ELIMINATING RAILWAY DEFICITS

The Effects for Australia

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1. THE SIZE OF AUSTRALIAN RAIL DEFICITS

Public railway deficits, in Australia as elsewhere, stand out as a conundrum in contemporary transport policy. How can such large organisations, under the auspices of government patronage and with parts of their markets guaranteed by monopoly controls, manage to incur those haemorrhaging losses, which in Australia total around $A1.25 billion per annum?[1] Moreover, railways have been making real losses on this scale since the early seventies; yet the deficits continue unabated!

It is all the more puzzling that the Australian state governments have not radically adjusted their approach to railway operations, because transport analysts have long since proffered the prescription for reducing deficits. The past analyses, in Australia at least, have all leant heavily for their solutions on the universal panacea of micro-economics: a straightforward exercise in reducing labour, cutting costs, eliminating small-volume services, increasing rates and fares and, all the while, raising productivity. Every one, it seems, knows what needs to be done; but every year, railway deficits grow and policy changes fail to materialise.

Why, then, is it that the policy-makers have not acted to curb their railways' unending appetites for revenue supplements? Hardly because the problem is not recognised, nor because the data are insufficient, nor even because there are not alternative policies available.

The catalyst for decision-makers to take action might come in the form of a better understanding of the consequences of a change in policy for the economy, for user industries and for any other beneficiaries of government involvement. This paper, then, looks at the potential effects of eliminating railway deficits in Australia.

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[1] At the time of writing the rate of exchange was $A1 = $US0.80 or £0.42.

TABLE 1

Australian Railway Deficits – 1986/87[1]

Railway Systems	*$A million*					
	Total Expenditure	*Total Identifiable Income (all sources)*	*Total Deficit (Government contribution)*	*Cost Recovery %*	*Payments to Revenue as Policy Reimbursements*	*Net Taxpayers' Contribution*
1. Australian National (Commonwealth)	352.0	279.7	72.3	79.5	3.2	75.5
2. Queensland Railways[2]	1,395.8	1,003.0	392.8	71.9	–	392.8
3. State Rail Authority of NSW[3]	1,987.9	1,607.7	380.2	80.9	166.8	547.0
4. V/Line (Victoria)	556.9	233.8	323.1	42.0	8.0	331.1
5. Westrail (Western Australia)	314.4	260.3	54.1	82.8	34.8	88.9
Totals	4,607.0	3,384.5	1,222.5	73.5	212.8	1,435.3

1 Calculations include both capital and working expenses for non-urban rail services (but see next note).
2 Queensland Railways still operates as a government department and does not provide separate estimates for urban passenger traffic; thus these results are an overestimate, because they include the Brisbane city services.
3 The cost of urban services provided by SRA for Sydney's Urban Transport Authority have been estimated and deleted from the SRA's published accounting results.
Source: Michael, 1988.

RAILWAYS WITHOUT DEFICITS – THE COMPOSITION

The first requirement for the elimination of railway deficits must be to determine the size and composition of these deficits. The results must allow for the varying objectives of the different state governments and the different accounting practices of the individual state railways. From this base a reasonable assessment can be made of the level of taxpayer support (or subsidy) for governments' involvement in rail transport.

Table 1 provides such a description of railway deficits in Australia for 1986/87, based on the latest available data from a complete set of public accounts. Rail losses can be identified in a number of ways, but here only two concepts are illustrated. The deficit can be viewed as an accounting differential between total expenditure and income, which in this case has been calculated with generous assumptions to include all forms of income, whether earned directly by the railway or attributable to its activities. On this basis, the total non-urban rail deficit for 1986/87 amounted to $A1.22 billion. This suggests that Australia's five government railways could average only 73.5 per cent cost recovery. On a different view, that element of railway revenues made up of reimbursements from government for meeting specific policy requirements might be included as part of the overall taxpayers' contribution to supplement rail incomes; in that case, it could be argued that the real cost to taxpayers was $A1.44 billion. These results appear more or less the same in real terms as those observed seven years ago; the figures remain five times as high as in 1969 (ARRDO, 1982, page 28).

