



# IMPACT PROJECT

A Commonwealth Government inter-agency project in co-operation with the University of Melbourne, to facilitate the analysis of the impact of economic demographic and social changes on the structure of the Australian economy



Paper presented at the Seminar on  
Structural Change, Immigration and Ethnic Relations  
at La Trobe University, 27 February 1981

PROSPECTS IN THE 1980s FOR MIGRANTS  
IN THE AUSTRALIAN WORKFORCE

by

L.H. Cook and P.B. Dixon  
La Trobe University

IMPACT General Paper No. G-34 Melbourne September 1981

*The views expressed in this paper do  
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STRUCTURAL CHANGE AND EMPLOYMENT PROSPECTS  
FOR MIGRANTS IN THE AUSTRALIAN WORKFORCE\*

L.H. Cook and P.B. Dixon

I. INTRODUCTION

Over the next ten years, the Australian economy will be subjected to many pressures leading to changes in the industrial composition of GDP, the occupational composition of the workforce and the regional allocation of economic activity. Among the pressures which are likely to be significant causes of these structural changes are

- (a) changes in world commodity prices,
- (b) changes in Australia's ability to earn foreign exchange via, for example, the further exploitation of mineral resources and
- (c) changes in Australia's policy on protection of textiles, clothing, footwear and motor vehicles.

Concern is often expressed that overseas-born workers in the existing Australian labour force will be required to bear a disproportionate share of the adjustment costs associated with structural change. This argument is sometimes raised as a justification for the continuation of Australia's protection of textiles, clothing, footwear and other industries employing large numbers of migrants.

This paper provides a quantitative analysis of some of the effects on the employment prospects for Australia's overseas-born

workers resulting from the three pressures listed above. We draw on the contribution of the IMPACT Project [6] to Sir John Crawford's study group on structural change [3]. For each of the three pressures, IMPACT provided projections of the effects on rates of return and employment in 109 industries. Here we extend the IMPACT projections to cover employment classified by place of birth and sex. To do this, we first take account of the occupation and sex composition of the workforce in each industry. This enables us to make projections of the effects of the three pressures on employment opportunities by occupation and sex. Then we use data on the birth places of members of each occupation and sex to provide projections of the implications of the three pressures for job opportunities for workers classified by birthplace and sex.

To foreshadow the results, it is found that structural change at the industry level does not lead to significantly different employment prospects for different groups distinguished by birthplace and sex. The first part of the explanation lies in the fact that the workers in each occupational group are spread across many industries; consequently, structural pressures on the industrial composition of GDP generate less severe, or dampened, structural pressures on the occupational composition of the workforce. The second part of the explanation is that the workers of each birthplace and sex group are spread across many occupations; this means

that the already dampened changes in the occupational composition of the workforce generate even less severe shifts in the composition of employment classified by birthplace and sex. It is true that some birthplace groups do fare better than others because of a more favourable occupational composition, but the differences are generally small.

The structure of the paper is as follows. In the next section, we describe the IMPACT projections for employment by industry. In section III we take into account the occupational structure of the workforce in each industry and make projections of the effects of the three structural pressures on employment by occupation and sex. Then, in section IV, we take into account the occupational structure for each birthplace and sex group and make projections of the effects of the structural pressures on employment by birthplace and sex. Section V contains concluding remarks. Two appendixes are attached : Appendix A provides brief notes on the data; Appendix B examines the sensitivity of the results for one of the structural pressures - increased foreign exchange earnings through further development of mineral resources - to alternative assumptions concerning the behavior of macroeconomic variables.

## II. THE IMPACT PROJECTIONS

Table I is a revised version of some of the projections provided by IMPACT to the Crawford study group.<sup>1</sup> The projections refer to percentage deviations in industry employment at time  $t + 1$  (1986, say) from the levels they would have reached if the exogenous structural pressures had not occurred at time  $t$  (1985, say). The most important underlying assumptions are that the balance of trade and the level of employment are fixed; it is assumed that real wages and aggregate demand are adjusting to leave these variables unaltered by the three structural pressures. Results reported in Appendix B indicate that projections of the macroeconomic effects of the structural pressures are sensitive to the macroeconomic assumptions, but that the relative employment prospects for different birthplace and sex groups are not sensitive to these assumptions.

ORANI Projections of the Effects of Changes in World Commodity Prices

The assumptions made by IMPACT concerning the movements in world prices are set out in Table II. It can be seen that the prices of machinery, equipment and appliances are assumed to be the slowest rising with the prices of various animal products rising the fastest.<sup>2</sup> To a large extent these forecasts are simply an extrapolation of trends observed in the sixties and seventies.

