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

THE IMPACT PROJECT AS A TOOL FOR POLICY ANALYSIS : BRIEF OVERVIEW

by

Alan A. Powell

and

Brian R. Parmenter

Industries Assistance Commission

Preliminary Working Paper No. IP-04 Melbourne May 1978

Reprinted October 1979 and April 1981

The views expressed in this paper do not necessarily reflect the opinions of the participating agencies, nor of the Commonwealth Government.

IMPACT PROJECT RESEARCH CENTRE 153 Barry Street, Carlton 3053

Postal Address: Impact Centre, University of Melbourne, Parkville, Vic. 3052 Australia

Phones: (03) 345 1844 extensions 7417 & 7418
After hours (03) 341 7417 or 341 7418

Contents

Queensland and South Australia where employment demand is projected to contract by about two percent.[1]

4. Concluding Remarks

The IMPACT project encompasses investments in data and computer systems, human expertise, and economy-wide policy-oriented models. The models are best regarded as a way of organizing one's thinking about a policy problem : they are not designed to, nor are they capable of, replacing policy analysts.

The use of the IMPACT models, however, does place a healthy discipline on policy analysis. This is because (i) inference is based on data whose conceptual bases are mutually compatible; (ii) assumptions made about some part of the economy have to be compatible with whatever view is taken of the economy at large ; and (iii) the accounting disciplines imposed (particularly in the ORANI model) ensure that any set of projections contains no internal contradictions. The models also offer better scope for the transmission of information than would be possible in a less highly structured policy information system. Finally, they offer a systematic framework for accumulation of knowledge through experience.

1. Because in these projections (unlike those of Section 3.1) farm labour is defined inclusive of owner-operator, the effects on demand for hired labour are likely to be even larger than those shown in Tables 3 and 4.

THE *IMPACT* PROJECT AS A TOOL FOR POLICY ANALYSIS : BRIEF OVERVIEW*

by

Alan A. Powell

and

Brian R. Parmenter**

1. Background

The purpose and history of the project are described in some detail in Volume 1 of its First Progress Report.[1] Here we will try to be brief.

The project grew out of initiatives taken during 1975. For a number of years the Tariff Board and its successor, the Industries Assistance Commission (IAC) had been acutely aware of the conflicts that could arise in the piecemeal approach to policy which had prevailed in Australia for so long. Even within the narrow field of its own primary responsibility (namely, protection policy), the Commission was concerned about the inconsistencies that could develop under an approach which treated each industry (or worse still, each commodity) as a one-off exercise. At the simplest level, one industry's protection contributes to the costs confronting users of the product produced by that industry, including other industries. A recommendation made in June on the level of protection appropriate for industry A could be rendered meaningless by decisions taken in July and September on the levels of protection afforded to industries B and C.

* Based on an address by Powell to the South Australian Branch of the Australian Agricultural Economics Society, Adelaide, 20th April, 1978.

** Without implicating him in remaining errors, we would like to thank our colleague Peter B. Dixon for helpful comments.

1. Alan A. Powell, The IMPACT Project : An Overview, March, 1977 - - First Progress Report of the IMPACT Project, Vol. 1 (Melbourne : Industries Assistance Commission, March, 1977).

The policy co-ordination problem, however, is not confined to tariff making. Even before the current recession began to loom so large in policy discussions, there had been an awareness of the need to foresee (and where necessary, to make provision to ameliorate) the effects on employment demand of decisions taken in the field of protection. Given several years of awareness of the potential for developing structural unemployment, interest was not confined merely to the numbers of persons involved, but extended also to their occupational composition and geographic location. It was natural, therefore, that the Department of Labor and Immigration (succeeded later by the Department of Employment and Industrial Relations (DEIR)) should accept the IAC's invitation to join a project directed toward securing co-ordination of policies in these, and other areas. It did so in 1975, followed by the Australian Bureau of Statisitics (ABS), the Department of Manufacturing Industry (succeeded by the Department of Industry and Commerce (DIC), now represented in the project by the Bureau of Industry Economics) and finally by the Department of Environment, Housing and Community Development. Two associate members joined the project on a non-participating basis, the Department of Immigration and Ethnic Affairs and the Department of Overseas Trade.