In the context of rail deficits, it is somewhat ironic that in Australia about three-quarters of the freight task of rail is the movement of bulk commodities, for which rail is allegedly the most efficient mode.[2] These commodities may be identified, perhaps as those for which rail shows both clear technical advantages and positive financial returns in each of the five government railways.[3] The commodity markets concerned are:

(1) Commodity markets which are "profitable" for railways (that is, markets returning more than 40–50 per cent over working expenses):
   1. black coal,
   2. ores and minerals,
   3. refined petroleum products.

(2) Commodity markets which are "marginal" for railways (that is, markets which ought to recover at least 40–50 per cent over working expenses):
   1. grains and cereals (wheat, barley, rice, etc.),
   2. quarry products, mineral sands, etc.,
   3. brown coal (including briquettes).

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[2] The freight task is defined as roughly 60 billion tonne-kilometres per annum. See Railway Annual Reports, 1986/87; also ARRDO (1981, page 7).

[3] The efficient markets for Australian railways were first identified by ARRDO (1981) and updated through a series of market studies, 1982–1986. The railways' Annual Reports, 1987–88, appear to suggest that these relationships are still valid.

These commodities are transported in very large volumes, often over distances exceeding 1,200 kilometres, in "unit" train operations,[4] from dedicated terminal facilities.

Many of these commodities are among the last still prescribed by state regulation for rail, because volumes are considered too great for either safe or economic road transport. Potentially, the existing regulatory structures may be responsible for some level of monopoly pricing, particularly for transport of black coal in Queensland and New South Wales. Nevertheless, the comparative transport costs suggest that rail remains the more efficient form of land transport for these commodities, except in a few isolated instances where distances are very short or volumes are very low.

Consequently, for the purposes of developing an illustrative policy model to demonstrate the impact of change, the transport of bulk commodities (see (1) and (2) above) can be taken as the optimum role for rail.

ASSUMPTIONS FOR A MODEL OF POLICY CHANGE

This section discusses the assumptions made in our analysis of the elimination of rail deficits.

There must be an initial assumption, first, that there is no physical impediment to the successful implementation of a policy to enforce rail efficiency; and, secondly, that the other elements of the national transport system are capable of serving the market segments vacated by rail. In Australia, most of the impact would fall on the road mode, which is currently over-supplied and can be readily expanded still further. Of course, some commodities may shift to sea or air, but the volumes of general freight likely to do so are too small for ready recognition. In this analysis it is assumed, as in previous studies (see ARRDO, 1985 and 1986), that cost increases of around 20 per cent for users of alternative transport can be taken as a reasonable guide.

A critical point is the need to estimate the proportion of current rail subsidies directly expended on non-commercial markets (passenger services and non-bulk freight). The sort of proportions developed by ARRDO (1981) suggest that, after making suitable adjustments to account for changes in the management and financing of the railways, approximately two-thirds of the current deficit is attributable to passenger and non-bulk freight services.

In Table 1 the 1986/87 deficit was stated at $A1.22 billion (plus a further $A212 million in direct reimbursements for specific services). The deficit target for policy change, then, is to reduce subsidy payments by around $A800 million ($1986/87). This still leaves the railways in receipt of more than $A400 million for subsidies to capital charges, joint urban rail costs, etc., and leaves something over for recognised community service obligations for which rail remains the appropriate supplier.

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[4] A unit train comprises an entire train formation of dedicated wagons which remains as an unbroken unit cycled between the loading and delivery terminals.

MAKING RAILWAYS VIABLE

The simulation model

The model used here in simulating rail closures is the ORANI multisectoral model of the Australian economy developed by Dixon *et al.* (1982), which has been extensively employed by the Australian and state governments and by regional modellers, academics and the private sector. ORANI is a large (112 sector, 114 commodity) neoclassical general equilibrium model, belonging to the essentially nonlinear Johansen class of multisectoral models.