TABLE I

Projected Effects on Employment by Industry of Changes in International  
Commodity Prices, a Foreign Currency Discovery, and Reductions in Tariffs

Industry Name <sup>(a)</sup>	Change in Number of Jobs			Percentage Change in Number of Jobs		
	Inter- national Prices	Foreign Currency Discovery	Reductions in Tariffs	Inter- national Prices	Foreign Currency Discovery	Reductions in Tariffs
1. Agriculture (1-8)	3119	-7186	3513	.77	-1.78	.87
2. Services to agriculture (9)	22	-85	38	.22	-.85	.37
3. Forestry, logging (10)	-35	-66	52	-.31	-.59	.46
4. Fishing, hunting (11)	252	-282	150	2.78	-3.10	1.65
5. Metallic minerals (12-13)	-113	-807	394	-.32	-2.35	1.15
6. Coal (14)	-466	-978	512	-1.91	-4.01	2.10
7. Crude petroleum, gas (15)	1	2	0	.13	.17	.05
8. Non-metallic minerals, n.e.c. (16)	7	10	24	.06	.09	.22
9. Services to mining (17)	6	15	5	.10	.26	.09
10. Food, beverages, tobacco (18-29)	345	-1241	603	.17	-.62	.30
11. Textiles (30-36)	-129	-268	-1178	-.28	-.60	-2.65
12. Clothing, footwear (37-39)	-195	-113	-1290	-.22	-.13	-1.49
13. Wood products, furniture (40-43)	-70	301	6	-.08	.35	.00
14. Paper, printing and publishing (44-48)	170	-116	92	.16	-.11	.09
15. Chemicals, petroleum and coal products (49-56)	103	-67	21	.15	-.10	.03
16. Other non-metallic mineral products (57-62)	-4	150	24	-.00	.27	.04
17. Basic metal products (63-64)	-1909	-2421	1128	-2.05	-2.61	1.21
18. Fabric and metal products (65-67)	-206	190	-153	-.19	.17	-.14
19. Transport equipment, including cars (68-71)	-2313	-843	-3892	-1.72	-.62	-2.89
20. Other machinery, appliances (72-78)	-1279	-35	21	-.73	-.02	.01
21. Manufacturing, n.e.c. (79-83)	-203	-34	-179	-.29	-.04	-.25
22. Electricity and gas (84-85)	-68	122	-27	-.08	.16	-.03
23. Water, sewerage, drainage (86)	13	38	1	.03	.11	.00
24. Construction (87-88)	773	2210	-340	.16	.47	-.07
25. Wholesale, retail trade (89-92)	1763	4643	763	.15	.41	.06
26. Road transport (93)	-42	-526	301	-.03	-.39	.22
27. Rail transport (94)	-354	-523	260	-.33	-.49	.24
28. Water transport (95)	-146	-128	50	-.45	-.39	.15
29. Air transport (96)	-76	97	-4	-.22	.29	-.01
30. Communication (97)	-139	486	-151	-.11	.41	-.12
31. Finance, insurance, etc. (98-103)	-364	1107	-156	-.08	.24	-.03
32. Public administration (104)	313	950	-83	.12	.37	-.03
33. Defence (105)	108	333	-27	.11	.36	-.03
34. Health (106)	369	1669	-163	.10	.47	-.04
35. Education, etc. (107)	460	1469	-130	.13	.41	-.03
36. Welfare, other community services (108)	124	521	-53	.08	.37	-.03
37. Entertainment, recreation (109)	-24	306	4	-.03	.46	.00
38. Restaurants, hotels, clubs (110)	157	762	-88	.07	.43	-.05
39. Other services (111-113)	52	339	-48	.07	.52	-.07
Total <sup>(b)</sup>	0	0	0			

(a) ORANI computations are carried out for 113 industries. In this table, ORANI results are aggregated to 39 industries. The numbers in parentheses show the aggregation. For example, industry 1 here consists of ORANI industries 1-8.

(b) Total employment was assumed to be unaffected by the structural pressures under consideration.



TABLE II

Assumptions Concerning Rates of Growth in World  
Commodity Prices, Typical Year in the Eighties<sup>(a)</sup>

<u>Commodity Descriptions<sup>(b)</sup></u>	<u>Projected Additional Inflation in Commodity Price Relative to Slowest Growing Group (per cent per annum)</u>
<u>Animal-based exports, e.g. meat products, fish products, wool, leather products</u>	5.0
<u>Typical export products (excluding machinery) from advanced countries, e.g. chemicals, man-made fibres, paints, fertilizers</u>	4.3
<u>Milk products</u>	4.0
<u>Processed foods, drink and tobacco</u>	3.8
<u>Non-energy minerals, e.g. iron, copper, various sands</u>	3.4
<u>Energy products, e.g. coal, oil</u>	2.8
<u>Products not elsewhere classified</u>	2.8
<u>Sugar and related products</u>	2.7
<u>LDC exports and prospective exports, e.g. textiles, clothing, footwear, basic iron and steel</u>	2.6
<u>Machinery, equipment and appliances, e.g. cars and parts, aircraft, ships electrical machinery, household appliances, agricultural machinery</u>	0

(a) These forecasts are taken from [6, pp.43-44]. In that source they were assumed to apply to a typical year in the period 1977-78 to 1984-85. Here we assume they apply to the period 1981-82 to 1990-91.

(b) More detail on the commodity groups is given in [6, p.44].

However, in the case of energy products it is assumed that OPEC has already taken advantage of the relative scarcity of oil and that the spectacular price rises of the seventies will not be repeated in the eighties.

The overall picture in Table II is that during the eighties there will be improvements in Australia's terms of trade. The prices of Australia's main exports will, at a minimum, keep pace with world inflation while the prices of the main imports will show a relative decline. An expected result of these changes is that Australia would experience an increased standard of living; according to ORANI the effect would be to increase real wages by 0.1 per cent and real absorption by 0.2 per cent for each year that the international prices changed in accordance with Table II. Another expected result is that industries producing products appearing near the top of Table II would be advantaged by the price changes and those producing products near the bottom would be disadvantaged.<sup>3</sup> This expectation is borne out in the first column of Table I. For example, the number of jobs in Agriculture is projected to increase by 3119 or 0.77 per cent on account of the international price changes for each year that they take place. Similarly, Fishing and hunting shows a 2.78 per cent increase in the number of jobs. On the other hand, Australian equipment manufacturers and their principal input suppliers would suffer downward pressure on account of movements in international prices. The industries

shown with the greatest job losses are Transport equipment (which includes cars), Basic metal products and Other machinery and appliances. Industries whose products are only remotely connected with international trade (e.g. the service industries) are projected, in most cases, to experience small employment increases because of the increase in aggregate absorption.