The project was not to cut across the individual policy-advising roles of the agencies, nor to compromise their independence. In fact, the project itself would not generate advice directly, nor have any direct access to executive government. Its aim would be to improve the capacity of each of the agencies to make well informed, but independent, recommendations to the government. It was to do this principally in the following three ways :

1. By gathering together an integrated body of factual data based on mutually compatible concepts. This body of data would be

up to twice as large if a strong regional link between wages and consumption is assumed. For the remainder of the discussion we focus on Table 3.

Viewed at the national level, the most obvious features of the results are the magnitude and direction of the projected changes in employment demand. Given the assumption of fixed domestic absorption, the 25% increase across-the-board in tariffs is projected to lead to a decline in employment demand. This is contrary to the popular widsom on the subject. The smallness of this effect (0.12%) will come as no surprise to those who have studied the relative impacts of exchange rate and tariff changes in the early seventies, among whom there is unanimous agreement that exchange rate movements dominated tariff changes (by several orders of magnitude) in that period.

One state, Victoria, actually gains additional employment demand (+ 0.2%). Another two states which actually lose, do so by percentage margins which are lower than the national average. These are South Australia (- 0.05%) and New South Wales (- 0.08%). This unevenness in the distribution of the benefits of increased protection is highlighted by the cases of Western Australia and Queensland, who suffer losses in employment demand of 0.60% and 0.54% respectively. The reason for these results lies principally in the relatively high concentration of highly protected labour intensive industries in Victoria, and the relative importance of export-oriented rural and mining industries in the economies of Western Australia & Queensland. The principal beneficiaries of increased employment demand resulting from increased tariffs are skilled blue collar metal and electrical workers resident in Victoria, for whom employment demand is projected to rise more than one half of one per cent. In similar terms the biggest losers are rural workers in Western Australia,

Table 4 : PERCENTAGE VARIATIONS IN LABOUR DEMAND DUE TO AN ACROSS-THE-BOARD TARIFF INCREASE OF 25%, BY REGION AND OCCUPATION (Strong link between Regional Variations in Labour Income and Consumption assumed)

Occupation	Region						Australia
	NSW & ACT	Victoria	Queensland	South Australia & NT	Western Australia	Tasmania	
Professional	- .0073	..3113	- .5699	.0133	- .5121	- .1988	- .0740
Skilled White Collar	.0808	.5049	- .6591	.1475	- .6393	- .2247	.0049
Unskilled White Collar	.0555	.4737	- .6906	.1139	- .6806	- .2412	- .0499
Skilled Blue Collar (Metal & Electrical)	.1094	.8078	- .6872	.5173	- .7832	- .4279	.1639
Skilled Blue Collar (Building)	.1685	.6626	- .6974	.2657	- .6988	- .0927	.0923
Skilled Blue Collar (Other)	.0957	.3737	- 1.0060	- .0711	- .9426	.0594	- .0492
Unskilled Blue Collar	.0170	.5508	- .8330	.1927	- .7984	- .2341	.0012
Rural	- 1.7630	- 1.5957	- 1.8862	- 1.9164	- 2.2216	- 1.5721	- 1.8211
Real Wage Bill	- .0512	.4025	-..8593	.0073	- .8874	- .3591	- .1309

sufficiently extensive to cover the areas of interest of the agencies (which include, among others, protection, industry structure, international trade, population and the workforce).

2. By building a series of economy-wide analytical models which, separately or together, would encompass the policy interests of the several agencies.

3. By providing in-house training to members of the public service staff of the agencies, to enable them to make use of the models and to contribute to their further development.

It is thus clear that the IMPACT project is a capital-goods producing enterprise. Its final product is embodied in the form of data banks, economic models, computer systems to manipulate them both, and last, but perhaps most important of all, in human expertise.