ORANI characterises the economy by a set of equations derived from micro-economic assumptions about the behaviour of producers and consumers, and about technology and market structures. These equations describe the demand for commodities and factor inputs by intermediate and final uses, domestic supply of commodities, relationships between prices and costs, trade, the allocation of investment, market clearing equations, and macroeconomic indicators.

A special feature of ORANI that is of particular importance here is its detailed modelling of the group of "margins" industries, which includes the transport industries. Approximately 20 per cent of Australia's GDP is generated by the activities of the margins industries in facilitating the flow of goods and services from producers to those who use them, whether for current production, capital formation, household spending, exports or "other" useage. (However, as yet, the ORANI margins facility has been little used, except for the work of Lubulwa (1986, 1987 and 1988)). ORANI's great advantage is that it allows simulation of the detailed effects on the economy of policy-driven or technology-induced changes in any of the transport industries; it can therefore analyse the impact of closing certain rail services.

Simulating policy – the approach

In our simualtions we eliminate all below-cost rail services, including both the transport of the input commodities in current production and the transport of the output of this production to the wholesale and retail industries. This ensures that rail transports only commodities for which its services are technologically suited and, therefore, economically efficient. The closure of the railways' inefficient services provides a significant reduction in their expenditure and, indeed, produces a substantial above-cost saving through the release of misallocated resources. As we have already estimated, the misallocation savings are of an order of magnitude of $A800 million ($1986/87).

In the present simulations, road transport replaces rail services on the basis that 1.2 units of road transport expenditures are needed to replace 1 unit of rail expenditures, on the assumption, outlined earlier, that road transport is approximately 20 per cent more costly for the users who are denied access to the rail service. In view of the present excess capacity in road transport in Australia, there ought to be no significant difficulties on the supply side.

In total four simulations of closure of inefficient services were performed, and they can be classified under the use made of the misallocation savings. The simulations are:

I savings absorbed by government (*reduced public expenditure*);
II savings used to *cut taxes to consumers*;
III savings spent directly on other government activities (*increase in other government expenditure*);
IV savings used to *cut taxes to producers.*

Under I the savings from the closure of inefficient services are absorbed by the government without additional outlays on other areas, and II sees the government savings returned to consumers to spend as they will. In Simulation III the government directly increases its expenditure by the amount it saves from rail transport; this is demonstrated in this case by an increase in spending on each commodity in proportion to government's current expenditures on domestic commodities. In the final simulation, option IV, the government returns the misallocations savings directly to industry in the form of production tax cuts, in order to relieve industry of the increased costs of replacing rail with road.

In short-run applications of ORANI, the standard version of the model allows capital stocks in each industry to remain fixed at their initial level. However, it is to be expected that the closure of a substantial portion of railway activity would induce industries to make changes in capital stocks; so a modified long-run version has been used to allow for these adjustments.

The results of any ORANI simulation are contingent on the closure of the model. The closure split of endogenous/exogenous variables defines the economic environment of any simulation, and so is reflected in its outcome. It is, therefore, necessary to make any deductions conditional on the appropriateness of the environmental setting imposed on the system. In the simulations conducted here, the standard long-run environment is employed. Under this environment the capital stocks of each industry are endogenous, and the rates of return on capital are exogenous. In addition, the price of labour moves in step with inflation, and employment adjusts accordingly. This endogeneity of labour is adopted in order to highlight the full extent of the potential effects of the rail closure on employment.

The shocks to the model

The satisfaction of direct demand for goods and services creates demands for margins industries, which in turn have a substantial impact on the economy. The ORANI data base contains the level of detail that is needed to identify individual commodities transported by rail to individual industries. This enables us to calculate the total use of rail in moving those commodities for which rail is the less suitable mode in each separate industry.

The commodities for which railway services are technically suitable and for which rail transport is to be retained are listed in Table 2. For all other commodities the use of rail services is terminated in the model.

