The Long Distance Road Haulage Industry

Report

This Report investigates the structure, market conduct and performance of the domestic long distance freight industry with particular emphasis on the long distance road transport sector and the inter-modal competition it faces. All sectors of the industry appear to be highly competitive. Not only is there competition within the industry, but rail has the potential to capture a significant amount of the long distance freight market from road. The terms of reference as given by the Minister are contained in Appendix 1 of this Report.

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BUREAU OF TRANSPORT ECONOMICS

THE LONG DISTANCE ROAD HAULAGE INDUSTRY

Australian Government Publishing Service
Canberra 1980

First published July 1979
Reprinted March 1980

ISBN 0 642 04467 8

Printed by C. J. THOMPSON, Commonwealth Government Printer, Canberra

FOREWORD

This report was prepared in response to a Ministerial request for the Bureau of Transport Economics to investigate the long distance freight industry with particular emphasis on road transport. The report provides an overview of the role and organisation of the road haulage industry and an examination of market conduct and performance, intermodal competition (with emphasis on road/rail) and the likely effects of government intervention. Concern with the performance of certain sub sectors of the industry, especially owner-driver truck operators, has recently been brought to public attention.

This report has been prepared under a tight time frame in order that it might provide a useful and timely contribution to improved understanding of the industry. At the same time the report identifies several areas where more detailed investigation would be desirable - notably intermodal competition on a commodity basis and characterisation of the extent and nature of excess capacity in the industry including the dynamics of the adjustment processes involved.

Assistance in the preparation of this report was provided by Dr Peter Swan of the Australian National University. Mr A. Lawson, Assistant Commissioner, Industries Assistance Commission, Consultancy and Industry Studies Division, carried out the analysis of the effect of increases in transport costs on the general level of prices which is contained in Appendix 5. The Bureau would also like to acknowledge the assistance of Mr W. Brennan of the Professional Transport Drivers Association of Australia who provided valuable statistical information relating to the long distance road haulage industry.

(Colin A. Gannon)
Director

Bureau of Transport Economics
Canberra
June 1979

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CHAPTER 1 - SCOPE AND PURPOSE OF THE REPORT

This report was prepared in response to a Ministerial request made to the Bureau in April 1979 to investigate and report on the structure, market conduct and performance of the domestic long distance freight industry with particular emphasis on the long distance road transport sector and the inter-modal competition it faces. The terms of reference as given by the Minister are contained in Appendix 1 of this report.

STRUCTURE OF THE REPORT

Chapter 2 provides an overview of the long distance road haulage industry and its role in the total freight task. An outline of the historical development of the industry over the post World War II period which culminated in the recent owner-drivers' dispute, is also provided.

Chapter 3 outlines an examination of the industry structure, market conduct and performance of the road transport industry. It describes the organisational structure of the industry, the way in which prices are determined, and the economic performance of the participants.

Chapter 4 relates to intermodal competition. Sea, air and rail freight tasks are examined in the context of their potential ability to compete with road. The factors influencing modal choice are discussed in order to establish the major reasons for the existing modal split and the likely impact of any changes in these factors on the competitive position of road in the freight transportation task.

Chapter 5 documents some of the Commonwealth and State responses to the problems raised by the owner-drivers' dispute and the impact of these responses on market structure, conduct and industry performance. The analysis is confined to proposals which have been publicly canvassed by various governments.

Chapter 6 contains the conclusions of this report and outlines the scope for further research into the structure, market conduct and economic performance of the domestic long distance freight transport market for each of the competing modes.

SCOPE FOR FURTHER RESEARCH

This report has been produced under considerable time constraints. More work could be conducted on the rail, sea and air modes. A more detailed study of the competing freight modes would be of value in considering the effect of intermodal competition.

In particular, a study of rail pricing policy would not only be of assistance in an examination of road-rail competition, but could be useful in identifying the sources of railway deficits.

SUMMARY OF CONCLUSIONS

The major problem perceived within the industry is the financial plight of the owner-driver. This segment of the industry suffers from oversupply, and rates paid to owner-drivers have not kept pace with operating costs. While this is essentially a short-term disequilibrium problem which should eventually correct itself, the adjustment process can be expected to be drawn out and particularly onerous to marginal sub-contractors who are obliged to leave the industry.

All sectors of the industry appear to be highly competitive. Not only is there competition within the industry, but rail has the potential to capture a significant amount of the long distance freight market from road.

Because the industry is so highly competitive it is doubtful that government attempts to alleviate the owner-driver cost price problem can be completely successful.

Finally, there are two allegations commonly made in the industry which, on the basis of the data examined in this report, are of questionable validity.

First, there is the claim that freight forwarders exploit their monopoly position in the industry. There is no evidence to support the contention that freight forwarders make monopoly returns: their returns do not appear to be excessive and reflect the relative risk of investment. Indeed there is no evidence to suggest that even the large freight forwarders maintain a monopoly position in the industry. At the same time, in circumstances in which there is an oversupply of owner-drivers, freight forwarders are in a position in the short-term to secure rates from owner-drivers which are below the long-term economic costs of providing sub-contractor services.

Second, no nexus between the fundamental problems of the long-distance (inter-capital city) road freight operator and 'unfair' subsidised competition from rail could be identified. If present, subsidised pricing by rail, could, in the short-term, exacerbate the problem of oversupply of owner-drivers and in the long-term distort efficient allocation of traffic between road and rail. Unfortunately, lack of comprehensive actual freight rate and cost information for rail services precluded detailed examination of road/rail competition. However, an analysis of the major inter-capital city route (Sydney-Melbourne) indicated that rail container services when they are priced at a level that covers attributable operating costs are price competitive with road.

CHAPTER 2 - THE ROAD HAULAGE INDUSTRY: AN OVERVIEW

THE LONG DISTANCE FREIGHT INDUSTRY

The Australian freight task involves the transportation of both domestically-produced goods and imported commodities throughout Australia. All modes - road, rail, sea, pipelines and air - contribute to the performance of the task.

While no single measure can characterise the freight task fully, for general purposes indexes of tonnes consigned or tonne-kilometres performed provide the most useful background statistics. In 1975-76 the tonneage consigned estimate for the domestic freight task was 1182 million tonnes. For the same year tonne-kilometres performed was estimated to be 197 thousand million tonne-kilometres. Table 2.1 sets out the Australian freight task estimates by mode in terms of both tonnes consigned and tonne-kilometres performed.

Transport by road in 1975-76 was responsible for 76 per cent of the freight task in terms of tonnes consigned of which nearly 2 per cent was interstate traffic (Table 2.1). However, most of those movements were comparatively short and consequently the tonne-kilometres performed by road relative to the other modes, except air and pipelines, were much smaller (Table 2.1).

The long distance road freight task is defined to include all interstate movements and intrastate movements which involve a duration greater than one day for the complete (both the forward and the return) journey. Thus, consignments within cities and comparatively short inter-urban movements are excluded. Long distance road freight movements comprise only a small part, 7.6 per cent, of the total road freight task and an even smaller component, 5.6 per cent, of the total Australian freight task.

The long distance road freight task is predominantly characterised by movements between state capitals. Figure 2.1 gives an indication of the pattern of road transport in Australia in terms of daily

TABLE 2.1 - ESTIMATES OF THE AUSTRALIAN FREIGHT TASK 1975-76

	Million Tonnes Consigned				Thousand Million Tonne-Kilometres Performed	
	Interstate	Intrastate		Total	Total	
		Inter-regional	Other[a]			
By mode						
Road	21.3	45.4	830	899.7	33	
Rail	7.7	42.0	163.0	212.7	59	
Sea	33.7	12.7	0.7	47.1	101	
Air	0.1	-	-	0.1	0.1	
Pipeline	-	22.6	(b)	22.6[c]	4[d]	
TOTAL	62.8	122.7	993.7[c]	1182.2[c]	197.1[d]	

(a) Consignments within cities and within short hauls.
(b) Not available.
(c) Excludes quantities carried by intra-regional pipelines for which no information is available.
(d) Excludes urban pipeline movements.

Source: Bureau of Transport Economics, Estimates of Australian Interregional Freight Movements, 1975-76, (AGPS, Canberra, 1978).

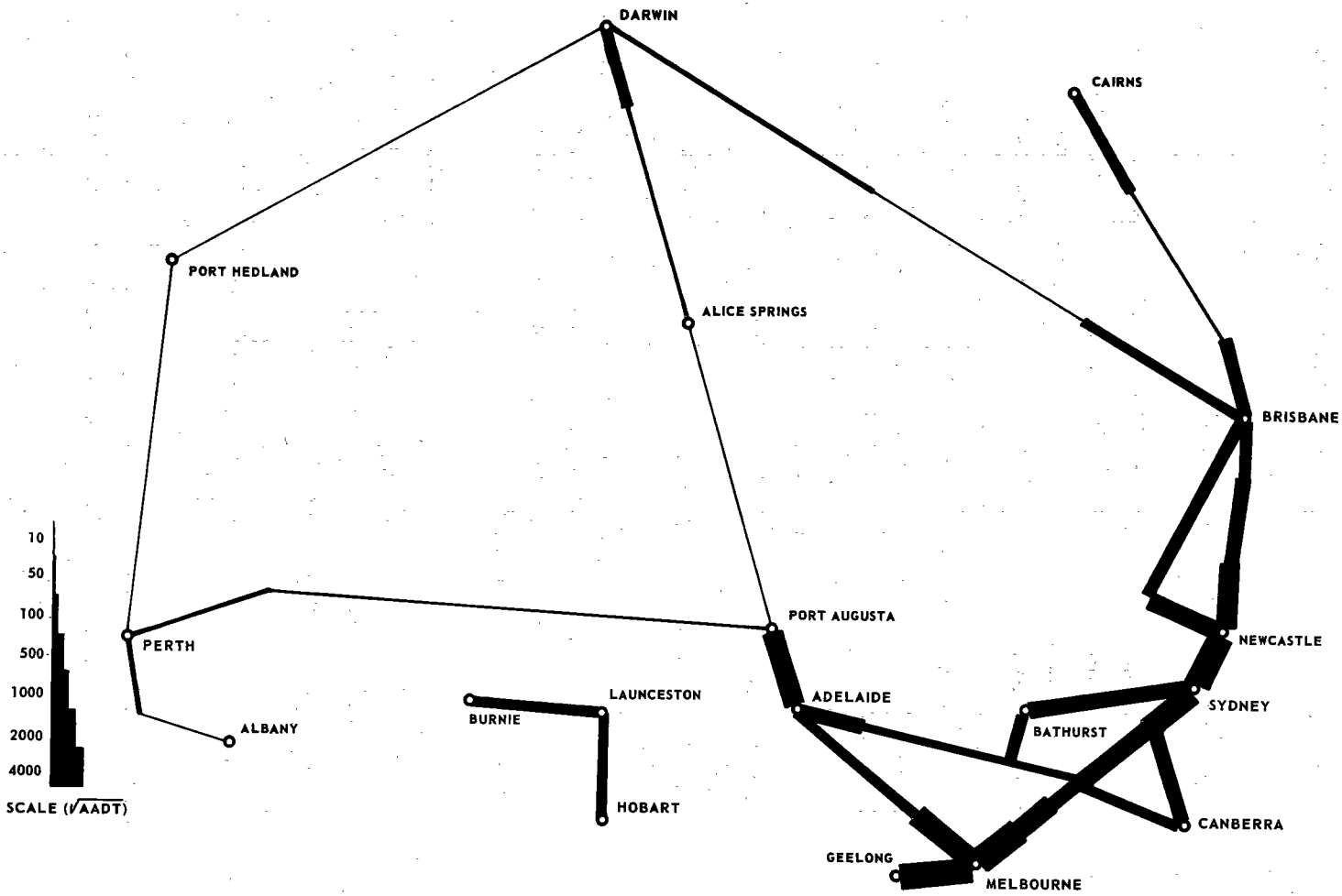

FIGURE 2.1 – ESTIMATED HEAVY VEHICLE MOVEMENT ON SELECTED TRUNK ROUTES 1975–1976 (AADT)

SOURCE: BTE ESTIMATES OUTLOOK PAPER: FREIGHT TRANSPORT, 1978 TRANSPORT OUTLOOK CONFERENCE.

vehicle movements. It is evident that movements are concentrated between the eastern state capitals - Brisbane, Sydney, Melbourne and Adelaide.

OPERATORS IN THE ROAD TRANSPORT INDUSTRY

Figure 2.2 outlines the organisational structure of operators in the road transport industry. The first distinction to be made is between the freight forwarder and the owner-driver. The major role of the freight forwarder is that of consolidation of freight. Once orders have been received, the forwarder can consolidate consignments of various densities in order to seek the optimum load in terms of both the maximum legal weight and the available volume. The importance of this consolidation task performed by the forwarder is discussed further in Chapter 3.

Freight forwarders may either provide a transport service nationally or concentrate on moving goods on specific routes. Furthermore, most forwarders are not restricted to the use of one transport mode and operate on a multi-modal basis. The freight forwarder may operate an ancillary road service, employing labour to operate vehicles. In general, a freight forwarder engages an owner-driver sub-contractor to provide the service for the customer on his behalf.

The owner-driver operates on a contractual basis securing consignments directly from a customer or from a freight forwarder. An owner-driver who is contracted by a forwarder to complete the line haul is classified under one of the following categories:

- a tow operator who supplies a prime mover and is sub-contracted to tow a trailer from terminal to terminal

- a 'painted' sub-contractor whose equipment bears the name of the forwarder and who is employed on a semi-permanent basis

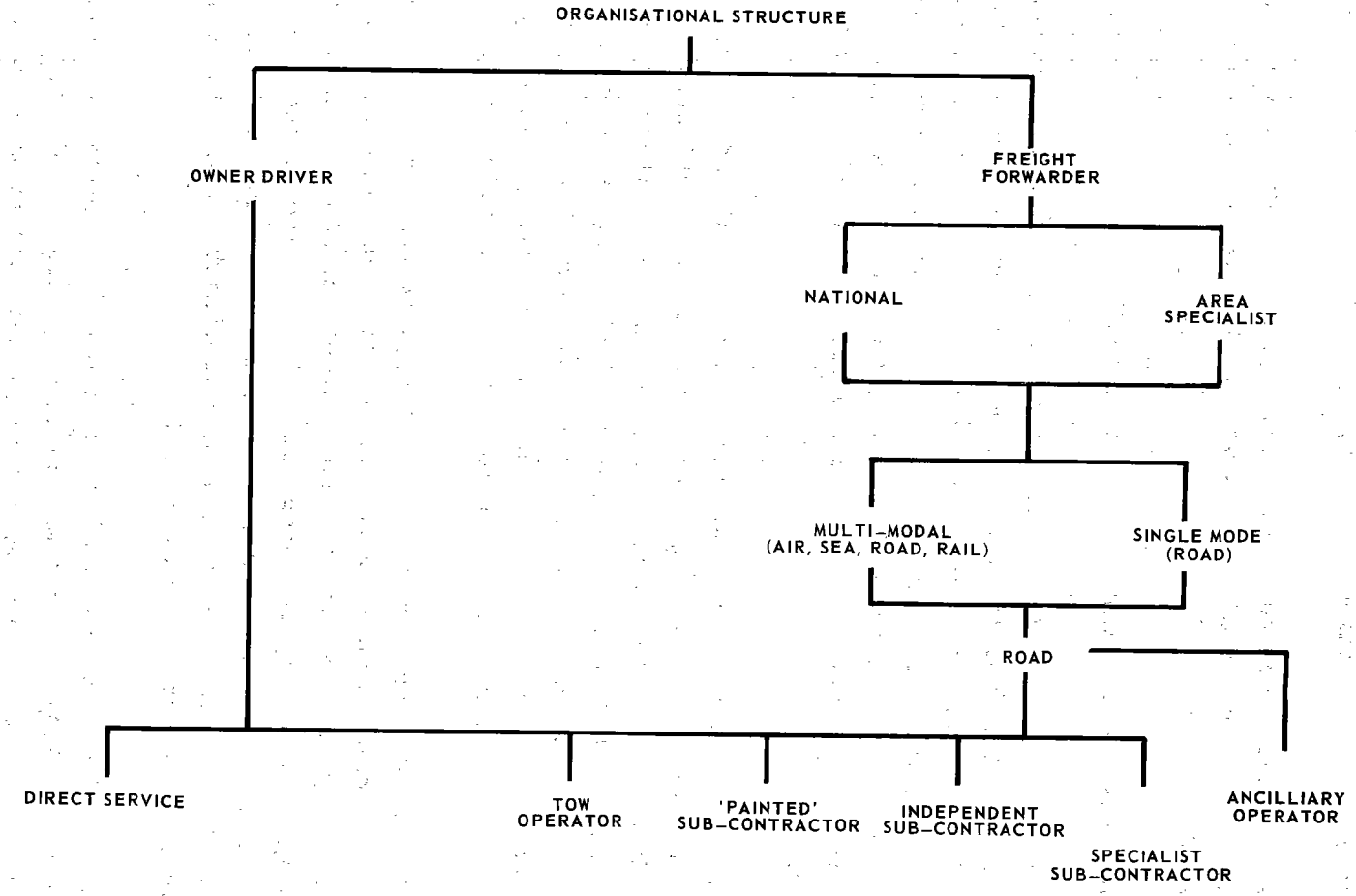

FIGURE 2.2 OPERATIONS IN ROAD HAULAGE INDUSTRY

- an independent sub-contractor working a single route and employed on an itinerant basis

- a specialist sub-contractor who supplies specialised equipment for the carriage of particular commodities such as cement, sand or beer.

DEVELOPMENT OF THE ROAD TRANSPORT INDUSTRY

Prior to World War II, interstate trade was dominated by coastal shipping. Rail was the dominant mode in the movement of intrastate traffic, but on the interstate scene was hindered by the lack of a standardised rail system. Long distance road transport was restricted by inadequate vehicles, poorly maintained roads and state regulations where road hauliers competed with the railways.

Legislation restricting competition between rail and road transport was introduced by state governments in the early nineteen-thirties. The form of the regulation varied from State to State and involved the prohibition of the transportation of specified (non-exempt) goods by road transport, (typically outside urban areas), taxation on road transport moving goods in competition with rail and the restriction of competition from road through licensing provisions.

Conditions became favourable for the establishment of the long distance road haulage industry after World War II. Accelerated economic growth increased trade between the States. Rail and sea transport were unable to cope with the increased trade due to a run down of railway equipment and losses of shipping during the War. As a result, the road haulage industry, particularly in the interstate arena, expanded rapidly.

The appeal of long distance road transport to customers was boosted in 1949 by a nationwide railway strike. All forms of state road regulations imposed to protect the railways were abandoned for the duration of the strike so that the road transport

industry could accommodate the displaced demand for transport services caused by the railway strike. Thus, many new customers were exposed to door-to-door service offered by the hauliers. After the strike, the States reimposed higher taxes on road haulage to protect the rail operations and even refused to grant permits for interstate movements. Despite these moves, the long distance road haulage industry continued to expand.

In 1952, in response to the interstate competition from road hauliers, the railways entered into the Forwarding Agents Scheme with major road operators. In accordance with this agreement the railways undertook the line haul movement of goods at rates less than those which existed on road, and the road operators were responsible for pick-up and delivery of the freight(1). This agreement led to the transformation of the larger road operators into national freight forwarders(2).

In 1954, there was a High Court challenge to the validity of the power of the States to impose taxes on interstate road freight movements. The High Court found state regulations on interstate transport unconstitutional and ruled that the only charge which could be levied had to be related to road use and that no other form of control over interstate freight movements by the States was valid. Furthermore, the Court stated that the proceeds must be 'expended only upon the maintenance of highways, using the word "maintenance" in its widest sense'(3). All States except Tasmania introduced similar legislation for the imposition of road maintenance charges which were in accord with the High Court decision. These charges involved a tonne-kilometre levy to be paid by operators of vehicles with load capacities exceeding the tonneage set by each independent State.