#### ORANI Projections of the Effects of a Foreign Currency Discovery

The results in the second column of Table I (those in the columns marked Foreign Currency Discovery) are a revised version of projections prepared by the IMPACT Project to illustrate some of the effects of further mining development in the eighties. Taken literally, the IMPACT projections refer to the effects of discovering a source of foreign currency which requires no local materials or labour for its exploitation.<sup>4</sup> The projections presented here are for the effects (in year  $t + 1$ ) of such a discovery (in year  $t$ ) yielding about 0.4 per cent of GDP per annum which is the order of magnitude suggested by the experience of 1968-69 to 1974-75. Thus, the projections can be interpreted as estimates of the effects on the economy in a typical year during the eighties should there be another mining boom of about the same intensity as that of the early seventies.

The highlights from the foreign currency discovery projections are as follows. Foreign currency discoveries in year  $t$  would allow absorption and real wages in year  $t + 1$  to be higher than they otherwise would have been (0.4 and 0.2 per cent, respectively). This would benefit industries producing services and non-traded commodities. There would be, however, downward pressure on industries closely associated with international trade. The increased availability of foreign exchange would tend to reduce its value in terms of non-traded goods and services, including Australian labour. Traditional export industries (e.g. agriculture) would be especially adversely affected. Although import-competing industries would suffer from increases in their costs relative to the local prices of competitive foreign products, they would receive some compensation from the expansion in domestic absorption. The negative figures reported for mining should be interpreted as the effects of a mining boom on existing mining activities; new mineral discoveries would affect old mining activities in the same way as they would affect any other export-oriented activity.

#### ORANI Projections of the Effects of Reductions in Tariffs

The results in Table I in the columns marked Reductions in Tariffs are from an ORANI simulation of a 25 per cent reduction in the tariffs on textiles, footwear, clothing and motor vehicles.<sup>5</sup>

Again the results are to be interpreted as the effects in year  $t + 1$  of a shock in year  $t$ ; here, however, the change is presumably only a once-and-for-all change, i.e. the tariff change occurs only in year 1985 (say), not in each year in the eighties. As would be expected, the results show contractions in employment opportunities in the footwear, textiles, clothing and motor vehicle industries. ORANI also indicates that the tariff reductions would restrain domestic costs which would increase activity in the export industries and their suppliers.

### III. THE EFFECTS OF THE THREE PRESSURES ON EMPLOYMENT BY OCCUPATION AND SEX

To transform the projections for employment by industry given in Table I into projections of employment by occupation for both males and females data are used from the 1976 Population Census [1] on the shares of each industry in the employment of workers in each occupation and sex category.<sup>6</sup> It is assumed that if employment in industry  $i$  increases by  $x_i$  per cent, then industry  $i$ 's employment of both male and female workers in each occupation  $j$  increases by  $x_i$  per cent. With this assumption the percentage increase ( $\ell_{sj}$ ) in employment for workers of sex  $s$  and occupation  $j$  is given by

$$\frac{\ell_{sj}}{x_i} = \sum_{i=1}^{39} S_{sj}^i x_i, \quad j=1, \dots, 72 \quad s=1, 2, \quad (1)$$

where  $S_{sj}^i$  is the share of the workers of sex  $s$  and occupation  $j$  who are employed in industry  $i$ . The calculations were made for 72 occupations, although for the purposes of presentation some of the results have been aggregated (see Tables III and IV).

The first columns of results in Tables III and IV show the effects on occupational employment of the changes in international prices. In Table I it was seen that with the projected international price changes the principal gainers are agriculture, fishing and hunting, while the principal losers are in the machinery and equipment sector. Thus, it is not surprising that the International

TABLE III

Projected Effects on Occupational Employment for Males of Changes in International  
Commodity Prices, a Foreign Currency Discovery, and Reductions in Tariffs