In simulating rail closure by the use of ORANI, the general approach adopted here is, of necessity, indirect. It involves, firstly, the recognition, on the demand side, of a decline in the demand for rail and an increase in the demand for road, and secondly, the impact on costs to industries using transport of the denial of

TABLE 2

Commodities for Continuing Rail Use

ORANI Commodity Classification	
Code No.	*Description*
3	Wheat
4	Barley
5	Other grains
14	Ferrous metal ores
15	Non-ferrous metal ores
16	Black coal
17	Oil, gas and brown coal
18	Other minerals
51	Chemical fertilisers
58	Petrol and coal products

rail services. Intuitively, the economy as a whole sees less rail and more road, while the industries see only that their costs have risen.

The four simulations, already outlined, involving the closure of inefficient rail services together with policy options for the spending of the released misallocated resources, can be accomplished by a series of shocks to the model. The shocks are summarised in Table 3 and described below.

The termination of margin usage is simulated as a shock to the production costs of each separate ORANI industry, since, effectively, industries suffer an increase in costs when road replaces rail. For each industry the increase in costs, due to the outlined prohibition of rail services in the transport of the relevant ORANI commodities, is calculated as 0.2 times the total margin use of rail in facilitating the flow of all prohibited commodities to that industry. These increases in costs are then converted into percentage changes and are used to shock miscellaneous production costs. These shocks comprise Shock (1), Table 3.

On the demand side, under the closures outlined, the use of rail decreases and the use of road increases. The shocked decrease in use of rail is obtained by summing the prohibited margin services, and the increase in road is then 120 per cent of this figure. These changes in use are converted to percentage changes in miscellaneous demands, and the resulting shocks are listed as Shock (2), Table 3. Shocks (1) and (2) are the basis of Simulation I; reduced public expenditure.

As already stated, the projected $A800 million ($1986/87) can be returned to the economy in a variety of ways. Three alternatives are explored here, and constitute the basis of Simulations II, III and IV.

Simulation II returns the savings directly to households through tax cuts, and we assume that the tax cuts are entirely used for increased real consumption. It is

TABLE 3

Summary of Shocks: Simulations I–IV

Shock	*Description of Shock*	*Simulation*
(1)	Miscellaneous production costs, all industries: road replacing rail	I, II, III, IV
(2)	Miscellaneous demand (domestic), road and rail: road replacing rail	I, II, III, IV
(3)	Real household consumption: savings returned to households	II
(4)	Shifts to foreign and domestic miscellaneous demand (compensating (3))	II
(5)	Miscellaneous demand (domestic), all industries: government spends savings	III
(6)	Miscellaneous production costs, all industries: tax reduction/subsidy increase	IV

of course likely that some of the tax cuts would find their way into investment expenditure. The case in which all the tax cuts are spent on consumption is highlighted here as an extreme case. The return of savings to households is accomplished by an appropriate positive shock to real private consumption (see Shock (3), Table 3). ORANI links real private consumption to domestic and foreign miscellaneous demand via shift factors. Appropriately sized negative shocks are given to these shift factors to ensure that the shocks to real private consumption do not induce direct shocks to domestic and foreign miscellaneous demand (Shock (4), Table 3). The Shocks (1), (2), (3) and (4) in Table 3 together determine Simulation II: cutting taxes to consumers.

Another method of returning the rail closure savings to the economy would be to increase government spending by an equal amount. Without assuming specific government priorities for these funds, we can model a default increase in government demand by an (equi-proportional) increase in miscellaneous demand for domestic commodities (Shock (5), Table 3). Simulation III, increase in other government expenditure, consists of Shocks (1), (2) and (5).

If the misallocation savings from the rail closure are returned directly to industry as a tax cut, then miscellaneous production costs receive a negative shock in addition to the shocked increase in costs caused by the adoption of the more costly road service. In Simulation IV an equal percentage tax reduction/subsidy increase for each industry is modelled; the total government outlay is the savings from rail closure. In this case an appropriately sized shock, determined by the

level of taxes and subsidies involved in the supply of each commodity to each industry, is applied to the production costs of each industry (Shock (6), Table 3). Shocks (1), (2) and (6) in Table 3 determine Simulation IV: cutting taxes to producers.

THE RESULTS

Macroeconomic effects

The impact of the four simulations of policy options on the closure of inefficient rail services can be broken into two parts: first, the impact for the economy as a whole, and, second, the effect on individual industries. The primary concern for policy is with the economy-wide implications of the four simulations. These are summarised in Table 4.