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(1) For a fuller discussion see P.J. Rimmer, 'Freight Forwarding: Changes in Structure, Conduct and Performance', in K.A. Tucker, Economics of the Australian Service Sector, (Croom Helm, London, 1977) p.172.
(2) P.J. Rimmer, op.cit., p.172.
(3) High Court of Australia, Allwrights Transport Ltd v. Ashley, The Australian Law Journal, Vol. 35 (Feb. 1962), No. 10, p.439.

As a result of the High Court decision there was an influx of road operators into the interstate road haulage business which led to a period of unrestricted competition not only between road and rail but also between road operators[1]. The railways responded to the challenge from the road haulage industry with improvements in technology and reductions in freight rates. The continuing long-term growth in the road transport sector has also been accompanied by technological improvements, particularly the increasing substitution of diesel for petrol powered vehicles.

The freight forwarding sector of the industry expanded rapidly with the continued alliance with the railways, an alliance which was initiated by the latter in 1952 (Forwarding Agents Scheme). Originally, the forwarders owned and operated their own road vehicles. However, in 1960, freight forwarders began progressively specialising in brokerage rather than the actual carriage of freight by selling their trucks and employing sub-contractors, on an itinerant or permanent basis, to perform the necessary line haul by road.

In the early sixties, the forwarders introduced new equipment that was easily transferable[2] between rail and road and this resulted in an increased volume of freight being moved by rail. In return, forwarders were given exclusive use of goods terminals in advantageous localities on railway property. This strengthening partnership between the freight forwarders and the railways caused the other operators in the road haulage industry to improve their efficiency by introducing new and better equipment[3]. A transition from petrol to diesel powered trucks was particularly evident.

In 1962, the National Freight Forwarders Association was established with the expressed aim of overcoming 'the unattractive and fluctuating returns in the industry by facilitating the consolid-

(1) P.J. Rimmer, Freight Forwarding in Australia, (Research School of Pacific Studies, ANU, Canberra, 1970).
(2) Includes flexi-vans, flexi-flats and flexi-fridges.
(3) P.J. Rimmer (1977), op.cit., p.173.

ation of the industry into fewer firms'[1]. The Association, through the Australian Road Transport Association, sought also to establish guidelines which culminated in the setting of a scale of rates which allowed what they considered to be a reasonable profit (15 per cent). Schedules were recommended to state sub-committees and, if the rates were accepted, forwarders in the Association had identical rate schedules for interstate freight. However, the Association had limited powers in enforcing the rate schedules.

Consequently, rates were often only used as a guideline for discounts and special quotes[2], particularly on consignments over two tonnes. However, for consignments under two tonnes, the schedules were followed reasonably closely.

The role of the National Freight Forwarders Association to set interstate freight rates for its members was abandoned with the introduction of the Trade Practices Act 1974. Since 1974, the Association has concentrated on the 'co-ordination and consolidation of advice to the Government in the legislative and industrial sphere'[3].

The owner-driver sector of the road haulage industry grew rapidly after the introduction of the Interstate Drivers Award in 1963. The Award gave a further incentive to the freight forwarders to continue the practice, initiated in 1960, of divesting themselves of their own rolling stock and employing owner-drivers as sub-contractors.

In 1966, a new series of agreements which guaranteed the forwarders annual hire contracts between state capitals was entered into by the railways and freight forwarders. Forwarders were thus encouraged to invest in container terminals complete with gantry cranes.

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(1) P.J. Rimmer, Freight Forwarding in Australia, (Research School of Pacific Studies, ANU, Canberra, 1970) p.20.
(2) P.J. Rimmer (1977), op.cit, p.191.
(3) P.J. Rimmer (1977), op.cit, p.193.

During the sixties, the coastal shipping industry consolidated its position to compete with land-based transport. Technological developments facilitated the movement of bulk goods and the introduction of new roll-on roll-off and container vessels facilitated the movement of general cargo by sea. These developments resulted in the forwarders extending their activities into line haul by sea partly by agreements with shipping companies but also by becoming shipowners themselves. Forwarders also introduced line haul by air although on a limited basis only(1).

In sum, the long distance road haulage industry has expanded greatly since World War II. Freight forwarders arrange and provide a door-to-door transport service utilising all modes to undertake the line haul. Road haulage owner-operators, as sub-contractors, predominantly service the line haul by road.

CURRENT REGULATION OF ROAD TRANSPORT

Interstate hauliers must comply with state operational safety regulations. However, there is a lack of uniformity in these regulations between States. Thus, on any interstate journey, the haulier is (legally) limited by the most restrictive regulations applying in all the States through which he travels. Road hauliers who operate solely on interstate routes are not required to pay registration charges on vehicles but pay a nominal fee for the purchase of number plates.

Regulations applying to the intrastate road haulage industry are more complex than those applying to interstate operations. Intrastate commercial road hauliers are required to pay annual registration taxes, and in some States additional nominal registration fees for each vehicle. There is no uniformity among the States in the formulae used to calculate these charges.

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(1) P.J. Rimmer (1977), op.cit., p.175.

Each state government applies restrictions on the weight and dimensions of vehicles operating within its boundaries. Again there is a lack of uniformity among the States in these regulations, although the States have been making progress toward the adoption of uniform vehicle regulations. There is, however, provision in each State enabling road hauliers to obtain a permit for loads in excess of that stipulated in the legislation. The granting of a permit is at the discretion of the appropriate state regulatory authority.

Further regulatory controls extend to speed restrictions of commercial vehicle operations, and the hours a driver is permitted to operate each day, which vary among the States.

In both New South Wales, South Australia and Queensland an 'open road' policy exists. Accordingly, there is no restriction regarding the type of traffic or area of operation, that can prevent the road transport industry competing with the State railway system. Nevertheless, in New South Wales all road haulage operations are required under the terms of the State Transport (Co-ordination) Act to be licensed.

In other States a licencing system still exists to effectively constrain road/rail competition. However, in 1976, the Victorian Government announced that the legislative control on the movement of commercial goods traffic on road would be removed within five years in line with the recommendations of the Bland Report[1]. Deregulation is also currently being considered by the Western Australian Government following recommendations contained in the South Western Australian Transport Study (SWATS)[2].

With the exception of Tasmania there are no legislative restrictions

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(1) Report of the Board of Inquiry into the Victorian Land Transport System 1971-72, (Government Printer, Melbourne, 1972).

(2) South Western Australian Transport Study Main Report, (Perth, December 1977).

in the States to entry into the road transport industry[1]. In Tasmania new applications for 'carrier' and 'cart' licences may be rejected by the State Transport Commission on the grounds of objections raised by existing licence holders.

RECENT DEVELOPMENTS IN THE INDUSTRY

The owner-driver sector of the road haulage industry has experienced major problems in recent years. The basic factor underlying these problems has been the cost-price squeeze faced by the industry. From Table 2.2 it can be seen that over the last six years (1973-1979) rates paid by freight forwarders to subcontractors have risen by 45 per cent while operating costs for the owner-drivers have increased by 110 per cent. While improvements in vehicle efficiency have enabled operators to meet this cost-price squeeze, rates of return in the industry have fallen.

TABLE 2.2 - COST PRICE PROBLEM FACED BY SUBCONTRACTORS

	1973	1974	1975	1976	1977	1978	1979
Rate by Freight Forwarders to Subcontractors[a]	100	107	113	121	127	134	145
Index of Operating Costs for Subcontractor[b]	100	111	137	151	176	196	210

(a) Intercapital city rates weighted by tonne kilometres performed.
(b) Operating costs per tonne-kilometre.
Source: Bureau of Transport Economics estimates.

Table 2.3 shows the major components of operating costs. All components, with the exception of road maintenance charges, have increased substantially over the period 1973-1979. Major increases were in fuel, maintenance and wages costs.

(1) In Victoria the Transport Regulation Board may currently reject new applications for 'discretionary' licences.

TABLE 2.3 - INDEX OF COMPONENTS OF OPERATING COSTS FOR A SUBCONTRACTOR

	1973	1974	1975	1976	1977	1978	1979
Wages	100	114	157	174	194	200	215
Fuel	100	113	148	158	191	229	249
Maintenance	100	110	145	171	186	239	270
Road Maintenance Charges	100	100	100	117	117	117	117
Depreciation	100	109	130	150	186	204	210
Other Costs	100	118	136	137	160	178	202
TOTAL COSTS	100	111	137	151	176	196	210

Source: Bureau of Transport Economics estimates.

While operating costs rose substantially, rates actually paid to owner-drivers by freight forwarders did not reflect these cost increases despite the fact that scheduled rates charged by freight forwarders have kept pace with the general level of prices. (See Figure 2.3) One of the major reasons for this has been an oversupply of subcontractors in the industry(1). In the longer term, market forces could be expected to adjust the number and capacity of subcontractors. However, over the past few years the tendency for this disequilibrium situation to persist has created major financial difficulties for some owner-drivers.

One contributing factor to the oversupply situation was the introduction of investment allowances. They have had an important effect on industry structure. The investment allowance had the immediate(2) effect of attracting new additional entrants into an already over supplied industry. There was a significant increase in the number of new trucks leased in 1977 and up to June 1978 in order to take advantage of the 40 per cent allowance.

(1) By definition an industry with free exit and entry less than normal returns indicates an oversupply in the industry.

(2) Since the owner-driver sector of the industry is competitive the investment allowances will in the longer term be reflected in lower rates received by subcontractors. However the short-term effect was to lower the cost of entry into the industry without an immediate effect on rates received and to produce disequilibrium in the industry.

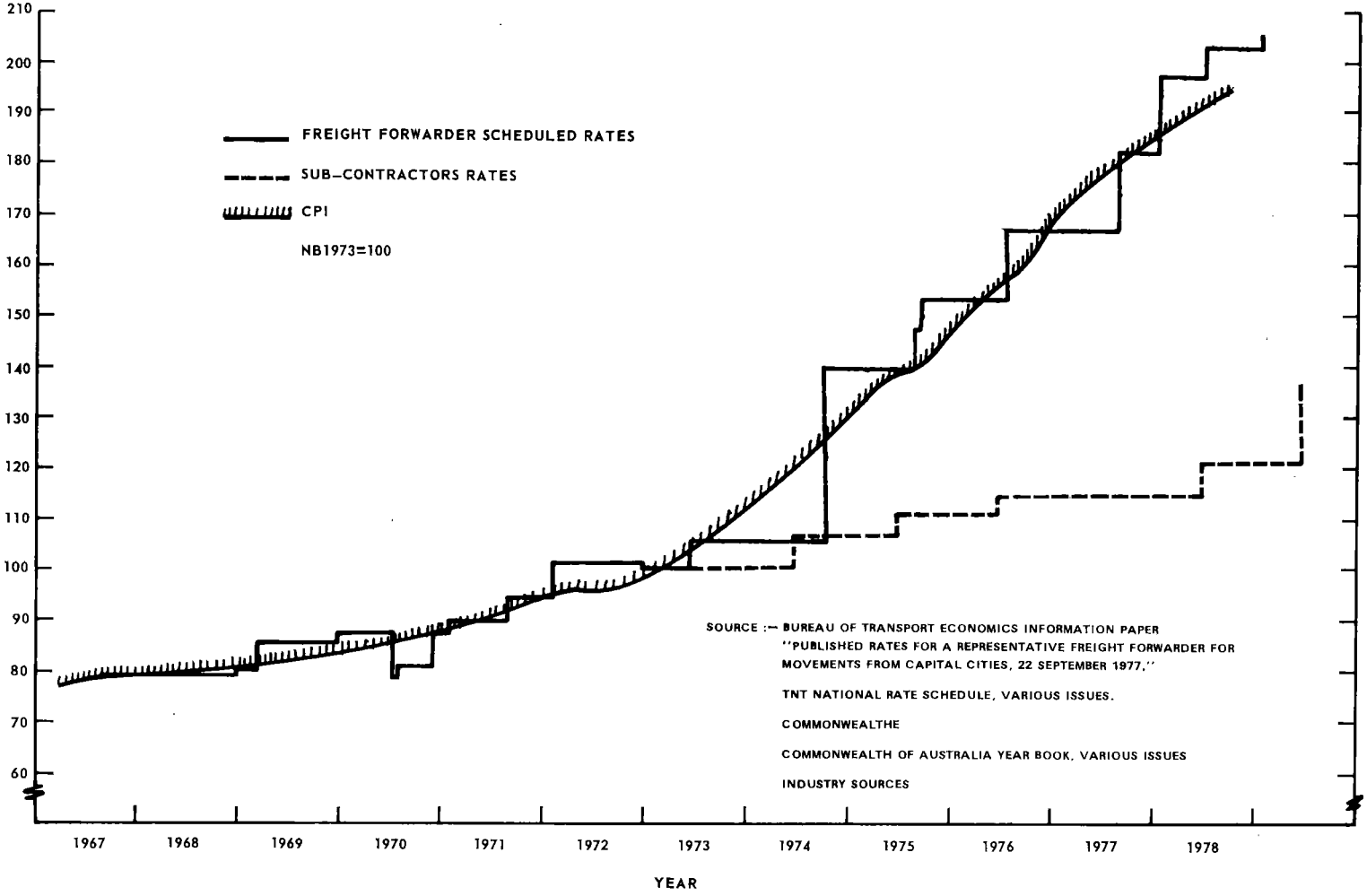

FIGURE 2.3 COMPARISON OF MOVEMENTS IN TNT FREIGHT RATE INDEX, THE CPI AND SUB–CONTRACT RATE INDEX

Whilst new entrants to the industry were encouraged by the introduction of the investment allowance, many of them were not able to take advantage of the concessions. As competition increased through oversupply, owners found that rates received were not keeping pace with operating costs. Those owners who incurred losses were not able to fully exploit the potential taxation concessions since they had no taxable income.

The investment allowances also had an effect on the pattern of ownership of the capital equipment in the industry. Freight forwarders who were making taxable profits, and therefore could take advantage of the tax concessions, were encouraged to move towards the purchase of capital equipment rather than the use of subcontractors.

Owner-drivers' dispute

Only new vehicles are eligible for the investment allowances. The introduction of the allowances resulted in a fall in the price of secondhand trucks. This added further to the problems of over supply by making it even more difficult for marginal operators to sell their trucks and thus leave the industry.

The cost-price squeeze and the over supply situation in the industry came to a head on April 2 of this year when six owner drivers moved their rigs onto the Hume Highway at Razorback Mountain, thus initiating a series of major nationwide blockades lasting some eight days.

The object of these blockages, at least initially, appears to have been to force the New South Wales Government to drop road maintenance charges. However, the demands of the blockaders quickly showed a tendency to escalate as large numbers of independent road hauliers joined the blockades.

While the focus of the dispute and consequent negotiations tended to remain in New South Wales, the blockages quickly spread to

Victoria, Queensland, South Australia and Western Australia. This rapid diffusion was partly in support of the actions of the New South Wales drivers, but it mainly reflects the common set of economic conditions facing all owner-drivers, regardless of their state(s) of origin and operation. Citizen Band radio facilitated rapid communication of the dispute, and rapid mobilisation of the drivers.

By April 4 the blockade was extensive in New South Wales, as well as having spread interstate. An estimated five hundred trucks were blockading the Hume Highway at Yass, while blockades had also been set up at Albury, Mudgee and Mt Victoria.

In Queensland, blockades were operating throughout the south-east by April 4, and by April 6, Adelaide was blockaded by an estimated three hundred and sixty trucks. Western Australian drivers also met on April 6 but in that State, traffic, including trucks, continued to be allowed through. However, owner-drivers parked along major east-west road links, and the threat of blockade was always present.

Initially, there were divergent responses from the state governments to the blockades.

In Queensland, the Premier agreed to abolish road maintenance charges on the same day the blockades were set up in that State. However, the blockades remained for some time after this, apparently in support of New South Wales owner-drivers.

South Australia, too, was conciliatory, offering to have an independent arbitrator examine the owner-drivers' grievances. The drivers held out for more concrete concessions.

The New South Wales Government initially took a firm stance. Emergency legislation was passed, providing for up to $1000 fines for obstruction to traffic. However, the legislation was not proclaimed, and hence did not become law, but rather remained as

a threat to the blockaders. Despite these actions the blockades remained. As the dispute continued, the New South Wales Government attempted to negotiate with the truckowners. By April 5 the New South Wales Government offered to:

- amend the Industrial Arbitration Act, to allow owner-drivers to appear before the State Industrial Commission and thus seek minimum standard freight rates and to meet the costs of a Queen's Counsel to appear for the truckowners before the Commission

- attempt to arrange a moratorium on moves by finance companies to repossess vehicles, if repayments fell behind in the period before the expected report on the New South Wales road freight industry by Commissioner McDonell, was acted upon.

These offers were rejected by the owner-drivers.

Although the Commonwealth Government initially avoided direct involvement in the dispute, there was a degree of common concern with public criticism of the efficiency of road maintenance charges by the Commonwealth as well as state governments. This concern was expressed by the Queensland Premier and the Prime Minister. This led in turn to requests from States for the Federal Government to reimburse the States, if road maintenance charges were abolished. The Commonwealth rejected this proposition.

As the dispute and blockades continued, shortages of perishable foodstuffs and industrial raw materials occurred. In the light of this, the Victorian Premier suggested an interstate conference of State Transport Ministers. This conference, chaired by the Commonwealth Minister for Transport, met in Melbourne on April 7 to consider the owner-drivers' demands.

These demands by the owner-drivers tended to vary over time. In the early stages of the blockade, it was not clear exactly what the demands were, although removal of the road maintenance charges

was the most prominent. Often this was coupled with a demand for cancellation of all outstanding charges, and associated fines. The vehicle gross weight limit of 36 tonnes was also considered too low; a 38 tonne limit was demanded. However, some of the statements made by owner-drivers indicated a more widespread set of grievances. As was pointed out above, increased operating costs, particularly fuel and tyre costs, had affected the marginal operator severely, at a time of reduced demand. Operators were aware of the problem of oversupply in the industry, and suggestions for entry regulation were made. The owner-drivers also expressed dissatisfaction with current freight rates offered by freight forwarders.

As the blockades continued, the owner-drivers were able to present a more coherent set of demands than previously. While there was some minor regional variation in these demands (for instance Western Australian drivers wanted an end to the permit system), they were remarkably uniform. The main demands were:

- immediate abolition of the road maintenance charges
- a moratorium on truck repayments
- regulation of entry into the industry; a licensing system similar to taxis was suggested
- minimum freight rates
- an increase in the maximum gross vehicle weight, from 36 tonnes to 38 tonnes
- no dismissals of, or police action against, drivers taking part in the blockade
- quashing of all outstanding fines arising from non-payment of the road maintenance charges.

The State Transport Ministers Conference, meeting in Melbourne on April 7, sympathetically considered the owner-operators' demands. The Conference proposed the following:

- abolition of Road Maintenance Tax from July 1
- minimum standard freight rates
- an increase in the road tonneage limit from 36 to 38 tonnes
- examination by all States of a uniform system of licensing, with a view to regulating the industry on a nation-wide basis, and providing an alternative to Road Maintenance Tax
- a moratorium on moves by finance companies to repossess vehicles.

By April 9 the blockade began to be lifted in Queensland and Victoria. South Australia and Western Australia quickly followed.

The New South Wales drivers initially refused the conditions arising out of the Melbourne Conference. In an effort to bring the blockades to an end, the New South Wales Premier proclaimed the emergency legislation foreshadowed on April 4. All State police were mobilised, but force proved unnecessary as the trucks disbanded from the blockade points without incident.

CHAPTER 3 - INDUSTRY STRUCTURE, MARKET CONDUCT AND PERFORMANCE

A recurrent theme in the recent owner-drivers' dispute has been allegations that the rates paid to sub-contractors were being depressed by the collusive activity of the freight forwarders.

Spokesmen for the owner-operators drew attention to apparently high mark-ups in the industry by comparing the published rate schedule[1] of the freight forwarders with the rates paid to subcontractors. Implicit in these allegations was the suggestion that the major freight forwarders were in possession of significant economic power and that this power enabled them to set rates paid to subcontractors at an artifically low level.

The freight forwarders however are not only buyers of the sub-contractors' services but also sellers of these (or other) services to the consumers. Significantly there were no allegations from the freight forwarders' customers of widespread collusive activity resulting in artifically high rates being set by freight forwarders.