Occupation (a)	Change in Number of Jobs			Percentage Change in Number of Jobs		
	Inter- national Prices	Foreign Currency Discovery	Reductions in Tariffs	Inter- national Prices	Foreign Currency Discovery	Reductions in Tariffs
1-20. White-collar occupations	-172	2761	-292	-.01	.21	-.02
21-26. Farmers, fishermen, hunters timbergetters	2206	-4787	2414	.69	-1.50	.76
27-29. Miners, quarrymen	-300	-797	420	-.91	-2.43	1.28
30-39. Workers in transport and communication	-201	-357	288	-.07	-.13	.11
30 & 31. Water transport workers	-19	-39	16	-.21	-.43	.18
32. Aircraft pilots, navigators, flight engineers	-7	7	-1	-.20	.20	-.03
33, 35 & 36. Mainly railway workers	-124	-169	69	-.32	-.44	.18
34. Drivers, road transport	6	-213	223	.00	-.12	.12
37 & 38. Telephone, telegraph and postal workers	-28	94	-27	-.10	.35	-.10
39. Workers in transport and communication, n.e.c.	-28	-38	7	-.27	-.36	.06
40-61. Tradesmen, production - process workers and labourers	-3117	-282	-2127	-.20	-.02	-.14
40. Spinners, weavers, etc.	-28	-52	-248	-.26	-.47	-2.27
41. Tailors, cutters, etc.	-27	22	-120	-.15	.12	-.66
42. Leather cutters, etc.	-9	2	-54	-.14	.03	-.84
43. Furnacemen, rollers, etc.	-246	-262	66	-1.46	-1.56	.39
44. Watchmakers, jewellers, etc.	-14	33	-0	-.08	.19	-.00
45. Tool makers, machinists, etc.	-1518	-453	-1009	-.39	-.12	-.26
46. Electricians, etc.	-258	135	-56	-.18	.10	-.04
47. Metal workers, n.e.c.	-496	-266	-315	-.82	-.44	-.52
48. Carpenters, etc.	-24	395	-123	-.02	.31	-.10
49. Painters, decorators	-31	126	-107	-.06	.25	-.21
50. Bricklayers, plasterers	126	439	-57	.11	.39	-.05
51. Compositors, engravers, etc.	41	-27	14	.13	-.08	.04
52. Potters, kilnmen, etc.	-2	22	3	-.02	.25	.04
53. Millers, bakers, butchers	134	-169	166	.17	-.21	.21
54. Chemical, sugar workers, etc.	14	-33	13	.07	-.17	.07
55. Tobacco preparers, etc.	2	-5	3	.17	-.60	.30
56. Paper, rubber workers, etc.	-54	16	-62	-.18	.05	-.21
57. Packers, wrappers, etc.	-3	-12	1	-.04	-.15	.01
58. Equipment operators, etc.	-169	-146	39	-.22	-.19	.05
59. Storemen, freight handlers	-148	26	-81	-.14	.03	-.08
60. Labourers, n.e.c.	-334	-26	-166	-.15	-.01	-.07
61. Apprentices, factory workers, n.e.c.	-72	-46	-34	-.28	-.18	-.13
62-72. Other occupations	100	753	-102	.04	.31	-.04
Total	-1484	-2709	600			

(a) The projections for occupational employment were made for the 72 occupational groups given in ABS [1, p.20]. For purposes of presentation, the results for the 72 occupations are aggregated to the groups shown here. For example, the first group, white-collar occupations, consists of ABS occupation categories 1 - 20.

TABLE IV

Projected Effects on Occupational Employment for Females of Changes in International  
Commodity Prices, a Foreign Currency Discovery, and Reductions in Tariffs

Occupation (a)	Change in Number of Jobs			Percentage Change in Number of Jobs		
	Inter-national Prices	Foreign Currency Discovery	Reductions in Tariffs	Inter-national Prices	Foreign Currency Discovery	Reductions in Tariffs
1-20. White-collar occupations	749	4131	-189	.06	.31	-.01
21-26. Farmers, fishermen, hunters timbergetters	1040	-2359	1162	.75	-1.71	.84
27-29. Miners, quarrymen	-1	-2	1	-.21	-.67	.43
30-39. Workers in transport and communication	-22	83	-9	-.05	.19	-.02
30 & 31. Water transport workers	1	-1	1	1.09	-1.47	.81
32. Aircraft pilots, navigators, flight engineers	0	0	0	.03	.06	.10
33, 35 & 36. Mainly railway workers	-2	-3	1	-.28	-.38	.18
34. Drivers, road transport	2	-3	9	.03	-.04	.10
37 & 38. Telephone, telegraph and postal workers	-23	92	-22	-.07	.29	-.07
39. Workers in transport and communication, n.e.c.	-1	-2	2	-.04	-.13	.11
40-61. Tradesmen, production - process workers and labourers	-501	-287	-1423	-.21	-.12	-.60
40. Spinners, weavers, etc.	-39	-82	-329	-.25	-.40	-2.10
41. Tailors, cutters, etc.	-100	-31	-689	-.18	-.06	-1.24
42. Leather cutters, etc.	-16	-6	-85	-.22	-.09	-1.20
43. Furnacemen, rollers, etc.	-6	-5	0	-1.19	-1.06	.09
44. Watchmakers, jewellers, etc.	-2	3	-2	-.13	.19	-.11
45. Tool makers, machinists, etc.	-58	-13	-59	-.73	-.16	-.74
46. Electricians, etc.	-6	2	-1	-.41	.12	-.10
47. Metal workers, n.e.c.	-250	-39	-156	-.76	-.12	-.47
48. Carpenters, etc.	-3	8	-2	-.10	.30	-.06
49. Painters, decorators	-3	1	-4	-.29	.12	-.42
50. Bricklayers, plasterers	0	2	-0	.05	.32	-.06
51. Compositors, engravers, etc.	8	-5	0	.10	-.06	.01
52. Potters, kilnmen, etc.	-1	4	0	-.05	.23	.01
53. Millers, bakers, butchers	38	-100	56	.13	-.48	.27
54. Chemical, sugar workers, etc.	6	-4	-2	.13	-.09	-.03
55. Tobacco preparers, etc.	3	-11	5	.17	-.61	.28
56. Paper, rubber workers, etc.	-36	4	-36	-.20	.02	-.20
57. Packers, wrappers, etc.	16	-26	-5	.07	-.11	-.02
58. Equipment operators, etc.	-1	-1	0	-.32	-.25	.05
59. Storemen, freight handlers	-2	10	-8	-.04	.17	-.13
60. Labourers, n.e.c.	-40	-22	-66	-.24	-.13	-.39
61. Apprentices, factory workers, n.e.c.	-10	4	-39	-.10	.04	-.29
62-72. Other occupations	220	1144	-143	.07	.37	-.05
Total	1484	2709	-600			

(a) The projections for occupational employment were made for the 72 occupational groups given in ABS [1, p.20]. For purposes of presentation, the results for the 72 occupations are aggregated to the groups shown here. For example, the first group, white-collar occupations, consists of ABS occupation categories 1 - 20.