The clear message from the projected outcome of Simulation I is overwhelmingly negative for the economy: the closure of inefficient services without effective use of the misallocation savings will increase costs across industry. The increase in production costs is transmitted to higher domestic prices, causing a deterioration in the trade balance. The higher prices also flow on to increased labour costs, lowering employment overall and in every ORANI labour category, with the exception of skilled white collar workers. The positive result for skilled white collar workers is due to the expansion of the retail trade industry, which employs a high percentage of such workers. The worst affected labour categories are skilled blue collar metal and electrical workers and rural workers, as the export sector suffers.

In Simulations II and III demand is simulated, and III suggests a significantly better macroeconomic outlook. As the additional government spending is on domestic commodities in Simulation III, whereas in Simulation II consumers spend on both domestic and imported goods, there is a smaller fall in GDP under III and an increase in employment. In both II and III the consumer-led expansion in demand has a strong inflationary effect, which, combined with increased demand for imports, leads to a further deterioration in the balance of trade.

The three Simulations I, II and III all produce inflationary effects and balance of trade difficulties, because none touches the problem of increased costs incurred across the economy through the enforced substitution of road for rail. Simulation IV tackles this cost increase by returning the savings directly to industry in the form of reduced taxation (or other cost-cutting measures). The ploughing back of the misallocation cost savings to the source of the disruption (that is, production costs) produces projections of deflationary price movements assisting both the export sector and the industries competing with imports. In short, exports rise, imports fall, the balance of trade improves, and GDP and aggregate employment show a strong positive movement. Employment improves in all labour classifications except the armed services.

It needs to be stressed, however, that the projections obtained are dependent on the model specification, its closure and the asserted misallocation savings. The inflationary effects of cost increases in Simulations I, II and III are fuelled by the full consumer price index flow-on environment within each simulation, with

TABLE 4

Macroeconomic Variables: Closure of Inefficient Rail Service

Economic Indicator		*Reduced Public Expenditure (Sim. I)*	*Savings Returned to the Economy*		
			Consumer Tax Cuts (Sim II)	*Increase in Other Govt. Expenditure (Sim. III)*	*Tax Cuts to Producers (Sim. IV)*
GDP		−0.449	−0.227	−0.107	1.622
L	Aggregate employment	−0.464	−0.257	0.025	1.294
	Employment by occupation				
	λ1 Professional white collar	−0.476	−0.583	0.638	1.060
	λ2 Para-professional	−0.317	−0.388	0.810	0.632
	λ3 Skilled white collar	0.556	0.775	0.777	1.825
	λ4 Semi and unskilled white collar	−0.501	−0.315	−0.027	0.675
	λ5 Skilled blue collar metal and electrical	−0.997	−0.824	−0.804	1.153
	λ6 Skilled blue collar building	−0.591	−0.485	−0.418	0.011
	λ7 Skilled blue collar other	−0.473	−0.244	−0.297	1.523
	λ8 Semi and unskilled blue collar	−0.728	−0.593	−0.385	1.610
	λ9 Rural workers	−1.041	−0.946	−0.934	3.724
	λ10 Armed services	−0.000	−0.619	2.206	−0.003
e	Aggregate exports (foreign currency value)	−2.577	−2.602	−2.581	7.540
m	Aggregate imports (foreign currency value)	0.554	0.809	0.748	−1.541
$\Delta\beta$	Balance of trade (exports−imports)	−0.487	−0.535	−0.519	1.412
ξ(3)	Consumer price index	0.310	0.315	0.310	−1.513
	GDP price deflator	0.357	0.363	0.358	−1.602

* All projections are in percentage change with the exception of $\Delta\beta$, which is in units of billions of 1978/79 Australian dollars.

repercussions for the export and import competing sectors. Some of this damage to competitiveness could be mitigated by allowing real wages to be endogenous; that would release some of the inflationary pressures generated.