The implicit argument behind the allegations of monopoly power are that the barriers to entry into the freight forwarding industry are high and that these barriers enable the freight forwarders to extract monopoly profits and that sub-contractors once they have entered the industry, have difficulty leaving.

This Chapter examines the market structure of the long distance road haulage industry for evidence of barriers to entry or monopoly profits. In so doing it describes the organisational structure of the industry, the way in which prices are set and the economic performance of the participants.

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(1) See Table 3.1, showing evidence of extensive discounting on scheduled rates.

MARKET STRUCTURE

Nature of Freight Forwarding Operations

In order to gain an appreciation of the structure of the long distance road haulage industry it is useful to begin with the freight forwarders who act as 'middle men', or intermediaries between the clients who wish to ship goods between two points ('shippers') and those that physically carry out the task ('sub-contractors'). While some freight forwarders do own trucks and employ drivers, the bulk of road freight is carried by independent sub-contractors. Apart from the routine work of coordination and documentation and dispatching of loads, the freight forwarder serves to facilitate an 'efficient' solution to two problems which each involve the allocation of 'joint' costs. The first of these is 'freight consolidation' and the second 'back loading'.

Freight consolidation

A typical truck used for long distance road haulage carries 23 tonnes or about 69 cubic metres of capacity. The average 'stowage factor' is therefore 3 cubic metres per tonne. In the absence of any freight consolidation, shippers of dense, low stowage factor goods will meet the legally imposed gross vehicle weight limit leaving the truck only partially full in terms of volume. Similarly shippers of bulky goods will meet the volume constraint leaving the truck capacity in terms of weight only partially utilised.

For example, if a truck is carrying a full load of metal products with a stowage factor of 2 cubic metres per tonne, only two-thirds of the volume capacity of the truck will be utilised. The fee paid to a sub-contractor for a shipment of a truck load of goods on the Melbourne to Sydney return run is approximately $506 or $22 per tonne capacity of the truck. The metal products in this example would pay this rate per tonne. However, if a truck is carrying foam rubber exclusively, which has a stowage factor of (say) 4 cubic metres per tonne, then only 75 per cent of the

capacity by weight of the truck will be utilised and the charge would need to rise to $29.33 per tonne to cover the $22 per tonne of carrying capacity.

In this example the cost penalty paid by shippers of foam rubber may be unnecessary and may be eliminated by freight consolidation. Suppose these metal and foam rubber products arrive at the freight forwarder's warehouse in equal proportions. If the truck is carrying both rubber and metal products there must be some procedure to jointly allocate the total costs of the trip between the two goods. If the truck is to be fully utilised in both weight and volume terms (i.e. a stowage factor for the total load of 3 cubic metres per tonne) the truck would carry 11.5 tonnes (23 cubic metres) of metal and 11.5 tonnes (46 cubic metres) of rubber. In this case fifty per cent of the total cost burden will be borne by the rubber customers which is $22 per tonne. The metal product customers will continue to pay $22 per tonne. There is no loss to metal product shippers and there is a $33\frac{1}{3}$ per cent gain, equal to $7.33 per tonne, to shippers of foam rubber.

In the previous example rubber products did not pay a premium on a per tonne basis. This is because the entire capacity of the truck, both in terms of weight and volume, was fully utilised. Now suppose that the demand for the transportation of foam rubber products rises relative to that of metal products. This means that rubber products could be expected to displace some metal products in each consignment and that the entire weight capacity of each truck will no longer be fully utilised. In the previous example rubber products occupied twice the volume of metal products. Now suppose that each 3 cubic metre load consists of 2.6 cubic metres of foam rubber weighing 0.65 tonnes and 0.4 cubic metres of metal products weighing 0.2 tonnes so that only 85 per cent of the weight capacity and the entire volume capacity is utilised. In this case, the volume capacity is the only real constraint. The freight rate for rubber products must rise to $27.08 per tonne in order to displace the necessary volume of metal products. Metal products will continue to be carried at the rate of $22.00

per tonne and each consignment will recover its entire cost for the journey of $22.00 per tonne of capacity. In this example even when the weight capacity of the truck is not fully utilised there is a saving of $2.25 per tonne on the cost of transporting rubber due to freight consolidation. Thus bulky goods with a higher than average stowage factor will pay a premium on a per tonne basis only when there is a freight imbalance such that the volume capacity constraint is reached before the weight constraint.

Back loading

Back loading refers to the situation that arises because a truck leaving a major centre full cannot be guaranteed a full cargo for the return journey. Back loading is of major significance in Australia because the amount of long distance freight going out of Sydney and Melbourne, which are the major centres of manufacturing, is far greater (overall) than that coming back in from the other capital cities[1]. For a journey to be undertaken the combined revenue from both legs must at least cover the cost (including a normal return on funds) of the round trip. Once again the question of joint costs arises since the return leg of the journey is produced in fixed (equal) proportions to the outward leg. Demand, i.e. willingness to pay, becomes the decisive factor in allocating these joint costs. For example, since demand for shipments to go from Sydney to Brisbane is greater than for the return journey, this will be reflected in higher rates charged by freight forwarders for the outward journey from Sydney to Brisbane (typical rates being $800 for a full truck or 3.43¢/tonne km) compared with the back haul Brisbane-Sydney (typical rate being $480 for a full truck load or 2.06¢/tonne km). Since, in general, owner-operators charge freight forwarders the same for a full load as for a half load, the true extent of freight imbalance is better represented in freight forwarders rates than in owner-operator charges.

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(1) For details see Table 3.2.

When any individual freight forwarder experiences an increase in demand for the outward leg he may simultaneously raise the rate for the outward leg and lower it for the back leg. This discourages freight movements in one direction and encourages movements in the reverse direction. At the same time it helps to even out freight imbalances between different companies.(1)

Unbalanced loadings of freight for different legs of the same journey are sufficient in magnitude to generate large freight rate differentials. Based on typical rates quoted by freight forwarders for a full truckload(2) rates from Melbourne to Adelaide, Sydney and Brisbane are respectively 28, 45 and 87.5 per cent higher than the in-bound leg. The rate from Sydney to Brisbane is 66 per cent higher than the in-bound leg. Also may the low rates out of Brisbane, are conducive to decentralised development of industry in that region.

There is a close anology between freight consolidation and back loading. With freight consolidation, goods are differentiated by their stowage factors, while in the backloading situation goods are differentiated by the direction in which they are travelling. Both situations involve the allocation of the total costs of a single activity to differing products/services (for which the sum of their separable costs falls short of total costs (i.e. some joint costs remain)). Premiums paid on bulky goods or on the outbound legs of journeys will both be reflections of an imbalance in demand for a given supply.

The freight forwarders

The freight forwarding sector of the industry is characterised by a small number of very large firms. Brambles Industries Ltd, Thomas Nationwide Transport Ltd, Ansett Freight Express Ltd and

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(1) Mohring H., Transportation Economics, Ballenger, (Cambridge, Mass 1976), pp. 60-62.
(2) See Table 3.6.

Mayne Nickless Ltd are major freight forwarders that all feature in the list of Australia's one hundred largest companies[1]. Chapter 2 has described the growth of the major freight forwarders - a growth which suggest increasing industry concentration at least until the mid sixties. A survey undertaken by Rimmer[2] in 1967 revealed that the top eight freight forwarding firms handled 68 per cent of interstate freight consigned by road, rail and sea. A subsequent analysis[3] in 1975 revealed that the top four freight forwarders accounted for 45 per cent of interstate movements between capitals and provincial cities and that the top eight handled 61 per cent. Superficially these figures suggest a high but fairly static degree of concentration. The particular characteristics of the industry where every sub-contractor is a potential freight forwarder and where the precise volume of the task remains obscure, prevents too much importance being attached to these figures. Such a degree of concentration is not however rare in Australian industry.

While there exists a degree of concentration in the freight forwarding sector this concentration alone does not necessarily provide scope for the exercise of economic power. What this degree of concentration does suggest is that there are some significant economies of scale in the industry.

The nature of freight forwarding, being concerned with the organisation of the line haul, requires some minimum scale of operations and terminals to facilitate the consolidation of freight of different densities and backloading.

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(1) Of course, freight forwarding is only one aspect of the total operations of these firms.

(2) P.J. Rimmer, Freight Forwarding in Australia, Department of Human Geography Publication HG/4 (1970), Research School of Pacific Studies, ANU, Canberra, 1970, pp. 92-107.

(3) P.J. Rimmer, 'Freight Forwarding: Changes in Structure, Conduct and Performance', in K.A. Tucker (ed) The Economics of the Australian Service Sector (London: Groom Helm, 1977) p. 183.

This minimum scale required for a firm to achieve freight consolidation and backloading economies is small compared to the size of the major firms currently operating in the industry. Once sufficient freight is available for effective consolidation, and once terminal facilities and pick up and delivery fleets are provided at each end of the line haul, these economies rapidly diminish. Similarly the ability to arrange back loads is only dependent on a presence at either end of the line haul and not a large scale operation. While these scale economies appear to have the potential to accrue to relatively small firms, the investment required to achieve even this level of operation effectively delimits the subcontractor's ability to take on the characteristics of a freight forwarder and similarly discourages the customer from setting up his own freight forwarding firm as an ancillary operation.

It is by no means clear whether these economies of scale persist in a diminished form for the larger freight forwarders. There may be some returns to large firms in having freight flows of sufficient volume to smooth out daily or seasonal fluctuations and to support a large comprehensive network, but there does not appear to be any clear evidence of this. Large scale economies where they occur would seem to be the result of an ability to maintain a fleet of specialised vehicles, such as very heavy haulage units, for translocation throughout a transport network. In fact the only real support for suggestions of significant scale economies in freight are the large freight forwarding firms themselves, that is, appeal to the 'observed survivor' principle.(1)

The structure of the freight forwarding sector does not rule out the possibility of monopoly rents being earned. However the absence of significant barriers to entry effectively mitigates

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(1) George Stigler, Organisation of Industry, Homewood, Illinois: Irwin, 1968, Chapter 7.

against the persistence of significant monopoly rents. Entry into the freight forwarding industry is completely unhindered by legal constraints or industrial associations. Minor barriers of scale exist but they are not sufficient to prevent entry into the industry and large scale returns are not sufficient to insulate the major freight forwarders from relatively small-scale competition. This means that operators in the industry are faced with potential competitors should monopoly rents, or the potential for monopoly rents, arise.

Sub-contractors

The organisational structure of the industry is diverse with many small operators. Table 3.3 shows the fleet size distribution of articulated vehicles in each of the five mainland states. This Table and Figure 3.1 show that the vast majority of trucks are part of small fleets of one or two vehicles. The relatively small number of larger fleets correspond to small specialist fleets owned by the large freight forwarders or are part of firms' ancillary operations. This diverse pattern of ownership of articulated vehicles is common to those vehicles engaged in long distance road haulage. The sub-contractor sector is characterised by a large number of small fleet owners, the typical owner-driver owning one or two trucks.

There are varying degrees of specialisation within this sector based on either the characteristics of the trailer or the location of the driver and rig. The diversity of ownership and the well developed used truck market however effectively mitigate against the development of even transitory monopoly based on market segmentation.

The diversity of ownership of rolling stock is largely the result of a number of national wage decisions beginning with the Interstate Drivers Award. This award and subsequent revisions made the employment of sub-contracting owner-operators a much more attractive

TABLE 3.3 - NUMBER OF FLEETS IN EACH FLEETSIZE INTERVAL[a] 1976

State		Fleetsize													
		1	2	3	4	5	6	7	8	9	10	11-20	21-30	30+	TOTAL
N.S.W.	Number	5117	959	324	151	80	68	39	27	25	24	74	16	20	6924
N.S.W.	Percentage	73.9	13.9	04.7	02.2	01.1	01.8	00.6	00.4	00.4	00.3	01.1	00.2	00.2	100.0
VIC	Number	3466	572	194	88	57	25	27	13	6	9	28	13	4	4502
VIC	Percentage	77.0	12.7	04.3	01.9	01.3	00.5	00.6	00.3	00.1	00.2	00.6	00.3	00.1	100.0
QLD	Number	2825	482	181	86	55	24	24	11	9	6	21	4	4	3732
QLD	Percentage	75.7	12.9	04.8	02.3	01.5	00.6	00.6	00.3	00.2	00.2	00.6	00.1	00.1	100.0
S.A.	Number	1585	295	89	67	24	19	17	18	13	9	35	8	12	2191
S.A.	Percentage	72.3	13.5	04.1	03.1	01.1	00.9	00.8	00.8	00.6	00.4	01.6	00.4	00.5	100.0
W.A.	Number	1174	189	77	39	12	7	8	7	4	2	12	6	3	1540
W.A.	Percentage	76.2	12.3	05.0	02.5	00.8	00.5	00.5	00.5	00.3	00.1	00.8	00.4	00.2	100.0
TOTAL NUMBER (FIVE MAINLAND STATES)		14167	2497	865	431	228	143	115	76	57	50	170	47	43	18889
PERCENTAGE		75.0	13.2	04.6	02.3	01.2	00.8	00.6	00.4	00.3	00.3	00.9	00.2	00.2	100.0

(a) Excludes Rigid Trucks.
Source: Bureau of Transport Economics.

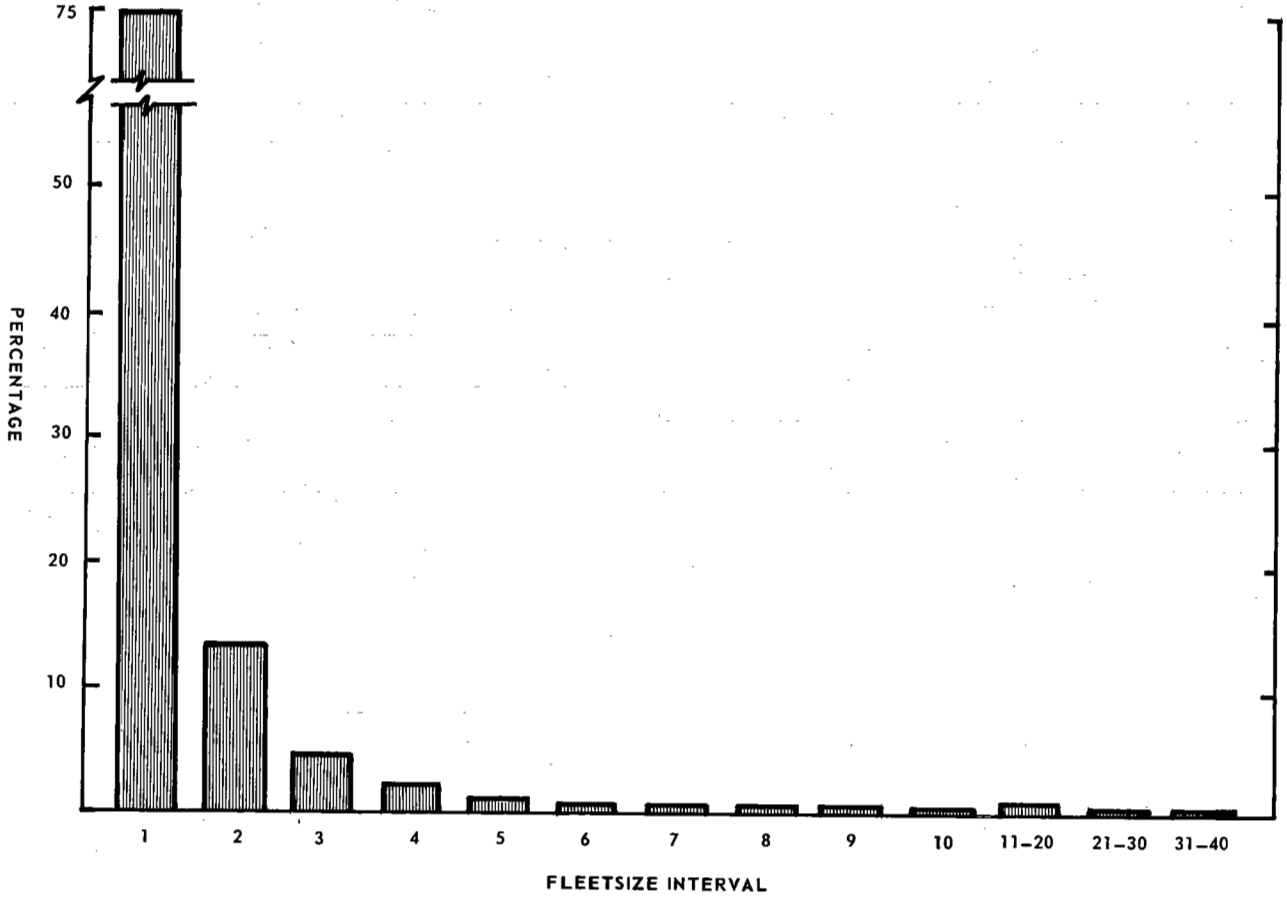

FIGURE 3.1 – PERCENTAGE OF FLEETS IN EACH FLEETSIZE INTERVAL FIVE MAINLAND STATES 1976

proposition vis-a-vis the use of employee drivers. The use of sub-contractors has offered a means of removing institutional and legal constraints on the market price of labour.

There are also economies in vesting the ownership of the rolling stock in the hands of the driver through the elimination of vehicle abuse and attention to maintenance.

The high costs of employee labour have also placed rigid limits on the scale of sub-contracting firms. Beyond the employment of one or two employee drivers the diseconomies of scale provide an effective barrier to the growth of individual sub-contractors' operations.

The sub-contracting sector of the industry is thus made up of a large number of self employed operators subject to essentially no economic regulations on entry, exit, pricing or location.

Allegations have sometimes been made that because there is complete freedom of entry into sub-contracting there is some potential for freight forwarders to collude in the setting of rates for sub-contractors' services. Clearly if it were true that freight forwarders are in a position to exercise such monopsony power freight rates would be higher, fewer goods would be moved and, so long as there is a rising supply price for sub-contractors' services, then their price received would be lower than in the situation with complete competition throughout the entire industry. None the less, sub-contractors must continue to obtain returns sufficient to keep them in the industry because not only is there freedom of entry but also freedom of exit. Provided information pertaining to exit and entry opportunities is adequate a situation cannot persist for any length of time where sub-contractors obtain less than a normal rate of return on their invested funds or less than the 'wage' available outside the industry. This is because sub-contractors who were receiving less than the normal return due to, for example, the downturn in the industry, would eventually leave the industry. The resultant decrease in the

supply would increase the rate of return for those electing to remain. However departure from the industry can be a drawn out and painful process especially when a downturn in the industry will be reflected in depressed second hand prices of trucks. Clearly those sub-contractors who have a deep attachment to the industry and have little in the way of other alternatives will be the last to leave.

MARKET CONDUCT

This section examines the pricing practices of the long distance road haulage industry with a view to establishing the competitive status of the industry.

Competitive Environment

There are three groups 'trading' in the market for long distance freight services: the sub-contractors who supply the line haul tasks, the freight forwarder who purchases the line haul task and resells the complete transport package and the consumers of the total service package. These three groups interact in what is essentially the same market; each with a different perspective.

Figure 3.2 describes the theoretical interaction between the three groups operating in the market for road haulage services.

The major input supply curve S_1S_1 describes the supply of line haul services by the sub-contractors. To this input supply curve must be added the cost incurred by freight forwarders for supplying the remaining freight services associated with the entire transport package. The gap between S_1S_1 and SS represents the cost of supplying these additional services. The freight forwarder's margin EE_1 represents the costs additional to the basic line haul. The demand curve D_1D_1 represents the derived demand for the services of sub-contractors. This is derived by subtracting the freight forwarder's cost from the the industry demand curve.