Prices columns of Tables III and IV show their largest positive entries for occupations 21-26 (Farmers, fishermen, etc.) and their largest negative entries for the equipment-related occupations, 43-47.

These changes in the occupational structure of employment explain the decline in the number of jobs for males relative to the number for females. (The relevant column sums in Tables III and IV are -1484 and +1484 respectively.) Although males are more heavily employed in farming than are females, they are much more heavily employed in equipment making.<sup>7</sup> The results for occupations 1-20 (white-collar occupations) also contribute to the projected decline in male relative to female employment. Whereas Table III shows a loss of 172 jobs for male white-collar workers, Table IV shows a gain of 749 jobs for female white-collar workers. This is because comparatively few female white-collar workers are in occupations used intensively in the contracting manufacturing industries; instead they tend to be located in the service-related occupations, e.g. teaching and nursing. Even within each individual white-collar occupation, the percentage of male members of the occupation in manufacturing generally exceeds the percentage of females. For instance, whereas 13 per cent of male architects, engineers and surveyors are employed in the equipment and metal product industries (17-20 in Table I), the figure for female architects, etc. is only four per cent.

For the foreign currency discovery, Tables III and IV again show an increase in employment opportunities for females relative to those for males. Because the foreign currency discovery increases

employment in the service sector while reducing employment in the export and import-competing industries, it increases opportunities in the white-collar occupations while reducing those in farming, fishing, mining and the various metal trades. This favours female employment relative to male employment. Male employment opportunities are also reduced by the effects of the foreign currency discovery on the road and rail transport industries. Road and rail services are used intensively by the traditional export activities, and the specialist occupations (e.g. truck driver, train driver) within the road and rail industries are male-dominated.

The last set of results in Tables III and IV, those for the tariff reductions, show a slight increase in male employment opportunities with a corresponding decrease in opportunities for females. Males gain because of their higher concentration in the export industries. They also benefit relative to females because of their lower concentration in the textile-related occupations (40-42). They lose, however, from the decline in opportunities in the transport equipment sector (industry 19 in Table I). This sector is a major employer of the male-dominated metal-working occupations, 45 and 47.

IV. THE EFFECTS OF THE THREE PRESSURES ON  
EMPLOYMENT BY BIRTHPLACE

The final set of calculations transforms the projections of employment by occupation (Tables III and IV) into projections of employment by birthplace (Tables V and VI). To calculate the percentage change in employment ( $e_{bs}$ ) for persons of birthplace  $b$  and sex  $s$ , it is assumed that

$$e_{bs} = \sum_{j=1}^{72} H_{sj}^b \ell_{sj}, \quad b=1, \dots, 11, \quad s=1, 2, \quad (2)$$

where  $H_{sj}^b$  is the share of the workers of sex  $s$  and birthplace  $b$  who belong to occupation  $j$ .<sup>8</sup> That is, the employment of Australian-born workers of sex  $s$ , occupation  $j$  is assumed to move with the overall percentage change ( $\ell_{sj}$ ) in the employment of this occupation-sex category. Similarly the percentage change in the employment of U.K.-born, German-born, etc. workers of sex  $s$ , occupation  $j$  is assumed to be  $\ell_{sj}$ . There are of course several well-known arguments why this assumption may not be the case. On the one hand, it is sometimes argued that employers (presumably, Australian-born) discriminate in favour of Australian-born workers at the expense of foreign-born workers, and that the latter group are the last to be hired and the first to be fired. On the other hand, it is also sometimes argued that foreign-born employees (particularly from non-English-speaking countries) work harder either because of more motivation or because of exploitation (possibly in the form of being paid less to do the same job) by employers. If this were the case then the expected

TABLE V

Projected Effects for Males on Employment by Place of Birth of Changes in International Commodity Prices, a Foreign Currency Discovery and Reductions in Tariffs

Place of Birth	Change in Number of Jobs			Percentage Change in Number of Jobs		
	Inter-national Prices	Foreign Currency Discovery	Reductions in Tariffs	Inter-national Prices	Foreign Currency Discovery	Reductions in Tariffs
1. Australia	-477	-2660	1102	-.02	-.10	.04
2. U.K., Eire	-367	74	-151	-.10	.02	-.04
3. Germany	-51	-0	-22	-.12	-.00	-.05
4. Greece	-63	-5	-55	-.11	-.01	-.09
5. Italy	-76	-104	-35	-.06	-.09	-.03
6. Malta	-36	-19	-17	-.14	-.08	-.07
7. Netherlands	-25	-1	-9	-.06	-.00	-.02
8. Poland	-40	-11	-23	-.16	-.04	-.09
9. Yugoslavia	-99	-44	-52	-.17	-.08	-.09
10. Other Europe	-97	-10	-47	-.12	-.01	-.06
11. Other countries	-152	73	-91	-.09	.05	-.06
Total	-1484	-2709	600			