Whether or not the actual figures in Table 4 are accepted, the overall implications remain clear. Economic efficiency in the railways is a goal worth seeking, with strong macroeconomic benefits to be had if the appropriate course is taken to return the misallocation savings to the economy. If the savings are returned at the production level, costs are lowered, worsening inflation is avoided, and international competitiveness is improved.

Industry specific effects

The industry-specific impact of the four simulations indicates which interests might gain or lose under the various scenarios. The measure used to evaluate the effects on individual industries is the industry activity level. The ORANI suite of models indicate activity levels, rather than detailing the output of industries. Each industry is viewed as purchasing inputs in order to gain a production possibility frontier; thus the industry activity level measures the capacity to produce a variety of products with inputs that are not specific to output. An increase in an industry's activity level indicates an expanded production possibility set; thus this variable can be used to gauge the winners and losers under the four presented simulations.

Simulations I, II and III show similar patterns of winners and losers, and the results are summarised in Table 5. The obvious winner in Simulation I is, naturally enough, the road transport industry itself, and road-related industries (industries 68, 80 and 93) are stimulated in response to the increased demand for road transport.[5] On the losing side, the direct impact of rail closures is shown by the decline in "rail and other transport" and its related industries (industries 70 and 94). Other industries to suffer include export and export-related industries (industries 4, 6, 10, 12, 13, 14, 15, 17, 18, 25 and 64) and industries competing with imports (36 and 45), all of which must contend with the lack of competitiveness resulting from domestic inflation.

Under Simulation II, where household taxation is reduced (see Table 5), domestic inflation resembles that of Simulation I; so the losers also appear in the traded or trade-related areas, and suffer in approximately the same degree. The winning side sees the addition of industry 103 (ownership of dwellings), which is responsive to consumer spending.

Under Simulation III, increased other government spending, the pattern of losers (see Table 5) is once again consistent with decreased competitiveness. This time the winners include traditional areas of government spending (industries 104, 105, 106, 107 and 108) and non-competing imports (industry 112) which can absorb some price rises.

The final simulation, Simulation IV, is reported separately in Table 6, as it

[5] The good results for road-related industries are partly due to capital creation in road transport caused by the increased demand. As excess capacity in road transport is assumed, the results for road-related industries need to be treated with caution.

TABLE 5

Percentage Change in Industry Activity Level for Simulations I, II and III*

Winners		*(% change)*			*Losers*		*(% change)*		
No.	*ORANI Industry*	*Sim I*	*Sim II*	*Sim III*	*No.*	*ORANI Industry*	*Sim I*	*Sim II*	*Sim III*
68	Motor vehicles and parts	1.6	1.9	1.9	4	Northern beef	−2.4	−2.2	−2.4
80	Rubber products	2.4	2.6	2.6	6	Other farming	−1.7	−1.5	−1.7
91	Mechanical repairs		1.3	1.0	10	Forestry and logging	−1.0	−1.0	
93	Road transport	11.2	11.3	11.4	12	Ferrous metal ores	−5.0	−5.1	−5.1
103	Ownership of dwellings		1.0		13	Non-ferrous metal ores	−4.1	−4.0	−4.0
104	Public administration			2.0	14	Black coal	−6.0	−6.0	−5.9
105	Defence			2.2	15	Oil, gas and brown coal	−6.4	−6.2	−6.3
106	Health			1.1	17	Services to mining	−5.3	−5.3	−5.1
107	Education, libraries			2.0	18	Meat products	−1.3	−1.2	−1.3
108	Welfare services			1.4	25	Other food products	−2.8	−2.7	−2.8
112	Non-competing imports			2.2	30	Cotton ginning, etc.	−1.5	−1.4	−1.4
					36	Textile finishing	−1.6	−1.2	−1.2
					45	Furniture and mattresses	−1.4	−1.2	−1.2
					64	Other basic metals	−4.8	−4.8	−4.8
					70	Locomotives	−11.6	−11.6	−11.1
					77	Construction machinery		−2.3	−2.1
					94	Rail and other transport	−19.9	−19.9	−19.3

* Only readings of magnitude greater than or equal to 1% are recorded. Industries which do not give a reading of this size in any of the three simulations are omitted. A complete description of ORANI industries is contained in Dixon *et al.* (1982).