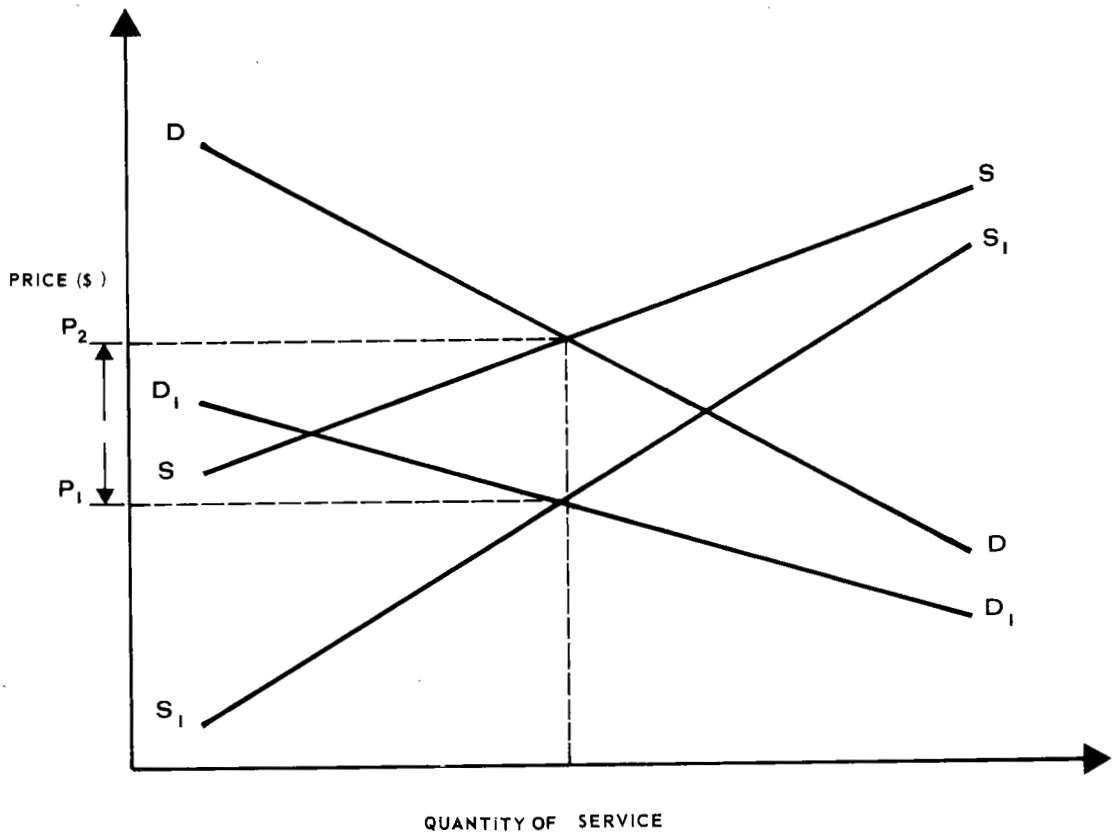

FIGURE 3.2 MARKET EQUILIBRIUM IN THE LONG DISTANCE ROAD HAULAGE INDUSTRY

The reason freight forwarders are able to charge a margin (EE_1) over and above the cost of sub-contractors' services is that they offer additional services to the consumer. These services include pickup and delivery for small consignments and also offer the benefits of consolidation to consignors of goods with differing stowage factors.

From this diagram it can be seen that each of the participants in the market is responding to the combined forces of supply and demand, but each only perceives one facet of the market in operation. Thus the consumers of transport services are not directly aware of the supply of line haul services but they respond to the derived supply in the form of the supply of the total transport package. Similarly, the sub-contractors are not aware of the demand for the total package but respond to the demand for line haul services. The individual participants in the system do not need to be aware of the market mechanism to be subject to its operation.

This theoretical consideration is obviously simplistic as the long distance freight industry is characterised by market segmentation. Both the transport services demanded and offered are highly specific in terms of origin and destination, equipment required and the conditions attached to the task. However, individual operators are generally free to move from one segment of the market to another quite readily. Within limits the same degree of mobility applies to freight forwarders who can translocate their entire operations or the emphasis of their operations in response to market pressure.

The long distance road transport industry is characterised by a large number of aggressively independent sub-contractors who act without any suggestion of collusive activity. The ease with which new operators can enter the industry effectively prevents the emergence of exclusive associations that could restrict supply and hence raise prices. In periods of excess supply due to rising fuel prices or other factors that affect demand, sub-contractors

are also free to leave the industry, albeit with some capital loss on their trucks. Such adjustment of industry capacity via exit helps prevent any long-term alleged 'exploitation' due to excessive numbers of sub-contractors.

While there are a few very large freight forwarders, the number of freight forwarders is quite large. Even the major freight forwarders appear to be unable to influence prices in the market place by manipulating either supply or demand. The relative ease of entry into the industry and the constant threat of potential competition from customers becoming their own freight forwarders prevents significant market manipulation from this source.

The consumers of transport services are also unable to influence prices. In this context prices in the industry are set in a free competitive environment. Whilst there may be short term fluctuations in supply or demand which may give rise to windfall gains or losses, in the longer term both freight forwarders and sub-contractors will find it worthwhile to remain in that sector provided that they obtain a competitive rate of return.

Table 3.4 presents typical rates currently being paid to sub-contractors between a number of mainland capital cities. These rates are expressed in terms of dollars per tonne and are generally payable on the nominal weight capacity of the truck being used. There is some deviation from this practice within the industry but the large freight forwarders are understood to apply this practice as a general rule. Variation from these rates occur for 'painted' operators and operators of specialised equipment. Deviation will also occur on a day to day basis reflecting variations in supply and demand of services available to individual freight forwarders. In this context the rates presented in this table should be regarded as broad averages about which day to day rates may fluctuate.

TABLE 3.4 - REPRESENTATIVE SUBCONTRACTORS' RATES[a], JUNE 1979

$/tonne

From	To				
	Sydney	Melbourne	Brisbane	Adelaide	Perth
Sydney	-	18-20	28-30	28-30	110
Melbourne	23-24	-	48-50	20	100
Brisbane	20	30	-	35	125
Adelaide	28-29	15-16	48	-	70-75
Perth	n.a.	36	-	22-24	-

(a) From industry sources.

These rates also reflect the backloading principle that was described above. Since the rates paid to sub-contractors are set freely by the interaction of demand and supply, any freight imbalances between different legs of the same journey will be reflected in lower demand on one leg and a corresponding lower rate. These rates are only indirectly related to costs. The relevant costs from the owner drivers' viewpoint are the costs of the round trip, not those applicable to any one segment of the journey.

As a reflection of the fact that market participants can be subject to the 'invisible hand' of market forces without knowing the full picture, it is interesting to note that some freight forwarders who quote vastly different rates for different legs of the same journey could give no rational explanation.

The services offered by freight forwarders vary independently of the line haul. Freight forwarders offer a range of services such as consolidation, pickup and delivery and different levels of priority. These services are offered independently of the line haul characteristics. Each of these service combinations will correspond to a form of market segmentation but freight forwarders are generally free to shift their resources from one segment to another at fairly short notice. The discussion that follows below concentrates on a single aspect of the services offered by freight forwarders, that is consignment size. Quality differentials such as speed and reliability are not considered by freight forwarders to relate closely to the size of consignment to be handled. Small consignments and consignments having extreme stowage factors require either consolidation and/or separate pickup and delivery and terminal services. Full truckloads of medium density freight may bypass these additional services and become simple line hauls with the freight forwarder offering only organisational/administrative services. The ruling prices for consignments of different size and characteristics reflect the level of service demanded.

Major firms in the industry produce rate schedules which theoretically apply to consignments under 10 tonnes weight. In practice however, these rate schedules apply only to very small consignments or small to medium consignments that are being shipped on a 'one off' basis. For this type of consignment the prices are standardised in the form of a printed scheduled price.

The rates applying to 25 kilogram consignments are presented in Table 3.5. An attempt has been made to relate these rates to the cost of these services to the freight forwarder. The cost figures are estimates based on the line haul cost and the pricing and delivery costs and the terminal costs for this size of consignment. The percentage 'mark-up' on these costs is quite variable ranging between 34 and 117 per cent.

These mark-ups however must cover the overheads and accounting costs involved in organising the consignment. The relatively high mark-up is a reflection of the considerable recording costs and paper work that do not vary with consignment size.

Although scheduled rates theoretically apply to all consignments under 10 tonnes, in practice they apply to only a very small percentage of total consignments. The great bulk of consignments are moved at 'discounted' rates that are set in the competitive market. Even small consignments that are moved frequently (or more than once) attract significant discounts from the schedules rates. These lower rates in part reflect the lower costs per unit of weights in handling larger consignments and lower accountancy charges per consignment with a flow of standardised consignments.

At the other end of the scale are consignments of full truck loads. Table 3.6 shows a series of representative rates applying between capital cities for full truck loads involving single pick-up and delivery on a regular basis. An attempt has been made to compare these rates to cost by assuming the full sub-contractor rate applies to a 23 tonne vehicle. The generated margins are again quite variable. The general pricing principle applied in

TABLE 3. 5 - REVENUE[a] AND SEPARABLE COSTS[b] TO A REPRESENTATIVE FREIGHT FORWARDER FOR A SINGLE 25 KG INTERSTATE CONSIGNMENT, JUNE 1979

$

From	To				
	Sydney	Melbourne	Brisbane	Adelaide	Perth
	REVENUE				
Sydney	-	10.78	11.58	12.18	18.25
Melbourne	10.78	-	12.68	9.43	15.70
Brisbane	9.98	12.13	-	14.58	20.88
Adelaide	11.35	9.25	14.95	-	n.a.
Perth	13.95	12.90	15.75	11.63	-
	SEPARABLE COSTS				
Sydney	-	7.00	7.25	7.25	9.25
Melbourne	7.10	-	7.75	7.00	9.00
Brisbane	7.00	7.25	-	7.38	9.63
Adelaide	7.23	6.90	7.70	-	n.a.
Perth	n.a.	n.a.	n.a.	n.a.	-

(a) Source: T.N.T. Road Fast National Rate Schedule 1 February 1979.

(b) Estimated by adding the line haul costs (sub-contractor's rate) to terminal and pickup and delivery costs that apply at either end of the line haul. Terminal and pickup and delivery costs were estimated using data contained in a paper delivered by J.A. Gouldstone of T.N.T. at 1977 Outlook Conference: The 'Trip End' Features of Transport, Outlook for Domestic Freight Session, Canberra ANU, 8 September 1977.

TABLE 3.6 - REVENUE[a] AND SEPARABLE COSTS[b] COSTS TO A REPRESENTATIVE FREIGHT FORWARDER FOR A SINGLE LOAD CONSIGNMENT, JUNE 1979

$

From	To				
	Sydney	Melbourne	Brisbane	Adelaide	Perth
	REVENUE				
Sydney	-	550	800	700	n.a.
Melbourne	800	-	1500	680	n.a.
Brisbane	480	800	-	n.a.	n.a.
Adelaide	800	530	n.a.	-	n.a.
Perth	n.a.	n.a.	n.a.	n.a.	-
	SEPARABLE COSTS				
Sydney	-	460	690	690	n.a.
Melbourne	552	-	1150	460	n.a.
Brisbane	460	690	-	n.a.	n.a.
Adelaide	667	368	n.a.	-	n.a.
Perth	n.a.	n.a.	n.a.	n.a.	-

(a) Rates quoted by a major forwarder for a full 23 tonne load, single pickup and delivery on a regular basis with no distinctive features.

(b) Estimated from the representative sub-contractor rates presented in Table 3.2. Includes the assumption that the sub-contractor is paid the maximum rate on the full 23 tonne load.

the industry is to aim to cover the direct line haul cost plus 20 per cent on consignments of this size to allow for other costs and the ability to meet freight forwarders' own costs and a normal rate of return on capital invested.

This aim is obviously constrained by market forces and freight forwarders will, if necessary, cut prices almost to the level of the line haul cost. Caution should be attached in drawing any firm conclusion from the margins depicted in this table. The rates that are applied are merely a snapshot of the rates being set by an individual forwarder on a particular day. These rates may not be realised on all or even most of the consignments moved. They also reflect the freight imbalance of that particular forwarder which may deviate significantly from the overall freight imbalance. Imperfect knowledge also contributes to significant deviations but the rate at which freight rates change for consignments of this size suggests that a highly competitive market is operating.

Between these two extremes, prices appear to be competitively set for the range of consignment sizes. Drawing general conclusions about the consignment type split of freight forwarders is difficult due to the diversity of their operations. Information gained from one major forwarder suggested that two thirds of the freight task was handled as single pickups and deliveries(1). Only about 20 per cent of freight is handled through terminals at both ends of the line haul, the remainder receiving terminal treatment at one end only.

There is a degree of specialisation practised by most forwarders. Thomas Nationwide Transport, for instance, is believed to have a proportionally larger volume of small tasks than the other major forwarders.

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(1) Or double pickup and delivery.

Despite the degree of market segmentation in the industry and the variability of specialisation of the participants, the evidence available would suggest that rhe industry is aggressively competitive at both the sub-contractor-freight forwarder and the freight forwarder-customer levels.

MARKET PERFORMANCE

The aim of this section is to examine conflicting claims made about freight forwarders. On the one hand some sub-contractors allege that they are the victims of exploitation and market manipulation by large freight forwarding companies wielding monopoly power. On the other hand freight forwarders may be depicted as offering a highly valuable package of transportation services to the benefit of both sub-contractors and consumers in a highly competitive market environment. In fact in many respects they see themselves subject to the same impersonal forces of the market place as do sub-contractors themselves. The previous sections have spelt out the rather unusual circumstance of the almost complete absence of artificial entry barriers because entry is not licensed or regulated in any way. Moreover, while there are economies arising from the technology of freight forwarding operations, on the available evidence they do not appear to be of major significance once a moderate scale of operations is reached.

If the criticisms of freight forwarders are valid, some empirical support might be found by examining the accounting rates of return on capital invested by the major freight forwarders. The alleged monopoly power should result in rates of return[1] which are

(1) Monopoly rents could also be reflected in managerial slack. But where the company concerned is subject to the threat of takeover by a corporate 'raider' by ousting the existing management and installing efficient managers, the opportunity for enjoying such a 'quiet' life is limited. Takeovers have in the past, and continue to be, a threat to the management of freight forwarding companies.

well in excess of the competitive rate of return. This competitive rate is equal to the supply price of capital to the industry, making due allowance for the degree of risk attached to the investment.

Some of the broad financial characteristics of the four major freight forwarders are shown in Table 3.7. While it is clear from this table that the four leading firms do not appear to be suffering any major financial hardship, it is not easy to interpret the results. Ansett Transport Industries relies heavily on its airline operations for its overall profitability and in any case only 9.4 per cent of revenue is generated by freight forwarding activities. Thomas Nationwide Transport, T.N.T., has diversified widely. For example, it has moved into coastal shipping and a wide variety of activities both in Australia and overseas. Mayne Nickless provides security services as well as a range of other activites. Brambles is also diversified into a variety of transport-related activities.

A comparison of shareholders' funds, as shown by company reports and as revealed by their stock market valuation, indicates that the market capitalisation based on share values exceeded the balance sheet valuation for Ansett, Mayne Nickless and Brambles. For T.N.T. the company report valuation exceeded the average market valuation. There are numerous possible explanations for these discrepancies. It is possible that Ansett, Mayne Nickless and Brambles have not fully revalued physical assets which have appreciated due to inflation. Shareholders' funds may also be understated because only the nominal value of debentures etc. have been deducted from the total asset value to arrive at shareholders funds. Long term debenture issues made years ago when (nominal) interest rates were low could be repurchased today at market prices well below their face value recorded in the accounts. A third possible explanation, which could be consistent with the allegations made by the sub-contractors, is that the companies concerned are earning monopoly rents which are then capitalised as 'goodwill' in the share price. This possibility is investigated subsequently.

TABLE 3.7 - FINANCIAL CHARACTERISTICS OF FOUR MAJOR FREIGHT FORWARDERS 1978

	Ansett	T.N.T.	Mayne Nickless	Brambles
Revenue ($A million)				
Total	518	475	236	220
Aust. only	n.a.	219	n.a.	n.a.
Freight Forwarding	49 (9.4%)	n.a.	n.a.	n.a.
Assets ($A million)				
Total	332	314	110	161
Net Profit[a] ($A million)	19.0	14.4	10.5	11.1
Employment (numbers)	13 786	14 950	n.a.	4 680
Shareholders' Funds ($A million)	100.8	93.5	62.7	79.8
Market value of shareholders' funds[b] ($A million)	116.0	84.1	85.0	111.5
Operating Income[c] after tax ($A million)	28.2	23.7	13.1	14.2
Funds Employed[d] ($A million)	201.09	236.64	80.51	119.84
Ratios				
Profit: Revenue (%)	3.67	3.03	4.43	5.00
Profit: Shareholders' Funds (%)	18.8	15.4	16.7	13.9
Profit: Market Value of Shareholders Funds (%)	16.4	17.1	12.4	10.0
Operating Income: Funds Employed (%)	14.0	10.0	16.3	11.9

(a) Includes extraordinary items and is net of tax.
(b) Market value of equity shares based on the midpoint share price between the high and the low.
(c) Net profit (after tax) plus interest paid.
(d) Shareholders' funds plus the value of interest bearing debt. Trade creditors and all other liabilities have been excluded on the grounds that there is usually some implicit quid pro quo in such arrangements which will already tend to be reflected in the costs the company has incurred.

Source: Annual company reports for 1978 and stock exchange data.

Much financial reporting is based on ratios of profit to total assets. Almost invariably the rates of return appear implausibly low. The difficulty with this method is that profit accrues to equity share owners exclusively whereas assets are financed by debenture holders as well as share owners. Once interest payments on debt are added back in to obtain operating income, and funds employed are taken to consist of shareholders funds plus the value of interest-bearing debt, far more realistic rates of return, ranging from 10 to 16.3 per cent, are obtained.

Before proceeding to consider whether these rates of return could be considered excessive, it is instructive to examine a more disaggregated set of accounts where activities relating to freight forwarding are separated from the other activities of the company. Table 3.8 shows such a set of returns for the road and rail sections of Mayne Nickless for 1974. The rate of return on assets employed of only 4.8 per cent is rather low. However this may be partly accounted for by the period in which these poor returns occurred. Employee drivers had received several large wage increases and the industry was in the process of adjusting to this by greater reliance on sub-contractors to carry out line haul operations.

The most reliable data on rates of return by companies comes from equity share valuations for shares traded on the stock exchange. Data based on company accounts is dependent on a range of accounting conventions. Unfortunately, market rates of return derived from stock market data can tell very little about the existence or otherwise of monopoly profits. Since the stock exchange is relatively close to the ideal of a perfectly competitive market, any actual or prospective monopoly profits earned by companies are quickly capitalised into the share price. Since share prices incorporate 'goodwill' i.e. monopoly returns, the market rate of return will be only a competitive one. Market data is, however, not entirely without value because it provides information on the riskiness of the activities of the companies themselves. This element of risk will play an important role in determining the competitive supply price of capital to the firms concerned.

TABLE 3.8 - MAYNE STEPHENS GROUP ESTIMATED FINANCIAL RESULTS YEAR ENDED 30/6/74

	Road	Rail	Total[a]
Revenue ($m)	6.85	6.60	13.44
Operating Costs ($m)	6.50	6.23	12.66
Section Margin ($m)	0.35	0.37	0.78
Overheads ($m)			
Division ($m)	0.11	0.04	0.15
Group ($m)	0.04	0.03	0.07
Corporate ($m)	0.18	0.17	0.35
Total ($m)	0.33	0.24	0.56
Total Costs ($m)	6.83	6.47	13.22
Revenue ($m)	6.85	6.60	13.44
Net	0.02	0.13	0.22
Return on Assets (%)			4.8

(a) Does not necessarily equal sum of road and rail due to rounding.

Source: Prices Justification Tribunal, Prices Justification Act 1973: Mayne Nickless Limited Matter No. N74/2532. Report by Prices Justification Tribunal, 1974, p.35.

The objective is to compare the accounting rate of profit (net of tax) on shareholders'funds with the competitive supply price of capital to the firm which includes a component known as the 'systematic risk'. 'Systematic risk' is that component of the total riskiness of an investment which cannot be insured against by holding a diversified portfolio of assets. Should the profit rate based on company accounts greatly exceed the estimated supply price of capital to the firm, both averaged over some time period, then this may constitute evidence of excessive or monopoly returns.