The inclusion of the ABS was a sine qua non for the formation of the project. Quite apart from anything that might be achieved in the field of analysis, it was realized that securing agreement among the agencies on common data concepts (and on the mobilization of a common data base to service their needs) would not only make better use of the ABS's resources, but would make it possible for the agencies to base their individual recommendations to the government on a compatible set of concepts embodied in a data base mutually regarded as being relevant. This could be expected to reduce the areas of disagreement among the agencies to matters of substance.

2. The Models

The one field of applied economics in which Australia has been well served now for several years is macroeconometrics. Intensive research efforts have been mounted over the years, especially by the Reserve Bank of Australia (RBA) and the ABS-Treasury joint working group on the National Income Forecasting (NIF) model. The IMPACT agencies, whilst required to harmonize their recommendations with the general macroeconomic climate, do not have responsibility in the monetary, fiscal, or demand management areas; rather their concerns are with various aspects of the structure of the economy, embracing such matters as its industrial and workforce composition, and patterns of imports and exports. Macroeconomic variables would be important to the agencies, however, because of their interactions with the structural variables. Because of the wealth of experience already available in Australia in macroeconometrics, it was decided at the outset to mount only a modest effort in this area. The development by Peter Jonson and associates at RBA of a small macroeconometric model nicely coincided with our needs.[1] The model had 22 equations, divided equally between the explanation of 11 real variables on the one hand, and 11 monetary and financial variables on the other. Apart from its small size, which suited us for technical reasons, features of the design of the RBA's minimal macro model meant that it could be converted relatively easily from a quarterly to an annual basis.[2] Our MACRO model, therefore, is based heavily on the RBA work.

1. For a very detailed description and scrutiny of this model see Reserve Bank of Australia, Conference in Applied Economic Research : Papers and Proceedings, December, 1977.

2. B. R. Bacon and H. N. Johnston, "A Macro Module for the IMPACT Model," Impact of Demographic Change on Industry Structure in Australia, Preliminary Working Paper No. MP-01, Industries Assistance Commission, Melbourne, December 1976 (mimeo), pp. 61.

Table 3 : PERCENTAGE VARIATIONS IN LABOUR DEMAND DUE TO AN ACROSS-THE-BOARD TARIFF INCREASE OF 25%, BY REGION AND OCCUPATION (Weak link between Regional Variations in Labour Income and Consumption assumed)

Occupation	Region							Australia
	NSW & ACT	Victoria	Queensland	South Australia & NT	Western Australia	Tasmania		
Professional	-.0370	.1103	- .3053	- .0346	- .3039	- .1293		-.0740
Skilled White Collar	.0417	.2540	- .2763	.0814	- .3012	- .1167		.0049
Unskilled White Collar	.0121	.1902	- .2462	.0399	- .2831	- .1180		- .0499
Skilled Blue Collar (Metal & Electrical)	.0815	.6378	- .3942	.4730	- .5111	- .3315		.1639
Skilled Blue Collar (Building)	.1174	.3332	- .2042	.1847	- .2574	.0382		.0923
Skilled Blue Collar (Other)	.0605	.1950	- .6483	- .1406	- .5707	.1738		- .0492
Unskilled Blue Collar	- .0078	.4002	- .5737	.1508	- .5695	- .1643		.0012
Rural	- 1.7704	- 1.6427	- 1.8492	- 1.9249	- 2.1861	- 1.5584		- 1.8211
Real Wage Bill	- .0832	.1991	- .5440	- .0458	- .5996	- .2681		- .1309

The mechanism used to project changes in employment demands is via their connection with industry outputs. Outputs in the 109 input-output industries are first projected at the national level. For the 81 industries which are not local in character, the percentage changes in output are projected to be the same in each state as for the national total -- that is, each state's share of total output is constant. The activity levels of local industries are then projected in such a way as to be consistent both with their projected national total and with their local character. To project outputs at the national level it is first of all necessary, as in the case of the mining boom, to set the macroeconomic scene as the basis for the industry projections. As previously, we assume a slack labour market and that real wages are fixed : employment is thus demand determined at the given wage rates. Unlike previously, however, absorption is assumed fixed (i.e., real aggregate investment, consumption and government spending are assumed not to change as a result of the rise in tariffs).