TABLE VI

Projected Effects for Females on Employment by Place of Birth of Changes in International Commodity Prices, a Foreign Currency Discovery and Reductions in Tariffs

Place of Birth	Change in Number of Jobs			Percentage Change in Number of Jobs		
	Inter-national Prices	Foreign Currency Discovery	Reductions in Tariffs	Inter-national Prices	Foreign Currency Discovery	Reductions in Tariffs
1. Australia	1457	1955	150	.09	.13	.01
2. U.K., Eire	72	425	-113	.04	.22	-.06
3. Germany	5	45	-22	.02	.18	-.09
4. Greece	-28	13	-141	-.08	.04	-.39
5. Italy	6	-30	-141	.01	-.06	-.27
6. Malta	-2	4	-19	-.02	.04	-.19
7. Netherlands	12	25	-5	.07	.15	-.03
8. Poland	-3	18	-24	-.03	.17	-.22
9. Yugoslavia	-39	-2	-104	-.13	-.01	-.35
10. Other Europe	0	65	-61	.00	.17	-.16
11. Other countries	3	192	-121	.00	.20	-.13
Total	1484	2709	-600			

outcome would be that foreign-born workers would be the first to be hired and the last to be fired. On balance, it is clearly difficult to know where any net bias lies. Thus in the absence of systematic and detailed evidence, the neutral assumption is adopted.

The most striking aspect of the results in Tables V and VI is how small the numbers are. The largest percentage movement is -0.39 (Greek-born women in the tariff column of Table VI). Going back to Table I, projected movements of up to four per cent in employment by industry can be seen. In Tables III and IV, there are no projected changes in employment by occupation and sex of more than 2.43 per cent. In Tables V and VI, most of the projected changes in employment by birthplace are close to zero.

This dampening effect arises because the employment of workers in each occupation is spread across many industries and the employment of workers of each birthplace is spread across many occupations. In equations (1) and (2), it is assumed that the three pressures do not affect either the occupational composition of the workforce in each industry or the shares of employment in each occupation accounted for by members of each birthplace group. It follows that movements in employment by occupation will be less extreme than movements in employment by industry and that movements in employment by birthplace will be less extreme than movements in employment by occupation. To see this, note that in equation (1) each  $\frac{\ell}{s_j}$  is a weighted average of the  $\underline{x}_i$ ,  $i=1, \dots, 39$ . Consequently, none of the  $\frac{\ell}{s_j}$  can have an absolute value greater than  $|\underline{x}_m|$

where  $\underline{m}$  is the industry having the largest percentage movement in employment. Similarly, in equation (2), each of the  $\underline{e}_{bs}$  is a weighted average of the  $\underline{\ell}_{sj}$  for  $j=1, \dots, 72$ . Thus none of the  $\underline{e}_{bs}$  can have an absolute value greater than  $|\underline{\ell}_{st}|$  where  $\underline{t}$  is the occupation having the largest percentage movement in employment for sex  $\underline{s}$ .

The dampening effect is particularly pronounced in Table V. For the changes in international prices, only 0.15 separates the largest and smallest entries in the percentage change column. For the foreign currency discovery, the spread across the percentage change results is also 0.15 and for the tariff reductions it is 0.13. What small differences there are in the effects of the three pressures on employment of males in the different birthplace groups arise mainly because (a) there are higher percentages of Australian- and Italian-born males in the farming occupations than is the case with the other birthplace groups and (b) Australian-born male workers have the lowest percentage of their group in the equipment-related occupations, with the highest percentages being for male workers born in Yugoslavia, Germany, Malta and Poland.

In Table VI, the variations within the percentage-change columns are greater than those in Table V. The spreads are 0.22, 0.28 and 0.40. There are large variations across birthplace groups in the percentages of their female workers belonging to some of the occupations for which Table IV shows comparatively significant changes in the numbers of jobs. For example, only two per cent of Australian-born female workers are in the textile-related occupations, 40-42.

The percentages for Greek- , Italian- and Yugoslav-born female workers are 24, 21 and 15 respectively. This also explains the comparatively large negative results for the effects of tariff reductions on employment of females born in these latter three countries (see the final column of Table VI).



## V. CONCLUDING REMARKS

An interesting phenomenon highlighted in this paper is the dampening effect discussed in section IV. Only very major pressures on the industrial composition of GDP could possibly lead to significant changes in the relative employment opportunities for workers in different birthplace classifications. Certainly the calculations provided here would not support arguments that structural changes should be resisted on the basis of their effects on migrant groups.

It should be emphasized that the dampening effect depends on the constancy of (a) the occupational shares in each industry and (b) the birthplace shares in each occupation. These assumptions are probably reasonable for the three structural pressures analysed here. However, we can envisage structural pressures that would violate both (a) and (b). For example, technical changes such as the introduction of word processors could reduce the share of typists and stenographers in each industry's workforce. Assumption (b) would not be valid for an analysis of the effects of changes in the immigration programme.

Technical change and other pressures, which possibly impinge more directly on occupational structure than on industrial structure, could be studied using the IMPACT facilities. Such studies might reveal larger effects on employment by birthplace than those shown in Tables V and VI. For the pressures examined here, various extensions could be made; data are available in the

1976 Population Census for very detailed classifications of industries, occupations and birthplaces, and various other characteristics of the workforce.