Table 3.9 sets out the actual accounting rates of profit earned by the four major freight forwarders together with a moderate sized forwarder, Fleetways. Table 3.10 sets out the estimated competitive supply prices (rates of return) of capital to the five companies over the same eight year period. These predicted supply prices of capital to the firms in question have been obtained by adding to the riskless rate of return, given by the market yield to maturity on government bonds, the estimated risk premium for the five companies in question.

Details concerning the estimation of the required risk premium using the Capital Asset Pricing Model (CAPM) are set out in Appendix 2.

The actual average profit rate (excluding extraordinary items) for Ansett at 14.73 per cent is only slightly higher than the predicted yield required of 13.41 per cent. The actual average return by Brambles is 3 percentile points (13.32 - 16.23) below the theoretical yield required, largely because of a high estimated risk component. For Mayne Nickless there is a close correspondence between the two while for Thomas Nationwide Transport even the very high average accounting rate of profit of 17.7 per cent is not high enough to match the theoretically required yield of 19 per cent. The estimated systematic risk component for T.N.T. is very high at 10.8 per cent. This is presumably due to its very extensive operations in the USA and elsewhere overseas. The

TABLE 3.9 - NET (AFTER TAX) ACCOUNTING RATE OF PROFIT OF THE MAJOR FREIGHT FORWARDING COMPANIES[a] 1971-1978

Year	Ansett Transport Industries	Brambles Industries	Mayne Nickless	Thomas Nationwide Transport	Fleetways
	%	%	%	%	%
1971	10.7 (15.7)	13.5	11.3	13.2	6.8
1972	12.6 (12.9)	11.5	10.1	16.3	2.8
1973	12.1 (37.1)	8.1	9.6	19.5	(-7.1)
1974	12.0 (14.4)	12.0	11.4	18.6	3.0
1975	14.1 (8.5)	17.3	13.9	16.9	5.2
1976	21.6 (17.7)	15.6	17.7	21.2	6.9
1977	20.3 (12.7)	15.3	16.8	20.1	9.2
1978	18.3 (18.8)	15.9	16.7	17.1	n.a.
Geometric Mean	14.73	13.32	13.09	17.69	-

(a) Ratio of net profit (after tax) to shareholders' funds. Extraordinary items are excluded but make no significant difference except in the case of Ansett where asset revaluations etc. mostly relating to airline operations, have made a significant difference. The adjusted figures are shown in brackets.

Source: Individual company annual reports.

TABLE 3.10 - PREDICTED THEORETICAL RATES OF RETURN REQUIRED BY EACH OF FIVE FREIGHT FORWARDERS[a] 1970-71 TO 1977-78

Financial Year	Ansett	Brambles	Mayne Nickless	T.N.T.	Fleetways	Theoretical Yield on 10 year non rebate bonds
	R_i	R_i	R_i	R_i	R_i	(R_f)
1970-71	12.05	14.85	12.45	17.65	11.85	6.85
1971-72	11.44	14.24	11.84	17.04	11.24	6.24
1972-73	11.11	13.91	11.51	16.71	10.91	5.91
1973-74	13.40	16.20	13.80	19.00	13.20	8.20
1974-75	14.70	17.50	15.10	20.30	14.50	9.50
1975-76	15.20	18.00	15.60	20.80	15.00	10.00
1976-77	15.43	18.23	15.83	21.03	15.23	10.23
1977-78	14.82	17.62	15.22	20.42	14.62	9.62
Geometric Mean	13.41	16.23	13.82	19.05	13.21	8.14
$(R_m-R_f)\beta_i$ [b]	5.2	8.0	5.6	10.8	5.0	

(a) These are theoretical returns required on equity share capital measured net of corporate tax.
(b) Market rate of return minus risk free rate of return times beta coefficient.
Source: See the Appendix 2.

stimated risk factor for Ansett is only about half the T.N.T. figure and this may be accounted for, at least in part, by its protected airline operations.

The evidence revealed by these tables on rates of return is consistent with a priori views about the competitive nature of the environment in which freight forwarders operate. These firms on average seem to be earning profits at roughly the rate required to cover the competitive supply price of the equity funds that they need for investment purposes. There is no evidence of monopoly profits based on a close examination of their accounting rates of return. This evidence based on accounting rates of return cannot of course be considered definitive in the light of the many well known defects in accounting data. It is, however, consistent with the other information relating to the structure of the industry.

Conclusion

In summarising the basic conclusion which has been reached, it may suffice to quote the findings of the Prices Justification Tribunal[1] concerning the freight forwarding industry.

> '... in general the industry is competitive. Not only is there competition within the industry between different operators and different modes of transport, but in addition the industry can only exist by offering its clients a more efficient and economic service than they can set up for themselves.'

No evidence has been found to support allegations that freight forwarders wield monopoly control over the industry although, naturally, one cannot rule out the possibility of isolated pockets where some collusive or local monopoly practices occur. Certainly, if such pockets exist, on the evidence available they are not characteristic of the industry. These allegations may have arisen partly because line haul sub-contractors are naturally going

(1) Prices Justification Act 1973, Mayne Nickless Limited, Matter No. N74/2532, 1974, p.3.

through a difficult period when fuel prices are rising and economic activity is at low ebb. They may have arisen also because published freight rates give a misleading impression of the actual rates charged by freight forwarders.

TABLE 3.1 - A COMPARISON BETWEEN SCHEDULED RATES[a] AND ESTIMATED[b] COMPETITIVE RATES FOR A SINGLE 10 TONNE INTERSTATE CONSIGNMENT, JUNE 1979

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From	To				
	Sydney	Melbourne	Brisbane	Adelaide	Perth
	SCHEDULED RATES				
Sydney	-	582	643	716	2644
Melbourne	582	-	1001	456	1821
Brisbane	444	791	-	999	2140
Adelaide	650	390	1030	-	n.a.
Perth	1180	1017	1650	737	-
	ESTIMATED COMPETITIVE RATES				
Sydney	-	275	400	350	n.a.
Melbourne	400	-	750	340	n.a.
Brisbane	240	400	-	n.a.	n.a.
Adelaide	400	265	n.a.	-	n.a.
Perth	n.a.	n.a.	n.a.	n.a.	-

(a) Source: T.N.T. Road Fast National Rate Schedule, 1 February 1979.

(b) Estimated by havling the competitive rate for full truck load single pickup and delivery. The basic sub-contractors' rate applies for loads involving up to two pickups and delivery so the basic costs of two 10 tonne loads are not appreciably different from one 23 tonne load.

n.a. not available.

TABLE 3.2 - INTERSTATE FREIGHT MOVEMENTS BY ROAD, 1975-76

('000 tonnes)

Origin	Destination				
	Sydney	Melbourne	Brisbane	Adelaide	Perth
Sydney	-	2165	649	465	22
Melbourne	1915	-	389	539	60
Brisbane	302	103	-	107	7
Adelaide	385	463	172	-	36
Perth	18	16	-	40	-

Source: Bureau of Transport Economics, Estimates of Australian Interregional Freight Movements, 1975-76, (AGPS, Canberra, December 1978).

CHAPTER 4 - INTERMODAL COMPETITION

In this Chapter sea, air and rail freight tasks are examined in the context of their potential ability to compete with road. The factors influencing modal choice are discussed in order to establish the major reasons for the existing modal split and the likely impact of any changes in these factors on the competitive position of road in the freight transportation task.

SEA FREIGHT TASK

The Australian coastal shipping task is mainly one of moving very large quantities of bulk commodities, both liquids (for example, crude and refined petroleum) and solids (for example, iron ore, coal and other minerals). In 1975-76, 47.1 million tonnes were shipped on the Australian coast and this total was composed of 18.7 million tonnes of bulk liquids, 22.1 million tonnes of bulk solids, 1.5 million tonnes of iron and steel products, and 4.6 million tonnes of non-bulk freight.

Some 3.4 million tonnes of the 4.6 million tonnes of non-bulk freight carried by sea in 1975-76 was over routes where sea transport was the only available mode: this total was made up of 3.2 million tonnes carried across Bass Strait and 0.2 million tonnes between Adelaide and Kangaroo Island.

Only 1.2 million tonnes of coastal non-bulk cargo was carried in 1975-76 over routes served also by land transport. About half of this total occurred on four long distance routes where sea transport had obvious advantages. Three of these routes emanated from Sydney/Melbourne where 135 000 tonnes were shipped to Brisbane, 130 000 tonnes to other Queensland centres, and 135 000 tonnes to Fremantle. Most of this freight was composed of new motor vehicles and general cargo. The fourth long distance route extended from Fremantle to ports in the north of Western Australia and to Darwin over which 134 000 tonnes were carried.

In 1975-76, general freight shipments from Fremantle to Sydney/ Melbourne totalled 77 000 tonnes. Other long-haul sea movements in that year included 45 000 tonnes of refined copper from Townsville to Port Kembla and 44 000 tonnes of general cargo from Darwin and Western Australian ports taken to Fremantle. Some significant short-haul sea movements occurred in Queensland and the Northern Territory where 45 000 tonnes and 42 000 tonnes respectively were distributed by sea to isolated coastal and off-shore settlements.

Available shipping capacity is sufficient only to meet these current demands. In the future the slower sea mode may attract some present road traffic as road rates rise relative to sea, but it can be expected that the freight quantities transferred will not become significant until such time as relative rates by road rise substantially. At that time, the amount that can actually be transferred to sea will depend on the availability of additional shipping capacity required to service the routes concerned.

AIR FREIGHT TASK

In terms of the freight task within Australia, the share transported by air in 1975-76 was insignificant, comprising only 117 000 or 0.06 per cent of the total. Most air freight capacity is provided as a by-product of air passenger services, with less than 30 per cent of the task being carried by air cargo transports.

Air freight plays an important role in the carriage of high value and perishable non-bulk freight where transit time is the predominant factor underlying modal choice. For this reason air transport is not expected to constitute a major source of competition for the road haulage industry, except in specialised markets such as fashion and pharmaceutical goods.

RAIL FREIGHT TASK

In 1975-76 total rail freight consignments in Australia, which

amounted to approximately 213 million tonnes, were considerably less than the estimated total consignments of 900 million tonnes carried by road. In terms of long distance movements the quantity carried by rail (50 million tonnes) compares with 67 million tonnes carried by road transport[1]. Interstate rail freight was dominated by non-bulk freight - 5.8 million tonnes out of a total of 7.7 million tonnes. Most of this represented inter-capital city movements.

In relation to competition between road and rail on major freight corridors by freight classification, rail dominated the bulk solids market (iron ore, coal, etc between road and rail on major freight corridors) and road the bulk liquids market (crude and refined petroleum). The major market in which rail and road compete is in non-bulk traffic. Table 4.1 shows the relative market shares in this traffic for major freight corridors. With the exception of the Perth-Eastern Australian corridors, road is the dominant mode in the transportation of non-bulk freight.

The freight rate differential and the shipment volume differential between Melbourne and Sydney, as shown in Table 4.2, demonstrate that freight rates are not the sole determinant of modal choice. For similar cargoes the rates on road were higher than rail but the majority of the traffic was moved by road transport.

Various quality factors of transportation such as transit time, reliability, loss and damage to freight affect the perceived overall price paid for transport services. While the significance of each factor varies according to the type of cargo, in general, the higher the quality of a service the lower the costs of inventories and production downtime to consumers of the service. Transport operators are therefore able to charge a premium for quality factors. Insofar that the cost savings to customers exceed the premium paid for a higher quality of service, quality factors, in addition to line haul charges, will be important determinants in modal choice.

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(1) Bureau of Transport Economics, Estimates of Australian Inter-regional Freight Movements, 1975-76, (AGPS, Canberra, 1978).

TABLE 4.1 - ESTIMATES OF INTER-CAPITAL CONSIGNMENTS OF NON-BULK FREIGHT BY ROAD AND RAIL[(a)]: PER CENT

Origin	Mode	Destination						
		Sydney	Melbourne	Brisbane	Adelaide	Perth	N.T.	A.C.T./Qbn
Sydney	Road		86.2	67.6	72.7	9.1	28.8	87.9
	Rail		13.1	30.1	27.3	63.5	1.9	12.1
Melbourne	Road	78.7		62.5	58.8	15.7	24.4	95.5
	Rail	19.8		19.0	31.3	63.5	17.1	0.5
Brisbane	Road	71.4	69.6		89.9	28.0	54.2	
	Rail	28.1	17.6		10.1	36.0	0.0	
Adelaide	Road	86.3	56.7	88.2		21.7	81.8	
	Rail	13.7	43.3	11.8		74.1	18.2	
Perth	Road	18.9	12.2	0.0	34.2			0.0
	Rail	53.7	42.7	100.0	65.0			100.0
N.T.	Road	60.0	100.0	100.0	58.1		100.0	
	Rail	40.0	0.0	0.0	41.9		0.0	
A.C.T./Qbn	Road	89.7	100.0					
	Rail	10.3	0.0					

(a) Figures may not add to 100 per cent as these figures are only the proportion of the total task carried by road and rail.

Source: Bureau of Transport Economics. Estimates of Australian Interregional Freight Movements, 1975-76, (AGPS, Canberra, 1978).

TABLE 4.2 - REPRESENTATIVE RATES AND RATE AND SHIPMENT VOLUME DIFFERENTIALS: MELBOURNE TO SYDNEY

Product	Rate ($ per tonne) (a)			
	Overnight road	Normal road	Unit train	Normal rail
Foodstuffs	280	35	26	30
Animals	(b)	(b)	(b)	(b)
Crude materials, inedible	(b)	(b)	26	(b)
Mineral fuels, lubricants	(b)	(b)	26	(b)
Oils and fats	(b)	(b)	26	(b)
Chemicals (drums)	(b)	35	30	(b)
Chemicals (powder)	280	30	23	23
Manufactured goods	280	35	26	25
Machinery	(b)	30	30	(b)
Miscellaneous	280	35	26	25

Ratio	Rate Differential (maximum)	Shipment Volume Differential
Overnight road: Unit train	12.2:1	
Normal road: Unit train	1.5:1	
Overnight road: Normal rail	12.2:1	
Normal road: Normal rail	1.5:1	
Northbound, road: rail		1.8:1
Southbound, road: rail		2.5:1

(a) Rates are for door-to-door consignments of over 5 tonnes shipped on a regular basis.
(b) Product not carried by this transport company.

Source: Industry sources quoted in Peter Gilmour, An Analysis of of Modal Choice for Freight Movements between Melbourne and Sydney, Commonwealth Bureau of Roads, Melbourne, November 1974, p.14.

Information available to the Bureau indicates that, for all quality factors, customers view road transport as superior to rail. The imbalance in market shares in favour of road transport in the long distance non-bulk freight market suggests that the quality aspects of road transport outweigh the additional price for the services.

Further supportive evidence of the importance of the quality of service in the determination of modal choice was presented to the Transport Industry Advisory Council in 1977 by the National Freight Forwarders' Association[1]. Their assessment of road/rail competition on various major routes is summarised below:

- Sydney-Melbourne-Sydney - 'straight load' freight, that is, one pick up, one delivery -is cheaper by road transport when the labour content is taken into consideration. General freight on this route is cheaper by rail van.

- Melbourne-Adelaide-Melbourne - as for Sydney-Melbourne-Sydney.

- Sydney-Adelaide - price advantage in favour of road.

- Adelaide-Sydney - rail has a slight price advantage for general freight for this route. However, as the road vehicles which have made the Sydney-Adelaide trip have to return, the majority of forwarders' traffic goes by road.

- Sydney-Brisbane - rail, particularly R.A.C.E., is far cheaper than road for general freight; however, full trailers loads are cheaper on road.

- Brisbane-Sydney - the rail rating structure generally precludes the use of rail out of Brisbane.

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(1) J. Linfoot, National Freight Forwarders' Association, Paper presented to Transport Industries Advisory Council, Working Committee No. 2, 13 October, 1977.

- Melbourne-Brisbane - the same comments apply as for Brisbane-Sydney-Brisbane except that for certain freight densities, R.A.C.E. is price competitive.

- Sydney-Melbourne and Adelaide-Perth - in all cases except out-of-gauge loading, rail has a price advantage.

- Melbourne-Sydney-Brisbane and Adelaide-Darwin - road is the main mode used. Road/rail with containers and transit units are used particularly during the wet seasons.

ROAD/RAIL COMPETITION

In an earlier study Fitzpatrick and Taplin[1] concluded that there is scope for substantial substitution between road and rail freight. In Appendix 1 of this report, consideration of the road rate relative to the rail freight rate shows that, for inter-capital city road haulage as a whole, a 10 per cent increase in road freight rates[2] relative to rail freight charges would imply an immediate 5.5 per cent reduction in the quantity of goods transported by road and a 9.0 per cent decrease in the longer term. For the Melbourne-Sydney haul, a 10 per cent increase in road freight rates relative to rail freight rates could be expected to result, in the short-term, in a 3.4 per cent reduction in the volume of goods carried by road on that route. In the longer term it is likely to result in a 7 per cent reduction in road freight.

Rail has the potential to expand its share of the traffic task in the market where freight has a stowage factor ranging from 3-4 cubic metres per tonne. This can be illustrated by referring to Figure 4.1 which shows the relationship between the stowage factor

(1) M.D. Fitzpatrick and J.H.E. Taplin, A Model to Estimate the Price Elasticity of Demand for Transport of Goods by Road, 6th Conference Australian Road Research Board, 1972.

(2) Any significant change in road freight rates will have implications for the subsidy paid under the Tasmanian Freight Equalisation Scheme. Under the terms of this scheme subsidies paid on freight moving between Tasmania and the mainland are based, in part, on road freight rates applicable over comparable routes on the mainland.