TABLE 6

Percentage Change in Industry Activity Level for Simulation IV*

Winners		*(% change)*	*Losers*		*(% change)*
No.	*ORANI Industry*		*No.*	*ORANI Industry*	
2	Wheat–sheep zone	3.5	59	Cement	−0.3
4	Northern beef	7.5	60	Ready mix cement	−0.5
6	Other farming (sugar, fruit and nut)	4.5	61	Concrete products	−0.5
12	Ferrous metal ores	12.0	65	Structural metal goods	−0.3
13	Non-ferrous metal ores	8.9	70	Locomotives	−8.0
14	Black coal	22.7	74	Household appliances	−0.3
15	Oil, gas and brown coal	28.6	76	Agricultural machinery	−0.4
17	Services to mining	19.1	88	Other constructions	−0.9
18	Meat products	4.5	94	Rail and other transport	−14.6
25	Other food products	7.3			
30	Cotton ginning etc.	3.8			
31	Man-made fibres, yarns	3.8			
56	Petrol and coal products	3.3			
68	Motor vehicles and parts	3.7			
80	Rubber products	4.9			
93	Road transport	13.5			

* Only readings less than or equal to −0.3 or greater than or equal to 3.3 are included.

shows a markedly different pattern of winners and losers. The reason is the increased, rather than decreased, competitiveness of Australian production: even the losses for rail itself are smaller in this simulation than in any of the other three. This simulation shows very few losers, apart from rail (industry 94) and the related locomotives (industry 70), and none of the other losers identified under Simulation I–III shows a decrease larger than 0.9 per cent. Industries 59–61 produce large, lumpy and heavy goods which are classified as non-traded, and could therefore be expected to lose resources to industries receiving great advantage from increased competitiveness. The only other significant loser under Simulation IV is "other construction", which suffers at the hands of the booming export sector. The slight fall in the agricultural machinery industry can be explained by a positive overall shock to its production costs; this is in contrast with reduced production costs in most other industries. A substitution of labour for capital in the agricultural industries is due to a fall in the price of labour relative to agricultural machinery.

Under Simulation IV there are numerous winners. Clearly "road transport" and related areas are advantaged, as is evident in Table 6 (see industries 56, 68, 80 and 93). In addition to the stimulation of demand induced by railway closures, these industries are further assisted by their increased international competitiveness (a consequence of this simulation). With domestic prices falling, export and export-related industries are stimulated (industries 2, 4, 6, 12, 13, 14, 15, 18, 25 and 30) and import-competing industries and road-related industries further encouraged (industries 31, 56, 68, 80 and 93).

OTHER REALITIES

This paper seeks to demonstrate the potential directions for economic change from adjustments to the existing policies of railway subsidies in Australia. It has assumed the operation of a freight rail network largely free from deficit, and a consequent change in the structure of land transport, as the basis to simulate changes in the Australian economy. It is perhaps more important that the model has identified those interests which would be most affected by those changes.

The results themselves are not conclusive evidence of a failure of public policy, for they carry a number of qualifications and self-imposed doubts. For real political decision-making, these might be powerful reasons for inaction and the preservation of the status quo. Not the least of the difficulties concerns the use of any synthetic approach to policy change which tries to derive human behaviour from mathematical relations: the results are only as good as the data. In this case, the ORANI model is based on the latest available data-base, 1978/79, which, despite its value in establishing relativities in the economy, nevertheless remains a decade out of date. For rail transport, this time gap is significant because it happens to cover a period of vast changes in the ways railways operate, in their cost structures and in their competitive position in relation to other modes. Indeed, to varying extents in all the state railways, a number of unprofitable commodity traffics have already been shed: thus some of the impacts mentioned in this paper are probably redundant or of lesser significance. This is not to

TABLE 7

Implied Changes to Railway Employment

Railway	*Estimated no. of rail employees* (1986/87)*	*Estimated no. of employees required for optimum role*
Australian National	7,800	5,000
Queensland Railways	18,500	12,500
S.R.A. (New South Wales)	28,000	15,000
V/Line (Victoria)	12,000	6,500
Westrail (Western Australia)	5,900	4,500
Total	72,200	43,500
Surplus		28,700

* Estimate derived from railways' Annual Reports (1986/87), but excluding those employees dedicated to, or largely associated with, urban passenger operations.

suggest that the approach is fatally flawed, but to emphasise that it is more illustrative than conclusive.