Finally, it should be noted that the dampening effect on employment by birthplace would be less pronounced if the industry employment results in Table I were transformed directly into employment by birthplace. This calculation could be made with data on the birthplaces of employees in each industry and the assumption that if employment in an industry changed by x per cent then employment of Australian-born, U.K.-born, etc. employees in the industry would change by x per cent. While the required data are available in the 1976 census, the required assumption seems unsatisfactory. It implies that the employment prospects for U.K.-born Tool makers, say, are linked to the prospects for the particular industries in which U.K.-born Tool makers happened to be employed in 1976. The assumption used in this paper, on the other hand, links the employment prospects for U.K.-born Tool makers to the prospects for this occupational-group in general.

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## FOOTNOTES

- \* This paper is a revised version of [2] published by La Trobe University's Institute for Immigration and Ethnic Studies. We are grateful to the Institute for permission to draw freely on that earlier paper. We would also like to thank Tony Lawson for advice on data sources and Russell Rimmer for assistance with the computing.
1. The projections for the Crawford group used the model ORANI 77 (see [4]) and are described in [6]. The revised projections use a later version of ORANI (see [5]).
  2. If machinery prices were to rise by  $x$  per cent per annum, then the prices of animal products are assumed to rise by  $x + 5$  per cent per annum, i.e., the figures refer to relative rates of price increases. For the purposes here the rates of absolute price increase are unimportant.
  3. We assume that the international price changes are occurring for reasons other than technical change or that technology in the rest of the world is changing relative to that in Australia.
  4. Unfortunately, there were insufficient data available to IMPACT for an assessment of the effects of direct linkages between mining and the rest of the economy, (i.e., the linkages arising from the purchases of material and labour inputs by new mining enterprises were ignored). However, these direct linkages are probably a minor part of the way in which new mining activity affects the Australian economy. The judgment made by the IMPACT Project was that the effects via the balance of payments are of much greater significance.
  5. The ORANI industries on which tariff cuts are imposed in this simulation are man-made fibres (ORANI industry 33), cotton, silk and flax (34), wool and worsted yarns (35), textile finishing (36), textile floor covers (37), textile products, n.e.c. (38), knitting mills (39), clothing (40), footwear (41) and motor vehicles and parts (70). The 25 per cent reduction is calculated on the tariff rates existing in 1974. Since then the rates of protection in these industries have been escalated by the imposition of quotas.
  6. Further information on the data is given in Appendix A.

## Footnotes (continued)

7. Nine per cent of males are in farming compared with seven per cent of females. Seventeen per cent of males are in equipment making while the corresponding percentage for females is two.
8. The shares,  $\frac{H^b}{S_j}$ , are taken from the 1976 Population Census (see Appendix A).

## APPENDIX A

## THE DATA

The occupation by birthplace data

Published data from the 1976 census [1, pp.20-21] give a cross-classification for both males and females of 73 occupations by 11 places of birth. The occupational shares for males and females in each birthplace category,  $\underline{H}_{sj}^b$ , have been calculated from

$$\underline{H}_{sj}^b = \frac{\underline{N}_{sj}^b}{\left( \sum_{k=1}^{72} \underline{N}_{sk}^b \right)}, \quad \underline{s}=1 \text{ (males), } 2 \text{ (females),}$$

$$\underline{b}=1, \dots, 11, \text{ and } \underline{j}=1, \dots, 72,$$

where  $\underline{N}_{sj}^b$  is the number of persons of sex  $\underline{s}$  born in country  $\underline{b}$  that are in occupation  $\underline{j}$ . "Occupation" 73, i.e. the group "inadequately described or not specified", has been omitted from the share calculations. This involves the assumption that the occupational shares for individuals in group 73 are the same as the shares for individuals of the same sex and birthplace that have adequately reported or described their occupation. Because of the relatively small numbers of individuals in group 73, this assumption is probably inconsequential. The total number of males and females in each occupation ( $\underline{L}_{sj}, \underline{j}=1, \dots, 72$ ) have been adjusted to include the individuals in group 73 as follows :

$$\underline{L}_{sj} = \sum_{\underline{b}=1}^{11} \underline{H}_{sj}^b \underline{E}_{bs}, \quad \underline{s}=1, 2, \quad \underline{j}=1, \dots, 72,$$

where  $\underline{E}_{bs}$  is the total number of workers of sex  $\underline{s}$  born in country  $\underline{b}$ , i.e.

$$\underline{E}_{bs} = \sum_{j=1}^{73} \underline{N}_{sj}^b, \quad \underline{s}=1,2, \quad \underline{b}=1,\dots,11.$$

#### The occupation by industry data

Published data from the 1976 census [1, pp.33-34] give a cross-classification for both males and females of 73 occupations by 13 major industries. Because of our need for a more detailed industrial classification, an unpublished disaggregated version of this data with 59 industries was obtained from the ABS computer tapes. These data were then aggregated to tables distinguishing 72 occupations and the 39 industries listed in Table I. In performing this aggregation, we omitted individuals who did not adequately describe their industry of employment. The assumption is that individuals who do not adequately describe their industry are distributed across industries in proportion to those individuals of the same sex who do adequately describe their industry. Again, any errors introduced by the assumption are probably very small because of the small numbers involved.