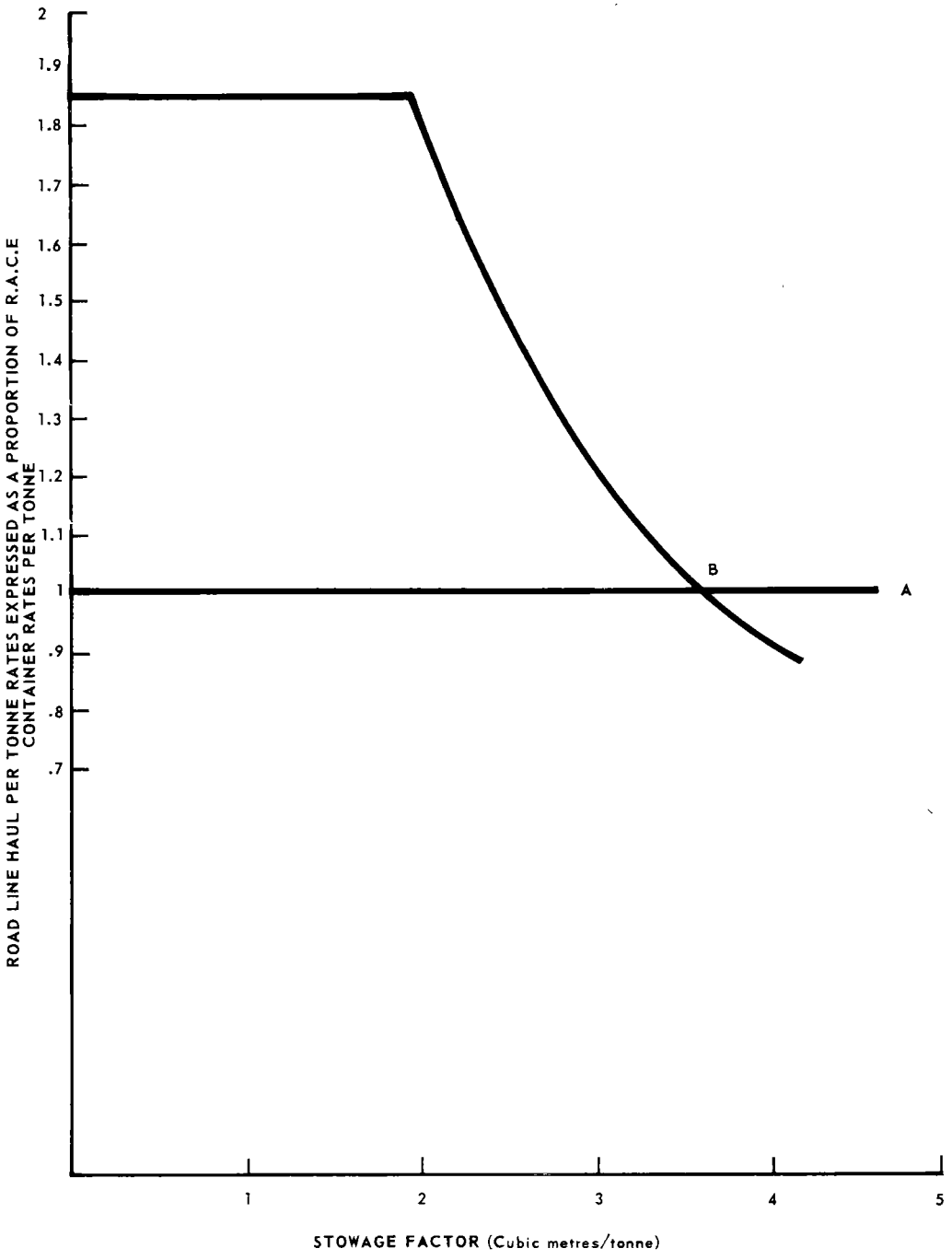

FIGURE 4.1 MELBOURNE TO SYDNEY–RELATIVE PRICES PER TONNE FOR ROAD AND RAIL TRANSPORT

and the relative price charged per tonne for line haul by road and rail on the Melbourne-Sydney route. The horizontal line designated by A, indicates where rail and road rates are equal and the point of intersection, B, indicates the type of cargo in terms of density where road and rail compete. That is, at approximately 3.5 cubic metres per tonne. If price was the sole criterion in modal choice, freight with a stowage factor greater than 3.5 cubic metre per tonne would move exclusively by road. Conversely, freight with a lower stowage factor than 3.5 cubic metres per tonne on this route would be confined to rail. A change in road rates relative to rail would be represented by a shift in curve and a consequent change in the modal split. A decrease in road rates would be represented by an downward shift in the curve signifying an increase in the share of the traffic task moved by road, and conversely, an increase in road freight rates would be represented by an upward shift of the curve reflecting rail's increased share of the market.

Should rail increase its share of the long distance traffic task at the expense of road, it is probable that most of the increased freight would be conveyed in containers, particularly R.A.C.E. containers. A price-cost analysis[1,2] relating to R.A.C.E. containers transported between Sydney and Melbourne has indicated that the revenue from these services not only exceeds the costs to the railways but also contributes towards railway overhead. Over the round trip the average revenue raised per container (involving approximately 17 tonne weight capacity and 34 cubic metres) is $352 compared with the average cost per container of $310.

The most important conclusion of this Chapter is that rail is a strong competitor for inter-capital city freight. Rail appears to

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(1) For details of cost estimates refer to Appendix 4.
(2) Prices were taken from "Railways of Australia R.A.C.E. Container Services Rates and Conditions Effective from 1 March 1979"; N.S.W. P.T.C. Marketing Division.

be very price competitive even when it is priced at a level such that revenue received more than covers operating costs. Any substantial increases in road freight rates, in the absence of similar increases in rail freights could be expected to produce a shift in freight from road to rail.

CHAPTER 5 - POSSIBLE GOVERNMENT INTERVENTION INTO ROAD TRANSPORT: IMPACT ON MARKET STRUCTURE AND PERFORMANCE

In this section of the report Commonwealth and State responses to the problems raised by the owner-drivers' dispute and the impact of these responses on market structure, conduct and industry performance are discussed. The analysis is limited to proposals which have been publicly canvassed by various governments.

MINIMUM FREIGHT RATES FOR OWNER-DRIVERS

It is clear from Table 2.2 that owner drivers have, in recent years, experienced a cost price squeeze. If rates which ensured an adequate return emerged then the cost price problem could be resolved.

The task of setting suitable minimum freight rates for owner-drivers for various routes is fraught with difficulties. As was pointed out in Chapter 3 the rates paid to owner-drivers reflect demand - as well as supply - side considerations. These demand orientated factors include 'backloading', a reflection of freight imbalances between the outward and inward legs, and 'freight consolidation' reflecting any imbalance between freight of different densities. For example, if legislated minimum rates on the Sydney-Brisbane route did not reflect the freight imbalance shippers of freight from Brisbane to Sydney would be penalised by much higher charges. This in turn would harm efforts being made by various Australian governments to encourage decentralised industrial development outside the major centres of Sydney and Melbourne. Moreover, under the present system owner-operators are encouraged to adopt vehicles with weight and volume configurations which match the density of the freight to be moved. It would be an immense if not impossible task to set regulated rates which fully reflect freight imbalance and load density imbalance over all the major routes and which could fluctuate in response to changes in these market factors.

Even if 'suitable' rates could be set there are associated legal difficulties and implications for intermodal competition and the general level of prices which require close examination.

One legal question relates to whether such an arrangement could be implemented under existing Trade Practices legislation.

The provisions of the Trade Practices Act (1974) are directed towards maintaining and encouraging competition. The Act attempts to strengthen the competitiveness of private enterprise and to strengthen the position of the consumer relative to producers and distributors. Under the Act, lessening of competition by a corporate body through contract, agreement or understanding is in contravention of the Act (Sect. 45-45D). Authorisation can be sought on public welfare grounds for the provision of arrangements etc. otherwise prohibited under the Act (Sect. 88-91). Interim permission for restrictive practices is given by the lodging of a Notification of Exclusive Dealing which gives exemption until the Commission has made a determination (Sect. 93). Statutory exemptions from the Act also exist.

There has been no authorisation given to general carriers/ hauliers, although it has been sought.[1] Authorisation has been confined to associations in particular specialised industries. (e.g. Pre-mixed Concrete Carriers.[2])

Agreements on rates of pay for owner-drivers may be acceptable to the Trade Practices Commission. However, if such arrangements flowed on through indexation to the overall freight rate, as charged by the freight forwarders, the Commission could view this as a restrictive practice and act accordingly.

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(1) Commission Determination 953 of 10/1/1977. Application for Authorisation under Sect. 88(1) by New South Wales Road Transport Association.

(2) See Trade Practices Decision Re G. & M. Stephens Cartage Contractors Pty Ltd, September 1977.

In addition to legal problems relating to the Trade Practices Act there are difficulties associated with Arbitration courts setting minimum rates for owner-drivers. The Commonwealth Arbitration Commission probably does not have the power to arbitrate in the case of self employed or contract workers. Federal unions do not appear (see Moore v. Doyle, 1968) to be able to legally admit these categories of workers to the union.

However, in the Report of the Industrial Commission of New South Wales on Section 88E of the NSW Industrial Arbitration Act it was argued that NSW had the power to set minimum rates for both intrastate and interstate owner operators by amendment to the NSW Arbitration Act. It maintained that such legislation could survive a challenge under Section 92 of the Constitution.

One possible solution to the Commonwealth/State impasse in this area which has been proposed is the establishment of the inter-state commission.

In October, 1975 the Federal Parliament enacted the Interstate Commission Act. Royal assent was granted on 27 October 1975.

The purpose of the legislation was to establish an Interstate Commission in accordance with the provisions of Section 101 of the Australian Constitution which states:

> "There shall be an Interstate Commission, with such powers of adjudication and administration as the Parliament deems necessary for the execution and maintenance, within the Commonwealth, of the provisions of this Constitution relating to trade and commerce and of all laws made thereunder".

Though the legislation was proclaimed in late 1975, the government has not activated the Interstate Commission.

Under the current legislation the function of an Interstate Commission include, inter alia, adjudication of whether the terms and conditions, including charges, of an interstate transport service are reasonable and just and, if not, what terms and conditions should apply (Section 9(2)(a)).

With the exception of interstate services covered under the Airlines Agreement Act, 1952-73, the two airlines policy of Australia, the powers of the Commission extends over all forms of hire and reward interstate transportation. Nevertheless, there are no provisions in the legislation enabling the Commission to regulate and control any sector of the transport industry by way of licensing operators or setting prices for services, similar to that applied by the Interstate Commerce Commission in the United States of America.

The second aspect of the proposal to set minimum terms and conditions for owner drivers relates to intermodal competition and the effect on the general level of prices.

Effect on Road-Rail Competition

With respect to the effect on intermodal competition, any increase in road haulage freight rates will, in the absence of similar increases in competing modes, result in other modes gaining freight which was previously carried by road. One of the principal conclusions which can be drawn from the examination of intermodal competition contained in Chapter 4 of this report is that long distance road hauliers face considerable competition from rail. The analysis presented in Appendix 3 of this paper indicates that, for the Melbourne-Sydney haul, a 10 per cent increase in road freight rates relative to rail freight charges could be expected to result in the short term, in a 3.4 per cent reduction in the quantity of goods transported by road on that route. In the longer term it is likely to result in a 7 per

cent reduction in road freight. For inter-capital city road haulage as a whole, a 10 per cent increase in road freight rates relative to rail freight rates would imply an immediate 5.5 per cent decrease in the volume of goods carried by road and a 9.0 per cent decrease in the longer term.

An analysis of the effect of a general increase in road transport charges on the Consumer Price Index is set out in Appendix 5. The results depend on the level of wage indexation. Figures 5.1 and 5.2 show the effect on the CPI of a 10 per cent increase in road transport and road and rail charges respectively, under various levels of wage indexation. With full wage indexation a 10 per cent increase in road charges is expected to lead to a .895 per cent increase in the CPI while a 10 per cent increase in road and rail charges is expected to result in a 1.328 per cent increase in the CPI.

Even if rates could be set then not only are there likely to be legal difficulties and undesirable macroeconomic implications associated with any proposal to introduce minimum freight rates for owner-drivers, but it is also likely that any legislation formulating minimum rates would be ineffective. As was pointed out in the previous section, the owner-driver section of the industry is highly competitive. In this competitive situation, which could be accentuated by losses in trade to rail as a result of higher road charges, owner-drivers could be expected to offer 'discounts' to freight forwarders in order to achieve work. Unless governments were prepared to introduce a bureaucracy devoted to enforcing minimum charges, the result of widespread discounting would be to defeat the whole object of the legislation.

REGULATION OF ENTRY

The regulation of entry into the road haulage industry has been suggested as a method to resolve the current difficulties of truck operators. This would involve state governments agreeing

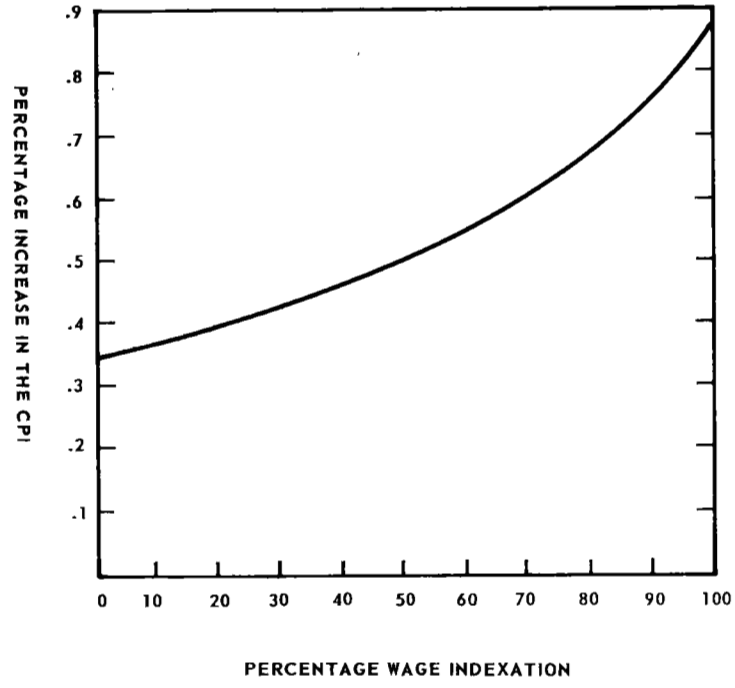

FIGURE 5.1 - EFFECT OF A 10 PER CENT INCREASE IN ROAD HAULAGE RATES ON THE CPI

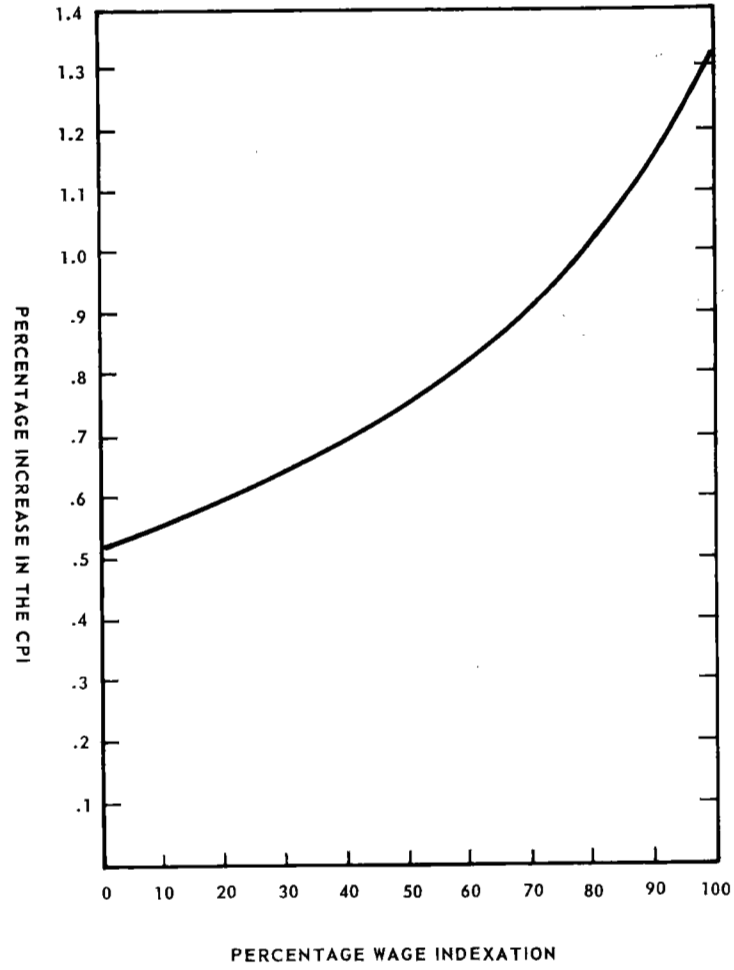

FIGURE 5.2 - EFFECT OF THE 10 PER CENT INCREASE IN ROAD/RAIL HAULAGE RATES ON THE CPI

to limit the number of licences to road hauliers to operate vehicles above a certain weight.

There would appear to be potential constitutional difficulties associated with restrictions on entry for interstate trucking. It is possible that, even if all States agreed to implement licencing provisions in a uniform manner and came to unanimous agreement about the number of licences issued by each State, a challenge in the High Court may invalidate the scheme on the grounds of impediments to free trade between the States. Failure by the States to achieve consensus on licensing provisions for interstate operations would make the regulations liable to constitutional challenge.

From the viewpoint of stability within the trucking industry, the licensing procedure would only be effective if it restricted entry and thus allowed truck operators to raise charges and achieve a better return on funds. This would imply a scarcity value on licences and result in a market for them.

If this option were to be seriously entertained, it would be desirable if consideration was given to auctioning licences in the first instance, to prevent windfall profits accruing to existing operators.

If this form of regulation was effective it would result in higher prices, and might cause a modal shift towards rail. The operators who were permitted to remain in the industry would have a smaller total market but would charge higher rates than at present. Regulation in the trucking industry has a history of resulting in higher prices. In European countries, with little or no regulation, freight rates are about 45 per cent lower than in the regulated markets of West Germany and the U.S.[1] It has been

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(1) T.G. Moore, 'The Beneficiaries of Trucking Regulation', The Journal of Law and Economics. Vol. XXI(2), October 1978.

estimated that the earnings of driver operators are 50 per cent higher in a regulated industry.[1] This increase in operators' earnings and freight rates represent transfers of income to the truck operators from the freight forwarders and the community.

Whilst it would be generally desirable to provide some regulation of the industry on safety grounds (e.g. road worthiness and gross weight checks for heavy vehicles), regulation of entry would not appear to be a suitable solution to the cost-price squeeze faced by owner-drivers. Indeed this type of regulation would appear to be contrary to the spirit of the industry and owner-drivers' aspirations. The industry is basically one where the 'little man' can run his own independent business in a competitive situation where reward is related to effort. The restriction of entry would mean that this situation no longer existed.

In addition, overseas experience indicates that once regulation has been initiated it would be difficult to deregulate at a latter date. Any move towards deregulation would face vigorous opposition from both labour and management groups within the regulated industry - groups which are likely to be politically influential.

MORATORIUM ON DEBTS

It has been suggested that, in order to alleviate the financial difficulties of owner-drivers, some form of moratorium on debts for owner-drivers could be introduced.

Approximately one in every three trucks on the road is subject to some type of financial arrangement, being either leased or acquired by hire purchase. The break-up between leasing and hire purchase is approximately 60:40. The typical hire purchase

(1) D.D. Wychoff and D.H. Maister, 'The Owner Operator Independent Trucker', 36, ICC Transport Statistics in the United States (1973), quoted in T.G. Moore, op.cit.

arrangement is of the order of $50 000 to $60 000 to be repayed over a period of four years with typical repayments of $1 000-$2 000 per month from a gross income of $6 000 per month. Typical monthly leasing charges are similar to hire purchase charges.

Subject to meeting certain provisions, tax concessions are available for owner-drivers when purchasing[1] new vehicles. As was pointed out earlier there is an investment allowance of 40 per cent for trucks ordered before 1 July 1978 and in operation within 12 months of order. An investment allowance of 20 per cent for vehicles ordered after 1 July 1978 is applicable up to June 30 1985. In common with other small businesses, road hauliers are also entitled to deduct interest charges and a depreciation allowance (either 20 per cent per annum simple or 30 per cent per annum reducible) from their taxable income. Leasing charges are also tax deductible although no depreciation allowance is granted as this has already been included in the leasing charge.

Finance companies have indicated that it is considerably more difficult to obtain finance than when the trucking industry was reasonably buoyant. Due to tighter credit controls, there are now less potential entrants into the industry. In this way the market has operated to reduce the rate of entry into the industry in a period when returns are low.

Finance industry officials have reservations about the proposed moratorium on debts owed to finance companies. They are of the opinion that a moratorium may be too unwieldy and difficult to administer. Moreover, there are problems in defining who would qualify for the moratorium. For some owner-drivers a moratorium would simply postpone the inevitable decision to leave the industry. As finance companies are commercially operated concerns

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(1) Persons leasing a truck are also entitled to receive the investment allowance provided the finance company elects to pass it on to the lessee.

which do not lend to people who cannot meet repayment conditions, an assessment of credit worthiness is determined before any financial contract is agreed. Institutions have therefore been acting to reduce the flow of new entrants into the industry by releasing less finance to this industry because such action is in their own commercial interest.

Informal contact with finance industry officials indicates that they would be prepared to give owner-drivers who are experiencing financial difficulties a sympathetic hearing. Repossession has inherent problems of storage of the asset and this has meant that the repossession rate for trucks by financial institutions has been low. No finance company would wish to store a valuable and continually depreciating asset which has the potential to raise money if in operation. It is in the interest of these institutions that vehicles be kept on the road.

Evidence[1] suggests that the rate of bankruptcies in the road transport industry is of the same order as small businesses engaged in retail trade. Lack of business acumen, and notably the inability to perceive and respond to changing economic and financial conditions, would appear to be the major cause of bankruptcy. Bankruptcies appear to be much more related to general economic activity than to peculiarities of the industry[2].

ACTIONS TO FACILITATE THE OPERATION OF A COMPETITIVE MARKET

There are a number of options open to governments which would facilitate the operation of a competitive market and assist in overcoming the problems identified in this industry.