Under the above macroeconomic conditions a 25% across-the-board rise in tariffs is projected to lead, about one to two years later, to the percentage changes in employment demand shown in Tables 3 and 4. The difference between the two tables reflects one's assumptions about the strength of the link between local (i.e., state) income and local consumption. If the link is very strong, so that variations in percentage changes in local labour income above or below the national average affect the shares of the states in the growth of consumption of goods and services, the results obtained are those of Table 4; if the link is totally absent, the relevant projections are those of Table 3. For short run analysis, in which deficiencies in local incomes can be moderated by liquidating savings and by access to social security payments, Table 3 is probably the more appropriate guide.

In qualitative terms, there is not a great deal to choose between Tables 3 and 4. The larger overall magnitudes in the last row of Table 4 demonstrate that effects on total employment demand within regions are anything

The second model of the IMPACT framework, and the largest, is ORANI, which disaggregates the big economic aggregates of the economy (real consumption, real investment, real government spending) into 109 input-output categories. It also deals with relative prices of commodities, imports and exports, and occupationally disaggregated employment demand. ORANI can be used in short run mode, in which case it disaggregates activity variables (projected either by MACRO, or exogenously)[1] or in long term mode.[2] Several papers illustrating the use of ORANI as a stand-alone model have been produced by the IMPACT team;[3] some of these results are mentioned below. The ORANI model has several novel features, perhaps the most outstanding of which is its flexibility from a policy user's viewpoint. In technical language, this flexibility is reflected in the user's ability to make almost any (logically valid) classification of the many hundreds of variables in the model into endogenous and exogenous sets. This would make it possible, for instance, for the IAC to treat some proposed

---

1. The activity-variables real aggregate consumption, investment and government spending are usually taken as given in short run ORANI applications; however, this is not mandatory. In the mining boom simulations reported below, consumption investment and government spending respond endogenously within ORANI. This is an example of the model's flexibility (discussed briefly below).

2. Peter B. Dixon, John D. Harrower and Alan A. Powell, "Long Term Structural Pressures on Industries and the Labour Market," Australian Bulletin of Labour, Vol. 5, June, 1977, pp. 5-44.

3. Alan A. Powell, The IMPACT Project ..., op. cit., Chapter 4.

   Peter B. Dixon, B. R. Parmenter, G. J. Ryland and John Sutton, ORANI, A General Equilibrium Model of the Australian Economy : Current Specification and Illustrations of Use for Policy Analysis -- First Progress Report of the IMPACT Project, Vol. 2 (Melbourne : Industries Assistance Commission, March, 1977, Chapter 4).

   Dixon, Harrower and Powell, op. cit..

   Peter B. Dixon, B. R. Parmenter and John Sutton, "Some Causes of Structural Maladjustment in the Australian Economy," Economic Papers, No. 57, January, 1978, pp. 10-25.

   Peter B. Dixon, B. R. Parmenter and John Sutton, "Industry Implications of International Trade Policy : Experiments with the ORANI Model," paper presented at the 48th Congress of the Australian and New Zealand Association for the Advancement of Science, Melbourne, August, 1978.

   Peter B. Dixon, B. R. Parmenter and John Sutton, "Spatial Disaggregation of ORANI Results : A Regional Balance Method," Impact of Demographic Change on Industry Structure in Australia, Preliminary Working Paper No. OP-19, Indusries Assistance Commission, Melbourne, February, 1978.

set of tariffs as exogenous and to project the resultant effects on the outputs of industries; the DIC, on the other hand, might wish to treat some of these outputs as fixed (i.e., exogenous), and solve for the tariffs and/or subsidies which would be necessary to maintain these activity levels. To take a further example, the balance of trade might be treated exogenously, and the exchange rate allowed to adjust, or vice-versa, depending on whether the regime being simulated is one of fixed or of floating exchange rates.