The male and female occupation shares by industry,  $\underline{S}_{sj}^i$ , have been calculated as

$$\underline{S}_{sj}^i = \frac{\underline{M}_{sj}^i}{\sum_{k=1}^{39} \underline{M}_{sj}^k}, \quad \underline{s}=1,2, \quad \underline{i}=1,\dots,39, \quad \underline{j}=1,\dots,72,$$

where  $\underline{M}_{sj}^i$  is the known number of persons of sex  $\underline{s}$  working in

industry  $\underline{i}$  and occupation  $\underline{j}$ . The employment levels for persons in each industry,  $\underline{X}_i$ , are then calculated by -

$$\underline{X}_i = \sum_{\underline{s}=1}^2 \sum_{\underline{j}=1}^{72} \frac{S_{\underline{s}}^i}{S_{\underline{s}}} L_{\underline{s}\underline{j}} \quad , \quad \underline{i}=1, \dots, 39.$$



## APPENDIX B

THE STRUCTURAL EMPLOYMENT EFFECTS OF A FOREIGN CURRENCY  
DISCOVERY WITH ALTERNATIVE MACROECONOMIC RESPONSES

A key assumption in the simulations discussed in the main text is that aggregate employment is unaffected by the three structural pressures. In this appendix, we give simulation results for one of the pressures (the foreign currency discovery) under two alternative assumptions regarding aggregate employment. The first is that the structural change takes place with real absorption, rather than aggregate employment, constant. The second is that the structural change takes place with real wages, rather than aggregate employment, constant.

Results for some macroeconomic variables computed under these two assumptions are in Table A1. For comparison, the table also includes, in column 3, results from the simulation described in the main text.

With assumption 1, the economy adjusts to the external surplus generated from further exploitation of mineral resources by a reduction in output. ORANI suggests that aggregate employment would fall by 0.7 per cent (approximately 40,000 jobs). The mechanism producing this result would involve increases in the prices of non-traded goods relative to the prices of traded goods, reducing the competitiveness of industries producing traded goods.

With assumption 2, real wages are assumed to be constant and aggregate real absorption and employment are allowed to adjust.

TABLE A1

Projected Effects of a Foreign Currency Discovery on Some  
Key Aggregate Variables with Alternative Macroeconomic Assumptions

Variable	Percentage Change		
	Assumption 1 (real absorption constant)	Assumption 2 (real wages constant)	Assumption 3 (aggregate employment constant)
Real wages	1.0	0.0 <sup>(a)</sup>	0.2
Real absorption	0.0 <sup>(a)</sup>	0.5	0.4
Employment	-0.7	0.3	0.0 <sup>(a)</sup>

(a) Assumed not to change.

Although the increased availability of foreign exchange again reduces the competitiveness of the export and import-competing industries, there are in this case two effects that tend to offset the decline. First, the increased foreign exchange allows an expansion in domestic absorption which in turn leads to some expansion in production, particularly in the import-competing and non-traded industries. Second, with real wages constant, production costs are restrained so that the decline in international competitiveness (particularly in the export sectors) is lessened. On balance, the net effect on aggregate employment projected by ORANI is an increase of 0.3 per cent or approximately 16,000 jobs.

TABLE A2

Projected Effects of a Foreign Currency Discovery on Employment of Males  
by Birthplace with Alternative Macroeconomic Assumptions

Place of Birth	Change in Number of Jobs		Percentage Change in Number of Jobs	
	Assumption 1 (real absorption constant)	Assumption 2 (real wages constant)	Assumption 1 (real absorption constant)	Assumption 2 (real wages constant)
1. Australia	-21691	4587	-.80	.17
2. U.K., Eire	-2527	1083	-.67	.29
3. Germany	-302	111	-.69	.25
4. Greece	-416	131	-.69	.22
5. Italy	-930	165	-.77	.14
6. Malta	-191	40	-.77	.16
7. Netherlands	-287	104	-.69	.25
8. Poland	-183	49	-.74	.20
9. Yugoslavia	-445	89	-.76	.15
10. Other Europe	-579	194	-.71	.24
11. Other countries	-1036	518	-.65	.32
Total	-28585	7071		

TABLE A3

Projected Effects of a Foreign Currency Discovery on Employment of Females  
by Birthplace with Alternative Macroeconomic Assumptions

Place of Birth	Change in Number of Jobs		Percentage Change in Number of Jobs	
	Assumption 1	Assumption 2	Assumption 1	Assumption 2
	(real absorption constant)	(real wages constant)	(real absorption constant)	(real wages constant)
1. Australia	-9069	6693	-.58	.43
2. U.K., Eire	-943	1018	-.48	.52
3. Germany	-125	116	-.51	.48
4. Greece	-217	92	-.61	.26
5. Italy	-376	94	-.72	.18
6. Malta	-61	30	-.64	.31
7. Netherlands	-93	74	-.55	.44
8. Poland	-56	47	-.52	.44
9. Yugoslavia	-204	70	-.68	.23
10. Other Europe	-200	176	-.52	.45
11. Other countries	-469	488	-.49	.50
Total	-11812	8898		

The employment by birthplace results under assumptions 1 and 2 are in Tables A2 and A3. As can be seen, the differences across birthplace groups in the percentage changes are again very small. For males, the differences between the largest and smallest figures in the two columns are 0.15 and 0.18. The corresponding differences for females are slightly larger (0.24 and 0.34).

In summary, the results in this appendix indicate that the projected macroeconomic effects of increased foreign exchange earnings depend crucially on the assumed macroeconomic environment. On the other hand, projections for the relative employment prospects for different birthplace and sex groups do not depend crucially on the macroeconomic assumptions.