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(1) The Financial Stability of the Road Haulage Industry in Western Australia, Policy Research Paper, Director General of Transport, Western Australia, 1976 Chap. 5.

(2) This is a generalisation from the West Australian Road Transport Industry Study. The findings of the above paper suggest that bankruptcies in the Western Australian road industry are less influenced by economic conditions than in other states.

At the Commonwealth-State level, governments could agree to prepare information designed to provide potential new entrants to the industry with realistic details regarding the rates of return and financial obligations involved in operating a truck. Such action could be expected to result in fewer and better informed new entrants[1].

Consideration might also be given by States to assist persons wishing to leave the industry. Such assistance might take the form of retraining schemes, preference for government employment, or direct financial assistance. Any proposals along these lines may however encourage other industries with similar structural problems to make application for similar treatment.

STATE FUEL TAXES

In addition to actions directed towards alleviating trucking industry problems there is the problem of recouping the costs imposed by heavy vehicles through damage to roads. It is estimated that these costs currently run at about $232 million annually.[2] Road maintenance charges involved collection of only $44 million annualy which represents only 19 per cent of total costs imposed by heavy vehicles. The extent to which the user pays principle is applied in this particular case will have an important effect on inter modal competition.

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(1) It should be noted however that, while there is a common assumption that many of the participants in the industry lack business skills, the way in which some operators formed 'straw companies' and other fairly sophisticated techniques to avoid road maintenance charges would indicate that this outcome may not necessarily emerge.

(2) Estimated by applying the Consumer Price Index to estimates made Fred Affleck and Associates. For methodology see 'Road User Charges in Australia', Working papers prepared for the sub-committee on Road User Charges appointed by the Co-ordinating and General Committee of the Australian Transport Advisory Council, Nov-Dec 1976.

One option which is under consideration by States as a means of recouping revenue lost by the removal of road maintenance charges is the introduction of state fuel taxes. The Western Australian Government has already legislated to implement this type of tax as from 1 July 1979 and other States are considering similar proposals.

This section examines the impact of the Western Australian legislation and the proposed legislation discussed at Australian Transport Advisory Council (ATAC)[1] on state finances and the financial status of road transport operators.

The Western Australian legislation[2] provides for a tax of 0.9¢/litre on motor spirit and 3.0¢/litre on automotive distillate consumed by road based vehicles. The tax is to be levied at a wholesale level in the form of a Business Franchise Fee, the rate being set according to the volume of sales over the previous year[3][4].

Provision is also made under the legislation for changes in vehicle licence (registration) fees. The concession of a 50 per cent reduction in registration fees on vehicles subject to road maintenance charges under previous legislation is to be withdrawn. The registration fees on petrol and diesel powered vehicles that were not previously subject to road maintenance charges are to be reduced by 20 per cent and 60 per cent respectively.

Unlike the road maintenance charge scheme, this scheme is administratively efficient since it is levied at the wholesale level and, because it uses an almost identical tax base as the Commonwealth excise legislation, most necessary records are already in existence.

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(1) Department of Transport News Release 79/1286, 13-6-79.
(2) Road Traffic Amendment Act, 1979.
(3) This provision is designed to avoid a constitutional challenge that the tax is a defacto excise tax.
(4) The legislation also provides for a flat licence fee. In terms of revenue raised, the flat fee is insignificant.

The financial implications of the scheme for the State Government are summarised in Table 5.1. The total package is expected to yield a net figure of $10.8m which is $4.5m in excess of the $6.3m that will be lost as a result of the abolition of road maintenance charges. This is, however, considerably short of costs imposed by heavy vehicles' damage to roads.

The incidence of the legislative package however departs greatly from the user pays principle. As an alternative to the previous system of road maintenance charges, the scheme has effectively redistributed more of the cost of heavy vehicle operation from the heavy vehicle users to the private motorist. Table 5.2 summarises the incidence of the scheme on the operations of different classes of vehicle. The table shows that the owners of all classes of light passenger vehicles suffer a small financial impost and, as a result of the scheme, the owners of truck type vehicles all benefit. The size of the net gains for truck type vehicles however vary greatly from $3 to $20 for the lighter rigid trucks to $1878 for the heavier articulated vehicles.

A small tax has been imposed on a large number of small vehicle owners in order to provide substantial financial benefits to a relatively small number of owners of heavy articulated vehicles.

If the state legislation discussed at ATAC were to be adopted, all States would gain revenue in excess of that collected through road maintenance charges. In common with the Western Australian legislation, passenger vehicle owners are obliged to subsidise the operators of heavy vehicles. The potential gains for heavy vehicle operators from the state legislation discussed at ATAC are significantly greater than those available under the Western Australian legislation. For instance a Volvo 5 axle articulated truck stands to gain over $3000 per year compared to $1878 from the Western Australian legislation.

TABLE 5.1 - WESTERN AUSTRALIAN LEGISLATION: EXPECTED ANNUAL REVENUE

		$M
(i)	Tax on motor spirit	12.9
(ii)	Tax on distillate	5.7
(iii)	20 per cent reduction in passenger vehicle registrations	9.2
(iv)	Abolition of 50 per cent concessions on registration of vehicles previously paying road maintenance charges (RMC)	2.0
(v)	50 per cent concession on licence fees for light diesel vehicles	.6
(vi)	Total Revenue from new tax (i)+(ii)-(iii)+(iv)-(v) (Previous RMC Collections $5.2m)	10.8

TABLE 5.2 - INCIDENCE OF THE WESTERN AUSTRALIAN PACKAGE

	Present Annual Charges ($)	Proposed Annual Charges(a) ($)	Gain (+) or Loss (-) as a result of changes to legislation ($)
MOTOR CARS			
Honda Civic 1500cc	31	38	-7
Cortina 2000cc	43	49	-6
Falcon 4100 cc	65	74	-9
Fairlane 4900 cc	91	99	-8
Mercedes 3000 cc Diesel	58	71	-13
RIGID TRUCKS			
Bedford 4 tonne	245	242	+3
Dodge 8 tonne	351	353	+2
Dodge 5 tonne diesel	282	258	+24
Toyota 7 tonne diesel	331	311	+20
ARTICULATED TRUCKS-DIESEL			
International 3 axle	932(b)	854	+78
Volvo 4 axle	2156(b)	1534	+662
Volvo 5 axle	4322(b)	2444	+1878

(a) Based on average mileage figures for specified vehicles.
(b) Includes road maintenance charges.
Source: W.A. Hansard, 16 May 1979, p.1536.

The implications of both the Western Australian legislation and the state legislation discussed at ATAC are similar. They both divert the financial burden resulting from heavy vehicle pavement damage from the owners of such vehicles onto the owners of petrol driven passenger vehicles. This is made politically possible by the vastly different tax bases involved. These schemes will improve the financial situation of the long distance owner operator. These gains however may be short lived. At the very least they will reduce the possibility of owner-drivers achieving significant rate increases from freight forwarders. Any reduction in costs to the owner-operator may be passed on in the form of lower sub-contractor rates and lower freight forwarder rates in the competitive environment of this industry. Hence the beneficiary of these schemes is likely to be the consumer of long distance transport and not the intermediate producers. The cost savings may result in lower overall road freight rates and thus an increase in road transport's share of the total transport task. Alternatively it may merely delay the impact of rising fuel prices through the import price parity and crude oil levy policies of the Commonwealth.

CHAPTER 6 - SUMMARY OF CONCLUSIONS AND SCOPE FOR FURTHER RESEARCH

SCOPE FOR FURTHER RESEARCH

Because of time constraints and in keeping with the Ministerial terms of reference, this study has been prepared on the basis of readily available information. With respect to road, a more detailed outline of the industry would be possible if further research was conducted on the pattern of road transport. By utilising substantial survey resources, and with the co-operation of freight forwarders, research could be carried out on the level and pattern of freight rates. However, whether the results of such work would justify the resources required to produce reliable results is open to doubt.

Perhaps the most useful work on the road transport industry which could be carried out is for the Bureau to develop a statistical system so that indices of operating costs for owner-drivers, freight rates paid by freight forwarders to owner-drivers, and freight forwarders' rates could be produced on a regular basis. Some of this work has been carried out - See Table 2.2 - of this report. The work required to expand this information and to produce the indices on a regular basis would be relatively modest.

Substantial research could be carried out on other transport modes. A study of rail pricing and the allocation of costs to various types of traffic and routes would be particularly valuable in identifying the nature of railway deficit.

Research on these other modes would enable a comprehensive description of the whole transport system to be prepared. This would facilitate a more thorough analysis of inter-modal competition.

CONCLUSIONS

The major problem perceived within the industry is the financial plight of the owner-driver. There is convincing evidence that the rates paid to owner-drivers have not kept pace with operating costs. This sector of the industry also suffers from a temporary oversupply situation. This is essentially a short-term disequilibrium problem. As was pointed out earlier, in the longer term exit from the industry of some sub-contractors will alleviate this problem.

Both government and the community recognise that this process of adjustment is likely to be drawn out and impose considerable hardship on marginal operators. However, there are difficulties associated with attempts by governments to alleviate these problems through direct intervention in the market. The basic conclusion of this report is that all sectors of the industry appear to be highly competitive. Not only is there competition within the industry, but rail has the potential to capture a significant amount of the long distance inter-capital city freight market from road if road haulage charges were increased. In a competitive environment such as this, government attempts to increase rates for owner-drivers, either by some form of minimum freight rate or regulation of entry, may be difficult to achieve and, even if successful, could result in a significant erosion of road's share of the total freight market.

Attempts to alleviate the owner-driver cost price squeeze, through the removal of road maintenance charges and the imposition of a system of fuel taxes, involves shifting the cost of maintaining roads damaged by heavy vehicles from the operators of heavy vehicles to the operators of passenger vehicles. While these schemes are likely to improve the financial position of the long distance owner-operator in the short-term, the competitive nature of the industry means that much of these gains will eventually be passed on to the consumer of long distance transport.

Finally, there are two allegations commonly made in the industry which, on the basis of the data examined in this report, are of questionable validity.

First, there is the claim that freight forwarders exploit their monopoly position in the industry. There is no evidence to support the contention that freight forwarders make monopoly returns: their returns do not appear to be excessive and reflect the relative risk of investment. Indeed there is no evidence to suggest that even the large freight forwarders maintain a monopoly position in the industry. At the same time, in circumstances in which there is an oversupply of owner-drivers, freight forwarders are in a position in the short-term to secure rates from owner-drivers which are below the long-term economic costs of providing sub-contractor services.

Second, no nexus between the fundamental problems of the long-distance (inter-capital city) road freight operator and 'unfair' subsidised competition from rail could be identified. If present, subsidised pricing by rail, could, in the short-term, exacerbate the problem of oversupply of owner-drivers and in the long-term distort efficient allocation of traffic between road and rail. Unfortunately, lack of comprehensive actual freight rate and cost information for rail services precluded detailed examination of road/rail competition. However, an analysis of the major inter-capital city route (Sydney-Melbourne) indicated that rail container services when they are priced at a level that covers attributable operating costs are price competitive with road.

APPENDIX 1 - TERMS OF REFERENCE FOR BTE STUDY OF ROAD/RAIL/SEA COMPETITION IN DOMESTIC LONG DISTANCE FREIGHT MARKET

1. On the basis of readily available information, investigate and report on the structure, market conduct and performance of the domestic long distance freight industry with particular reference to:

   (a) the extent to which the market share of long distance road transport is affected by changes in freight rates (and particularly by increases in contract rates payable to road transport owner-drivers by freight forwarders);

   (b) the inter-relationship between the freight forwarding section of the industry and road transport owner-drivers and sub-contractors.

2. Undertake explorative investigations that would enable identification of the extent and nature of research that would be required to provide an authoritative assessment of the structure, market conduct and economic performance of the domestic long distance freight transport market for road/rail/sea modes.

3. Report to the Minister on these matters by 30 June 1979.

APPENDIX 2 - ESTIMATION OF THE SYSTEMATIC RISK COMPONENT OF THE RETURN ON EQUITY FOR FREIGHT FORWARDING COMPANIES

The theory underlying the Capital Asset Pricing Model can be found in texts such as C.A. D'Ambrosio, Principles of Modern Investments, Chicago SRA, 1976 and E. Fama and M. Miller, The Theory of Finance, New York, Holt, Rienehart and Winston, 1972. The expected rate of return on the ith security $E(\tilde{R}_i)$ can be expressed as the sum of the riskless interest rate, R_f, plus the difference between the expected return on the entire market portfolio of assets $E(\tilde{R}_m)$ and the riskless rate weighted by the appropriate β_i risk factor.

$$E(\tilde{R}_i) = R_f + (E(\tilde{R}_m) - R_f)\ \beta_i; \quad i = 1, \ldots, n$$

$\beta_i = \dfrac{\overline{cov}\ (\tilde{R}_i, \tilde{R}_j)}{\sigma^2(\tilde{R}_m)}$ is the ratio of the average covariance between the rate of return of the ith security and all other securities to the variance of the market portfolio. It is a measure of the association between the ith security and the market as a whole. It is therefore a measure of the systematic risk. Investors can escape the non-systematic portion of risk by not 'placing all their eggs in one basket', i.e. by holding a diversified portfolio of assets. The average value of β taken over all assets is unity.

Professor Robert Officer[1] has estimated the rate of return on the market portfolio, $\tilde{R}_m$, for equities quoted on the stock exchange using the Brown Data File for the period 1958-73 using monthly data and this was updated using the State Actuaries Accumulation Index. The relevant period for the present study is 1971-1978 for which R_m = 14.82 per cent. The market yield on 10 year non-

(1) R.R. Officer, 'Estimation of the Cost of Capital for Shell Australia Limited and its Subsidiary Companies', Evidence presented to the 1979 Shell inquiry by the Prices Justification Tribunal on behalf of Shell p.20.

rebateable bonds as at 30 June over the same period is 8.14 per cent so that the risk premium on the equity market as a whole is the difference of 6.68 per cent. Appendix Table A2.1 sets out the estimated β_i coefficients for the five companies covered by the study. The risk premium for the ith security is then computed as

$$R_i - R_f = \beta_i (R_m - R_f) = 6.68 \beta_i.$$

This risk premium is then added to the individual year values of the riskless rate to obtain the supply price of capital given in the Table.

APPENDIX TABLE A2.1 - ESTIMATED VALUES OF BETA COEFFICIENTS

	β_i	Standard Deviation	t value[(a)]	Months[(b)]	Ending
Ansett	0.782	0.146	-1.495	191	Dec. 73
Brambles	1.191	0.164	1.167	191	Dec. 73
Fleetways	0.743	0.233	-1.102	104	Dec. 73
Mayne Nickless	0.841	0.133	-1.195	191	Dec. 73
T.N.T.	1.618	0.207	2.987	143	Dec. 73

(a) The t statistic is designed to test the hypothesis that β_i differs from the mean value of unity.
(b) Number of observations.
Source: Computed by Robert Officer, Professor of Finance, Monash University using a tape compiled by Professor Phillip Brown, Australian Graduate School of Management, University of NSW.

APPENDIX 3 - PRICE ELASTICITY FOR INTER-CAPITAL ROAD FREIGHT

THEORETICAL MODEL

In the model used we assume that, while freight forwarders may consider it in their interests to shift from one transport mode to another as relative prices change, there are costs associated with changes in mode.

Let T_t^* be the desired amount of freight to be transported from one city to another by road in period t. The freight forwarder incurs costs, C_1, arising from the fact that the actual amount transported by road, T_t, differs from the desired amount. We model such disequilibrium costs as:

$$(1) \quad C_1 = \alpha(\ln T_t - \ln T_t^*)^2.$$

The freight forwarder also incurs 'adjustment' costs which are related to the degree to which the volume of goods transported by road changes from one period to the next. We model these costs, C_2, as:

$$(2) \quad C_2 = \beta(\ln T_t - \ln T_{t-1})^2.$$

Thus a decision to change modes in period t as against period t-1 is expected to result in higher adjustment costs but may mean that the costs of being out of equilibrium, C_1, are reduced.

Total costs, C, incurred (i.e. adjustment plus disequilibrium costs) can be obtained from summing equations (1) and (2).

$$(3) \quad C = \alpha(\ln T_t - \ln T_t^*)^2 + \beta(\ln T_t - \ln T_{t-1})^2.$$

Minimising total cost by setting $\delta C/\delta T_t$ equal to zero gives

(4) $\ln T_t - \ln T_{t-1} = \lambda(\ln T_t^* - \ln T_{t-1})$

where $\lambda = \alpha/(\alpha + \beta)$.

Since $\alpha > 0$ and $\beta > 0$, λ must be such that $0 < \lambda < 1$.

The desired amount of freight shipped is modelled as

(5) $\ln T_t^* = -\theta_1 \ln RD_t/RW_t + \theta_2 \ln y_t + \theta_3 J + \theta_4 S + \theta_5$

where RD is an index of road freight charges, RW represents rail freight charges, y is an index of real income and J and S are seasonal dummies for the June and September quarters to take account of the relatively higher volume of freight shipped in those quarters.

Substituting (5) into (4) gives

(6) $\ln T_t = -\lambda\theta_1 \ln RD_t/RW_t + \lambda\theta_2 \ln Y + \lambda\theta_3 J + \lambda\theta_4 S + (1-\lambda) \ln T_{t-1} + \lambda\theta_5$

which is the reduced form equation to be estimated empirically where all the variables included are observable.

EMPIRICAL ESTIMATION

Two reduced form equations were estimated. The first equation has as the dependent variable the quantity of goods shipped by road between Sydney and Melbourne whilst the second equation relates to the quantity of goods consigned between four State capital city pairs.

The index for road freight used was based on published freight forwarders' rates for moving a 10 000 kg consignment by road from Melbourne to Sydney. The rail freight rate used was an index measuring the rate charged by the Victorian Railways to freight

forwarders for shipping goods from Melbourne to Sydney. The income series used was real gross domestic product.

The equations estimated over the period 1971-72 to 1976-77 are shown in Table A3.1.

The equations appear to accord with theory. All coefficients are significant with the expected signs.

In the short-term, the equations imply that a 10 per cent increase in road freight rates relative to rail rates would result in a 3.4 per cent reduction in the quantity of goods transported by road between Melbourne and Sydney. For all inter-capital city routes it would mean a reduction in road freight of 5.5 per cent.

In the long-term a 10 per cent increase in road freight would result in a 7.0 per cent reduction in road freight between Melbourne and Sydney and a 9.0 per cent reduction in road freight over all inter-capital city routes.

TABLE A3.1

$$\ln T_{sm} = \underset{(-2.259)}{-0.3432} \ln RD_t/RW_t + \underset{(4.345)}{1.076} \ln Y_t + \underset{(5.510)}{0.1620} J + \underset{(6.659)}{0.1865} S + \underset{(4.177)}{0.5110} \ln T_{sm_{t-1}} \underset{(-2.592)}{- 3.850}$$

$\bar{R}^2 = 0.8670$ D = -0.333

$$\ln T_{cc} = \underset{(-3.739)}{-0.5538} \ln RD_t/RW_t + \underset{(7.738)}{1.240} \ln Y_t + \underset{(6.151)}{0.1597} J + \underset{(7.032)}{0.1631} S + \underset{(3.519)}{0.3885} \ln T_{cc_{t-1}} \underset{(-2.299)}{- 3.141}$$

$\bar{R}^2 = 0.8906$ D = 0.0466

T_{sm} = tonnes consigned between Sydney and Melbourne.

T_{cc} = tonnes consigned between four city pairs.

D is a Durbin D statistic which is a measure of serial correlation when a lagged dependent variable has been incorporated in the equation. It is measured as a standard normal deviate.

$\bar{R}^2$ is R^2 corrected for degrees of freedom.

't' values shown in brackets.

APPENDIX 4 - COSTS INCURRED BY THE RAILWAYS IN PROVIDING CONTAINER SERVICES BETWEEN SYDNEY AND MELBOURNE

The costs presented below are estimates of the long term marginal costs of providing a rail based container service between Sydney and Melbourne.