Apart from the option of using ORANI in long-term mode, IMPACT has another long term model, SNAPSHOT,[1] which has been validated over the interval 1962-63 to 1971-72.[2] SNAPSHOT focusses on the effects on the structure of the economy of long term shifts in demography (e.g., as projected in the Borrie Report[3]), in trading patterns (as encapsulated in projected relative prices for commodities on world markets), and in technology.[4]

ORANI, like SNAPSHOT, can be used to project labour demands provided relative wages are specified exogenously. Neither model endogenizes labour supply, which is handled in an economic-demographic labour-force oriented model

1. Peter B. Dixon, John Harrower and Alan A. Powell, "SNAPSHOT, A Long Term Economy-Wide Model of Australia : Preliminary Outline," Impact of Demographic Change on Industry Structure in Australia, Preliminary Working Paper No. SP-01, Industries Assistance Commission, Melbourne, February, 1976.
2. Peter B. Dixon, John D. Harrower and David P. Vincent, "Validation of the Economics of the SNAPSHOT Model," Impact of Demographic Change on Industry Structure in Australia, Industries Assistance Commission, Melbourne (forthcoming).
3. Australian Government, National Population Inquiry (W. D. Borrie, Chairman), Population and Australia - A Demographic Analysis and Projection (Canberra : Australian Government Publishing Service, 1975), Vols. 1 and 2, pp. xxxiv and 760.
4. The Bureau of Industry Economics, an IMPACT participant on behalf of the Department of Industry and Commerce, has prepared scenarios on foreseeable technological developments in several industries over the next decade. These will be published in due course.

projections by states have thus been made of activity levels, employment demand, and a number of other variables of interest.[1] The 28 industries which are 'local' according to our definition are mainly in the service sector, although some others (such as Ready-mixed concrete and Residential building) are involved - - see Table 2.

Table 2 : LIST OF 'LOCAL' INDUSTRIES USED FOR REGIONAL SIMULATIONS

Abbreviated Input-Output Nomenclature for Industries	
Services to agriculture	Communication
Bread, cakes	Banking
Soft drinks, cordials	Finance & life insurance
Beer & malt	Other insurance
Ready-mixed concrete	Investment, real estate
Electricity	Other business services
Gas	Ownership of dwellings
Water, sewage	Health
Residential building	Education, libraries
Building, n.e.c.	Welfare services
Wholesale trade	Entertainment
Retail trade	Restaurants, hotels
Motor vehicle repair	Personal services
Other repairs	Business expenses

1. Dixon, Parmenter and Sutton, "Spatial Disaggregation ....," op. cit.. The results reported in this section are based on this paper.

land than the other land using industries. Given that the simulations assume total agricultural land is fixed, the model attempts to reallocate land among industries in such a way as to make the return to land the same in each industry. This is a result which we don't believe to be plausible in the context of Australian rural technology, and is one factor which led us to revise the model to make agricultural land rather more industry specific.[1] The common value in column (3) of the projected decline in the implicit rental on land is, as explained above, an artifact of the model's recognition of only a single type of land. In the version of ORANI currently under construction, variations would occur in column (3). We would not expect these refinements, however, to lead to any major variation in the picture obtained of the impact of the mining boom on farm incomes.

3.2 Regional Employment Effects of a 25% Increase in Tariffs

The ORANI model has been used to simulate across-the-board changes in tariffs.[2] Recognizing the idea that some industries are local in character - - that is, supplies of and demands for their outputs must more or less balance within state borders - - the national results from the ORANI simulations have been disaggregated to the state level. Separate

1. Under the revised specification, agricultural industries are multi-product in character. They determine their mix of products according to relative product prices. Land is assumed to be industry - - but not product - - specific. Technical details of the agricultural technologies underlying the 1978 version of ORANI are given in Peter B. Dixon, David P. Vincent and Alan A. Powell, "Factor Demand and Product Supply Relations in Australian Agriculture : the CRESH/CRETH Production System," Impact of Demographic Change on Industry Structure in Australia, Preliminary Working Paper No. OP-08, Industries Assistance Commission, Melbourne, November, 1976; and David P. Vincent, Peter B. Dixon and Alan A. Powell, "Estimates of the CRETH Supply System in Australian Agriculture," Impact of Demographic Change on Industry Structure in Australia, Preliminary Working Paper No. OP-17, Industries Assistance Commission, Melbourne, October, 1977.

