disruption index than a two year period. It is easy to adjust for the latter difficulty: the disruption index for the five year intercensal period is multiplied by two fifths. Unfortunately, no adjustment is feasible in the case of the former problem. Our pro-rated values of the intercensal disruption index consequently must be viewed as lower limits to the historically experienced magnitudes.

We have calculated the disruption index for the intercensal periods 1961-66, 1966-71 and 1971-76. The respective values after pro-rating are

TABLE 1

Projected Short-run Macroeconomic Consequences of Four Different Approaches to Securing a 25 per cent Increase in the Trade Liberalization Index[a]

Macro Variable Projected	Approach 1	Approach 2	Approach 3	Approach 4
	No industries exempted from tariff cuts		Industries in the textiles, clothing, footwear and motor vehicles sectors exempted	
	25% across the board cut in protection	'tops down' tariff cut to a 31.17% benchmark	75.85% across the board cut in protection	'tops down' tariff cut to a 3.17% benchmark
Aggregate employment	0.34	0.17	0.59	0.56
Aggregate imports (foreign currency value)	1.53	1.62	1.40	1.43
Aggregate exports (foreign currency value)	2.94	2.49	3.59	3.50
Balance of Trade	0.23	0.14	0.35	0.33
Consumer Price Index	-2.35	-2.11	-2.58	-2.56
Trade Liberalization Index	25	25	25	25
Index of Disruption in the Labour Market	0.07	0.14	0.02	0.02

(a) Projections are generated from the ORANI 78 model in standard short-run mode using 1974/5 input-output data and 1980/81 tariff rates (see Table 2). All projections are percentage changes except those for the balance of trade which are expressed as percentages of 1974/5 GDP.

(d) a tops-down cut to 3.17 per cent applied to all tariffs except those on the TCF and MV sectors.

In calculating labour market disruption, we use formula (1). Formula (2) with weighting scheme (8) is used to ensure that the overall tariff cut is 25 per cent in all four cases. That is, t is equal to 25 when all tariffs are cut by 25 per cent, when all tariffs above 31.17 per cent are cut to 31.17 per cent, when all tariffs apart from those on TCF and MV are cut by 75.85 per cent, and when all tariffs above 3.17 per cent apart from those on TCF and MV are cut to 3.17 per cent. (The cuts in the individual tariffs, the t_i's, are indicated in Table 2, columns 4, 7, 10 and 13.)

The main assumptions underlying the four ORANI simulations to be reported in the next subsection are as follows:

(i) changes in tariffs do not affect real wages. If a tariff cut makes the CPI 2 per cent less than it otherwise would have been, then all money wages rates will be 2 per cent less than they otherwise would have been.

(ii) labour markets are slack. There are no shortages of labour in any occupational category at going wage rates.

(iii) changes in tariffs do not affect real domestic absorption or its major components (household consumption, private investment and government spending).

(iv) changes in tariffs do not affect the nominal exchange rate ($A per $US for example).

(v) changes in tariffs do not affect the quantity of physical capital available to each industry.

Assumptions (i) and (ii) are descriptive of the Australian labour market where there are high rates of unemployment and no apparent tendency for real wages to adjust in response to changes in the demand for and supply of labour. Assumption (iii) is based on the idea that aggregate absorption can be controlled independently of tariff policy by fiscal and monetary instruments. Under assumption (iii), all of the effect of changes in tariffs on national output is reflected in the balance of trade. The obvious alternative is to assume that the balance of trade is unaffected by tariff changes, that the government allows aggregate absorption to adjust so as to eliminate any change in the balance of trade which otherwise would occur. In subsection 4.2, it will be seen that the projected balance of trade effects of tariff changes under the fixed absorption assumption are very small. Thus, in simulating the effects of tariff changes it makes very little difference whether we assume that it is the balance of trade or absorption which adjusts. Assumption (iv) reflects our choice of numeraire. Under the conditions of our simulations, movements in the nominal exchange rate do not affect any real magnitudes or relative prices; they just translate into one-to-one movements in the absolute domestic price level. Assumption (v) means that the results are short-run. In short-run ORANI simulations, tariff cuts cause changes in industries' rates of return and in the allocation of aggregate investment across industries. However, the simulations do not allow sufficient time for these revisions in investment plans to affect the quantity of capital stock available for use by each industry. Empirical work by Cooper and McLaren (1980) and Cooper (1983) suggests that the ORANI short-run is best interpreted as a period of about 2 years. For example, we should interpret the first result in Table 1 as meaning that 2 years after a 25 per cent across-the-board tariff cut, aggregate employment would be 0.34 per cent higher than it would have been in the

absence of the tariff cut.

4.2 The Macro Results : General Aspects[15]

Table 1 contains results from our four simulations for the main macro variables. In all cases, the 25 per cent tariff cut (or trade liberalization) is projected to reduce the CPI by between 2.11 and 2.58 per cent with similar reductions in money wages.[16] Reductions in wages and other costs are particularly helpful to export industries which must compete on world markets where selling prices are largely independent of Australian costs. Thus tariff cuts are projected by ORANI to increase exports. The increases in the four simulations reported in this paper are between 2.49 and 3.59 per cent. Tariff cuts will, of course, increase imports. Our four simulations show increases of between 1.40 and 1.62 per cent. In each case, the increase in imports is insufficient to offset the increase in exports implying that the reductions in tariffs lead to improvements in the balance of trade. Similarly, the employment gains in the export-oriented industries are projected to outweigh the losses in the import competing industries, leading to small gains in aggregate employment of between 0.17 and 0.59 per cent.

The final results in Table 1 are for the labour market disruption index, d, specified by equation (1). To obtain a perspective on these results we need to know how much occupational mobility is normal in the Australian labour

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15. For a much more detailed description of an ORANI simulation of the effects of a general tariff reduction, see DPSV (1982, ch. 7). This subsection is a quick sketch of the usual ORANI story. In the following subsection, we will provide a comparison of the four simulations reported in this paper.

16. This means that if the increase in the CPI and money wages would have been 10 per cent over the projection period (2 years) without the tariff cuts, then it will be between 7.42 and 7.89 per cent with the tariff cuts.