The estimates are based on the best information available to the Bureau of Transport Economics at the time of preparation of this Report. However some of the components of the system are difficult to cost accurately and more accurate cost estimates may be available. Accordingly a detailed cost breakdown is provided to enable the costs to be updated if better information is available.

The cost estimates are presented in Table A4.1. The operation has been divided into a forward leg Melbourne to Sydney and a back leg to illustrate the impact on costs of unbalanced freight flows. All containers on the forward leg are assumed to be full while only 80 per cent on the back leg are loaded. A loaded container is assumed to hold an average of 11.3 tonnes.

The sources of the data used include:

- Bureau of Transport Economics, Mainline Upgrading: Evaluation of a Range of Options for the Melbourne-Sydney Rail Link, AGPS, Canberra, November 1975;

- Bureau of Transport Economics, Railway Freight Operations: Survey of Wagon Utilisation, to be published;

- Bureau of Transport Economics, Regional Freight Centre Study: report in preparation;

- Vic Rail and New South Wales Public Transport Commission annual reports and published timetables.

TABLE A4.1 - RAIL LINE HAUL COSTS FOR A SYDNEY, MELBOURNE CONTAINER SERVICE IN MARCH 1979 DOLLARS

Item	Melbourne-Sydney	Sydney-Melbourne
Capital		
. locomotive	450	450
. wagons	735	735
. guards van	18	18
. containers	326	326
. gantry	113	113
Maintenance		
. locomotive	1398	1398
. wagons	566	497
. guards van	28	28
. track	224	202
. containers	143	112
Fuel	929	839
Locomotive crew	1473	1473
Marshalling	280	280
Gantry operation & maintenance	229	229
Total Cost Per Train ($)	6912	6700
No full containers	42	33
No empty containers	0	9
Net tonnes excluding containers	475	373

Cost estimates are for March, 1979. The CPI has been used to update earlier cost information.

Route Details

	Time (hours)	Distance (kms)
Melbourne Albury	5	311
Albury Sydney	11	652
Detention Albury	1	-
TOTAL	17	963

Train Configuration

- 2 1491 kW locomotives between Sydney and Albury
- 1 1491 kW locomotive between Albury and Melbourne
- 14 SKX wagons
- 1 brake van
- 42 containers

Locomotives (1491 kW)

- Weight 114 tonnes
- Capital cost $750 000
- Life 22.5 years
- Operates 5 100 hours per year
- Maintenance cost of $1.01/km in New South Wales and $0.26/km in Victoria

Wagons (SKX)

- Tare 20 tonnes
- Cycle time[1] 3.1 days and usable 260 days per year

(1) The cycle time is here defined as the average time between successive loadings of the wagon. The cycle time used has been for BCX wagons, as these are the most commonly used on the Melbourne Sydney run.

- Capital cost $40 000
- Life of 25 years
- Maintenance cost of $0.70 per 1000 gross tonne km of trailing load

Guards van

- Tare 24 tonnes
- Capital cost $35 000
- Life 22.5 years
- Operates 3 648 hours per year
- Maintenance cost of $0.029 per km

Gantry

- Capital cost $1 000 000 per unit
- Life 22.5 years
- Operates 260 days per year for 24 hours a day
- Operating, maintenance and power cost $37 per hour

Containers

- Tare weight 2 tonnes
- Average net load 11.3 tonnes
- Cycle time 3.1 days over 260 days per year
- Capital cost $4 000
- Life of 10 years
- Maintenance cost of $3.40 per loaded trip

Load

- Each SKX wagon carries 3 containers
- A fully loaded SKX wagon carries an average 40 tonnes
- A SKX wagon carrying empty containers is carrying 6 tonnes
- From Melbourne to Sydney the 14 SKX wagons are fully loaded
- From Sydney to Melbourne, 11 wagons are fully loaded (33 full containers) and 3 are carrying empty containers (9 containers).

TABLE A4.2 - CAPITAL COSTS FOR RAIL CONTAINER SERVICE

Equipment	Replacement Cost/Unit ($)	Life (Years)	Cost /Annum ($)	Hours Utilised /Annum	Cost /Hour ($)	Time /Unit /Trip (hrs)	Cycles /Annum	Capital Cost/Unit /Trip	Units Required /Trip	Capital Cost /Trip ($)
1491 kW loco NSW	750 000	22.5	85 000	5 100	16.66	11		183.3	2	367
1491 kW loco Vic	750 000	22.5	85 000	5 100	16.66	5		83.3	1	83
Guards van	35 000	22.5	3 964	3 648	1.09	17		18.5	1	18
Wagon SKX	40 000	25.0	4 407				84	52.5	14	735
Containers	4 000	10.0	651				84	7.75	42	326
Gantry	1 000 000	22.5	113 300	6 240	18.16	3.1		56.3	2	113

Train weight in tonnes

		Trailing load	Locomotives	Total train weight
VIC	Melbourne Albury	864	114	978
NSW	Albury Sydney	864	228	1092
NSW	Sydney Albury	762	228	990
VIC	Albury Melbourne	762	114	876

The cost of capital has been taken as an annuity over the life of the asset valued at replacement cost and using a discount rate of 10 per cent per annum. The capital costs are detailed in Table A4.2.

Rail maintenance costs are traditionally difficult to estimate accurately and correctly allocate to an operation. The aim when generating the maintenance costs was to calculate the costs incurred by providing the services over a long period, given existing cost structures, the total fleet composition, the relative performance of equipment used and the cost data available.

The maintenance costs are detailed in Table A4.3.

Fuel costs given in Table A4.3 have been calculated on the basis of:

- a cost of $0.15 per litre
- a consumption of 6.1 litres per 1000 gross tonne km of train weight.

Other costs are calculated as follows:

Locomotive crew

- Assume no loading for double heading
- $1.53 per train km travelled in New South Wales

- Take Victoria to be the same
- Distance 963 km
- Cost per trip $1473

Marshalling

- $10 per wagon per end
- 14 wagons per train
- Assume no marshalling at Albury
- Cost per trip $280

Gantry: Operations and maintenance

- Assume 24 hour operation 260 days
- Cost $233 000
- Cost per hour $37
- One train occupies gantry for 3.1 hours at each end
- Cost per trip $229.

TABLE A4.3 - MAINTENANCE AND FUEL COSTS FOR RAIL CONTAINER SERVICE

Equipment	State or Direction	Maintenance Cost/Unit ($)	No of Units	Average Gross Weight/Unit (Tonnes)	km	Cost Per Trip ($)
Locomotive	NSW	1.01/km	2		652	1317
Locomotive	Vic	0.26/km	1		311	81
Guards van		0.029/km	1		963	28
Wagons		0.70/1000 g.t. km				
	M-S		14	60.0	963	566
	S-M		14	52.7	963	497
Track		0.22/1000 g.t. km				
	loco NSW		2	114	652	33
	loco Vic		1	114	311	8
	trailing load M-S			864	963	183
	trailing load S-M			762	963	161
Containers		3.40/loaded container				
	M-S		42			143
	S-M		33			112
Fuel		0.915/1000 g.t. km				
	loco NSW		2	114	652	136
	loco Vic		1	114	311	32
	trailing load M-S			864	863	761
	trailing load S-M			762	963	671

APPENDIX 5 - THE EFFECTS OF INCREASES IN TRANSPORT COSTS ON CONSUMER PRICES[a]

1. INTRODUCTION

This attachment provides estimates of the increase in consumer prices resulting from an initial increase in the basic values price of road and rail transport under varying assumptions about the level of wage indexation. It represents an application of a general equilibrium model of the Australian economy which has been developed through the joint efforts of a number of Commonwealth agencies.

2. THE MODEL

The analysis is carried out using the ORANI-78 version of the ORANI model. That version of the model is described in a recent paper by Vincent, Dixon, Parmenter and Sams.[1] ORANI-78 differs from the earlier ORANI model[2] in three respects. First, the computing solution algorithm has been revised to provide more flexibility in the uses of the model and to make the computer output easier to interpret. Second, some minor revisions have been made to the data base, certain parameters and the treatment of indirect taxes. Thirdly, and perhaps more importantly from the point of view of users, the agricultural sector is treated in a different manner by allowing for joint production possibilities and regional technologies in several agricultural industries.

(a) This appendix was prepared by Mr A. Lawson, Industries Assistance Commission.

(1) Vincent, D.P., P.B. Dixon, B.R. Parmenter and D.C. Sams, "The Short Term Effect of Oil Price Increases on the Australian Economy with Special Reference to the Agricultural Sector", IMPACT General Paper No. G-17, February 1979.

(2) Dixon, Peter B., 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 (Canberra: AGPS, 1977). (Hereafter referred to as Volume 2.)

3. METHODOLOGY

The paper by Vincent et al. concentrated on the latter aspect of the revised model but did so in the context of simulating the short run effects of an increase in the basic values price of domestically produced petroleum products. In this paper exactly the same methodology is used to analyse the effects of increases in the basic values prices of road and rail transport. Consequently the assumptions underlying these simulations are exactly the same as in the paper by Vincent et al.[1] and they are not repeated here.

The increases in the basic values prices of road and rail transport are generated by an increase in their 'other costs'. Other costs accounted for 21.2 per cent and 3.1 per cent of the total costs of industries; 51.01, Road Transport and 52.01, Rail Transport, respectively, in 1968-69. Hence for the basic values price of all output produced by these two industries to increase by 10 per cent, their 'other costs' would have to increase by 47.2 per cent and 322.6 per cent, respectively. That however would only be the initial increase in their prices. Other industries would now have to pay more for transporting their products and, to the extent that they are able to pass on these cost increases, they will raise their prices.[2,3] In addition if these price increases flow on into consumer prices and wage indexation continues, then this will further increase all industries' costs and hence their prices.

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(1) Vincent et al., op.cit., section 4.

(2) Note that here we are referring to the price paid by users, i.e., purchasers' price. This differs from the ex-factory or basic values price by the extent of distribution costs (mark-ups or margins) and commodity taxes less subsidies. The distinction is important in this paper since most of the output of the road and rail transport industries represent mark-ups rather than direct sales to users.

(3) Not all industries are able to do so and some industries which export a lot of their output may have to lower their basic prices if the cost of distributing their goods increases so that they can still compete in overseas markets. See Vincent et al., p. 39.

Thus under full wage indexation ORANI-78 gives the result that the initial 10 per cent increase in the basic values price of road transport results in a final 10.73 per cent increase. In the results reported in this paper it is assumed that 'other costs' increase by a percentage (44.0 and 313.7 per cent, respectively) such that under full wage indexation the final increases in the basic values prices of road and rail transport are both 10 per cent.

The manner in which these values are obtained from an ORANI simulation involves first choosing the appropriate sets of exogenous and endogenous variables for the particular experiment. The model is then solved. The solution is a matrix of elasticities showing the percentage change in an endogenous variable with respect to a percentage change in an exogenous variable. In this experiment the endogenous variables of initial interest are the basic values prices of road and rail transport and the exogenous variables are 'other costs' for those two industries. Once the two relevant elasticities have been obtained (i.e., the elasticities of the basic values prices of road and rail transport, respectively, with respect to an increase in their 'other costs') we can calculate the appropriate increases in 'other costs' required to generate the 10 per cent final increases in the basic values prices of both industries. Next we specify the particular values of the exogenous variables of interest, including 'other costs', purchased by road and rail transport, and premultiply this vector by the matrix of elasticities to obtain the values of the percentage changes in all the endogenous variables.

In addition full wage indexation is assumed. This is because we could then use the ORANI-78 solution for the oil price rise simulation. (The only difference between the two simulations is in the specification of the values of the exogenous variables. The set of exogenous variables is the same for each simulation). Otherwise the model would have to be rerun since before it can be solved the wage indexing parameter must be specified - it had a value of 1 in the oil price rise simulation, which means that

real wages are fixed. In terms of explaining the results it would have been preferable to start from a bench mark of zero wage flows ons and then later allow for varying degrees of wage indexation, but as will be shown later we can start at the other extreme with full indexation and work back to the zero indexation case.

4. RESULTS

The increases in the prices of road and/or rail transport will have differential impacts on all industry outputs, prices, rates of return, employment by occupation, exports, imports, the balance of trade, the indexes of consumer and investment prices, etc. All of these impacts are shown in the printouts of the results of the simulations and are available if required[1]. The effects on some of the macro variables are shown in Table 1. The combined effect of increases in both rail and road transport prices is obtained by summing the results for the two separate increases[2].

In interpreting the results the underlying assumptions of the ORANI model should be borne in mind. In the context of this particular experiment one important set of assumptions is concerned with the substitution between different products. In certain markets rail transport may be a close substitute for road transport.

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(1) The ORANI model has a very large number of variables. To reduce computing costs most of these are substituted out before solving the model. The standard printout only provides results for a few sets of variables. The values of all other endogenous variables could of course be derived by back substitution. A facility exists in the print program to provide results for some of the more important of these variables.

(2) Note however that in combination the prices of both rail and road transport increase by more than 10 per cent. The road transport price increase raises the price of rail transport by 0.8 per cent, while increases in rail transport prices cause the price of road transport to increase by 0.2 per cent.

ORANI however does not allow any substitution except between goods and services sold to households[1]. Most of the output of the road and rail transport industries represents mark-ups associated distributing goods between producers and users. In ORANI these various mark-ups are assumed to be a constant proportion of commodity flows[2], e.g., 100 units of steel sold to export markets requires 10 units of road transport services to get it to the ports.

Table 1 shows that the relative effects of the two price increases vary from variable to variable. Thus road transport price increases have more than twice the impact of rail transport increases on the index of investment prices, but only a 50 per cent greater effect on aggregate employment (measured in hours worked). To explain these differences it is necessary to examine carefully the structure of each industry and their relative usage, both directly and indirectly, of road and rail transport. The explanation of the overall differences is of course that in 1968-69 the total value of sales of road transport was over 70 per cent greater than that of rail transport and hence an increase in road transport prices will have a greater overall effect on the economy.

In the remainder of this paper the effects on the ORANI index of consumer prices (denoted CPI but not to be confused with the official consumer price index) are considered in more detail. The ORANI CPI is given by equation 13.1 in Dixon, Parmenter, Ryland and Sutton:

$$\xi^{(3)} = \sum_{s=1}^{2} \sum_{i=1}^{g} W_{is}^{(3)} P_{is}^{(3)} + W_{(g+1)}^{(3)} P_{(g+1)}^{(3)},$$

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(1) Substitution between imported and domestic sources of the same product is allowed but is not relevant in this case, since there are no imported road and rail transport.
(2) Dixon, Parmenter, Ryland and Sutton, op.cit., section 8.

where $\xi^{(3)}$ is the percentage change in the overall level of consumer prices, $W_{is}^{(3)}$ and $W_{(g+1)}^{(3)}$ are the base period shares of aggregate consumer spending devoted to good i from source s and to non-competitive imports, and $P_{is}^{(3)}$ and $P_{(g+1)}^{(3)}$ are the purchasers' prices paid by consumers for those goods. The base period shares are calculated from the ORANI input-output data base, while the purchasers' prices are endogenous variables whose values are determined within the ORANI model.

The 10 per cent final increase in the basic values price of road transport increased the ORANI CPI by 0.90 per cent. The CPI is affected in three ways:

(a) Some road transport services (e.g., coach travel) are purchased directly by consumers. In 1968-69 these direct purchases amounted to $232.2 million out of total consumption expenditure of $16308.9 million[1]. Because of this a 10 per cent increase in road transport charges would directly increase the ORANI CPI by about 0.14 per cent.

(b) Consumers pay a mark-up, including the costs of road transport services, on the basic values prices of their purchases of goods and services. The road transport mark-up component of their consumption expenditure amounted to $166.5 million in 1968-69. This effect would produce a 0.10 per cent increase in the CPI.

(c) The major effect is indirectly via increases in the basic values of output in all other industries as a result of the initial increase in the price of road transport, the flow on into other prices and, finally, the flow on via full wage indexation. As we shall see the flow on due to wage indexation is the most important factor of all.

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(1) In ORANI, sales by final buyers to consumers, and the margins on these sales, have been deleted. Hence total consumption expenditure is less than the value shown in the published input-output tables.

So far we have assumed that wages are 100 per cent indexed to changes in the ORANI consumer price index. It is however possible to consider the effects with any level of wage indexation. The methodology for this is set out in a paper by Dixon, Parmenter and Powell.(1)

Suppose that we want to know the final effect on the ORANI consumer price index with 70 per cent wage indexation. Then, following Dixon et al, we have:

$$\xi^{(3)}_{70} = \xi^{(3)}_{100} + \eta_{\xi^{(3)}_{(-w)}} \times 0.3 \times \xi^{(3)}_{70}$$

i.e.

$$\xi^{(3)}_{70} = \xi^{(3)}_{100} \; / \; 1 - 0.3 \times \eta_{\xi^{(3)}_{(-w)}}$$

We already know $\xi^{(3)}_{100}$ (the effects on the CPI with 100 per cent wage indexation). $\eta_{\xi(3)}$ is the elasticity of the CPI with respect to a reduction in real wages. This can be readily obtained. One of the sets of exogenous variables for this experiment is $f_{(g+2)1m}$, the wage shift variables. If we set the value of these variables to -1 then we can use our existing solution to the ORANI-78 model to obtain the required elasticity. A one per cent reduction in real wages results in a 1.547 per cent decrease in the ORANI CPI. Hence,

$$\xi^{(3)}_{70} = 0.895 \; / \; (1 - 0.3 \times -1.547) = 0.61.$$

Similarly for zero wage indexation we get,

$$\xi^{(3)}_{0} = 0.895 \; / \; (1 - 1 \times - 1.547) = 0.35.$$

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(1) Dixon, Peter B., B.R. Parmenter and Alan A. Powell, "Structural Adjustment and the Macroeconomy", IMPACT General Paper, No. G-18, February 1979, pp.8-9.

Table 2 shows the effects on the ORANI CPI of increases in the basic values prices of road and rail transport assuming zero, 70 per cent and full wage indexation. As can be seen the CPI increase is much less with no wage flow on. The final increases in the basic values prices of road and rail transport were calculated using the formula shown in Dixon et.al. With 70 per cent wage indexation the increase in the basic values price of road transport, p_{bv}, is given by

$$p_{bv_{70}} = p_{bv_{100}} + \eta_{p_{bv}(-w)} \times (0.3) \times (\xi_{70}^{(3)})$$

$$= 10.00 + (-1.622) \times (0.3) \times (0.609) = 9.7.$$

$\eta_{p_{bv}(-w)}$ is the elasticity of the basic values price of road transport with respect to a one per cent reduction in real wages. Its value can be calculated at the same time as $\eta_{\xi_{(-w)}^{(3)}}$ is obtained. $\eta_{\xi_{70}^{(3)}}$ has already been obtained above.

The specific formula given above can be generalised to provide results for any variable for any degree of wage indexation. The general formula is

$$\chi_\alpha = \chi_{100} + \eta_{\xi_{(-w)}} (1 - \alpha)\xi_\alpha^{(3)},$$

where χ_{100} is the ORANI result for variable χ with 100 per cent wage indexation, χ_α is the required result for the same variable with α per cent wage indexation, $\xi_\alpha^{(3)}$ is the ORANI CPI with α per cent wage indexation and $\eta_{\xi_{(-w)}}$ is the elasticity of variable χ with respect to a reduction in real wages. One example from Table 1 is used to illustrate the formula. With 70 per cent wage indexation real gross national product decreases by 0.18 per cent:

$$GNP_{70} = -0.262 + 0.449 \times (0.3) \times (0.609) = 0.18$$

Users of the above formula are cautioned to be aware of rounding errors. Such calculations are probably best left to the computer.

5. CONCLUDING REMARKS

Attention is drawn to the concluding remarks in Vincent et al. The simulations generate short run (1-2 year) effects and industry capital stocks do not change. A slack labour market is assumed and real domestic absorption is fixed (but not real gross national product which includes the balance of trade). Substitution between different types of transport is not allowed.

The simulations show that the critical variable in determining the effect of increased transport changes on the ORANI CPI is the extent of wage indexation. With full wage indexation the CPI increase is more than 150 per cent greater than if there is no wage flow on.