2. See results reported in Powell, op. cit., Ch. 4 ; Dixon, Parmenter, Ryland and Sutton, op. cit., Ch. 4 ; and Dixon, Parmenter and Sutton, "Industry Implications ...," op. cit..

called BACHUROO.[1] Because of staffing difficulties and severe problems in mobilizing a suitable data base - - disaggregated labour force statistics of all kinds are woefully scarce in Australia - - this model's development is lagging somewhat behind the other three, all of which have working prototypes (and two of which, MACRO and ORANI, are well into the second round of development). Nevertheless, the demographic core of BACHUROO is well advanced - - the facility to project population, family formation and female workforce participation already exists.[2]

The three modules MACRO, ORANI and BACHUROO, when linked will form IMPACT's annual medium term model. Work has started on the MACRO-ORANI interface; not a great deal can be done on the interfaces with BACHUROO until the development of that model is further advanced. The way in which the three modules of the medium term model will interact in the medium term model is indicated in Figure 1 (albeit in a heavily simplified form).

1. Ashok Tulpulé and Malcolm McIntosh, "BACHUROO - An Economic-Demographic Module for Australia," Impact of Demographic Change on Industry Structure in Australia, Working Paper No. B-02, Industries Assistance Commission, Melbourne, May, 1976.

2. R. Filmer and R. Silberberg, "Family Formation and Female Workforce Participation in Australia, 1922-1974," Impact of Demographic Change on Industry Structure in Australia, Preliminary Working Paper No. BP-08, Industries Assistance Commission, Melbourne, December, 1977.

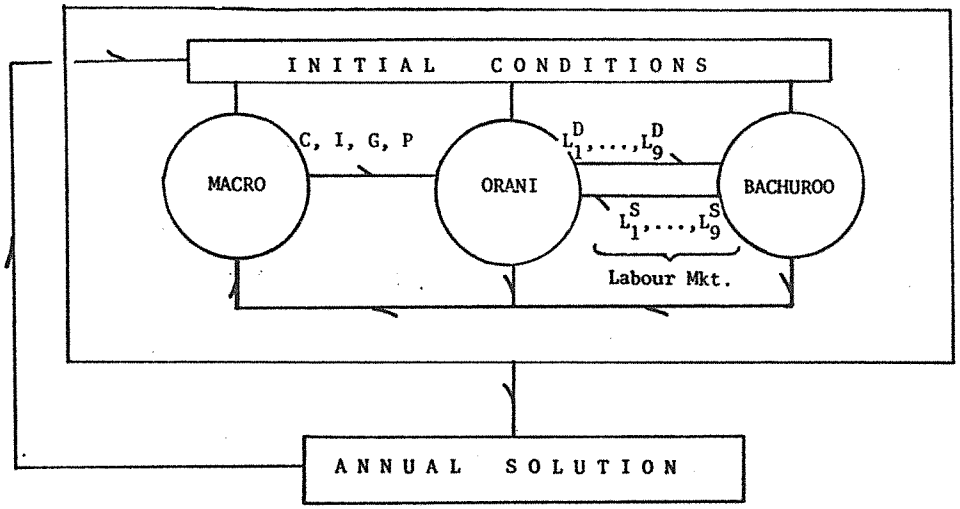

Figure 1

SIMPLIFIED DIAGRAM OF MEDIUM TERM MODEL. The levels of real consumption C , real investment I , real government spending G , and the general price level P , may be thought of as originating in MACRO. ORANI disaggregates these into 109 input-output industries and determines relative prices of commodities, imports and exports by I-O industry, and (if wage relativities are given), labour demands by nine occupations. BACHUROO determines the supplies of labour by occupation. Excess demand for or supply of labour can feed back into the macroeconomic environment. Interactively the three models will, given a set of initial conditions, produce an annual solution which then determines a new set of initial conditions for a second annual solution; and so on.

on the return to existing capital in the Poultry industry, due to increased domestic demand. The mixed Other farming group records a drop of about 10% in the implicit rental value of its non-land capital.