More political problems arise because the proposition that railways should only operate those services for which they are technically efficient (thereby eliminating rail deficits) entails a radical rearrangement of rail services and a significant reduction in resource requirements. Translated into political terms, the proposition implies specific social and economic dislocations that would be most apparent in specific local and regional environments. That these micro-environments must necessarily coincide with political electorates and the locations of particular interest groups would, of course, have significant ramifications for the acceptability of the proposed change in policy.

The level of employment serves as an illustration. Table 7 estimates the present numbers of people employed by the non-urban railway, compared with the numbers required to fulfil rail's optimum role – and it implies job reductions to the order of 28,000 people. These staff reductions are not equally spread, either between railway systems or within them. Each of the government railways performs different tasks, and performs them in different ways. Those railways with high employment levels in workshops, general freight or terminal services would obviously have higher redundancy levels imposed. Moreover, these job losses would be concentrated at the railway centres focussing on these activities. In some rural cities there might be no alternative source of employment. Rail-using industries would suffer similar effects.

In short, the results observed as the outcomes to possible policy changes (that is, Simulations I to IV) only help to spell out the range of potential political

consequences of any action against rail deficits. While the model clearly nominates those interests likely to gain or lose, it does not and cannot perceive such changes in a micro context. In small communities, the multiplier effects of a change of policy on standards of living can be widespread, and the political ramifications even more so. For the elected representative of a local area, these may well be the more important parameters for decision-making. In the same way, individual firms within a given sector of industry may be more or less affected by a policy change than what has been suggested as the average outcome; thus, while some firms may be advantaged, others could be significantly disadvantaged in comparison with their competitors.

Nonetheless, the identification of policy impacts can be used to develop more sophisticated solutions. Government could choose to sponsor the development of growth industries, or to foster the development of relocation or retraining schemes in those areas likely to be disadvantaged (or, perhaps, reduce its intervention in those areas most advantaged)!

CONCLUSIONS

The point of this paper is not that computerised general equilibrium (CGE) modelling is the panacea for analysis of transport policy, for its incapacity to deal with some real world considerations demonstrates that it is not. Rather, we have sought to illustrate an approach to the consideration of some Australian transport issues through such a model (ORANI) because it has the singular advantage of enabling us to pursue a policy proposal through observation of the changes it imposes on the economy, not just in broad economic terms but also with the ability to identify and isolate those market segments affected by transport.

We have applied this method to the perennial issue of railway subsidies. Instead of asking what is politically right or economically wrong with the subsidy policy, we have sought to model the empirical consequences of change (under a given set of assumptions for four scenarios). The results themselves are quite significant, considering that railway subsidies make up such a small fraction of public expenditure in Australia. In particular, scenario IV suggests that Australia's overall economic welfare could be positively enhanced by cutting production taxes by an amount equivalent to much of the current cost subsidies. If the misallocation savings were returned at the production level, costs would be lowered; this would avoid raising inflation and would improve international competitiveness, while increasing economic output in Australia. In short, there could be a considerable net economic gain from a national policy of enforced rail efficiency. We must acknowledge, of course, that some interests would be injured and, in some cases, that their economic disbenefit could be quite considerable.

In the final analysis, policy choice remains a political decision based on the effects and consequences in the decision-makers' constituencies. Using ORANI, or any such model, will not avoid the decision-maker's role, but the approach does provide a means to explore the implications and changes likely to stem from

a policy shift and the means to determine which interests are likely to be involved. For the policy-maker, then, the danger that "the alternatives might possibly be worse" can now be tested before the decision is required.

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