Real farm income is defined, for the purposes of these projections, as value added less payments tc hired labour. The first four industries register falls between 13 to 16 per cent; Poultry gains slightly (3%) whilst real Other farming income falls 10½ per cent. These effects are substantial, particularly if viewed against the 3% increase in economy-wide income projected to result from the additional exports.

Besides pointing to some potential pitfalls in interpretation, some further comments on these results may give a feeling for the on-going nature of model refinement. The first remark concerns the industry classification. Due to the overwhelming predominance of multi-product enterprise in Australian agriculture, an industry classification based on commodities is not well suited to any economic analysis in which it is important to capture the underlying production processes. For this reason a revised form of input-output accounting, based on industry definitions compatible with the Bureau of Agricultural Economics' zonal classification used in its Australian Sheep Industry Survey, is being introduced into ORANI. Thus in the new version of ORANI several types of agricultural land will be distinguished (whereas in the present simulations only one type is recognized). This explains the (admittedly small) movements in usage of land in column (5) of Table 1.[1] Milk cattle & pigs and Other farming would (according to the model) be relatively better placed to pay the (now lower) implicit rental on

1. An appropriately weighted average (where the weights are the shares of the industries in total agricultural land) of the figures in column (5) would be zero.

The results indicate, for example, that, as a result of the mining boom, real output in all six rural industries other than Poultry could be expected to decline by amounts up to about two per cent. The largest decline is projected to occur in Meat cattle. Real output in the Other farming group is hardly affected, whilst a rise of a third of one per cent is projected for the real output of the Poultry industry. The basic reason for these latter two results is the same : the projected increase in total real consumption (2.98%) stimulates Australian demand for poultry and for the domestic-market-oriented component of the products of Other farming (mainly fruit and vegetables).

The percentage reductions in employment demand for the predominantly export oriented industries (Nos. 1 through 4) are of the same order of magnitude : 6½ to 8½% . (Notice, however, that the relative importance of hired labour as a factor varies considerably among the industries - - see column (7).) A significant gain in hired employment (1.7%) is projected in the Poultry industry, whilst the mixed domestic/export oriented Other farming group, as before, occupies an intermediate position, suffering a decline in employment demand of about 5%.

In discussing the projected effects of the mining boom on returns to land and other fixed assets, it should be kept in mind that the return to the owner-operator's labour is not separately allowed for elsewhere. Rates of return on existing farm assets are driven down by the cost-price squeeze induced by the additional minerals export income.[1] In the first four industries the implicit rental values of farm assets (excluding land) are driven down by percentages varying between 13 and 17. There is a slight improvement (about 3%)[2]

1. If the exchange rate is fixed, so that producers' prices for farm products are virtually fixed in domestic currency, then farmers are squeezed by the inflation in money labour costs necessary to maintain real wages in the face of increasing commodity prices. If, on the other hand, the exchange rate appreciates sufficiently to avoid pressure on the domestic cost of living, then farm labour costs remain constant, but producers' prices of farm products fall in domestic currency.

2. Not three percentage points.

3. Illustrative Applications

Having attempted to describe (however briefly) what IMPACT is, I will now turn to some examples of its use. The illustrative nature of the role of these examples is to be taken literally - - the project staff have no brief to give policy advice at any official level. It is of course necessary and desirable, however, that the models and their uses and limitations be widely understood and open to full public scrutiny. To this end technical papers describing the design of the models in detail are given wide circulation in Australia and overseas. The feedback generated is IMPACT's insurance against overlooking potential improvements in research strategy which are feasible in terms of data, manpower and computing constraints.

3.1 The Effects of the Mining Boom on Farm Incomes[1]

The simulation reported here is based on the idea (first highlighted by Gregory[2]) that the direct effects of new mining activity on employment and other sorts of demand have overall an impact on the total economy which is small by comparison with the effects of the additional foreign exchange earned. Over the early seventies the latter certainly was large enough to make a significant impact on the exchange rate and/or the domestic rate of inflation.

By contrast with Gregory's analysis, however, the present simulation allows an increase in domestic absorption (i.e., consumption plus investment plus government spending) to be generated by the mining boom.

1. Based on B. R. Parmenter, "The Effects of the Mining Boom on Farm Incomes," Impact of Demographic Change on Industry Structure in Australia, Research Memorandum (ORANI Module), Industries Assistance Commission, Melbourne, September, 1977, pp. 9 (mimeo); and Peter B. Dixon, B. R. Parmenter and John Sutton, "Some Causes of Structural Maladjustment ...," op. cit..

2. R. G. Gregory, "Some Implications of Growth in the Mining Sector," Australian Journal of Agricultural Economics, Vol. 20, No. 2, August, 1976.

To be fully specific, the projections reported below are based on the assumption that the additional mineral exports add 15% to annual export receipts (measured in foreign currency at the base period exchange rate). It is further assumed that this new export income induces domestic inflation and/or exchange rate appreciations which are sufficient to return the balance of trade to its initial position; this means that the additional foreign currency is absorbed by reductions in traditional exports (including pre-mining boom mineral exports) and by increases in imports. The 15% hike in export revenue leads to an increase of about three per cent in real national income and in real absorption.[1] Employment in the projections discussed here is demand determined. This results from our assumption that real wages, both absolute and relative, are fixed, and that the labour market is slack.

The ORANI model was used in stand alone mode to analyse the effects of the mining boom on many thousands of variables in the model. Here we focus on the farm sector, thus reporting only a small subset of the results. In each industry we treat the representative farm owner-operators' labour and capital as fixed over our "short-run" projection horizon. Agricultural land is assumed fixed in aggregate for Australia as a whole. We allow variations in the demand for hired labour and other purchased inputs, however, and simulate the impact of the additional mineral exports on rural outputs, employment of hired labour, and farm income. The adjustment period underlying these simulations is to be interpreted as about two years. The results are shown in Table 1.

1. In the macroeconomic scenario underlying our projections, all three components of absorption have been assumed to share equally in growth.

2. For a broader coverage, see Dixon, Parmenter and Sutton, op. cit..

Table 1 : PROJECTED EFFECTS OF THE MINING BOOM ON RURAL INDUSTRIES*

Industry	Simulated Percentage Changes in :						Base Period Shares in Value Added		
	Real Output	Employment of Hired Labour	Implicit Real Rentals on		Usage of Agricultural Land	Real Farm Income(a)	Hired Labour	Land	Other Farm Assets
			Land	Other Farm Assets					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Sheep	- 1.23	- 6.75	- 13.29	- 13.49	- 0.08	- 13.4	.18	.28	.54
2. Cereal grains	- 0.62	- 7.33	- 13.29	- 14.66	- 0.67	- 14.4	.05	.38	.57
3. Meat cattle	- 1.82	- 8.40	- 13.29	- 16.81	- 1.77	- 16.3	.16	.26	.58
4. Milk cattle & pigs	- 0.33	- 6.44	- 13.29	- 12.88	0.19	- 13.0	.06	.39	.55
5. Poultry	0.28	1.64	-	3.27	-	3.3	.17	0	.83
6. Other farming	- 0.05	- 4.88	- 13.29	- 9.77	1.76	- 10.5	.14	.36	.50

* Source : Parmenter, op. cit.. Differences between results shown in column (1) and those reported in Dixon, Parmenter and Sutton, "Some Causes for Structural Maladjustment ...," op. cit., are due to treatment here of owner-operator's labour as a fixed factor.

(a) Real farm income here defined as real value added less payments to hired labour. (In Parmenter, op. cit., figures shown refer to real value added.)